# Finding Causes (Environmental Carcinogens)

- Sources of Information
  - Clinical anecdotes
  - Lab *In vitro* mechanistic biology
  - Animal testing
  - Epidemiological Patterns

# All tools are imperfect

- Clinical and lab observations not definitive
  - Rarely well controlled or statistically sound
  - Human repair mechanisms are unaccounted for

# All tools are imperfect

- Animals are not like people
  - – Don’t live long enough for carcinogens to act
  - – Have different anatomy and physiology
  - – No clear basis for extrapolating results

# All tools are imperfect

- Can’t do experiments
- “Natural” epidemiologic observations are hard
  - Opportunities with enough exposure rare
  - Multiple exposures usual
  - Dosage approximate
  - Like democracy, the worst except for the others
  - Must exclude chance, bias, other explanations

# Formal Criteria designating carcinogens are used to guide regulation

- THE MODEL CRITERIA:
  - International Agency for Cancer Research
  - Definite, Probable, Possible, Unclassifiable
- EPA, FDA, NTP
- CANADA, OTHERCOUNTRIES,STATES
- CALIFORNIA EPA: PROPOSITION 65

# Our knowledge is incomplete

- Every kind of cancer has unique causes
- A few exposures cause multiple kinds
  - Smoking
  - Ionizing radiation
  - Chemotherapeutic chemicals
- Every case has multiple causes
- Our ignorance varies by type
- An unexplained excess may give a lead

# DEFINITE ENVIRONMENTAL CARCINOGENS

>20 INDUSTRIAL CHEMICALS; >15 PROCESSES

>15 INORGANIC PRODUCTS, >15 METALS/ MINERALS

>30 PHARMACOLOGIC PRODUCTS

10 FOOD/DRINKS/HABITS

10 INFECTIOUS AGENTS

5 FORMS OF RADIATION

3 INSECTICIDES/HERBICIDES

# Carcinogenic exposures in the workplace Heavy doses

- Airborne arsenic, asbestos, hexavalent chromium
- Airborne asbestos
- Other heavy metal dusts: e.g. nickel
- Products of combustion: soot, diesel exhaust
- Industrial dioxins, PCB’s PBB’s, vinyl chloride
- Toxic gas and mists: strong acids, mustard gas
- Refinery products like benzene and benzidene
- Solvents: carbon tetrachloride, TCE,
- Agricultural Pesticides: arsenic, chlordane, dieldrin

# CHRONIC LIFESTYLE CARCINOGENS

– TOBACCO FOR SMOKING OR CHEWING

– ALCOHOL

– SOLAR RADIATION

– DRUGS AND HORMONES

– DIETARY PREFERENCES (WELL-DONE MEAT)

– OBESITY/SEDENTARY LIFESTYLE

– PHYSIOLOGIC OR THERAPEUTIC HORMONES

# LIFESTYLE CARCINOGENS

- CONTACT WITH INFECTIOUS AGENTS
  - HIV
  - Papilloma virus,
  - Hepatitis B,
  - Helicobacter pylori
  - Parasitic flukes

# What Carcinogens are in the Residential Environment?

- Cumulative Airborne Carcinogens?
- Cumulative Waterborne Carcinogens?
- Acute Airborne Carcinogens?
- Airborne carcinogenic viruses?

# CUMULATIVE ENVIRONMENTAL CARCINOGENS

- AIRBORNE POLYCYCLIC HYDROCARBONS
  - FROM LOCAL SOURCES OF COMBUSTION
  - DIESEL EXHAUST FROM TRUCKS, SHIPS, ETC
  - AIRBORNE SOLID PARTICLES
- AIRBORNE ASBESTOS
- WATERBORNE ARSENIC

# Arsenic

- Many industrial and agricultural uses
- When ingested, skin, bladder, GI cancers
- When inhaled, lung cancer
- No history of residential cases from inhalation
- High water levels in some US areas
  – No evidence of increased cancer rates

# AIRBORNE (PERSON TO PERSON) INFECTIOUS AGENTS?

RARE UNKNOWN LEUKEMIA VIRUS?

# AIRBORNE CHEMICAL CARCINOGENS FROM INDUSTRY COMMONLY PRESENT IN RESIDENTIAL AIR

- Hexavalent Chromium
- Methylene Chloride
- Benzene
- Trichloroethylene
- Carbon Tetrachloride
- Vinyl Chloride
- Dioxins
- PCB'S, PBB'S

# Airborne Carcinogenic chemicals

- Chemical carcinogens are everywhere
- Doses are very small
- Powerful methods now detect very low doses
- Emissions are widely dispersed
- Carcinogens are heavily diluted
- Residential exposures are miniscule

# Solvents and Pesticides

- Mechanistic evidence suggests cancer risk
- Cancers caused in animals by very high dose
  - Sites do not correspond to human cancers
- Best evidence from those heavily exposed
  - Dry cleaner workers exposed to TCE, carbon tetrachloride
  - Pesticide sprayers exposed to pesticides/herbicides
  - Arsenic, chlordane/heptachlor, dieldrin, methyl bromide
  - Neither commonly exposed to only one chemical
- **NO EVIDENCE TO DATE OF RESIDENTIAL RISK**

# PROBLEM OF DOSE

- Causation usually established in workplaces
- Doses there higher than residential doses
- Federal/State regulation is now fairly effective
- Technology picks up minute doses

# Hexavalent Chromium

- Causes lung cancer
- Single most potent emission in California
- No demonstrated residential cases

# Effect of Industrial exposure to hexavalent chromium:

# Mean level 790 micrograms/cubic meter of air


# Projected effect of Strongest Community Exposure to Hexavalent Chromium

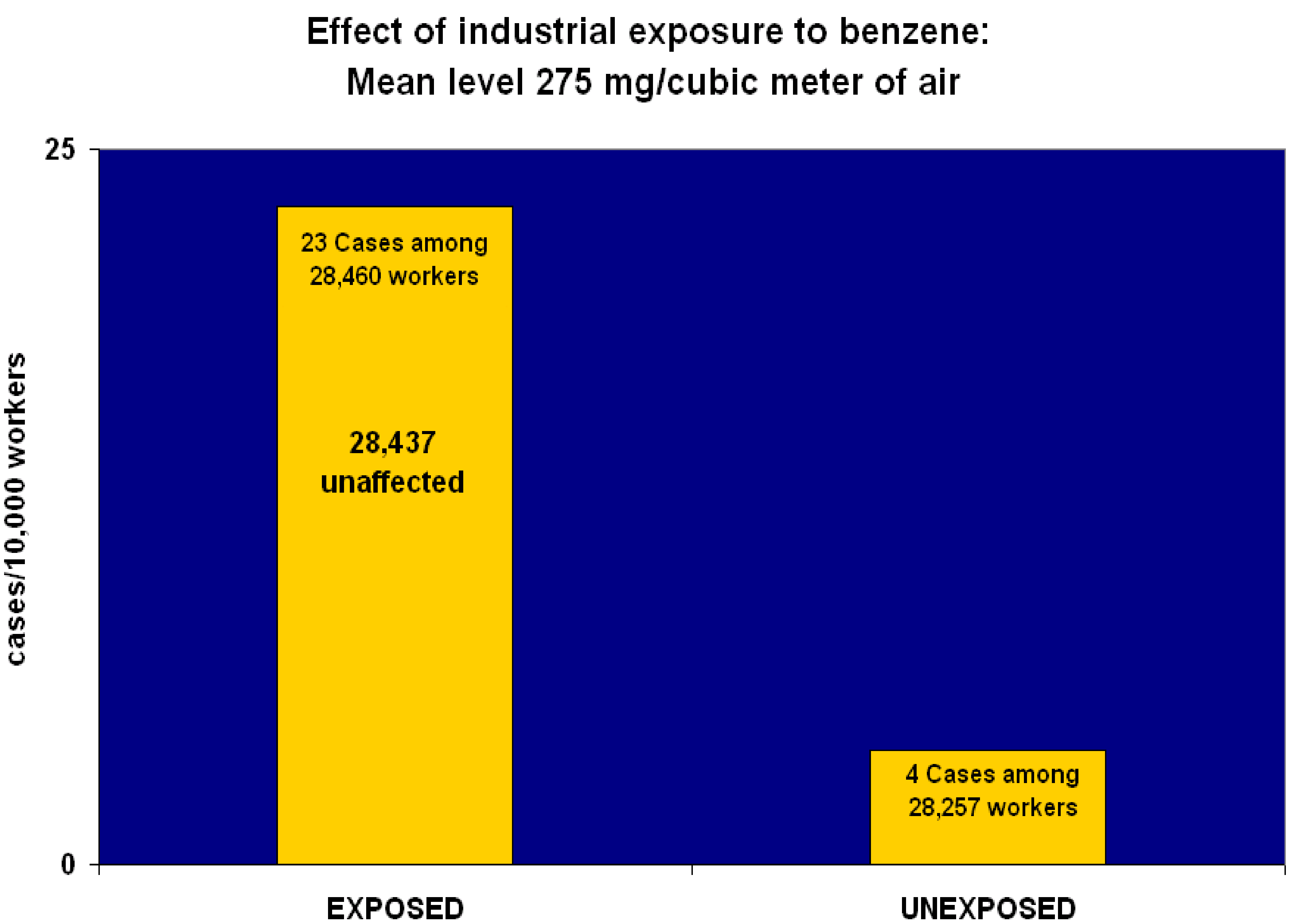
| | Micrograms $chromium^6/m^3$ | Lung cancers /100,000 |
|---|---|---|
| Workplace | 790 | 1700 |
| Community | 0.04 | 0.09 |

Thus exposure at the point of the strongest known emission of carcinogen in California, about one extra case per million would appear (i.e. in the average census tract, one case every 200 years)

# Benzene

- Causes Acute Myelocytic Leukemia

- Component of gasoline
- Storage under gas stations
- Old refinery “tank farms” under housing
- Yet
  – No consistent excess among service station workers
  – No consistent excess among refinery workers


Effect of industrial exposure to benzene:
Mean level 275 mg/cubic meter of air
25
0
cases/10,000 workers
23 Cases among
28,460 workers
28,437
unaffected
4 Cases among
28,257 workers
EXPOSED
UNEXPOSED

# Projected effect of Community Exposure to Benzene

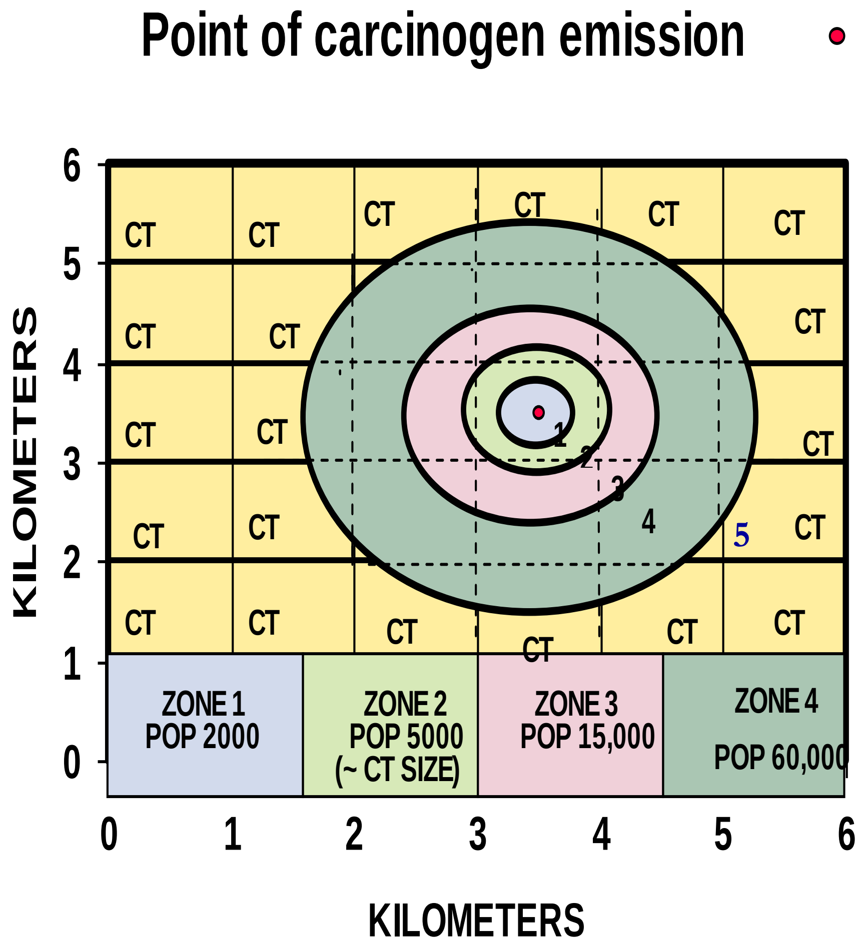
| | Milligrams benzene/$m^3$ | New leukemias /100,000 |
|---|---|---|
| Workplace | 275 | 67 |
| Community | 0.2 | 0.04 |

**Thus exposure to the highest level found in Southern California in 1963 (before current regulations) would produce about one extra case of leukemia per 2.5 million (i.e. in the average census tract, one case every 500 years**

# MORE PROBLEMS WITH DOSE

- Dose-response effects are presumed linear
- Chemicals rapidly disseminate into space
- Dilution is proportional to the square or cube of distance from the emission point
- ANY SUCH CARCINOGEN COULD CAUSE CANCER, BUT NONE WOULD PRODUCE A NOTICABLE EXCESS OVER BACKGROUND

# Dispersion of carcinogen emissions



# Impact of point source emission of a carcinogen known to double risk

| | Population | Distance | Attributable Risk | # Cases |
|---|---|---|---|---|
| At Source | 50 | 0.1 km | 100/100,000 | 0.05 |
| Zone 1 | 2000 | 0.3 km | 11/100,000 | 0.22 |
| Zone 2 | 5000 | 0.5 km | 4/100,000 | 0.20 |
| Zone 3 | 15,000 | 1.0 km | 1/100,000 | 0.15 |
| Zone 4 | 60,000 | 2.0 km | 0.25/100,000 | 0.15 |
| Zone 5 | 120,000 | 3.0 km | 0.10/100,000 | 0.12 |

**Thus, no more than a single additional case would be expected**

# Other Special Concerns

- Electromagnetic Radiation
  - Mobile phones
  - High tension wires
  - Electric blankets
  - Microwave radiation
- No certain causation

# WHAT ENVIRONMENTAL CLUSTERS HAVE OCCURRED?

- No clear residential or local excess has ever been attributed to industrial emission of one of the volatile chemicals

- An occasional case could in theory have been caused, but no excess has ever been identified

# However, there have been Environmental Clusters

- At least two in the US
- Several in the rest of the world
- Many false alarms
- At least one recent concern

# True cluster: Fallon, NV 2000-2001

Acute Lymphoblastic Leukemia

Expected number of cases: 0.3

Observed number of cases: 16

Probably due to a virus introduction

# True Cluster: Libby, MT

- Vermiculite Mining scattered asbestos-containing tailings all over town
- Cases of mesothelioma occurring in local persons

# True clusters: Italy, Greece, New Caledonia

- Asbestos-containing whitewash used to whiten residential buildings
- Excess cases of mesothelioma occurred

# True cluster: Cappadocia, Turkey

- Local stone used to build houses for people and shelter for sheep
- Mesothelioma occurred in both residents and their sheep

# True clusters:
# Taiwan, Chile, Bangladesh, Argentina

- Geologic source of ground water containing high levels of arsenic
- High rate of bladder cancer in consumers

# True cluster: Seveso Italy

- Massive industrial spill of dioxins
- Unexpectedly high number of sarcomas

# True cluster: Areas of Ukraine and Belarus

- Chernobyl nuclear accident
  - Release of radioactive particles
- Thyroid cancer in downwind areas
  - Especially in children

# Untrue "clusters" Love Canal NY, Woburn MA* and Hinkley CA*

- (Subjects of "A Civil Action" and "Erin Brockovich")
- Despite clear evidence of chemical toxins, no increase in cancer frequency has been documented

# Possible LA cluster:

- Excess of squamous Cancers near the port and 710 freeway

# WHAT ARE THE PROBLEMS IN ASSESSING CLUSTERS?

- Demography, not Geography
  - Age, sex, race, ethnicity, lifestyle
  - Income/education, occupation, medical care
- Errors in diagnosis or attribution
- Errors in census estimates
- CHANCE

# Non-environmental “clusters”: Overcounting

- Mixture of different cancers
  - 33% of women, 40% of men over life
- Inclusion of non-cancer conditions
  - Common conditions easily found
- Cancers diagnosed before residence
  - Could not be caused locally
- Cancers occurring after moving out
  - Prevents comparison with registry

# Non-environmental “clusters”: Overdiagnosing

- Changes in Diagnostic technology
  - New, more sensitive test
  - New convenient or cheaper equipment
  - Change in public motivation

# Non-environmental “clusters”

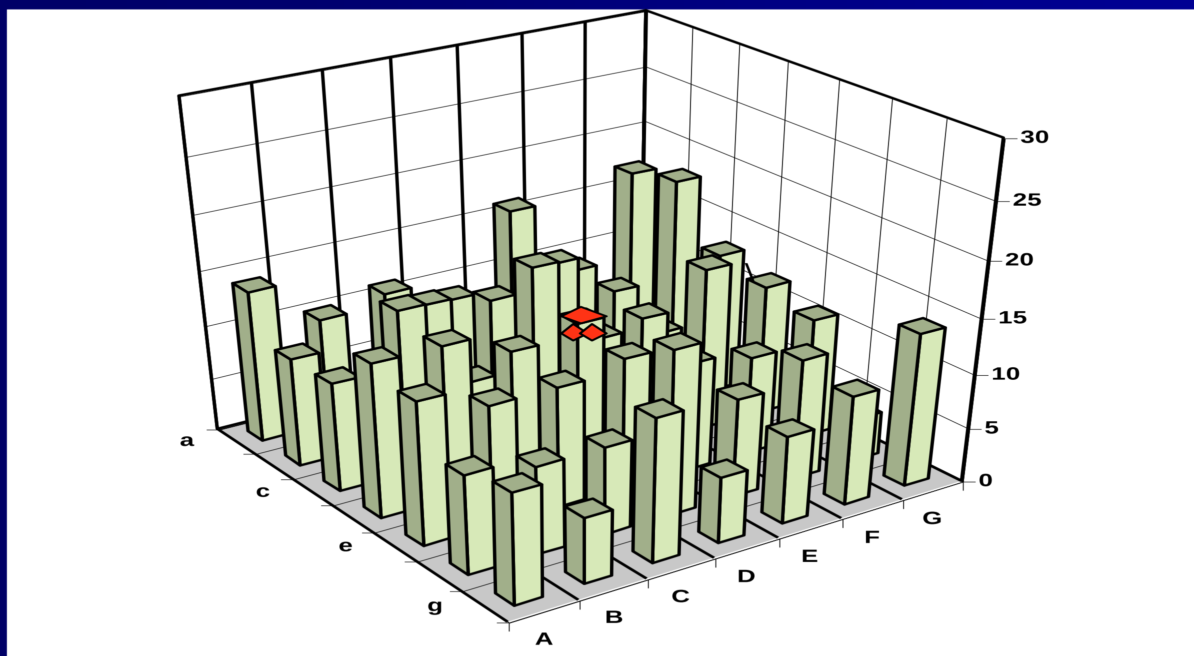
- Errors in the Census Denominator
  - Rapid post-census growth
  - Temporary residency for medical care

# Non-environmental clusters: chance

# Chance has several effects

- Variation in population size at a given time
- Variation in baseline occurrence by chance
- Variable small number of added cases
- Large number of "clusters" from chance

# Relatively small number of cases from emissions

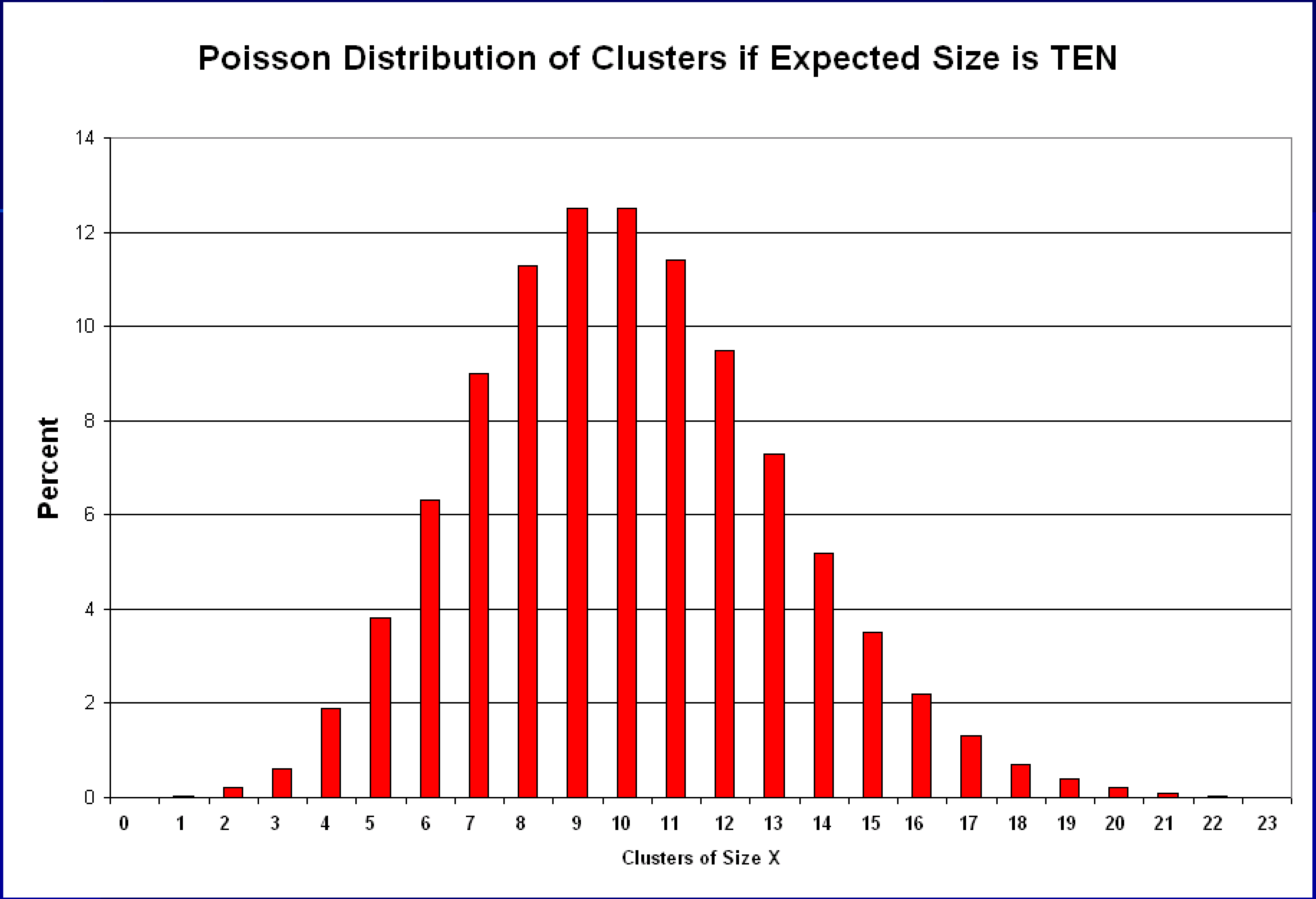


# The number expected rarely appears

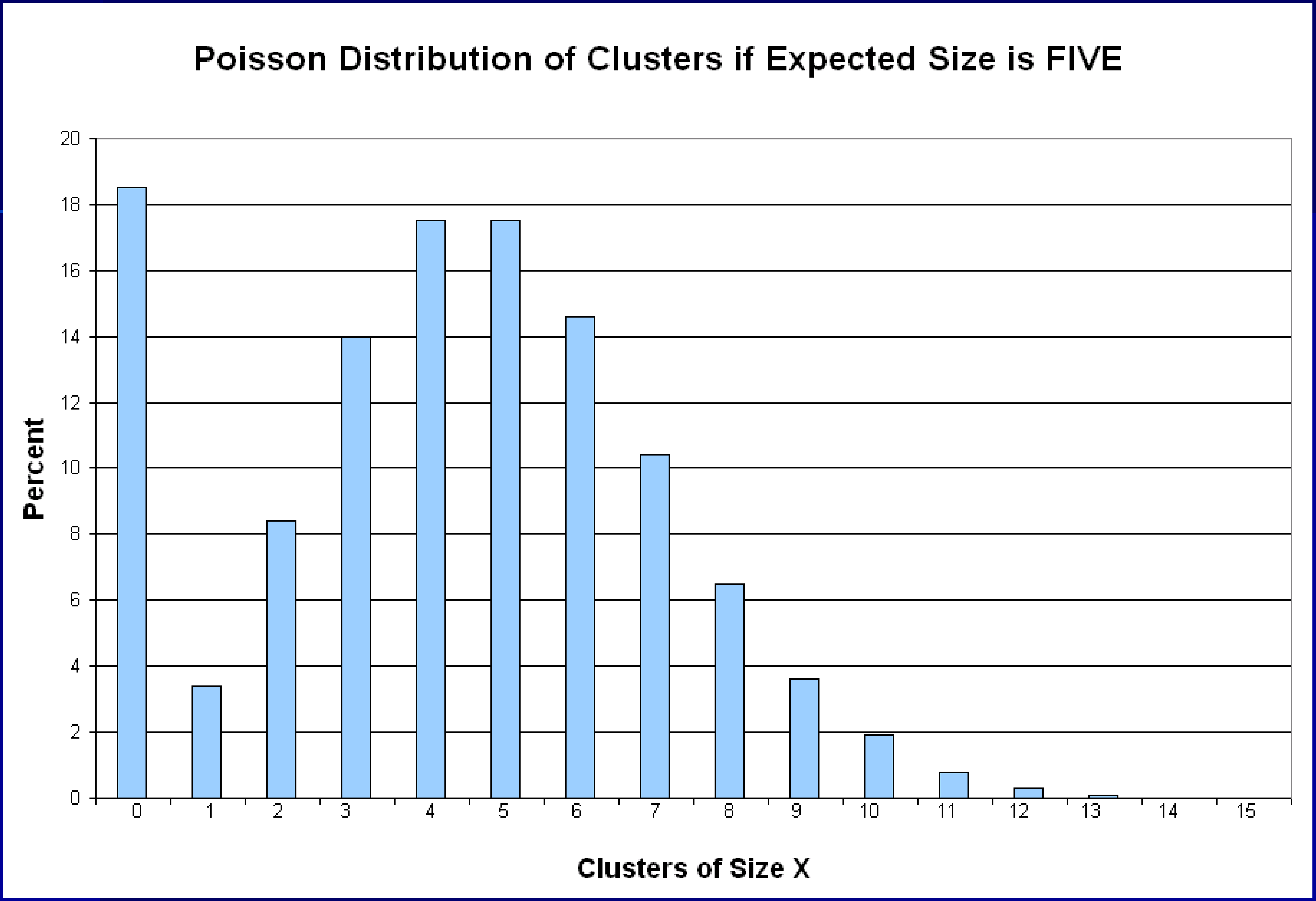
- A toss of two dice, on average, should give a 7
  - Happens only one in 6 tries; otherwise by chance half willl be higher, half lower
  - Thus when x cases are expected, very often more occur by chance

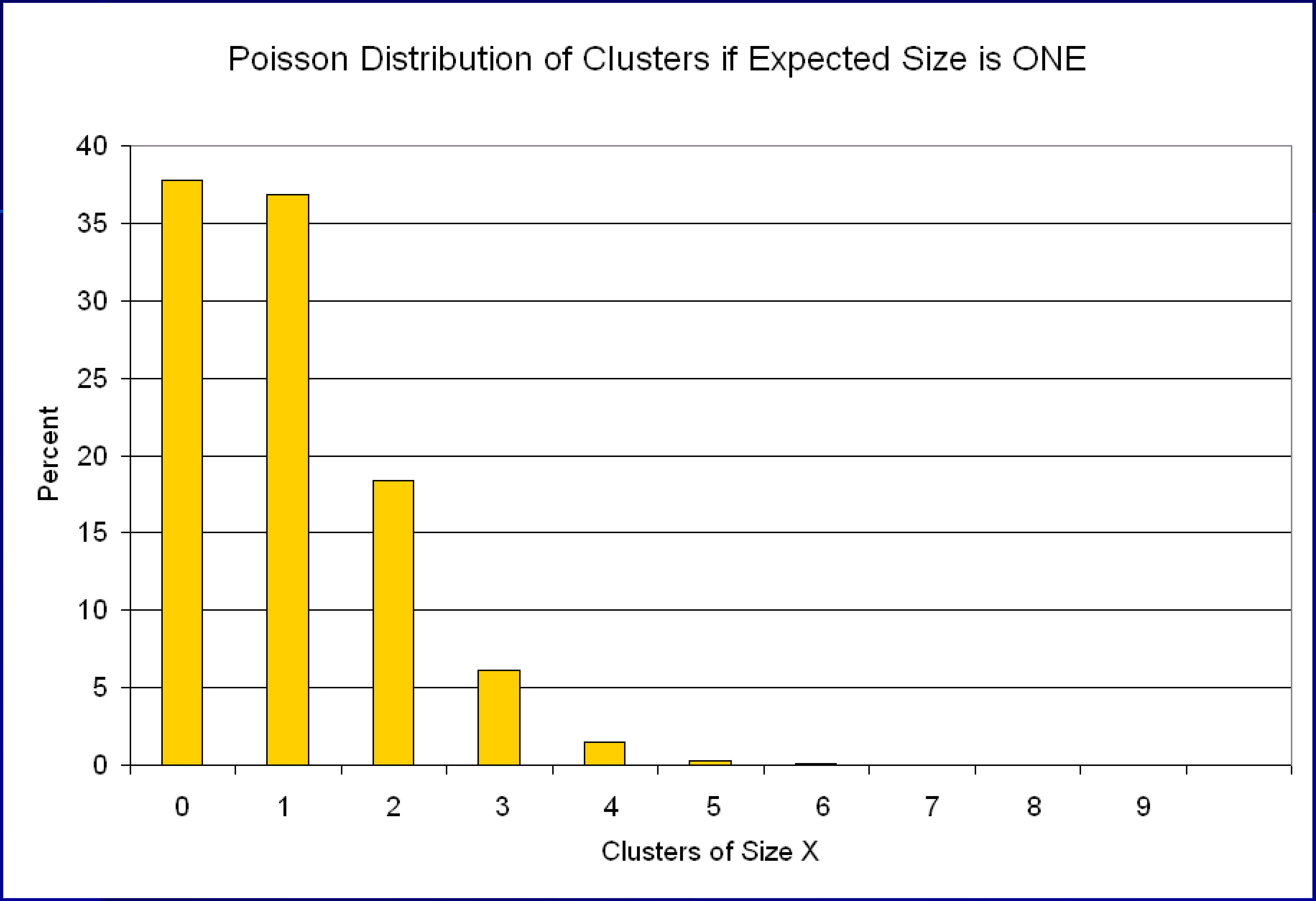
# The number expected rarely appears

- Especially if the expected number is small
  - A specific card from a deck should appear twice out of 100 separate draws
  - If 100 separate sets of 100 draws are repeated, the card will appear twice in only 59%.
  - In 9% the card will not be drawn at all, and in 32% it will appear 3 or more times.

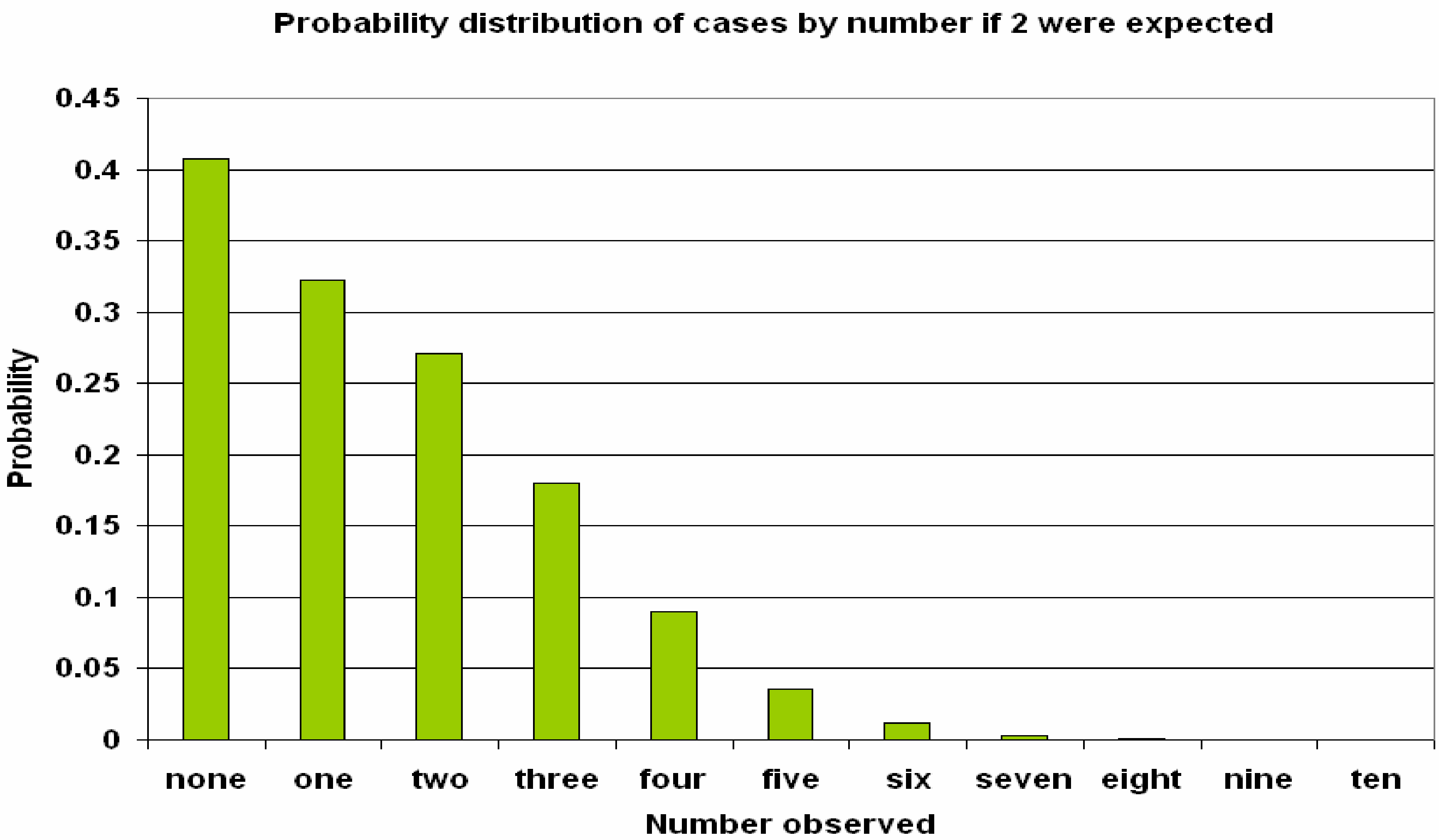


Poisson Distribution of Clusters if Expected Size is TEN
Percent
0
2
4
6
8
10
12
14
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Clusters of Size X


Poisson Distribution of Clusters if Expected Size is FIVE
Percent
0
2
4
6
8
10
12
14
16
18
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Clusters of Size X


Poisson Distribution of Clusters if Expected Size is ONE
Percent
40
35
30
25
20
15
10
5
0
0
1
2
3
4
5
6
7
8
9
Clusters of Size X

# Distribution of 5-case clusters Poisson distribution



# Multiple comparisons

- The more independent comparisons, the more likely a positive finding by chance alone.

- Special problem: when many alternative hypotheses are obvious
  - Nutrients
  - Occupations
  - Neighborhoods

# The number of comparisons matters

- **When something happens 1% of the time by chance**
  - **If there are 100 neighborhoods, one is usual**
  - **If there are 1000 neighborhoods, there should be 10**
  - **If there are 5000 neighborhoods, there should be 50**
  - **There are a lot more than 5000 neighborhoods**
  - **But, If it happens in your neighborhood, never chance**

Table 3 Look up tables for when there are100 populations of the size as the one perceived to be at risk

Grey/bolded cells are those calling for possible cluster investigation

N.B. If, for example, 350 such populations are thought to exist, multiply Table one by 3.5 and bold those cells showing over 2 "clusters" by chance

| μ | x=1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 63.2 | 26.4 | 8.0 | **1.9** | **0.4** | **0.1** | **0.0** | | | | | | | | |
| 2 | | 59.3 | 32.2 | 14.2 | 5.2 | **1.6** | **0.4** | **0.1** | **0.0** | **0.0** | | | | | |
| 3 | | | 58.4 | 36.0 | 19.2 | 9.1 | 3.4 | **1.2** | **0.4** | **0.1** | **0.0** | **0.0** | | | |
| 4 | | | | 56.6 | 37.1 | 21.5 | 11.1 | 5.1 | **2.1** | **0.8** | **0.3** | **0.1** | **0.0** | **0.0** | |
| 5 | | 100 x $p^{x+>x}$ | | | 55.8 | 38.3 | 23.7 | 13.3 | 6.8 | 3.2 | **1.3** | **0.5** | 0.2 | 0.1 | 0.0 |
| 6 | | | | | | 55.4 | 39.3 | 25.5 | 15.2 | 8.3 | 4.2 | **1.9** | **0.8** | 0.3 | 0.1 |
| 7 | | | | | | | 54.9 | 40.0 | 27.0 | 16.9 | 9.8 | 5.3 | **2.7** | **1.3** | **0.6** |
| 8 | | | | | | | | 54.8 | 40.8 | 28.4 | 18.5 | 11.3 | 6.5 | 3.5 | **1.8** |
| 9 | | Given expected (μ), number of "clusters"size x by chance | | | | | | | 54.3 | 41.1 | 29.2 | 19.5 | 12.2 | 7.2 | 4.0 |
| 10 | | | | | | | | | | 45.3 | 32.8 | 21.4 | 21.0 | 13.7 | 8.5 |

# Is a cluster real or by chance?
## *A judgment call*

| If this many cases are expected, | At least 5% of tracts will have as many as: | At least 1% of tracts will have as many as: | Given 5,000 tracts at risk, concern gets serious at: |
|---|---|---|---|
| 0.5 cases | 2 cases | 3 cases | 6 cases |
| 1 case | 3 cases | 4 cases | 7 cases |
| 2 cases | 5 cases | 6 cases | 9 cases |
| 5 cases | 9 cases | 11 cases | 15 cases |
| 10 cases | 16 cases | 18 cases | 23 cases |

# WHAT SPECIFICS RELATE TO THIS LOCAL CONCERN?

West Hills

# Cancer Incidence in Males West Hills, 1996-2008

| Males | | | | |
|---|---|---|---|---|
| CT 113231 | Obs | Exp | O/E | p |
| Colorectal | 9 | 8 | 1.13 | 0.7 |
| Lung | 11 | 9 | 1.22 | 0.43 |
| Prostate | 33 | 26 | 1.27 | 0.12 |
| Bladder | 12 | 5 | 2.4 | < 0.01 |
| AML | 0 | 1 | | |
| All Sites | 75 | 77 | 0.97 | 0.89 |

# Cancer Incidence in Males West Hills, 1996-2008

| Males | | | | |
|---|---|---|---|---|
| CT 134401 | Obs | Exp | O/E | p |
| Colorectal | 8 | 18 | 0.44 | 0.03 |
| Lung | 16 | 20 | 0.8 | 0.46 |
| Prostate | 46 | 47 | 1.02 | 0.91 |
| Bladder | 19 | 11 | 1.72 | 0.01 |
| AML | 1 | 1 | 1 | 0.91 |
| All Sites | 163 | 175 | 0.93 | 0.39 |

# Cancer Incidence in Males West Hills, 1996-2008

| Males | | | | |
|---|---|---|---|---|
| CT 134421 | Obs | Exp | O/E | p |
| Colorectal | 15 | 15 | 1 | 0.94 |
| Lung | 12 | 17 | 0.71 | 0.23 |
| Prostate | 41 | 42 | 0.98 | 0.96 |
| Bladder | 4 | 10 | 0.4 | 0.09 |
| AML | 1 | 1 | 1 | 0.75 |
| All Sites | 134 | 148 | 0.91 | 0.26 |

# Cancer Incidence in Males West Hills, 1996-2008

| Males | | | | |
|---|---|---|---|---|
| CT 134422 | Obs | Exp | O/E | p |
| Colorectal | 23 | 15 | 1.53 | 0.02 |
| Lung | 11 | 17 | 0.65 | 0.18 |
| Prostate | 48 | 39 | 1.23 | 0.14 |
| Bladder | 9 | 10 | 0.9 | 0.92 |
| AML | 0 | 1 | | |
| All Sites | 146 | 142 | 1.03 | 0.73 |

# Cancer Incidence in Males West Hills, 1996-2008

| Males | | | | |
|---|---|---|---|---|
| CT 135203 | Obs | Exp | O/E | p |
| Colorectal | 28 | 25 | 1.12 | 0.47 |
| Lung | 28 | 29 | 0.97 | 0.98 |
| Prostate | 68 | 67 | 1.02 | 0.87 |
| Bladder | 22 | 16 | 1.38 | 0.13 |
| AML | 2 | 2 | 1 | 0.68 |
| All Sites | 257 | 228 | 1.12 | 0.05 |

# Cancer Incidence in Males West Hills, 1996-2008

Males

| West Hills | Obs | Exp | O/E | p |
|---|---|---|---|---|
| Colorectal | 83 | 81 | 1.03 | 0.75 |
| Lung | 78 | 92 | 0.85 | 0.16 |
| Prostate | 228 | 217 | 1.05 | 0.42 |
| Bladder | 66 | 53 | 1.24 | 0.06 |
| AML | 4 | 6 | 0.67 | 0.49 |
| All Sites | 751 | 782 | 0.95 | 0.27 |

# Cancer Incidence in Females
# West Hills, 1996-2008

Females

| CT 113231 | Obs | Exp | O/E | p |
|---|---|---|---|---|
| Colorectal | 3 | 7 | 0.43 | 0.18 |
| Lung | 10 | 8 | 1.25 | 0.39 |
| Breast | 42 | 27 | 1.56 | < 0.01 |
| Bladder | 0 | 1 | | |
| AML | 0 | 0 | | |
| All Sites | 81 | 75 | 1.08 | 0.42 |

# Cancer Incidence in Females
# West Hills, 1996-2008

Females

| CT 134401 | Obs | Exp | O/E | p |
|---|---|---|---|---|
| Colorectal | 23 | 13 | 1.77 | < 0.01 |
| Lung | 11 | 14 | 0.79 | 0.45 |
| Breast | 76 | 60 | 1.27 | 0.04 |
| Bladder | 2 | 3 | 0.67 | 0.95 |
| AML | 0 | 1 | | |
| All Sites | 182 | 155 | 1.17 | 0.03 |

# Cancer Incidence in Females West Hills, 1996-2008

| Females | | | | |
|---|---|---|---|---|
| CT 134421 | Obs | Exp | O/E | p |
| Colorectal | 14 | 11 | 1.27 | 0.3 |
| Lung | 11 | 13 | 0.84 | 0.61 |
| Breast | 56 | 49 | 1.14 | 0.27 |
| Bladder | 2 | 2 | 1 | 0.9 |
| AML | 0 | 1 | | |
| All Sites | 148 | 128 | 1.16 | 0.08 |

# Cancer Incidence in Females
# West Hills, 1996-2008

Females

| CT 134422 | Obs | Exp | O/E | p |
|---|---|---|---|---|
| Colorectal | 14 | 12 | 1.17 | 0.54 |
| Lung | 11 | 15 | 0.73 | 0.42 |
| Breast | 52 | 49 | 1.06 | 0.63 |
| Bladder | 3 | 3 | 1 | 0.58 |
| AML | 0 | 1 | | |
| All Sites | 141 | 134 | 1.05 | 0.53 |

# Cancer Incidence in Females West Hills, 1996-2008

Females

| CT 135203 | Obs | Exp | O/E | p |
|---|---|---|---|---|
| Colorectal | 18 | 20 | 0.8 | 0.46 |
| Lung | 29 | 24 | 1.21 | 0.3 |
| Breast | 98 | 85 | 1.14 | 0.17 |
| Bladder | 2 | 4 | 0.5 | 0.41 |
| AML | 1 | 1 | 1 | 0.79 |
| All Sites | 233 | 240 | 0.97 | 0.66 |

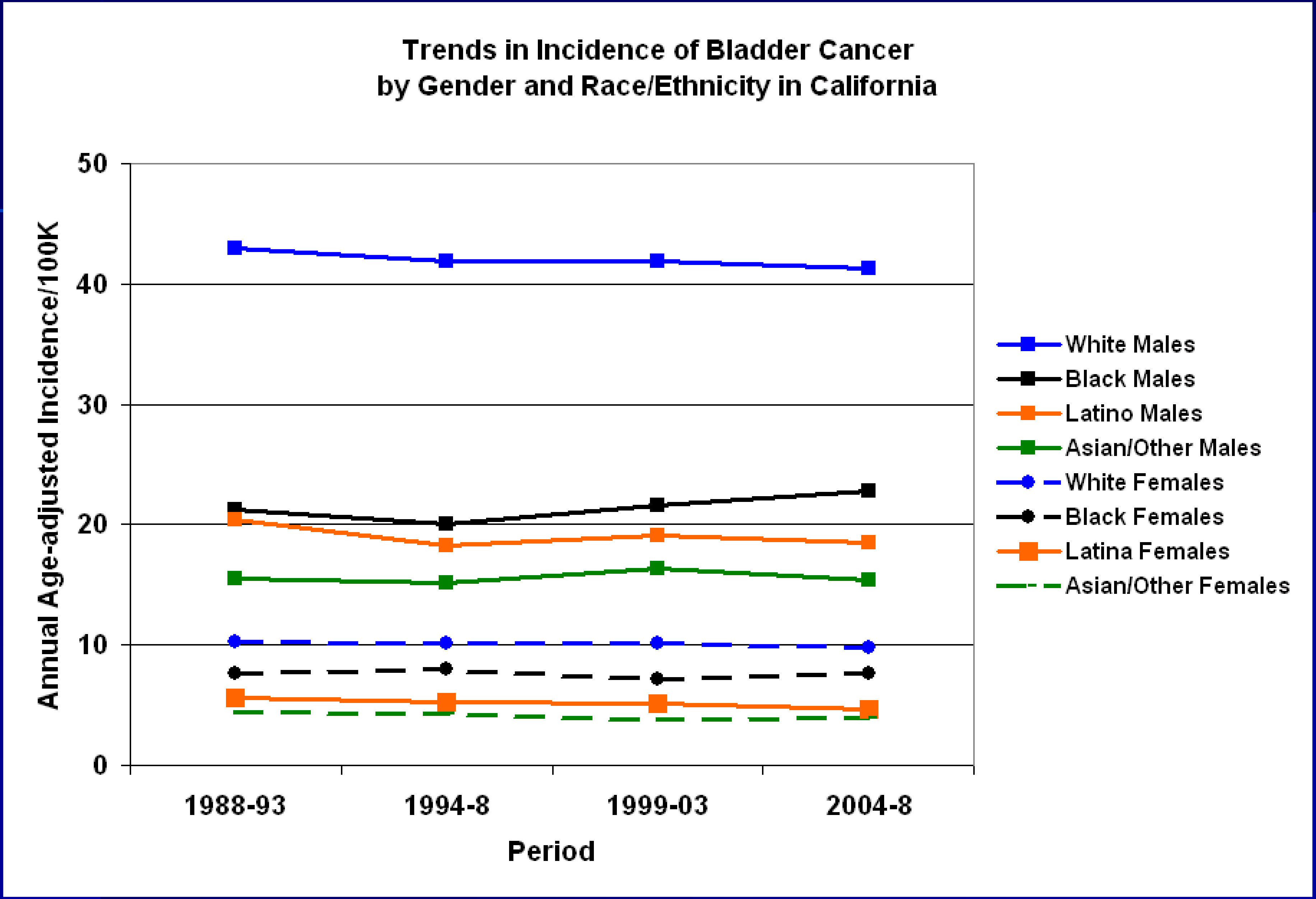
# Cancer Incidence in Females West Hills, 1996-2008

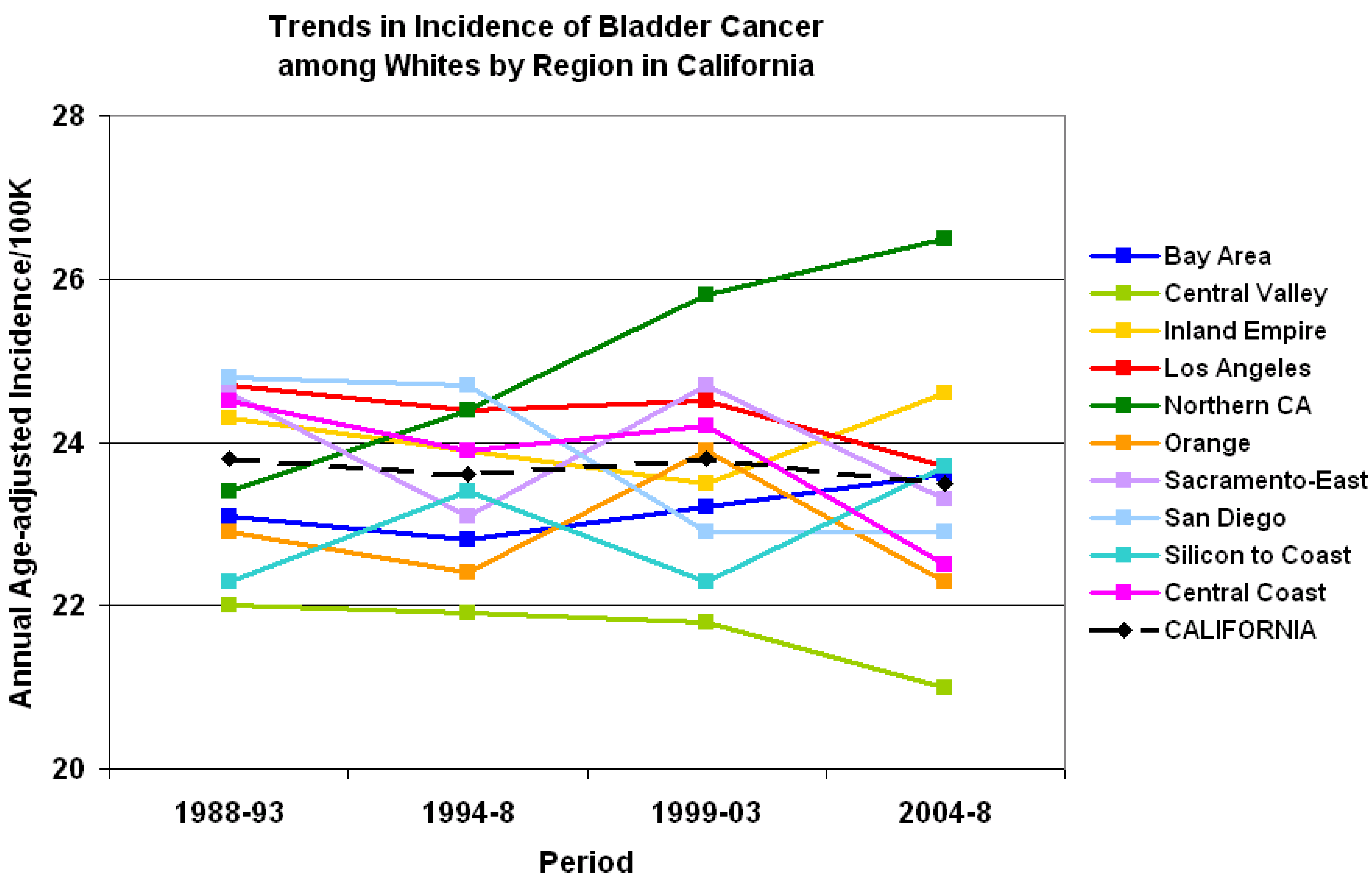
Females

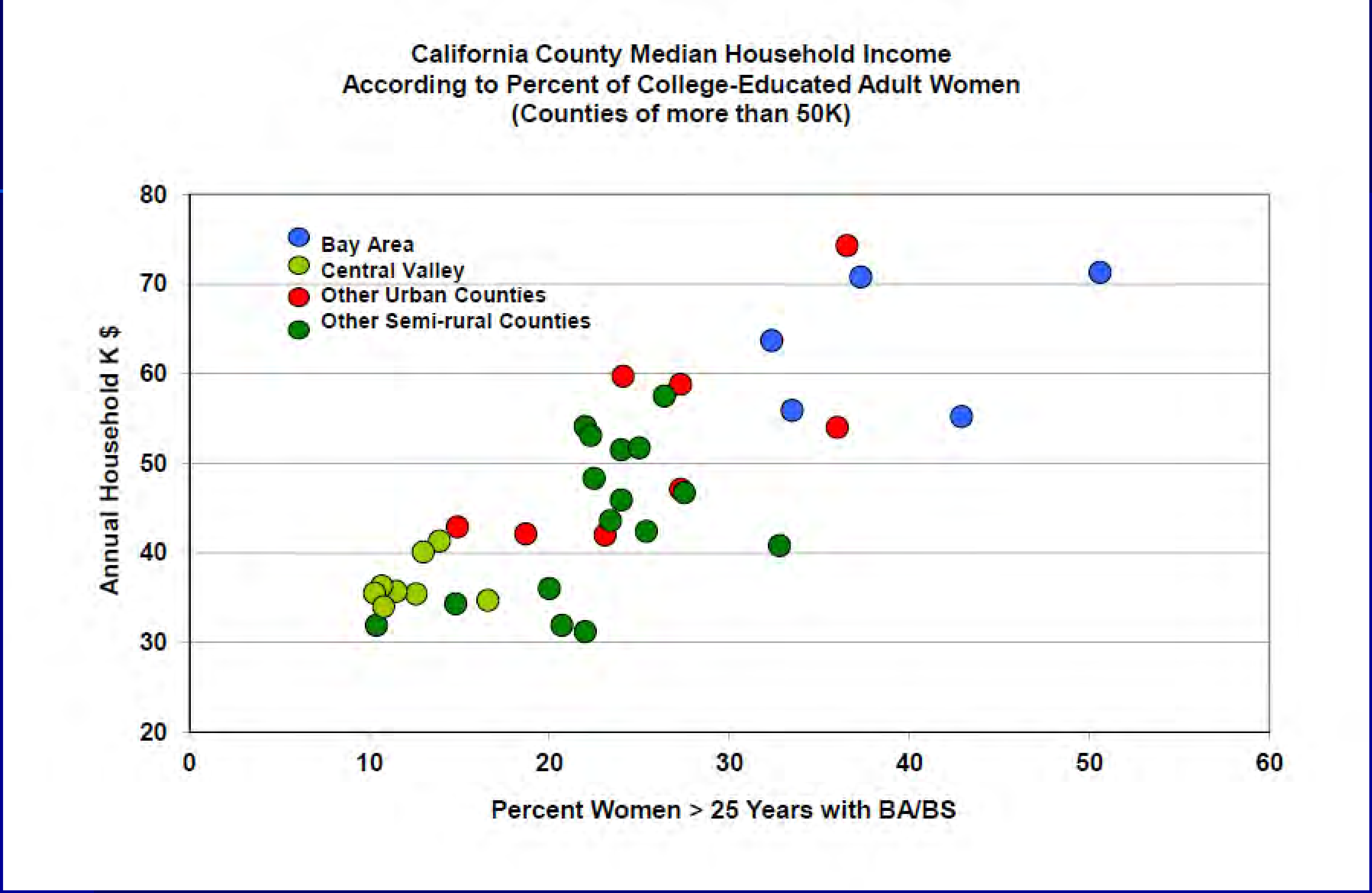
| West Hills | Obs | Exp | O/E | p |
|---|---|---|---|---|
| Colorectal | 70 | 63 | 1.11 | 0.34 |
| Lung | 72 | 75 | 0.96 | 0.8 |
| Breast | 324 | 271 | 1.2 | < 0.01 |
| Bladder | 9 | 13 | 0.69 | 0.31 |
| AML | 1 | 4 | 0.25 | 0.22 |
| All Sites | 809 | 720 | 1.12 | < 0.01 |

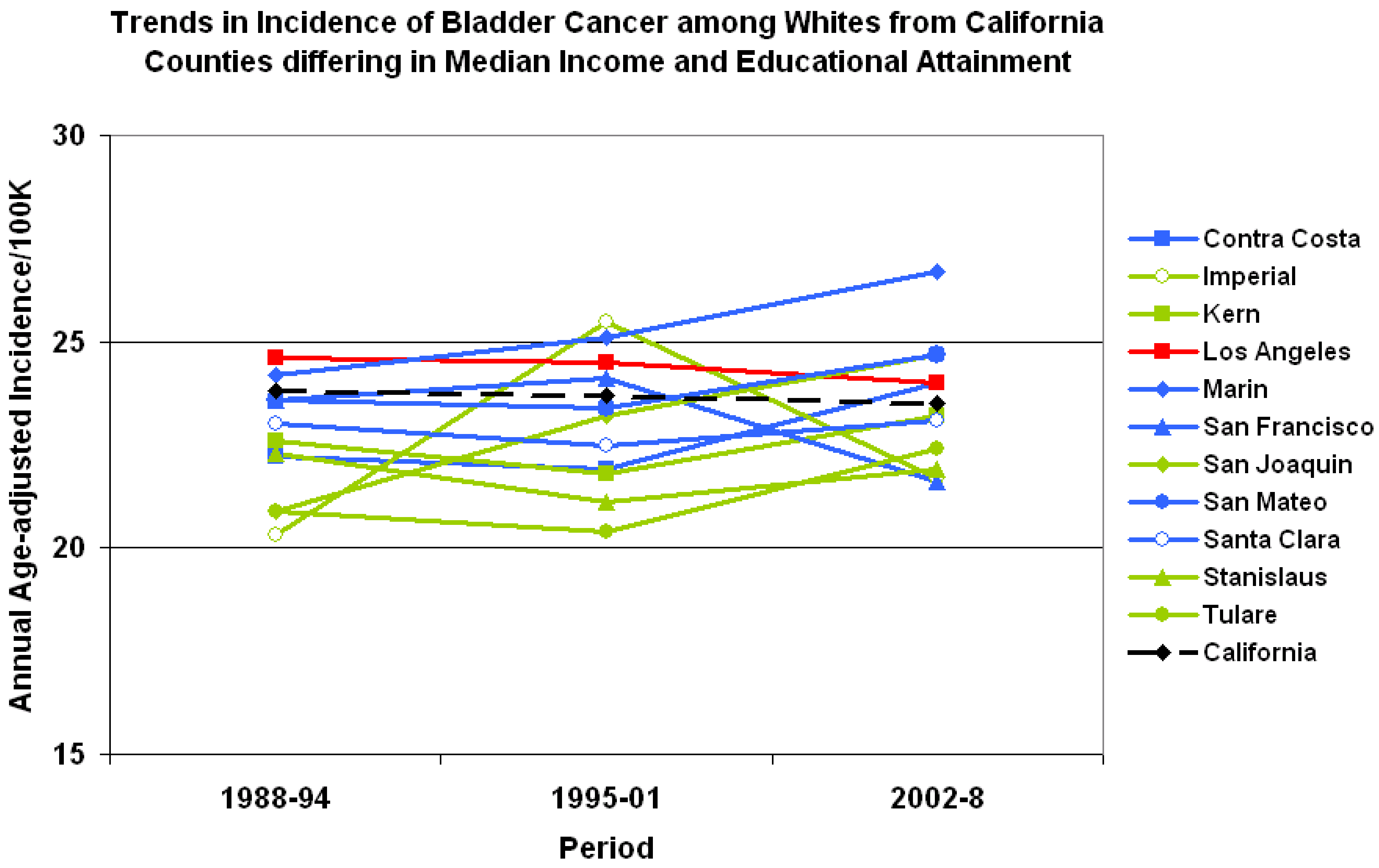
## Summary

The most extreme finding is the apparent increase in bladder cancer risk in the most northerly, and to a lesser extent in the next most northerly, tract in West Hills.  The former increase would probably be as great by chance in 8 or 9 tracts in Los Angeles County

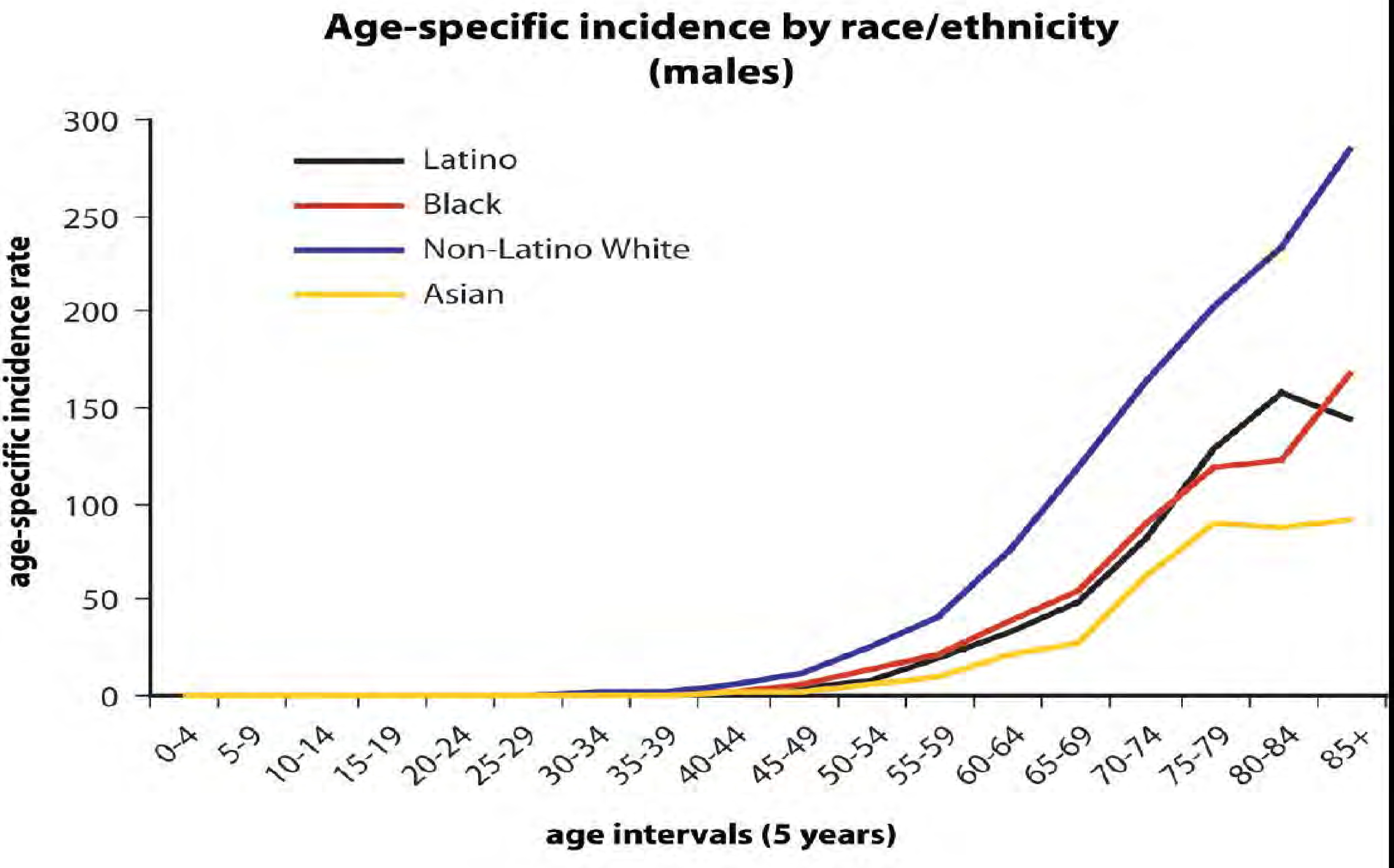

Trends in Incidence of Bladder Cancer
by Gender and Race/Ethnicity in California
Annual Age-adjusted Incidence/100K
50
40
30
20
10
0
1988-93
1994-8
1999-03
2004-8
Period
White Males
Black Males
Latino Males
Asian/Other Males
White Females
Black Females
Latina Females
Asian/Other Females


Trends in Incidence of Bladder Cancer
among Whites by Region in California
Annual Age-adjusted Incidence/100K
28
26
24
22
20
1988-93
1994-8
1999-03
2004-8
Period
Bay Area
Central Valley
Inland Empire
Los Angeles
Northern CA
Orange
Sacramento-East
San Diego
Silicon to Coast
Central Coast
CALIFORNIA

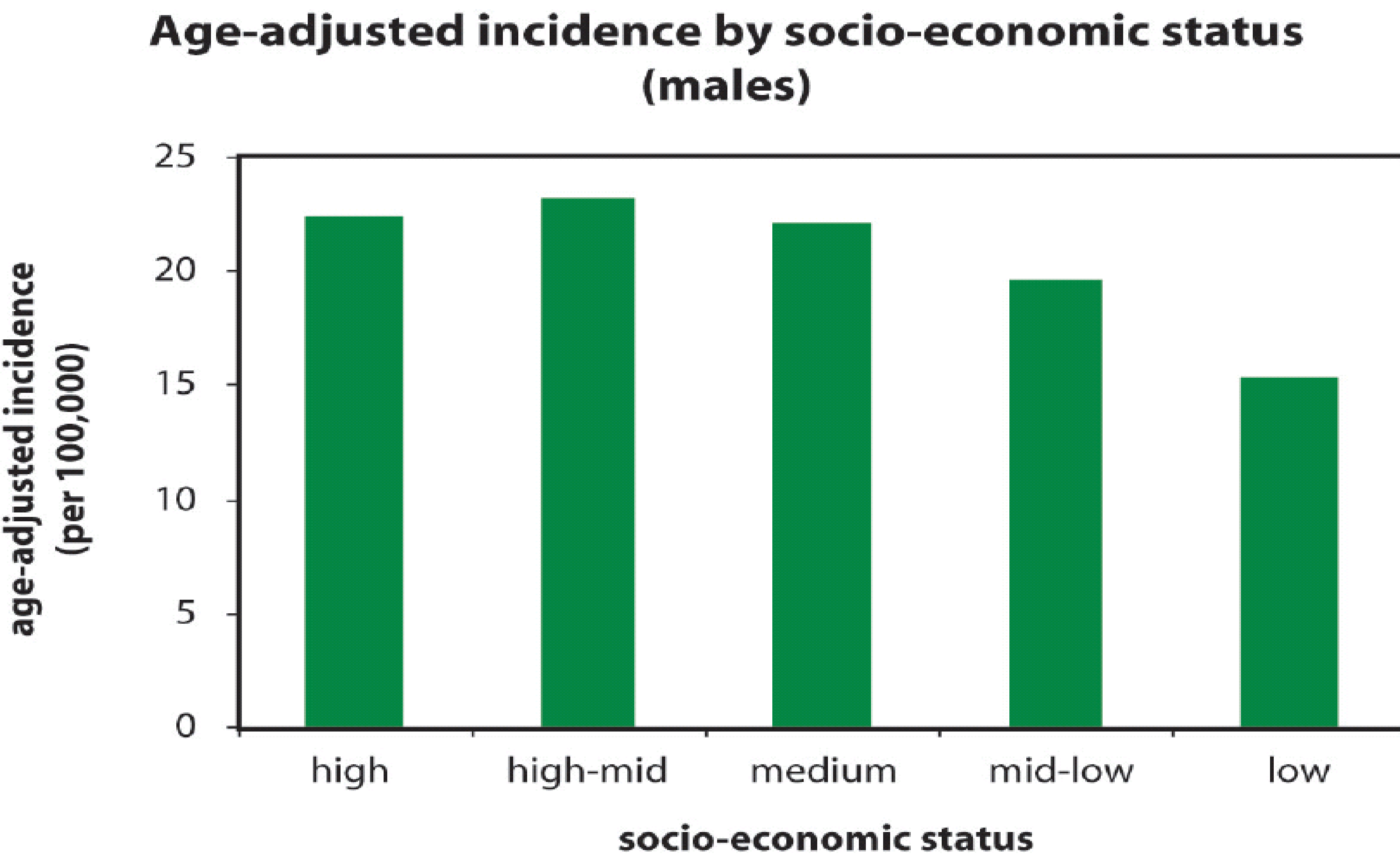

California County Median Household Income
According to Percent of College-Educated Adult Women
(Counties of more than 50K)
Bay Area
Central Valley
Other Urban Counties
Other Semi-rural Counties
Annual Household K $
80
70
60
50
40
30
20
0
10
20
30
40
50
60
Percent Women > 25 Years with BA/BS

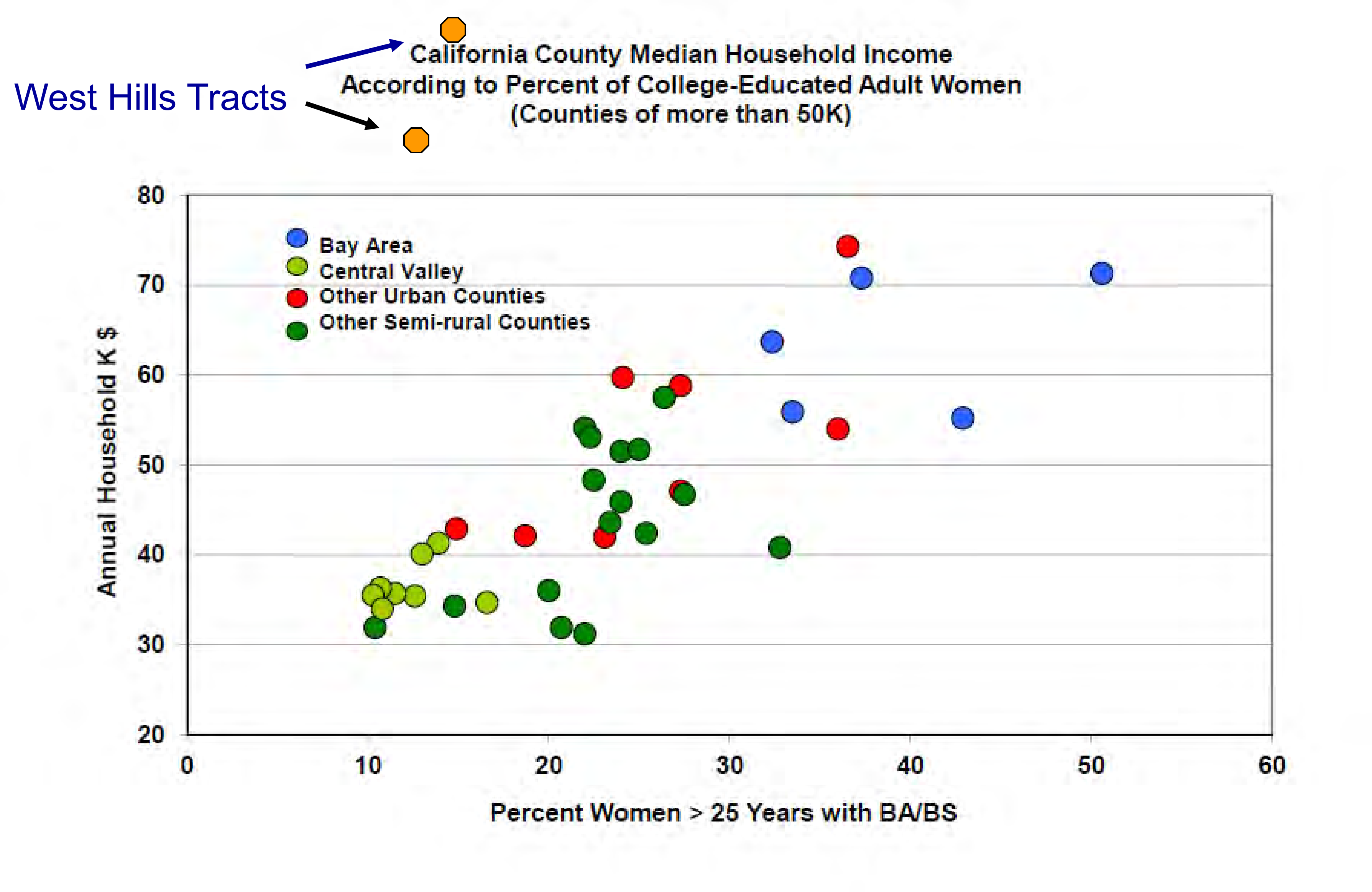

Trends in Incidence of Bladder Cancer among Whites from California Counties differing in Median Income and Educational Attainment
30
25
20
15
Annual Age-adjusted Incidence/100K
1988-94
1995-01
2002-8
Period
Contra Costa
Imperial
Kern
Los Angeles
Marin
San Francisco
San Joaquin
San Mateo
Santa Clara
Stanislaus
Tulare
California

# Bladder Carcinoma



# Bladder Carcinoma





West Hills Tracts
California County Median Household Income
According to Percent of College-Educated Adult Women
(Counties of more than 50K)
Bay Area
Central Valley
Other Urban Counties
Other Semi-rural Counties
Annual Household K $
80
70
60
50
40
30
20
0
10
20
30
40
50
60
Percent Women > 25 Years with BA/BS

# Interpretation

No increase was noted among female residents of the West Hills tracts, and bladder cancer generally occurs more frequently among smokers,among upper middle class men, and among those employed in certain occupations.  The observed increase is therefore not surprising.

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 1:22 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: 1.1 Million Californians Have Been Diagnosed With Chronic Obstructive Pulmonary Disease (COPD)

Dear Mr. Malinowski,

Please include this letter to DTSC Director Raphael in my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Thu, Sep 26, 2013 at 4:17 AM
Subject: 1.1 Million Californians Have Been Diagnosed With Chronic Obstructive Pulmonary Disease (COPD)
To: Debbie Raphael <draphael@dtsc.ca.gov>, "SBlack@dtsc.ca.gov" <SBlack@dtsc.ca.gov>, "Leclerc, Ray@DTSC" <Ray.Leclerc@dtsc.ca.gov>

Dear Director Raphael,

I recognize that you are the Director of the lead agency that is controlling the Santa Susana Field Laboratory cleanup.

And I also recognize that I live within 5 miles of the SSFL site - in the prevailing winds of this site. I received a letter stating this around 1989 - I don't know from whom. That letter stated that I was in the prevailing winds area of the Santa Susana Field Laboratory, and if I ever want to sell my home, I will have to disclose that fact.

Now, with the potential for hundreds of thousands of more trucks potentially driving within a mile of my home, will I have to disclose that to a future buyer as well?
How do I know that my chronic illnesses are not related to Santa Susana, the cleanup, and the trucks?

I did not have any lung diseases before I moved to Los Angeles or when I was younger. But now, after living in Los Angeles for more than 36 years of my life, I have asthma among many other illnesses that are not necessary to address here.

When I was the Public Health Committee Chair of the West Hills Neighborhood Council, a Boeing employee at the request of the West Hills Neighborhood Council responded that about 150,000 trucks had been used to for demolition, soil removal, and other purposes in the past 10 years. That was two years ago, and a lot more demolition has occurred since that time.

It was also estimated at that time that based on SB 990 or the AOCs - that about another 100,000 trucks would need to leave this site. All will go through some part of West Hills - across school crossings, in front of parks, and in front of senior living facilities.

I live within one of the census tracts that is within a mile of one of the proposed NASA routes. Those trucks and the remediation of the site could impact my lungs further.

This week in Bakersfield, there was a meeting with the NIH and the CDC regarding Valley Fever.
http://www.cdc.gov/features/valleyfever/

http://www.examiner.com/article/kevin-mccarthy-hosting-valley-fever-seminar-today-and-tomorrow

At the NASA DEIS meeting, a stakeholder stated that there was a correlation with the dust that was stirred up during the 1994 Northridge Earthquake and Valley Fever. I went home, and I researched that fact - and I found that this correlation was true.
http://articles.latimes.com/1997-03-19/local/me-39826_1_valley-fever

I just found this document from Breathe LA:
http://www.breathela.org/news/press/first-time-data-analysis-reveals-11-million-californians-have-been-diagnosed-chronic-obst

"**LOS ANGELES – An estimated 1.1 million Californians, with nearly 200,000 in Los Angeles County, have been diagnosed with Chronic Obstructive Pulmonary Disease (COPD), according to the first research of its kind by the UCLA Center for Health Policy Research along with Survey Research Group and Public Health Institute (PHI).**

**"BREATHE LA (BLA) funded the UCLA research to fill a significant gap in the understanding of COPD's impact in California. We now know COPD prevalence in the state is more complex than many people realize," said Enrique Chiock, BLA President and CEO. "Preliminary findings reveal that a significant number of people in California diagnosed with COPD have never smoked, are under the age of 45, and are women, providing a striking contrast to the perception that the disease is only a "smokers" condition affecting men and older people."**

**For the first time, the Behavioral Risk Factor Surveillance System, funded by the Centers for Disease Control in collaboration with the California Department of Public Health and PHI, included detailed survey questions about COPD in California, which served as a basis for the UCLA research. Statewide, the actual prevalence of COPD may be twice the 1.1 million people diagnosed, and the number in Los Angeles County is likely double the 200,000 identified in the survey. The socio-demographic and health care access information provided in the UCLA study will enable BREATHE LA to more precisely focus its early detection and treatment programs in order to better educate COPD patients about the disease and provide ways to improve their quality of life.**

**"COPD progressively destroys the lungs and has no cure. Mortality rates continue to rise, yet many people with COPD are undiagnosed or are unaware of the lifestyle changes needed to manage the condition and improve their quality of life," said leading pulmonologist Dr. Guy Soo Hoo, a former BREATHE LA Board Chair. "This data gives BREATHE LA hard numbers to show to policy makers and the medical community that we are in the midst of a public health crisis. The cost of COPD to our economy and to our healthcare industry needs to be mitigated through prevention, early diagnosis, and treatment. This data shows us the enormity of the need."**

**BREATHE LA will share this new data analysis with public officials as part of their advocacy efforts for prevention, early detection, treatment research, and funding. According to National Institute of Health findings, despite nearly 140,000 annual COPD deaths, government funding for disease research and programs is dwarfed by funding for other diseases, such as AIDS/HIV. For example, funding for AIDS/HIV research and programs is nearly 30 times greater than that for COPD, even though COPD claims nearly 15 times as many lives each year.**

**BREATHE LA is assertively reaching out to public officials to inform them about the latest data associated with this lung health crisis. BLA representatives recently met with Congressman Henry A. Waxman, D-California, a longtime advocate of lung health who led the charge to keep cigarettes away from kids and helped to strengthen the Clean Air Act. Rep. Waxman is firm in his belief that lung health issues are a priority.**

"The increase in COPD is yet another result of tobacco's harmful effects and the dangers of polluted air. COPD is now the third leading cause of death nationwide. An estimated 12 million Americans are diagnosed with the disease and another 12 million may be affected by the disease but are undiagnosed. Californians, especially those of us from Los Angeles, know firsthand how important it is to have clean air to breathe." Rep. Waxman said. "I will continue my ongoing efforts to address the primary causes of COPD – killer tobacco and dirty air. And, I am encouraged that organizations like BREATHE LA are passionate about doing the same."

BREATHE LA's funding supported the efforts of the UCLA research team to paint a picture of COPD in the state and in Southern California. The UCLA report, which will be released later this year, will be important for the understanding of the current status of how COPD is diagnosed and treated in the region. For example, preliminary analyses show approximately one-third of those diagnosed with COPD never received a spirometry test, even though this is the only approved method for diagnosing COPD.

"COPD remains a significant public health burden. There is still ample room for improvement in adherence to primary prevention and treatment," said Dr. Ying-Ying Meng, lead author of the report and Co-Director, of the Chronic Disease Program at the UCLA Center for Health Policy Research. "Our findings highlight the need to incorporate prevention, early diagnosis and treatment strategies that aim at reducing activity limitations, emergency department visits and mortality due to COPD."

About BREATHE LA

BREATHE LA's focus on COPD is driven by its Board of Directors, which includes researchers and medical professionals in The Trudeau Society, a leading pulmonologist group. BREATHE LA targets outreach and education efforts through community health fairs and the *Better Breathers Clubs™* program in neighborhoods of Los Angeles County that are most affected. This effort provides education, services, and support groups primarily to people living with COPD to improve health outcomes and quality of life. Through a partnership with the National Heart, Lung and Blood Institute, BREATHE LA established a *COPD Regional Center* in the western U.S. to raise COPD awareness and share best practices among health service providers.

About COPD

COPD is a combination of lung damage and mucus buildup that makes it hard to breathe. It can include chronic bronchitis, emphysema and sometimes adult asthma. This progressive and incurable disease destroys the lungs and is often responsible for the end of life. COPD can be managed to slow the progression of the disease.

The most common cause of COPD is smoking, though exposure to secondhand smoke is also a major factor. In addition, long-term exposure to other lung irritants, such as pollution, chemical fumes or dust, sometimes present in work environments, may also lead to the disease. A rare genetic condition, known as alpha-1 anti-trypsin deficiency, is also known to cause the disease.

COPD is diagnosed with a simple spirometry test, which shows how much air an individual's lungs hold and how quickly each person can exhale. To be tested, health care providers will ask patients to breathe into a spirometer as hard and as long as they can. Spirometry should be a routine procedure for patients at risk, but unfortunately this diagnostic tool remains under-utilized."

No matter how well intentioned the authors of SB 990 were, no matter how well intentioned the authors of the 2010 Consent Order were, it is my understanding that no DTSC employees that would have to implement this document, and no DTSC toxicologists reviewed it before it was signed.

I am asking you on behalf all of all of the local residents that will be impacted by the digging of soils and by the shipment of structures and soils to please go back to the table with NASA and DOE - and this time - please take the CDPH and your toxicologists with you.

Just as with issues like Obamacare and other medical coverage, where the the citizens want the doctors to decide what treatments a patient should have - not the insurance companies - I believe that it is the qualified people at CDPH and your toxicologists that should look at the risks to the offsite community and to the potential future use of the SSFL site to determine just what contaminants and at what level they should be the risk based drivers. **This site should have a risk based cleanup - and we need balance in that cleanup to protect those who are most fragile offsite from the impacts of that cleanup.**

**Please use the 2007 Consent Order which was signed first by all parties as your basis for a risk based cleanup.**

I have stated many times that no matter how the property is zoned, a good attorney could argue that the Santa Susana Field Laboratory has been an industrial site since 1946 , and that it is therefore grandfathered as that in the zoning codes.

**Please work with NASA and the DOE - allow them to return to their NEPA documents to allow the community to see all alternatives. Then please use their NEPA and Section 106 documents to guide you in your CEQA approach.**

Please see this document that refers to the joint NEPA / CEQA process dated March 2013. http://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/handbooks

Respectfully submitted,

*Christine L. Rowe*

West Hills resident and SSFL impacted stakeholder

**Dale Till**

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**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 1:50 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: Agreement in Principle between the DOE and DTSC
**Attachments:** Nine Balancing Criteria in the AOC.pdf

Dear Mr. Malinowski,

Please consider my question to NASA below as a question to DTSC for my SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sat, Sep 28, 2013 at 4:11 AM
Subject: Agreement in Principle between the DOE and DTSC
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

One issue related to the Administrative Order on Consent, and therefore there is concern related to the cultural / archaeological aspects of the SSFL site is addressed on this DTSC power point which I have named the Nine Balancing Criteria of the AOC.

Please see page 6 adobe - am I correct in interpreting this as - under exceptions -

There is: "No cap on exceptions on detection limits, **Native American artifacts / sites, or endangered species?**

**How does NASA interpret this slide and language related to artifacts and sites? Was this just a community recommendation - or did DTSC accept this in their responses?**

Respectfully submitted,

*Christine L. Rowe*

# Administrative Order on Consent

**between**

**The State of California**
**and**
**The U.S. Department of Energy**

**November 2010**

# Agreements in Principle
# A Path Forward

- Resolve disagreements over interpretations and implementation of SB 990 (Kuehl, 2007)

- Fast forwards the process to where it will likely end up (years from now)

- Provide certainty and eliminates concerns about the unknown outcome of “process”

- Take advantage of U.S.EPA’s ongoing site survey and soil sampling work ***and*** U.S.EPA’s expertise on radiological contamination

# What is the Administrative Order on Consent?

- The final agreement between DOE and DTSC
- Integrates the Agreement in Principle with cleanup and environmental review procedures
- Includes key elements that govern the relationship between DOE and DTSC
- Establishes the requirements as binding and enforceable

# Agreements in Principle
# Public Comments

- Public comment period September 3 – October 1
- Overwhelmingly positive
- Questions and concerns expressed

# Public Comments
# Suggested Additions

- Include groundwater
  - Groundwater is already part of 2007 agreement
- Radioactive contamination outside of Area IV
  - Still negotiating with NASA (and Boeing)
- Need a Confirmation Protocol for NASA
  - Will be negotiated with NASA
- Boeing not included
- Sign final agreements as soon as possible

# Public Comments

## Concerns about Possible Consequences

- Impacts on habitat and ecosystems and the surrounding community
  - Impacts will need to be estimated, and mitigation proposed, as part of Remedial Action Implementation Plan
- Exceptions – limitations
  - No cap on exceptions for detection limits, Native American artifacts/sites, or endangered species

# Public Comments
## Concerns about Possible Consequences

- Amount of soil to be removed
  - There's no way to estimate until characterization complete - Estimates based on assumptions
- CEQA Compliance
  - CEQA documents will be prepared and available for public review when the Remedial Action Implementation Plan is made available (combined with NEPA if needed)

# Public Comments

## Concerns about Implementation Procedures

- Onsite treatment
  - Onsite/in situ treatment of soils is allowed – AOC makes it clear
- Role of other State and Federal regulatory agencies
  - All agencies will be consulted, and requirements integrated into cleanup plan
- How background is determined
  - Background to be determined by EPA (rad) and DTSC (chem) - in process
- Unknown details of cleanup plan
  - Remedial Action Implementation Plan with specific details will be available for review after characterization

# Public Comments
## Concerns about Implementation Procedures

- Use of “Not to exceed” cleanup standards
  - EPA confirms that this is an acceptable method of verifying cleanup
- Disposal of Contaminated Soils
  - DTSC has worked with NRC and others to verify classification and disposal requirements
- Backfill soils from “Southern Buffer Zone”
  - Any use of onsite soils requires approval of appropriate agencies

# Public Comments
## Concerns about Implementation Procedures

- 2017 cleanup date
  - Recognize this date is aggressive – important to keep it to quicken the pace - approach in the AIP may be the only possible way to achieve it
- Public comment for final orders
  - Public comment period now (10/27 – 11/22)
- Stricter than SB 990
- Cleanup Process and “balancing criteria”

# SB 990

- What it says:
  - Requires cleanup standards for radioactive and chemical contaminants based on “rural residential” land use assumptions
  - Requires the use of EPA’s radiologic Preliminary Remediation Goals as the “point of departure”
  - Clarifies that risks due to ***both*** radioactive and chemical contaminants must be added
  - Requires use of the State Superfund process

# Superfund

- Cleanup goal (for carcinogens) of one or less excess cancer risks in one million ($10^{-6}$)

- Allows departure from the $10^{-6}$ goal to a maximum of one excess cancer risk in 10,000 ($10^{-4}$)

# Superfund Risk Range

**Highest Allowable Cleanup Levels** — **$10^{-4}$ (1/10,000)**

**Most Protective Cleanup Goals** — **$10^{-6}$ (1/1,000,000)**

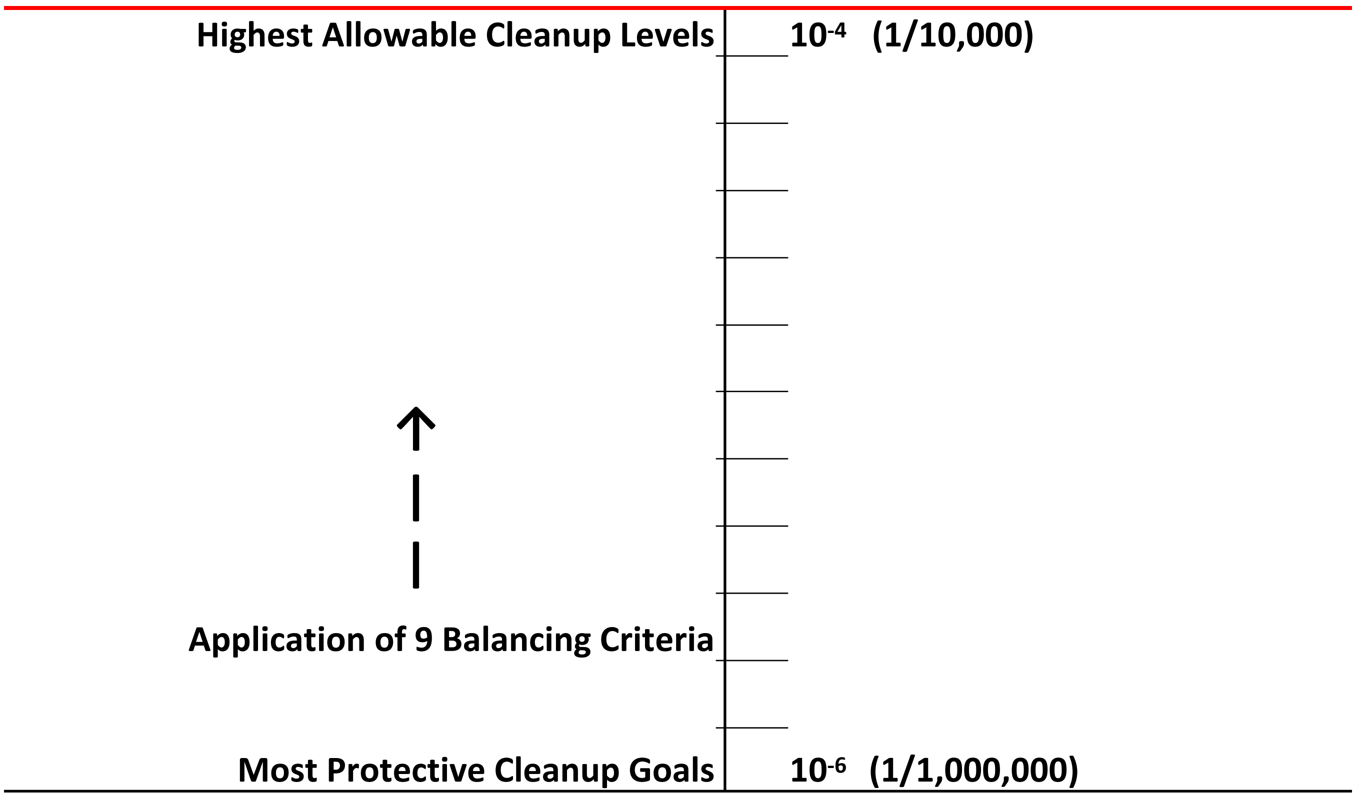
# Superfund

- Requires consideration and balancing through a set of 9 criteria to adjust the goal

# Nine Balancing Criteria

1. Overall protection of human health and the environment
2. Compliance with Applicable, Relevant and Appropriate Requirements
3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume
5. Short-term effectiveness
6. Implementability
7. Cost
8. State acceptance
9. Community acceptance

# Superfund Risk Range



# Superfund

- Recognizes:
  - Cannot clean up what is below "background"
  - Cannot clean up what you cannot measure (below "detection limits")

## Cesium 137

| | | |
|---|---|---|
| 0.21 pCi/g | 95% UCL background (McLaren Hart) | 2/10,000 excess cancer risk |
| 0.12 pCi/g | Upper limit SB 990 | 1/10,000 ($10^{-4}$) excess cancer risk |
| 0.0012 pCi/g | EPA Preliminary Remedial Goal for Rural Residential (SB 990) | 1/1,000,000 ($10^{-6}$) excess cancer risk |

## Strontium 90

| | | |
|---|---|---|
| 0.13 pCi/g | Upper limit SB 990 | 1/10,000 excess cancer risk |
| 0.11 pCi/g | 95% UCL background (McLaren Hart) | 1/10,000 ($10^{-4}$) excess cancer risk |
| 0.00139 pCi/g | EPA Preliminary Remedial Goal for Rural Residential (SB 990) | 1/1,000,000 ($10^{-6}$) excess cancer risk |

## Arsenic

| | | |
|---|---|---|
| 15 mg/kg | Background (2005 Background Study) | |
| 0.16 mg/kg | Upper limit - Draft SB 990 RBSLs | 1/10,000 ($10^{-4}$) excess cancer risk |
| 0.0016 mg/kg | Draft SB 990 RBSLs for Rural Residential | 1/1,000,000 ($10^{-6}$) excess cancer risk |

## 2,3,7,8 TCDD (Dioxin)

| | | |
|---|---|---|
| 5 x 10-7 mg/kg | Background (2005 Background Study) | |
| 4.7 x 10-7 mg/kg | Upper limit - Draft SB 990 RBSLs | 1/10,000 ($10^{-4}$) excess cancer risk |
| 4.7 x 10-9 mg/kg | Draft SB 990 RBSLs for Rural Residential | 1/1,000,000 ($10^{-6}$) excess cancer risk |

# Administrative Order on Consent

# What does the Administrative Order on Consent do?

**After cleanup, the site will be restored to the way it was before it was polluted**

**(“cleanup to background”)**

# Anatomy of the Administrative Order on Consent

# Introduction

- Who, what, where, authorities
- Definitions

# Key Definitions

- Cleanup of soils *doesn't include contamination from groundwater*
- Cleanup to Background Levels
  - *Includes in situ or other onsite treatment of soils*
  - Does not include onsite burial or landfilling
- Detection Limits
  - For chemicals = method reporting limit
  - For radionuclides = minimum detectable activity

# Work to be Performed

- Building demolition
  - Clear buildings first
  - Easier to characterize
  - Boeing buildings in Area IV

- Site characterization

# Site Characterization

- Characterization of radiologic contamination
  – EPA's radiologic characterization work to continue
- Characterization of chemical contamination
  - Phase I: Co-located samples
  - Phase II: Co-located random samples (& step outs?)
  - Chemical Data Gap Investigation
- Treatability Studies

# Chemical Data Summary Report

- Summary of the chemical data collection efforts
- Defines the extent of soils contamination that exceeds chemical background levels

# Site Cleanup

- Soils Remedial Action Implementation Plan
  - based on the Chemical Data Summary Report and U.S. EPA's radiologic characterization survey
  - Planned remedial action
  - Proposed use of exceptions
  - Proposed for in situ or onsite treatment
  - Proposed mitigation measures
  - Schedule for implementation

- Confirmation Sampling (protocol)

# Public Participation

- Public review and comment on ***all*** draft plans and reports

# California Environmental Quality Act

- Documents to be made available for public review and comment at the same time as the draft Soils Remedial Action Implementation Plan

# U.S. Environmental Protection Agency Activities

# Summary Judgment Order (Judge Conti)

# General operating provisions

- Project director
- Web site
- Review/approvals
- Submittals
- Contractors
- Analyses
- Availability of sampling data and documents
- Access
- Recordkeeping
- Comply with all laws and regulations.
- DOE to pay DTSC costs (and DOE cost recovery)
- Availability of Federal Funds
- Penalties for Noncompliance
- Dispute Resolution (enforcement mechanism)
- Force Majeure
- Schedule Changes
- Extension Requests

# Next Steps

- Receive public input on AOC
- Modify agreement if needed
- Sign and implement

# More information

- Comments by email to: ssfl@dtsc.ca.gov by November 22, 2010

- Copies of the AOC, Responses to Comments (Summary and Detailed) and this presentation are located on-line at http://www.dtsc.ca.gov/SiteCleanup/Santa_Susana_Field_Lab/SSFL-Cleanup.cfm

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Saturday, January 04, 2014 10:29 PM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: Archaeological Survey and CEQA comments

Dear Mr. Malinowski,

Please include this comment that I sent to NASA for their DEIS for their portion of the SSFL property.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sun, Sep 8, 2013 at 2:43 AM
Subject: Archaeological Survey and CEQA comments
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

First, I want to say I was extremely disappointed in the documentation related to the cultural resources of the United States Government property. I recommend that a local archaeological consulting firm perform this Information Center search (again) because they know the project area better than any other local groups in my opinion. Therefore, the two consulting firms that I would recommend for this project are Compass Rose Archaeological and Topanga Archaeological.

Second, before I would hire a consulting firm, I would want to make sure that preservation in situ of the archaeological materials was the agreed upon recommendation of whatever archaeological firm that you hire. I do not support excavation of any archaeological resources for research purposes.

Third, this firm should review the records including any in consultation with the Native American Heritage Commission and the appropriate point of contacts for the federal register of historic places to determine the exact acreage and GIS coordinates so that the Burro Flats complex is appropriately bounded.

Fourth, the Burro Flats complex should be fenced in a protective yet decorative manner so that the fencing can be kept in place in perpetuity. Any additional significant sites should be fenced in a similar manner.

Sixth: According to this document: http://www.kshs.org/p/shpo-s-guide-to-archeological-survey/15783
**A Phase I survey is: "the research and review portion of any project is referred to as Phase I background research."**
**"The actual survey of the project area, whether reconnaissance or intensive, is called a Phase II survey, and the assessment of archeological sites, which determines the eligibility of a site for listing on the National Register of Historic Places, is referred to as Phase III testing. Phase IV testing refers to the recovery of artifacts for mitigation purposes."**

Burro Flats has already had Phase III testing, and I believe some Phase IV testing? I believe that some of the Burro Flats materials had been taken to the Southwestern Museum, and other artifacts may be world wide?

Seventh: We know that as the result of the need to remove all vegetation for the radiological survey and chemical co located surveys of AREA IV, that many new archaeologcal sites were discovered. It is my opinion therefore, that while buildings are demolished, archaeological and Native American monitoring is required.

Eighth: Whenever any vegetation is removed, before any demolition activity or sampling or soil removal action is taken, a new Phase II survey should be performed of that area.

Finally,

I have found this CEQA document that I believe supports my definition of historical resources as applying to both the the structures and the archaeological.

**Also, since this document is old, are you aware that the Native American Heritage Commission has been relocated? This is a concern since there is a deadline for public comment.**

Please see the area highlighted in yellow. It is important to notice that what I have highlighted in RED is in reference to the requirement of nondisclosure of archaeological sites to the public - the key word being "withhold".

Respectfully,

*Christine L. Rowe*
*NASA SSFL Section 106 Consultant*

***http://ceres.ca.gov/ceqa/more/tas/Arcpage2.html***

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# Sections 21083.2 and 21084.1

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**CEQA and the *CEQA Guidelines***

The California Environmental Quality Act (CEQA) establishes statutory requirements for the formal review and analysis of projects. The *CEQA Guidelines* have been adopted by the State to guide public agencies in implementing CEQA. CEQA's requirements for addressing impacts on archaeological resources are discussed in detail under Sections 21083.2 and 21084.1 (see Appendix 1 of this paper). Appendix K of the *Guidelines* (or Supplementary Document J of the 1992 printing of the *Guidelines*) offers a suggested method for implementing the requirements of Section 21083.2.

Sections 21083.2 and 21084.1 operate independently to ensure that potential effects on archaeological resources are considered as part of a project's environmental analysis. The latter applies to archaeological sites which are listed on or eligible for listing on the California Register, the former applies to other "unique" archaeological resources. Either of these benchmarks may indicate that a proposal may have a potential adverse effect on archaeological resources.

**Initial Study**

An initial study must be prepared for projects which are not exempt from CEQA in order to guide the decision whether to prepare either a Negative Declaration or EIR (*Guidelines* Section 15063). The original determination whether to prepare a Negative Declaration or an EIR is subject to the "fair argument" test (*Laurel Heights Improvement Assoc. v. U.C. Regents* (1993) 47 Cal.3d 376). In other words, if a fair argument can be raised on the basis of "substantial evidence" in the record that the project may have a significant adverse environmental impact, in this case that unique archaeological resources or archaeological sites that are historical resources would be affected, then an EIR is required even if evidence also exists to the contrary.

Section 21083.2 explicitly requires that the initial study examine whether the project may have a significant adverse effect on "unique archaeological resources." Pursuant to Part (g) of that section, a unique archaeological resource is:

> "an archaeological artifact, object, or site, about which it can be *clearly demonstrated* that, without merely adding to the current body of knowledge, there is a *high probability* that is meets any of the following criteria:
> "(1) Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
> "(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
> "(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person." [emphasis added]

In the one court case to address this definition, the Court of Appeal applied it strictly in finding that "[a]n archaeological artifact, object, or site which does not meet these criteria is a nonunique archaeological resource and 'need be given no further consideration, other than the simple recording of its existence by the lead agency if it so elects.'" (*Topanga Association for a Scenic Community v. County of Los Angeles* (1989) 214 Cal.App.3d 1348)

Appendix K of the *Guidelines* (see Appendix 2 of this document) takes a broader approach, using the term "important" in place of "unique." Appendix K goes beyond Section 21083.2, suggesting additional criteria to guide the Lead Agency in making a determination of uniqueness. These include that the resource be at least 100 years old and possess "substantial stratigraphic integrity" (i.e., is substantially undisturbed); and the resource involves "important" research questions that historical research has shown can be answered only with archaeological methods.

Section 21084.1 requires an initial study to treat any substantial adverse change in the significance of a historical resource listed in or eligible to be listed in the California Register as a significant effect on the environment. The definition of "historical resource" includes archaeological resources listed in or formally determined eligible for listing in the California Register and, by reference, the National Register of Historic Places, California Historical Landmarks, Points of Historical Interest, and local registers (Sections 5020.1(j) and

5024.1).

If such an effect may occur, the Lead Agency must prepare an EIR. If there is no substantial evidence in the record for the occurrence of such effect, or if the potential effect can be reduced to a level of insignificance through project revisions, a Negative Declaration or mitigated Negative Declaration can be adopted. The Lead Agency must note the source or content of the data relied upon in preparing the initial study (*Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296). Supporting information may include specific studies, or references to previous environmental documents or other information sources. A thorough, referenced initial study is a crucial part of the record supporting the Lead Agency's determination to prepare a Negative Declaration or mitigated Negative Declaration. Bear in mind, of course, that an initial study is not required to provide the full-blown analysis of a complete EIR (*Leonoff v. Monterey County Board of Supervisors* (1990) 222 Cal.App.3d 1337).

Pursuant to Sections 21083.2 and 21084.1, neither an EIR nor a Negative Declaration is required for a project which would impact only non-unique archaeological resources or archaeological sites that are not considered "historical resources" pursuant to Section 5020.1(j). Furthermore, an EIR that is required as a consequence of other significant environmental effects is not required to address non-unique archaeological resources.

**Site Evaluation**

The effectiveness of the initial study depends largely upon an accurate evaluation of the site's potential archaeological significance. This means determining whether there is present a unique archaeological resource (Section 21083.2) or a historical resource that is an archaeological resource (Section 21084.1).

The "unique" criterion established by Section 21083.1 is narrower and more restrictive than general, professionally accepted criteria by which the significance of an archaeological site would be evaluated. Establishing that a site is or is not "unique" may involve extensive research, analysis, field testing, and excavation. In practice, ascertaining that a significant archaeological site is not unique and therefore not subject to CEQA may involve more research, analysis, and testing than would be necessary if the resource were a significant historical resource and mitigated. This is particularly true when avoidance is a feasible alternative.

A record search to determine whether any previously identified resources exist on site is the first step in determining whether there may be archaeological resources present. Often, when the applicant submits environmental information with their project the Lead Agency requires that this include the results of a record search at the applicable California Historical Resources File System Information Center (formerly the Archaeological Information Centers). These 11 regional centers maintain the State Archaeological Inventory as part of the Historical Resources File System. This system maintains current information on recorded archaeological sites, as well as resources listed on the California Register of Historic Resources. Alternatively, the Lead Agency itself may undertake this record search during the initial study phase of project review.

Additional sources of information on the possible presence and value of archaeological resources are colleges and universities with archaeology departments, the local historical or archaeological society, local Native American groups, or appropriate archives and repositories. Also, the Native American Heritage Commission maintains a file of Sacred Lands which contain information unavailable elsewhere. The Commission can be contacted at:

915 Capitol Mall, Room 364
Sacramento, CA 95814
(916) 653-4082

Some cities and counties have mapped areas of known archaeological sensitivity. These maps may be used as general indicators of the presence of archaeological resources, but are usually not detailed enough or current enough to be definitive. Sensitivity maps do not substitute for a record search, or archaeological field survey where necessary.

If the project area is expected to contain unique archaeological sites or historical resources that are archaeological resources, the Lead Agency should require a field survey by a qualified professional archaeologist in order to assess the significance of the resource. Certification by the Society of Professional Archaeologists (SOPA) is one indicator that an archaeologist is qualified. The State of California does not license or certify archaeologists.

Where field survey results are inconclusive, a test excavation of some type may be necessary to determine whether unique, subsurface components exist. When a unique resource is found, the archaeologist should recommend means of avoiding or mitigating impacts, including excavation plans if necessary. In such cases, the archaeologist's report should also estimate the cost of mitigation.

In order to protect the sites from unauthorized excavation, looting, or vandalism, the Lead Agency should not publicize the location of known archaeological resources beyond what is necessary. Records in the Information Centers are exempt from the California Public Records Act (Government Code Section 6250 et seq.). Government Code Section 6254.19 states that "nothing in this chapter requires disclosure of records that relate to archaeological sites information maintained by the Department of Parks and Recreation, the State Historical Resources Commission, or the State Lands Commission." Along this line, Government Code Section 6254 explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission."

The State Office of Historic Preservation can provide additional assistance regarding archaeological resources. The Office can be contacted at:

1416 Ninth Street
Sacramento, CA 95814
(916) 653-6624

For examples of local guidelines for researching archaeological data, see Appendix 4 of the print version of this document. Appendix 3 lists the Historical Resources File System Information Centers across the State.

**Mitigation**

CEQA requires the Lead Agency to examine and impose mitigation measures or feasible project alternatives that would avoid or minimize any impacts or potential impacts identified in an EIR or a mitigated Negative Declaration.

**When archaeological resources are involved, avoidance, or preservation in an undisturbed state is the preferable course of action. Section 21083.2 provides that preservation methods may include:**

- Planning construction to avoid archaeological sites.
- **Deeding sites into permanent conservation easements.**
- Capping or covering sites with a layer of soil before building on the sites.
- Planning parks, greenspace, or other open space to incorporate archaeological sites.

Actual preservation measures may vary, depending upon the specific situation. For instance, capping or covering sites with soil may not be a practical solution where it might interfere with later carbon-14 or pollen dating procedures.

**When avoidance is not possible, excavation may be the only feasible alternative or mitigation measure. Section 21083.2 limits excavation to those parts of the site which would otherwise be damaged or destroyed by the project**. Excavation is not required if the Lead Agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource. This information must be documented in the EIR.

Part V of Appendix K suggests that any necessary excavation should be based upon an excavation plan or "research design." The contents of such a plan might include, but are not limited to:

- A brief summary of the excavation proposed as part of the mitigation plan.
- A list and discussion of important information the excavated resources contain or are likely to contain.
- An explanation of how the information should be recovered to be useful in addressing scientifically valid research questions.
- An explanation of the methods of analysis.
- A final report for distribution.
- An estimate of the cost of and time required to complete the excavation proposed under the plan.
- Plans for the curation of collected materials.

An excavation plan should be prepared by a qualified archaeologist. Unless special or unusual circumstances warrant a longer period, Section 21083.2 requires that the field excavation phase of an approved mitigation plan must be completed within 90 days of final approval. Where a phased project is involved, the excavation must be completed within 90 days of the final approval of the phase to which the mitigation measures apply. The project applicant may allow additional time at their discretion.

### Mitigation Monitoring and Reporting

Section 21081.6 requires a public agency to adopt a mitigation monitoring and reporting program whenever it makes a finding of significance under subdivision (a) of Section 21081 (also *CEQA Guidelines* Section 15091(a)(1)) or adopts a mitigated Negative Declaration. This clearly applies to any EIR or mitigated Negative Declaration which identifies adverse effects or potentially adverse effects on unique archaeological resources or historical resources.

The purpose of the mitigation monitoring and reporting program is to ensure that mitigation measures such as avoiding sites during construction, following an excavation plan, or halting construction when resources are discovered, are complied with during project implementation. Where unique archaeological resources or historical resources are involved, continuous monitoring may be necessary during development. OPR's advisory memo entitled *Tracking CEQA Mitigation Measures Under AB 3180* discusses monitoring and reporting programs in detail.

### Applicant Contributions

Section 21083.2 requires the applicant for a qualifying project to guarantee to the Lead Agency that the applicant will pay one-half the estimated cost of mitigating the project's effects on the resource. When determining the applicant's share, consideration must be given to the in-kind value of "project design or expenditures" that permit any or all the unique archaeological resource to be preserved in place or left undisturbed. The estimated cost of mitigation, other than avoidance or leaving the resource in an undisturbed state, should be included in the EIR.

The project applicant's share of mitigation funding is limited by statute to the following amounts:

- For commercial or industrial projects, an amount equal to one-half of one percent of the projected cost of the project for mitigation measures undertaken within the site boundaries.
- For a single residential unit, an amount equal to three-fourths of one percent of the projected cost of the project for mitigation measures undertaken within the site boundaries.
- For a residential project of more than one unit, an amount equal to three-fourths of one percent of the projected cost of the project for mitigation measures undertaken within the site boundaries for the first unit plus the sum of the following:
  a. $200 per unit for any of the next 99 units.
  b. $150 per unit for any of the next 400 units.
  c. $100 per unit in excess of 500 units.

When a final decision is made on the project, the Lead Agency shall, if necessary, reduce the specified mitigation measures to those which can be funded with the money guaranteed by the applicant and any other sources. Where such reduction results in a significant effect not being reduced to a level of insignificance, the Lead Agency must adopt findings of overriding consideration pursuant to *Guidelines* Section 15093.

**Human Remains**

The disposition of Native American burials (human remains) are governed by the provisions of Sections 5097.94 and 5097.98, and fall within the jurisdiction of the Native American Heritage Commission. Where human remains are known, or thought likely to exist, consultation with the Native American Heritage Commission should be initiated by the Lead Agency as early in the project planning process as possible. The Commission has statutory authority to mediate agreements relative to the disposition of Native American remains. These agreements are not subject to CEQA.

**The location of old grave sites and Native American remains are often not known in advance. Appendix K suggests a specific procedure for dealing with the unexpected discovery of human remains. (Part VIII of Appendix K) If human remains are discovered, the County Coroner must be notified within 48 hours. There should be no further disturbance to the site where the remains were found. If the remains are Native American, the coroner is responsible for contacting the Native American Heritage Commission within 24 hours. The Commission, pursuant to Section 5097.98, will immediately notify those persons it believes to be most likely to be descended from the deceased Native American.**

**Accidental Discoveries**

CEQA authorizes, but does not require, a Lead Agency to adopt provisions in the agency's own CEQA guidelines for responding to the accidental discovery of archaeological resources during construction. A number of jurisdictions have done this, including Santa Barbara County. These measures may include, but are not limited to, the following:

- Requirements for the immediate evaluation of the find.
- Provisions for contingency funding and a time allotment sufficient to either allow excavation and recovery of an archaeological sample, or to employ measures which would avoid the site of the resource without disturbing it.
- The stopping of construction work on that portion of the site where an archaeological or historical resource was discovered.

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# SECTION 21083.2 EXCEPTION

Pursuant to its subdivision (j), the requirements of Section 21083.2, including limits on the applicant's share of the cost of mitigation, may be waived for the following:

- A public agency project, if the Lead Agency elects to comply with all other applicable provisions of CEQA.
- A project undertaken by a person that is supported in whole or in part through contracts, grants, subsidies, loans or other forms of assistance from one or more public agencies, if the Lead Agency elects to comply with all other applicable provisions of CEQA.
- A public agency's consideration of a private project, if the applicant and the Lead Agency jointly elect to comply with all other applicable provisions of CEQA. A private project cannot be excepted from Section 21083.2 without the applicant's consent.

**When Section 21083.2 does not apply, a substantial adverse change in any archaeological resource should be considered a significant effect on the environment. Therefore, the project's initial study must address the potential for significant impacts relative to any significant archaeological resource (not simply the "unique resources" defined under Section 21083.2), as well as any archaeological resource that is also a historical resource pursuant to Section 21084.1.**

**The majority of sub-surface archaeological sites derive their significance from their information potential, that is, the ability to yield important information which contributes to our understanding of history and pre-history. Any action, such as clearing, scraping, soil removal, mechanical excavation or digging that would alter or destroy a site's integrity (i.e., intactness), stratigraphy, or association has the potential to be a significant adverse impact.**

**For purposes of CEQA, "environment" is defined to include: "the physical conditions which exist within the area which will be affected by the proposed project, including ... objects of historic or aesthetic significance" (Section 21060.5). This includes archaeological sites (*Society of California Archaeology v. Butte County* (1977) 65 Cal.App.3d 832).**

**Mitigation Measures**

**Although the specific mitigation provisions of Section 21083.2 do not apply, the applicant and Lead Agency may use them as a general guide to mitigation. If an archaeological survey and report is required for the project, it should recommend specific measures to mitigate the significant effect identified in the report. These recommendations should form the basis for mitigation measures or alternatives in the EIR for the project. If the project is approved on the basis of an EIR or mitigated Negative Declaration, the Lead Agency must adopt a mitigation monitoring and reporting program as required under Section 21081.6.**

END

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Appendix 1: Excerpts from the Public Resources Code

Appendix 2: Appendix K of the CEQA Guidelines

Appendix 3: Historical Resources Information Centers

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State of California
**Governor's Office of Planning and Research**

1400 Tenth Street
Sacramento, CA 95814
916-322-2318

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 2:18 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: Brownley Makes Funding For The Santa Susana Clean Up A Priority

Dear Mr. Malinowski,

Please add the email to NASA below to my DTSC SSFL comments. I am particularly concerned that Representative Brownley references a partial nuclear meltdown as a reason to fund the NASA SSFL cleanup. Furthermore, you can see that there could be a problem getting the funding to clean up NASA's portion of funding from Congress. For this reason, DTSC must consider the alternative cleanup scenarios so that a risk based cleanup plan can be presented to the decision makers - which will include Congress.

Thank you.

*Christine L. Rowe*
West Hills resident

Subject: Brownley Makes Funding For The Santa Susana Clean Up A Priority
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

It would be nice if NASA posted this kind of information on its website in addition to letters related to the Environmental Impact Statement. I do not live in Congresswoman Brownley's district, and I do not receive emails from her.

Please see below.

*Christine L. Rowe*
*West Hills, California - Impacted resident by the planned cleanup*

http://juliabrownley.house.gov/media-center/press-releases/brownley-makes-funding-for-the-santa-susana-clean-up-a-priority

1. me
2. »Media Center
3. »Press Releases

# Brownley Makes Funding For The Santa Susana Clean Up A Priority

Jul 18, 2013
Press Release
***Offers Amendment to Increase Funding for NASA's Environmental Compliance and Restoration Program***

**WASHINGTON, D.C. —** Today, Representative Julia Brownley (D-Westlake Village), a member of the Science, Space, and Technology Committee, offered an amendment to the NASA Authorization Act of 2013 which would authorize funding for environmental cleanup and restoration at NASA sites across the U.S.

"Communities near the Santa Susana Field Laboratory and others across the country should not be forced to wait another minute for these contaminated NASA sites to be cleaned up," said **Congresswoman Brownley**. "The families and children whose health and safety have suffered from the effects of these past mistakes is appalling and we should do everything we can to remove this contaminated soil and groundwater immediately."

**The current NASA Authorization Act of 2013 would authorize only $45 million for NASA's Environmental Compliance and Restoration program. This is far less than the $75.5 million that is needed to meet NASA's clean-up commitments in states across the nation, including California. Inadequate funding of the program may cause NASA to fail to meet agreed-upon compliance deadlines. This will increase long-term costs of clean-up, and force American taxpayers to foot the bill for non-compliance fines.**

Brownley's amendment will authorize full funding for NASA's Environmental Compliance and Restoration program. This will ensure the Agency continues the vital environmental restoration projects that improve environmental and public health.

See the full remarks delivered by Congresswoman Brownley on her amendment below.

/ / /

***Mr. Chairman, today, I offer a simple amendment to restore funding to NASA's Environmental Compliance and Restoration program. Specifically, my amendment increases funding from $45 million to $75.5 million dollars, which is the level requested by the Administration.***

*NASA's Environmental Compliance and Restoration program is responsible for cleaning up hazardous materials and waste that have been released at the surface or have seeped into the groundwater at NASA installations, NASA-owned industrial plants supporting NASA activities, sites where NASA operations have contributed to environmental problems, and other locations where the Agency is legally obligated to address hazardous pollutants.*

*The program is charged with protecting human health and preserving natural resources for future NASA missions. Environmental Compliance and Restoration program activities include clean-up projects, assessments, investigations, sampling, construction, related engineering, program support, monitoring, and regulatory Agency oversight.*

*Cleaning-up the soil and groundwater contamination at sites across the country is our responsibility to our constituents whose health and safety have suffered from the effects of these past mistakes. Communities across the country should not be forced to wait even longer for clean-up.*

*According to NASA's 2014 budget request, key planned projects include the following:*

***Investigation and cleanup of contaminated groundwater, soils, and demolition at Santa Susana Field Laboratory in accordance with the consent order with the State of California. Toxic material from a partial nuclear meltdown at this former rocket-testing site in 1959 still has not been cleaned-up, in spite of dangerous levels of known carcinogens.***

*It also includes clean-up of contaminated groundwater emanating from Jet Propulsion Laboratory;*

*Continued investigation and cleanup of groundwater and soil contamination at Kennedy Space Center in accordance with State of Florida requirements;*

*Continued cleanup of ground water contamination and investigation of soil contamination at White Sands Test Facility, to comply with the facility permit issued by the State of New Mexico; and*

*Cleanup of the peninsula solid waste disposal site at the Ames Research Center.*

*Mr. Chairman, many of NASA's planned environmental compliance and restoration activities resulted from painstaking negotiations between NASA and several states.*

*A further delayed federal response could jeopardize these carefully negotiated agreements and end up costing the federal government more money down the road.*

*My amendment ensures that NASA has the funding to keep in good faith with its legal obligations to states.*

***According to NASA Administrator Charles Bolden, the $23.9 million sequester impact to this program will likely result in numerous delays to projects.  If we fail to provide adequate funding and force NASA to renegotiate agreed-upon compliance dates, American taxpayers will end up footing the bill for non-compliance fines.***

***NASA has an obligation to keep its word, and our Committee has an obligation to ensure the funding is there so that NASA clean ups across the United States can continue, on schedule.***

***Many of the sites that depend on this funding are in our Congressional districts and directly impact the health and well-being of our constituents.***

*I urge my colleagues to support my amendment and restore needed funding to NASA's Environmental Compliance and Restoration Program.*

# # #

**Issues:**

Energy and Environme

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Saturday, January 04, 2014 7:52 PM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: CEQA Segmentation

Dear Mr. Malinowski,

Please include the letter to Ms. Bothwell in my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Thu, Aug 22, 2013 at 3:42 AM
Subject: CEQA Segmentation
To: "Bothwell, Nancy@DTSC" <Nancy.Bothwell@dtsc.ca.gov>

Dear Ms. Bothwell,

In reviewing various rulings relative to CEQA, it is my opinion as it has always been, that a complete Environmental Impact Review for the whole site should have been performed when the DTSC became the lead agency on this project.

While I do understand that DTSC believes that the removal of the structures is ministerial in action under Ventura County, I believe that two documents refute that opinion. (1) (2)

These are paragraphs from the second source:

**"In considering EIR timing, the court explained an "approval" of a private project "occurs upon the earliest commitment to issue or the issuance by the public agency of a discretionary contract, grant, subsidy, loan or other form of financial assistance…" (quoting Cal. Code Regs, tit. 14, § 15352 (b)). The court emphasized two legislative policy considerations relating to the timing issue. First, an EIR should not be required until the project is sufficiently defined to permit a meaningful environmental assessment. Second, an EIR should not be so delayed that it fails to serve its intended function of being a tool to aid an agency in making a fully informed decision on a project. Because Save Tara's claim challenged the City's postponing its preparation of the EIR on future conditions, the challenge was predominantly procedural, subject to de novo review with heightened scrutiny (citing *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564). The court noted that characterizing the timing issue as procedural did not remove all agency discretion, but did establish an outer limit. The court explained that agencies could not evade the central tenets of CEQA by establishing procedures that allow for the commitment to a project to occur prior to EIR preparation." (2)**

**"The Supreme Court also disagreed with the appellate court's suggestion that all agreements should be deemed CEQA approvals if a project is sufficiently well-defined when the agreements are executed to allow preparation of an EIR. The court said such a requirement ignored the commitment requirement, noting that CEQA recognizes a number of pre-approval actions, such as feasibility or planning studies, that can occur without environmental review (citing Cal. Code Regs., tit. 14, § 15262). The court further observed that CEQA was not intended to unnecessarily burden an agency's preliminary or tentative agreements executed prior to deciding project specifics. Instead, the court provided the following guiding general principle: "[b]efore conducting CEQA review, agencies must not 'take any action' that significantly furthers a project 'in a manner that forecloses alternatives or mitigation measures that would ordinarily be part of CEQA review of that public project.'" Save Tara, ____ Cal. 4th ____ (citing Cal. Code Regs., tit. 14, §15004(b)(2)(B)). Surrounding circumstances along with the agency's agreements should be evaluated by the courts when applying this general principle. To assist in making the determination, the court set forth a two-step approach: (i) whether the agency, in taking action indicated it would perform environmental review before making any further commitment to the project, and if so, whether the agency nevertheless limited its discretion regarding environmental review; and (ii) whether the record showed the agency committed significant resources to shape the project and foreclosed consideration of meaningful alternatives (citations and quotations omitted).**

**Applying the two-step approach to the facts of the case, the court found the City's agreements evidenced commitment to the project by among other things: (i) repeatedly stating the project would be developed as outlined in the HUD application; (ii) allowing almost a half a million dollars to be loaned which was not conditioned on CEQA and would not be repaid if final approval did not occur; (iii) limiting the City's discretion over the CEQA process by improperly delegating to the city manager such authority and limiting such determinations to a "reasonableness standard" (exposing the City to potential challenges it acted unreasonable if it ultimately did not to certify the EIR); and (iv) phrasing the condition that "requirements of CEQA" be "satisfied" as raising questions as to whether the City would still be able to reject the project on substantive grounds even if it found the EIR legally adequate. In looking at the overall circumstances evidencing the City's commitment to the project, the court pointed to: (i) public statements unequivocally advancing support for the project and rejecting alternatives; (ii) preparatory tenant relocation actions; (iii) substantial financial contributions; and (iv) the willingness to condition its obligation to convey the property based on whether CEQA was satisfied as reasonably determined by the city manager. In this case, both the provisions in the City's agreements and the surrounding factual circumstances convinced the court that the City had improperly "committed itself to a definite course of action regarding the project before fully evaluating its environmental effects. That is what sections 21110 and 21151 [of the Public Resources Code] prohibit."** ***Save Tara*****, __ Cal. 4th ___."(2)**

Please see page 6 of the NEPA CEQA Handbook dated March 2013. In that handbook, it states that there cannot be two lead agencies. (1) It is my opinion that while building demolition is ministerial under certain parts of CEQA, that is not always the case. An example is when a structure is historic in nature. I believe that since DTSC has had to sample all structures prior to demolition, that DTSC is actually the lead agency on when a building can be demolished, and therefore it is only the permitting that is ministerial.

Therefore, it is my opinion that when DTSC became the lead agency on this project, they should have anticipated that there would eventually have been the need for a full site EIR. And while both DTSC and the Water Board are able to file CEQA exemptions, the community and other agencies should have had an opportunity at some time in the last roughly 20 years to consider the cumulative environmental impacts of this project.

While I know that thousands of truckloads of building debris and soil have been removed due to building demolition, the Northern Drainage project, and the Interim Source Removal Project, it is my opinion that you must consider the cumulative impacts of those projects on air quality, surface water, greenhouse gas emissions, etc.

While the DOE and NASA are both in the process of doing their own Environmental Impact Statements, the NEPA CEQA document refers to NEPA and CEQA co leads.

In reading the chart that is on page 9 of this document, it is my opinion that DTSC should have been performing an EIR at the same time that the DOE was doing their initial Environmental Assessment which triggered the DOE lawsuit.

Finally, I believe that what is happening is defined as Segmentation under CEQA. (3) I recommend that you also see reference to the fact that if the water is impacted, the project may also be subject to NEPA. I believe that if any decisions related to the changes of the surface water are involved, the Army Corps of Engineers must be involved. I also believe that the Army Corps of Engineers can also mandate their own Section 106 authority and NEPA requirements.

I respectfully submit that DTSC should be further along in the CEQA process than what we have seen on our time tables and in our monthly DTSC updates. Please see CEQA on page 18 of the NEPA CEQA handbook regarding alternatives. (1) Please see paragraph 4 where it states that **"CEQA review must be complete, however, before California agencies constrain their discretion in any way, particularly regarding the adoption of project alternatives or mitigation measures." (1) - page 18**

This statement indicates to me that despite the Administrative Order on Consent, DTSC should not have communicated with Senator Boxer to force NASA to change their alternatives to cleaning up to Background or No Further Action. The same would be true of the future EIS for DOE.

**"State and Federal agencies should begin NEPA / CEQA procedures as early as possible in their planning process in order to allow environmental considerations to influence project design." (1) - page 18**

I also believe that the Army Corps of Engineers should be consulted regarding the current status of the NASA Draft Environmental Impact Statement (DEIS), and the Administrative Orders on Consent - which - it is my opinion will have a tremendous potential impact on surface water runoff and the potential impact for flooding and landslides based on my initial review of the NASA DEIS. All agencies and elected officials - in my opinion - that could be impacted by flooding and surface water runoff should be consulted for the NASA DEIS, the DOE EIS, and the DTSC EIR while the public comment period is running for NASA.

Respectfully,

*Chris Rowe*

1) NEPA CEQA Guidelines:
http://ceq.hss.doe.gov/publications/NEPA_CEQA_Draft_Handbook_March_2013.pdf

2) "Agreements conditioned on subsequent CEQA review violate CEQA if record shows agency already committed to projec"t:
http://www.lexology.com/library/detail.aspx?g=c511eedd-1d30-432c-832e-d92da929beb0

3) CEQA FACTS:
http://www.waterboards.ca.gov/water_issues/programs/grants_loans/grant_info/docs/ceqa_faq.pdf

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 2:41 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: DEAR NASA - PLEASE EXTEND THE COMMENT PERIOD FOR THE NASA SANTA SUSANA DEIS / SECTION 106

Dear Mr. Malinowski,

Please include my comments to NASA below in my DTSC CEQA comments. DTSC has never had a discussion with the SSFL community to the best of my knowledge related to the archaeological and cultural aspects of the SSFL site - let alone the historical aspects.

These need to be topics in DTSC's CEQA analysis, and these need to be discussions with DTSC and technical experts in these areas.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sat, Oct 5, 2013 at 2:42 AM
Subject: DEAR NASA - PLEASE EXTEND THE COMMENT PERIOD FOR THE NASA SANTA SUSANA DEIS / SECTION 106
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

Due to the current government shutdown, many of the responses that I get from emailing NASA come back with a response that states that the NASA employee has been furloughed.

I do not know why NASA chose the NEPA process in which to consider the Section 106 process. However, as a result, our opportunity to meet as Section 106 consultants, and to discuss one of the most critical aspects of the NEPA DEIS document, will most likely be taken away from us because the October 1st, 2013 date has passed.

**Therefore, the discussion for Section 106 and how to protect the archaeological / cultural aspects of the U.S. Government property now that the whole SSFL site has been declared Sacred Lands by the Santa Ynez Band of Chumash will fall outside of the general public comment period. Our last two meetings focused completely on the preservation of the three historic districts without real discussion of the impact of the cleanup on the archaeological / cultural.**

I respectfully request that NASA either extend the date for the NASA EIS for one month after the government shutdown has ended, or one month after the project director has the opportunity to consult with the NASA Federal Preservation Officer, and after both employees have the opportunity to consult with their superiors . I suspect that others may have asked for an extension to comment as well.

**NASA Santa Susana is a unique environment in many ways. The cultural / historical significance of the earliest inhabitants of this site cannot be ignored, and our ability to consult and to be educated by other consultants in regards to this aspect should not be denied. I believe that our focus was taken away from this important aspect of the site because we were forced to address a worst case scenario document that was not risk based, and which did not consider the NASA OIG's comments in my opinion since by selecting the two alternatives, NASA ignored the wisdom of the NASA OIG report.**

Please extend the NASA DEIS deadline / Section 106 comments after NASA personnel return to work so that we are given enough time to have a presentation from NASA by Ms. Groman and other NEPA / Section 106 historical and cultural consultants.

Respectfully submitted,

*Christine L. Rowe*
NASA Section 106 Consulting Party

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Saturday, January 04, 2014 7:17 PM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: Definition of an artifact et al for the NASA DEIS
**Attachments:** ACHP ARCHAEOLOGY GUIDANCE.pdf; Anthropocene.docx

Dear Mr, Malinowski,

Below is my first comment to NASA on their DRAFT DEIS. Please add this to my CEQA comments on the SSFL.

Thank you.

*Christine L. Rowe*
West Hills resident

From: **Christine Rowe** <crwhnc@gmail.com>
Date: Thu, Sep 5, 2013 at 2:03 AM
Subject: Definition of an artifact et al for the NASA DEIS
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

I have been, and I continue to be concerned, that NASA signed the 2010 Agreement in Principle and the 2010 Administrative Order on Consent - to my knowledge - without review by NASA personnel or consultants that are qualified to understand Section 106, NEPA, and CEQA.

I researched the Section 106 Archaeology guidance, and while the term artifact is used, I do not see it defined. (document date 1/1/ 2009)

In the context of the Section 106 documents - in fact - I believe that they misuse the term artifact because they imply that an artifact is something is portable - it can be found on the surface or excavated and studied. I disagree with that interpretation.

I have gone to several textbooks on Physical Anthropology and Archaeology for the definitions of an artifact:

1. **artifact - Any physical remains of human activity.** (1)
2. Artifacts - Objects or materials made or modified for use by hominids. The earliest artifacts tend to be tools made of stone, or occasionally, bone.(2)
3. artifact - Any object, usually found at an archaeological site, that was made by humans. (3)
4. Artifact - An object (tool or ornament) showing human workmanship or modification.(4)
5. Feature - A large, complex artifact or part of a site such as a hearth, cairn, housepit, rock alignment or activity area. (4)
6. Site - The location of past cultural activity; a defined space with more or less continuous archaeological evidence. (4)

NASA astronauts - as our representatives from the United States - can look from space back at earth. These astronauts can see what features are of a geologic nature and which are anthropogenic in nature (caused or produced by humans).

In the short term, a hundred years from now, humans will look back to 2013 and see television sets, smart phones, and the computers of today, as artifacts of the past. The buildings that remain, the Space Shuttles, the Santa Susana Field Laboratory NASA test stands; all will be artifacts made by humans. So too are the cave paintings and other markings on these natural features at Santa Susana. While a cave or a stone outcrop may be a natural feature, it is the evidence of human activity that makes them artifacts or archaeological sites in my opinion.

I have attached a box from Chapter 11 of ***Stein and Rowe, Physical Anthropology***. It is Box 11- 5 called **The Anthropocene**. It is being sent in its text form from prior to publication. It is found on page 261 of that text. (1)

This box discusses the different epochs in the geologic scale - a proposed new epoch written by a geologist. The box is from: "J. Zalasiewicz, ***The Earth After Us: What Legacy Will Humans Leave in the Rocks?*** ( Oxford:Oxford University Press, 2008), p. 15

My points to NASA are many:

1. **NASA is aware and has been aware of the many "artifacts": middens, mortar basins, tools, cave paintings, and other evidence of human activity on the U.S. Government property.**
2. **NASA is now aware that the Santa Ynez Band of Chumash - and many other Native American tribes - believe this area to be sacred land.**
3. **Archaeologists have placed the Burro Flats complex into the context of a discontiguous archaeological district. That term was first used in relation to this site to me by John Romani, and it has subsequently been used by Dan Larson of Compass Rose Archaeological.**
4. **While we may not see evidence of human activity from the past on the surface, digging in any area could potentially reveal or permanently damage unknown human remains, animal remains, or artifacts at depth.**
5. **The actions that NASA takes on the U.S. Government property at the level stated in the NASA DEIS under the clean up to the AOC is irreversible.**
6. **While NASA mentions "bounding" the Burro Flats site and data recovery - it is my belief that this action diminishes the sacredness of the site; it takes the artifacts from their place which removes their value of place and time; and there is the potential to encounter both human and animal remains that could be placed in burial positions with specific religious and ritual significance.**
7. **Leave the Burro Flats site alone!**
8. **I respectfully request that NASA request information from the Native American Heritage Commission (NAHC) or other applicable agencies to determine the MINIMAL boundaries of the Burro Flats complex location. In consultation with local archaeologists, it is the opinion of those archaeologists that NASA's archaeologists have reduced the size of the known area of the complex.**
9. **It is my opinion that this location (Burro Flats) should be fenced off and left undisturbed - permanently - as has been done at Lascaux or at the Painted Cave near Santa Barbara .**
10. **No sampling should be done in any known archaeological site areas without the concurrence of the NAHC and the SHPO.**

11. **DTSC can state in their final release of the property that this fenced area is to be used only by the Native Americans for ceremonial uses or language of a similar nature in a land covenant).**
12. **NASA needs to renegotiate the Administrative Order on Consent to reflect the new status of the U.S. Government property as Sacred Lands.**
13. **NASA needs to more accurately define and use more words which reflect the cultural aspects of this site historically in any future agreements with the State of California.**

Respectfully submitted,

*Christine L. Rowe*
NASA Section 106 Consulting Party

(1) Philip L. Stein and Bruce M. Rowe - ***Physical Anthropology - 11th Edition*** - 2013 - page G-2
(2) Turnbaugh, William A.; Jumain, Robert; Nelson, Harry; Kilgore, Lynn - ***Understanding Physical Anthropology and Archaeology - Seventh Edition*** - 1999 - page 519.
(3) Feder, Kenneth L. and Park, Michael Alan - ***Human Antiquity - Second Edition*** - *1993 - page 461*.
*(4)* ***Glossary of Archaeological Terms - Native American Heritage Commission -***
*http://www.nahc.ca.gov/glossory.html*

# Box 11-5

We look around us and see a landscape greatly altered by human activity. Yet let us imagine that a geologist, a far distant descendant of today's humans or, what is more likely, an alien from another world, comes to earth 100 million years from now. What evidence would our geological traveler find that would mark the fact that we, living in the 21st century, once inhabited the earth?

Geologist Jan Zalasiewicz has pondered this very question. He suggests that no hint of our tenure on this planet will be seen on the earth's surface. "Our planet is too active, its surface too energetic, too abrasive, too corrosive, to allow even (say) the Egyptian Pyramids to exist for even a hundredth of that time."[1] Yet, perhaps,some hint of our existence may be found in the sedimentary layers lying deep within the earth, brought to the surface by erosion and tectonic activity. What features of these sedimentary layers would provide the necessary clues?

The divisions of the geological time scale are defined in terms of major geological and paleontological events that can be observed in the layers of the earth. Many geologists have recently proposed that a new epoch be added to the geological time scale: the **Anthropocene.** The key events that would mark this new epoch would be signals of human activity that would be preserved in the stratigraphic record. These signals include human activities that have altered the earth to such an extent that geologists millions of years in the future will be able to spot signs of humankind's passing.

Future geologists will be able to see the results of earlier human presence by noting unique changes in the landscape caused by mining, road building, leveling of mountains, and the rapid building up of sediments behind river dams. Geochemical analysis will reveal the sudden appearance of chemical signals such as a layer of mercury associated with 1980s coal plants. Future paleontologists will observe the rapid extinction of a great many species in the fossil record and a major reduction in plant and animal diversity. Sedimentary beds will be formed from unique soil types caused by organic matter enrichment, cultivation, and overgrazing.

There is some debate as to when the beginning of this epoch should be set. Some suggest that it should begin at the start of the Industrial Revolution, but others feel it should be extended back to the beginnings of agriculture, and perhaps earlier. A proposal to add the Anthropocene to the Geological Time Scale has been formally made to the Stratigraphy Commission of the Geological Society of London. The proposal is awaiting further study.

[1] J. Zalasiewicz, *The Earth After Us: What Legacy Will Humans Leave in the Rocks?* (Oxford: Oxford University Press, 2008), p. 15.

From: Philip L. Stein and Bruce M. Rowe, *Physical Anthropology* 11th ed., New York: McGraw-Hill, 2014, page 261.

## SECTION 106 ARCHAEOLOGY GUIDANCE

*(available online at www.achp.gov/archguide)*

*(current as of 01/01/2009)*

# I. INTRODUCTION

**A. Purpose of the guidance.** The Advisory Council on Historic Preservation's Section 106 Archaeology Guidance is designed to assist federal agencies in making effective management decisions about archaeological resources in completing the requirements of Section 106 of the National Historic Preservation Act (NHPA) (www.achp.gov/nhpa.html) [16 U.S.C. § 470f] and its implementing regulations, "Protection of Historic Properties" [36 CFR part 800] (www.achp.gov/regs-rev04.pdf). To encourage both effective and efficient consideration of archaeology in planning, this guidance highlights the decision-making role of the federal agency in the Section 106 process. This document is also designed for use by State and Tribal Historic Preservation Officers (SHPOs/THPOs), Indian tribes, Native Hawaiian organizations (NHOs), and cultural resource management professionals when assisting federal agencies to meet their responsibilities under Section 106.

This document presents non-binding guidance.

**B. Web-based presentation and long-term vision of assistance.** This guidance is presented in an interactive, Web-based format as a series of questions and answers. It is designed to be a dynamic document, with examples used to illustrate the points and perspectives made here.

Each question has a unique answer. However, the answers complement each other in such a way that, when considering a specific question or topic, the user is strongly encouraged to access links to other answers and their questions, as suggested. Also, links to pertinent federal law, regulation, standards, and guidance are provided. Accessing this additional information offers the user a more thorough explanation.

We invite you to send your feedback on this guidance, your recommendations on additional archaeology topics that should be considered, and examples of successful Section 106 outcomes to archaeology@achp.gov.

**C. Topics covered.** The questions and answers are grouped under five main categories that mirror the steps in the Section 106 process (a complete list of questions can be found in the index at the end of this document):

- Getting started in the Section 106 process
- Section 106 consultation about archaeology
- Determining which archaeological sites are significant
- Reaching agreement on appropriate treatment
- Completing the Section 106 process

**D. Terms used in the guidance.** A ***historic property*** (or ***historic resource***) is defined in the NHPA [16 U.S.C. § 470w(5)] as any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places, including artifacts, records, and material remains related to such a property or resource." Following National Register Bulletin No. 36, "Guidelines for Evaluating and Registering Archaeological Properties" (www.cr.nps.gov/nr/publications/bulletins/arch/), an ***archaeological site*** is "a location that contains the physical evidence of past human behavior that allows for its interpretation." The term ***archaeological site*** refers to those that are eligible for or are listed on the National Register (historic properties) as well as those that do not qualify for the National Register. The commonly used term ***cultural resource*** does not have a consistent or legal definition.

The ***significance*** of a property refers to its ability to meet one of the four National Register criteria (A-D) (www.achp.gov/nrcriteria.html). According to National Register Bulletin No. 15, "How to Apply the National Register Criteria for Evaluation" (www.cr.nps.gov/nr/publications/bulletins/nrb15/), "[t]he quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association" and that meet one or more of the four criteria (A-D). ***Integrity*** is the ability of the property to convey this significance through physical features and context. Historic properties are significant because they do meet these criteria and have integrity. Pursuant to Section 101(d)(6)(A) of the NHPA, properties of traditional religious and cultural significance to an Indian tribe or NHO may be deemed eligible for listing on the National Register (See "Consulting with Indian Tribes in the Section 106 Review Process" at www.achp.gov/regs-tribes.html).

Indian tribes, NHOs, ethnic or religious groups, communities, professional and other organizations, or the public may ascribe a cultural, historical, or religious ***value*** to an archaeological site. The term *value* here refers to the site's worth and importance to them and their experience, regardless of whether the site possesses National Register ***significance***. For example, an archaeological site may be of historical or cultural value to the Mormons, or to an African-American community (See the description of the African Burial Ground at www.achp.gov/casearchive/casessum03NY1.html), or to the Order Sons of Italy in America, with or without its meeting the criteria for listing in the National Register.

***Mitigation*** is a way to remedy or offset an adverse effect or a change in a historic property's qualifying characteristics in such a way as to diminish its ***integrity***. ***Treatment*** is the act of mitigating those effects, or how one goes about implementing the mitigation measure(s) agreed upon in consultation. Thus, a mitigation plan for the undertaking may contain several treatment plans, one for each property being adversely affected. Data recovery is a common mitigation measure that, through implementation of a treatment plan, retrieves the important information present within an archaeological site that makes it eligible before the site's integrity is compromised or destroyed.

## II. BACKGROUND

**A. Archaeology under Section 106.** The Advisory Council on Historic Preservation's (ACHP) primary involvement with archaeology is through Section 106 review. It has been estimated that more than 90 percent of the archaeological excavations conducted in the United States are done so pursuant to Section 106 of the NHPA.

Responsibilities for archaeology under Section 106 extend to undertakings such as construction projects and land and resource planning efforts occurring on federal lands, as well as those where federal agencies provide funding or issue licenses, permits, or approvals for actions on non-federal lands, including tribal, state, municipal, and private property.

Archaeological sites are identified and evaluated under Section 106 by federal agencies for their eligibility for listing in the National Register. Through consultation with stakeholders, such as State and Tribal Historic Preservation Officers, Indian tribes, and Native Hawaiian organizations, federal agencies take into account the effects of their undertakings on eligible or listed archaeological sites. Together, the agency and the consulting parties specified in the ACHP's regulations consider ways to avoid, minimize, or mitigate adverse effects, and it is in this consultation process that the finite and non-renewable nature of listed or eligible archaeological sites is considered, as well as the ***value*** these sites may have to different parties.

**B. Origins of ACHP archaeology guidance**. The extraordinary diversity of our nation's archaeological heritage is only one of the many national historic preservation issues that fall within the ACHP's broad agenda. The identification, analysis, and treatment of archaeological resources have always been a mainstay of the Section 106 process. Over the years, the ACHP has prepared several guidance documents that address archaeology in Section 106 review, including:

- Treatment of Archeological Properties: A Handbook (1980)
- Identification of Historic Properties: A Decision-making Guide for Managers (1988, joint ACHP-NPS publication)
- Consulting About Archeology Under Section 106 (1990)
- Recommended Approach for Consultation on Recovery of Significant Information from Archeological Sites (1999) (www.achp.gov/archguide.html)
- Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects (2007) (www.achp.gov/docs/hrpolicy0207.pdf)

Although the ACHP's "Treatment of Archeological Properties: A Handbook" (1980) is still cited, it has become dated. This current guidance does not replace this handbook but rather is designed to build on the foundation it established.

As with the *Treatment Handbook*, the current guidance has been developed under the direction of an Archaeology Task Force (www.achp.gov/atf.html) established by the chairman of the ACHP in 2003 to identify those new and recurring issues that should receive priority consideration and action by the ACHP. Following outreach to federal agencies, SHPOs/THPOs, Indian tribes and NHOs, and the professional archaeological community (Society for American Archaeology, the Society for Historical Archaeology, the American Cultural Resources Association, and the Register of Professional Archaeologists), the task force determined new Section 106 archaeology guidance was needed.

## III. QUESTIONS AND ANSWERS ABOUT SECTION 106 ARCHAEOLOGY

### A. GETTING STARTED IN THE SECTION 106 PROCESS

**1. What are a federal agency's responsibilities under Section 106 of the NHPA?**
Section 106 of the National Historic Preservation Act (www.achp.gov/nhpa.html) requires federal agencies to "take into account" the effects of their undertakings on historic properties and to provide the ACHP a "reasonable" opportunity to comment. Federal agencies meet these two requirements through the process set out in the ACHP's regulations, "Protection of Historic Properties" (36 CFR part 800) (www.achp.gov/regs-rev04.pdf).

[Related questions:
- What is the role of the federal agency official in the Section 106 process?

- What is the ACHP's policy on dealing with burial sites, human remains, and funerary objects?]

**2. What is the role of the federal agency official in the Section 106 process?**

The federal agency official is the individual who has "approval authority for the undertaking and can commit the federal agency to take appropriate action for a specific undertaking as a result of Section 106 compliance" [36 CFR § 800.2(a)], and who makes the decisions in each step of the Section 106 review process, following consultation with the parties specified in the ACHP's regulations. The ACHP, State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO) and other consulting parties advise and assist the federal agency official in this effort. In reaching decisions, a federal agency should seek to reconcile historic preservation with other important public values, such as its mission, objectives, costs and public benefits. The impact on archaeological resources is one of many considerations for an agency as it weighs its decisions.

[Related questions:
- Why should federal agencies consult with other parties about archaeology?
- Who consults with whom, and how?
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?
- What information is needed to decide on treatment options?]

**3. What is the ACHP's policy on dealing with burial sites, human remains, and funerary objects?**

On February 23, 2007, the ACHP adopted a new "Policy Statement Regarding Burial Sites, Human Remains, and Funerary Objects" (www.achp.gov/docs/hrpolicy0207.pdf) that, among other things, calls for federal agencies to avoid impacts to burial sites, human remains, and funerary objects unless absolutely necessary. When the federal agency determines that avoidance of impact is not appropriate, the agency first should consider active steps it may take to preserve the burial site in place. When the federal agency decides human remains or funerary objects must be disturbed, they should be removed respectfully and dealt with according to the plan developed by the federal agency, in consultation with others as specified in the regulations. The ACHP's policy does not prescribe an outcome or endorse any specific treatment. Rather, the level of documentation and analysis should be decided through consultation on a case-by-case basis. Implementation of this policy and its principles does not in any way change, modify, detract, or add to the Native American Graves Protection and Repatriation Act or other applicable laws.

[Related questions:
- Who consults with whom, and how?
- What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?
- What issues should be considered when consulting about mitigation?]

**4. Does issuance of an ARPA permit constitute an undertaking requiring Section 106 review?**

Section 4(i) of the Archeological Resources Protection Act of 1979 [16 U.S.C. 470cc(i)] states:

> "Issuance of a permit in accordance with this section and applicable regulations shall not require compliance with section 106 of the National Historic Preservation Act, as amended [16 U.S.C. 470f]."

Thus, federal agency issuance of an ARPA permit for archaeological investigations on public or Indian lands does not, by itself, trigger review under Section 106 of the NHPA.

However, the uniform regulations implementing ARPA [43 CFR § 7.12] state that “mere issuance of such a permit does not excuse the Federal land manager from compliance with section 106 where otherwise required.” This means that if an ARPA permit is issued for archaeological investigations done in conjunction with an undertaking subject to Section 106 review, the federal land manager will still need to comply with Section 106 for the undertaking.

An example would be a federal undertaking on public or tribal lands, such as the building of a road or permitting of an energy development project that has the potential to affect historic properties. In these examples, the issuance of an ARPA permit for archaeological investigations designed to identify, evaluate, and mitigate eligible archaeological sites does not trigger Section 106 review. However, the overall undertaking for which these investigations are being carried out (i.e., the building of the road or the energy development project) is subject to Section 106 review.

[Related questions:
- What are a federal agency’s responsibilities under Section 106 of the NHPA?]

**5. Who owns the artifacts recovered from private land?**
Artifacts recovered from private lands during archaeological survey and excavation during the course of Section 106 review are usually the property of the landowner, unless state or local law mandates otherwise. (Human remains are generally covered under specific laws.)

The issue of concern to many archaeologists, SHPOs, Indian tribes, and Native Hawaiian organizations is not always that of strict ownership but that of what happens to the artifacts. There may be tax incentives to donate artifacts to qualified institutions. The relevant SHPO should be contacted for up-to-date information on ownership laws and preservation incentives within a particular state.

Federal agencies should reach agreement with the private landowner on the disposition of any artifacts extracted from his/her land prior to commencing work on the land. (A related question that will be addressed in this guidance deals with federal agency responsibilities regarding the management of archaeological documentation produced as a result of Section 106 archaeology.)

[Related questions:
- What kind of information is necessary to evaluate the eligibility of an archaeological site?
- What issues should be considered when consulting about mitigation?
- What are a federal agency’s responsibilities to complete Section 106 review?]

**6. Can the NHPA be used to restrict access to information about an archaeological site?**
Under the Freedom of Information Act [FOIA, 5 U.S.C. 552], members of the public have a right to access federal agency records, except to the extent that such records (or portions thereof) are protected from public disclosure by exceptions found under the Act. The third such exception under FOIA provides that an agency may withhold records “specifically exempted from disclosure by statute” [5 U.S.C. 552(b)(3)].

One of these statutes that specifically restrict disclosure is Section 304 of the National Historic Preservation Act [16 U.S.C. 470w-3]. Section 304 requires federal agencies, or other public officials receiving grant assistance under the NHPA, to “withhold from disclosure to the public, information about the location, character, or ownership of a historic resource…” if the agency and the Secretary of the Interior agree that its release may (1) cause a significant invasion of privacy, (2) risk harm to the historic resource, or (3) impede the use of a traditional religious site by practitioners. Once a determination to withhold from the public has been made, the Secretary of the Interior, in consultation with the relevant agency, will determine who (if anyone) may have access to the information for NHPA purposes. If the information was developed as part of a Section 106 undertaking or under Section 110(f) of NHPA, the Secretary of the Interior must consult with the ACHP in making the above determinations regarding withholding and access. For purposes of Section 304 of the NHPA, the Secretary of the Interior acts through the National Park Service.

It is important to keep in mind several issues about the authority of Section 304 to restrict information:

- First, not all archaeological records, field notes, or data analyses are subject to withholding under Section 304 of the NHPA—only information about a property's "location, character, or ownership."

- The information excludable under the scope of Section 304 of the NHPA must be about a historic property. Information about an archaeological site that is neither listed, nor eligible for listing, on the National Register of Historic Places, would fall outside the protective scope of Section 304.

- Finally, a determination has to be made that release of such information may cause a "significant" invasion of privacy, may risk harm to the historic resource, or may impede use of a traditional religious site by practitioners. Archaeological information (including as noted above records, notes, or analyses, or parts thereof) that does not meet these standards regarding historic property status, type of information, and risk of invasion, harm or impediment of use, is not protected under Section 304.

This could have implications, for example, for an Indian tribe or Native Hawaiian organization that shares sensitive written information about an archaeological site with a federal agency to ensure that it is considered in Section 106 review. Should the federal agency determine that the site is not listed or eligible for the National Register, the written information collected about this site, including its location and sensitivity, would not be protected under Section 304.

Another federal law also addresses the issue of restricting certain kinds of information. Section 9 of the Archeological Resources Protection Act [ARPA, 16 U.S.C. 470aa-mm] specifically prohibits the release of information concerning the nature and location of archaeological sites excavated or removed under an ARPA permit unless the federal land manager determines that releasing the information furthers the purposes of ARPA and will not create a risk of harm to the resources [16 U.S.C. 470hh]. The purposes of ARPA [at 16 U.S.C. 470aa] are:

> "*to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals ....*"

Because ARPA only applies on public lands or Indian lands, information from archaeological sites on private lands or non-federal public lands is not protected under its terms.

[Related questions:
- What happens when a consulting party cannot or will not provide its views?

- How should federal agencies consider past planning, research, and studies in determining the appropriate level of effort for identification?]

## B. SECTION 106 CONSULTATION ABOUT ARCHAEOLOGY

### 7. What is Section 106 consultation?

The ACHP's regulations define consultation as "the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process" [36 CFR § 800.16(f)]. By definition, then, consultation is an active exchange of ideas and information between a federal agency and other Section 106 participants that seeks consensus about what eligible or listed archaeological sites may be affected by an undertaking; why those properties are significant and of value, and to whom; and how any adverse effect to them might be avoided, minimized, or mitigated (See "Protecting Historic Properties: A Citizen's Guide to Section 106 Review" at www.achp.gov/citizensguide.html).

Federal agencies are encouraged to use, to the extent possible, existing agency procedures and mechanisms to fulfill the consultation requirements of the ACHP's regulations [36 CFR § 800.2(a)(4)]. For example, an agency may use its National Environmental Policy Act (NEPA) procedures to identify additional consulting parties. Usually, however, reliance on NEPA efforts alone will not meet the regulatory standard for consultation essential to Section 106 review because consultation requires interaction between the agency and consulting parties.

[Related questions:
- Why should federal agencies consult with other parties about archaeology?
- When does consultation begin?
- How can federal agencies foster more informed participation by stakeholders in consultation about archaeology?]

### 8. Why should federal agencies consult with other parties about archaeology?

The National Historic Preservation Act [16 U.S.C. 470h-2(a)(2)(E)(ii)] and the Section 106 implementing regulations require federal agencies to consult with other parties in the course of the Section 106 process. The active exchange of views and information among the federal agency and other parties with an interest in the effects of the undertaking on historic properties should begin in the early stages of project planning [36 CFR § 800.1(a)] and continue through all of the findings and determinations made during the Section 106 process [36 CFR § 800.2(a)(4)]. However, it is critical to recognize that, while consultation is required in each step of Section 106 review, final decision-making rests solely with the federal agency (See "Protecting Historic Properties: A Citizen's Guide to Section 106 Review" at www.achp.gov/citizensguide.html).

There are practical reasons why a federal agency should consult about archaeology. It is a way for the federal agency to gain information about the likely location and nature of historic properties that might be present in the area of potential effects prior to conducting any fieldwork. Through consultation, such as with those who might possess oral or traditional knowledge about an archaeological site, a federal agency may acquire information that helps in making a National Register evaluation or leads to a better understanding of a property's value to the community. In addition, consultation informs federal agencies about appropriate and culturally sensitive methods to use during any testing and excavation (See "Consulting with Indian Tribes in the Section 106 Review Process" at www.achp.gov/regs-tribes.html and "Native Hawaiian organizations and the Section 106 Review Process" at www.achp.gov/regs-nhos.html).

[Related questions:
- What are a federal agency's responsibilities under Section 106 of the NHPA?
- What is the role of the federal agency official in the Section 106 process?
- What information is needed to decide on treatment options?
- What kind of information is necessary to evaluate the eligibility of an archaeological site?]

**9. Who consults with whom, and how?**
Consulting parties fall into two broad groups:

a) Parties with a right to participate in consultation [see 36 CFR §800.2(c)(1) -(4)] are:

- The relevant SHPO and/or THPO, or the representative officially designated by the tribe for tribal lands;

- Indian tribes and NHOs that attach traditional religious and cultural significance to historic properties that may be affected by an undertaking. Indian tribes and NHOs determine what historic properties may be of traditional religious and cultural significance to them. Any tribe or NHO that makes such a determination must be invited by the federal agency to participate in consultation. A federal agency may also need to identify and consult with tribes that reside outside of the state or locality where the undertaking is to be located, because many tribes are now far removed from their ancestral lands (see "Consulting with Indian Tribes in the Section 106 Review Process" at www.achp.gov/regs-tribes.html and "Native Hawaiian organizations and the Section 106 Review Process" at www.achp.gov/regs-nhos.html).

- Applicants for federal assistance, permits, licenses, or other approvals;

- Representatives of local governments, and

- The ACHP, which also may enter consultation when it determines that any one of the criteria established in *Criteria for Council Involvement in Reviewing Individual Section 106 Cases* [36 CFR part 800, Appendix A] has been met. Even when not actively involved in consultation for a specific undertaking, the ACHP may provide federal agencies and other consulting parties with advice, assistance, and guidance regarding the conduct of Section 106 review, including help in resolving disputes [36 CFR § 800.2(b)(2)].

Consultation between federal agencies and Indian tribes should be conducted in a "sensitive manner respectful of tribal sovereignty," and must recognize the government-to-government relationship between the federal government and Indian tribes [36 CFR § 800.2(c)(2)(ii)]. This means the federal agency is responsible for initiating consultation with Indian tribes. This responsibility cannot be delegated unless the Indian tribe agrees in advance.

b) Other parties who may participate in consultation include the following [see 36 CFR § 800.2(c)(5)]:

- Parties with legal or economic interest in the undertaking or affected historic properties;

- Those concerned with the undertaking's effects on historic properties, such as individual tribal members with special knowledge or expertise in identifying properties of traditional religious and cultural significance to that tribe.

These parties may be identified by a federal agency and invited to participate in consultation, or such parties may submit a written request for consulting party status directly with the federal agency. However, the federal agency, following consultation with the SHPO/THPO, makes the final decision about which of these other parties will participate (See "Protecting Historic Properties: A Citizen's Guide to Section 106 Review" at www.achp.gov/citizensguide.html).

According to "The Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act" (http://fpi.historicpreservation.gov/TechnicalInfo/HistPres/FedAgencyGuidelines.aspx), in conducting consultation, a federal agency should:

make its interests and constraints clear at the outset;

- make clear any rules, processes, or schedules applicable to consultation;
- acknowledge the interests of others and seek to understand them;
- develop and consider a full range of options; and
- make an effort to identify solutions that will leave all parties satisfied.

[Related questions:

- When does consultation begin?
- Are federal agencies expected to pay consulting parties for Section 106 participation?
- How much consultation is enough?
- When does consultation end?
- What happens when a consulting party cannot or will not provide its views?]

**10. When does consultation begin?**

Federal agencies are advised to begin the Section 106 process early in project planning "so that a broad range of alternatives may be considered during the planning process for the undertaking" [36 CFR § 800.1(c)]. Early initiation of consultation helps agencies avoid delays later in review and head off potential conflicts.

In order to streamline environmental review, many agencies strive to coordinate Section 106 and National Environmental Policy Act (NEPA) requirements. When coordinating Section 106 and NEPA, federal agencies should be prepared to begin consultation early in the NEPA process, "when the purpose of and the need for the proposed action, as well as the widest possible range of alternatives, are under consideration" [36 CFR § 800.8(a)(1)].

It is important to note that the ACHP's regulations [36 CFR § 800.4(a)(3)] require federal agencies to seek information from certain parties, such as the SHPO/THPO, Indian tribes, or NHOs, before conducting an archaeological survey. It is imperative, therefore, that the agency initiate consultation prior to conducting any such archaeological fieldwork.

[Related question:

- What are a federal agency's responsibilities under Section 106 of the NHPA?]

**11. Are federal agencies expected to pay consulting parties for Section 106 participation?**

On April 26, 2002, the ACHP issued its official position on "Fees in the Section 106 Review Process," a statement designed to assist federal agencies in determining when it is appropriate to compensate a party in the Section 106 process. The entire text can be viewed at www.achp.gov/regs-fees.html.

- In summary, the NHPA and ACHP's regulations authorize federal agencies to contract with others to provide information for complying with Section 106. However, neither authority requires federal agencies to pay for any aspect of consulting party participation in the Section 106 process.

- For example, when the federal agency is seeking the views of an Indian tribe to fulfill the agency's legal obligation to consult under a specific provision of ACHP's regulations, the agency is not required to pay the tribe for providing its views. If the agency has made a reasonable and good faith effort to consult with an Indian tribe and the tribe refuses to respond without receiving payment, the agency has met its obligation to consult and is free to move to the next step in the Section 106 process.

- When an agency seeks to identify historic properties that may be significant to an Indian tribe, however, it may ask for specific information and documentation regarding the location, nature, and condition of individual sites, or actually request that a survey be conducted by the tribe. In that case, the agency essentially is asking the tribe to fulfill the role of a consultant or contractor. In such cases, the tribe would seem to be justified in requiring payment for its services, just as any other contractor. The agency may refuse to do so, but is still obligated to gather information necessary to support Section 106 decision making.

- Whenever the line between the two is not clear, the agency is "encouraged to act in a manner that facilitates, rather than impedes, effective participation in the Section 106 process.

[Related questions:
- When does consultation begin?
- How much consultation is enough?]

**12. What is the role of applicants and consultants/contractors in archaeology conducted under Section 106?**

The ACHP's regulations [36 CFR § 800.2(c)(4)] allow a federal agency to authorize an applicant (not consultants or contractors) for federal assistance, permits, licenses, or approvals to initiate Section 106 consultation. Under such an authorization, however, the federal agency maintains legal responsibility for all Section 106 findings and determinations, even though the applicant usually produces the documents and studies (including archaeological survey and testing reports) on which these decisions are based.

Federal agencies, as well as applicants, often rely on the services of consultants and contractors to prepare the information, analyses, recommendations, and studies needed during Section 106 review. Whenever a non-federal party prepares a Section 106 document or a study for review, the agency is responsible "for ensuring that its content meets applicable standards and guidelines" [36 CFR § 800.2(a)(3)]. The ACHP advises federal agencies to monitor its applicants and its consultants closely to ensure that the requirements of Section 106 are being followed.

A federal agency may not delegate to an applicant or any other non-federal party its responsibility to consult with federally recognized Indian tribes on a government-to-government basis. The federal government's responsibility to consult on a government-to-government basis with Indian tribes as sovereign nations is established through Executive Orders, Presidential memoranda, and other authorities, and is explicitly recognized by the ACHP's regulation [36 CFR § 800.2(c)(2)(ii)(B) and (C); see also "Consulting with Indian Tribes in the Section 106 Review Process" at www.achp.gov/regs-tribes.html].

While consultation with Indian tribes is a federal responsibility, federal agencies and tribes may mutually agree to allow applicants to initiate and carry out such consultation during the course of Section 106 review. To avoid any later misunderstanding, the ACHP recommends federal agencies and Indian tribes to document such agreements in writing. Any deviation from the government-to-government relationship between the federal government and Indian tribes should be agreed to as early as possible in the Section 106 process, particularly in advance of any survey and testing actions to identify National Register-eligible archaeological sites.

In the absence of such an agreement, a lack of response from the tribe to such a solicitation should not be interpreted as a lack of interest in consultation or in providing information. Rather, the tribe may choose not to respond to a query from an applicant (or its consultant or contractor) because this contact does not meet the requirement of government-to-government consultation. In those cases where a tribe has not responded to an applicant or its representative, the federal agency must contact the tribe to initiate consultation and ascertain its interest.

Before any steps are taken in Section 106 review, the federal agency first must notify the SHPO/THPO that it is authorizing an applicant (or group of applicants) to initiate consultation [36 CFR § 800.2(c)(4)]. By the time this notification is sent, the federal agency should have resolved how its government-to-government responsibilities will be fulfilled.

Following this notification, applicants and their authorized representatives may consult with the SHPO/THPO to initiate Section 106 review, identify and evaluate historic properties, and assess effects. The federal agency, however, remains responsible for participating in the consultation process when:

- initiating consultation with Indian tribes;
- it is determined that the Criteria of Adverse Effect apply to an undertaking;
- there is a disagreement between the applicant or their authorized representatives and the SHPO/THPO regarding identification and evaluation, and/or assessment of effects;
- there is an objection from a consulting party or the public regarding Section 106 findings and determinations, the implementation of agreed upon provisions, or their involvement in a Section 106 review; or
- there is the potential for a foreclosure situation or anticipatory demolition as specified in Section 110(k) of NHPA [36 CFR § 800.9(b) and (c)].

In determining the scope of work for archaeological fieldwork where listed or eligible archaeological sites of significance to Indian tribes may be involved, the applicant is advised that the federal agency has a responsibility to gather information from such tribes [36 CFR § 800.4(a)(3) and (4)]. Without this step, the identification effort might include measures an Indian tribe might consider inappropriate, insensitive, or insufficient. Therefore, the federal agency should ensure the applicant is aware of this requirement.

[Related questions:
- What is the role of the federal agency official in the Section 106 process?
- How do federal agencies meet the “reasonable and good faith effort” standard?
- How are eligibility determinations made in Section 106 review?
- How can federal agencies find out about appropriate treatment options and alternatives?]

**13. How much consultation is enough?**

While consultation establishes the context within which a federal agency takes into account the effect of its undertaking on historic properties, there is no hard and fast rule about how much consultation is enough. The ACHP's regulations call for consultation to be carried out in a manner "appropriate to the scale of the undertaking and the scope of the federal involvement" [36 CFR § 800.2(a)(4)], taking into account the nature of the undertaking and its effects on historic properties [36 CFR § 800.3(c)(3); (See "Consulting with Indian Tribes in the Section 106 Review Process" at www.achp.gov/regs-tribes.html and "Native Hawaiian organizations and the Section 106 Review Process" at www.achp.gov/regs-nhos.html)].

Where listed or eligible archaeological sites are likely to be involved, the federal agency should consider questions such as the following when planning for consultation:

- What is the significance of the site likely to be affected?
- What is the likely value of the site to living communities and cultural descendants?
- Is the nature of the undertaking the kind that may diminish the integrity of the site? For example, is the scale of the undertaking such that extensive ground disturbance, with the potential to destroy the site, anticipated? Or, if an Indian tribe or NHO attaches traditional religious and cultural significance to the site, will that association be damaged or destroyed?

[Related questions:
- How can federal agencies foster more informed participation by stakeholders in consultation about archaeology?
- What kind of information is necessary to evaluate the eligibility of an archaeological site?
- What information is needed to decide on treatment options?
- What are a federal agency's responsibilities to complete Section 106 review?]

**14. When does consultation end?**
Federal agency consultation responsibilities are met when the agency has completed the Section 106 process. If a Section 106 agreement has been executed, such completion includes implementation of those stipulations or provisions contained in the agreement. The federal agency should be able to demonstrate that it has:

- identified the appropriate consulting parties as early as practicable;
- provided them with adequate and timely documentation to participate effectively;
- involved them in Section 106 findings and determinations in a manner that is appropriate to the scale of the undertaking and its effects;
- allowed a reasonable opportunity for consulting parties to provide their views; and
- determined how to resolve adverse effects taking into account the views of consulting parties and the public or, failing to reach an agreement to resolve the adverse effects, requested, considered and responded to the ACHP's formal comments on the undertaking.

Often consultation about effects to eligible and listed archaeological sites is straightforward and non controversial, but this is not always the case. For example, consultation on the fate of an eligible or listed archaeological site that was once a small campsite may not warrant any face-to-face meetings. In contrast, consultation regarding a property of national significance, such as the African Burial Ground in New York City, which is valued by many different communities and groups, may require a much more intensive and lengthy effort (See the African Burial Ground in the ACHP's Case Digest in Fall 2001 [link at www.achp.gov/casearchive/casesfall01NY1.html], Summer 2003 [link at www.achp.gov/casearchive/casessum03NY1.html] and Fall 2003 [link at www.achp.gov/casearchive/casesfall03NY.html]).

[Related questions:
- Who consults with whom, and how?
- What happens when a consulting party cannot, or will not, provide its views?]

**15. How can federal agencies foster more informed participation by stakeholders in consultation about archaeology?**

To ensure consulting parties participate in an informed manner, federal agencies should present descriptions of archaeological investigations and recommendations using as little technical jargon as possible. Furthermore, it is in the interest of the federal agency to ensure that all recommendations and conclusions about the significance and treatment of listed and eligible archaeological sites are supported by clear and succinct statements showing the logical progression of decision-making. Experience has shown that sometimes what appears to be an objection raised by a consulting party about the treatment of an eligible or listed archaeological site may actually result from a misunderstanding caused by poorly presented technical information, or inadequately or incompletely described archaeological work (See "Protecting Historic Properties: A Citizen's Guide to Section 106 Review "at www.achp.gov/citizensguide.html).

[Related questions:
- What are a federal agency's responsibilities under Section 106 of the NHPA?
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?]

**16. What happens when a consulting party cannot, or will not, provide its views?**

The ACHP's regulations [36 CFR § 800.3(c)(4)] specify timeframes for consulting parties to respond to agency findings and determinations. When the regulations specify a timeframe for a response, the federal agency cannot proceed before that specified period has ended. Where no timeframe is given, agencies should expect a response within a reasonable time.

While consulting parties determine their level of participation in the Section 106 process, the refusal of a participant to consult or provide their views within a time frame specified in the regulations or a reasonable time frame does not stop the process. When a consulting party has been notified of a reasonable deadline for response but has exceeded that time limit, the federal agency may elect to extend the review period or may decide to proceed in the Section 106 process. In either case, the agency should ensure that it can document a reasonable and good faith effort to consult (See "Consulting with Indian Tribes in the Section 106 Review Process" at www.achp.gov/regs-tribes.html and "Native Hawaiian organizations and the Section 106 Review Process" at www.achp.gov/regs-nhos.html).

However, federal agencies and their contractors should be aware that there may be cultural prohibitions preventing or limiting information sharing, such as with archaeological sites that are properties of traditional religious and cultural significance to Indian tribes or NHOs. Where such a restriction exists, the agency should work closely with that consulting party to ensure sufficient information can be shared to support informed decision-making.

Section 304 of the National Historic Preservation Act provides protection from public disclosure of information about a historic property that might result in harm to the property, a significant invasion of privacy, or impediments to traditional religious practice at a site. For example, a tribe might be concerned that sharing information about the location of an archaeological site that contains human remains could make that site more vulnerable to the destructive activities of looters. The federal agency should inquire into the reasons behind an Indian tribe or other consulting party's non-response since a concern protected by Section 304 may be involved.

The ACHP's regulations require federal agencies to make a "reasonable and good faith effort" to identify Indian tribes or NHOs that should be consulted and provide them a "reasonable opportunity" to share their views in all steps of the Section 106 process. In practice, this does not mean an agency must put the progress of the undertaking on hold indefinitely until all tribes or NHOs respond. When the designated tribal or NHO representative has been involved in consultation and received adequate information, the agency may proceed if no response is received within a reasonable time.

For tribal consultation, the ACHP strongly recommends the agency follow-up to ensure its request has reached the correct tribal representative and that the time provided for response took into account any tribal government procedures. For example, a federal agency may propose a response within 30 days. If the tribal council meets every 90 days, and must approve all tribal correspondence, the agency's time frame for response may not be reasonable. Federal agencies should take all reasonable measures to ensure a consulting party's views are considered as it moves forward through the Section 106 process.

[Related questions:
- What are a federal agency's responsibilities under Section 106 of the NHPA? ]
- Are federal agencies expected to pay consulting parties for Section 106 participation?
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?
- When does consultation end?]

**17. Can archaeologists participate in Section 106 review as consulting parties?**
Yes. Archaeologists and professional archaeological organizations can be invited to participate in Section 106 consultation by a federal agency or may request consulting party status from the federal agency [36 CFR § 800.2(c)(5)]. However, unless they happen to be the applicants for the relevant undertaking, archaeologists and professional archaeological or preservation organizations are not parties with a right to consulting party status under the Section 106 regulations [36 CFR § 800.2(a)(4)]. Accordingly, the decision granting consulting party status for archaeologists and their professional organizations rests solely with the federal agency in consultation with the SHPO/THPO. Archaeologists and their organizations do have the right to express their views on an undertaking in the Section 106 process as members of the public.

[Related questions:
- Who consults with whom, and how?
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?
- How can federal agencies foster more informed participation by stakeholders in consultation about archaeology?

## C. DETERMINING WHICH ARCHAEOLOGICAL SITES ARE SIGNFICANT: IDENTIFICATION

**18. Does the federal agency have to identify or locate every archaeological site for Section 106 review?**
No. The ACHP's regulations do not require the identification of all of the archaeological sites within the area of potential effects (APE). Rather, federal agencies are expected to make a "reasonable and

good faith effort" to identify historic properties, including archaeological sites listed or eligible for listing on the National Register in the APE. An agency's identification effort can be considered reasonable and in good faith when it has appropriately taken into account the factors specified in 36 CFR § 800.4(b)(1) - past planning, research and studies, the magnitude and nature of the undertaking and the degree of federal involvement, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the area of potential effects.

One of the reasons the ACHP's regulation contains a post-review discovery provision [36 CFR § 800.13] is that the level of effort is reasonable and in good faith, not 100 percent or exhaustive. The costs attendant with work stoppage because of a discovery should be reason enough for a federal agency to put forth a competent professional effort at the identification stage.

[Related questions:
- What are a federal agency's responsibilities under Section 106 of the NHPA?
- What is the "reasonable and good faith effort" regulatory standard?
- How do federal agencies meet the 'reasonable and good faith effort' standard?"
- Is every archaeological site eligible for the National Register?]

**19. What is the "reasonable and good faith effort" regulatory standard?**
In order to take effects into account as required under Section 106 of the National Historic Preservation Act, a federal agency must first "take the steps necessary to identify historic properties in the area of potential effects" [36 CFR § 800.4(b)]. To do this the federal agency:

> …shall make a <u>reasonable and good faith effort</u> to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. The agency official <u>shall take into account past planning, research and studies, the magnitude and nature of the undertaking and the degree of federal involvement, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the area of potential effects.</u> *The Secretary's Standards and Guidelines for Identification* (www.cr.nps.gov/local-law/arch_stnds_2.htm) provide guidance on this subject. [36 CFR § 800.4(b)(1), emphasis added].

This section of the ACHP's regulations establishes the regulatory standard as well as those factors that must be considered in meeting it.

[Related questions:
- What are a federal agency's responsibilities under Section 106 of the NHPA?
- With whom should a federal agency consult in determining how to meet the "reasonable and good faith effort" regulatory standard?]

**20. How do federal agencies meet the "reasonable and good faith effort" standard?**
While guidance on the scope of archaeological identification issued by SHPOs or other non-federal agencies often is helpful in determining the appropriate level of effort, it does not define the federal standard and must be considered guidance only.

Ultimately, it is up to the federal agency to thoughtfully consider and weigh the following factors in developing an effective and reasonable approach to the identification of archaeological properties in Section 106 review. The federal agency official makes a "reasonable and good faith effort" to identify historic properties by designing and implementing an identification plan that addresses the following factors [set out in the regulations at 36 CFR § 800.4(b)(1)]:

- “past planning, research and studies;”
- “magnitude and nature of the undertaking;”
- “the degree of federal involvement;”
- the “nature and extent of potential effects on historic properties,” and
- the “likely nature and location of historic properties within the area of potential effects.”

**21. How should federal agencies consider the magnitude and nature of the undertaking, and the degree of federal involvement, in determining the appropriate level of effort for identification**?

Undertakings with the potential for extensive ground disturbance generally will require a more involved effort to identify archaeological properties than those with less ground disturbance. For example, the proposed construction of a new multi-story federal complex with underground parking on a vacant city block may require an intensive survey and deep testing in order to identify eligible archaeological sites. On the other hand, construction of a surface parking lot may require investigations into only the top foot of the soil. Likewise, installation of a six-inch water pipe below the frost line with a Ditch Witch should warrant a significantly less intense effort and may not even involve any subsurface testing prior to laying the line, when compared to a large sewer main.

In determining the level of effort for identification, the regulations [36 CFR § 800.4(b)(1)] call for the federal agencies to consider the “degree of federal involvement” in the undertaking. Federal “involvement” as used here means the federal agency’s degree of control or influence over the undertaking. Federal control and influence is highest when a federal agency proposes some ground-disturbing activity on federal land, such as an Army training area expansion.

Federal agencies that grant assistance or issue permits, licenses, or approvals may have a lesser degree of control or involvement over an undertaking. There are several reasons for this:

- Federal assistance and permitting agencies do not have the same degree of control as a land managing agency since they typically do not own the land.
- In most cases the applicant for the assistance or permit conducts the work needed for the federal agency to meet its Section 106 responsibilities, not the federal agency.
- Because these activities take place on non-federal lands (state, tribal, and private), federal agency influence on what the applicant does to help satisfy the Section 106 process is generally limited to conditioning the assistance, permit, or license with stipulations setting what the recipient will do, not necessarily how it will do it.

For example, for a gas pipeline project needing a certificate from the Federal Energy Regulatory Commission, it is reasonable to expect the applicant to apply professional tools, such as current and accepted predictive models, in order to identify eligible archaeological sites. It may not be reasonable, however, to expect the applicant to refine the predictive model by surveying all low and high probability areas.

[Related question:
- What are a federal agency’s responsibilities under Section 106 of the NHPA?]

**22. How should federal agencies consider the nature and extent of potential effects on historic properties in determining the appropriate level of effort for identification**?

A federal agency is not expected to conduct a 100 percent survey of the area of potential effects. Rather, the identification effort should be conditioned by where effects are likely to occur and the likely impact of these effects on listed or eligible archaeological sites. For example, archaeological identification efforts for a license renewal from the Federal Energy Regulatory Commission likely would not involve the entire area of potential effects (APE). Rather it would be directed to those locations within the APE that are experiencing project related effects associated with operation, usually along the shoreline. Likewise, identification of listed and eligible archaeological sites for a new highway project would be conducted within the APE where direct effects, such as ground disturbance from road construction, are likely. Archaeological testing, however, also should occur within the APE wherever destructive impacts can be reasonably expected to occur later in time, be farther removed in distance or be cumulative. In this example, testing should not be limited to the confines of the new road alignment because experience has demonstrated that highway interchanges tend to attract future development associated with the transportation corridor.

[Related questions:
- Why is the "area of potential effects" (APE) important in identifying eligible archaeological sites?
- How is the area of potential effects (APE) determined?
- Should the area of potential effects (APE) also be defined vertically?]

**23. How should federal agencies consider the likely nature and location of historic properties within the area of potential effects in determining appropriate level of effort for identification**?

The identification effort is based on what might be found and where it is likely to be located. In other words, the APE is the geographic area where identification occurs, but it doesn't necessarily follow that the entire APE must be subject to archaeological scrutiny. Generally, the level of effort would be expected to be more intensive if there is potential for the APE to contain an archaeological site of national significance or value to a living community.

[Related questions:
- What are a federal agency's responsibilities under Section 106 of the NHPA?
- Does the federal agency have to identify or locate all archaeological sites for Section 106 review?

**24. How should federal agencies consider past planning, research, and studies in determining the appropriate level of effort for identification**?

A review of previous archaeological work done within or in the vicinity of the area of potential effects (APE) is essential in determining the scope of the identification effort. For example, where portions of the APE have been subjected to archaeological survey using methods that conform to current professional standards, it may not be necessary to conduct additional fieldwork on those areas. Conversely, a more intensive effort reasonably would be expected for an APE that has been the subject of little or no previous archaeological study.

Federal agencies should evaluate the reliability and accuracy of any past work because that factor, as well as changing perceptions of significance, may affect what is considered "reasonable." In conducting such an evaluation agencies should recognize that archaeological work done prior to the 1992 amendments to National Historic Preservation Act may not have benefited from consultation with Indian tribes or Native Hawaiian organizations (NHOs). Accordingly, even though the APE appears to be well studied, any archaeological sites that had been identified previously, both those determined eligible and those found not eligible, may need to be reevaluated in consultation with SHPOs/THPOs, Indian tribes, or NHOs in order to fully appreciate the site's significance and value.

Review of existing information also assists in determining the types of eligible archaeological sites that might be present and their possible location. The lack of published regional archaeological information does not necessarily mean no eligible archaeological sites are present in the APE. When planning to conduct identification studies it is essential to consult with the SHPO/THPO, Indian tribes, or NHOs that might ascribe traditional religious and cultural significance to listed or eligible archaeological sites in the APE and others knowledgeable about the region and its past before any survey and field testing begins.

[Related questions:
- Why should federal agencies consult with other parties about archaeology?
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?
- What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?]

**25. With whom should a federal agency consult in determining how to meet the "reasonable and good faith effort" regulatory standard**?

In conducting its identification effort, federal agencies are required to consult with the SHPO/THPO to determine the scope of identification efforts, including the initial determination of the undertaking's area of potential effects, and to seek information from consulting parties and others about historic properties and effects to them. Federal agencies should also gather information from Indian tribes or NHOs to assist in identifying properties of traditional religious and cultural significance to them within the APE that may be eligible for the National Register.

However, federal agencies should be aware that "an Indian tribe or NHO may be reluctant to divulge specific information regarding the location, nature, and activities associated with such sites" [36 CFR § 800.4(a)(4)]. Accordingly, consultation with the SHPO/THPO, Indian tribes, NHOs, and other consulting parties should begin well before the archaeological survey is performed and continue until identification has been completed. This also means, in some cases, consultation with only the SHPO may not be sufficient to develop an appropriate scope of work for the identification and evaluation of archaeological sites.

Because Indian tribes and NHOs determine what properties are of traditional religious and cultural significance to them, it is particularly important to reach out to Indian tribes and NHOs to determine their level of interest in the undertaking and its potential to affect any such properties before initiating any archaeological field work. Failure to do so could result in the agency taking what may be inappropriate actions, such as the removal of materials from, or insensitive treatment of, historic properties or could result in the agency having to conduct additional or supplementary identification studies later in Section 106 review.

[Related questions:
- Who consults with whom, and how?
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?]

**26. How are disputes about the "reasonable and good faith effort" standard resolved**?

Federal agencies should seek the advice, guidance, and assistance of the ACHP in resolving disputes with other consulting parties on its level of effort to identify and evaluate historic properties [36 CFR § 800.2(b)(2)]. Since the ACHP established this standard, its views on what constitutes an appropriate level of effort to identify eligible archaeological sites deserves careful consideration in the Section

106 process. In the end, however, the ACHP's views are advisory and the federal agency makes the final decision about how much work is enough.

**27. Why is the "area of potential effects" (APE) important in identifying eligible archaeological sites?**

The APE is the geographic area(s) within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking [36 CFR § 800.16(d)]. Because the APE defines the geographic limits of federal agency responsibility for purposes of Section 106 review, archaeological survey necessary to identify and evaluate historic properties is carried out within its boundaries. Within the APE, however, the level of effort may vary considerably depending on such factors as anticipated effects and prior ground disturbance.

**28. How is the area of potential effects (APE) determined?**

The APE is defined by the federal agency, in consultation with the SHPO/THPO, prior to initiating identification efforts. It is therefore a good idea to start out with an APE that is reasonably broad enough to capture the full geographic extent of the undertaking's effects, and reassess it as more information is gathered.

An effect to a historic property occurs when an undertaking will alter those characteristics of the property that qualify it for the National Register [36 CFR § 800.16(i)]. In developing the APE for an undertaking, consideration must be given to those effects that will occur immediately and directly as well as those that are reasonably foreseeable and may occur later in time, be farther removed in distance or be cumulative, but still result from the undertaking.

The APE is not static, but should be adjusted as a federal agency further develops the details of the undertaking and learns more about potential historic properties and how they may be affected. The input of consulting parties is crucial to this informed revision and refinement of the APE throughout Section 106 review.

Most archaeological sites are considered eligible for the National Register principally under Criterion D, because of their potential to yield information "important in prehistory or history." This important information lies in the site's artifacts and features and their association (or context). Accordingly, any action that would alter a site's context would have an effect on its ability to yield information and thus its eligibility for the National Register. The most easily envisioned effect occurs when potential information (the site context) is threatened with destruction; the site or parts of it are bulldozed or plowed away.

Federal agencies, however, should not confuse delineation of the APE with the project's construction "footprint" since effects to archaeological properties are not restricted solely to direct physical impacts. By consulting with Indian tribes, NHOs, and others, the federal agency can ensure due consideration is given to all aspects of an archaeological site's National Register significance. This is especially important when the APE may contain archaeological properties of traditional religious and cultural significance to Indian tribes or NHOs, and/or that may be eligible for National Register listing under criteria other than Criterion D. Such properties, for example, could be affected not only through direct physical impact but also from the introduction of visual or atmospheric elements that would alter the property's setting and feeling.

[Related question:
- How do federal agencies meet the "reasonable and good faith effort" standard?]

**29. Should the area of potential effects (APE) also be defined vertically?**
Yes. Since an undertaking's effects are not restricted to the surface, in delineating the APE, a federal agency also should consider the potential for the undertaking's effects to occur above and below ground. Because the APE is three dimensional, agencies should consider how the undertaking might impact historic properties on the surface, above it, and below it.

In setting the APE's lower limits, the federal agency should rely on scientific and engineering analyses to define a depth beyond which alteration to any eligible or listed archaeological site, if present, is not reasonably expected to occur. This analysis should demonstrate that any such site, if present, would not be affected by the undertaking through changes in soil compaction or soil chemistry, for example. The challenge is to determine a vertical limit below which a knowledgeable person can reasonably say there will be no effect to the integrity of a site, should one be present.

The APE for construction of a surface parking lot, for example, might be quite shallow because its limited subsurface disturbance is unlikely to affect deeply buried archaeological properties. However, construction of an airport runway that is designed to support enormous weight, while still essentially a surface disturbance, could lead to compaction of buried archaeological properties, and thus would warrant testing to a greater depth.

In determining the geographic extent of the APE, the nature of the historic properties that might be present also should be considered to better understand the nature and magnitude of the effects that might apply. For example, a project that would construct over an eligible archaeological site deemed of religious and cultural significance to an Indian tribe may not cause physical damage to the property. However, depending on the property's significance, the proposed construction might be expected to diminish the property's integrity through loss of feeling or association. For this reason agencies are encouraged to consult early and be willing to refine the dimensions of the APE as more information is gathered during the course of Section 106 review.

[Related questions:
- How should federal agencies consider the likely nature and location of historic properties within the area of potential effects in determining the appropriate level of effort for identification?
- What kind of information is necessary to evaluate the eligibility of an archaeological site?]

**30. What constitutes a "reasonable and good faith effort" to identify historic properties in accordance with the *ACHP's Policy Statement on Affordable Housing and Historic Preservation*?**
Principle VIII of the ACHP's 2006 *Policy Statement on Affordable Housing and Historic Preservation* [Affordable Housing Policy, 72 FR 7387-7389] (http://www.achp.gov/polstatements.html) states that: "Archaeological investigations should be avoided for affordable housing projects limited to rehabilitation and requiring minimal ground disturbance."

Neither existing guidance from the Department of Housing and Urban Development [HUD; e.g., *Historic Preservation Fact Sheet #6, "When Should I do Archaeological Surveys?"* (http://www.hud.gov/utilities/intercept.cfm?/offices/cpd/environment/review/hpfactsheet06.pdf)] nor the ACHP's Affordable Housing Policy Statement provides a definition of what constitutes "minimal ground disturbance;" indeed, it is likely that a simple definition useful for purposes of affordable housing rehabilitation and applicable across the country is not possible. Rather than define the term the focus should properly be shifted to the question of whether or not an archaeological investigation is needed in order to meet the "reasonable and good faith" regulatory standard for the identification of historic properties established by the ACHP's regulations.

In determining whether an archaeological survey is necessary, the ACHP's regulations set forth several factors that should be considered in meeting the "reasonable and good faith" test [36 CFR § 800.4(b)(1)]. Most importantly for purposes of affordable housing rehabilitation, these include consideration of the "magnitude and nature of the undertaking" and "the nature and extent of potential effects on historic properties."

<u>Consider the magnitude and nature of the undertaking</u>: The ACHP's policy pertains solely to rehabilitation of existing building stock, not new construction, demolition, or redevelopment. Therefore, most work is limited to bringing existing housing stock up to local code standards. In doing this work, rehabilitation might take place on the interior and exterior of the building, as well as on utility connections between the building and the street.

Examples of common rehabilitation activities that can cause ground disturbance include, but is in no way limited to, foundation repair, installation of exterior foundation drainage, upgrading of existing utility lines, and the delivery and staging of materials to the housing site. Given the nature of the undertaking, ground disturbance associated with affordable housing rehabilitation activities typically is limited in scope and predictable. Accordingly, the broader the scope and more intense the previous construction activities, the less likely are new construction activities to affect historic properties.

<u>Consider the nature and extent of potential effects to historic properties</u>: Typically, utility trenches for affordable housing projects, especilly in urban contexts, traverse small front yards from the building directly to the street. Most front yards already have been disturbed from previous construction and the installation of infrastructure. Accordingly, the placement of new utility lines in existing trenches should result in minimal or no new ground disturbance, and absent special circumstances, it would be appropriate to conclude that a reasonable and good faith identification effort does not require any archaeological testing. Similarly, repair of building foundations usually takes place in areas disturbed during the original construction of the building. When such rehabilitation activities are confined to such previously disturbed areas, identification efforts should not require any archaeological testing.

When new utility lines are to be installed in new trenches it still may be appropriate some times to conclude that no archaeological testing is necessary to meet the reasonable and good faith identification standard. Again, the agency official, working with the housing sponsor, needs to take into account several factors. One is the scope and degree of disturbance experienced when the target building was constructed and its infrastructure installed, as most front yards would have already been disturbed by these activities. This factor should not be considered alone, but must be weighed against the size and depth of the new trench. As the width and depth of a new trench increases so does the scope of the ground disturbance.

Because there is always the potential for National Register-eligible archaeological sites to be adversely affected in housing rehabilitation involving ground disturbance, the housing agency official and housing sponsor should work with the SHPO when negotiating Memoranda of Agreements (MOAs) to develop a plan for post-review discoveries in accordance with the ACHP's regulations [36 CFR § 800.13].

Delivery methods and staging areas also have the potential to affect historic properties, but the scope of these activities also can be minimized. Delivery may vary from dumping construction material to the use of a forklift for unloading. Materials may be staged in yards or adjacent lots, but also can be placed on existing driveways or roadways. Proper equipment used under the right surface conditions sized appropriately for the job helps to reduce ground disturbance, making it reasonable to conclude that archaeological testing is not warranted.

Affordable housing officials and project sponsors should consider ways to minimize ground disturbance with those who will be carrying out the rehabilitation projects. Exercising caution and common sense, in conjunction with adopting measures that limit ground disturbing activities, can minimize ground disturbance and support the position that a reasonable and good faith identification effort does not need to include archaeological testing.

[Related questions:
- What is the "reasonable and good faith effort" regulatory standard?
- How do federal agencies meet the "reasonable and good faith effort" standard?
- Should the area of potential effects (APE) also be defined vertically?]

## D. DETERMINING WHICH ARCHAEOLOGICAL SITES ARE SIGNIFICANT: EVALUATION

### 31. How are eligibility determinations made in Section 106 review?

The regulations require the federal agency to apply the National Register eligibility criteria in consultation with the SHPO/THPO and any Indian tribe or NHO that attaches traditional religious and cultural significance to the property [36 CFR § 800.4(c)(1)]. During such consultation, a federal agency may use in-house expertise or rely on information and recommendations provided by applicants or consultants/contractors. The federal agency, however, is legally responsible for decisions on National Register eligibility.

Most eligibility determinations made within the Section 106 process are called "consensus determinations" because agreement between the federal agency and the SHPO/THPO is all that is required; no formal nomination to or listing on the National Register is necessary. Consensus determinations that properties are not eligible should also be documented so that consulting parties and the public have an adequate basis upon which to evaluate the agency decision.

When the federal agency and the SHPO/THPO disagree about eligibility, the opinion of the Keeper of the National Register must be sought [36 CFR § 800.4(c)(2)].

[Related questions:
- Why should federal agencies consult with other parties about archaeology?
- What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?]

### 32. What are the consequences of eligibility determinations in the Section 106 process?

The determination that an archaeological site is eligible for the National Register subjects it to Section 106 review. This means the federal agency must then decide if the undertaking will alter that property's qualifying characteristics, and if so, whether it will do so in a manner that will diminish the property's integrity. If the agency determines there could be an adverse effect, then the agency consults further on appropriate measures to avoid, minimize, or mitigate that effect to the property.

In order to carry out these steps effectively, it is essential that the federal agency fully identify a property's qualifying characteristics. To do so, the federal agency should explore the full range of National Register criteria that may apply to an archaeological site.

Frequently federal agencies just assume data recovery is the mitigation measure that should be automatically selected to resolve adverse effects to sites considered eligible solely under Criterion D. In fact, other measures, such as site burial, might be as appropriate. Given the inherent flexibility of the Section 106 process and its emphasis on resolution through consultation, a range of archaeological solutions usually should be considered.

[Related questions:
- What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?
- What information is needed to decide on treatment options?
- What issues should be considered when consulting about mitigation?]

**33. What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?**

The ACHP's regulations acknowledge the special expertise that Indian tribes and NHOs possess in assessing the National Register eligibility of properties that may be of traditional religious and cultural significance to them [see 36 CFR § 800.4(c)(1)]. This means that the tribe's or NHO's opinions about, or position on, the National Register significance of a particular archaeological site as a property of traditional religious and cultural significance to that tribe or NHO should be given due consideration by the federal agency in making a final determination on eligibility.

[Related questions:
- What is the ACHP's policy on dealing with burial sites, human remains, and funerary objects?
- What is Section 106 consultation?
- Why should federal agencies consult with other parties about archaeology?
- What happens when a consulting party cannot or will not provide its views?]

**34. What kind of information is necessary to evaluate the eligibility of an archaeological site?**

Archaeological sites often, but not always, require some limited exploration to gather information needed to make an evaluation. However, there is a distinction between "testing" archaeological properties for identification and evaluation and "excavating" them for purposes of data recovery. Testing is aimed at determining if the site should be considered eligible for listing in the National Register. Generally, when testing an archaeological site, only a very small sample need be disturbed, but this varies on a case-by-case basis. While it is impossible to define a hard and fast standard, a rule of thumb is that testing is sufficient when enough is known about the nature, size, limits, and contents of the site to judge its significance and integrity against the National Register criteria.

Evaluation under each of the criteria should be done according to the professional standards of practice. The National Register Bulletin No. 36, "Guidelines for Evaluating and Registering Archeological Properties" (www.cr.nps.gov/nr/publications/bulletins/arch/), addresses the kinds of information needed to evaluate an archaeological site under the National Register criteria.

[Related questions:
- Is every archaeological site eligible for the National Register?
- Can you evaluate archaeological sites under Criteria A-C in addition to D?
- Does the presence of human remains make an archaeological site eligible for the National Register?]

**35. Is a National Register nomination form required in a Section 106 evaluation of eligibility?**

No. Section 106 eligibility determinations do not require filling out any National Register forms. However, the kinds of information called for in the forms, such as information on a property's boundaries, area(s) and period(s) of significance, integrity, deposits, and National Register criteria being considered are essential to making eligibility determinations under Section 106.

**36. Is every archaeological site eligible for the National Register?**
No. Not every archaeological site is eligible for the National Register because not all archaeological sites possess both significance and sufficient integrity to be considered eligible. Sites may be deemed *important* to a group or community, or people may feel that, as a place of ancestral occupation or activity these sites possess a *value* that should be recognized. However, in neither case does this automatically translate or equate to the requisite *significance* for National Register eligibility purposes.

To be eligible for listing on the National Register, archaeological sites must meet at least one of the four National Register criteria (A through D) established by the National Park Service and possess integrity. Significance relates to a historic property's ability to meet at least one of the criteria. As with any other kind of historic property, listed or eligible archaeological sites must be associated with significant events (Criterion A), or be identifiable with specific, important individuals (Criterion B), be of a distinctive type or period or have artistic value, or be a component of an identifiable historic district (Criterion C), or "have yielded or have the potential to yield, information important in prehistory or history" (Criterion D, as quoted from the regulations). When determining significance under criterion D, one must keep in mind that while all archaeological sites can yield some kind of information, the key is to determine if that information is *important.* Importance is best assessed when considered within a framework of a historic context.

Integrity is the ability of the property to convey significance through physical features and context. According to the National Register Bulletin No.36, "Guidelines for Evaluating and Registering Archeological Properties" ([www.cr.nps.gov/nr/publications/bulletins/arch/](www.cr.nps.gov/nr/publications/bulletins/arch/)),

> Integrity of location, design, materials, and association are of primary importance [for sites being considered] under Criteria A and B. Design, materials, and workmanship are especially important under Criterion C. Under Criteria C and D, integrity of setting adds to the overall integrity of an individual site and … district.

For example, context, or the association of artifacts, features, and other site characteristics, is considered essential for the archaeological site to convey information about the past (Criterion D). The context of an archaeological site subjected to regular plowing or looting may be sufficiently disrupted so that the site no longer possesses integrity of association. On the other hand, for an archaeological site where a significant event took place (for example, consideration under Criterion A) integrity of feeling and setting may be more critical than association.

Consequently, a site with excellent associative integrity still may not be eligible if several other similar sites have already been studied, because the kind of information it could provide is considered redundant, and/or not currently important to history or prehistory. [For more detailed information about, and examples of, integrity refer to National Register Bulletin No. 36, "Guidelines for Evaluating and Registering Archeological Properties" cited above].

[Related questions:
- What kind of information is necessary to evaluate the eligibility of an archaeological site?
- Can you evaluate archaeological sites under Criteria A-C in addition to D?]

**37. Can you evaluate archaeological sites under Criteria A through C in addition to D?**
Yes, it is possible for an archaeological site to be eligible under Criteria A, B, C, and D. The ACHP's Section 106 regulations call for the federal agency to consider how all of the National Register qualifying characteristics of a historic property may be affected by the undertaking [36 CFR § 800.5(a)(1)]. Accordingly, when conducting its evaluation, a federal agency should determine the full range of criteria that may apply to a property. National Register Bulletin No. 36, "Guidelines for Evaluating and Registering Archaeological Properties" (www.cr.nps.gov/nr/publications/bulletins/arch/), lays out a step-by-step process for evaluating sites under all of the criteria and provides useful examples.

[Related question:
- What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?]

**38. Does the presence of human remains make an archaeological site eligible for the National Register?**
Human remains, associated funerary objects, and the sites where they are found possess *values* beyond their importance as sources of information about the past. National Register Bulletin No. 36, "Guidelines for Evaluating and Registering Archaeological Properties" (www.cr.nps.gov/nr/publications/bulletins/arch/), also notes this distinction between an archaeological site's National Register *significance* and other *values* it may exhibit. Therefore, Section 106 users should be aware that even when a property has been determined eligible for the National Register only under Criterion D, the special nature of burials, which are widely recognized in law and practice as having special qualities, may also possess a value to living groups that extends beyond the interests of archaeological research. Burial sites may be considered properties of traditional religious and cultural significance to Indian tribes or NHOs, which could make the site eligible for the National Register under more than simply Criterion D. See National Register Bulletin No. 41, "Guidelines for Evaluating and Registering Cemeteries and Burial Places" (www.cr.nps.gov/nr/publications/bulletins/nrb41/) for further guidance.

For further direction in navigating the difficult and sensitive issues associated with the treatment of burial sites and human remains, see the ACHP's "Policy Statement Regarding the treatment of Burial Sites, Human Remains, and Funerary Objects" (http://www.achp.gov/news022307hr.html).

[Related questions:
- What is the ACHP's policy on dealing with burial sites, human remains, and funerary objects?
- What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?]

**39. When should an agency reevaluate the National Register status of archaeological sites?**
According to the ACHP's regulation, "[t]he passage of time, changing perceptions of significance, or incomplete prior evaluations may require the agency to reevaluate properties previously determined eligible or ineligible" [36 CFR § 800.4(c)(1)]. In deciding if reevaluation is warranted, a federal agency should consider the following questions, among others:

- How long ago was the determination made?
- Were Indian tribes or NHOs consulted about the eligibility of the archaeological site during the initial evaluation?
- Have Indian tribes or NHOs been consulted to determine if the archaeological site may be of traditional religious and cultural significance to them?

- What relevant physical changes to the archaeological site have occurred since the initial determination of eligibility was made?
- Does the archaeological site still possess integrity?

**40. Is the loss of access by archaeologists to listed or eligible archaeological sites an adverse effect under the ACHP's regulations?**

Some Section 106 stakeholders take the position that indefinite loss of access by archaeologists to known listed or eligible archaeological sites resulting from burial of the site under a road, parking lot, building, or other relatively permanent feature constitutes an adverse effect. They argue that since these historic properties will be unavailable for study indefinitely, the loss of access by archaeologists prevents a site that is eligible under Criterion D from yielding its "information important in prehistory or history." Some use this argument to support the notion that there is no limit to the depth of the area of potential effects. This argument concludes that federal agencies have an obligation under Section 106 to search for and evaluate deeply buried sites, even though such sites might lie below the depth of a particular undertaking's APE.

Such a position is not consistent with the ACHP's Section 106 regulations, which state that an adverse effect occurs when:

> an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register of Historic Places in a manner that would <u>diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association</u>. [36 CFR § 800.5(a); emphasis added].

Accordingly, an action that will cause an adverse effect is one that will diminish an eligible or listed archaeological site's integrity. Since loss of access by archaeologists for study is unlikely to alter the qualifying characteristics of a National Register listed or eligible archaeological site in such a way as to diminish that property's integrity, it generally will not be considered an adverse effect by the ACHP.

## E. REACHING AGREEMENT ON APPROPRIATE TREATMENT

**41. What information is needed to decide on treatment options?**

Consulting about possible options to resolve adverse effects should begin with basic information about the eligible or listed archaeological site and the nature of the federal undertaking. At this point in consultation, the federal agency has already determined the property is eligible for listing or is listed on the National Register. This basic National Register information—the property's boundaries, its integrity, <u>all</u> of its qualifying characteristics, and period(s) of significance—is critical to evaluate the appropriateness of measures proposed to avoid, minimize, or mitigate the adverse effects.

In many cases, federal agencies will be bound by other federal, tribal, state, or local laws, such as the Native American Graves Protection and Repatriation Act (NAGPRA—see www.cr.nps.gov/nagpra/) or state burial laws, that may dictate how the listed or eligible archaeological sites, especially those that contain human remains or funerary objects, are treated. The federal agency must identify and follow applicable laws and implement any prescribed provisions.

[Related questions:
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?
- What issues should be considered when consulting about mitigation?]

**42. When is data recovery the appropriate treatment?**
One of the strengths of the Section 106 consultation process is that there is no predetermined outcome. This means that a range of solutions is usually available for consideration by consulting parties. Contrary to the view held by some Section 106 practitioners, data recovery is not required by law or regulation. It is, though, the most commonly agreed-upon measure to mitigate adverse effects to archaeological sites eligible or listed under Criterion D, as it preserves important information that will otherwise be lost.

Under the ACHP's Section 106 regulations, an adverse effect occurs when:

> an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association [36 CFR § 800.5(a)(1)].

When an undertaking will diminish the historic property's integrity by destroying all or part of it, information contained in the property will be lost. Data recovery preserves at least some of that information. Thus, if the site cannot be avoided and preserved in place, and the federal agency determines it is eligible for the important information it contains and should be retrieved, some agreed-upon level of data recovery, analysis, curation, and reporting is appropriate in order to preserve that important information for the benefit of future generations.

**43. What issues should be considered when consulting about mitigation?**
An important goal of Section 106 consultation to resolve adverse effects is to identify an outcome that represents the broader public interest. Key issues in determining appropriate resolution of adverse effects include:

- What is in the public interest?
- What are the benefits to, or concerns of, the consulting parties, those they represent, and those who ascribe importance and value to the property?
- If the proposed mitigation is designed to advance our knowledge about the past, how will this knowledge be provided to the public, to schools, to tribes or NHOs, and to professional archaeologists?
- Will it enhance the preservation and management of listed or eligible archaeological sites in a region?

Related questions that should be considered by the federal agency and consulting parties include the following:

*Why is the affected listed or eligible archaeological site important?* Listed or eligible archaeological sites can be important for, among other reasons, their scientific or educational potential, their nature as traditional or sacred sites, or their potential as heritage tourism assets. Typically, archaeological sites are considered eligible for listing under Criterion D (they contain important information), but they are sometimes eligible under other criteria. Consideration of these various aspects of a site's importance in the consultation process creates opportunities for alternative treatments, in keeping with the concerns of the consulting parties.

*How is the importance of one historic property judged relative to that of other properties?* When making decisions about the value of one archaeological site versus another, it is important to consider relative potentials of each to yield important information; significant gaps in knowledge that each property can fill; the National Register criteria represented by each site; and whether one property embodies multiple significance, to several groups, thus perhaps giving it a higher preservation priority. Federal, tribal, and state management or preservation plans may provide information on priority lists of research questions, important information gaps, archaeological site types, and other information that can help with this comparative analysis.

*Does the affected property have potential to contain human remains?* The potential for an archaeological site to contain human remains or funerary objects that will be disturbed should be evaluated before alternative mitigation can be considered. It is the ACHP's policy that human remains should not be knowingly disturbed unless absolutely necessary. However, if they must be disturbed, the remains should be removed carefully, respectfully, and in a manner developed in consultation with others as specified in the ACHP's regulations (See ACHP's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects" at (www.achp.gov/docs/hrpolicy0207.pdf)).

[Related questions:
- What are a federal agency's responsibilities under Section 106 of the NHPA?
- What is the ACHP's policy on dealing with burial sites, human remains, and funerary objects?
- What are the consequences of eligibility determinations in the Section 106 process?
- What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?
- How can federal agencies find out about appropriate treatment options and alternatives?]

**44. What is "alternative" or "creative" mitigation?**
These terms refer to alternatives to archaeological data recovery as mitigation for an undertaking's adverse effects. Such approaches can either be implemented alone or as part of a broader mitigation package. Examples of such alternatives may include:

- preserving selected eligible archaeological sites and incorporating them into heritage tourism plans while allowing others to be lost;
- burying sites under fill or incorporating them into the undertaking;
- using resources to develop syntheses of existing information on a region or area instead of, or in addition to, using them on data recovery;
- use of barriers to route traffic away from eligible archaeological sites;
- using resources to develop virtual or Web-based reports or educational media that otherwise would not be produced.

Another example of these alternatives is archaeological "mitigation banking." This term refers to the acquisition and preservation of archaeological sites away from the project area in return for doing little or no direct mitigation on sites within the area of potential effects.

This concept of "alternative" or "creative" mitigation is consistent with the definition of "mitigation" as used in the National Environmental Policy Act regulations of the Council on Environmental Quality [Section 1508.20(c)-(e)], where it includes:

> (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
> (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and

(e) Compensating for the impact by replacing or providing substitute resources or environments (i.e., "off-site mitigation").

**45. Are there advantages to considering alternative mitigation?**
There is no prohibition against alternative treatments in the ACHP's Section 106 regulations, and the law does not prescribe any specific measures to resolve adverse effects. The regulations [36 CFR § 800.6(a)] leave development of these measures to the federal agency consulting with other parties, calling for them to "develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties."

Recovery of an eligible or listed archaeological site's important information, and/or redirecting resources toward other preservation goals identified as more critical, is consistent with the purposes of the broader federal historic preservation program as set out in Sections 1 and 2 of the National Historic Preservation Act (NHPA). Other sections of the NHPA and guidance call for mitigation but are not specific. Section 110(b) of the NHPA calls for federal agencies to make "appropriate records … for future use and reference." This is reiterated in Standard 6 of the "Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs" (http://fpi.historicpreservation.gov/TechnicalInfo/HistPres/FedAgencyGuidelines.aspx), which calls for agencies to "provide for appropriate recording of the historic property." Data recovery, however, is not the only way to construct a record when archaeological properties will be adversely affected by an undertaking.

The ACHP supports consideration of alternative mitigation and notes that:

> Appropriate treatments for affected archaeological sites, or portions of archaeological sites, may include active preservation in place for future study or other use, recovery or partial recovery of archaeological data, public interpretive display, or any combination of these and other measures [From the ACHP's "Recommended Approach for Consultation on Recovery of Significant Information from Archeological Sites" (www.achp.gov/archguide.html)].

In reaching decisions about appropriate treatment measures, federal agencies should weigh a variety of factors, including significance of the historic property, its value and to whom, and associated costs and project schedules. As mitigation decisions reached through consultation represent the broader public interest, they should be considered appropriate so long as they are legal, feasible, and practical.

By considering alternatives to data recovery, federal agencies can address how the community or the general public best benefits from the expenditure of public funds for preservation treatments. The public may derive greater benefit from a variety of data recovery alternatives or a combination of more limited data recovery and exhibits on excavation, brochures, site tours, public lectures, Web sites, documentary videos, and history modules for use in schools. Using these means to achieve broader public involvement can lead to increased appreciation of the past and a greater willingness to expend public funds in the pursuit of preservation goals.

**46. How can federal agencies find out about appropriate treatment options and alternatives?**
The ACHP encourages federal agencies, SHPOs/THPOs, Indian tribes, and NHOs, to develop priority lists of preservation strategies, mitigation plans, or programs for ready consideration in the consultation process. Many land managing agencies have preservation or management plans that contain lists of priority activities that could be implemented with sufficient resources. SHPOs have state preservation plans that set forth what is known about the history of their state, provide historic contexts for making decisions about significance, and identify gaps in archaeological knowledge. Some THPOs and tribes have, or are developing, preservation plans for tribal lands that may be

considered in consultation to resolve adverse effects. These kinds of plans, particularly those developed in consultation with other preservation stakeholders, are important to consider in providing a context for making site-specific treatment decisions.

[Related questions:
- Why should federal agencies consult with other parties about archaeology?
- What is the role of applicants and their consultants/contractors in archaeology conducted under Section 106?
- How can federal agencies foster more informed participation by stakeholders in consultation about archaeology?]

## F. COMPLETING THE SECTION 106 PROCESS

### 47. What are a federal agency's responsibilities to complete Section 106 review?

A federal agency's responsibilities are met when the agency has completed the Section 106 process. If a Section 106 agreement has been executed, such completion includes implementation of those stipulations or provisions contained in the agreement (e.g., completion of a data recovery plan, analysis and curation of retained materials, final reporting of results in professional and public formats). Procedurally, the federal agency must be able to demonstrate it identified the appropriate consulting parties, provided them with adequate documentation [36 CFR § 800.11] so they were able to participate in consultation effectively, and provided a reasonable opportunity for consulting parties to exchange views about the identification of historic properties, the assessment of effects to them, and the resolution of adverse effects, as required under the ACHP's Section 106 regulations.

[Related question:
- What are a federal agency's responsibilities under Section 106 of the NHPA?]

**INDEX OF QUESTIONS ADDRESSED:**

## III. QUESTIONS AND ANSWERS ABOUT SECTION 106 ARCHAEOLOGY

**D. Determining which archaeological sites are significant: Evaluation**

31. How are eligibility determinations made in Section 106 review?
32. What are the consequences of eligibility determinations in the Section 106 process?
33. What special role do Indian tribes and Native Hawaiian organizations have in evaluating properties?
34. What kind of information is necessary to evaluate the eligibility of an archaeological site?
35. Is a National Register nomination form required in a Section 106 evaluation of eligibility?
36. Is every archaeological site eligible for the National Register?
37. Can you evaluate archaeological sites under Criteria A-C in addition to D?
38. Does the presence of human remains make an archaeological site eligible for the National Register?
39. When should an agency reevaluate the National Register status of archaeological sites?
40. Is the loss of access by archaeologists to archaeological properties an adverse effect under the ACHP's regulations?

**E. Reaching agreement on appropriate treatment**

41. What information is needed to decide on treatment options?
42. When is data recovery the appropriate treatment?
43. What issues should be considered when consulting about mitigation?
44. What is "alternative" or "creative" mitigation?
45. Are there advantages to considering alternative mitigation?
46. How can federal agencies find out about appropriate treatment options and alternatives?

**F. Completing the Section 106 process**

47. What are a federal agency's responsibilities to complete Section 106 review?

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 12:48 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: DOE EIS Comments
**Attachments:** all groups - table (1).pdf; SSFL Final Draft_ Orange Group Alternatives 062412 CR.pdf

Dear Mr. Malinowski,

Please include my comments to NASA below as part of my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Thu, Sep 19, 2013 at 2:00 AM
Subject: DOE EIS Comments
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

For the DOE, in June 2012, I was a part of the "Orange group" for the alternatives for their EIS.

While the DOE did tell us that our mandate was to conform to the Administrative Order on Consent, our group focused on the "Nine Balancing Criteria of CERCLA" that Mr. Rick Brausch of DTSC had explained to us at a meeting were to be considered relative to the future clean up standards at Santa Susana.

That Power Point is a part of the explanation to the community of the Agreements in Principle that is a part of the NASA / DTSC Administrative Order on Consent.
http://www.dtsc-ssfl.com/files/lib_pub_involve/meeting_agendas/64727_Agreements_in_Principle.pdf

I really appreciated some of the members of my group that were much more knowledgeable than I was on the California Native Plants, the wildlife at the site, etc. I focused more on health risk on and off site, trucks, and the cultural / archaeological aspects of the site.

I do hope that the final comments by all four groups - some of which I agree with - and some that I don't - these show the diverse thoughts relative to the SSFL cleanup. This is why the comments of one group over another should not outweigh just due to number - the scientific or legal basis for considering various alternatives related to the cleanup.

I am sure that I have stated that if the 9th Circuit upholds the ruling on SB 990, that NASA and DTSC should renegotiate the Administrative Order on Consent based on what Judge Walter said in his ruling.

I stand by that - it would be the easiest method of cleanup if all parties were subject to just one clean up standard - that all parties did commit to - the 2007 Consent Order. That is the risk based cleanup that I have always supported.

Please consider the Orange group's comments as a part of my comment on the NASA Draft EIS.

I should point out that since this document mentions structures - that this was in reference to AREA IV where no structures are considered eligible for historic preservation to the best of my understanding. And if they were - they are probably contaminated with both chemicals and radionuclides above the suburban residential standard. I do not support the demolition of all structures in AREA IV.

Least important - "meeting the 2017 deadline".

Respectfully submitted,

*Christine L. Rowe*

Date: June 28, 2012
Copies to:
Stephie Jennings
John Jones
John Wondolleck
Sandy Enyeart
Wendy Lowe

June 24, 2012

# FINAL DRAFT

## Remediation for Area IV and Northern Buffer Zone
## Santa Susana Field Laboratory
## Environmental Impact Statement
## Alternatives Development Workshop
## Orange Group
## Warner Center Marriott, Woodland Hills, CA
## June 9, 2012

| *SUGGESTED DISCUSSION TOPICS* | *GROUP CONTRIBUTION* |
|---|---|
| **Condition of the Property at Transfer**<br>• *What condition do you think the property should be in before transfer to Boeing*<br>• *Describe what the property would look like*<br>• *What would be left behind*<br>• *What would the land look like* | At transfer, the property should be open space, highly invasive non-native plant species removed, re-vegetated with native habitat, preserving biological, botanical, cultural, and historical resources. All Federal, State, and local special status species will be protected. In particular, the major population of federally-endangered Braunton's milkvetch (*Astragalus brauntonii*) growing on the southwestern hills in Area IV will be undisturbed and protected, as will the major populations of Santa Susana tarweed (*Deinandra minthornii*) growing in the northern portion of Area IV. Smaller populations of Santa Susana tarweed growing on the rock outcrops around Area IV will also be protected from disturbance. The SSFL property will have a visitor's center focusing on history and educational issues relevant to the site. Replacement nesting/roosting structures shall exist on the site. (See Structure/Infrastructure below.) |
| **Structure/Infrastructure**<br>• *Removal of uncontaminated debris, slabs?*<br>• *Retain any structures for historic preservation purposes?*<br>• *Approach, sequencing, how to prioritize*<br>• *On-site storage of debris (pending transport to disposal) – where, how*<br>• *Sorting of debris for disposal* | Remove all contaminated structures and infrastructure that cannot be decontaminated in place on a cost-effective basis. Where possible, consider re-using non-contaminated structures for the visitor center. Removal and de-contamination priorities shall be based on toxic risk assessments.<br>Known or newly discovered historical /cultural sites shall be left undisturbed and be protected.<br>Short-term (measured in days or weeks, not months) on-site storage of containerized debris shall be confined to unused paved parking lots. No land shall be cleared for the purpose. Sorting of debris shall be done at the site of removal. Recycling shall be given priority.<br>Remove all unnecessary road paving. Maintain critical access roads and use existing, uncontaminated roads and parking lots to the extent possible. Assess need for remaining uncontaminated infrastructure using best management practices and /or on a case-by-case basis. Uncontaminated debris and slabs may be left in place.<br>Replacement structures for sensitive species, such as raptors, shall be constructed near existing structures currently used by wildlife prior to their demolition. |

| SUGGESTED DISCUSSION TOPICS | GROUP CONTRIBUTION |
|---|---|
| **Soil Contamination**<br>• *Thoughts regarding the balance between excavation and on-site treatment*<br>• *How to minimize impacts on biological resources*<br>• *How to minimize impacts on cultural resources*<br>• *Prioritization, approach, sequencing under constrained budget scenarios*<br>• *Contamination in the northern drainages?* | Toxicity is a major consideration in development of look-up tables.<br>Conduct toxicity analyses on known areas of contamination. Prioritize clean-up areas by toxicity. Based upon prioritization, select best available treatment(s) for those most toxic areas first. Following that, focus on areas of lower toxicity. Minimize excavation by using a suite of alternative treatments, including on-site treatment, based on priorities (determined by toxicity analyses). This approach includes the assumptions:<br>• That the prioritization process described above is carried forward through the look up table development and application;<br>• Look up table numbers should be able to correlate with established EPA or State of California toxicity levels.<br>The clean up process should be thoughtfully applied without deadline(s) as the driver. New treatment technologies should be continually sought. Cost-benefit analysis, based on toxic risk, shall be applied proactively and funds budgeted accordingly. |
| **Disposal**<br>• *Preferences for radiological contamination*<br>• *Preferences for radiological/chemical contamination (mixed)*<br>• *Preferences for chemical contamination*<br>• *Preferences for uncontaminated debris*<br>• *Acceptability of recycling uncontaminated metals?*<br>• *Prioritization, approach, sequencing under constrained budget* | For contaminated material: Subsequent to implementation of all treatment options, remaining contaminated materials would be taken to appropriate, licensed facilities. All other debris would be disposed of by landfill or recycling as appropriate, and include requirements as described in Structure / Infrastructure. Where necessary and feasible, local disposal, for example at Calabasas Landfill, is preferred over long-distance transport.<br>Priorities should follow the recommendations indicated under Structure / Infrastructure, and cost-benefit analysis should be applied as indicated under Soil Contamination. |
| **Transportation**<br>• *Depending upon preferred disposal sites:*<br>    o *Transportation modes*<br>    o *Routes*<br>    o *Logistics, as needed*<br>    o *How to minimize traffic impacts*<br>    o *How to minimize noise?*<br>    o *How to minimize air emissions and climate impacts?*<br>    o *How to maximize safety*<br>• *Method and route for transporting fill material* | Minimize number of loads and transportation of waste from site by truck by making every effort to treat soil on –site. Follow established routes and select route based upon contaminant types, concentrations, and load weights. For example, Chatsworth route may not be appropriate, because it is a narrow two lane road through a residential and light commercial area, and the road may not be designed to support hours of heavily-loaded truck traffic. Look to minimize shipping distances when selecting approved and /or licensed disposal locations. Best management practices should be utilized to protect the public health by minimizing noise and air pollution; trucks should be required to utilize new technologies such as alternate fuels, new hybrid engines, and/or engines with low emissions.<br>Transportation activities should occur during the hours between 0900 and 1430 to avoid rush hours and school arrivals and departures., and to prevent accidents that could occur by trucks driving on Woolsey Canyon after dark<br>. |

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<tr><th>SUGGESTED DISCUSSION TOPICS</th><th>GROUP CONTRIBUTION</th></tr>
<tr><td>Groundwater<ul><li>Technology options</li><li>Prioritization, approach, sequencing under constrained budget</li></ul></td><td>Expand GETS. Pump groundwater to prevent further contaminant migration. Explore data gaps on seeps and springs. Install vapor extraction system where necessary. Continue with tests that are in place, but accelerate groundwater treatability studies to include present and future technologies. Tritium in groundwater: allow natural attenuation with continued monitoring.<br><br>Priorities should follow the recommendations indicated under Structure / Infrastructure, and cost-benefit analysis should be applied as indicated under Soil Contamination.<br><br>Groundwater and soil treatment must be considered and treated at the same time to prevent recontamination of new soil by groundwater.</td></tr>
<tr><td>Additional Actions<ul><li>What else might be necessary to accomplish the desired condition:<ul><li>Backfilling?</li><li>Recontouring?</li><li>Revegetation?</li><li>Long-term monitoring?</li><li>Restoration of the northern drainages?</li></ul></li><li>Would your proposed alternative accomplish your desired condition?</li></ul></td><td>Backfilling should be minimized, and its placement should be timed to lessen erosion potential.<br><br>Backfill soils should be similar to what was taken from the contaminated area.<br><br>Any recontouring should be minimal, should consider natural drainage patterns, and should be performed for remediation purposes only after soil disturbances.<br><br>Re-vegetation should be site-specific, consist of local, native plant species and should allow for re-colonization of Area IV by native plant species from adjacent habitat.<br><br>Long-term monitoring will be performed and will include monitoring of soils, drainages, historical, archaeological and biological resources that are protected or listed (or when these resources are discovered during the remediation process). Clean-up impacts to the Northern Buffer Zone should be minimized to the extent possible.<br><br>Systematic monitoring of plants growing on contaminated soils should be instituted to evaluate the effectiveness of contaminant uptake, degradation, and potential adverse effects on consumer species.<br><br>The group believes its suggestions for conditions at transfer can be accomplished.</td></tr>
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| ***SUGGESTED DISCUSSION TOPICS*** | ***GROUP CONTRIBUTION*** |
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| **Total Package**<br>• *What is most important, least important*<br>• *What is urgent?*<br>• *Brainstorm predictable impacts – positive and negative*<br>• *Is the alternative as robust as possible?*<br>*Any weaknesses that should be addressed* | Most important: Review results of site assessments and toxicity characterization. Prioritize clean up accordingly based upon toxicity to humans and biota.<br>Least important: Meeting the 2017 deadline.<br>Urgent: There is a need for rumor control and a reliable, responsive source of information dissemination to combat exaggerated claims of negative health and safety impacts emanating from the site.<br>Possible positive impacts: Public health and safety will be protected; the SSFL site will be restored to open space; and native habitat will be protected and restored as necessary.<br>There is a lessening of fear levels in surrounding communities, a growing appreciation of the natural beauty and cultural history of the site, and involvement by local residents in staffing and in volunteering at the onsite Education Center.<br>Possible negative impacts: Transportation of hazardous waste and non-hazardous waste and infrastructure and all transportation associated risks and drawbacks, including damage to the site environment, roads, etc., health and safety impacts for the community living in the area which include potential lung and other illnesses associated with traffic, the potential for accidents and spills, and noise. Increased contamination of other areas (other landfills) that may be impacted by AREA IV and NBZ remediation. Maintenance and security considerations may impact long-term site access for humans and wildlife.<br>Weakness to be addressed: There is a potential for failures of treatment methodologies, lack of clarity as to the end state desired, failures or obstruction due to political interference, failures or obstruction from a proliferation of misinformation, and / or deliberate disinformation campaigns. |

<table>
<tr><th></th><th>Blue Group</th><th>Orange Group</th><th>Salmon Group</th><th colspan="2">Yellow Group[1]</th></tr>
<tr><td rowspan="2">Summary Statement</td><td rowspan="2">Cleanup SSFL Area IV environment in such a way as to not cause damage to the existing ecosystem in excess of need.</td><td rowspan="2">Orange Group members believe that DOE should produce a full-scope EIS that takes into consideration a full range of alternatives not limited to the clean-up to background for soils stipulated by the Administrative Order on Consent/Agreement in Principle  We would appreciate a sincere effort on the part of the Department of Energy to adopt a comprehensive approach in the EIS that unequivocally covers the potential damage to the natural environment, water, air and public health resulting from a wholesale removal of soils. The wholesale removal of soils with low to high levels of contaminants is a poorly-conceived method intended to clean up the site to an ill-defined or impossible-to-define “background.”</td><td rowspan="2">We feel strongly that DOE should take all steps necessary to obtain sufficient funds to implement the Administrative Order on Consent (AOC) on the agreed schedule.  DOE should take all steps necessary to meet the 2017 schedule.  There should be no back-tracking and DOE should focus on implementing the AOC.  In addition, DOE should work in cooperation with the California Department of Toxic Substances Control to prepare a joint Environmental Impact Statement/ Environmental Impact Report (in compliance with the National Environmental Policy Act and the California Environmental Quality Act).</td><td colspan="2">At the beginning of the cleanup & throughout the cleanup process, consider the entire SSFL property’s condition at transfer & potential end use<br>Establish point-based prioritization system (similar to LEED system for Green Construction certification) for all activities<br>Minimize creation of new risks and new problems as we solve old ones<br>Engage California companies and California residents in any new jobs created<br>Minimize soil movement by use of alternative treatment technologies; careful sorting of contaminated materials to keep as much out of disposal facilities as possible; preserving uncontaminated infrastructure, vegetation, & soil<br>Establish a place open to the public with potential for one or more museums, research laboratories, etc. that documents the site’s history and remediation and provide facilities for research on remediation relevant to the SSFL</td></tr>
<tr><td>Building preservation variation:<br>Preserve uncontaminated structures</td><td>Building demolition variation:<br>Remove all buildings in Area IV, as all structures have been declared NOT significant</td></tr>
</table>

[1] *The Yellow Group presents variations on points where participants’ preferences diverged, as shown in parallel columns.*

<table>
<tr><th></th><th>Blue Group</th><th>Orange Group</th><th>Salmon Group</th><th colspan="2">Yellow Group[1]</th></tr>
<tr><td rowspan="2">Condition of the Property at Transfer</td>
<td rowspan="2">Complete mitigation supportive of native habitat including cultural resources, flora, and fauna.<br>Property should be conducive to integration with open space/parkland.<br>Its infrastructure should support such open space/parkland use.<br>Property should commemorate the history of the Site.</td>
<td rowspan="2">At transfer, the property should be open space, highly invasive non-native plant species removed, re-vegetated with native habitat, preserving biological, botanical, cultural, and historical resources. All Federal, State, and local special status species will be protected. In particular, the major population of federally-endangered Braunton’s milkvetch (Astragalus brauntonii) growing on the southwestern hills in Area IV will be undisturbed and protected, as will the major populations of Santa Susana tarweed (Deinandra minthornii) growing in the northern portion of Area IV. Smaller populations of Santa Susana tarweed growing on the rock outcrops around Area IV will also be protected from disturbance. The SSFL property will have a visitor’s center focusing on history and educational issues relevant to the site. Replacement nesting/roosting structures shall exist on the site. (See Structure/Infrastructure below.)</td>
<td rowspan="2">Clean the property to the AOC’s requirement of background. This is not an alternative but a requirement, consistent with the Purpose and Need statement. Following cleanup, Area IV should be clean enough to serve as a wildlife corridor, in a near-natural state similar to the state of property prior to the installation of buildings.</td>
<td colspan="2">• Using a collaborative process, consider the entire SSFL property’s condition at transfer and potential end use as clean-up decisions are made and implemented.<br>• Establish a decision-tree process to preserve and document site history and history of cleanup<br>• Maximize sustainability<br>• Keep uncontaminated infrastructure wherever possible<br>• Don’t create new problems as you solve the old ones<br>• Establish a space open to the public but with limited private vehicle access to minimize future environmental damage<br>• Preserve peripheral slabs for public parking, so shuttles can take people on the site<br>• Preserve archeological features<br>• Foster the natural state:<br>o Return the site to the original state as near as possible and practical: try to ascertain and reestablish what was there prior to development, at the same time as you maintain positive features currently in place, like the oak forest<br>o Do not create additional damage during cleanup – for example, avoid cutting down existing vegetation and spray painting the rocks, as was done during characterization<br>Minimize soil movement to reduce truck traffic</td></tr>
<tr><td>Building preservation variation:<br>Keep uncontaminated buildings wherever possible</td>
<td>Building demolition variation:<br>Remove all buildings in Area IV.<br>Do not support attempting to save any structures in Area IV. All structures have been declared NOT significant already.</td></tr>
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| | Blue Group | Orange Group | Salmon Group | Yellow Group[1] |
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| Structure/Infrastructure | Remove all structures except those that can be appropriately repurposed (e.g. – the million dollar hole – building 56, sodium pump test facility)<br>Option A – Leave non-contaminated/stable subsurface structures and footings in place<br>Option B – Remove building foundations, roads and road base for appropriate off-site management.<br>Option C – Same as Option B with on-site management<br>Remove roads after the A, B, or C option | Remove all contaminated structures and infrastructure that cannot be decontaminated in place on a cost-effective basis. Where possible, consider re-using non-contaminated structures for the visitor center. Removal and de-contamination priorities shall be based on toxic risk assessments.<br>Known or newly discovered historical /cultural sites shall be left undisturbed and be protected.<br>Short-term (measured in days or weeks, not months) on-site storage of containerized debris shall be confined to unused paved parking lots. No land shall be cleared for the purpose. Sorting of debris shall be done at the site of removal. Recycling shall be given priority.<br>Remove all unnecessary road paving. Maintain critical access roads and use existing, uncontaminated roads and parking lots to the extent possible. Assess need for remaining uncontaminated infrastructure using best management practices and /or on a case-by-case basis. Uncontaminated debris and slabs may be left in place.<br>Replacement structures for sensitive species, such as raptors, shall be constructed near existing structures currently used by wildlife prior to their demolition. | Remove contaminated roads, pads, etc. as required by the AOC. Remove uncontaminated pads and foundations as needed to investigate for the presence of contamination. This is not an alternative but a requirement, consistent with the Purpose and Need statement.<br>Short-term, on-site contained storage is acceptable, but should not exceed 30 days. | Establish a process for evaluating infrastructure for beneficial use prior to demolition. The idea is to avoid unnecessarily filling trucks with non-contaminated infrastructure.<br>**Building preservation variation:**<br>Establish a process for evaluating structures for beneficial use prior to demolition. Avoid unnecessarily filling trucks with non-contaminated structures. Focus on things that must be done. Apply a point system to determine whether it is more cost-effective to keep or demolish each structure. Retain all uncontaminated structures that can potentially be turned to beneficial use (like the Annenberg Foundation Malibu Creek project – see attachment). This would be part of the program to reduce the amount of soil that is moved around. Set aside “appropriate” buildings for future use as museum(s) and related facilities, such as Science of Remediation or Laboratory for Future Projects (such as testing of technologies) and Education. View this as part of making the site self-sustaining cost-wise… “Build it and they will come,” meaning colleges and universities.<br>**Building demolition variation:**<br>Remove all buildings in Area IV.<br>Do not support attempting to save any structures in Area IV. All structures have been declared NOT significant already. |

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| **Soil Contamination** | Remediate soil to level consistent with ultimate land use. Avoid removal to the extent possible.<br>Step 1: Develop hierarchy of area's cultural and ecological assets based on balancing criteria in NEPA and CEQA.<br>Step 2: Select from suite of technologies for soil remediation based on Step 1. Give preference to in-situ remediation.<br>Step 3: Perform soil removal minimizing potential for water run-off and migration of contaminants to other areas of SSFL and off-site.<br>Make sure room is left for possible future options, not explored at this time. Work In order of these priorities.<br>1. In-situ Treatment<br>2. On-site Treatment<br>3. On-site Containment<br>4. Isolate sources of multiple contaminants mixing to prevent further mixing.<br>5. Other Option<br>6. Other Option<br>7. Any Other Option<br>8. Soil Removal to Off-site Location (last resort/last option)<br>** Remediate highest risk areas first.<br>** Implement phytoremediation immediately | Toxicity is a major consideration in development of look-up tables.<br>Conduct toxicity analyses on known areas of contamination. Prioritize clean-up areas by toxicity. Based upon prioritization, select best available treatment(s) for those most toxic areas first. Following that, focus on areas of lower toxicity. Minimize excavation by using a suite of alternative treatments, including on-site treatment, based on priorities (determined by toxicity analyses). This approach includes the assumptions:<br>• That the prioritization process described above is carried forward through the look up table development and application;<br>• Look up table numbers should be able to correlate with established EPA or State of California toxicity levels.<br>The clean up process should be thoughtfully applied without deadline(s) as the driver. New treatment technologies should be continually sought. Cost-benefit analysis, based on toxic risk, shall be applied proactively and funds budgeted accordingly. | For contaminated soils, cleanup to meet the AOC standard of background by 2017 as stipulated in the AOC as follows:<br>1. Remediation in-situ (in place) using technologies that have been demonstrated to be effective and timely where possible.<br>2. Excavate and treat on-site using technologies that have been demonstrated to be effective and timely where possible for soils that cannot be remediated in-situ.<br>3. Excavate no more than necessary (e.g., aiming to not excavate soil to a depth deeper than where the contamination is located) for those soils that cannot be treated using 1 or 2 (above).<br>4. Remove that which must be removed as soon as possible.<br>5. For contamination found in relatively inaccessible parts of the northern drainages, consider<br>a. Installation of catchment basins in more accessible locations downstream and introduction of water at or above the location of the contamination to allow accessible impoundment to remove and/or treat contamination. Flush with water, collect in a catchment, and treat or remove with vacuum trucks for remote disposal.<br>b. Use of mules and/or helicopters to minimize disturbance.<br>6. Consider use of soil vapor extraction to address volatile organic compounds in the soil. | • To reduce the volume of contaminated soil to be removed, identify and treat the gradients of less contaminated soil surrounding the "pink blobs" so this less contaminated, now treated, soil can remain on-site.<br>• Use existing buildings for soil treatment.<br>• Ensure "outlier" contaminated soils (those that occur outside the sphere of the main contaminated areas) are treated or removed.<br>• Evaluate sorting out uncontaminated on-site soil and mixing it with soil that has low levels of contamination to bring the mixed soil within the levels required by the Look-up Tables.<br>• Have a system for making decisions about moving soil. Always use alternate technologies over "muck and truck." Model the system on the US Green Building Council, LEED Certification System. (The highest level is Platinum.) Use a system that already exists and take the emotion out of decision-making.<br>• For remaining characterization of site soils, test plant materials that grow in the soil to be tested.<br>• During remaining characterization and cleanup, ensure that all workers are properly wearing personal protective equipment for all tasks.<br>• Evaluate whether the entire SSFL is a "traditional cultural property" and ensure active on-going consultation with Native American populations in the area.<br>• Have a soil treatment options system that includes a parallel evaluation of the site for areas that have "sensitive" issues, such as archeological or biological or safety issues and therefore call for special treatment. Some areas may call for sequestering, for example, the steep incline in the northern drainages. |

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| **Disposal** | Categorize waste by level of contamination.<br>• Dispose of most contaminated soil first. Only most contaminated soil goes off-site to appropriate landfill (closest and least expensive)<br>• Treatment of treat waste streams to separate components to maximize on-site disposal and minimize off-site disposal requirements.<br>• Recycling of uncontaminated metal and other recyclables should be pursued whenever possible | For contaminated material: Subsequent to implementation of all treatment options, remaining contaminated materials would be taken to appropriate, licensed facilities. All other debris would be disposed of by landfill or recycling as appropriate, and include requirements as described in Structure / Infrastructure. Where necessary and feasible, local disposal, for example at Calabasas Landfill, is preferred over long-distance transport.<br>Priorities should follow the recommendations indicated under Structure / Infrastructure, and cost-benefit analysis should be applied as indicated under Soil Contamination. | For radiological contamination: The three options identified by DOE for disposal of radiological contamination (Nevada National Security Site in Nevada, Energy Solutions in Utah, and Waste Control Specialists in Texas) seem acceptable. DOE should choose between the three based on the following considerations (in order of importance):<br>• Minimize the distance that contamination must be shipped<br>• Minimize impacts on communities already negatively impacted by environmental hazards (environmental justice considerations)<br>• Select a disposal site that can accept rail shipments (presuming rail transportation is selected for transport to disposal site)<br>• Minimize cost.<br>For mixed waste (containing both radiological and chemical contaminants): follow the same considerations listed above to select the most appropriate disposal site from among the same three disposal sites identified for radiological contamination.<br>For waste containing chemical contamination, follow the same considerations listed above for selection from among licensed facilities that can accept chemical contamination<br>Before any excavated material can be shipped to a disposal site not licensed to receive radiological or chemical contamination, that waste must be proven to be uncontaminated.<br>This group prefers that no metals be shipped for recycling based on prior bad experiences.<br>Minimize the quantity of material to be disposed (soil and construction debris) by using any material that is clean (based on the AOC) on the site in areas where fill is needed. | • First priority is treatment to reduce need for disposal<br>• Place high priority on on-site sorting of waste to minimize creation of mixed waste<br>• Place high priority on using California-based companies, such as disposal sites for non-radioactive waste<br>• Strive for solutions that are characterized by longevity, with the goal to avoid recontamination<br>• Develop a matrix system for easier and more efficient decision-making on disposal that recognizes cost, jobs, local impacts, environmental justice, health effects, safety, etc. For example, safety must be a factor in deciding what to do about characterizing and cleaning up the steep inclines in the northern drainages.<br>• Reduce debris by good sorting – concrete slabs can be recycled as shade pavilions. Don't remove them if it is not necessary.<br>• Recycle metals, equipment, building materials<br>• Use a point system for setting priorities under a constrained budget |

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| **Transportation** | MINIMIZE!!!<br>Minimize off-site transportation requirements by on-site treatment and containment.<br>• Assess feasibility of improving existing fire roads from northern drainage area to Southern Pacific rail spur<br>• Evenly distribute transportation routes for disposal<br>• Evaluate railroad option<br>• Consider current and projected traffic conditions along suggested routes: especially Woolsey Canyon, Lake Manor Drive, Plummer, Topanga Canyon Blvd. and the 118 freeway. e.g. (rush hour, overloaded intersections, current traffic impacts, ability for trucks to navigate existing roadways (i.e. – turns))<br>• Mindful of invasive species control with vehicles coming on and off Site.<br>• - Timing of trucks driving off-site (i.e. – one every 5 minutes) | Minimize number of loads and transportation of waste from site by truck by making every effort to treat soil on –site. Follow established routes and select route based upon contaminant types, concentrations, and load weights. For example, Chatsworth route may not be appropriate, because it is a narrow two lane road through a residential and light commercial area, and the road may not be designed to support hours of heavily-loaded truck traffic. Look to minimize shipping distances when selecting approved and /or licensed disposal locations. Best management practices should be utilized to protect the public health by minimizing noise and air pollution; trucks should be required to utilize new technologies such as alternate fuels, new hybrid engines, and/or engines with low emissions.<br>Transportation activities should occur during the hours between 0900 and 1430 to avoid rush hours and school arrivals and departures., and to prevent accidents that could occur by trucks driving on Woolsey Canyon after dark. | Mode of transport:<br>1. Off the mountain, consider using a modular conveyor system with dust controls (either an enclosed belt or sealed containers for the materials being conveyed) or (if that won't work) trucks using modular containers. Conveyance system may also be suspended cable – think zip line or ski lift – to which the containers are attached<br>2. To the disposal site, consider rail option of transferring onto rail. Evaluate use of transfer points on both sides of the county line (e.g., Simi Valley and Chatsworth)<br>3. If the Texas disposal site is selected, consider using ship transport relying on Port Hueneme or Los Angeles harbor<br>4. If trucks must be used, use electric or natural gas to minimize air emissions<br>5. If trucks must be used, employ truck washing/ decontamination (including tires) to avoid moving contamination off the site<br>Routes:<br>1. Off the mountain, consider developing an existing fire road from Area IV into Simi Valley OR through Ahmanson Ranch (possibly to Van Nuys rail yard for transfer to rail transport) as an alternative to Woolsey Canyon Road<br>2. If trucks down Woolsey Canyon Road, consider alternative routes from the bottom of Woolsey and consider spreading out the impact by rotating among multiple route options<br>3. Consider upgrading roads to compensate for damages to be incurred<br>For fill: Use on-site material for fill and on-site re-contouring whenever possible. If must use off-site fill, use the same mode of transportation and routes as for excavated materials | • Ensure road infrastructure from top to bottom of mountain is safe<br>o Include a bike lane and turnouts on Woolsey Canyon/Valley Circle so cyclists are not run off the road<br>o Establish a clear definition of ownership of the road<br>o Use natural gas for fuel and other environmentally protective steps<br>o Rework/reconstruct the intersection at Woolsey Canyon and Valley Circle<br>o Incorporate safety measures, including live monitors, strict enforcement of speed limit<br>• Maximize safety to community and to drivers<br>• Minimize fill to be brought in<br>• Minimize bringing new materials to SSFL that will have to be taken away later<br>• Coordinate transportation among all parties responsible for SSFL cleanup to minimize impacts to community and the environment<br>• Keep jobs in California for chemical waste disposal<br>• Build temporary treatment plant in Area IV for SSFL chemical waste – then dismantle after cleanup |

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| **Groundwater** | Priority: Focus on source removal to minimize impacts to groundwater (vadose zone)<br>• Continue SSFL site-wide coordination of groundwater investigation and remediation. This includes Area IV.<br>• Continue monitoring forever, including seeps and springs.<br>• Continue treatment using existing systems<br>• Explore new technologies as they become available<br>• Treated groundwater should go back into the ground on-site…. If this is not possible, retain for discharge during the appropriate season (wet season) in consideration of biological resources<br>• Groundwater treatment technologies can't cause a bigger problem than what we're trying to fix (i.e. fracking) | Expand GETS. Pump groundwater to prevent further contaminant migration. Explore data gaps on seeps and springs. Install vapor extraction system where necessary. Continue with tests that are in place, but accelerate groundwater treatability studies to include present and future technologies. Tritium in groundwater: allow natural attenuation with continued monitoring.<br>Priorities should follow the recommendations indicated under Structure / Infrastructure, and cost-benefit analysis should be applied as indicated under Soil Contamination.<br>Groundwater and soil treatment must be considered and treated at the same time to prevent recontamination of new soil by groundwater. | Implement radically-enhanced pump and treat system (better than Boeing's current or previous Groundwater Extraction Treatment System) to treat the groundwater and control further spread of contamination<br>In parallel, aggressively investigate, test, and implement, in a timely fashion, advanced technologies (that have been demonstrated to be effective) to treat groundwater contamination<br>Install long-term monitoring wells, including at the base of the Santa Susana Mountains where they intersect with the Simi Valley alluvium to detect migration of contaminants<br>It is possible that Tritium cannot be addressed as it is too difficult to separate from water for treatment; short life means quantity will diminish significantly in relatively short period of time | • Use phytoremediation and other alternative technologies to reduce soil movement and draw contamination toward "neutralization" points<br>• Keep native plants and use plants that reduce secondary impacts, i.e., if the plants are non-native, make sure they do not cause other adverse impacts<br>• Use treated groundwater to irrigate phytoremediation plants; in reusing treated groundwater, store it as close to original location as possible<br>• In event of constrained funds:<br>o Use funds where they will have the best and most beneficial effects<br>o Halt contaminant migration patterns |

| | Blue Group | Orange Group | Salmon Group | Yellow Group[1] |
|---|---|---|---|---|
| Additional Actions | Backfill – Use locally sourced and similar type and seed bank, reuse on-site soil when possible<br>Re-contour<br>Re-vegetate – local natives<br>All actions done in consultation with other appropriate state resource agencies including State Parks, Fish and Game, and Santa Monica Mountains Conservancy.<br>Create and implement SSFL Integrated Restoration and Resource Management Plan before hand-over to Boeing.<br>Make property accessible for educational opportunities.<br>Property should be conducive to integration into regional open space parkland and Rim of the Valley planning.<br>Integrate property into Santa Monica Mountains National Recreation Area or similar national park service entity (i.e. Rim of the Valley)<br>Create an Endowment<br>Must address cumulative impacts with Boeing and NASA.<br>Bury non-contaminated debris on-site.<br>Conduct a cost-benefit analysis of all possible levels of activity on the Site.<br>Cleanup visible debris in northern drainage area. | Backfilling should be minimized, and its placement should be timed to lessen erosion potential.<br>Backfill soils should be similar to what was taken from the contaminated area.<br>Any re-contouring should be minimal, should consider natural drainage patterns, and should be performed for remediation purposes only after soil disturbances.<br>Re-vegetation should be site-specific, consist of local, native plant species and should allow for re-colonization of Area IV by native plant species from adjacent habitat.<br>Long-term monitoring will be performed and will include monitoring of soils, drainages, historical, archaeological and biological resources that are protected or listed (or when these resources are discovered during the remediation process).<br>Clean-up impacts to the Northern Buffer Zone should be minimized to the extent possible.<br>Systematic monitoring of plants growing on contaminated soils should be instituted to evaluate the effectiveness of contaminant uptake, degradation, and potential adverse effects on consumer species.<br>The group believes its suggestions for conditions at transfer can be accomplished. | For the Sodium Burn Pit, a permanent remedy is needed for contamination in, near, and beneath (including the bedrock) the former sodium burn pit, including the Northern Buffer Zone, as previous cleanup work was to provide an interim remedy only. A final remedy is needed for long-term protection, consistent with the AOC.<br>Backfilling, re-contouring, and re-vegetation to restore the landscape to the desired condition (wildlife corridor).<br>Long-term monitoring to assure on-going effectiveness.<br>Maintain complete records in a form that will last to memorialize all known information and maintain those records in a form that can be accessed using existing technology in perpetuity. | • Revegetation should include native plant species that are beneficial to erosion control, as well as those that are efficient in uptake of potential remaining contaminants<br>• Establish responsible contour of land to protect drainages, prevent erosion, etc.<br>• Establish long-term monitoring to ensure no recontamination and to make sure contaminants do not move (as with groundwater)<br>• Long term monitoring should also include phyto-data as far as contaminant uptake, number of cycles, to demonstrate progress and how alternative solutions are applied and their success measured.<br>• Establish mechanism for coordinated decision-making among all parties to ensure cooperation, information sharing, etc.<br>• Provide for active dust suppression by a guy with a hose (meaning a human who can judge how much water is just right – not too much or too little) |

<table>
<tr><th></th><th>Blue Group</th><th>Orange Group</th><th>Salmon Group</th><th colspan="2">Yellow Group[1]</th></tr>
<tr><td rowspan="2">Total Package</td><td rowspan="2">Cleanup SSFL Area IV environment in such a way as to not cause damage to the existing ecosystem in excess of need.<br>Priority: Protect, don’t Destroy!<br>2nd Priority: Ultimate (best and highest use) – PARKLAND and HABITAT LINKAGE<br>3rd Priority: Ecological functionality and cultural resource protection<br>• Contain and treat as much as possible on-site.<br>• True cleanup, not relocation<br>• Regional Coordination<br>• Site-wide Coordination<br>• Document historic significance of Area IV<br>• Scientific decision-making</td><td rowspan="2">Most important: Review results of site assessments and toxicity characterization. Prioritize clean up accordingly based upon toxicity to humans and biota.<br>Least important: Meeting the 2017 deadline.<br>Urgent: There is a need for rumor control and a reliable, responsive source of information dissemination to combat exaggerated claims of negative health and safety impacts emanating from the site.<br>Possible positive impacts: Public health and safety will be protected; the SSFL site will be restored to open space; and native habitat will be protected and restored as necessary.<br>There is a lessening of fear levels in surrounding communities, a growing appreciation of the natural beauty and cultural history of the site, and involvement by local residents in staffing and in volunteering at the onsite Education Center.<br>Possible negative impacts: Transportation of hazardous waste and non-hazardous waste and infrastructure and all transportation associated risks and drawbacks, including damage to the site environment, roads, etc., health and safety impacts for the community living in the area which include potential lung and other illnesses associated with traffic, the potential for accidents and spills, and noise. Increased contamination of other areas (other landfills) that may be impacted by AREA IV and NBZ remediation. Maintenance and security considerations may impact long-term site access for humans and wildlife.</td><td rowspan="2">Most important – Get started and get finished</td><td colspan="2">• Make it safe while protecting what’s there today<br>• Least important: the political “win”<br>• Most urgent: identify all potential contaminant pathways so that best priorities can be established<br>• Positives: we’ll have a clean site<br>• Negatives: Land-use limitations must be detailed for perpetuity, as we believe it is inappropriate to consider any part of Area IV for residential land-use, due to known groundwater impacts likely to exceed the several generations required to complete that cleanup.<br>• The vision: A site that shows it was cleaned up with green technology, striving for a reduced foot print, …<br>(complete with each of the two variations below)</td></tr>
<tr><td>Building preservation variation:<br>…keeping uncontaminated buildings (such as Building 9 with the movable roof) so that they might be used for a museum to showcase site history, remediation technologies, and responsible reuse (as examples)</td><td>Building demolition variation:<br>…removing all buildings in Area IV, as all structures have been declared NOT significant already.</td></tr>
</table>

| | Blue Group | Orange Group | Salmon Group | Yellow Group[1] |
|---|---|---|---|---|
| | | Weakness to be addressed: There is a potential for failures of treatment methodologies, lack of clarity as to the end state desired, failures or obstruction due to political interference, failures or obstruction from a proliferation of misinformation, and / or deliberate disinformation campaigns. | | ***Please note that the Yellow Group provided an exhibit to illustrate their vision for the future,*** |

# Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 2:30 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: Letter to Senator Boxer re: NASA EIS
**Attachments:** Senator Boxer re NASA DEIS September 22nd, 2013.pdf

Dear Mr. Malinowski,

Please include my email below and my attached letter to the elected officials in my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Tue, Oct 1, 2013 at 5:25 PM
Subject: Letter to Senator Boxer re: NASA EIS
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

As per the request of NASA, I have not submitted this letter directly to NASA Administrator Bolden even though the CC says to NASA Administrator Bolden.

At this time, I believe that I have sent it to both Senator Boxer and Senator Feinstein, to Congressman Waxman and Congressman Sherman. It will be sent to the others I have cc'd ASAP.

Respectfully submitted,

*Christine L. Rowe*
West Hills resident

**Dear Senator Boxer,                                              September 22,2013**

**October 1st, 2013, the public comments are due for the NASA Santa Susana Field Laboratory Draft Environmental Impact Statement.**

**Last year you met with California Department of Toxic Substance Control Director Debbie Raphael regarding the NASA Environmental Impact Statement. I believe you also met with NASA Administrator Bolden, and you may have communicated with Nancy Sutley of the Council on Environmental Quality.**

**While I know that you have been hearing from many constituents over the past twenty years regarding the Santa Susana Field Lab site, the site is not as contaminated today as it was when you first became involved with this project.**

**At about the same time that you were having these meetings in Washington, D.C., I was the Environment Committee Chair and the Public Health Chair of the West Hills Neighborhood Council. We voted last May to write to NASA Administrator Bolden and to request a full scope Environmental Impact Statement (EIS).**

**NASA has complied with your request and the request of Director Raphael to do a Draft EIS with only two alternatives - a cleanup to the Administrative Order on Consent (AOC) and the required No Further Action.**

**This document is over 1000 pages, and I have skimmed all of those pages, and studied many others.**

**The conclusion that I have is this remediation action will have a tremendous impact on the communities of West Hills - where I have lived for more than 35 years, as well as the communities of Chatsworth, Canoga Park, and Woodland Hills.**

**DTSC has a Community Advisory Group, and it is my expectation that this group and many others including the Chatsworth Neighborhood Council will be asking DTSC and NASA to change their Administrative Order on Consent to a risk based cleanup. <u>The majority of the people who understand the technical aspects of the site cleanup support a risk based clean up to a suburban residential standard</u>.**

**The cleanup deadline for soils is 2017. There is no way for all three Responsible Parties to achieve their demolition and soil remediation by 2017, and do so in a safe manner. The roads that these trucks must traverse while they are highways in West Hills and the neighboring communities - they also cross many school crosswalks, and they drive through many minority and low income census tracts. Furthermore, you are taking soil that is not being cleaned up based on risk to other communities that are also Environmental Justice Communities.**

**I respectfully request that you ask the federal EPA, DTSC, and the California Department of Health to appear before your committee and tell you if the AOC level**

**of cleanup is necessary to protect public health offsite, and to protect people who would use the site in the future.**

**DTSC has already sent a letter to the Mayor of Simi Valley that indicates that they do not know of any offsite risk to the community at this time.**

**However, at recent meetings, it was brought up that the more soil that is removed, the greater risk that may be caused to the community from dust and spores that can cause Valley Fever and other illnesses. You will also risk releasing more naturally occurring radionuclides and other metals into the environment. Furthermore, the cleanup could possibly cause enough erosion that could lead to flooding in the area should we have a hard rain during the remediation period.**

**The loosened soil will most likely enter the streams which lead to the L.A. River and other blue line streams and they will most likely exceed the NPDES permits as a result of this remediation.**

**I have contacted the South Coastal AQMD regarding the truck emissions to and from the site and their impact on my community's health. I was told that they only monitor stationary sources, and that the Santa Susana Field Laboratory is in Ventura County, and outside of their jurisdiction. They have no control over the mobile sources.**

**The impact of greenhouse gases is also spelled out in the NASA Draft Environmental Impact Statement. Los Angeles has the worst air quality in the Nation, and now we are adding these trucks to our load for possibly the next 10 or more years.**

**I respectfully request that you find people in the government who can give you the real truth regarding how best to clean up this site to protect the public health and safety of my community, the wildlife corridor, the protected Endangered Species, and the global environment.**

**Thank you.**

**Respectfully,**

**Christine L. Rowe**
***Former West Hills Neighborhood Council Board member – for identification purposes only**
**6732 Faust Avenue**
**West Hills, California 91307**

**cc: Senator Diane Feinstein**
**cc: Congressman Brad Sherman**
**cc: Congressman Henry Waxman**
**cc: Governor Jerry Brown**
**cc: DTSC Director Debbie Raphael**
**cc: Senator Fran Pavley**
**cc: NASA Administrator Bolden**
**cc: Nancy Sutley, Chair of the Council on Environmental Quality**
**cc: Mayor Eric Garcetti**

**Dale Till**

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**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 1:26 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: NASA DEIS

Dear Mr. Malinowski,

Please include the two sets of comments to NASA below as part of my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sat, Aug 17, 2013 at 6:59 AM
Subject: Re: NASA DEIS
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

One more question that is not clear regarding air quality. It is in reference to the statement about highways. Valley Circle, Roscoe Blvd, and Topanga Canyon are all classified as highways. These highways will be impacted by this project. Please clarify this comment relative to air quality and highways.

Respectfully,

*Chris Rowe*

On Sat, Aug 17, 2013 at 6:55 AM, Christine Rowe <crwhnc@gmail.com> wrote:
Dear Mr. Elliott,

This is the first opportunity that I have had to review the hard copy that was sent to me of the DEIS for the Santa Susana Field Laboratory.

I have a couple of questions please:

1) I did see that you had included some of the alternatives that would not meet the AOC in this document. Will there be further information in the whole document to reflect those scenarios? Because from what I have seen so far, it appears that all structures would be removed, the archaeological sites could be impacted, and all vegetation and therefore all habitat would be removed?

2) You refer to a conveyor system that would meet up with a train. That would require eminent domain. It is my understanding that Simi Valley does not have a policy of eminent domain. Have you consulted their City Manager on this issue?

3) Eminent domain requires its own Environmental Impact Studies. This is what my nephew does for a living - accesses the cost of the property and purchases for the U.S. Government to gain the right of way. I believe this is at least a five year process according to him.

4) Mobile Source Air Toxics - this action only refers to NASA's contribution to the air quality = not the cumulative impact of the remediation of the whole SSFL site. I therefore think that the total potential emissions for all three parties needs to be addressed at the same time.

Please advise where you can.

Thank you.

*Chris Rowe*

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Saturday, January 04, 2014 11:36 PM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: NASA DEIS - Schools, Parks, and Open Space
**Attachments:** CANOGA-PARK-NEIGHBORHOOD-COUNCIL-Small.jpg; ChatsworthNeighborhoodCouncil-map.jpg; West-Hills-East-Neighborhood-Council-small (1).jpg; Woodland-Hills-Warner-Center-Small.jpg

Dear Mr. Malinowski,

Please consider my comments below to NASA as part of my DTSC SSFL CEQA comments. DTSC must consider the location of schools, preschools, churches, synagogues, other religious facilities, parks, and other open space locations where children will be who could be potentially impacted by trucks from the SSFL site.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Mon, Sep 9, 2013 at 2:36 AM
Subject: NASA DEIS - Schools, Parks, and Open Space
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

I am making reference again to your Figure 3.12 - 3. This time I am referencing the locations of parks in West Hills.

One of these parks is Shadow Ranch Park - which has historical status in the City of Los Angeles. It is used by the New Community Jewish High School football and other athletic activities; it also still has preschool programs to the best of my knowledge. It is across the street from the New Community Jewish High School to the north. It is also most likely in your Region of Influence Roadways.

Other parks that are in West Hills that I do not see located are closer to Valley Circle. Some of these may fall into your Upper Las Virgenes Canyon Open Space Preserve?

But they include:

1. Castle Peak Park
2. El Escorpion Park
3. West Hills Baseball
4. Knapp Ranch Park West

In Woodland Hills on Topanga and Oxnard is Warner Ranch Park. You also missed a major park in Woodland HIlls  on Shoup which is south of Oxnard and north of Burbank I believe).

I have attached the Neighborhood Council maps for the four communities that will be potentially impacted by your trucks.

I have done this for a number of reasons:

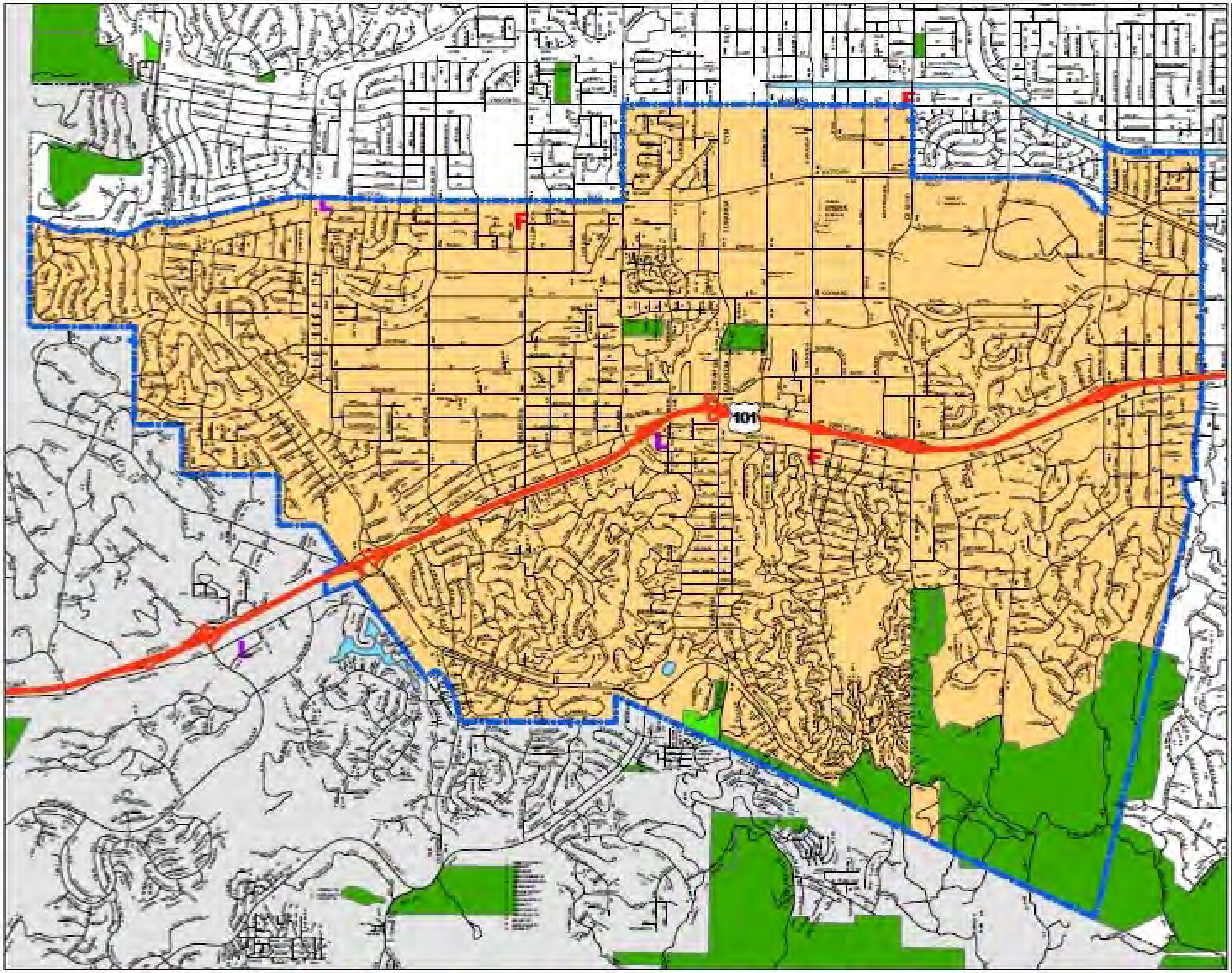
1. I think that all of these Neighborhood Councils (NC) need to be made aware of the NASA DEIS and the potential for all of this future traffic. This is particularly true for the Canoga Park NC which may not have been as actively engaged in the project. A second NC which should be consulted is the Woodland Hills Warner Center NC.
2. Both Canoga Park and Chatsworth have census tracts that have a higher minority population and lower income populations than census tracts in other locations. Your census tract documents seemed to focus on those Environmental Justice communities - Section 4.8 Environmental Justice.
3. As you look at Table 4.8-2 : Schools Near Local Roadways Affected by the Proposed Action - please review my previous comments on schools that were missed on your school map on Figure 3.12 - 3.
4. Your census tract data is referenced on Figure 3.12- 2 and on Tables 3.12 - 1 and 3.12 -2.
5. Another reason for submitting these maps is to show that you can show primary streets on a small map which is necessary for someone to understand locations of schools, approximate distances, etc.
6. Open spaced are shown on these map attachements as well.
7. Your Final maps - you may want an acrylic overlay for hard copies to show some locations. Another option is to put a number on a map - and have the map fold over to reveal the legend of the school locations. By putting the full names on the maps - with maps as small as roughly 7" x 10" - your words overlay other features. I recommend the school symbol with an associated number.
8. You must also consider that not all schools have the same hours of operation. Some schools have after school programs; other schools may close for specific religious holidays - or they may be open on days that you may not expect.

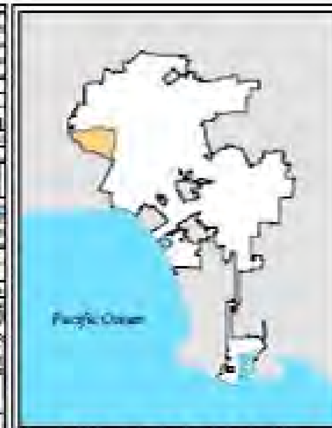
In all of your truck traffic scenarios, you must be considering summer activities which are a really important aspect of Lanark Park in Canoga Park.

I do not see any notations for major parks such as Chatsworth Park South, Santa Susana Pass State Historic Park, or Stoney Point Park in Chatsworth (which is exactly where the trucks queue to get on the 118 freeway going east).

Respectfully submitted,

*Christine L. Rowe*




**SOUTH VALLEY AREA**

COUNCIL DISTRICTS: 3 & 11

**WOODLAND HILLS-WARNER CENTER NC**

**CERTIFIED: 03/06/2002**

Department of Neighborhood Empowerment
(213) 485-1360 or dial 311
www.lacityneighborhoods.com

P Police Station
F Fire Station
L Library
Park
Recreation Area
Water
Freeway
Street

N

NOT TO SCALE



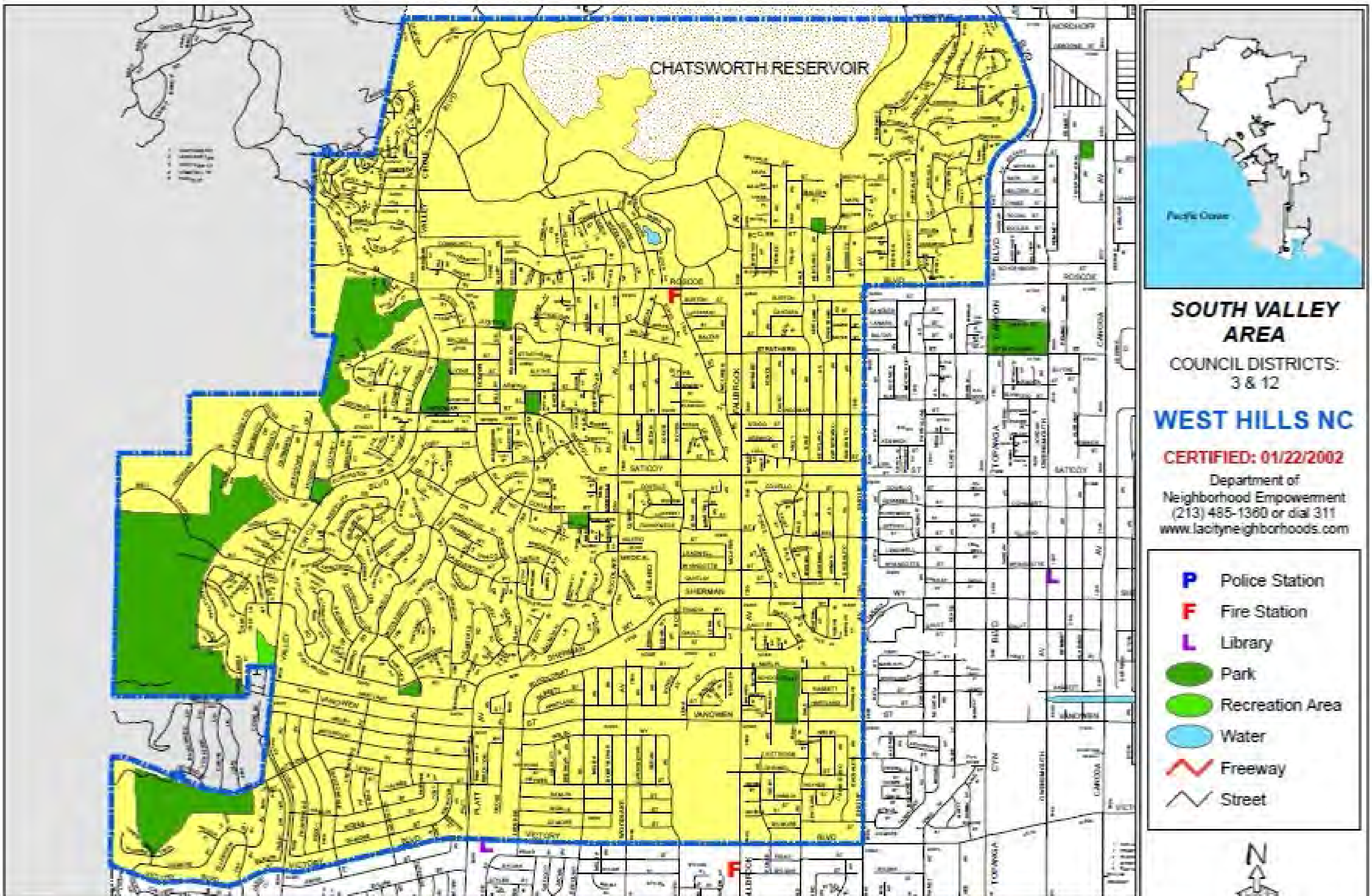
# WOODLAND HILLS-WARNER CENTER

NEIGHBORHOOD COUNCIL
DEPARTMENT OF NEIGHBORHOOD EMPOWERMENT
CITY OF LOS ANGELES

ANTONIO R. VILLARAIGOSA
MAYOR

LA DPW ENGINEERING

GARY LEE MOORE, P.E.
CITY ENGINEER




# WEST HILLS

NEIGHBORHOOD COUNCIL

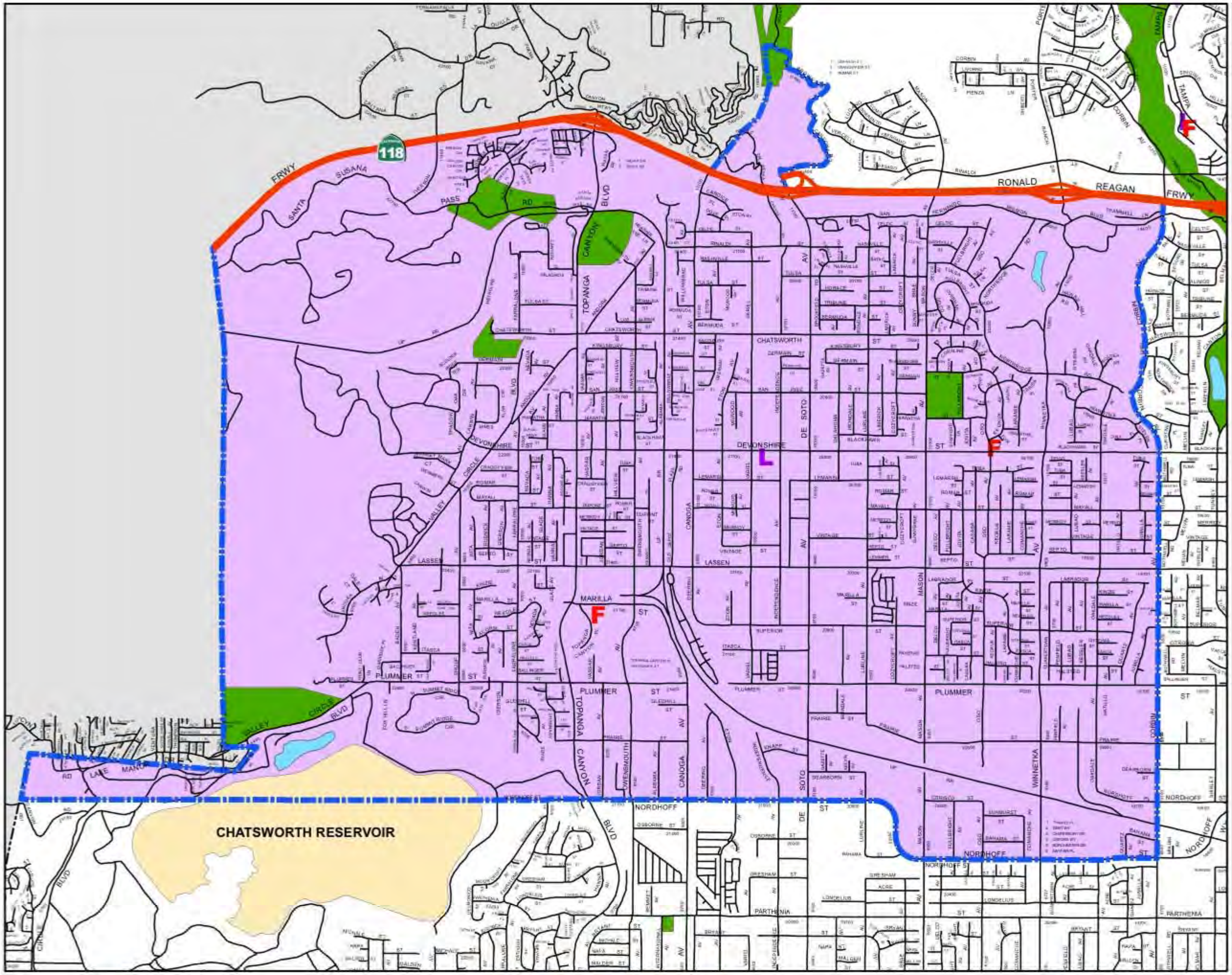
DEPARTMENT OF NEIGHBORHOOD EMPOWERMENT

CITY OF LOS ANGELES

ANTONIO R. VILLARAIGOSA
MAYOR

LA DPW ENGINEERING

GARY LEE MOORE, P.E.
CITY ENGINEER





# NORTH VALLEY AREA

COUNCIL DISTRICT: 12

# CHATSWORTH NC

**CERTIFIED: 04/29/2003**

Department of Neighborhood Empowerment
(213) 485-1360 or dial 311
www.lacityneighborhoods.com

- P Police Station
- F Fire Station
- L Library
- Park
- Recreation Area
- Water
- Freeway
- Street

N

NOT TO SCALE



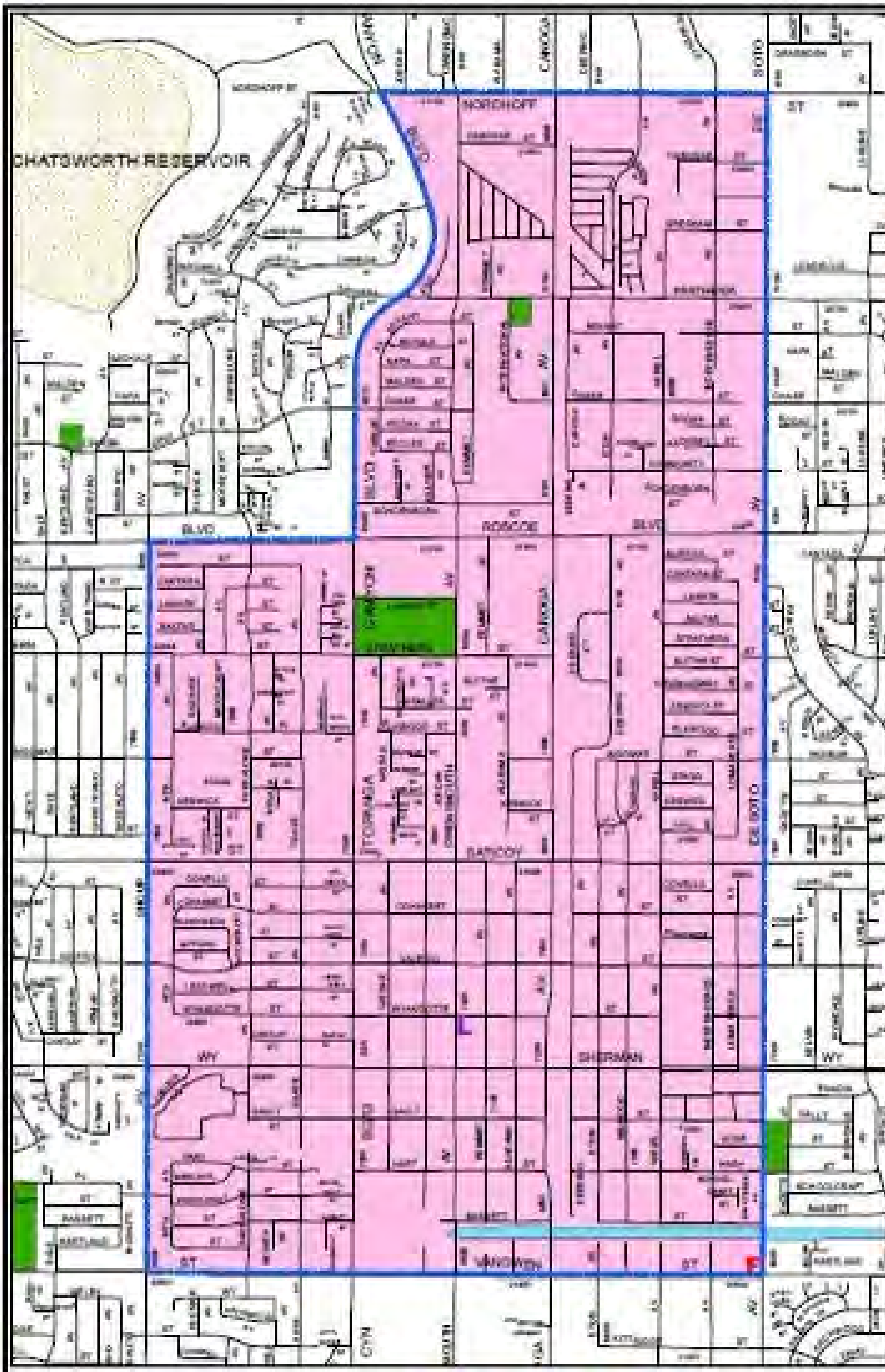
# CHATSWORTH

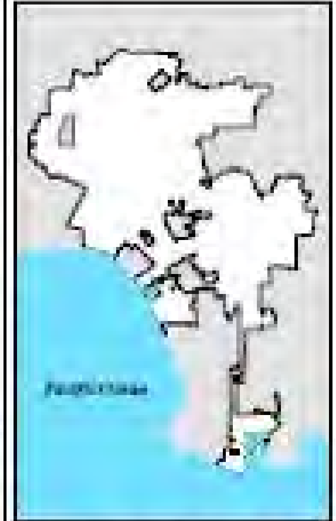
NEIGHBORHOOD COUNCIL
DEPARTMENT OF NEIGHBORHOOD EMPOWERMENT
CITY OF LOS ANGELES

ANTONIO R. VILLARAIGOSA
MAYOR

LA DPW ENGINEERING
Serving the Present; Designing the Future

GARY LEE MOORE, P.E.
CITY ENGINEER




## SOUTH VALLEY AREA

COUNCIL DISTRICTS: 3 & 12

## CANOGA PARK NC

CERTIFIED: 06/18/2002

Department of Neighborhood Empowerment
(213) 485-1360 or dial 311
www.lacityneighborhoods.com

- P Police Station
- F Fire Station
- L Library
- Park
- Recreation Area
- Water
- Freeway
- Street

N

NOT TO SCALE

# CANOGA PARK

NEIGHBORHOOD COUNCIL

DEPARTMENT OF NEIGHBORHOOD EMPOWERMENT

CITY OF LOS ANGELES

ANTONIO R. VILLARAIGOSA
MAYOR

LA DPW ENGINEERING

GARY LEE MOORE, P.E.
CITY ENGINEER

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 2:07 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: NASA DEIS ACTION ALERT

Dear Mr. Malinowski,

Please include the email below in my DTSC SSFL CEQA comments. I do not know if the Santa Susana Field Laboratory site is the most contaminated site in Ventura County or not. Recently Ray Leclerc of DTSC spoke of the SSFL site in comparison to military bases in California due to its size. I am not sure what contamination there is at other military bases in Ventura County.

DTSC should be discussing this in their CEQA documents - how large the SSFL site is in comparison to other sites in Ventura County, Los Angeles County, and throughout the State. DTSC should also compare the fact that this site may be more isolated ( at least historically) than some other contaminated sites. DTSC must how the pathways to the community - where and how far the storm water migrates from the SSFL site, where the groundwater has migrated to - not just where the community believes it may have migrated to. And how far does the dust from this site blow in order for someone offsite to be at risk from an airborne pathway?

These issues all must be addressed relative to current offsite risk today v the potential risk from demolition, removal, and trucking.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sun, Sep 29, 2013 at 7:08 AM
Subject: NASA DEIS ACTION ALERT
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

As the result of finding the action alert on FACEBOOK, I decided to do a GOOGLE search to find out what else I could find. Not only did I find that the Los Angeles City Council had voted to support the cleanup to the AOCs ( I had no knowledge of this action since I no longer read Council files). But I then found this other action alert.

Did Congressmember Brownley have NASA appear before her committee on September 20th, 2013, and ask NASA to promise to clean up to the AOC level? Can you please send me the transcripts of what NASA said to this committee?

Where is the transparency by NASA to tell the rest of the community that it is taking this action in Congress?

**Why is there a DEIS process if the cleanup standard is predetermined by Congress?**

Please see below.

*Christine L. Rowe*
*disappointed West Hills resident*

There are multiple action alerts on the link below:

http://org2.democracyinaction.org/o/5393/p/dia/action/public/index

http://org2.democracyinaction.org/o/5393/p/dia/action/public/index.sjs?action_KEY=15447

"

# Urgent Action Needed Now To Assure Cleanup of Contaminated Ventura County Rocket Test Site

Your help is needed now on a critical environmental and public health issue.

The most contaminated place in Ventura County is the Santa Susana Field Laboratory, where reactors and rockets were tested. One atomic reactor suffered a partial meltdown there in 1959; there were tens of thousands of rocket tests. Radioactive and chemical contamination resulted.

For decades, the fight to get the site cleaned up has raged. Finally, we got a breakthrough: in 2010, the U.S. Department of Energy (DOE) and NASA, which operated key parts of the site, agreed to a cleanup to background levels of contaminants. In short, if they detect contamination from their activities, they will clean it up. This is what the community has sought for so long.

The Ventura County Democrats strongly supported the cleanup agreements (Administrative Orders on Consent or AOCs) as did elected officials such as Julia Brownley, Fran Pavley, Barbara Boxer, and thousands of local residents.

NASA has now published a Draft Environmental Impact Statement about the cleanup for public comment.There appear to be some within NASA who would like to break the agreement NASA signed. We need to make sure that doesn't happen.

Because of these concerns, Congresswoman Julia Brownley on September 20 questioned NASA on the matter at a hearing of the House Science and Technology Committee. She got NASA to repeatedly state, "NASA is committed to fulfilling our obligations under the AOC."  We need to weigh in now to make sure that NASA indeed does what it promised.

**ACTION NEEDED:** PLEASE send in a comment NOW urging that NASA fully live up to the cleanup agreement they executed. (Comments are due no later than October 1.) You can send the sample message below or edit it or otherwise put it in your own words (generally best at the beginning of the email.) If you do personalize your message, we encourage you to customize the e-mail subject line too.

**Sample E-mail** **E-mails will be sent to:"**

**Dale Till**

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| | |
|---|---|
| **From:** | Christine Rowe <crwhnc@gmail.com> |
| **Sent:** | Saturday, January 04, 2014 8:48 PM |
| **To:** | DTSC_SSFL_CEQA |
| **Cc:** | Malinowski, Mark@DTSC; Leclerc, Ray@DTSC; Bothwell, Nancy@DTSC |
| **Subject:** | Fwd: NASA DEIS Comment regarding NRDC, Committee to Bridge the Gap, and the City of Los Angeles v Department of Energy |
| **Attachments:** | nrdc cbg la v doe.pdf |

Dear Mr. Malinowski,

Please include the following email that was sent to NASA for their DEIS in my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sat, Sep 7, 2013 at 8:21 PM
Subject: NASA DEIS Comment regarding NRDC, Committee to Bridge the Gap, and the City of Los Angeles v Department of Energy
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

It is my strongest opinion that it is irresponsible of NASA to consider this one cleanup alternative (the AOC) as the only possible alternative under NEPA despite all political pressures.

I am attaching the complaint by the National Resource Defense Council, Committee to Bridge the Gap, and the City of Los Angeles v the Department of Energy

This lawsuit is against the Department of Energy (DOE). Yet, NASA is under a similar NEPA process. It is my belief based on the requests of the parties of this lawsuit, that the parties wanted a full scope Environmental Impact Statement because the information on the Environmental Assessment was inadequate in their opinion.

While many parts of this lawsuit reference nuclear contamination which NASA does not have as a result of any NASA or Air Force activities to the best of my knowledge, they also reference various environmental laws that I believe NASA would also be obligated to comply with.

Furthermore, the City of Los Angeles references**: *"The City seeks to protect the public health, safety, and welfare and the environment of its citizens and employees from the threats posed by radioactive and other contamination at and migrating from SSFL, including Area IV."*  It is my opinion after reading the NASA DEIS that the risk of cleaning the U.S. Government portion of the Santa Susana Field Laboratory property to the Administrative Order on Consent level <u>could potentially pose a greater public health, public safety, and risk to the environment - both local and global - than a more balanced approach to clean up.</u>**

It is possible, based upon my reading of the NASA Draft EIS, that there is a tremendous risk of impacting my community as the result of **potential landslides** if much of the vegetation is removed, and **there will be a much greater risk of releasing naturally occurring contaminants above the NPDES permitting levels to the L.A. River system the more that the soil is removed and the closer we dig to bedrock**. ***"Migration of contamination, including contaminated groundwater and surface water, into City limits will also cause the City and its citizens financial and economic harm due to costs of remediation, devaluation of property values, loss of tax revenues, and physical harm to citizens."***

**In fact, I believe the reverse is true - the longer that this cleanup is prolonged, the longer that the trucks are running through my community, the more trucks that enter my community, there is a greater risk of physical harm to the local residents within one mile of the traffic corridors; there is a potential for people along the route to be unable to sell their homes; and there is the potential for tremendous physical harm due to the routes that are major highways in the communities of West Hills, Canoga Park, Chatsworth, and Woodland Hills.**

<u>Why are we not being briefed by Fish and Wildlife representatives and other environmental agencies that understand the applicable laws, and the true risk of this cleanup under the Administrative Order on Consent (AOC) level to the environment?</u>

While I would want NASA's attorneys to review this whole complaint, I would like to make specific reference to these sections:

**"2. In deciding to proceed with this deficient cleanup of Area IV, DOE has failed to comply with the 1995 Joint Policy with EPA, as well as with the cleanup standards of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), 42 U.S.C. §§ 9601, <u>et</u> <u>seq.</u>. DOE has done so, moreover, without preparing either an Environmental Impact Statement ("EIS") under the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321, <u>et</u> <u>seq.</u>, or complying with the CERCLA decision-making process. In addition, despite the fact that the cleanup may adversely impact federally protected endangered species within and near Area IV, DOE has failed to complete the mandatory federal consultation process with the U.S. Fish and Wildlife Service, in violation of the Endangered Species Act ("ESA"), 16 U.S.C. § 1531, <u>et</u> <u>seq</u>."**

"8. NRDC's ability to participate effectively in the cleanup of the SSFL and Area IV, and to thereby protect the environment and its members near the site is injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA and the APA, because, by violating these statutory provisions defendants are denying NRDC information to which the organization is statutorily entitled."

"NRDC brings this action on its own institutional behalf and also on behalf of its members, who both reside near and regularly visit areas near the SSFL site. **These NRDC members enjoy educational, recreational, and scientific activities in that portion of California where the SSFL is located, <u>including observing and looking for Braunton's milkvetch and other plant and wildlife species in this area.</u>** <u>These members' interests in living and recreating in a safe and healthy environment</u> are injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions, and leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas with permanent environmental damage."

"12. **The ability of CBG to participate effectively in the cleanup of the SSFL site, and to t<u>hereby protect the environment and its members near the site is injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA and the APA, because, by violating these statutory provisions, defendants are denying CBG information to which the organization is statutorily entitled.</u>**

**In addition, by leaving massive quantities of radioactive and other contamination at the site, <u>the defendants are threatening both the site and surrounding areas with permanent environmental damage."</u>**

**"These and other CBG members' interests in living and recreating in a safe and healthy environment are injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions, and leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas with permanent environmental damage."**

"14. Plaintiff City of Los Angeles ("City") is a municipal corporation organized and existing under the Constitution and laws of the State of California and the Charter of the City of Los Angeles. The City is located in Los Angeles County and its northwest boundary is near the SSFL.

The City seeks to protect the public health, safety, and welfare and the environment of its citizens and employees from the threats posed by radioactive and other contamination at and migrating from SSFL, including Area IV."

"15. The City's ability to participate effectively in the cleanup of the SSFL and Area IV, and to thereby protect the environment, City residents, and City employees near the site is injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions, defendants are denying the City information to which it is statutorily entitled. In addition, by leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas, with permanent environmental damage. Migration of contamination, including contaminated groundwater and surface water, into City limits will also cause the City and its citizens financial and economic harm due to costs of remediation, devaluation of property values, loss of tax revenues, and physical harm to citizens."

**"16. The City brings this action on its own behalf and on behalf of its citizens and employees, who reside near or regularly visit areas near the SSFL site. These citizens and employees enjoy educational, recreational, and scientific activities in that portion of California where the SSFL is located, including observing and looking for Braunton's milkvetch and other plant and wildlife species in this area. The City is concerned about the risks that the contamination at the SSFL, and Area IV, pose to the health, safety, and welfare of its citizens and employees, particularly in light of the discovery of tritium, perchlorate, and other contamination migrating off the site. These City intere sts in living and recreating in a safe and healthy environment are injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions and leaving massive quantities of radioactive and other contamination at the site, including groundwater contamination, the defendants are threatening both the site and surrounding areas with permanent environmental damage."**

"<u>STATUTORY FRAMEWORK</u>

1. **<u>The National Environmental Policy Act</u>**

**"20. NEPA is our "basic national charter for protection of the environment."**

**40 C.F.R.§ 1500.1. NEPA requires all agencies of the federal government to prepare a "detailed statement" regarding all "major federal actions significantly affecting the quality of the human environment."**

**42 U.S.C. § 4332(C). This statement, known as an Environmental Impact Statement ("EIS"), must descri be (1) the "environmental impact of the proposed action," (2) any "adverse environmental effects which cannot be avoided should the proposal be implemented," <u>(3) alternatives to the proposed action,</u> (4) "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity," and (5) <u>any "irreversible or irretrievable commitment of resources which would be involved in the proposed action should it be implemented." 42 U.S.C. § 4332."</u>**

**"22. Among the factors an agency must consider to determine whether a project may have <u>"significant" impacts</u>, and therefore whether <u>an EIS is required, are the "context" and "intensity" of the action.</u> 40 C.F.R. § 1508.27. Regarding context, the CEQ regulations provide that, for a "site- specific action," <u>an agency must determine whether the "effects on the locale" are significant.</u> <u>Id.</u> § 1508.27(a)**.

**"23. As for intensity, the regulations provide that, among other relevant factors, the severity of the impact must be judged based on whether "the proposed action affects public health an d safety"; "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial"; "the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks"; "[t]he degree to which the action may adversely affect an endangered species"; "[w]hether the action threatens a violation of Federal [law] imposed for the protection of the environment"; and "the degree to which the action is related to ot her actions with . . . cumulatively significant impacts." <u>Id</u>. § 1508.27(b). With regard to the last factor, such cumulative impacts include "the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) undertakes such other actions." <u>Id.</u> § 1508.7."**

**"26. <u>Even after a NEPA process is completed, where an agency learns of "significant new circumstances" or new "information relevant to environmental concerns and bearing on the proposed action or its impacts," the agency must undertake further review under NEPA</u>. <u>Id.</u> § 1502.9(c); 10 C.F.R. § 1021.314"**

**Please see the complete complaint including:**

**2. <u>The Comprehensive Environmental Response, Compensation, and Liability Act</u>**

**3. <u>The Endangered Species Act</u>**

B. <u>DOE's Broken Promises **To Characterize And Cleanup Area IV**</u>

I**n conclusion, the full complaint by the parties against the DOE related to the AREA IV property at Santa Susana has significant relevance to what actions NASA should take regarding its Environmental Impact Statement. It is my opinion that NASA, in just supplying the options of the cleanup to the AOC level, or a No Further Action level, is depriving the <u>community at risk</u> from having the necessary information to make informed decisions regarding the standards of cleanup, the risk to the community from various cleanup alternatives, the risks from the trucks, and the potential hazards to the local environment (endangered species, native plants, protected trees, and wildlife).**

**Let me reiterate again: "It is my strongest opinion that it is irresponsible of NASA to consider this one cleanup alternative (the AOC) as the only possible alternative under NEPA despite all political pressures. "**

Thank you for this opportunity to comment on the NASA Draft Environmental Impact Statement.

*Christine L. Rowe*

*West Hills resident of 35 years*

*NASA Section 106 consultant*

*September 7th, 2013*

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UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

| | |
|---|---|
| **NATURAL RESOURCES DEFENSE COUNCIL, INC., COMMITTEE TO BRIDGE THE GAP, AND CITY OF LOS ANGELES**<br><br>Plaintiffs,<br><br>v.<br><br>**DEPARTMENT OF ENERGY, SPENCER ABRAHAM**, Secretary, Department of Energy, and **CAMILLE YUAN-SOO HOO**, Manager, National Nuclear Security Administration, Oakland Operations Office<br><br>Defendants. | **COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF**<br><br>**ADMINISTRATIVE PROCEDURE ACT CASE** |

1. This case challenges the Department of Energy's ("DOE") March 2003 decision concerning the cleanup of radioactive and other contamination on Area IV of the Santa Susana Field Laboratory ("SSFL") in Simi Valley, California, a DOE-controlled area that, for over fifty years, was used for the development, fabrication, and disassembly of nuclear reactors, reactor fuel, and other radioactive and highly toxic materials. For decades, Area IV was the site of widespread radiological and chemical contamination from a range of sources, including the illegal burning of radioactive and toxic wastes in open pits, reckless disposal practices, at least two nuclear accidents involving serious fuel damage, and, in 1959, even a partial core meltdown not disclosed to the public until 20 years later. As a result, Area IV itself is a radioactive and toxic wasteland, and contamination has migrated off-site, posing health risks to the public both onsite and in surrounding communities.



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Nevertheless, without conducting a full environmental review, and in violation of U.S. Environmental Protection Agency ("EPA") cleanup standards that, pursuant to a 1995 Joint Policy with EPA, DOE is required to apply to this and other DOE sites, DOE has decided to carry out only a partial cleanup, leaving almost 99% of the contaminated soil unremediated. Although the EPA has objected to DOE's cleanup decision – concluding, for example, that after the cleanup Area IV will remain so unsafe that even picnicking and hiking will have to be restricted – DOE does not plan to take any steps to restrict future use of the site, and anticipates that "future use of the property for residential purposes is probable."

2. In deciding to proceed with this deficient cleanup of Area IV, DOE has failed to comply with the 1995 Joint Policy with EPA, as well as with the cleanup standards of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), 42 U.S.C. §§ 9601, et seq.. DOE has done so, moreover, without preparing either an Environmental Impact Statement ("EIS") under the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321, et seq., or complying with the CERCLA decision-making process. In addition, despite the fact that the cleanup may adversely impact federally protected endangered species within and near Area IV, DOE has failed to complete the mandatory federal consultation process with the U.S. Fish and Wildlife Service, in violation of the Endangered Species Act ("ESA"), 16 U.S.C. § 1531, et seq.

3. As a result of these failures, once DOE's cleanup is complete Area IV will remain so contaminated that it will expose future residents of the area to a cancer risk as high as 1 in 50, and the soil will continue to contain contamination at levels as much as 19,000 times higher than EPA



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standards. By deciding that this level of cleanup is sufficient, and is appropriate for unrestricted residential development of the site, DOE is violating NEPA, CERCLA, the ESA, and the Administrative Procedure Act ("APA"), 5 U.S.C. § 706.

## JURISDICTION AND VENUE

4. This Court has subject matter jurisdiction pursuant to 28 U.S.C. § 1331 (federal question jurisdiction), 42 U.S.C. § 9659(a) (CERCLA) and 16 U.S.C. § 1540(g) (ESA). Venue is proper in this judicial district pursuant to 28 U.S.C. § 1391(e).

## INTRADISTRICT ASSIGNMENT

5. Pursuant to Civil L.R. 3-2(d), assignment is appropriate in the San Francisco or Oakland Divisions because the decision at issue here was issued in Oakland, California by the Department of Energy's Oakland Operations Office.

## PARTIES

6. Plaintiff Natural Resources Defense Council, Inc. ("NRDC") is a national, non-profit organization with an office in San Francisco, California, and over 480,000 members dedicated to the protection of the environment, more than 90,000 of whom live in California. Through education, advocacy, litigation and other efforts, NRDC works to protect the environment, and its members, from environmental threats, including the threats posed by radioactive and other contamination from former nuclear research and development facilities throughout the country, such as the SSFL site.

7. NRDC has invested considerable organizational resources in advocating for the proper and expeditious cleanup of the SSFL, including the cleanup of Area IV, which is at issue



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here. For example, at various stages of the SSFL cleanup process, NRDC has submitted comments, attended public meetings, and participated in formal proceedings related to the site, including Area IV.

8. NRDC's ability to participate effectively in the cleanup of the SSFL and Area IV, and to thereby protect the environment and its members near the site is injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA and the APA, because, by violating these statutory provisions defendants are denying NRDC information to which the organization is statutorily entitled. In addition, by leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas with permanent environmental damage.

9. NRDC brings this action on its own institutional behalf and also on behalf of its members, who both reside near and regularly visit areas near the SSFL site. These NRDC members enjoy educational, recreational, and scientific activities in that portion of California where the SSFL is located, including observing and looking for Braunton's milkvetch and other plant and wildlife species in this area. These members' interests in living and recreating in a safe and healthy environment are injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions, and leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas with permanent environmental damage.



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10. Plaintiff Committee to Bridge the Gap ("CBG") is a non-profit corporation organized and existing under the laws of the State of California, with an office in Santa Cruz, California. CBG provides technical assistance to communities near nuclear facilities. CBG has been deeply involved in assisting the community near the SSFL since 1979, when it released to the public, policymakers, and the news media detailed information about the 1959 partial meltdown of a nuclear reactor in Area IV.

11. Since the late 1980s, CBG has invested considerable organizational resources to assist the community in ensuring the appropriate cleanup of the contamination at the SSFL and Area IV. In addition to participating in comment periods and meetings throughout the various stages of the SSFL cleanup, CBG has engaged in public education regarding the SSFL and the nuclear and other contamination at the site.

12. The ability of CBG to participate effectively in the cleanup of the SSFL site, and to thereby protect the environment and its members near the site is injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA and the APA, because, by violating these statutory provisions, defendants are denying CBG information to which the organization is statutorily entitled. In addition, by leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas with permanent environmental damage.

13. CBG brings this action on its own institutional behalf, and also on behalf of its members, who both reside near and regularly visit areas near the SSFL site. For example, CBG



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members Barbara Johnson and Dawn Kowalski both live in Susana Knolls, California, approximately 2 miles down the hill from the SSFL site. They are both concerned about the risks that the contamination at the SSFL, and Area IV, pose to their health and that of the surrounding communities, particularly in light of the discovery of tritium, perchlorate and other contamination migrating off the site; the fact that they have both suffered from breast cancer; and their experience with cancers and birth defects in their community. They have both actively been involved in advocating for the proper cleanup of the SSFL, and Area IV, since 1989, attending public hearings, and participating in various committees working on this issue. These and other CBG members' interests in living and recreating in a safe and healthy environment are injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions, and leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas with permanent environmental damage.

14. Plaintiff City of Los Angeles ("City") is a municipal corporation organized and existing under the Constitution and laws of the State of California and the Charter of the City of Los Angeles. The City is located in Los Angeles County and its northwest boundary is near the SSFL. The City seeks to protect the public health, safety, and welfare and the environment of its citizens and employees from the threats posed by radioactive and other contamination at and migrating from SSFL, including Area IV.



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15. The City's ability to participate effectively in the cleanup of the SSFL and Area IV, and to thereby protect the environment, City residents, and City employees near the site is injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions, defendants are denying the City information to which it is statutorily entitled. In addition, by leaving massive quantities of radioactive and other contamination at the site, the defendants are threatening both the site and surrounding areas, with permanent environmental damage. Migration of contamination, including contaminated groundwater and surface water, into City limits will also cause the City and its citizens financial and economic harm due to costs of remediation, devaluation of property values, loss of tax revenues, and physical harm to citizens.

16. The City brings this action on its own behalf and on behalf of its citizens and employees, who reside near or regularly visit areas near the SSFL site. These citizens and employees enjoy educational, recreational, and scientific activities in that portion of California where the SSFL is located, including observing and looking for Braunton's milkvetch and other plant and wildlife species in this area. The City is concerned about the risks that the contamination at the SSFL, and Area IV, pose to the health, safety, and welfare of its citizens and employees, particularly in light of the discovery of tritium, perchlorate, and other contamination migrating off the site. These City interests in living and recreating in a safe and healthy environment are injured by the federal defendants' failure to comply with NEPA, CERCLA, the ESA, and the APA, because, by violating these statutory provisions and leaving massive quantities of radioactive and other contamination at



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the site, including groundwater contamination, the defendants are threatening both the site and surrounding areas with permanent environmental damage.

17. DOE is the federal agency that has controlled and been responsible for activities within Area IV of the SSFL for decades and that is responsible for the cleanup of Area IV.

18. Defendant Spencer Abraham is the Secretary of the DOE and is the official ultimately responsible for all DOE activities.

19. Defendant Camille Yuan-Soo Hoo is the manager of DOE's Oakland, California Operations Office, which is the DOE office that made the cleanup decision at issue in this case.

## STATUTORY FRAMEWORK

### 1. The National Environmental Policy Act

20. NEPA is our "basic national charter for protection of the environment." 40 C.F.R. § 1500.1. NEPA requires all agencies of the federal government to prepare a "detailed statement" regarding all "major federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(C). This statement, known as an Environmental Impact Statement ("EIS"), must describe (1) the "environmental impact of the proposed action," (2) any "adverse environmental effects which cannot be avoided should the proposal be implemented," (3) alternatives to the proposed action, (4) "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity," and (5) any "irreversible or irretrievable commitment of resources which would be involved in the proposed action should it be implemented." 42 U.S.C. § 4332.



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21. The Council on Environmental Quality ("CEQ") -- an agency within the Executive Office of the President -- has promulgated regulations implementing NEPA which are "binding on all federal agencies." 40 C.F.R. § 1500.3. These regulations require that, unless an activity is "categorically excluded" from NEPA compliance, an agency must either prepare an EIS, or, at the very least, an Environmental Assessment ("EA") which is used to determine whether an EIS is necessary. Id. § 1501.4.

22. Among the factors an agency must consider to determine whether a project may have "significant" impacts, and therefore whether an EIS is required, are the "context" and "intensity" of the action. 40 C.F.R. § 1508.27. Regarding context, the CEQ regulations provide that, for a "site-specific action," an agency must determine whether the "effects on the locale" are significant. Id. § 1508.27(a).

23. As for intensity, the regulations provide that, among other relevant factors, the severity of the impact must be judged based on whether "the proposed action affects public health and safety"; "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial"; "the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks"; "[t]he degree to which the action may adversely affect an endangered species"; "[w]hether the action threatens a violation of Federal [law] imposed for the protection of the environment"; and "the degree to which the action is related to other actions with . . . cumulatively significant impacts." Id. § 1508.27(b). With regard to the last factor, such cumulative impacts include "the incremental impact of the action when added to other



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past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) undertakes such other actions." Id. § 1508.7.

24. Irrespective of whether an EIS is required, where an agency prepares an EA the regulations require that the EA discuss both the need for the proposed action and alternatives to it, address the environmental impacts of both the proposal and the alternatives, and "provide sufficient evidence and analysis for determining whether to prepare" an EIS. Id. § 1508.9.

25. If, after preparing an EA, the agency concludes that an EIS is not necessary, it must issue a Finding of No Significant Impact ("FONSI") that adequately explains why the project will "not have a significant effect on the human environment" and an EIS will not be prepared. 40 C.F.R. § 1508.13.

26. Even after a NEPA process is completed, where an agency learns of "significant new circumstances" or new "information relevant to environmental concerns and bearing on the proposed action or its impacts," the agency must undertake further review under NEPA. Id. § 1502.9(c); 10 C.F.R. § 1021.314.

## 2. The Comprehensive Environmental Response, Compensation, and Liability Act

27. Congress enacted CERCLA to address "the serious environmental and health risks posed by industrial pollution." United States v. Bestfoods, 524 U.S. 51, 54 (1998). To carry out this goal, the statute grants "broad power to command government agencies and private parties to clean up hazardous waste sites." Id.



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28. Although many of CERCLA's provisions are directed at prioritizing, and apportioning financial liability for, cleanups on private property, CERCLA Section 120 provides that "[e]ach department, agency, and instrumentality of the United States . . . shall be subject to, and comply with, [CERCLA] in the same manner and to the same extent, both procedurally and substantively, as any nongovernmental entity . . . . " 42 U.S.C. § 9620(a)(1). The statute further provides that "[n]o department, agency, or instrumentality of the United States may adopt or utilize any [ ] guidelines, rules, regulations, or criteria which are inconsistent with the guidelines, rules, regulations and criteria established by the Administrator," – i.e., "the Administrator of the United States Environmental Protection Agency." Id. §§ 9620(a)(2), 9601(2).

29. Pursuant to Executive Order 12580, federal agencies are responsible for certain remedial actions on facilities under their jurisdiction, custody or control. E.O. 12580. Accordingly, DOE is responsible for the cleanup at those portions of the SSFL site that it owns or controls, including Area IV.

30. In 1995, DOE and the EPA entered into a Joint Policy On Decommissioning Department of Energy Facilities Under CERCLA ("1995 Joint Policy"). The Policy provides that, "regardless of whether or not a release or threatened release" of contamination "is from a site listed on the NPL [National Priorities List]," DOE will undertake the cleanup "in a manner consistent with CERCLA." 1995 Joint Policy at 2.

31. In 1999 and 2000, DOE submitted Reports to Congress listing all of the DOE sites around the country subject to CERCLA Section 120, 42 U.S.C. § 9620. DOE listed the SSFL in



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both of these Reports as one of these sites. <u>See</u> U.S. Department of Energy Office of Environmental Management Twelfth Annual Report To Congress (April 2000).

32. Under CERCLA, a federal agency undertaking a remediation of a contaminated federal facility site must follow a specific set of procedures. <u>Id</u>. § 9621; 40 C.F.R. § 300.3. Pursuant to the National Contingency Plan ("NCP"), those procedures require, *inter alia*, a remedial investigation and feasability study to evaluate the scope of contamination and to begin to develop potential remediation alternatives. <u>See</u> 40 C.F.R. § 300.430. In considering these alternatives, the agency must evaluate nine criteria, including such factors as the protection of human health and the environment; applicable or relevant and appropriate requirements under federal and state law; effectiveness and permanence; feasibility and cost; and community and state acceptance. <u>Id.</u> § 300.430(e)(9). Once the agency has developed a proposed remediation plan, it must again solicit public input, before making its Record of Decision, in which the agency must explain the bases for the chosen alternative. <u>Id.</u> § 300.430(f)(1)-(5).

33. Substantively, the NCP mandates that where there are "multiple contaminants at a site or multiple pathways of exposure," a "$10^{-6}$ risk level shall be used as the point of departure for determining remediation goals . . . ." 40 C.F.R. § 300.430(e)(2)(i)(A)(2). This means that after a cleanup is completed, the resulting residual risk of cancer to the maximally exposed individual on the site should be 1 in 1,000,000. As EPA has explained, although "the final cleanup level may reflect a different risk level within the acceptable risk range ($10^{-4}$ to $10^{-6}$ for carcinogens)," such a



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level may only be selected "[b]ased on a consideration of factors during the nine criteria analysis . . . ." Rules of Thumb For Superfund Remedy Selection (EPA 1997) at 8.

### 3. The Endangered Species Act

34. Congress enacted the ESA in order to protect plants and animals that "have been so depleted in numbers that they are in danger of or threatened with extinction." 16 U.S.C. § 1531(a)(2). Once a species is listed under the Act as "endangered" or "threatened," it is entitled to critical protections, including a requirement under Section 7 of the Act that all federal agencies "shall, in consultation with and with the Assistance of the [U.S. Fish and Wildlife Service ("FWS")], insure that any action authorized, funded or carried out by such agency . . . is not likely to jeopardize the continued existence of " the species. Id. § 1536(a)(2).

35. To carry out this requirement, the ESA's implementing regulations require that whenever a federal project "may affect" a listed species, the action agency must engage in "formal consultation" with the FWS, unless the agency obtains the FWS's written "concurrence" that formal consultation is not necessary. Id.; 50 C.F.R. § 402.14. In this formal consultation, the action agency provides the FWS with "the best scientific and commercial data available" concerning the species, id. § 402.14(d), and the FWS, in turn, issues a "biological opinion" detailing "how the agency action affects the species," 16 U.S.C. § 1536(b)(3)(A), and in particular, whether the action is "likely to jeopardize" the continued existence of the species. 50 C.F.R. § 402.14(g), (h).

36. If, after the conclusion of the consultation process, the FWS concludes that the action is likely to jeopardize a listed species, and therefore will violate Section 7, the FWS "shall suggest



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those reasonable and prudent alternatives which," if implemented, would prevent such a violation. 16 U.S.C. § 1536(b)(3)(A). In any event, the FWS must also specify the "reasonable and prudent measures" the agency must take to minimize the impact of the action on the species. Id. § 1536(b)(4).

## FACTS GIVING RISE TO PLAINTIFFS' CLAIMS

### A. DOE's Use Of The SSFL, And The Legacy Of Contamination At The Site

37. The SSFL is an 11-square kilometer (~ 2800 acre) site located atop a range of hills between the Simi and San Fernando Valleys in southeastern Ventura County, California. Located approximately 30 miles northwest of downtown Los Angeles, more than 69,000 people live within five miles of the SSFL, and more than 1,400 people live within 2 miles of the site. The area also provides a unique semi-arid habitat for a diverse array of sensitive species, 14 of which have been observed in area surveys, including, for example, the critically-endangered Braunton's milkvetch, which is federally listed as an "endangered" species, and has been found in Area IV of the SSFL.

38. Area IV, where DOE is undertaking the cleanup at issue here, is located on the Western edge of the SSFL. Within Area IV are a number of buildings that comprise The Energy Technology Engineering Center ("ETEC"). While the SSFL is principally owned by Rocketdyne Propulsion & Power (a division of The Boeing Company) and the National Aeronautics and Space Administration ("NASA"), DOE's Oakland, California operations office controls and is responsible for ETEC and Area IV.



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39. Beginning in the 1940s, the Department of Defense and NASA used the SSFL for testing rocket and spacecraft engines and subsequently lasers, with Rocketdyne and its predecessor corporations acting as government contractor for the work. DOE and its predecessor agencies used, and sponsored Rocketdyne activities on, Area IV to conduct nuclear research and energy development projects. These projects included the development, fabrication, disassembly, and examination of nuclear reactors, reactor fuel, and other radioactive materials. In addition, the agency engaged in large-scale liquid sodium metal experiments to test liquid metal fast breeder reactor components. Over 200 facilities were used within Area IV to undertake these projects, including 10 nuclear reactors, a plutonium fuel fabrication facility, a "hot lab" where highly irradiated reactor fuel was stripped of its cladding and cut apart, and various nuclear materials storage facilities.

40. There were a number of radiological accidents and releases at the site over the years. For example, in 1959, one of the site's ten nuclear reactors experienced a partial melt-down, with approximately one-third of its fuel experiencing melting. Although government officials did not notify the public of the seriousness of the incident for nearly 20 years, some experts estimate that the incident released hundreds of times the contamination released in the 1979 Three Mile Island nuclear reactor disaster. At least eight other "radiological incidents" occurred in Area IV between 1959 and 1976, including serious fuel damage in two other reactors.

41. Large volumes of chemicals were also used within Area IV. For example, trichloroethylene ("TCE") and other solvents and chemicals were used in connection with work on



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the nuclear reactors. There were accidental spills and releases of all of these contaminants within Area IV.

42. As a consequence of these and other contaminant releases, the ETEC, Area IV, and the SSFL as a whole are contaminated with extensive radiological and chemical material. Based on existing, albeit incomplete, surveys conducted thus far, DOE has determined that the potential radioactive contaminants within Area IV include uranium-238, thorium-232, cesium-137, strontium-90, and cobalt-60. According to EPA, human exposure to these, and other potential radioactive substances at the site, can cause cancer. The groundwater within Area IV is also contaminated, principally with TCE, a dense liquid that, if ingested even at low concentrations, can be toxic, as well as with radioactive tritium. The surface water is also contaminated as a result of operations at the site, primarily with mercury, antimony, copper, and cadmium.

43. Extensive contamination has also already been detected off-site, including, in several locations, radioactive tritium and perchlorate, a toxic chemical that often serves as a leading indicator of contaminant migration. In addition, cesium-137, plutonium-238, and strontium-90 have also all been detected at significantly elevated levels near Area IV, including at a public park and a camp.

**B. <u>DOE's Broken Promises To Characterize And Cleanup Area IV</u>**

44. In the 1990s DOE repeatedly agreed to have EPA conduct a radiological characterization of Area IV of the SSFL, to help identify and characterize the contamination in preparation for cleanup. As late as May 2001, EPA Administrator Christine Todd Whitman



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announced that EPA remained prepared to conduct this survey. In a 2001 Scoping Plan, EPA explained the numerous deficiencies in prior contamination surveys that had been conducted at the site.

45. DOE never funded the EPA survey, and that survey was never conducted. As a result, DOE's current cleanup decision is based on contamination surveys that are – according to EPA – patently deficient, both because samples have not been taken from an adequate number of locations throughout the site and because the equipment used to test the samples that have been taken have not been sensitive enough to provide adequate results.

46. DOE has already decommissioned – i.e., shut down and dismantled – a number of the facilities within Area IV, without preparing an EA or EIS, without complying with the CERCLA process or standards, and in violation of DOE's 1995 Joint Policy with EPA which mandates that the CERCLA process and standards shall apply to this and other DOE cleanups. See Joint Policy On Decommissioning Department of Energy Facilities Under CERCLA ("1995 Joint Policy").

47. In January 2002, DOE issued a Draft Environmental Assessment ("EA") "For Cleanup And Closure of the Energy Technology Engineering Center." Aside from the 'no-action' alternative, the Draft EA only considered two other alternatives. Under both alternatives, DOE's proposal largely focused on the demolition of remaining structures within Area IV, including the Radioactive Materials Handling Facility ("RMHF") Complex; a building used for nuclear power testing; another building that housed nuclear test reactors; and the sodium pump test facility. Once



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the cleanup is complete, DOE explained, "future use of the property for residential purposes is probable."

48. Aside from the removal of contaminated structures, the only cleanup DOE proposed under Alternative One was to remove 5,500 cubic meters of contaminated soil from the vicinity of the RMHF Complex. Under Alternative One, no other contaminated soil or other media would be removed from near any of the other radioactively contaminated buildings, or the rest of Area IV. Nonetheless, DOE claimed that this alternative would achieve a cleanup level within Area IV of 15 millirems per year ("mrem/yr.") of exposure, and that this cleanup alternative would result in a residual lifetime cancer risk of 3 in 10,000 – i.e., an exponentially greater exposure risk than the 1 in 1,000,000 risk that the NCP mandates agencies use as their "point of departure for determining remediation goals." 40 C.F.R. § 300.430(e)(2)(i)(A)(2). Alternative one was DOE's "preferred alternative."

49. The only additional element in Alternative Two in the Draft EA was a provision for the removal of additional contaminated soil within Area IV. Under Alternative Two, DOE would remove more than 400,000 cubic meters of contaminated soil throughout Area IV. According to the Draft EA, this alternative would achieve a cleanup level of .05 mrem/yr. of exposure, and would result in residual lifetime cancer risk of 1 in 1,000,000.

50. DOE received 79 comments on the Draft EA, including those of EPA and plaintiffs CBG and NRDC. In detailed comments, EPA explained that it had "serious concerns about several key issues" in the Draft EA. Among other concerns, EPA explained that "the selection of a cleanup



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level at the site is premature and is not based on the CERCLA process." EPA also commented that DOE had not undertaken adequate contamination surveys, including "an evaluation of radionuclides or other hazardous materials that could be present [ ] throughout Area IV."

51. EPA observed that, by failing to consider the impacts associated with the chemical contamination at the site, and by failing to consider the overall impacts associated with decommissioning the entire ETEC site, the EA "is an inappropriate segmentation under NEPA." EPA further explained that, "as a matter of public disclosure under NEPA, an analysis of potential impacts of these other contaminants, including impacts to public health, [should] be integrated into DOE's NEPA analysis of environmental impacts and mitigation measures for the ETEC as a whole." EPA also noted that the EA did not address the potential for radioactivity and/or chemical contamination to migrate off the site, through groundwater or otherwise. For example, EPA noted that tritium has been detected in groundwater at the site, but that the EA does not discuss this contamination.

52. EPA further explained that the "range of reasonable alternatives analyzed is limited and incomplete." Among other alternatives, EPA noted that DOE should have at the very least considered following CERCLA standards and procedures in selecting its cleanup plan, which DOE has entirely failed to do. EPA also commented that DOE should have considered on-site management of radiological materials and restrictions that might prevent residential use of the site. EPA noted that "the level of human health risks and other impacts associated with all of the alternatives [DOE has considered] warrant serious consideration of additional [ ] alternatives."



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53. California's Department of Toxic Substances Control ("DTSC") also submitted comments, echoing many of the same concerns as those expressed by EPA. For example, DTSC also explained the DOE's existing characterization of the contamination within Area IV was insufficient; that DOE had improperly failed to consider the chemical contamination on the site; and that "there is a lack of sufficient information to support a Finding of No Significant Impact for ETEC."

54. Plaintiffs NRDC and Committee to Bridge the Gap ("CBG") also submitted comments. Among other concerns, CBG explained that DOE's estimates of the amount of residual contamination that will result in 15 mrem/yr. of exposure in Area IV deviate significantly from EPA's own Preliminary Remediation Goals ("PRGs") for those same radionuclides. For example, while, under DOE's approach, the agency will permit 629,000 picocuries/gram of radioactive Iron-55 to remain after the cleanup is complete, EPA's PRG for Iron-55 in a "rural residential" area – which is how the land is zoned – is .8 picocuries/gram.

55. As CBG further explained, in the Draft EA DOE also severely underestimated the risks that the residual contamination will pose. For example, DOE assumed that people will sleep only on the second floor of homes with a 4 inch concrete slab foundation.

56. Both California Senators Diane Feinstein and Barbara Boxer have also written multiple letters about their concerns regarding the cleanup, including letters to DOE, to EPA and to the White House.



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## C. DOE's Final Cleanup Decision For Area IV

57. In March 2003, DOE issued a Final EA and FONSI for the Area IV cleanup, choosing to proceed with Alternative One. DOE admitted that the chosen alternative allows "10,000 times more radioactivity in the soil than" would be permitted were the agency to "remediate to a $1 \times 10^{-6}$ risk level."

58. In the Final EA, DOE also admitted that it had not considered the cumulative impacts of the contamination that would remain after its cleanup of radiological contamination in Area IV together with the chemical contamination in this area, or the contamination within the rest of the SSFL.

59. In the Final EA, DOE also claimed that, although sensitive species, including the federally listed Braunton's Milkvetch – an endangered species – exist in Area IV, the cleanup would have no impact on these species because they are not present in any of the buildings where the cleanup will occur. The EA did not discuss impacts on endangered or sensitive species resulting from the people and equipment that will be traveling through the area, or the reasonably foreseeable impacts on species that will occur should the property be used for residential development. On information and belief, DOE has neither undertaken formal consultation with the FWS concerning the impacts of the Area IV cleanup on federally listed species, nor obtained the FWS's written concurrence that formal consultation is not necessary.

60. In the FONSI, issued by DOE's Oakland Operations Office, DOE claimed that its cleanup is being conducted in a manner "consistent with" NEPA and CERCLA. DOE announced in



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the FONSI that "DOE has decided to implement Alternative 1." DOE also decided that "[t]he cleanup of Area IV does not constitute a federal action significantly affecting the quality of the human environment within the meaning of NEPA [and] [t]herefore a FONSI is made and an environmental impact statement is not required."

61. DOE has begun carrying out the Area IV cleanup decision made in the FONSI and has indicated that the cleanup will be completed in the next year or two, after which DOE intends to release control of the property. The agency does not intend to take any steps to restrict future use of the site, and anticipates that the land will then be developed for residential use.

### D. Developments Since DOE Made Its Cleanup Decision

62. In a July 2003 Senate Report, the Appropriations Committee expressed concerns that "the ETEC site will not be remediated to CERCLA standards," and stated that DOE's cleanup decision "may represent an unacceptable deviation from the Department's commitment . . . to fund an EPA radiological survey of the ETEC site and to remediate the site to CERCLA standards." Sen. Rep. 105, 108th Cong., 1st Sess. 95-96 (2003). DOE responded by reiterating that it will not fund the EPA survey and claiming that the cleanup plan "meets the level that EPA has stated is fully protective of human health and the environment."

63. Contrary to those assurances, in December 2003, EPA submitted further comments to DOE, explaining that, even after issuance of the Final EA, the "concerns expressed in our DEA [Draft EA] comments remain the same," and that DOE had "misinterpret[ed]" EPA positions to justify its cleanup decision.



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64. EPA once again explained that, before DOE can make an appropriate cleanup decision for the site, it must undertake "further characterization" of the site "using more sensitive and specific measurements" than have been used thus far. EPA explained that "[n]ot enough measurements have been made in enough places and the measurements that were made were not sensitive enough or specific enough."

65. EPA also explained that, contrary to DOE's plan to release the site for unrestricted use, including residential development, under DOE's cleanup decision the site would only be safe if its use is "restricted to day-use recreational activities with limitations on picnic and camping facilities [or] other time consuming activities." EPA further reiterated that, contrary to DOE's claims, "DOE's cleanup decision-making approach . . . is not consistent with CERCLA."

66. In May 2004, DOE announced that it had discovered radioactive tritium in groundwater monitoring wells near two former nuclear test facilities within Area IV at levels up to four hundred percent of EPA's maximum contaminant drinking water standard. Elevated tritium and TCE levels have since been detected at additional wells in the surrounding area.

67. On July 19, 2004, plaintiffs NRDC and CBG wrote to DOE to detail DOE's violations of NEPA, CERCLA, and the ESA in connection with the cleanup of Area IV. Plaintiffs formally requested that, in light of EPA's comments on the Final EA; the discovery of tritium contamination; and the migration of tritium and perchlorate off the site, DOE must, at a bare minimum, conduct further review under NEPA at this time. Plaintiffs also explained that DOE must (a) follow CERCLA standards, and the CERCLA process, for the cleanup; (b) prepare an EIS on the



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cleanup; and (c) undertake formal consultation under the ESA concerning the cleanup. This letter served as written notice of plaintiffs' intent to sue under the citizen suit provisions of CERCLA and the ESA. 42 U.S.C. § 9659; 16 U.S.C. § 1540(g).

68. DOE has not responded to plaintiffs' letter. In response to a Freedom of Information Act request, DOE has informed plaintiffs that, since issuing the FONSI, the agency has not initiated any supplemental NEPA review concerning the cleanup of Area IV.

## PLAINTIFFS' CLAIMS FOR RELIEF

### First Claim (NEPA)

### (Violations of 42 U.S.C. § 4321, et seq.)

69. Because the cleanup of Area IV is a major federal action that may have significant, unknown, and highly controversial impacts on public health and the environment, DOE is violating NEPA, and its implementing regulations, and is acting in a manner that is arbitrary and capricious and contrary to the law in violation of the APA, by failing to prepare an Environmental Impact Statement ("EIS") prior to rendering its decision on the cleanup of Area IV. 42 U.S.C. § 4332; 5 U.S.C. § 706.

70. By preparing an Environmental Assessment for the cleanup of Area IV which fails to adequately consider the impacts of the cleanup on the environment, or reasonable alternatives, and by issuing a FONSI based on that EA, DOE is violating NEPA and its implementing regulations, and is acting in a manner that is arbitrary and capricious and contrary to the law in violation of the APA. 5 U.S.C. § 706.



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71. By failing to consider impacts associated with the chemical contamination within Area IV, or the synergistic and cumulative effects of the chemical and radiological contamination taken together, and by failing to consider the impacts associated with the contamination throughout the rest of the SSFL, or the synergistic and cumulative effects of all of the SSFL contamination taken together, DOE is unlawfully segmenting its consideration of environmental impacts in violation of NEPA and its implementing regulations, and is acting in a manner that is arbitrary and capricious and contrary to the law in violation of the APA. 5 U.S.C. § 706.

72. By failing to undertake any supplemental analysis under NEPA concerning the impacts of the Area IV cleanup on the environment, and by failing to respond to plaintiffs' letter formally requesting further NEPA review, DOE is violating NEPA and its implementing regulations; is acting in a manner that is arbitrary and capricious and contrary to the law in violation of the APA, 5 U.S.C. § 706; and has unreasonably delayed and unlawfully withheld agency action in violation of Section 706(1) of the APA. 5 U.S.C. §§ 555(b), 706(1).

73. These violations are injuring plaintiffs in the manner described in ¶¶ 6-16 above.

**Second Claim (CERCLA)**

**(Violations of 42 U.S.C. § 9620 and the 1995 Joint Policy)**

74. By failing to implement CERCLA standards and follow the CERCLA process in carrying out the Area IV cleanup, including by failing to comply with the 1995 Joint Policy with EPA, failing to undertake a remedial investigation and feasibility study, and failing to consider the nine criteria which must guide the remedy selection process under CERCLA, DOE is violating



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CERCLA, 42 U.S.C. § 9620, and its implementing regulations and guidance, including the 1995 Joint Policy with EPA, and is acting in a manner that is arbitrary and capricious and contrary to the law in violation of the APA. 5 U.S.C. § 706.

75. These violations are injuring plaintiffs in the manner described in ¶¶ 6-16 above.

**<u>Third Claim</u> (ESA)**

**(Violations of 16 U.S.C. § 1536(a)(2))**

76. By failing to undertake and complete formal consultation with the FWS concerning the impacts of the Area IV cleanup on federally listed species, including the Braunton's Milkvetch, DOE is violating the ESA, 16 U.S.C. § 1536(a)(2), and is acting in a manner that is arbitrary and capricious and contrary to the law in violation of the APA, 5 U.S.C. § 706.

77. These violations are injuring plaintiffs in the manner described in ¶¶ 6-16 above.

WHEREFORE, plaintiffs respectfully request that this Court:

(1) declare that the federal defendants have violated, and continue to violate, NEPA, CERCLA, the ESA and the APA;

(2) set aside federal defendants' March 31, 2003 FONSI on the Area IV cleanup;

(3) preliminarily and permanently enjoin the federal defendants from transferring ownership or possession of, or otherwise relinquishing control over, any portion of Area IV until defendants have (a) completed an EIS and issued a Record of Decision pursuant to NEPA; (b)



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complied with CERCLA's standards and completed the CERCLA process; and (c) obtained a Biological Opinion from the FWS pursuant to the ESA;

(4) retain jurisdiction of this matter until the federal defendants have fulfilled all of their legal obligations under NEPA, CERCLA, the ESA and the APA;

(5) award plaintiffs their costs, attorneys' fees, and other disbursements for this action, including any expert witness fees; and

(6) grant plaintiffs such other and further relief as the Court may deem just and proper.

Respectfully submitted,

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*Attorneys for Plaintiff City of Los Angeles*

October 21, 2004

## CERTIFICATION OF INTERESTED ENTITIES OR PERSONS

Pursuant to Civil L.R. 3-16, the undersigned certifies that the following listed persons, associations of persons, firms, partnerships, corporations (including parent corporations) or other entities (i) have a financial interest in the subject matter in controversy or in a party to the proceeding, or (ii) have a non-financial interest in that subject matter or in a party that could be substantially affected by the outcome of this proceeding: The Boeing Company.

ANDREW P. CAPUTO, Cal. Bar No. 203655
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## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 2:49 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: NASA DEIS Comments
**Attachments:** Allen Elliott DEIS Comments former WHNC Board Members WITH CORRECTIONS October 5 2013.docx

Dear Mr. Malinowski,

Please include the email below and the attachment which has minor corrections to a previous letter as part of my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

--
Date: Sat, Oct 5, 2013 at 6:38 PM
Subject: Re: NASA DEIS Comments
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

I have now found a second error in my written comments to you as a former Board member. Those comments were also supported by Donn Howell and Steve Lenske - former members of the West Hills Neighborhood Council. I was in a rush to get my comments in by the 30th knowing that the U.S. Government was preparing to shut down on October 1st - the deadline of the comments.

Please see the letter attached that was used by me and Donn Howell as our former Board member comments. Steve Lenske made personal changes to my draft. The minor corrections are made in **red.**

Respectfully submitted,

*Christine L. Rowe*

On Tue, Oct 1, 2013 at 10:56 PM, Christine Rowe <crwhnc@gmail.com> wrote:
Dear Mr. Elliott,

In the letter that was attached as coming from former WHNC Board members, I made that initial draft. In reading another former Board member's comments, I discovered a small error.

The sentence should state:

"When NASA and the DOE signed the 2010 Administrative Order on Consent (AOC) with **DTSC**, the WHNC considered potential conflicts between the AOCs with the DOE's need to comply with a court order to perform an Environmental Impact Statement."

Please add this note to letters that were submitted by me,
Stephen Lenske, and Donn Howell.

Respectfully submitted,

*Christine L. Rowe*
**Former West Hills Neighborhood Council member*
** for identification purposes only*

On Tue, Oct 1, 2013 at 5:35 PM, Christine Rowe <crwhnc@gmail.com> wrote:
Dear Mr. Elliott,

As a former Board member of the West Hills Neighborhood Council, and as their Public Health and Environment Committee Chair at the time that these letters were voted upon, I am submitting them to you as a reminder of actions that were taken by former WHNC Board members - some who still reside in West Hills.

Respectfully submitted,

*Christine L. Rowe*
*October 1st, 2013 5:36 PM*

Allen Elliott,
SSFL Program Director,
NASA MSFC AS01,
Building 4494,
Huntsville, AL 35812

RE: NASA Draft Environmental Impact Statement

Dear Mr. Elliott,

The West Hills Neighborhood Council (WHNC) is an advisory body to the City of Los Angeles per its Charter. Neighborhood Council Board members are elected by the local stakeholders to represent them on issues related to land use, public health, public safety, and the environment. In fact, the WHNC has committees that address each of these issues.

The West Hills Neighborhood Council has been addressing the Santa Susana Field Laboratory cleanup for more than 10 years. As former members of this Board, we have been to the Santa Susana Field Laboratory, and we have been to see some of the NASA test stands and other facilities at the site.

When NASA and the DOE signed the 2010 Administrative Order on Consent (AOC) with DTSC, the WHNC considered potential conflicts between the AOCs with the DOE's need to comply with a court order to perform an Environmental Impact Statement.

We also considered that the cleanup plans under DTSC's authority was being based on their authority under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). (1)

"California State Senate Bill SB 990 was codified as California Health and Safety Code Section 25359.20, effective January 1, 2008. As a result of this new direction from the State legislature, the California Department of Toxic Substances Control (DTSC) is transitioning their oversight of the SSFL cleanup from the State's RCRA Program to the California State CERCLA Program. A new Consent Order is being negotiated to finalize this transition. Cleanup at the SSFL will continue to be overseen by the DTSC and will meet strict federal and state cleanup standards. NASA is committed to cleaning up Area II and its Area I parcel to a level that is protective of public health and the environment and that meets regulatory processes and requirements."

DTSC did a presentation on the Agreements in Principle which are a part of the 2010 Administrative Order on Consent in September 2010. (2)

As a result of that discussion, and information from many more meetings and documents, the WHNC later discussed at their August 13 2011 Board meeting what CERCLA means, and the Nine Balancing Criteria among other issues. (3)

The letter which was addressed to the City Attorney of Los Angeles is attached. I believe that this letter was also generated to NASA after that meeting.

In May 2012, the West Hills Neighborhood Council called a "Special Meeting" after a meeting of their Environment Committee to address the issue of the NASA Environmental Impact Statement. A letter was subsequently generated to NASA Administrator Bolden requesting that a full Scope Environmental Impact Statement be performed by NASA. West Hills will be one of the most impacted communities due to the NASA remediation. Minutes of that meeting are linked below. (4) The letter to NASA Administrator Bolden is attached.

As residents of West Hills and former members of the West Hills Neighborhood Council, we would like to reiterate our concerns related to the limited Draft Environmental Impact Statement that NASA has just produced, and we support the votes of the West Hills Neighborhood Council that we submitted in resolution approved on August 3rd, 2011 and May 17, 2012.

For the protection of our community, we respectfully request that NASA do an Environmental Impact Statement that addresses all of the alternative scenarios as was presented at NASA's March 27, 2012, NASA Environmental Impact Study Meeting. (5)

Please also consider our comments in our letter to the City attorney including:

- the request for the U.S. Government property to not be used for residential use;
- the use of the Nine Balancing Criteria of CERCLA;
- the need to monitor airborne emissions and dust from remediation;
- the need to monitor surface water and groundwater;
- to monitor soils at the Santa Susana Field Laboratory site until DTSC deems that the site is cleaned to all relevant and applicable laws;
- the future use of the site should be parkland or open space based upon the final characterization of the site;
- the WHNC recommended preservation of some of the test stands on the NASA property if it can be done in a manner that is protective of public safety and will not impede the cleanup beneath the test stands;
- the WHNC supports all environmental laws that are applicable to this site that were protective of endangered species and wildlife that uses the site as a major wildlife corridor;
- the WHNC supports all laws that are applicable for the protection of the Native American community and the archaeological sites that are on the National Register of Historic Places.

Respectfully submitted,

Christine L. Rowe
*West Hills Neighborhood Council former Board member
*Former WHNC Public Health and Environmental Committee Chair
* For identification purposes only
October 1st, 2013

1) **State CERCLA: http://ssfl.msfc.nasa.gov/environmental-cleanup/default.aspx**
2) **Agreements in Principle: http://www.dtsc-ssfl.com/files/lib_pub_involve/meeting_agendas/64728_AgreementsInPrinciple09-22-10.pdf**
3) **WHNC August 3, 2011 Minutes: http://www.westhillsnc.org/uploads/WHNC_Minutes_8-3-11.pdf**
4) **WHNC May 17, 2012 Minutes: http://www.westhillsnc.org/uploads/WHNCMinutes20120517.pdf**
5) **NASA Environmental Impact Statement (EIS) Informational Meeting Presentation: http://ssfl.msfc.nasa.gov/documents/presentations/201203_EIS_Informational_Meeting/NASA_EIS_Presentation_March_27_2012.pdf**

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 2:47 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: NASA DEIS Comments
**Attachments:** Allen Elliott WHNC Former Member Comments for DEIS October 1 2013.pdf; NASALtr.pdf; West Hills Neighborhood Council Resolutions regarding the Santa Susana Field Lab.pdf

Dear Mr. Malinowski,

Please include the attached documents to DTSC as part of my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Tue, Oct 1, 2013 at 5:35 PM
Subject: NASA DEIS Comments
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

As a former Board member of the West Hills Neighborhood Council, and as their Public Health and Environment Committee Chair at the time that these letters were voted upon, I am submitting them to you as a reminder of actions that were taken by former WHNC Board members - some who still reside in West Hills.

Respectfully submitted,

*Christine L. Rowe*
*October 1st, 2013 5:36 PM*

**Allen Elliott,**
**SSFL Program Director,**
**NASA MSFC AS01,**
**Building 4494,**
**Huntsville, AL 35812**

**Dear Mr. Elliott,**

**The West Hills Neighborhood Council (WHNC) is an advisory body to the City of Los Angeles per its Charter. Neighborhood Council Board members are elected by the local stakeholders to represent them on issues related to land use, public health, public safety, and the environment. In fact, the WHNC has committees that address each of these issues.**

**The West Hills Neighborhood Council has been addressing the Santa Susana Field Laboratory cleanup for more than 10 years. As former members of this Board, we have been to the Santa Susana Field Laboratory, and we have been to see some of the NASA test stands and other facilities at the site.**

**When NASA and the DOE signed the 2010 Administrative Order on Consent (AOC) with the DOE, the WHNC considered potential conflicts between the AOCs with the DOE's need to comply with an order to perform an Environmental Impact Statement.**

**We also considered that the cleanup plans under DTSC's authority was being based on their authority under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). (1)**

**"California State Senate Bill SB 990 was codified as California Health and Safety Code Section 25359.20, effective January 1, 2008. As a result of this new direction from the State legislature, the California Department of Toxic Substances Control (DTSC) is transitioning their oversight of the SSFL cleanup from the State's RCRA Program to the California State CERCLA Program. A new Consent Order is being negotiated to finalize this transition. Cleanup at the SSFL will continue to be overseen by the DTSC and will meet strict federal and state cleanup standards. NASA is committed to cleaning up Area II and its Area I parcel to a level that is protective of public health and the environment and that meets regulatory processes and requirements."**

**DTSC did a presentation on the Agreements in Principle which are a part of the 2010 Administrative Order on Consent in September 2010. (2)**

**As a result of that discussion, the WHNC later discussed at their August 13 2011 Board meeting what CERCLA means, and the Nine Balancing Criteria among other issues. (3)**

**The letter which was addressed to the City Attorney of Los Angeles is attached. I believe that this letter was also generated to NASA after that meeting.**

**In May 2012, the West Hills Neighborhood Council called a "Special Meeting" to address the issue of the NASA Environmental Impact Statement. A letter was subsequently generated to NASA Administrator Bolden requesting that a full Scope Environmental Impact Statement be performed by NASA. West Hills will be one of the most impacted communities due to the NASA remediation. Minutes of that meeting are linked below. (4) The letter to NASA Administrator Bolden is attached.**

**As residents of West Hills and former members of the West Hills Neighborhood Council, we would like to reiterate our concerns related to the limited Draft Environmental Impact Statement that NASA has just produced, and we support the votes of the West Hills Neighborhood Council that we submitted in resolution approved on August 3rd, 2011 and May 17, 2013.**

**For the protection of our community, we respectfully request that NASA do an Environmental Impact Statement that addresses all of the alternative scenarios as was presented at NASA's March 27, 2012, NASA Environmental Impact Study Meeting. (5)**

**Please also consider our comments in our letter to the City attorney including:**

- **the request for the U.S. Government property to not be used for residential use; the use of the Nine Balancing Criteria of CERCLA;**
- **the need to monitor airborne emissions and dust from remediation;**
- **the need to monitor surface water and groundwater;**
- **to monitor soils at the Santa Susana Field Laboratory site until DTSC deems that the site is cleaned to all relevant and applicable laws;**
- **the future use of the site should be parkland or open space based upon the final characterization of the site;**
- **the WHNC recommended preservation of some of the test stands on the NASA property if it can be done in a manner that is protective of public safety and will not impede the cleanup beneath the test stands;**
- **the WHNC supports all environmental laws that are applicable to this site that were protective of endangered species and wildlife that uses the site as a major wildlife corridor;**
- **the WHNC supports all laws that are applicable for the protection of the Native American community and the archaeological sites that are on the National Register of Historic Places.**

**Respectfully submitted,**

**Christine L. Rowe**
***West Hills Neighborhood Council former Board member**

*Former WHNC Public Health and Environmental Committee Chair
* For identification purposes only
October 1st, 2013

1) State CERCLA: http://ssfl.msfc.nasa.gov/environmental-cleanup/default.aspx
2) Agreements in Principle: http://www.dtsc-ssfl.com/files/lib_pub_involve/meeting_agendas/64728_AgreementsInPrinciple09-22-10.pdf
3) WHNC August 3, 2011 Minutes: http://www.westhillsnc.org/uploads/WHNC_Minutes_8-3-11.pdf
4) WHNC May 17, 2012 Minutes: http://www.westhillsnc.org/uploads/WHNCMinutes20120517.pdf
5) NASA Environmental Impact Statement (EIS) Informational Meeting Presentation: http://ssfl.msfc.nasa.gov/documents/presentations/201203_EIS_Informational_Meeting/NASA_EIS_Presentation_March_27_2012.pdf

# West Hills Neighborhood Council

*First in the Valley*

P.O. Box 4670
West Hills, CA
91308-4670

mail@westhillsnc.org
www.westhillsnc.org



May 25, 2012

NASA Administrator Charles F. Bolden, Jr.
NASA Headquarters
Washington, D.C. 20546

Dear Administrator Bolden,

As elected officials of the community of West Hills in the City of Los Angeles, we have an obligation to address issues that could have an impact on our community.

We, the members of the West Hills Neighborhood Council, believe that NASA should comply with NEPA and CEQA, and NASA should perform a complete full scope Environmental Impact Statement (EIS), and that NASA should consider all alternatives under the EIS with regards to the cleanup standards of NASA's property at the Santa Susana Field Laboratory.

Very truly yours,

STEPHEN A. LENSKE
President/Co-Chair
West Hills Neighborhood Council

SAL: mlr
cc: West Hills Neighborhood Council Board

# RESOLUTIONS FOR THE REMEDIATION OF AND FUTURE USE OF THE SANTA SUSANA FIELD LABORATORY

WHEREAS the West Hills Neighborhood Council is an advisory body to the City of Los Angeles under the City Charter and is the nearest community in the City of Los Angeles to the Santa Susana Field Laboratory site; and

WHEREAS West Hills is the community in Los Angeles that is most likely to be affected by contamination from the Santa Susana Field Laboratory site and by cleanup efforts that include truck traffic to and from the site, airborne contamination and emissions, potential groundwater contamination, and contaminates in the groundwater that may have a potential for vapor intrusion;

LET IT BE RESOLVED that:

[1] The West Hills Neighborhood Council respectfully requests that the future use of the Santa Susana Field Laboratory not be used for residential purposes;

[2] The West Hills Neighborhood Council encourages the use of the Nine Balancing Criteria for the remediation of the Santa Susana Field Laboratory;

[3] The West Hills Neighborhood Council recommends ongoing monitoring of airborne emissions and dust from remediation, monitoring of surface water and groundwater, and monitoring of soils at the Santa Susana Field Laboratory site until it [DTSC]* deems that the site is cleaned according to all relevant and applicable laws;

[4] The West Hills Neighborhood Council recommends the future use of the Santa Susana Field Laboratory as parkland or open space based upon the final characterization of the site;

[5] The West Hills Neighborhood Council recommends the protection of some of the test stands on the NASA property if it can be done in a manner that is protective of public safety and will not impede the cleanup beneath the test stands;

[6] The West Hills Neighborhood Council supports all environmental laws that are applicable to this site that are protective of endangered species and wildlife that uses the site as a major wildlife corridor; and

[7] The West Hills Neighborhood Council supports all laws that are applicable for the protection of the cultural and archaeological aspects of this site, which is considered sacred to the Native American community and has archaeological sites that are on the National Register of Historic Places.

The West Hills Neighborhood Council recommends to the City Council and the City Attorney that this resolution be recorded as part of a Community Impact Statement for West Hills. The West Hills Neighborhood Council also requests that the City Attorney present this resolution with any other letters from elected officials and community groups when submitting any recommendations to the City Council or to Judge Samuel Conti or his peers relating to *NRDC, Committee to Bridge the Gap, and the City of Los Angeles v the Department of Energy*.

*the word DTSC was placed for clarification because the previous paragraph in the original resolution which mentioned the California Department Of Toxic Substance Control (DTSC) was voted upon by the West Hills Neighborhood Council to be removed from the resolution.

Respectfully submitted by:
*Chris Rowe*
West Hills Neighborhood Council
Environment Committee Chair and Public Health Committee Chair

August 3, 2011

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 1:37 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Bell, Jazmin; Leclerc, Ray@DTSC
**Subject:** Fwd: NASA DEIS Maps for schools and truck routes - point of clarification

Dear Mr. Malinowski,

Please include my comments below to NASA in my DTSC CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sun, Sep 29, 2013 at 9:02 PM
Subject: NASA DEIS Maps for schools and truck routes - point of clarification
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

On my previous comment related to schools and parks as indicated in Figure 3.12 - 3, I would like to make a clarification.

There are schools and parks that I listed in my previous comments that are missing on that map such as the New Community Jewish High School.

I would like to make it clear that by comparing the map in that figure mentioned above, with maps on Figures 4.5 -1, 4.5 - 2, and 4.5 - 3; there are many more school locations listed - but there are still some schools and parks missing. However those later maps related to schools and parks are more reflective of the actual school locations, and those figures do show Pierce College which is within 1 - 2 miles of the Topanga route.

I respectfully request that you recalculate your numbers for impacted schools based on some real research. Have your consultants contact these schools and find out how many students walk to school, how many are bused, how many bike, and how many are driven. If there are more cars, then that will impact your numbers for intersections your LOS as per Table 4.5 - 2.

Are you aware that there is a bike plan for Los Angeles that will also be impacted by your trucks? http://www.bicyclela.org/maps_main.htm

Respectfully submitted,

*Christine L. Rowe*

## Dale Till

|  |  |
|---|---|
| **From:** | Christine Rowe <crwhnc@gmail.com> |
| **Sent:** | Saturday, January 04, 2014 9:05 PM |
| **To:** | DTSC_SSFL_CEQA |
| **Cc:** | Malinowski, Mark@DTSC; Leclerc, Ray@DTSC |
| **Subject:** | Fwd: NASA DEIS Section 3.7.3 Landslide Potential |
| **Attachments:** | screen shot NASA DEIS Landslides.png; The Northridge Earthquake and its Economic and Social Impacts.pdf; SCEC001activefaultsLA.pdf |

Dear Mr. Malinowski,

Please consider my comments below to NASA regarding potential earthquakes and the potential impacts of ground disturbances in my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sat, Sep 7, 2013 at 10:11 PM
Subject: Fwd: NASA DEIS Section 3.7.3 Landslide Potential
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

**This is the most frightening passage that I have read to date in your draft EIS. That is because the source for locations for an earthquake of a magnitude 6.0 or greater was a book from 1978. ( please see attached)**

**Your document stated that there has not been an earthquake greater than 6.0 in the region.**

**It is my understanding that the consultants for this project should have done a literature search regarding earthquake history in the region. Had they done a competent literature search, <u>and an actual review of those documents</u>, they would have discovered both the original sources (their 1978 source), the more recent documents related to the Northridge quake of 1994, <u>and the location of the fault systems related to that Northridge quake.</u>**

I believe that the attached statement was not the appropriate statement to quote from the 1978 source considering the earthquake history of California - and the potential for another major quake in California within our lifetimes.

**While I did a search for the key word earthquakes in your document, and while your references do mention the Northridge Earthquake, <u>I do not believe that the author of this section realized the regional impact of that earthquake.</u>**

This is a link to potential landslide areas:
http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm

**In researching this earthquake - and I was much more familiar with fault zones at the time of the quake - I believe it was on the Oak Ridge Fault Zone. I recall, from my Environmental Geology class at CSUN, learning around 1989, that they did not believe that any of the faults except the San Andreas had the potential for greater than a 6.0. I therefore was very surprised to learn that there was a quake of this magnitude on this fault at the time of the Northridge quake, and that I believe that ridge was along the Santa Susana range all the way to the Moorpark area?**

**It is called the Pico Thrust or the Northridge Thrust fault I believe which is a part of the Oak Ridge System:**
http://www.data.scec.org/significant/oakridge.html
http://www.data.scec.org/significant/losangeles.html

**These links state that these faults are blind and cannot be seen on maps.**

Would you please have someone with a more geological background than I have look into my comments for accuracy please?

**The bottom line - it is scary to quote a 1978 document on earthquakes in Southern California when we have Cal Tech here as a resource.**

**The links that I just provided said that this fault may never erupt again. But it also said the map is not predictive of the future. Your document really downplayed the risk from earthquakes and landslide potential at the site.**

**Please see this link and the relationship between Valley Fever in VENTURA COUNTY and the Northridge earthquake.**

http://www.ncbi.nlm.nih.gov/pubmed/9062329

- **As someone stated at the DEIS meeting, digging up the ground around here is correlated with Valley Fever.**

- **There is a health risk which could be correlated to the more that you dig up that top soil.**
- **Appropriate mitigation methods need to be in place.**

Respectfully,

*Christine L. Rowe*

### 3.7.2 Topography

SSFL occupies approximately 2,850 acres of hilly terrain that expresses approximately 1,100 ft of topographic relief near the crest of the Simi Hills. The highest surface elevation in the ROI occurs in the southern portion of the ROI at an approximate elevation of 2,665 ft above mean sea level (msl). The highest surface elevation in the ROI occurs in a series of peaks that trend east-west. The lowest elevation in the ROI occurs near the northern property boundary of the NASA-administered property, along the eastern boundary of the broad, flat Burro Flats area. Elevations in this area are approximately 1,700 ft above msl. The southern portion of the ROI is rugged, while the northern portion of the ROI is dominated by a broad, relatively flat region.

### 3.7.3 Landslide Potential

Landslides, or sudden slope failures, are known historical hazards in the region (State of California, 1998). Landslides can be triggered by a number of causes, such as earthquakes, heavy rain, or increased loads (for example, increased traffic). No landslides are known to have occurred within the ROI since development began, and the Chatsworth Formation is not known to be highly susceptible to landslides (Parise and Jibson, 2000). Several of the geologic units, particularly those underlying the access roads into and out of the ROI (the Miocene [23 to 5.30 million years ago] Topanga and Modelo formations) are susceptible to landslides (Parise and Jibson, 2000). Periodic but relatively minor earthquakes have caused past landslides in Ventura County. Although Ventura County is tectonically active, no large earthquake (magnitude greater than 6.0) has occurred in the region (Weber and Kiessling, 1978). Impacts from the historical tectonic activities near the ROI have resulted primarily in bedding parallel and bedding perpendicular fractures with numerous fault blocks and fault zones that traverse the property (Parise and Jibson, 2000).

5 April 2001

**EuroConference on Global Change and Catastrophe Risk Management**
**Earthquake Risks in Europe, IIASA, Laxenburg Austria, July 6-9, 2000**

# The

# NORTHRIDGE EARTHQUAKE, USA

# and its
# ECONOMIC AND SOCIAL IMPACTS

William J Petak
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# TABLE OF CONTENTS



This research material is based on work supported by the Tsunami consortium, investigating the uninsured elements of natural catastrophic losses worldwide.

# 1. INTRODUCTION AND GENERAL DESCRIPTION

## 1.1 General Description

The Northridge earthquake that struck at 4.31 a.m. on Monday, January 17, 1994 affected an area of 2,192 square miles in the San Fernando Valley, a densely populated residential area of northern Los Angeles, California.[1] Three counties, Los Angeles, Ventura and Orange were affected by the earthquake. The area has been repeatedly struck by moderate to large earthquakes, and Los Angeles County is one of the best-prepared regions of the United States. Yet in terms of financial losses, Northridge is one of the worst disasters in US history.

The earthquake was of moderate size, measuring 6.7 moment magnitude, on an unknown 'blind thrust' fault 20 miles northwest of Los Angeles. The depth of the earthquake was 11 miles (18 km), and near-record ground shaking was recorded. Peak horizontal ground accelerations approached or exceeded 1g in the region of the epicentre, and 11 of 100 monitoring instruments measured in excess of 0.25g. The peak vertical acceleration measured 0.48g. There were 14,000 reported aftershocks, many in the magnitude of 4.0-5.0 range. The duration of the earthquake was 15 seconds.

Human Impacts:
57 people were killed, and 72 deaths have been attributed to the earthquake.[2] 11,800 people received hospital treatment for injuries. 22,000 people were left homeless. The earthquake occurred in the early morning on a national holiday.[3] Had it occurred at another time of day or date, building occupancies would have led to more extreme human losses. A number of bridges and multi-storey car parks collapsed, yet only one person died as a result.

Economic Impacts:
Preliminary total damage estimate were USD 15-17 billion,[4] but these total direct loss estimates have been revised upwards over time.[5] The Average Reported Estimated Direct Loss (AREDL) has been calculated to be USD 41.8 billion, using the estimates set out in section 2.1. The scale of the losses was unprecedented and indirect losses were high, exceeding all previous predictions. The earthquake alerted federal and state governments, as well as private insurers to the magnitude of potential losses from earthquakes in urban areas.

## 1.2 Detailed Description of Earthquake

The Northridge earthquake occurred on an unknown 'blind thrust', meaning that the rupture never spread to the earth's surface, but stopped some way below it. Several hidden fault zones have subsequently been identified which have changed the perception of earthquake risk in the greater Los Angeles area.[6] The earthquake occurred in the densely populated San Fernando Valley, which has been repeatedly struck by moderate to large earthquakes. This is a predominantly residential area in one of the most well prepared regions of the United States.

[1] See http://www.fema.gov/NR/nr_0106.htm
[2] ibid
[3] EQE (1994)
[4] ibid
[5] Scawthorn et al (1997), Eguchi et al (1998), Bolin and Stanford (1998), FEMA (2000)
[6] Smolka (1995)

The size of the earthquake was moderate, yet some affected areas had ground motions more than twice those allowed for in the building code. Most of the structures in the affected area had been built within the last three decades and the relevant building standards had been considered to be reasonably earthquake resistant. As a result, the percentage of buildings destroyed by the ground motions was small, and the greatest damage occurred within about 16 km of the epicentre. Approximately 114,000 residential and commercial structures were damaged, including some 450 public buildings, sections of six freeways and 27 bridges, as well as power, water and sewer utilities.[7] Liquefaction and landslides were not a major cause of structural damage.

Lifelines:
Lifelines[8] were badly affected by the earthquake, particularly power, water and sewer utilities. Utility lifelines were restored within days, in most cases. The longest restoration period was 12 days for the gas supply.[9] Damage to transportation lifelines was more severe. Traffic disruptions were a major problem after the earthquake, as the area is almost entirely dependent on automobiles. Portions of 11 major arteries into Los Angeles had to close and 9 bridges on major interchanges collapsed.[10] Months afterwards there were still major traffic disruptions and sections of the Interstate (I) 5 and the Santa Monica Freeway were closed. These highways returned to normal service at varying rates, and transport-related effects included freight problems with raw materials and manufactured goods, as well as employee and consumer commuting problems.[11]

### 1.3 Emergency Response

The California Governor's Office of Emergency Services (OES) co-ordinates overall state agency response. 104 emergency service stations were operational and traffic congestion was minor, in part due to the timing of the earthquake. Emergency operations appear to have been well co-ordinated. Immediately after the earthquake, local building and safety departments organised teams of inspectors to identify the extent of the damage. Buildings were inspected and tagged according to their structural safety. These coloured tags did not include damage to contents and damage that was not easily visible, and the full extent of earthquake damage was often unknown until wall surfaces had been exposed and the structure examined. 105,000 inspections were carried out in the building safety process.[12]

There were 110 fires. The Los Angeles County Fire Department lost its computer aided dispatch capability for a critical 7 hours, and subsequent fire fighting was hampered by the lack of water.[13] Fortunately, there was little wind and the Northridge earthquake was 'linear', unlike Kobe, so the increased demand for manpower and material resources during and after the earthquake did not exceed the available supply.[14]

Prior to the earthquake, the OES had commissioned an Early Post Earthquake Damage Assessment Tool (EPEDAT)[15] to serve both the emergency response and planning needs of the agency. Immediately after the earthquake, an estimated shaking-intensity map for the Los Angeles area with likely damage levels was compiled, reducing uncertainty and enabling emergency managers to locate and focus on the hardest hit areas. This Geographical Information Systems (GIS) system

[7] EQE (1994)
[8] A common definition for utility and transportation systems. See Eguchi (1997)
[9] Eguchi (1997)
[10] ibid
[11] Gordon et al (1996)
[12] Eguchi et al (1998). Refer to section 4.2 for a discussion on the social impacts
[13] EQE (1994)
[14] Eguchi (1997), p 117.
[15] Goltz (1996).

improved the amount and timing of information available for the emergency response. The initial damage assessment was prepared for the California Office of Emergency Services (OES) immediately after the earthquake using GIS for the first time. This data were collated, analysed and distributed through a field office set up by the Federal Emergency Management Agency (FEMA) to co-ordinate activities. The United States Geological Survey (USGS) was entrusted with the communication of information. FEMA also introduced a teleregistration scheme to speed the federal disaster response.[16]

# 2. ESTIMATED LOSSES

## 2.1 Direct losses

The preliminary total damage estimate ranged between USD 15-17 billion,[17] and was prepared for the California Office of Emergency Services (OES) the day after the earthquake. This was required for the disaster aid application to the President and Congress, and Governor Wilson, the Governor of California warned that the disaster could cost as much as USD 30 billion. A refined loss estimate of USD 13-22 billion was prepared for the OES by 25th January, eight days after the event.[18] Later estimates of total direct losses totalled USD 25 billion,[19] then upwards to figures of USD 39.6 billion[20] and USD 44 billion.[21] The Average Reported Estimated Direct Loss (AREDL) has been calculated to be USD 41.8 billion,[22] using the estimates set out in the table below.

**TABLE 1:**

| **ESTIMATES OF LOSSES in billion USD** | | | | |
|---|---|---|---|---|
| **Source** | **Time after disaster** | **Direct or total** | **Primary or Secondary** | **Amount of Estimate (USD)** |
| OES (EQE, 1994) | 1 day | direct | secondary | USD 15-17 billion |
| OES (in Goltz, 1996) | 8 days | direct | secondary | USD 13-22 billion |
| RMS. (1999) | 15 months | total | secondary | USD 25-30 billion |
| Smolka (1995) | 18 months | total | secondary | USD 40 billion |
| ***Scawthorne et al (1997)**** | ***20 months*** | ***direct*** | ***Primary*** | ***USD 39.6 billion*** |
| Collins (1998) | | total | secondary | USD 30-40 billion |
| ***OES* (in Eguchi et al, 1998)**** | ***3+ years*** | ***direct*** | ***Primary*** | ***USD 44 billion*** |
| Bolin and Stanford (1998)* | 4 years | direct | secondary | USD 44 billion |
| ***AREDL*** | | | | ***USD 41.8 billion*** |

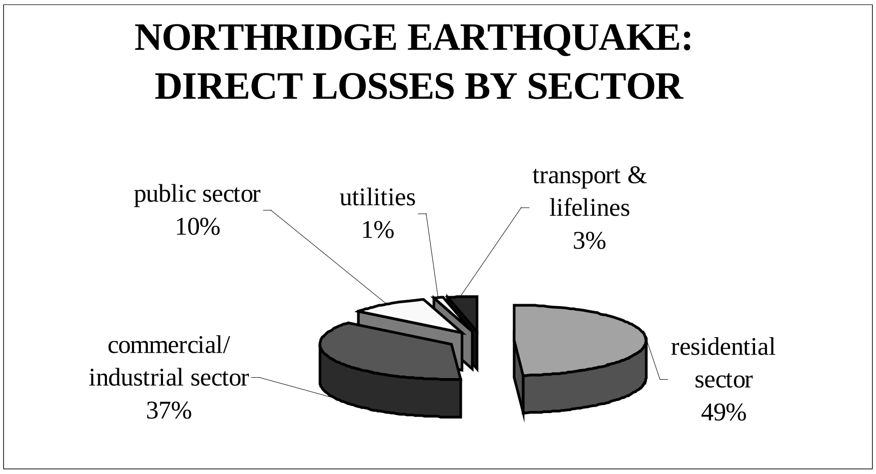
***(Estimates used for calculation of AREDL)**

The increase in the losses over time was due to the initial damage estimates being prepared by building inspectors checking for safety, rather than losses. 105,000 initial safety checks were made. 333,000 insurance claim inspections were made later by loss adjusters, with increased estimates.[23] Many buildings did not pose an immediate safety concern, but required repair. Structural damage was found in many modern structures, hidden by finishes and fireproofing. Damage to contents,

16 See http://www.fema.gov/rt/10442-e2.html
17 EQE (1994). See http://www.eqe.com/publications.northridge/execside.htm
18 Goltz (1996)
19 RMS (1999)
20 Scawthorn et al (1997)
21 Eguchi et al (1998), Bolin and Stanford (1998)
22 There is always a wide range of reported loss estimates. The Average Reported Estimated Direct Loss (AREDL) meets the following criteria: only estimates of direct losses, only estimates made at least four months after the disaster, only primary estimates or those based on original data.
23 Refer to Eguchi et al (1998) for a detailed discussion

water damage due to broken pipework, the exposure of asbestos-related materials, as well as retroactive building code requirements for replacement work all increased the direct economic losses even further.

**FIGURE 1**: Direct losses by sector




Most damage was incurred in the residential and commercial sectors, as shown in figure 1 and table 2. Although the Northridge earthquake occurred in a residential area, commercial and industrial losses were proportionately very high. Damage to agriculture was comparatively minimal. Public sector losses were relatively small, but Los Angeles is a car-bound society dependent on motor vehicles for urban transportation, and damage to infrastructure affected indirect losses. These indirect losses have been estimated to be over USD 7.5 billion,[24] of which more than 80% were from business interruptions. Most of these losses were uninsured and have had major social and economic impact on the affected area. Tax revenue losses are estimated to be USD 0.86 billion. Almost 1% of the USD 4.1 billion Small Business Administration loans has currently defaulted. The San Fernando Valley had been subjected to a recession for three years prior to the earthquake, and this exacerbated the effects of the earthquake.[25]

**TABLE 2: ESTIMATED DIRECT ECONOMIC LOSSES IN USD BILLIONS**

| **Sector** | **Estimated direct losses in USD billions** | **Percentage share of direct losses** | **Amount insured, in USD billions** | **Amount uninsured, in USD billions** |
|---|---|---|---|---|
| Residential | 20.6 | 49.3% | 9.88 | 10.72 |
| Commercial/Industrial | 15.2 | 36.4% | 4.02 | 11.18 |
| Public infrastructure | 6.0 | 14.3% | No mention | 6.0 |
| Agricultural | No mention | na | 0.004 | na |
| **DIRECT LOSSES** | **41.8** | **100%** | **13.9** | **27.9** |

[24] Refer to table 3
[25] Alesch & Holly (1996), Bolin & Stanford (1999)

## Public Sector Losses

Losses resulting from damage to infrastructure (power, gas, water) and direct damage to production centres were initially estimated at USD 6 billion, equivalent to 15 -30% of actual property losses. Lifeline damage was estimated at USD 2 billion.[26] Some 450 public buildings, sections of six freeways and 27 bridges, as well as power, water and sewer utilities were damaged.[27]

Transportation: Traffic disruptions were a major problem after the earthquake, as the area is almost entirely dependent on automobiles for urban transportation. Portions of 11 major arteries into Los Angeles had to close and 9 bridges on major interchanges collapsed. All of these structures had already been scheduled for retrofitting after the 1989 Loma Prieta earthquake, when 860 structures were identified in need of retrofit. None of the 122 structures, which had already been strengthened, failed in the Northridge earthquake.[28] A report prepared for the California Department of Transportation concluded that had the bridges been retrofitted, they would have survived the earthquake with little damage.[29] There was no significant damage to any of the airports in the vicinity.

Lifelines: Various lifelines were affected by the earthquake, and losses varied considerably as set out: LADWP (Power) - USD 136m, SoCal Edison - USD 0.5m, LADWP (Water) - USD 44m, MWD - USD 5m, LA City (Sewer) USD 36m, SoCal Gas - USD 60m, PacBell - USD 26m, GTE USD 3.5m, Caltrans - USD 1450m. Almost 95% of the damage to lifelines were eligible for federal assistance. Under the terms of the Stafford Act, FEMA was liable for 90% of these costs, while the utilities had to cover the 10% shortfall, USD 0.3 billion.[30]

Schools: Almost half of Los Angeles schools were damaged and costs exceeded USD 100 million.[31]

Hospitals: 31 Los Angeles area hospitals were damaged, and 9 were forced to evacuate.

## Corporate/Business Losses

Corporate damage has been estimated at approximately USD 15.2 billion.[32] The area's largest shopping centre, the Northridge Fashion Centre, was virtually destroyed and did not open for more than a year and a half. Several multi-storey reinforced concrete parking structures collapsed, and many were severely damaged, causing indirect retail losses.[33] 57% of Los Angeles businesses in the affected area reported experiencing some type of direct physical damage due to the earthquake, of which the most common type was non-structural (68% of those with reported damage) damage to furnishings (56%) damage to equipment (52%) damage to inventory or stock (50%) structural damage to building (39%) and buildings declared unsafe (15%).[34]

In some buildings the structural damage exposed asbestos (insulation and fireproofing), which delayed reconstruction due to the specialist removal requirements. In addition, the structural damage caused large-scale failure of sprinkler and utility pipes in inadequately braced ceilings and equipment. These failures of air conditioning units, ducting and sprinkler systems caused serious interior damage to many business premises, flooding the contents below. This in turn affected the ability of some stores to reopen, exacerbating the indirect business interruption losses. [35]

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[26] Eguchi (1997)
[27] EQE (1994)
[28] EQE (1994) Scawthorn et al (1997)
[29] Eguchi (1997), p 121.
[30] Eguchi (1997), Eguchi et al (1998)
[31] EQE (1994)
[32] Updated from Scawthorn et al (1997). The original figure was based on total losses of USD 39.6 billion, and has been amended by the same percentage.
[33] EQE (1994)
[34] Tierney (1997)
[35] EQE (1994), Smolka (1995)

### Residential Losses

Total damage from residential exposure has been estimated as USD 20.6 billion, 49% of the total losses.[36] Building inspectors with the task of estimating initial damage estimated that 82% of all structures rendered uninhabitable by the earthquake were residential.[37] This percentage totalled 14,600 dwelling units, of which 77% were apartments and 23% were single family dwellings. Soil conditions played a major role in damages.[38] Many structures failed due to inadequate bracing or lack of connection to foundations. Mobile homes were found to be more vulnerable to fires, and 100-150 mobile homes were destroyed by conflagrations from gas and propane lines.[39]

### Agriculture Losses

There is no data readily available, although some insured losses have been reported.

## 2.2 Indirect Losses

A number of studies assessing the indirect losses have been undertaken, usually with a focus on the restoration of lifelines. Indirect impacts associated with the failure of lifeline systems may far outweigh the direct costs of repairing the system.[40] Several studies have surveyed businesses in the impacted area,[41] and one such study modelled the economic impacts using their Southern California Planning Model, estimating business interruption losses to total USD 6.5 billion in terms of lost output.[42]

**TABLE 3:**

| **ESTIMATED INDIRECT LOSSES in billion USD** | | |
|---|---|---|
| **Commercial** | Business interruption | **6.402** |
| **Unemployment** | 69,014 person-years of employment | |
| **Residential** | Vacated housing | **0.098** |
| **Other federal agencies** | Default on SBA loans | **0.376** |
| **Federal and state losses** | Tax revenue losses | **0.86** |
| **TOTAL** | | **7.736** |

Source: Gordon et al (1996), FEMA (1999), SBA (1999)

[36] Updated from Scawthorn et al (1997). The original figure of USD 19.5 was based on total losses of USD 39.6 billion, and has been amended by the same percentage.
[37] EQE (1994)
[38] ISO (1994)
[39] EQE (1994) This vulnerability is due to the likelihood of detachment of the structure from its foundation and the effect of this failure on utility lines such as gas and propane.
[40] Eguchi (1997)
[41] Alesch & Holly (1996), Tierney (1997)
[42] Gordon et al (1996)

### Public Sector Losses

Lifelines have been shown to be extremely vulnerable to earthquakes, and their failure can result in substantial direct and indirect losses.[43] Transportation lifelines proved to be problematical, and months after the earthquake there were still major traffic disruptions and sections of the Interstate (I) 5 and the Santa Monica Freeway were closed. These highways returned to normal service at varying rates, and transport-related effects included freight problems with raw materials and manufactured goods, as well as employee and consumer commuting problems.[44]

### Corporate/Business Losses

Aggregate business losses have been estimated at USD 6.4 billion, of which 48% were direct business interruptions.[45] Losses of $1 billion were suffered outside the region. Studies indicate that 15-30% of businesses damaged closed down permanently.[46] Some business losses were alleviated by the quick restoration of utilities, but damage to transportation routes, car-parking garages and retail areas affected losses. Residents who remained in Northridge changed their shopping habits. Businesses were also hampered by the slow response of public agencies, and their inability to obtain Small Business Administration loans.

Only about 20% of businesses carried earthquake insurance for damage or business interruption and only slightly more than 25% of those filed claims.[47] The highest job losses were in the retail (24%) and health service (18%) sectors. Half of the Northridge job losses, equivalent to 69,014 person-years of employment, occurred in the fault zone. Tax revenue losses associated with business interruption amounted to a total of USD 0.86 billion, of which USD 530 million was at federal level, USD 163 million at State level, and USD 164.4 million at local level.[48]

Indirect losses have major economic and social impacts on society. Many individuals change their spending patterns and draw on savings, current earnings and credit for essential rebuilding after a major disaster. Discretionary income is drastically reduced, which in turn affects many small businesses. Damage was not found to be a reliable predictor of business failure, while entrepreneurial skills were a critical factor in the ability of a business to survive. Some small businesses were failing as a result of the Northridge earthquake two years after the event.[49]

### Residential

There were 9 billion unit-days of vacated housing. 25% of damaged multi-dwellings and 80% of damaged single dwellings were vacated for more than 3 months. This amounted to USD 98 million, approximately 1.5% of the total cost of business interruption.[50]

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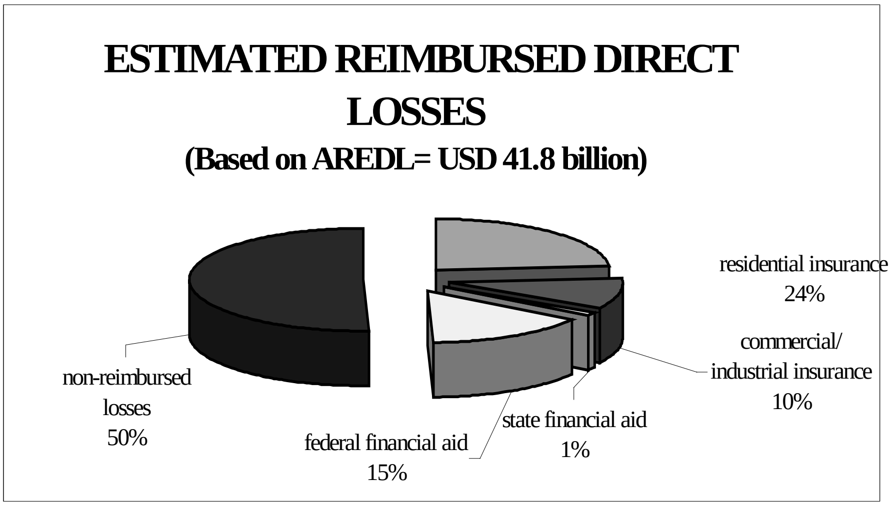
[43] Eguchi (1997)
[44] Gordon et al (1996))
[45] Gordon et al (1996)
[46] ibid.
[47] Tierney (1997)
[48] Gordon et al (1996)
[49] Alesch & Holly (1996)
[50] Gordon et al (1996)

# 3. REIMBURSED LOSSES

**FIGURE 2:**




Source: FEMA (2000) HUD (2000), Eguchi et al (1998) Scawthorne (1997), IBHS (1999)

**TABLE 4:**

| **REIMBURSED LOSSES in USD billions** | | | | | |
|---|---|---|---|---|---|
| | | **Insured** | **Uninsured** | **TOTAL** | ***Direct reimbursed losses*** |
| **FEMA** | Public Assistance program | | 4.578 | **6.197** | *4.0** |
| | Individual Assistance program | | 1.424 | | *1.193* |
| | Administrative costs | | 0.195 | | |
| **Other federal agencies** | HUD | | 0.837 | **1.962** | *0.837* |
| | Dept of Interior | | 0.005 | | *0.005* |
| | Department of Education | | 0.256 | | *0.256* |
| | Federal costs unaccounted for (this includes mission assignments to other agencies) | | 0.864 | | |
| **California State*** | Public Assistance program | | 0.45 | **0.606** | *0.45* |
| | Individual Assistance program | | 0.06 | | *0.06* |
| | State Employment Dept | | 0.041 | | |
| | State Board of Control | | 0.055 | | |
| **Voluntary aid** | Red Cross, Salvation Army | | 0.037 | **0.037** | |
| **Insurance payments** | Residential insurance | 9.88 | | **13.9** | *9.88* |
| | Commercial insurance | 4.02 | | | *4.02* |
| **TOTAL REIMBURSED LOSSES** | | **13.9** | **8.8** | **22.7** | ***20.7*** |

Source: FEMA (2000) HUD (2000), Eguchi et al (1998) Scawthorne (1997), IBHS (1999)

* *Estimated portion of direct loss reimbursements for public assistance programme.*
Estimates of total losses include structural damage, individual and family grants, as well as *rental assistance, relocation costs, debris removal, mission assignments, medical and funeral costs*. (*Items italicised have not been included in the direct loss estimate.*)

## 3.1 Government

**Federal aid**

A Major Disaster Declaration must be requested by the governor, and declared by the president. It includes an agreement to commit state funds and resources to the long-term recovery.[51] On February 12th 1994, President Clinton signed the bill for the President's Disaster Relief Fund that authorised USD 8.6 billion in aid for the earthquake victims.[52] The Federal Emergency Management Agency (FEMA) co-ordinates federal assistance when disasters and emergencies are declared and so administers this fund. The proportions for Northridge were 90% federal and 10% state.

Total federal expenditure amounted to USD 13 billion,[53] of which USD 8.16 billion were reimbursed federal losses by the Federal Emergency Management Agency (FEMA) and other federal agencies. Federal assistance was generous, perhaps due to the political importance of California. The earthquake occurred in a congressional election year.[54] Although FEMA plays a key role in disaster assistance, other agencies such as the Small Business Administration (SBA) U.S. Department of Agriculture (USDA), Department of Housing and Urban Development (HUD), U.S. Department of Transportation (DOT) U.S. Department of Interior (DOI) are also involved.

**TABLE 5:**

| **FEMA FUNDING in USD billions** | | |
|---|---|---|
| **Individual Assistance**: | | |
| Temporary housing, emergency home repairs, mortgage assistance | **1.193** | **1.424** |
| *Personal property replacement, permanent repairs, transportation, medical and funeral expenses* | ***0.167*** | |
| *Disaster unemployment assistance* | ***0.009*** | |
| *Housing inspection services* | ***0.023*** | |
| *Crisis counselling* | ***0.032*** | |
| **Public Assistance** | | |
| Payments to state and local governments for repair and replacement of damaged infrastructure, emergency services and debris removal | | **4.578*** |
| *Mission assignments to other federal agencies* | | ***0.020*** |
| *Administrative costs* | | ***0.194*** |
| *Hazard mitigation measures* | | ***0.741*** |
| **Total FEMA relief costs** | | **6.957** |

Source: FEMA (2000)

Note that items italicised have not been included in the direct loss estimate.

**Estimated portion of direct loss reimbursements for public assistance programme = USD 4 billion. This excludes indirect loss reimbursements, such as debris removal and emergency services.*

Table 5 sets out the current details of reimbursements from FEMA, dated January 31, 2000, totalling USD 6.957 billion. Other federal expenditure amounted to USD 6.043 billion, of which some costs relate to the Small Business Administration loans and hazard mitigation projects. Direct reimbursements from FEMA have been estimated at USD 5.193 billion and those from other

[51] See http://www.fema.gov/about/4-sect1.htm
[52] ISO (1994)
[53] FEMA (2000)
[54] Bolin & Stanford (1998)

agencies USD 1.098 billion, totalling 6.291 billion for direct federal reimbursements.[55] By the close of 1994, FEMA reported that some 667,801 Southern Californians had applied for federal aid, three times as many as following Hurricane Andrew in 1992.[56]

**Other federal agencies disaster aid**

Although FEMA plays a key role in disaster assistance, other agencies such as the Small Business Administration (SBA) U.S. Department of Agriculture (USDA), Department of Housing and Urban Development (HUD), U.S. Department of Transportation (DOT) U.S. Department of Interior (DOI) are among those that also play a role. The details available of aid from these agencies are set out below.

| | |
|---|---|
| Department of Housing and Urban Development (HUD) | USD 0.837 billion[57] |
| Department of Interior - historic preservation work | USD 0.005 billion[58] |
| Department of Education | USD 255.6 million[59] |
| Federal costs unaccounted for | USD 0.864 billion[60]. |
| **TOTAL** | **USD 1.098 billion** |

**Federal Disaster Loans**

The federal government provides assistance to victims in the private sector through the Small Business Administration (SBA), who make low-interest long-term loans (generally 4%, up to 30 years). SBA loans are available to restore structures to their pre-disaster condition, and may be increased up to 20% to include mitigation measures. Loans to a limit of USD 200,000 are available to residential homeowners, renters and non-farm businesses. Similar loans, to a maximum of USD 1.5 million, are available to businesses and private, non-profit organisations. In some cases, the SBA will refinance existing mortgages on homes and business properties.

39,129 commercial and 193,867 residential SBA applications were made (as of 24.3.1995), an unprecedented number.[61] Of a sample population, 11% had applied for SBA loan assistance for their business losses. Of this number, half had received loan amounts requested, 30% had their applications turned down and 10% of the loans were still pending. For the businesses that had received SBA loan assistance, the median percentage of business losses covered was about 50%.[62] 124,245 SBA loans, amounting to USD 4.1 billion[63] were approved. The SBA announced that 9,144 loans totalling USD 286 million were in default, and have estimated that a further USD 90 million of Northridge borrowers are likely to default on their loans.[64]

[55] Refer to table 5 for details. Direct reimbursements exclude rental assistance, relocation costs, debris removal, medical and funeral costs, mission assignments and administration costs.
[56] See http://www.fema.gov/NW294/94_015.htm
[57] HUD (2000)
[58] See http://www.fema.gov/NW295/95_129.txt
[59] See : http://nces.ed.gov/pubs/d96/D96T356.html, item 96.
[60] This figure is the unknown element of the federal disaster relief programme, and includes the FEMA USD 0.20 billion assigned to other federal agencies.
[61] Gordon et al (1996)
[62] Tierney (1997)
[63] See http://www.fema.gov/library/df_4htm
[64] See http://www.sba.gov/IG/sar3-99.pdf

### 3.2 State Sector

The Governor's Office of Emergency Services (OES) co-ordinates overall state agency response to major disasters. Under the Stafford Act, the state was liable for 10% of the costs of the federal assistance programme and contributed USD 0.6 billion in reimbursements. California voters rejected a proposed USD 2-billion bond issue earmarked for earthquake relief, and so only some of the repair and rebuilding needs could be met. A plea was made to President Clinton, who agreed to redistribute USD 225 million from infrastructure budgets to enable the affected cities to make 30-year no-interest deferred loans to owners of damaged buildings.[65]

| | |
|---|---|
| State Board of control | USD 0.055 billion |
| California Employment Development Department | USD 0.041 billion |
| Individual/Family Grant programmes | USD 0.06 billion |
| Public Assistance | USD 0.45 billion |
| **Total California State share** | **USD 0.6 billion**[66] |

### 3.3 Private Insurance Sector

There are two estimates of insured losses. The Property Claim Services (PCS) estimated the final losses to be USD 12.5 billion, after adjusting them upwards eight times from an initial USD 2.5 billion to a final figure of USD 12.5 billion, 20 months later. The Institute of Building and Home Safety (IBHS) reached a final estimate of USD 15.3 billion. The National Research Council (NRC) recommends the use of both the PCS and IBHS figures, the advantage of the IBHS figures being that they provide disaggregated catastrophe claims information.[67] The average has been calculated to be USD 13.9 billion, as set out in table 6 below.

**TABLE 6:**

| **ESTIMATES OF INSURED LOSSES** | | | |
|---|---|---|---|
| | **PCS estimate**[68] | **IBHS estimate**[69] | **Average** |
| **Residential** | USD 8.4 billion | USD 11.35 billion | **USD 9.88 billion** |
| **Commercial** | USD 4.1 billion | USD 3.95 billion | **USD 4.02 billion** |
| **TOTAL** | USD 12.5 billion | USD 15.3 billion | **USD 13.9 billion** |

Source: IBHS (1999), Kerney (2000), Scawthorne et al (1997), Eguchi et al (1998)

Both the PCS and the IBHS adjusted their estimates of insured losses upward over time. Several factors have contributed to the large increases. The seismological data on which initial estimates were based was incorrect, and estimates were prepared assuming a smaller earthquake with an epicentre further from central Los Angeles.[70] Adjustment (such as replacement of new for old) and retroactive building codes contributed to the underestimation of these losses.[71] Reopened claims with additional discovered damage, higher living expenses resulting from longer repair periods, and a large number of claims initially thought to be below the level of the deductible all increased estimates. Underinsurance was a major issue that was not reflected in most of the settlements, due

[65] See http://www.huduser.org/publications/destech/bigone/sect1.html
[66] Eguchi et al (1998)
[67] NRC (1999)
[68] Kerney (2000), Scawthorne et al (1997), Eguchi et al (1998)
[69] IBHS (1999)
[70] Scawthorne (1995)
[71] Eguchi et al (1998), Scawthorne (1995)

to its political sensitivity.[72] It has also been suggested that insurers were generous in their claims settlement to influence moves to repeal the mandatory offer requirement.[73]

Legal issues regarding Northridge claims have centred on the interpretation of the statute of limitations in residential property claims, delayed discovery of loss, waiver and estoppel, and the obligations of the insurer. The California Department of Insurance (CDI) instigated a mediation program to resolve disputes over earthquake claims without costly litigation. This program has investigated more than 3,300 complaints about insurance-related claims and recovered over USD 71 million from insurers.[74] Allstate opened 9,000 of its 46,000 homeowner's claims for reevaluation, as part of a settlement of two civil suits that charged Allstate with deliberately underreporting estimates by loss adjusters during inspections. Allstate put aside USD 60 million to deal with these claims, and have earmarked USD 5 million to set up a charitable foundation.[75]

### 3.4 Aid from other sources

Volunteer assistance was received from volunteer organisations including the American Red Cross (ARC) and Salvation Army. The ARC sheltered 22,000 people, served 1.7 million meals and operated various other programmes. The ARC spent USD 36 million on their programme. The Salvation Army spent more than $1 million for displaced persons' housing and mass feeding.[76]

## 4. ECONOMIC AND SOCIAL IMPACTS

### 4.1 Economic Impacts

Almost 67% of all estimated direct losses were uninsured. Federal financial aid met over 15% of these losses, while 1% were covered by state financial aid.[77] Over 56% of the federal aid programme went to meet the public losses through the Public Assistance programme, while approximately 28% of private losses were met by the FEMA and other federal aid programmes. Despite generous federal, state and insurance reimbursements half of the direct losses were borne by the disaster victims.[78] "*Many homeowners, renters and businesses paid thousands of dollars out of their own pockets to rebuild their own lives*",[79] said James Witt, director of FEMA.

Northridge earthquake demonstrated the success of a modern building code in reducing deaths and injuries to a very small fraction of the affected population. Most of the buildings were built within the last three decades, and were considered to be reasonably earthquake resistant.[80] However, there was considerable economic loss and social disruption, raising the issue of how much protection should be provided economically. This debate should not be the sole responsibility of the engineers and code developers; society must participate in the process of weighing the costs and benefits of more protection.

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[72] Collins (1998)
[73] Eguchi et al (1998)
[74] See http://www.insurance.ca.gov/PRS/PRS1997/Pr032-97.htm
[75] See http://www.claimsmag.com/Issues/November/feature_allstate.asp
[76] See http://www.fema.gov/NR/nr_0106.htm
[77] Refer to figure 2, and table 4 for details
[78] Based on AREDL=USD 41.8 billion. Refer to section 2.1 for details
[79] See http://www.fema.gov/library/wittspch5.htm
[80] EQE (1994)

The scale of losses inflicted by the Northridge earthquake has forced both federal and state governments to reassess the levels of disaster aid, particularly in the current climate of shrinking budgets and federal cutbacks. The focus of government has increasingly shifted from post-disaster relief operations to pre-disaster mitigation measures,[81] and the stated mitigation goal of FEMA is to reduce natural disaster losses by half by the year 2010. Northridge earthquake illustrated graphically the value of the seismic strengthening and risk reduction programmes, which can avoid substantial losses. None of the failed transportation structures had been strengthened, yet all 122 strengthened structures were undamaged.[82] Examples of other retrofitting successes, such as department stores, hospitals etc. have been highlighted and used by FEMA as justification for their shift of policy to mitigation.[83]

Small businesses are often hardest hit by natural disasters, as they seldom carry insurance or possess the resources to make a meaningful recovery. Small businesses are also rarely diversified in terms of products or services, and their customers are often victims of the same disaster. They have less mobility than other members of the community, and generally suffer both personal and business losses. Damage is not a reliable predictor of business failure. Small businesses were still failing as a result of the Northridge earthquake two years after the event. Entrepreneurial skills were a critical factor in the ability of a business to survive. When these businesses fail, there are costs to the individual and to the community. A significant effect can be the downward spiral of a neighbourhood. In contrast, large businesses are able to relocate their operations temporarily, and offset losses against other locations.[84]

Business interruption effects have been estimated to be USD 6.5 billion, of which USD 5.5 billion were in the Northridge region.[85] Most businesses had earthquake insurance for their homes, but only 13% of small businesses were insured. This led to large uninsured losses, and many business failures. The rate of business failure varied among sectors. Manufacturing was the least affected, due to customers outside the region, while retail and service firms were most badly affected.[86] Tax revenue losses associated with business interruption amounted to a total of USD 0.86 billion, of which USD 530 million was at federal level, USD 163 million at State level, and USD 164.4 million at local level.[87]

Northridge earthquake was a direct hit on an urban area and the scale of losses caused by the earthquake far exceeded expectations. The threat of the 'Big One' has occupied much forethought and research at local and national level.[88] The US has a large concentration of localised industries, such as the entertainment and aerospace industries in southern California, the electronics industry in San Francisco, the aerospace industry in the Pacific Northwest and the financial sector in New York. These industries could be seriously affected in the case of a major earthquake.[89]

### 4.2 Social Impacts

Disasters are often accompanied by a desire for a recovery to reproduce a return to normalcy, and achieve the status quo of the socio-economic and built environment prior to the earthquake. This is

[81] See http://www.fema.gov/library/wittspch5.htm
[82] EQE (1994), Eguchi (1997)
[83] See http://www.fema.gov/library/wittspch5.htm and http://www.fema.gov/impact/impact00.htm
[84] Alesch & Holly (1996)
[85] Gordon et al (1996)
[86] Alesch & Holly (1996)
[87] Gordon et al (1996)
[88] See http://www.huduser.org/publications/destech/bigone/sect1.html
[89] Scawthorne et al (1997). The risks are greater in areas where earthquake preparedness is less established, rather than California.

almost impossible to achieve. There are many federal, state and local participants each with their own political, economic, social or environmental agenda, and at best recovery takes the form of restructuring, rather than the desired reversion to the previous status quo.

There are certain groups less likely to achieve any semblance of their prior socio-economic level, and these groups are often the most vulnerable members of society - the low income, immigrant, unemployed and elderly groups. They also have the least access to resources to manage their losses.[90] Social, economic and political processes structure the lives of different groups of people in different ways and affect their ability to react to a natural hazard. Their level of vulnerability only becomes apparent in the face of disaster.[91]

The earthquake affected a large area of the San Fernando Valley, which supports half of the city of Los Angeles' population. Approximately 48% of the population were homeowners - middle class and therefore not obviously insecure- yet many proved to be vulnerable to the hazard. This vulnerability had been increased by the declining market value of housing in the area (which followed a boom of the 80s), job redundancies due to corporate restructuring, defence spending cuts, increasing liabilities due to underemployment, as well as the high insurance deductibles, which are based on the value of the property rather than the level of damage.[92]

Northridge earthquake provided a generous system of federal social protection by international standards, yet victims received at most partial compensation for their losses and had to find means to cover their losses. Many individuals changed their spending patterns and drew on savings, current earnings and credit for essential rebuilding after the disaster. Discretionary income is drastically reduced, which in turn impacts many small businesses.[93]

Despite substantial financial aid, people and businesses moved out of damaged downtown areas and did not return. An estimated 60,000 people migrated and only 20,000 moved into the area. Many of these newcomers were Hispanic and Korean, and were younger and poorer than their predecessors. These migrants had different retail habits, which changed the social structure of the area.[94] The downtown areas of Whittier, Santa Cruz and Northridge were slow to recover.[95]

Disasters also offer an opportunity to improve safety measures. The moves initiated by Northridge earthquake were an increase in the level of geological hazard mapping, the development of new building code standards, seismic retrofitting of older structures to meet revised seismic codes, as well as improved emergency preparedness. This preparedness involved emergency training for households and residents and the creation of Disaster Assistance Response Teams, (DART). A non-profit corporation, the Emergency Network Los Angeles (ENLA) was established to act as an umbrella organisation for the NGOs (non-governmental organisations) and approximately 300 CBOs (community based organisations) that provided a second tier protection for the vulnerable members of society, whose needs were not met through conventional channels. The other aim of the ENLA is to provide a network for future disasters.[96] Both government and non-governmental organisations have benefited from a history of collaboration over a number of Californian earthquakes.

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[90] Bolin & Stanford (1998)
[91] Blaikie et al (1994)
[92] Bolin & Stanford (1998)
[93] Alesch & Holly (1996)
[94] Alesch & Holly (1996)
[95] CDI (1997/8)
[96] Bolin & Stanford (1998)

Due to the localised impact of the earthquake, damage was concentrated in particular areas. 15 of such areas (later increased to 17) with red-tagged[97] damage levels averaging 60% of the housing stock, were designated 'ghost towns' by the Los Angeles Housing Department (LAHD). All but 4 of these areas were heterogeneous, middle-income neighbourhoods. The high number of abandoned structures soon made these areas a target for looters, and they were rapidly blighted by squatters and street gangs. This degeneration had serious social effects on the remaining housing, businesses and neighbourhoods. The federal Department of Housing and Urban Development (HUD) and its state counterpart, the LAHD targeted assistance towards these areas, but it was not always economically viable to reconstruct this housing stock in a weak housing market. As a consequence, there is less available low-income housing provision in Los Angeles. In many cases non-structural damage, damage to parking facilities and outbuildings was not repaired. This has led to neighbourhood decline and a negative spiral of property values.[98]

# 5. INSTITUTIONAL ASPECTS

## 5.1 Regulatory/legal framework

The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 is the core legislation under which federal emergency relief is managed. In order to qualify as a major disaster the event must be clearly more than state or local governments can handle alone. A Major Disaster Declaration must be requested by the governor, and declared by the president. This declaration is based on the damage assessment, and an agreement to commit state funds and resources to the long-term recovery.[99] There are two main categories of disaster aid, namely:

- Individual Assistance (IA), for damage to residences, businesses and personal property losses. This aid includes Disaster Housing, Disaster Grants and other Disaster Aid Programmes, such as legal aid, unemployment assistance, crisis counselling. Applications are made through a Disaster Application Centre or by tele-registration, normally to a 60-day deadline. Low-Interest Disaster Loans are also available through the Small Business Association.
- Public Assistance (PA), is aid to the state or local government to pay part of the costs of rebuilding the community's damaged infrastructure and public facilities. This may include debris removal, emergency protective measures, loans for essential government functions and grants for public schools.

Under the Stafford Act the financial burden of emergency assistance is placed on the taxpayers, and the federal government provides funds to state, local governments and private non-profit organisations to cover at least 75% of the costs of the repair, restoration or replacement of public facilities. At the time of Northridge, the percentage (the Volkmer percentage) provided by the federal government met 90%[100] of the replacement costs. Generally, public assistance programs pay 75% of the approved project costs, but this can be increased at the discretion of the President.

[97] Tagging of buildings is set out in the California State Post-Disaster Safety Assessment Plan. Inspectors affix tags to inspected buildings. Green tags indicate that no hazards have been discovered, yellow tags allow only limited entry, and presuppose a potential danger, while red tags indicate immediate danger and non-admittance. (Eguchi et al, 1998)
[98] Comerio (1996), in Bolin & Stanford (1999)
[99] See http://www.fema.gov/about/4-sect1.htm
[100] According to the Insurance Services Office, the federal government has reduced its share of disaster assistance programmes from 100% for Hurricane Andrew, 90% for the Midwest floods, to 75% for the Northridge earthquake. ISO (1994) Other authors, such as Kunreuther (1998), Bolin & Stanford (1998) maintain that the percentage for Northridge was 90%.

### 5.2 Mitigation measures

Current policy, as set out in the Stafford Disaster Relief and Emergency Assistance Act of 1988, places the financial burden of emergency assistance on the taxpayer. This policy has meant that local communities have had little interest in investing in mitigation measures.[101] FEMA breakdown of costs indicate that USD 0.741 billion was spent on hazard mitigation directly as a result of Northridge.[102] As a result of the increasing losses from natural hazards, FEMA adopted a National Mitigation Strategy, aimed at reducing loss of life and property damage by increasing mitigation. There are five main elements:

- Public Awareness and Training for architects, engineers, building and local officials.
- Leadership and Co-ordination: all twenty nine affected federal agencies have issued regulations to incorporate seismic safety measures in all new buildings owned or leased by the Federal Government and to reduce the earthquake risk to existing federally owned or leased buildings.
- Hazard Identification and Risk Assessment: FEMA has commissioned the National Institute of Building Sciences to develop a nationally applicable standardised method for estimating potential earthquake losses.
- Applied Research and Technology Transfer: Reports, recommending the NEHRP provisions for new buildings and a comprehensive set of nationally applicable consensus-backed guidelines has been distributed.
- Incentives and Resources: The 1993 Volkmer Amendment to the Stafford Act following the Midwest floods incorporated a new formula for post-disaster mitigation funding. This increased the Northridge mitigation funds to nearly USD 1billion instead of the USD 200 million under the old formula.[103]

Under the terms of the Stafford Act the state must prepare a disaster mitigation plan for future events. For each major disaster declared by the President, FEMA will fund up to 75% of the eligible costs of each mitigation project, provided the additional 25% is raised by the state or local sources, in cash, in-kind services or donated materials. Small Business Administration (SBA) applicants can request up to 20% increase in their loan for appropriate hazard mitigation.[104] The Hazard Mitigation Grant Program (HMGP) can provide up to 15% of the federal share of Public and Individual Assistance programmes, minus administrative expenses.

FEMA also created a Seismic Hazard Mitigation Program for Hospitals (SHMPH), which provided grants totalling USD 1.7 billion to participating hospitals, almost 25% of the costs incurred. The program was initiated after disagreement with the California OES about the state requirements, under PIN3, that hospitals meet the 1992 California Building Code.[105] FEMA has established a community based disaster mitigation programme, 'Project Impact', which has absorbed USD 80 million of funding.[106] Other mitigation measures have been undertaken, which include:

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| Research into design criteria for steel moment-resisting construction | USD 8.7 million[107] |
| FEMA Preparedness, Training and Exercises Directorate | USD 144 million[108] |
| US Fire Administration | USD 29 million |
| Risk Assessment of natural hazards | USD 128 million |

[101] See Kunreuther & Roth (1998) introduction.
[102] FEMA (2000)
[103] Moore (1997)
[104] See http://www.huduser.org/publications/destech/bigone/sect1.html
[105] See http://www.fema.gov/IG/shmp_bk.htm
[106] See http://www.fema.gov/nwz98/98017.htm and http://www.fema.gov/impact/impact00.htm
[107] See http://www.fema.gov/NWZ95/95_129.txt This was done as a direct result of the poor performance of the steel construction method, which is widely used, and was believed to be seismically resistant.
[108] See http://www.fema.gov/nwz98/98017.htm

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|---|---|
| Emergency Food and Shelter Program | USD 100 million |
| LA Unified School District (securing of overhead lights in schools) | USD 120 million[109] |

The pressures of the immediate needs of constituents ensure that mitigation measures are often short-term recovery plans rather than long-term mitigation measures. California State offered USD 250 million for financing of seismic retrofitting and another USD 50 million to match funds to help localities retrofit public buildings[110]. The California Department of Insurance (CDI) initiated two earthquake retrofit programmes in 1997, providing grants or low interest loans for low- to moderate-income households so reducing the risk of earthquake damage. The CDI also organised home inspections and mitigation measures using CDI approved seismic retrofit contractors.[111] The California Earthquake Authority launched a retrofit programme, SAFER, in October 1999.[112]

Mitigation measures could include better structural design, tougher enforcement of building codes or improved land-use planning. In view of the low frequency of catastrophic events, individual homeowners and small businesses are often unwilling to commit their funds to mitigation measures.[113] Such measures could reduce some of the potential losses from an earthquake, but there appears to be reluctance by the insurance industry to provide incentives such as premium reductions to encourage their adoption. Regulatory restrictions constrain realistic setting of rates and incentives would encourage residents in high-risk areas to purchase coverage, thus increasing insurers risks.[114] Suggestion has been made for a seal of approval for structures complying with building codes, similar to current termite and radon inspections, as a mandatory condition for use when financing a property.[115]

**Building Codes:**

Building Design Codes:

Los Angeles building codes specify buildings to resist a horizontal acceleration of 0.4g. The model codes only require consideration of vertical acceleration in special design cases such as the design of cantilevered elements, and in areas of high seismicity. Los Angeles City adopted an Unreinforced Masonry Retrofit code in 1981, but this was not adopted in other areas affected by the earthquake such as Fillmore, Whittier, Santa Cruz and Coalinga, due to the high costs associated with the strengthening procedures.[116]

When designed to conform to the lateral force requirements of the code the structure should:

- Resist minor earthquake motions without damage
- Resist moderate earthquake ground motions without structural damage, but may experience some non-structural damage
- Resist major earthquake ground motion having an intensity equal to the strongest forecast for the building site, without collapse, but with possible structural damage.

Current building codes focus on saving lives, and not property loss. "*The purpose of the Uniform Building Code is to provide minimum standards to safeguard life or limb, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures.*" Prescriptive building codes,

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[109] See http://www.fema.gov/library/wittspch5.htm

[110] See http://www.huduser.org/publications/destech/bigone/sect1.html

[111] See http://www.insurance.ca.gov/EXECUTIVE/CatSeries/Earthquake/Earthquake.3.htm and http://www.insurance.ca.gov/PRSarchive/PRS1999/Pr149-99.htm

[112] See http://www.earthquakeauthority.com/data/about/about.html

[113] Petak (1998). The CEA provides an incentive of 5% premium discount for retrofitted houses.

[114] Roth (1997)

[115] Kunreuther (1996)

[116] Bolin & Stanford (1999)

based on proven performance standards, are perceived to be a way of addressing the economic consequences of earthquakes.[117]

Building codes form the primary form of protection against losses from earthquakes, but adoption of a code will not necessarily ensure that building practice meets the standards set out in the code without competent enforcement. Building codes are often not enforced in hazard-prone areas, and varying levels of enforcement lead to different standards.[118]

The state of California requires all cities to adopt the most current version of the Uniform Building Code (UBC) as the minimum code for the city/county. [119] A city/county may choose to adopt a more restrictive code; so the requirements and regulations could differ between San Francisco and Los Angeles. The City of Los Angeles introduced retroactive building codes to improve the seismic standards of buildings, and replacement work had to comply with these codes in order to obtain building permits.

The UBC code contains seismic design provisions and it existed long before the National Earthquake Hazards Reduction Program (NEHRP) provisions were developed. The NEHRP standards were drafted by the Building Seismic Safety Council (BSSC), a council under the National Institute of Building Sciences (NIBS). The NEHRP provisions have enabled the Federal Emergency Management Agency (FEMA) to provide a uniform guide for seismic risks, but states are not obliged to adopt these measures.

FEMA has issued a set of guideline provisions that all three code bodies in the US have adopted, which set out design criteria based on the seismic risk of the area. Federal policies have encouraged a uniform set of codes. The advantages are that of legal liability (the uniform code would be widely accepted as up to date practice) as well as the increased efficiency of a uniform standard for compliance and enforcement.[120]

The International Code Council[121] (ICC) is a non-profit organisation created in order to develop a single set of national codes, and the final draft of the International Building Code[122] for the United States has been completed. This code provides a comprehensive set of construction codes without regional limitations, but it will require adoption and enforcement by state, county and municipal authorities. FEMA has signed an agreement with the ICC to work together on Project Impact, a series of mitigation measures, and has committed funding to encourage adoption and enforcement of the new International Code.[123] There is a competitive effort led by the National Fire Protection Association, but it does not look likely to succeed.[124]

**Land-Use Planning:**

The Alquist-Priolo Act of 1972 is the principal form of land use planning for earthquakes in California, and is designed to prevent development along active fault lines. The legislation requires evaluation of the site by an engineering geologist who can make recommendations for ’safe’ construction, and it also requires real estate agents or sellers to disclose risks if the property lies

[117] Moore, FEMA representative (1997); Petak (1998)
[118] Kunreuther (1996)
[119] Petak (2000)
[120] Wright (2000)
[121] The ICC was founded in 1994 as an umbrella organisation by the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), and the Southern Building Code Congress International (SBCCI).
[122] See http://www.intlcode.org
[123] See http://www.intlcode.org/newsrel/nr100899.html
[124] See http://www.nfpa.org.

within 1/8 mile of a trace of an active earthquake fault. Studies indicate that this legislation has not been implemented.[125]

# 6. EARTHQUAKE INSURANCE

## 6.1 Earthquake insurance in the US

The insured losses of Northridge cost more than three times the total earthquake premiums California insurers collected in the 25-year period prior to the disaster. Prior to Hurricane Hugo in 1989, with insured losses of $4 billion, the insurance industry had never suffered losses in excess of $1 billion. Since then, over 10 disasters have exceeded that amount.[126]

These recent losses have made it more difficult and expensive to find insurance for natural disasters. The increased risks posed by natural disasters are also due to the increasing number of Americans living in high risk areas, increasing capital investment - sometimes in new technologies, a large number of unsafe buildings, vulnerable lifelines, as well as the increasing interdependence of people. Some insurers and reinsurers consider the earthquake premiums inadequate at present and believe that the potential losses far exceed their capacity, encouraging them to withdraw from the market completely.[127]

Earthquakes pose a significant risk in at least 39 states. Unlike California, these states are not well prepared for these events, and as a consequence are potentially likely to face higher human and physical losses than a comparable earthquake in California. Although the potential for US earthquake insurance appears great, each state has a different regulatory body and system, which makes the potential risk difficult and expensive for the insurer to determine. The eastern United States has experienced a number of damaging earthquakes, such as the 1755 Boston, 1811 New Madrid, and 1884 New York earthquakes. There are longer recurrence periods, and therefore less information and greater uncertainty about these risks. There is a credible risk of a magnitude 5-6 earthquake affecting cities such as Philadelphia, Boston or New York, yet no planning has been made for this risk.[128] Although there are some current moves to make lifelines more resilient to earthquakes, and for new construction to meet seismic building codes, the overall lack of preparedness, ageing buildings and infrastructure leave society exposed.

Earthquake insurance can be purchased as a supplement to standard coverage, but the take-up is low except in high-risk areas. California, and subsequently Washington, the Midwest and Oregon have all seen increased pricing plans, based on more detailed information of the seismic risks. Insurers are now departing from their past practice of basing earthquake premiums on historical data and using scientific research and computer simulation models to predict earthquake risks.[129] Earthquake insurance policies are usually for replacement coverage, replacing old for new, which increases the liability of the insurance company.[130]

## 6.2 Earthquake insurance in California

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[125] Palm (1998)
[126] Kunreuther (1998)
[127] CDI (1997/8), Roth (1997)
[128] Jacob (1995)
[129] Risk Management Solutions, in New York Times (1999)
[130] Roth (1997)

Demand for both residential and commercial earthquake insurance has increased over the past 15 years, due to earthquakes, media publicity and rising property values. At the time of the Northridge earthquake, 40% of homes in Los Angeles County had earthquake insurance. This earthquake insurance tends to be purchased by higher-value homeowners, and similarly larger commercial businesses. Mortgage lenders do not normally require earthquake insurance. The reasons given for this are that most loans are on post-1940 properties (built according to some earthquake code) therefore the probability of default is unlikely if there is still positive net equity in the property. Lenders also spread their risks geographically and often pass the risks on to others, and may not discriminate on mortgage loans, because of state and federal anti-redlining legislation.[131]

In general, it is large multistate companies with multiple lines of insurance business that have the financial resources to provide insurance against natural catastrophes. The Northridge earthquake demonstrated that the losses were subsidised by other lines of business and business written in other states.[132] Over the last decade, the number of insurers writing homeowners policies in California has dropped by 23%, resulting in a higher concentration of policies, an increased market share and therefore, a disproportionately larger exposure for the three largest homeowners insurers.[133] Seismologists from the United States Geological Survey (USGS) have predicted an increase in seismic tremors and major magnitude 8 earthquakes, and the occurrence of earthquakes of a magnitude of 6.0+ is expected every 1.6 years for the next 30 years, which has increased insurers concerns about their exposure.[134]

**Residential earthquake insurance.**

In 1985 California State introduced the ’mandatory offer law’, which required insurers selling homeowners policies on one- to four-family units to offer earthquake coverage for these structures.[135] This law requires any insurer writing residential property insurance to offer its prospective and existing clients coverage for loss due to earthquake. The offer must be in writing, subject to minimum coverages. The client has 30 days to accept the offer, but if it is not accepted, the insurer must renew the offer every 2 years.[136]

The mandatory earthquake offer requirement took away from insurers the ability to manage their total risk exposure as they were required to insure old structures in poor condition as well as newer structures, leading to adverse selection problems. After the Northridge earthquake, homeowners decided to avail themselves of this insurance policy, but the high level of losses and seismologists’ predictions of further earthquakes caused most insurers to stop writing residential policies, the only legal recourse open to them due to the mandatory offer law. This caused an insurance availability crisis.

The California Earthquake Authority (CEA) was created by the Legislature in 1996 to address the crisis in insurance availability. It is a state-run company funded by the private sector offering earthquake insurance as an endorsement of homeowners’ insurance policies. The funds to pay insured loss claims come from premiums, participating insurance companies and reinsurance purchased by the CEA. No public money, including the State General Fund, is pledged to cover losses. The CEA has a total claims-paying capacity of $7.2 billion.

[131] Palm (1998)
[132] Roth (1998)
[133] ISO (1996)
[134] This information stems from "Seismic Hazards in Southern California: Probable Earthquakes 1994-2024", and is discussed in CDI (1997/8), Macilwain (1994), NYT (1999).
[135] Roth (1997), CDI (1997/8)
[136] CDI (1999)

The CEA commissioned earthquake risk analyses for the entire state, dividing the state into 19 separate rate territories. Rates are dependent on earthquake risk, as well as the age and construction of the home, soil type and proximity to faults. These rates subsequently doubled to actuarially based premiums, but due to political pressure the rates in northern California were reduced despite the results of the risk modelling.[137] The rating structure of the CEA has been controversial since its inception.[138] The average cost for a basic policy is now $2.79 per $1,000 coverage, but can be as high as $8 per $1000.[139]

Deductibles were increased from 5-10% to a standard 15%, the value of contents was lowered to $5000 and additional living costs was limited to $1500. The standard coverage offered by the CEA does not cover out buildings and structures, for example detached garages, garden walls, swimming pools, patios, fences or driveways. Some participating companies have introduced a reduced 10% deductible, and higher coverage limits for personal property and additional living expenses. Depending on its date and type of construction, a retrofitted house may be eligible for a 5% premium discount.

It is important to note that the deductible is 15% of the replacement cost of the structure itself. This ensures that the CEA will not pay any claims for structure damage or contents damage unless the damage to the structure exceeds 15%. Should any residents be forced out of their home, the policy will, however, still pay the additional living expenses allowance, up to its $1500 limit, even if there is minimal structural damage. Many homeowners have chosen not to insure due to the increased premium rates, reduction in coverage offered by the CEA and the low chance that the loss will exceed the 15% deductible. These factors have caused the average level of residential earthquake coverage in California to drop by half to 17%.

**Commercial earthquake insurance**
There is no mandatory offer requirement for commercial earthquake insurance. Commercial rates are low and appear to be readily available. Approximately 80% of earthquake exposure are on commercial property, yet it is the owners of commercial properties, rather than the small businesses renting the space that purchase this earthquake insurance. Most commercial buildings are only partially insured for earthquake damage, and many older buildings are not covered at all. Small businesses do not buy insurance due to the high cost of cover, their short time horizon, the low number of assets at risk, and the perceived availability of loans and grants. There is generally little coverage for loss of use or business interruption losses.[140]

# 7. CONCLUSIONS

Northridge earthquake was relatively small in terms of seismic intensity, yet its financial impact made it one of the worst disasters in US history. The economic losses were extreme, exceeding all previous predictions. The earthquake provided a graphic illustration of the magnitude of potential losses, alerting federal and state governments, as well as private insurers, to the large risk exposure from earthquakes and the need for greater loss control to reverse the trend. Research has shown that potential direct losses from natural disasters are only likely to increase over time as more Americans live in 'high risk' areas, yet often fail to take the commensurate structural steps to safeguard their property. Indirect losses have also escalated due to the increased interdependence of people and businesses on all forms of communication and other infrastructure.

[137] Petak (2000)
[138] Consumer Watchdog (1999)
[139] III (2000)
[140] CDI, 1997/98

Although the earthquake occurred in one of the best-prepared regions of the world, the extent of the financial losses was extreme. The levels of reimbursement were high; yet non-reimbursed losses still amounted to 50% of the total losses. These losses of approximately USD 21 billion were met by the victims of the disaster and have had major social impacts on the communities affected.

The federal and state governments provided the primary source of relief and economic recovery. FEMA estimates of total federal expenditure on Northridge are more than USD 13 billion, making it the most expensive natural disaster in US history for the federal government. However, federal disaster relief programmes have been reduced over time from 100% assistance for Hurricane Hugo, 90% for Northridge to a current lower level of 75%. This level could be reduced further, particularly in the light of federal cutbacks. This is likely to mean that future disasters will not be covered by government aid to the same extent.

The future role of private insurance in the protection of financial losses from catastrophic events is uncertain, and will depend on the extent of future federal relief programmes for natural disasters. Should these federal programmes be reduced, the demand for private insurance will increase. However, the increasing scale of these losses has made it more difficult and expensive to find insurance for natural disasters. The insured losses inflicted by the Northridge earthquake were so extreme they amounted to three times the total earthquake premiums collected by California insurers in the 25-year period prior to the disaster. As more research becomes available regarding the risk of potential losses posed by earthquakes, insurers increase their premiums, increase the levels of the deductible or reduce the level of coverage. This in turn lowers the level of insurance penetration and leaves more of society vulnerable should a disaster occur.

Northridge earthquake highlighted the value of two preventive measures. First, it showed that good data collection and the use of Geographical Information Systems (GIS) could reduce delay and minimise losses. The proactive steps taken by the California Office of Emergency Services (OES) in the commission of a GIS system appeared to serve the emergency response and planning needs of the agency admirably. It enabled data to be collated, analysed and distributed which in turn improved the ability of the authorities to co-ordinate the response and to focus on the hardest hit areas.

In addition, the earthquake proved the value of seismic strengthening and mitigation measures in reducing deaths and injuries to a very small fraction of the affected population. Current building codes focus on saving lives, but this does not reduce the economic and social costs to a community. The economic costs of better seismic protection are high, and the issue of how much building codes should address the economic consequences of earthquakes has led to considerable debate. The public is not always willing to invest in costly mitigation measures that are essentially long-term, when the likelihood of residential occupation is short-term. This risk debate cannot be restricted to the engineers and code developers, and society at large must participate in assessing the costs and benefits of better seismic protection. In addition, the earthquake demonstrated the vulnerability of some of these building types. Most of the structures affected by the earthquake were constructed in the last three decades and were considered to be earthquake resistant, but not all buildings proved resistant. This has led to improved seismic building codes and highlighted the need for a modern standardised building code.

The probability of another Northridge earthquake, with a similar or greater scale of losses, appears to be high. Yet federal and state governments are keen to shift the responsibility for disaster relief, and funding is unlikely to be equally generous next time. Insurers have grown wary - as the increased premium rates and reduced coverage offered by the California Earthquake Authority indicate - and earthquake insurance is no longer as widely carried by the public as before. Who will bear the costs of the next Northridge earthquake? Will it be the federal government? The state government? The private insurers? Or the disaster victims? The likelihood is that it will be the latter, but this will result in clear political, economic and social costs. The situation becomes more complex as the percentage of society vulnerable to natural disaster increases. There is no simple solution to this problem, and the result will probably be a trade-off between political, economic and social factors. The issue this trade-off raises is one that only society at large can make.

*"With few exceptions, the country's catastrophe strategy has been to stay lucky. It has worked, in an era of infrequent catastrophes, smaller populations and exposures. But it cannot work forever and, will not work where increased populations and exposures are a fact of life."* [141]

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# Active Faults in the Los Angeles Metropolitan Region

Southern California Earthquake Center Group C*

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## Introduction

Group C of the Southern California Earthquake Center was charged with an evaluation of earthquake fault sources in the Los Angeles Basin and nearby urbanized areas based on fault geology. The objective was to determine the location of active faults and their slip rates and earthquake recurrence intervals. This includes the location and dip of those faults reaching the surface and blind faults that are expressed at the surface by folding or elevated topography.

Slip rate determinations are based on several timescales. The tectonic regime of the Miocene was generally extensional, and the north-south contractional regime came into being in the early Pliocene with the deposition of the Fernando Formation (Wright, 1991; Yeats and Beall, 1991; Crouch and Suppe, 1993). The longest timescale for slip-rate estimates, then, is the time of imposition of the north-south contractional regime, the past $5 \times 10^6$ years. Another timescale is the early and middle Quaternary (~ $2 \times 10^6$ years), the time of deposition of the upper Pico member of the Fernando Formation plus the shallow-marine to nonmarine San Pedro Formation. Information for the first two timescales is derived from the subsurface using oil-well and water-well logs, multichannel seismic profiles, and surface geology. A third timescale is the late Quaternary ($10^2$-$10^5$ years), information for which is obtained through trench excavations, boreholes, and high-resolution seismic profiles and ground-penetrating radar augmented by the 232-year-long record of historical seismicity in the Los Angeles area. The shortest timescale (10 yrs) is that afforded by repeated GPS observations.

The late Quaternary rate is the most representative long-term rate in forecasting future behavior because it provides a geologically- and statistically-significant averaging time but is unlikely to be contaminated by Pliocene and early Pleistocene geologic processes no longer active today. Two examples illustrate this problem. (1) The post-Miocene slip rate on the Las Cienegas blind fault was estimated as 2.1-2.3 mm/yr by Schneider et al. (1996) based on Fernando and San Pedro growth strata, but only as 0.09-0.13 mm/yr by Ponti et al. (1996) based on thickness changes of late Quaternary strata between the upthrown and downthrown blocks of the Las Cienegas fault. (2) The late Quaternary displacement on the Whittier fault is almost purely by strike slip (Rockwell et al., 1992), yet the total lateral displacement is too small to be expressed in offset facies changes of members of the Miocene Puente Formation (Bjorklund and Burke, in review).

The late Quaternary rate may be different from the rate based on GPS observations. For example, the GPS rate across the Eastern California Shear Zone (Sauber et al., 1994; Thatcher et al., 1999; Miller et al., 2001; Dixon et al., 2000) is considerably higher than the late Quaternary geologic estimates. In California, similar differences between GPS and geology may occur on the Garlock fault. In this instances, the GPS rate may not be steady state but may represent a short-term strain transient.

This report summarizes the evidence for slip rates across faults of the Los Angeles metropolitan region and calculates the north-south component of shortening to compare with the convergence rates of about 4.4 mm/yr between downtown Los Angeles and the San Gabriel Mountains based on GPS (Bawden et al., 2001). The references are largely those that summarize recent SCEC-supported work, and they should be consulted for earlier references such as Hoots (1931), Yerkes et al. (1965), Ziony (1985), and Wright (1991) that made important contributions to an understanding of active faulting in Los Angeles.

**Transverse Ranges Southern Boundary Fault System**

**Santa Monica fault**

The Santa Monica fault is part of the Transverse Ranges Southern Boundary fault system, a west-trending system of reverse, oblique-slip, and strike-slip faults that extends for more than 200 km along the southern edge of the Transverse Ranges (Dolan et al., 1997, 2000a). Other faults in this system, included in this review, are the Hollywood and Raymond faults. The Anacapa-Dume, Malibu Coast, Santa Cruz Island, and Santa Rosa Island faults to the west are also part of this system, but are not included in this report.

The Santa Monica fault extends east from the coastline in Pacific Palisades through Santa Monica and West Los Angeles and merges with the Hollywood fault at the West Beverly Hills Lineament in Beverly Hills, west of the crossing of Santa Monica Boulevard and Wilshire Boulevard, where its strike is northeast. The surface expression of the fault is a series of left-stepping en échelon, south-facing scarps with an overall southward-convex map pattern. Onshore, the fault offsets the surface 2-3.5 km south of the Santa Monica Mountains range front; the range front itself is marked by the inner edge of the Stage 5e marine terrace (Dolan et al., 2000a). Accordingly, the fault traverses alluvium that allows the Quaternary history of the fault to be characterized based on geomorphology, stratigraphy, and seismic reflection characteristics (Dolan and Pratt, 1997; Dolan et al., 2000a).

Uplift of an alluvial-fan surface north of the fault requires a reverse-slip rate of ~0.5 mm/yr (Dolan and Pratt, 1997). The inner-edge altitude of the Stage 5e marine terrace at Potrero

Canyon in Pacific Palisades requires an overall uplift rate of 0.6-0.7 mm/yr and a reverse-slip rate on the fault of about 0.6 mm/yr (McGill, 1989; Dolan et al., 2000a).

A trench excavation on the grounds of the Veteran's Administration hospital at Sawtelle (here called the VA trench), west of I-405, supplemented by a high-resolution seismic profile (Dolan and Pratt, 1997), provided evidence for at least six surface ruptures in the past 50 ky, and at least two and probably three events after the burial of a prominent paleosol dated as 16-17 ka (Dolan et al., 2000a). According to these authors, a well-documented surface rupture occurred between10 and 17 ka, although a more recent earthquake probably occurred in the vicinity of the trench 1-3 ka. This leads to an average earthquake recurrence interval of 7-8 ky, which is much longer than the ~1.9-3.3 ky recurrence interval for earthquakes of $M_w$ 6.9-7.0 that would be expected if the entire Santa Monica fault ruptured at once. The longer recurrence interval may be explained by the Santa Monica fault rupturing along with other faults to the west (Anacapa-Dume fault) or east (Hollywood fault), resulting in greater slip per event.

In the subsurface, the active Santa Monica fault is shown to be the youngest of several faults, the oldest of which sustained major left-lateral strike-slip of basement rocks and Eocene strata prior to the deposition of alluvial strata south of the range front (Yeats, 1968; Tsutsumi, 1996; Tsutsumi et al., 2001). The South strand of the Santa Monica fault underwent normal separation in the late Miocene as documented by a thick sequence of Mohnian strata north of the fault relative to a thinner sequence to the south. The separation changed to south side down in the Delmontian and continued through the deposition of the Fernando Formation. The South strand cuts strata as young as the Middle Pico Member of the Fernando Formation. Thickness differences in the Upper Pico Member indicate that the South strand continued to be active as a blind fault throughout the deposition of the Upper Pico (age 2.5-0.9 Ma, Tsutsumi et al., 2001). The Quaternary San Pedro Formation shows no variation in thickness across the upward projection of the South strand, evidence that it post-dates this strand.

The out-of-sequence North strand of the Santa Monica fault underwent all of its dip separation of 180-200 m during and after deposition of the San Pedro Formation, or in the last ~1 my (D, Ponti in Hummon et al., 1994). If the 0.6 mm/yr dip separation rate characterizes the entire history of the fault, then the North strand of the fault became active at about 300 ka (Dolan et al., 2000a).

The Santa Monica fault has not yielded direct evidence for its strike-slip rate. Evidence for left-lateral strike slip includes the left-stepping pattern of en-échelon faulting, numerous small strike-slip faults in the VA trench (Dolan et al., 2000a), and left-lateral stream offsets on the Malibu Coast fault north of Point Dume (Drumm, 1992; Treiman, 1994). The abrupt changes of dip with depth: steep close to the surface, low-angle at depth (Tsutsumi et al., 2001), suggest a major component of strike slip, possibly a flower structure, with the high-angle strike-slip fault beneath the range front at depth. Treiman (1994) estimated that the strike-slip rate north of Point Dume is currently < 0.5 mm/yr, diminished from a longer-term Quaternary rate of up to 2 mm/yr.

**Santa Monica Mountains blind thrust**

Davis and Namson (1994) suggested on the basis of a balanced cross section that the Santa Monica Mountains are uplifted along a north-dipping blind thrust with a slip rate of 3.9-5.9 mm/yr over the past 2-3 my. However, Johnson et al. (1996) indicated that this blind fault has a slip rate < 1 mm/yr based on the uplift of marine terraces along the Malibu coast. The 120-ka terrace at Point Dume and Pacific Palisades is being uplifted at a rate of 0.1-0.2 mm/yr (Dolan et al., 2000a). Uplift of the footwall block of the Santa Monica fault at Potrero Canyon (McGill, 1989) is taking place at a rate of < 0.2 mm/yr along the coast (Dolan et al., 2000a). Meigs et al. (1999) show that the south flank of the Santa Monica Mountains has been uplifted over the past several million years at an average rate of 0.5 +/- 0.4 mm/yr, and the north flank has been uplifted at a rate of 0.24 +/- 0.1 mm/yr.

It is unclear if the Santa Monica fault and the blind thrust are the same fault, or if the two faults represent strain partitioning. If the 0.6 mm/yr dip-slip rate is the same as that on the blind thrust, then north-south shortening on the entire structure is 0.4 mm/yr (Dolan et al., 2000a).

**Hollywood fault**

The Hollywood fault extends ENE for a distance of 14 km through Beverly Hills, West Hollywood, and Hollywood to the Los Angeles River and Interstate 5. It is truncated on the west by the NNW-striking West Beverly Hills Lineament (WBHL), which marks a left step of 1.2 km between the Santa Monica fault and Hollywood fault (Dolan et al., 2000a). The lineament, located in Beverly Hills immediately east of the Los Angeles Country Club, is on trend with, and may be the northwest continuation of the Newport-Inglewood fault. The WBHL is a topographic scarp separating highly-dissected older alluvium to the west from young alluvium of the Beverly Hills plain to the east (Dolan et al., 2000a). Subsurface well control shows that the WBHL has normal separation, with its east side down (Tsutsumi et al., 2001).

The Hollywood fault is marked by a steep gravity gradient (Chapman and Chase, 1979) that extends to and beyond the Los Angeles River in the direction of the Raymond fault. However, the Hollywood fault has not been documented as a young fault even as far east as the Los Angeles River, although a south-facing slope in alluvium north of Los Feliz Boulevard may have been produced by a strand of that fault (Dolan et al., 1997; J.F. Dolan, in prep.). A bedrock fault between Mesozoic granitic rocks and Miocene strata south of Los Feliz Boulevard and west of Interstate 5 is probably the Hollywood fault, but evidence for late Quaternary activity has not been found there (Dolan et al., 1997).

Subsurface evidence for late Quaternary faulting is found in Hollywood, including a borehole transect along Cahuenga Boulevard and trenches and borehole transects at La Brea Avenue, Fuller Avenue, Camino Palmero Avenue, and Vista Street, with the clearest evidence for timing at the Camino Palmero borehole transect (Dolan et al., 1997; 2000b). The most recent faulting at Camino Palmero occurred after deposition of ~9 ka sediments and prior to deposition of sediments dated as ~6 ka (Dolan et al., 1997; 2000b). However, a pronounced ground-water barrier at Highland Ave, between La Brea Avenue and Cahuenga Boulevard, suggests that steeply north-dipping faults extend upward into late Holocene deposits there (Lindvall et al., 2001). The fault dips northward 70°-85° at Camino Palmero based on shear fabric in the fault zone and 60°-70° north dips at the Metrorail subway tunnel between Fuller and La Brea avenues. Quartz diorite is consistently on the north side, faulted against Quaternary alluvium, but at Camino Palmero, separation of soil horizons shows north-side-down separation, suggestive of an unknown component of strike slip (Dolan et al., 1997; 2000b).

Based on sediment accumulation rates determined by radiocarbon dating, the dip separation rate is slow, but is at least 0.075 mm/yr. The narrow Hollywood Basin, filled by Quaternary deposits parallel to and south of the Hollywood fault, contains strata as old as 0.8-1.2 Ma (D. Ponti in Hummon et al., 1994). Dolan et al. (1997) estimate that the strike separation rate on the Hollywood fault is greater than 0.25 mm/yr.

The Hollywood Basin was modeled as the backlimb of a blind thrust generating the Wilshire arch, the axis of which generally follows Wilshire Boulevard (Hummon et al., 1994). However, Tsutsumi et al. (2001) suggest that the Hollywood Basin is a pull-apart basin related to the left step between the Santa Monica and Hollywood faults. Not only is the WBHL characterized by normal separation, but the southern boundary of the basin is the North Salt Lake normal-separation fault of Wright (1991) and Schneider et al. (1996), a fault that is parallel to the Hollywood fault. The thickness of shallow-marine Quaternary San Pedro Formation is greater in the Chevron Laurel Core Hole in the western part of the Hollywood Basin than it is in the central Los Angeles trough (Hummon et al., 1994; Schneider et al., 1996). A pull-apart origin of the Hollywood basin strengthens the case for left-lateral strike slip on the Hollywood fault, although the slip rate is as yet unknown.

In Hollywood, where the fault was studied in detail by Dolan et al. (1997; 2000b), the active fault is close to the Santa Monica Mountains range front. Farther west, however, near the intersection of Sunset and La Cienega boulevards in West Hollywood, the active fault lies near the base of a pronounced south-facing alluvial apron along the mountain front (Dolan et al., 1997; Lindvall et al., 2001). Several south-dipping and north-dipping normal faults displace a marine abrasion platform overlain by marine sands that are estimated as 400-900 ka in age (Lindvall et al., 2001). Unfaulted soil horizons >100 ka in age provide an upper bound to the age of most of these hangingwall faults. The alignment of bedrock outcrops along a topographic scarp at Sunset Boulevard, previously assumed to be the active trace of the fault, is apparently a Pleistocene beach cliff; the active fault trace must lie farther south (Lindvall et al., 2001). These authors compare the altitudes of the 400-900-ka hangingwall terrace in West Hollywood to the Pleistocene marine terrace identified by Quinn et al. (2000) south of the fault in La Brea Plain, and they conclude that the differential uplift rate across the Hollywood fault is less than 0.14 mm/yr.

**Raymond fault**

The Raymond fault extends 25 km from the Los Angeles River east of Griffith Park east to east-northeast across the San Gabriel Valley through South Pasadena, Pasadena, San Marino, Arcadia, and Monrovia to a junction with the Sierra Madre fault at the foot of the San Gabriel Mountains. A sharp gravity gradient connects the western end of the Raymond fault across the Los Angeles River floodplain with the eastern end of the Hollywood fault, but this connection is not confirmed by geological evidence except for local air-photo lineations. The fault is convex southward, consisting of a western section that strikes east-west and an eastern section that strikes east-northeast. Left-deflected drainages, shutter ridges, sagponds, and pressure ridges in right-stepping restraining bends indicate that the Raymond fault is predominantly a left-slip fault (K. Sieh in Jones et al., 1990), although south-facing scarps along the central reach of the fault indicate a component of dip slip due to motion around a 25° restraining bend (Crook et al., 1987; Weaver and Dolan, 2000). One kilometer west of the change in strike, the Raymond fault has a poorly-defined intersection with the Eagle Rock fault. The Eagle Rock fault is much more poorly defined geomorphically than the Raymond fault, suggesting that it is less active, hence the kinematics of the fault intersection remains obscure. The Raymond fault joins the Sierra Madre fault south of Santa Anita Wash and south of the Clamshell-Sawpit fault in the foothills of the San Gabriel Mountains (Weaver and Dolan, 2000) on which the 1991 Sierra Madre earthquake of $M_W$ 5.8 occurred (Hauksson, 1994). The 1988 Pasadena earthquake of $M_L$ 4.9 probably occurred on the Raymond fault based on the fault-plane solution of the mainshock and the distribution of aftershocks (Jones et al., 1990); this earthquake sequence delineated a fault dipping 80° north.

Trenches excavated by Crook et al. (1987) and Weaver and Dolan (2000) show that the most recent earthquake occurred 1000-2000 years ago (Weaver and Dolan, 2000). Between 5 and 8 earthquakes occurred between 40 and 2 ka, a maximum average recurrence interval of 5.7 to 10 k.y. (Crook et al., 1987; Weaver and Dolan, 2000). Between 3 and 5 of these events occurred between 41.5 and 31.5 ka, an average recurrence interval equal to or less than 3300 yrs (Weaver and Dolan, 2000). This may indicate a cluster of earthquakes, or it may signify undetected events.

A site in east Pasadena yielded a best-estimate left-lateral strike-slip rate of 4 +1/-0.5 mm/yr based on left offset of a gravel-filled channel of 44 m, with 0.5 m vertical component. This rate is based on sediments within and below the channel dated by radiocarbon and by optically-stimulated luminescence (Marin et al., 2000; Dolan et al., in review). An apparent 3.4-km left-lateral offset of a crystalline basement ridge at the east end of the fault may represent the total slip on the fault (Weaver and Dolan, 2000).

## Santa Susana and Sierra Madre Fault Systems

The western Transverse Ranges are crossed obliquely by a set of north-dipping reverse faults extending from the Santa Barbara Channel east to an intersection with the San Jacinto fault near Cajon Pass. These faults include, from west to east, the Red Mountain, San Cayetano, Santa Susana, Sierra Madre, and Cucamonga faults. The San Cayetano and Santa Susana faults have the highest documented long-term reverse slip rates in southern California. The Santa Susana and Sierra Madre faults are within the Los Angeles metropolitan area and are described here. The San Gabriel fault is characterized by Quaternary reverse-oblique slip in the east Ventura basin; it traverses the foothills of the San Gabriel Mountains north of the San Fernando Valley and is also described here, even though its long-term history is predominantly that of a strike-slip fault.

### Santa Susana fault

The Santa Susana fault extends 28 km west-northwest from the northwest edge of the San Fernando Valley into Ventura County and is at the surface high on the south flank of the Santa Susana Mountains. The fault ends near the point where it overrides the south-side-up South strand of the Oak Ridge fault. The fault has a low dip near the surface, locally becoming horizontal. This may in part be due to a distortion of the stress field by the steep topographic gradient on the southern slope of the Santa Susana Mountains (Butler, 1977) as well as to uplift from a blind, south-dipping fault, part of the Oak Ridge fault system (described below).

The fault has two left-stepping lateral ramps (Yeats, 1987). The Gillibrand Canyon ramp on the west is the smaller of the two but is the best documented by subsurface geology. The Pliocene Frew fault (Yeats, 1987) ends or changes strike westward to another fault, also named the Frew fault of the Santa Susana and Tapo Canyon oil fields, and the pre-Saugus Torrey fault also changes strike there, indicating that this ramp influenced Pliocene structures in the Santa Susana footwall (Yeats, 1987). The east Ventura Basin fold belt changes its structural character across a northeast projection of this lateral ramp (Yeats, 1987), leading Yeats et al. (1994) to call it a segment boundary. The ramp had an effect on the distribution of aftershocks of the Northridge earthquake of 1994. The zone of major moment release in the 1994 earthquake was southeast of the Gillibrand Canyon ramp (Wald et al., 1996). Immediately southeast of the ramp, a zone of 1994 aftershocks "lit up" the Santa Susana fault (Pujol, 1996, cross section A-A' of his fig. 4). Northwest of the ramp, aftershocks in the Santa Susana footwall defined rupture planes that are more steeply dipping than they are southeast of the ramp. (See website of Sara Cavena, geoweb.princeton.edu/students/Cavena/ImageGallery/ImgGallery.html)

The larger ramp at the western edge of the San Fernando Valley is called the San Fernando or Chatsworth ramp (Yeats, 1987; Yeats et al., 1994); this ramp may be influenced by the Miocene Chatsworth set of faults marking the western margin of the San Fernando Valley (Tsutsumi and Yeats, 1999; Yeats, 2001a). The mainshock and a large number of the aftershocks of the 1971 Sylmar (San Fernando) earthquake were located on or close to this ramp; focal mechanisms showed a large component of left slip (Whitcomb et al., 1973). However, the rupture plane of the 1994 earthquake as defined by aftershocks went across this ramp.

The Pico Canyon earthquake of 4 April 1893, of M 5.5-5.9 (Toppozada, 1995), which might have occurred on the Santa Susana fault, caused damage in Newhall, Saugus, Castaic, and the now-vanished oil town of Mentryville (Richter, 1973), in addition to Los Angeles, Pasadena, and Fillmore.

The Santa Susana fault cuts the Quaternary Saugus Formation, and clasts in the Saugus contain evidence for the age of uplift of the Santa Susana Mountains. Most of the Saugus at Horse Flats, south of the Aliso Canyon Oil Field in the Santa Susana Mountains, contains conglomerate clasts largely derived from basement rocks of the San Gabriel Mountains and other crystalline ranges, evidence for deposition prior to uplift of the Santa Susana Mountains (Saul, 1975). In contrast, conglomerate in the uppermost Saugus of Saul (1975) at Horse Flats is dominated by locally-derived Modelo and Towsley clasts, evidence of uplift of the Santa Susana Mountains, presumably by upward movement of the hangingwall of the Santa Susana fault. Similar relations are found on the north side of the range near Magic Mountain amusement park (Treiman and Saul, 1986; Levi and Yeats, 1993, their fig. 3), where the deformed, locally-derived Saugus is called Pacoima Formation, following Oakeshott (1958). Paleomagnetic stratigraphy by Levi and Yeats (1993) permits the estimation of the ages of the base of the Saugus Formation, of the appearance of locally-derived clasts in the Saugus, and of the top of the Saugus as 2.3 Ma, 600-700 ka, and 500 ka, respectively. The age of initiation of the Santa Susana fault is thus constrained to have begun between 2.3 Ma and 600 ka (Huftile and Yeats, 1996).

The total dip-slip displacement on the Santa Susana fault is based on the offset of the base of the Fernando Formation in a balanced cross section (Huftile and Yeats, 1996). The displacement is 4.9 to 5.9 km, giving a dip-slip rate of 2.1 to 9.8 mm/yr. The horizontal component of displacement is 4.1 km, giving a horizontal shortening rate of 5.7 +/- 2.5 mm/yr (Huftile and Yeats, 1996).

An additional constraint on the age of initiation of the Santa Susana fault is based on the age of initiation of clockwise rotation of the Saugus Formation in its hangingwall at Magic Mountain. Most of the Saugus in the Magic Mountain section is rotated clockwise approximately 30°, whereas the Van Norman Dam section in the footwall of the Santa Susana fault is not rotated at all (Levi and Yeats, 1993). The uppermost part of the Magic Mountain section is rotated only about 15°, and the age of initiation of rotation of the Saugus Formation can be estimated at about 1 Ma (Levi and Yeats, 1993; S. Levi and R.S. Yeats, in prep.). If the rotation is evidence that the displacement on the Santa Susana hangingwall is not a translation but a rotation about a pivot point at the Santa Susana fault tip, then the age of initiation of the fault can be estimated as 1 Ma. Using 1 Ma to accumulate 4.9 to 5.9 km of displacement, the long-term slip rate is 4.9-5.9 mm/yr, and the horizontal shortening rate is about 4.1 mm/yr (S. Levi and R.S. Yeats, in prep.).

A trench across the fault at Limekiln Canyon at the northern edge of Horse Flats yielded no evidence of Holocene displacement (Lung and Weick, 1987). However, this trench was across the Older strand of the Santa Susana fault, which has been abandoned for the Younger strand within the Santa Susana Mountains (Yeats, 1987). Lung and Weick (1987) also exposed the fault in a sidehill cut near Tapo Canyon, west of the Gillibrand Canyon lateral ramp; this trench also yielded no evidence for Holocene rupture. As mapped by Ricketts and Whaley (1975) and Yeats (1977; cf. fig. 9.2 of Yeats, 1987), the Santa Susana fault is a single strand bringing Miocene Modelo Formation over Saugus Formation and late Quaternary fan deposits containing debris from the hangingwall. Fan deposits unconformably overlying the fault were undated, but are considered to be Pleistocene because they are extensively dissected by erosion. In a nearby flat-bottomed canyon, older alluvium interpreted by Lung and Weick (1987) as younger than these fan deposits includes peat with an age of 10,010 +/- 580 radiocarbon years. These results appear to be inconsistent with the high long-term slip rate on the Santa Susana fault and with the high north-south shortening rate based on GPS (Argus et al., 1999). Possibly the Holocene displacement is distributed among north-dipping bedding planes in bedrock in the hangingwall, but this cannot be confirmed. Because the Santa Susana fault crops out on the steep southern slopes of the Santa Susana Mountains rather than at the base of the range, age-diagnostic trenching sites are difficult to find, as pointed out by Lung and Weick (1987).

**Sierra Madre fault (west)**

The Santa Susana fault strikes northeast at the Fernando lateral ramp and turns east at the northern margin of the Sylmar Basin to become the Sierra Madre fault. This fault is exposed near the base of the San Gabriel Mountains for 75 km from San Fernando Pass at the Fernando lateral ramp east to its intersection with the San Antonio Canyon fault in the eastern San Gabriel Mountains (Crook et al., 1987), east of which the range front is formed by the Cucamonga fault. Exhumation of the San Gabriel Mountains began about 7 Ma based on fission-track and (U-Th)He geochronology; this may date the time of initiation of the Sierra Madre fault (Blythe et al., 2000). We describe the Sierra Madre fault in two sections, with their boundary the intersection of the Sierra Madre fault with the Raymond and Clamshell-Sawpit faults. A short distance west of this intersection, the Vasquez Creek fault (the Southern strand of the San Gabriel fault of Ehlig, 1975) intersects the Sierra Madre fault at a low angle to strike. East of this intersection, the Sierra Madre fault, like the Cucamonga fault farther east, is a zone of deformation close to the base of the San Gabriel Mountains. To the west, however, the Sierra Madre fault is the northernmost of several north-over-south faults including the Mission Hills, Verdugo, and Northridge Hills faults, all of which appear to be active.

The Sierra Madre fault differs from the Santa Susana fault in that it lies at the base of the range, whereas the Santa Susana fault crops out high on the south slopes of the Santa Susana Mountains. It differs also in its complexity, including a series of boomerang-shaped faults characterized by a west-northwest-striking section of reverse slip and a northeast-striking section of apparent left slip (Oakeshott, 1958). These include the Lopez-Limerock and Sunland faults and possibly the Buck Canyon-Watt faults of Oakeshott (1958). The Saugus Formation in Kagel Canyon and Lopez Canyon is rotated clockwise approximately 34° (Levi and Yeats, 2001), suggesting that these boomerang-shaped blocks are rotating clockwise in a broad system of right-lateral shear related to the San Gabriel fault a short distance to the north (S. Levi and R.S. Yeats, in prep.). It is more difficult to determine the slip and slip rate of a rotating block because these rates would increase from zero at the pivot point to a maximum at the edge of the block. Furthermore, the rotations pertain only to slip rates over the past million years; these faults are not known to have tectonic geomorphic expression or to offset late Quaternary deposits younger than Saugus. Electron-spin resonance plateau dating of fault gouge shows that the most recent movement on the Limerock fault took place at 346 +/- 23 ka (Lee and Schwarcz. 1996).

Crook et al. (1987) concluded that the Sierra Madre fault between the 1971 San Fernando earthquake rupture and the Cucamonga fault is less active than segments to the east and west, based on degree of dissection of fault scarps and the relative age of fan surfaces cut by the fault based on geomorphology and soil development. Following criteria established by Bull (1964), Crook et al. (1987) noted that alluvial fan heads in the vicinity of the 1971 earthquake, such as the Pacoima and Little Tujunga Canyon fans, are incised to a lesser degree and hence are more active than the Arroyo Seco and Eaton Canyon fans in the Pasadena area farther east. A minimum long-term slip rate on this westernmost part of the fault can be obtained from the intersection of the base of the Saugus, which is 2.3 Ma in age, with the fault at the northern edge of the Sylmar basin. This intersection is at least 5 km below the surface, a minimum slip rate of 2.2 mm/yr. The rate would be larger depending on how much erosion of basement rocks had taken place in the hangingwall after deposition of the Saugus.

In that part of the Sierra Madre fault east of the 1971 earthquake rupture, Crook et al. (1987) were unable to identify any fault scarps or displaced strata involving sediments younger than late Pleistocene, and they concluded that this section of the fault had not produced large earthquakes in several thousand years and possibly not in the Holocene. Rubin et al. (1998) trenched a site in Altadena and found evidence that the most recent earthquake there had occurred in the past 10,000 years. Two earthquakes in the past 18,000 years had resulted in 10.5 m of slip, a minimum slip rate of 0.6 mm/yr. Displacements on these two earthquakes are large enough that Rubin et al. (1998) concluded that they were produced by earthquakes of M 7.2 to 7.6, much larger than the M 6.7 Sylmar earthquake of 1971 involving the western end of the fault.

The north-dipping rupture plane defined by aftershocks of the 1971 earthquake is probably the Sierra Madre fault at depth (Mori et al., 1995; Tsutsumi and Yeats, 1999). But the Sierra Madre range-front fault east of Big Tujunga Canyon did not rupture at the surface (Barrows, 1975; Kahle, 1975; Weber, 1975). The fault plane delineated by 1971 aftershocks passes south of the Sierra Madre fault in the direction of active reverse faults to the south: the Mission Hills and Northridge Hills fault (Mori et al., 1995; Tsutsumi and Yeats, 1999).

**Mission Hills fault**

The Mission Hills fault strikes east-west for about 9 km along the southern edge of the Mission Hills and Granada Hills, which are apparently uplifted by long-term reverse displacement of the hangingwall of this fault. The fault is mapped eastward to the eastern end of the hills near the Golden State Freeway, where it appears to turn southeastward toward the Verdugo fault (Tsutsumi and Yeats, 1999). The fault branches westward into two strands. The northern strand dips 60°-70° north in the Mission Oil Field and juxtaposes Modelo Formation against Fernando Formation. The southern strand extends along the base of the Santa Susana Mountains to Limekiln Canyon, where it brings upper Saugus on the south against lower, marine Saugus on the north. The fault may be linked with the Devonshire fault. Tsutsumi and Yeats (1999) argue that this fault does not join the Simi fault of the Simi Valley, as some maps have done.  The active, north-side-up Simi fault ends where its geomorphic expression ends at the northeastern corner of the Simi Valley (Hanson, 1983).

Dip separation of the base of the Saugus Formation across the Mission Hills fault yields a dip separation rate of 0.6-0.7 mm/yr.  The thickness of the Fernando Formation is about the same on both sides of the fault, indicating that slip began after Fernando deposition (Tsutsumi and Yeats, 1999).

Balboa Boulevard follows Bull Canyon, a drainage antecedent to Mission Hills uplift that is now filled with alluvial-fan deposits, some of which developed a large lateral spread during the 1994 earthquake (Holzer et al., 1999).  CPT borings show that unfaulted Holocene sediments overlie a fault, considered by R.S. Yeats to be the Mission Hills fault, near Rinaldi Street at the southern edge of the Mission Hills based on a ground-water cascade and stratigraphic changes across the fault (Holzer et al., 1999).  A slip rate on the fault could not be determined because the fault was not directly observed in the field.

**Northridge Hills fault**

A series of discontinuous low hills that extend from near the town of Chatsworth east-southeast to the San Diego Freeway marks the crest of a south-vergent  fault-propagation fold above the blind, north-dipping, 15-km-long Northridge Hills thrust (Tsutsumi and Yeats, 1999). Well data in the western part of the fault show a dip of 70 degrees, but farther east, growth triangles in a seismic profile along Balboa Boulevard show that the fault is thin-skinned, with a moderate dip.  Dip separation across the fault of a sandstone within the Miocene Modelo Formation gives a long-term dip separation rate as high as 0.3 mm/yr.

Baldwin et al. (2000) excavated a trench, several test pits, and  several boreholes across a 2-m-high scarp on a probable Holocene terrace adjacent to Aliso Canyon Wash.  A gravel bed with a soil age estimate of 6 to 30 ka shows 6 +/- 1 m vertical separation, and an unconformity on the top of the Saugus Formation is warped into a monocline with 13 +/- 2 m of relief.  These relations provide a reverse-slip rate of 1.0 +/- 0.7 mm/yr on the blind Northridge Hills thrust (Baldwin et al., 2000).

The fault has no topographic expression east of the San Diego Freeway, where its presence is based on subsurface oil-well data (Tsutsumi and Yeats, 1999) and a steep gradient in the groundwater table (Weber et al., 1980).  The fault intersects and either merges with or is truncated by the Verdugo fault at the Pacoima Oil Field (Tsutsumi and Yeats, 1999).

**Verdugo fault**

Both the Mission Hills and Northridge Hills faults appear to merge with the southeast-striking Verdugo fault, which lies on the southwest side of the Pacoima Hills and the Verdugo

Mountains. Vertical separation across this fault is at least 1000 m based on the structural relief between the valley floor and the crest of the Verdugo Mountains and the intersection of the base of the Saugus Formation with the fault in the Pacoima Oil Field (Tsutsumi and Yeats, 1999). The fault at the southwest edge of the Verdugo Mountains is marked by a pronounced gravity gradient (Weber et al., 1980) that is best modeled as a normal-separation fault (Langenheim et al., 2000). Pujol et al. (2001) , using seismic tomography, image the Verdugo fault with a nearly vertical dip. Adjacent to the Pacoima Hills, however, the gravity gradient is more consistent with a thrust-fault geometry (Langenheim et al., 2000), an interpretation supported by subsurface oil-well data around the Pacoima Oil Field (Tsutsumi and Yeats, 1999).

Weber et al. (1980) reported southwest-facing scarps 2-3 m high in alluvial-fan deposits in the Burbank-west Glendale area. In the Sun Valley area, they found minor faults 40 m below the surface in sand and gravel deposits in a gravel pit. Also in Sun Valley, groundwater-bearing alluvial deposits of Big Tujunga Wash are displaced, and in Glendale, there is a groundwater cascade in Verdugo Wash.

The Verdugo fault is on trend to the southeast with the Eagle Rock fault, but Weber et al. (1980) were not able to find evidence of late Quaternary offset. Weaver and Dolan (2000) observed that the Eagle Rock fault, especially its southeastern reach, is much more subdued geomorphically than the Raymond fault farther south.

**San Fernando fault**

The 1971 Sylmar (San Fernando) earthquake produced about 15 km of surface rupture south of the Sierra Madre fault (Sharp, 1975; Barrows, 1975; Weber, 1975); this rupture became known as the San Fernando fault. Slip vectors showed about equal amounts of reverse slip, north side up, and left-lateral strike slip, with the horizontal component of net slip as large as 2.5 m (Sharp, 1975). The Tujunga segment of the San Fernando fault occurred at the range front, evidence of pre-1971 faulting. Trench excavations also showed that the 1971 rupture followed older, prehistoric ruptures (Heath and Leighton, 1973). Bonilla (1973) reported that the most recent prehistoric rupture occurred less than 200 years prior to 1971, although the sample providing the radiocarbon date might be historic. Fumal et al. (1995) excavated trenches on both side of Bonilla's trench and found evidence for only two surface ruptures in the past 3.5-4 ky, including the 1971 break.

Tsutsumi and Yeats (1999, their figs 4f, 4g, and 7) showed that the San Fernando fault did not follow any major fault zone but occurred on the south flank of the Mission Hills syncline and Merrick syncline. Slip vectors measured by Sharp (1975) were parallel to bedding, and Tsutsumi and Yeats (1999) concluded that the San Fernando fault was a flexural-slip fault, formed during folding of the synclines.

Lindvall et al. (1995) described a set of fault scarps, north side up, near Pacoima Wash in the Sylmar Basin west of the Tujunga segment of the 1971 rupture. These faults, which did not rupture in 1971, offset terraces of Pacoima Wash, with an older terrace covered by soils estimated to be 20-30 ka and a younger terrace with a soil age estimated as 8-15 ka. The height of the fault scarps gives a minimum reverse-separation rate of 1 mm/yr across this zone of faulting If these faults are secondary to a master fault dipping 45° north (a non-flexural-slip origin), the master fault would have a reverse-slip rate of 2 mm/yr.

**Sierra Madre fault (east)**

The Sierra Madre fault lies at or south of the range front of the San Gabriel Mountains east of its intersection with the Raymond and Sawpit-Clamshell faults (Crook et al., 1987), passing through the cities of Arcadia, Monrovia, Bradbury, Duarte, Azusa, Glendora, San Dimas, and Claremont. This section of the fault terminates eastward at the northeast-striking San Antonio Canyon left-lateral fault, where the Sierra Madre fault steps left to the Cucamonga fault. This left-lateral fault, together with subsurface left-lateral faults that were the source of the 1988 and 1990 Upland earthquakes (Hauksson and Jones, 1991) lead to the assumption that the Cucamonga fault would have a higher dip-slip rate than the Sierra Madre fault, as suggested by their comparative geomorphic expression (Crook et al., 1987). The Cucamonga fault has a dip-slip rate of 2-5 mm/yr (Dolan et al., 1996), which serves as an upper bound to the slip rate on the eastern Sierra Madre fault. The Sierra Madre fault is expressed as a series of southward-convex lobes, and at several localities, the most active strrand is south of the range front, which is itself marked by less-active or inactive older strands (Crook et al., 1987; Tucker and Dolan, 2001).

Crook et al. (1987) located the fault in several trenches, but they were unable to obtain age control because of the lack of availability of AMS radiocarbon dating. Tucker and Dolan (2001) excavated a trench and several large-diameter boreholes in Horsethief Canyon in San Dimas, near the Glendora Tunnel, where extensive geotechnical observations are available. They found evidence for at least 14 m of slip on the Sierra Madre fault between 24 and 8 ka, and no surface rupture since 8 ka. This leads to a minimum slip rate of 0.6 mm/yr since 24 ka and a minimum of 0.9 mm/yr between 24 and 8 ka. Surface rupture at Horsethief Canyon was the result of earthquakes with $M > 7$, consistent with the interpretation by Rubin et al. (1998) of large surface displacements during the two most recent surface ruptures in their trench at Altadena along the western part of the fault. The most likely scenario is that the entire Sierra Madre fault ruptures at the same time (Tucker and Dolan, 2001). The Raymond fault could also rupture during Sierra Madre events, but the Raymond fault has undergone at least one and possibly several ruptures since the most recent rupture at Horsethief Canyon. Similarly, trench data suggest that the Cucamonga fault has ruptured at least twice and possibly several times since the most recent surface rupture on the eastern Sierra Madre fault (Dolan et al., 1996, and in prep.).

**San Gabriel fault**

The San Gabriel fault is the westernmost member of the San Andreas strike-slip fault system to cut across the Transverse Ranges (the others to do so are the San Jacinto fault and the San Andreas fault itself). A precursor fault, the Canton fault, underwent displacement in middle Miocene time and may have crossed the San Fernando Valley to an intersection with the Raymond fault (Powell, 1993; Yeats and Stitt, 2001). This strand was abandoned in the late Miocene, and activity shifted to the present trace of the San Gabriel fault, which crosses the southern foothills of the San Gabriel Mountains to an intersection with the left-lateral San Antonio Canyon fault in the eastern San Gabriel Mountains. The Miocene slip rate on this fault system was 6.6-9.2 mm/yr (Yeats et al., 1994) or even faster (Yeats and Stitt, 2001), but this rate slowed drastically in the Pliocene in the Castaic Lowland and eastward. The fault became inactive in the Ridge Basin, where it is overlain unconformably by the upper part of the Hungry Valley Formation (Crowell, 1982), and the fault is overridden by a south-side-up reverse fault, possibly the eastern extension of the Santa Felicia fault, at the mouth of Violin Canyon (Yeats et al., 1994; Yeats and Stitt, 2001). In both the Ridge Basin and Castaic Lowland, the San Gabriel fault dips moderately to steeply east.

The fault is active east of a segment boundary near the Honor Rancho Oil Field in the Castaic Lowland, an area now largely covered by the city of Santa Clarita. At this segment boundary, the fault changes strike southeastward from southeast to east-southeast and changes separation from normal to the northwest (northeast side down) to reverse to the southeast (northeast side up). The segment boundary is northeast of and on trend with the Gillibrand Canyon lateral ramp on the Santa Susana fault (discussed above). A line connecting these features separates contrasting geologic structures in the east Ventura Basin: the Holser-Del Valle fault system and Newhall-Potrero anticline to the northwest and the Pico anticline and Oat Mountain syncline to the southeast.

The fault has geomorphic expression in Santa Clarita, including linear ridges, trenches, hillside benches, and ponded alluvium along the fault trace (Kahle, 1986). Cotton (1986) showed that the fault cuts Holocene alluvium in trenches near Castaic Junction, and Swanson (2001) found that undated stream terrace material in the fault zone in a railroad cut at Bouquet Junction has a vertical separation of 3 to 5 meters, and an overlying soil zone is offset vertically 1 m. The Pacoima Formation, which overlies the Quaternary Saugus Formation unconformably, has a dip separation of more than 10 m across a secondary reverse fault in this railroad cut

(Swanson, 2001). Distinctive clast assemblages in the Saugus Formation are offset right-laterally about 500 m (Weber, 1982).

If the age of the top of the Saugus Formation is about 500 ka, as estimated from paleomagnetic evidence (Levi and Yeats, 1993), the 500 m of offset would have accumulated at a right-lateral strike-slip rate of 1 mm/yr. Kahle (1986), largely on the basis of geomorphic evidence, estimated the slip rate as less than 1 mm/yr. Yeats et al. (1994) argued for a long-term slip rate of 2.5-3 mm/yr based on reverse separation of the base of the Saugus Formation in the Saugus Oil Field, where dip separation is greatest (Yeats and Stitt, 2001). Estimates of long-term slip rate are larger than those for late Quaternary slip rate, suggesting that the slip rate has slowed with time.

The late Quaternary activity of the San Gabriel fault in the San Gabriel Mountains has not been studied. Electron-spin resonance plateau dating of San Gabriel fault gouge in the Little Tujunga area shows that the most recent movement occurred at 39 +/- 6 ka (Lee and Schwarcz. 1996), although this result is inconsistent with evidence for Holocene displacement farther west in Santa Clarita. The fault splays into a northern and southern branch (Ehlig, 1975), renamed by Powell (1993) the San Gabriel fault *sensu stricto* and the Vasquez Creek fault, respectively. In the eastern San Gabriel Mountains, the San Gabriel fault *sensu stricto* is cut off by the left-lateral San Antonio Canyon fault, suggesting that this is the less active strand. We suggest that the major part of the activity shifts to the Vasquez Creek fault, which merges to the southeast with the Sierra Madre fault. The long-term slip rate on the Vasquez Creek fault, based on offsets of basement rocks, is no more than 5 mm/yr (Powell, 1993), but the Quaternary rate must be much less, based on analogy with the San Gabriel fault farther west (cf. Yeats and Stitt, 2001).

**South-dipping Reverse Faults**

The most damaging earthquake in the history of the United States, the 1994 Northridge earthquake, struck a previously-unknown south-dipping blind reverse fault beneath the eastern Santa Susana Mountains and western San Fernando Valley. Aftershocks of this earthquake terminated updip at the base of the north-dipping 1971 rupture zone (Mori et al., 1995). The Quaternary long-term slip rate on the blind fault was estimated as 1.7 mm/yr (Davis and Namson, 1994; Huftile and Yeats, 1996) based on thickness changes in the Saugus Formation in the Castaic Lowland, a foredeep with respect to the blind fault contributing to uplift of the Santa Susana Mountains and warping of the Santa Susana fault. Only the Saugus Formation appears to have responded to growth of the foredeep (Yeats et al., 1994; Huftile and Yeats, 1996), indicating that faulting began at or after about 2.3 Ma, the age of the base of the Saugus, earlier than the age of initiation of the faster-moving north-dipping Santa Susana fault (Levi and Yeats, 1993; S. Levi and R.S. Yeats, in prep.). The Saugus is even thicker in the Sylmar Basin, which also acted as a foredeep, but a slip rate based on the Sylmar Basin has not been worked out (Tsutsumi and Yeats, 1999).

Small-scale flexural-slip faulting was recognized by Treiman (1995) in Santa Clarita, where bedding slip in folded Saugus Formation broke the surface of building pads in the Stevenson Ranch housing development during the 1994 Northridge earthquake.

The 1994 earthquake uplifted the footwall of the Santa Susana fault , with the maximum coseismic uplift at Oat Mountain in the hangingwall (Hudnut et al., 1996). The Santa Susana fault occurs high on the south flank of the Santa Susana Mountains rather than at the base of the mountains as the San Cayetano fault does, evidence that uplift of the Santa Susana footwall in 1994 was part of the long-term uplift of the footwall in the late Quaternary accompanying earlier earthquakes on the blind south-dipping fault (Yeats and Huftile, 1995). Other faults with footwalls uplifted by blind faults dipping in the opposite direction are the western San Cayetano fault, underlain by the Sisar fault, and the Red Mountain fault, underlain by the Padre Juan fault (Yeats and Huftile, 1995). The correlation between footwall uplift and blind south-dipping reverse fault is not perfect, however. The fault as illuminated by 1994 aftershocks continues east of the Santa Susana Mountains beneath the San Fernando Valley, and the only uplift is that of the Mission Hills, which could also be explained by uplift on the north-dipping Mission Hills reverse fault. Pujol et al. (2001), using seismic tomography, imaged a south-dipping thrust beneath the north-dipping Northridge Hills thrust.

Yeats and Huftile (1995) interpreted the 1994 south-dipping earthquake fault as the eastern blind continuation of the Oak Ridge fault, which reaches the surface in the Ventura Basin. They proposed that the Oak Ridge fault curves from an east-west strike to east-southeast, following changes in strike in the pre-Saugus Frew and Torrey faults. The long-term slip rate on the Oak Ridge fault is 3.7-4.5 mm/yr near the point where the fault is overridden by the Santa Susana fault (Huftile and Yeats, 1996), a rate at least twice as fast as that of the 1994 blind thrust. The cause of the eastward decrease in slip rate is unclear, unless part is taken up by the south-side-up Holser and Del Valle faults in the east Ventura Basin (Yeats et al., 1994; Yeats, 2001). Long-term slip rate on each of these faults is estimated as not more than 1 mm/yr, but this is poorly constrained because the Saugus is eroded away where fault displacements are largest.

Farther east, in the southeastern San Fernando Valley east of Universal Studios, Weber et al. (1980) mapped a sharp photo lineament south of the Los Angeles River close to a sharp gravity gradient. They correlated this structure to the Benedict Canyon bedrock fault of Hoots (1931), which has left separation where it crosses the Santa Monica Mountains and has its north side down farther east along the northern base of the range. At the eastern end of the Santa Monica Mountains, where the Los Angeles River turns to the south, the bottom of the alluvial basin appears to be displaced relatively downward 170 m on the north side, near where faceted spurs have been identified on the flanks of the range. However, Weber et al. (1980) were unable to find evidence that this fault displaces Quaternary deposits; the faceted spurs could be caused by fluvial erosion and not fault displacement.

## Los Angeles fold-and-thrust belt

### Introduction

The M 5.9 Whittier Narrows earthquake of October 1, 1987, occurred on a previously-unrecognized blind thrust fault in the eastern part of the Los Angeles Basin, leading to a paradigm shift in geological understanding of the active tectonics of the basin. This earthquake provided evidence that anticlines housing the great oil fields of the Los Angeles Basin overlie seismogenic source faults. The previous belief had been that Los Angeles is primarily a strike-slip province. The appearance of an earthquake in the Los Angeles Basin with a reverse-fault signature similar to those in the Transverse Ranges led to a reappraisal of the anticlines of the Los Angeles Basin for their earthquake potential. This reappraisal used the tools of the petroleum geologist: oil-well data and seismic profiles, as well as ground-water data (Dept. of Water Resources, 1961) and tectonic geomorphology.

The folds extend from the Newport-Inglewood fault eastward to the Elysian Park, Montebello, Santa Fe Springs, West Coyote, East Coyote, Richfield, and Kraemer anticlines, all housing oil fields except the Elysian Park anticline. Davis et al. (1989) constructed balanced (retrodeformable) cross sections across the Los Angeles Basin and concluded that the blind fault generating the Whittier Narrows earthquake is part of a thrust ramp they called the Elysian Park thrust. The anticlinal feature overlying the thrust ramp was referred to by them as the Santa Monica Mountains anticlinorium, uplift of which produced the Santa Monica Mountains, the Elysian, Repetto, and Montebello Hills, and the Puente Hills. (An anticlinorium is a major anticlinal structure that consists of several smaller anticlines.) The folds were drawn as fault-propagation folds, that is, slip on faults is consumed updip by folding, following Suppe and Medwedeff (1990). The long-term slip rate on the Elysian Park thrust was estimated by Davis et al. (1989) as 2.5-5.2 mm/yr.

Shaw and Suppe (1996) also constructed balanced cross sections across the Los Angeles Basin using a relatively high-quality 2D seismic data set, but in contrast to Davis et al. (1989), they interpreted their folds to be generated by fault-bend folding, following Suppe (1983). The blind thrust consists of thrust flats and thrust ramps, and the folds are generated as a result of the non-planar geometry of the thrust surface. In the Shaw and Suppe model, the thrust ramps generate dip panels that they called trends, and the thrust flats make up the lowlands, principally the central Los Angeles Basin lowland. These make up one very large fault called the Compton-

Los Alamitos thrust. They decoupled their northwest-trending Elysian Park trend from the east-west-trending Santa Monica Mountains anticlinorium of Davis et al. (1989). The slip rate on the thrust ramp beneath the Elysian Park trend was estimated as 1.7 +/- 0.4 mm/yr. Here we discuss the Elysian Park trend within the Los Angeles Basin as limited by Shaw and Suppe (1996). In this summary, we discuss the individual structures making up the Elysian Park trend separately, although the possibility exists that several of these structures might rupture together in a cascade, an implication of the models of both Davis et al. (1989) and Shaw and Suppe (1996).

**Las Cienegas fault**

The last oil-exploration and development campaign in Los Angeles took place in the downtown area in the 1960s, largely on the Las Cienegas structural shelf between the deep central trough and the Santa Monica Mountains. Hummon et al. (1994) showed that the base of shallow-marine Pleistocene gravels, 0.8-1.0 Ma in age (D. Ponti in Hummon et al., 1994) is upwarped along a broad arch in Hollywood and West Hollywood called by them the Wilshire arch because its axis approximately follows Wilshire Boulevard. The south side of the arch leads into the central trough, and the north side into an elongate low called the Hollywood Basin.

Hummon et al. (1994) proposed that the arch is formed by the blind, north-dipping Wilshire thrust dipping 10°-15° north. If the Hollywood Basin is the backlimb of this arch, a fault-bend fold model yields a dip-slip rate of 1.5-1.9 mm/yr over the past 0.8-1.0 m.y. They also located the fault using an elastic-dislocation model of the wavelength (10 km) and amplitude (400 m) of the Wilshire arch, following King et al. (1988), who showed that the wavelength of a fold associated with an active fault can be compared to the wavelength of coseismic folding. This model locates a fault dippng 30°-35° north, with the fault tip 2.0 to 2.8 km below the surface, consistent with a diffuse zone of seismicity. This yields a right-oblique slip rate of 2.6-3.2 mm/yr.

These models depend on the Hollywood Basin being the backlimb of the fault generating the Wilshire arch. However, Tsutsumi (1996) and Tsutsumi et al. (2001) showed that the Hollywood Basin is a pull-apart basin related to the left step between the Santa Monica and Hollywood faults, hence a strike-slip feature in contrast to the dip-slip backlimb of the Wilshire arch. Schneider et al. (1996) used Pliocene and younger growth strata between the Las Cienegas structural shelf and the central trough to model the blind fault generating the boundary between the central trough and the structural shelf. The vertical component of displacement is the difference in thickness of coeval strata between the shelf and the trough, backstripped to obtain pre-compaction thicknesses. The horizontal component is the difference in shortening by line-length balancing of horizons of different ages. Analysis of growth strata show that the folds grew through progressive limb rotation, with fault dip of 61° at East Beverly Hills Oil Field and

62° at Las Cienegas Oil Field.  The slip rates on the fault over the past 5 m.y. were1.1-1.3 mm/yr at East Beverly Hills and 1.3-1.5 mm/yr at Las Cienegas, with horizontal convergence rates 0.5-0.6 mm/yr at East Beverly Hills and 0.6-0.7 mm/yr at Las Cienegas.

Ponti et al. (1996) and Quinn et al. (2000) compared relative vertical displacement between the structural shelf and the central trough for the past 330 ky and found a vertical uplift rate no more than 0.09-0.13 mm/yr, about an order of magnitude lower than the slip rate of Schneider et al. (1996).  Although the uplifted side of the Las Cienegas blind fault is still active based on topographic expression (Dolan and Sieh, 1992; M. Oskin, pers. commun., 2000), it is clear that the long-term rate is much higher than the late Quaternary rate.  Analysis of additional cross sections eastward in the Boyle Heights and East Los Angeles districts near the Pomona Freeway between Las Cienegas and Bandini oil fields (R.S. Yeats and G.J. Huftile, see R.S. Yeats website) shows that the vertical changes of the Pleistocene San Pedro Formation across the Las Cienegas blind fault are considerably less eastward and essentially non-existent south of Bandini Oil Field (Yeats et al., 1999).

This eastern edge of the Los Angeles trough was depicted in a cross section by Shaw and Suppe (1996, their cross section Y-Y') as the Las Cienegas trend, a fault-bend fold generated by a thrust ramp of their Las Cienegas thrust.  Growth triangles imaged on their seismic profiles showed that displacement on the blind thrust took place during deposition of the upper Pico (latest Pliocene) and continued into the Quaternary.  Shaw and Shearer (1999) named this structure the Los Angeles segment of their Puente Hills thrust.

**Elysian Park anticlinorium**

The Elysian Park anticlinorium *sensu stricto* is a southward-verging anticline 20 km long with a curved, southward-convex axis, lying between the left-lateral(?) Hollywood fault on the northwest through the Silver Lake district and the cities of South Pasadena and Alhambra to the right-lateral East Montebello fault on the east in the city of San Gabriel.  Uplift of the structure has produced the Elysian, Repetto, and Monterey Park Hills.  From the Los Angeles River eastward, the southern range front of the hills is formed by the active axial surface between the south limb of the anticlinorium and the nearly-flat dips of the Las Cienegas structural shelf (R.S. Yeats and G.J. Huftile, work in progress).

Oskin et al. (2000) studied parasitic minor folds in the vicinity of the axial surface, the largest being the Coyote Pass escarpment and monocline close to the range front.  Bullard and Lettis (1993) concluded that these folds provide evidence for a southward migration of deformation.  Deformed late Quaternary deposits across the Coyote Pass escarpment and related structures allowed Oskin et al. (2000) to estimate a contraction rate across the structure of 0.6-1.1 mm/yr and a late Quaternary slip rate on the blind Elysian Park reverse fault of 0.8-2.2 mm/yr.

The dip of the blind fault was determined by analysis of growth strata, similar to the method of Schneider et al. (1996).

The late Quaternary slip rate on the Elysian Park fault is similar to the long-term slip rate on the Las Cienegas fault, suggesting that convergence is shifting northeastward from the Las Cienegas fault to the Elysian Park fault (Yeats et al., 1999). Unlike the Las Cienegas fault, with structural growth taking place throughout the Pliocene and early Pleistocene, the Elysian Park anticlinorium shows no significant decrease in thickness of the Repetto and early Pico members of the Fernando Formation between the structural shelf and the south limb of the anticlinorium, based on oil-well data. However, Soper and Grant (1932), based on surface geology, concluded that this structure was active in the Pliocene based on an unconformity between the Pico and Repetto members of the Fernando Formation. A possible western continuation of the Elysian Park fault in downtown Los Angeles, the San Vicente fault of Schneider et al. (1996) has relatively small reverse separation superposed on a much larger normal separation during the Miocene. However, the San Vicente fault north of East Beverly Hills Oil Field shows evidence of Pliocene growth, earlier than that at the Elysian Park axial surface (Schneider et al., 1996, their fig. 4) and consistent with observations of Soper and Grant (1932).

An unresolved problem is the origin of the MacArthur Park escarpment southwest of the Hollywood Freeway and several minor folds in alluvium on the crest of the Wilshire arch mapped by Dolan et al. (1997) along Wilshire Boulevard and La Brea Avenue to the north. The MacArthur Park lineament is the northwest-trending range front between southwest-dipping strata of the Elysian Park anticlinorium and Quaternary deposits atop the Wilshire arch, which are cut off at the range front. Oskin et al. (2000) show the MacArthur Park escarpment as the continuation of the Coyote Pass escarpment, based on uplifted fluvial terraces. However, the MacArthur Park escarpment does not correspond to the same axial surface between low-dipping strata of the Las Cienegas structural shelf and southwest-dipping strata of the anticlinorium. Cross sections constructed by R.S. Yeats and G.J. Huftile across the Los Angeles Downtown Oil Field and the Jefferson pool of the Las Cienegas Oil Field (see R.S. Yeats website) show that the range front is northeast of the active axial surface.

**Whittier Narrows earthquake source fault**

The fault-plane solution for the 1987 Whittier Narrows earthquake showed a moderately-dipping fault plane with an east-west strike (Hauksson and Jones, 1989). Releveling after the earthquake showed an uplifted area extending from the Santa Fe Springs anticline northward across the intervening La Habra syncline to the Montebello anticline (Lin and Stein, 1989). Shaw and Shearer (1999) relocated the mainshock and aftershocks of the earthquake, illuminating a fault plane dipping about 25° north, a dip consistent with fault-plane reflections on a seismic profile west of the crest of the Santa Fe Springs anticline between -3 and -7 km below sea level. The fault tip is located beneath the south side of the Santa Fe Springs anticline based on a trishear kinematic model (Allmendinger and Shaw, 2000). The long-term slip rate was estimated as 0.5 to 2.0 mm/yr, with the faster limit based on GPS evidence (Argus et al., 1999); a minimum long-term slip rate is 0.5-0.9 mm/yr (Shaw et al., 2000).

High-resolution seismic profiles across the updip projection of the active axial surface between the Santa Fe Springs anticline and low-dipping strata to the south provide structural data within 15 m of the surface, with south dips of 20° to 25° north of the axial surface and horizontal dips to the south (Williams et al., 2000; Christofferson et al., 2000 and in prep.). If these dipping sediments can be dated through borehole traverses and trench excavations, a short-term slip rate could be calculated.

The fault is part of the Puente Hills thrust of Shaw and Shearer (1999), with the Santa Fe Springs segment stepped to the right from their Los Angeles segment farther west. The cloud of aftershocks of the 1987 earthquake is limited to the Santa Fe Springs segment (Hauksson and Jones, 1989).

The Montebello anticline to the north is a separate structure from the Las Cienegas, Elysian Park, or Santa Fe Springs structure. It is described below as part of the Whittier fault system.

**Coyote folds**

The Puente Hills thrust steps right east of the Santa Fe Springs anticline to a north-dipping reverse fault beneath the Coyote Hills (Shaw and Shearer, 1999). The Whittier earthquake of July 8, 1929, with intensities as high as VII, had its epicenter close to this stepover, with meizoseismals oriented north-south (Richter, 1958).

The Coyote Hills in the cities of La Mirada, La Habra, Fullerton, and Placentia are uplifted along a string of doubly-plunging anticlines. From west to east, these are the West Coyote anticline, housing the West Coyote Oil Field, and the Hualde and Anaheim domes of the East Coyote Oil Field. Farther to the southeast in the cities of Yorba Linda and Orange, the Richfield and Kraemer anticlines converge with the Whittier fault north of the Santa Ana River in the foothills of the Puente Hills. The south-verging Coyote folds each include an axial reverse fault, the South Flank fault of West Coyote and the Stern fault of East Coyote (Wright, 1991). Myers (2001) showed that the Stern fault underwent 1200 m of left-lateral strike slip, when the fault was nearly vertical, and became inactive prior to folding in the Quaternary. This strike-slip fault was traced westward across the Leffingwell Oil Field and must extend eastward south of the Anaheim dome of the East Coyote Oil Field. Folding began during deposition of the Pico member of the Fernando Formation.

Myers (2001) and D. Myers, J. Nabelek, and R. Yeats (in prep.) used dislocation modeling to locate the blind fault generating the Coyote folds, yielding dips consistent with those observed using aftershocks and fault-plane reflections beneath the Santa Fe Springs anticline (Shaw and Shearer, 1999), although there is large uncertainty in fault dip. Several dated horizons were projected into the East Coyote fold: the Brunhes-Matuyama boundary from a water well in Pico Rivera south of the Montebello anticline (D. Ponti, pers. commun., 2000), an age estimate of 1.4 +/- 0.4 Ma of a mollusc in the San Pedro Formation in the West Coyote Hills (Powell and Stevens, 2000), and the dated Nomlaki Tuff (3.4 +/- 0.3 Ma, Sarna-Wojcicki et al., 1991) near the Meyer shale in the Santa Fe Springs Oil Field (A. Sarna-Wojcicki and T.H. McCulloh, pers. comm., 2000). This leads to a slip rate on the blind thrust of 1.2 +1.4/-0.5 mm/yr.

Dislocation modeling was also applied to the Santa Fe Springs anticline, resulting in a slip rate slightly higher than that at East Coyote and a fault dip consistent with that obtained by fault-plane reflections and distribution of 1987 mainshock and aftershocks (D. Myers, J. Nabelek, and R. Yeats, in prep.).

### Peralta Hills thrust

South of the Coyote folds, Burruel Ridge and the Peralta Hills project westward into the Los Angeles Basin from the Santa Ana Mountains, possibly deflecting the course of the Santa Ana River westward. This feature is a southward-vergent anticline with the thrust on the south side; west of the Santa Ana River, the anticline projects into the Olive Oil Field. Bryant and Fife (1982) suggested that bedrock structures are thrust southward against Pleistocene terrace deposits, although subsequent geotechnical work by others suggests that they may have mapped a landslide. West of the Costa Mesa Freeway in Orange, immediately south of the Olive anticline, a scarp in alluvial deposits of the Santa Ana River adjacent to Lincoln Avenue appears to be active. A contractional structure, if extended eastward across the northern Santa Ana Mountains, could explain the difference in slip rate between the Elsinore fault at Glen Ivy and the Whittier fault at Santa Ana Canyon.

## Northwest-striking faults in the northernmost Peninsular Ranges

### Introduction

The southern part of the Los Angeles metropolitan area is tectonically a part of the Peninsular Ranges, with northwest-striking right-lateral faults that are part of the southern San Andreas fault system. Slip rates on these faults are highest on the San Andreas fault itself, lower on the San Jacinto fault, and still lower on the Whittier-Elsinore and the Newport-Inglewood faults (Yeats, 2001b). Davis et al. (1989) and Shaw and Suppe (1996) pointed out that these are not simple strike-slip faults; reverse slip is also important and locally may be dominant. Davis et al. (1989) even suggested that the Whittier fault may be relatively unimportant compared to the regional blind thrust that underlies the Puente Hills. It seems likely that strain partitioning is an important element in the earthquake evaluation of these faults, just as it is in the central Coast Ranges, affected by reverse-fault earthquakes in 1983 (Coalinga) and 1985 (Kettleman Hills) as well as the great Fort Tejon strike-slip earthquake of 1857 and several Parkfield earthquakes from then until 1966.

Here we discuss those northwest-striking local faults that strongly impact the Los Angeles metropolitan region: the Whittier-Elsinore, Newport-Inglewood, and Palos Verdes faults. The San Jacinto fault is important to the San Bernardino-Riverside metropolitan area, and the San Andreas fault is important to the entire Los Angeles metropolitan region, but these faults are not discussed here. Offshore faults in the California Continental Borderland, in particular the San Diego Trough-San Pedro fault and the San Clemente fault, have an impact on the Los Angeles region, but too little is known about their slip rates to include them in this discussion.

Also included in this section are the east-northeast-striking San Jose fault and the north-northwest-striking Chino fault and a consideration of the active-tectonic significance of the Santa Ana Mountains and San Joaquin Hills.

**Whittier-Elsinore fault**

The Whittier and Elsinore fault is marked by a band of diffuse seismicity, although this is much less pronounced than the seismicity marking the San Jacinto fault to the east.

The late Pleistocene to Holocene strike-slip rate on the Elsinore fault at Glen Ivy Marsh south of Corona is 5.3-5.9 mm/yr (Millman and Rockwell, 1986), with evidence for 4 to 5 earthquakes of M 6-7 since about 1060 AD (Rockwell et al., 1986). The most recent event was probably the Temescal Valley earthquake of M 6 on May 15, 1910, with about 15 km of surface rupture (Rockwell, 1989). Northwest of Glen Ivy, the fault divides into two subpararalle strands, with the northeastern strand becoming the Chino fault and the southwestern strand, following the northeastern range front of the Santa Ana Mountains, becoming the Whittier fault. East of Santa Ana Canyon, the Whittier fault turns west-northwest into the northern end of the Santa Ana Mountains, where digital terrain images suggest right-lateral stream offsets. At Santa Ana Canyon, the Whittier fault has a right-lateral strike-slip rate of 2-3 mm/yr based on a 400-m offset of terraces of the Santa Ana River that are 140 ka in age (Gath, 1997; Gath et al., 1998; Rockwell et al., 1988). Farther west, at Olinda Creek, one strand of the Whittier fault has a right-lateral strike-slip rate of about one mm/yr. The stream offset by this strand is offset the same amount by another strand, and Gath et al. (1992) assigned a strike-slip rate on both strands of at least 2 mm/yr. The two strands are part of a positive flower structure, with Miocene Puente

Formation thrust over alluvial deposits; however, the displacement is mainly by strike slip (Gath et al., 1992). In addition, the tectonic geomorphic expression of the fault is characteristically strike slip, including right-deflected streams and shutter ridges (Rockwell et al., 1988).

The slip rate difference led Rockwell et al. (1992) to conclude that about 2.6 mm/yr of strike slip escapes along the Chino fault. However, some of this difference can be accounted for by the Coyote folds that intersect the Whittier fault at Santa Ana Canyon. The slip rate on the blind thrust generating the East Coyote folds (Myers, 2001) is enough to account for part of the difference between the strike-slip rate at Glen Ivy Marsh and that at Olinda Creek. Additional displacement could take place on the Peralta Hills thrust and on a footwall anticline beneath the Whittier fault between Turnbull Canyon (Herzog, 1998) and Yorba Linda (see fig. 17 in Myers, 2001, and R.S. Yeats website), including the 304 and 184 anticlines of the Whittier Oil Field (Herzog, 1998) and the Brea anticline of the Brea-Olinda Oil Field. This anticline (locally an anticlinorium) is considered to be active due to footwall uplift east of Turnbull Canyon; west of Turnbull Canyon, the Whittier fault lies at the Puente Hills range front (Herzog, 1998).

At the Whittier Narrows of the San Gabriel River, the Whittier fault turns more northerly to become the East Montebello fault. At Alhambra Wash in Rosemead, Gath et al. (1994) and Gath and Gonzalez (1995) trenched a strand of the East Montebello fault and found a slip rate of only 0.2 +/- 0.1 mm/yr; a second, larger scarp to the west was not investigated. This suggests a lower slip rate than that measured at Olinda Creek, which could be accounted for by growth of the Montebello anticline, which is truncated on the east by the East Montebello fault. The Montebello anticline was not uplifted separately from the Santa Fe Springs anticline during the 1987 Whittier Narrows earthquake (Lin and Stein, 1989), suggesting that its uplift history is controlled by strike slip on the Whittier fault instead of (or in addition to) reverse slip on the blind Santa Fe Springs segment of the Puente Hills thrust.

Despite the evidence for late Quaternary strike slip, the total right slip on the Whittier fault is relatively small. Part of the difficulty in establishing piercing-point offsets is that the modern Whittier fault reactivated a Miocene normal fault with the north side down (Yeats and Beall, 1991; Bjorklund and Burke, in review). McCulloh et al. (2000) estimate the right separation as 8-9 km based on offset facies and isopachs of Paleogene strata. This estimate faces the difficulty that north of the fault, Paleogene facies boundaries turn abruptly westward in the southeastern Puente Hills. The Santa Rosa basalt dated at 10.6 Ma is offset across the Elsinore fault no more than 15 km (Hull and Nicholson, 1992). Bjorklund and Burke (in review) are able to construct isopachs of the late Miocene Sycamore Canyon member of the Puente Formation without any offset, although the isopachs south of the fault are parallel to it, and an undetermined amount of strike slip is permitted by the isopach data.

Throughout most of its length on the south side of the Puente Hills, the fault has reverse separation, north side up, with maximum vertical separation of 4267 m in the northwest Puente Hills (McCulloh et al., 2000). This separation is less to the southeast, and near the Horseshoe Bend of the Santa Ana River, the sense of separation in bedrock (although probably not in late Quaternary deposits) changes to south side up, and the dip is vertical (Bjorklund and Burke, in review; McCulloh et al., 2000). Nonetheless, northwest of Horseshoe Bend of the Santa Ana River, the dominant expression is reverse slip, with a dip of 60° to 75° north. At Rideout Heights at the northwestern end of the Whittier fault, the late Pleistocene-Quaternary uplift rate is 0.6 +/- 0.1 mm/yr, and the dip separation rate is 0.97 +/- 0.1 mm/yr (Herzog, 1998), about the same as the strike-slip rate.

**Puente Hills, San Jose Hills, and the San Jose fault**

Davis et al. (1989) implied that the uplift of the Puente Hills is dominated by the Elysian Park blind thrust. Shaw and Shearer (1999) named the regional blind thrust generating the 1987 Whittier Narrows earthquake the Puente Hills thrust, although the topographic expression of the Puente Hills thrust is the Santa Fe Springs anticline and the Coyote Hills, not the Puente Hills. Herzog (1998) observed that the Puente Hills are restricted to the region between the Santa Ana and San Gabriel rivers, where the west-northwest-striking Whittier fault is a restraining bend between the northwest-striking Elsinore fault and north-northwest-striking East Montebello fault. Bjorklund and Burke (in review, based on structure contours of the La Vida member of the Puente Formation, map the structure of the Whittier fault hangingwall as a south-vergent anticline with its culmination west of Brea Canyon, next to the Brea-Olinda Oil Field. The uplifted footwall of the fault between Turnbull Canyon and Yorba Linda, related to a footwall anticline, attests to dip-slip on part of the Whittier fault system, evidence of partitioning between strike slip, as seen in the geomorphology and trench excavations, and dip slip, as seen in anticlines in both the footwall and hangingwall.

In contrast to the southern Puente Hills, the northern Puente Hills and San Jose Hills appear to be structurally more complex, and folding dominates (Olmstead, 1950). The San Jose Hills trend east-northeast and are uplifted along a west-southwest-plunging anticline underlain by the La Vida member of the Puente Formation, the Glendora Volcanics, and Cretaceous granitic rocks. The San Jose fault lies at the southern range front, steps left where the anticlinal axis steps left (Tan, in press a, b), and dies out at the surface farther west in the south limb of the anticline. Farther south, the Amar syncline is in an alluviated lowland, and still farther south, the Puente Hills anticline, housing the Walnut Oil Field, is also expressed as tectonic topography in the Little Puente Hills (Tan, in press a, b). This leads to the suggestion by R.S. Yeats that these folds, along with the Glendora South Hills farther north (Shelton, 1955), may be previously-unrecognized reverse-fault earthquake sources with a Transverse Ranges trend.

This implies that the Upland strike-slip earthquakes of 1988 and 1990 (Hauksson and Jones, 1991) may not have originated on the northeastern continuation of the San Jose fault. However, their source could have been the continuation of a strike-slip fault farther northwest, such as the Walnut Creek fault mapped by Tan (in press a, b) along the southwestern margin of the San Gabriel Valley or the Indian Hill fault mapped in the San Gabriel Valley farther northwest (Dept. of Water Resources, 1966; 1970; located on maps by Hauksson and Jones, 1991). A difficulty in evaluating these sources is that the youngest bedrock is Puente Formation; the thick Pliocene of the western San Gabriel Valley is absent. The Indian Hill fault appears to offset the base of water-bearing sediments, with the north side up (Dept. of Water Resources, 1970).

**Chino fault**

The Chino fault has been regarded as a strike-slip member of the Elsinore fault system (Rockwell et al., 1992). An earthquake of M 4.3 in February, 1989, with its epicenter southwest of the surface trace of the fault, had a fault-plane solution consistent with right-lateral strike slip on the Chino fault (Hauksson and Jones, 1991). A strike-slip fault with a more northerly strike than that of the Elsinore fault should be transtensional; indeed, small depressions are found at right stepovers along the fault (E.M. Gath, in prep.). On the other hand, the Chino fault has reverse separation throughout its length, with the southwest side up (Gray, 1961; Durham and Yerkes, 1964; Castro, 1975; Schoellhamer et al., 1981). In the Chino Hills, the Mahala anticline in the hangingwall of the Chino fault has topographic expression, following the Chino Hills drainage divide. McCulloh et al. (2000) suggested that the total right slip on the Chino fault can be no greater than a few kilometers, based on isopachs of Paleogene strata. R.S. Yeats (in prep.) suggests that the Mahala-Chino structure might comprise an active fold-reverse fault pair that is propagating north-northwestward toward the San Jose Hills, although the 1989 earthquake provided evidence that this fault can generate strike-slip earthquakes. Alternatively, the Chino fault could bend to a more northerly strike, cutting off the San Jose Hills on the east.

Heath et al. (1982) estimated a slip rate of 0.06 mm/yr horizontal and the same rate vertical near Prado Dam. Their slip rate was based on the 8-m vertical separation of a paleosol, the age of which was estimated as 125 ka. This separation was both by faulting and downwarping. They had no independent evidence for horizontal offset of this paleosol or of younger deposits; they simply assumed that the horizontal offset would be no larger than the vertical. Chris Walls and Eldon Gath suggest that the fault is active and is predominantly right lateral, based on northeast-facing fault scarps, deflected drainage, and beheaded drainage in the

Chino Hills and northeast-facing fault scarps and vegetated lineaments in the alluvium near and southeast of Prado Dam (see also Weber, 1977). Walls and Gath salvage-logged a trench excavation in the Chino Hills in which an organic colluvial layer overlying Puente Formation is offset 4.2-5.6 m right laterally with 10-15 cm apparent vertical separation. Charcoal from this colluvium was dated by Chris Walls as 11,219 +/- 331 and 9543 +/- 55 radiocarbon years.

To the east, the Central Avenue fault may be a right stepover from the Chino fault, based on photo lineations and geomorphic features being studied by J.A. Treiman (in prep.).

**Newport-Inglewood fault and the Compton-Los Alamitos trend**

Like the Whittier-Elsinore fault, the Newport-Inglewood fault, 70 km long onshore, is marked by a band of diffuse seismicity. Several earthquakes have struck the fault zone, including the March 10, 1933 "Long Beach" earthquake of M 6.4, with its epicenter off Newport Beach, and smaller earthquakes at Inglewood on June 20, 1920 (M 4.9), Gardena on October 22, 1941 (M 4.9), and Torrance-Gardena on November 14,1941 (M 5.4; Hauksson, 1990). Many microearthquakes are characterized by right-lateral strike-slip focal mechanisms, as was the 1933 earthquake (Hauksson, 1987; 1990). No historical earthquake is known to have been accompanied by surface rupture (Barrows, 1974).

The Newport-Inglewood fault continues offshore to the southeast (Fischer and Mills, 1991) and makes landfall in La Jolla as the Rose Canyon fault, which has evidence of Holocene right-lateral strike slip and a slip rate of 1.5 mm/yr (Lindvall and Rockwell, 1995). It is not a continuous surface fault like the Whittier fault, but instead is marked by a series of uplifts and anticlines including Newport Mesa, Huntington Beach Mesa, Bolsa Chica Mesa, Alamitos Heights and Landing Hill, Signal Hill and Reservoir Hill, Dominguez Hills, Rosecrans Hills, and the Baldwin Hills (Barrows, 1974). Farther northwest, it is on trend with the Cheviot Hills and the West Beverly Hills Lineament, the latter marking the left stepover between the presumably left-lateral Santa Monica and Hollywood faults (Dolan et al., 1997; 2000b). The right-lateral stress field is evident from the predominance of reverse faults in the west-trending Dominguez anticline, the coincidence of Signal Hill with a short, northeast step (Pickler fault) in the Long Beach segment of the fault, and normal separation on north-striking faults in Sunset Beach and Huntington Beach oil fields (Yeats, 1973; Harding, 1973).

Freeman et al. (1992) worked out long-term strike-slip rates on the fault by correlating electric-log facies of strata of 6 to 2.3 Ma on one side of the fault to a best match on the opposite side. At Seal Beach and Huntington Beach oil fields, this gave a slip rate of 0.49-0.52 mm/yr. At Long Beach Oil Field, the slip rate is 0.5 mm/yr, and at Inglewood Oil Field, at the northwest end of the zone, the slip rate is 0.31 mm/yr. With error bars, the approximate slip rate can be estimated as about 0.5 mm/yr. Slip rates can also be determined from offset anticlines at Seal

Beach and Inglewood oil fields, and offset isopachs (Freeman et al. (1992). Maximum displacement measured is about 4 km for strata about 7 Ma at Huntington Beach Oil Field. The maximum displacement at Inglewood Oil Field is 1.4 km for strata of 4 Ma (Wright et al., 1973), indicating that strike slip at Inglewood did not start until the Pliocene, later than it started at Huntington Beach. Freeman et al. (1992) estimated the ratio of vertical to horizontal slip to be 1:20. Grant et al. (1997) estimated a minimum Holocene right-lateral strike-slip rate of 0.30-0.55 mm/yr for the southern Newport-Inglewood fault zone in the Huntington Beach Oil Field.

Yet a purely strike-slip history, even taking into account restraining bends such as the one at Dominguez Hills and a transfer of strike slip to folds west of the fault at Sawtelle Oil Field (Tsutsumi et al., 2001), cannot explain the Central Uplift, the name applied by the petroleum industry to the elevated structure of the Newport-Inglewood trend with respect to the central trough to the northeast and the Wilmington structural shelf to the southwest. Davis et al. (1989) accounted for the Central Uplift by a blind thrust. Shaw and Suppe (1996) described the northeast-dipping flank of the Central Uplift as the Compton-Los Alamitos trend, a fault-bend fold that overlies a thrust ramp with 4 km of slip, based on upward-narrowing growth triangles of sedimentary strata above the ramp. The base of the growth triangle, marking the age of initiation of thrusting, was estimated as 2.5 Ma, near the top of the Repetto Member of the Fernando Formation. With this information, the long-term dip-slip rate was calculated as 1.4 +/- 0.4 mm/yr.

T.K. Rockwell and K.J. Mueller excavated a trench, and K.J. Mueller acquired CPT borings across the surface projection of the Compton-Los Alamitos axial surface (Mueller, 1997), showing that this surface does not deform peat deposits dated as 1.9 ka or the Gaspur aquifer (cf. Dept. of Water Resources, 1961) dated as 15-20 ka. Additional work (K.J. Mueller and T.K. Rockwell, in prep.), including structure contours on five aquifers ranging in age from 15-20 ka to 730 ka tied into the global eustatic sea level curve (D.J. Ponti, in prep.), additional trenching and CPT profiles on the Los Alamitos air base, and analysis of a digital elevation model shows no folding of the Gaspur aquifer on the air base. But the Sunnyside (720 ka), Lynnwood (650 ka), and Gage (330 ka) aquifers are folded consistent with the Shaw and Suppe (1996) model but at a slower rate, about 0.5 mm/yr.

Grant et al. (1997) showed that a splay of the North branch of the Newport-Inglewood fault at Huntington Beach has a vertical separation rate of 0.2 mm/yr. They found evidence of five earthquakes, with the oldest shortly after 11.0-12.3 ka. Events younger than 4.4-5.0 ka may be present but are unresolvable with their data.

**San Joaquin Hills**

Adjacent to the Newport-Inglewood fault where it crosses the shoreline, the San Joaquin Hills are uplifted at a rate of 0.21-0.27 mm/yr, based on mapping and dating late Quaternary shorelines (Grant et al., 1999; in press). The relations are best explained by a southwest-dipping blind thrust with a slip rate of 0.42-0.79 mm/yr. Rivero et al. (2000) consider this southwest-dipping thrust to be part of a larger structure extending offshore to the south and dipping 23°. In their view, the southwest-dipping thrust is a hangingwall structure in their east-dipping Oceanside thrust, a Miocene low-angle normal fault reactivated in the Quaternary. They described a similar thrust farther west, the Thirtymile Bank fault, which is too far offshore to be included in this summary.

Coseismic coastal uplift of the San Joaquin Hills may have generated the largest historical earthquake in the Los Angeles region, an earthquake experienced by the Portolá expedition on July 28, 1769. Late Holocene marsh deposits and shorelines are elevated 1 m to 3.6 m above the active shoreline in a pattern that is best explained by tectonic uplift accompanying an earthquake of M>7. Radiocarbon dating and pollen analysis constrain the date of the earthquake as between 1635 and 1855 A.D., with the strong possibility that this was the earthquake reported by Portolá (Grant et al., in revision).

**Palos Verdes fault**

The Palos Verdes fault follows the northeastern range front of the Palos Verdes Hills between Redondo Beach and San Pedro, extending across Los Angeles Harbor onto the continental shelf to the southeast. The Palos Verdes Hills are etched by a flight of marine terraces with their ages estimated as 0.45 to 1.5 Ma, leading to an uplift-rate determination of 0.7 +/- 0.2 mm/yr (Ward and Valensise, 1994). The uplift pattern of the Palos Verdes terraces enabled Ward and Valensise (1994) to model the uplift of the Palos Verdes anticlinorium, 15 km long and 8 km wide, as due to a restraining bend on an oblique reverse-right slip fault dipping to the southwest with a long-term slip rate of 3.0-3.7 mm/yr. The uplift rate of Ward and Valensise (1994), and therefore the slip rate on the fault, is controlled by the correlation of the marine terraces; more recent work by D.J. Ponti suggests a slower uplift rate, 0.3-0.5 mm/yr.

Northwest of San Pedro, high-resolution seismic profiles show that the channel of the ancestral Los Angeles River, dated as 120-80 ka, is deflected 300 m, leading to an intermediate-term slip rate of 2.5-3.8 mm/yr, with strike slip predominating (Stephenson et al., 1995). To the southeast, in Los Angeles Harbor, McNeilan et al. (1996) showed that an early Holocene paleochannel has been deflected 21-24 m, indicating a slip rate of 2.7 mm/yr for the past 7.8-8 ka, with the ratio of horizontal to vertical slip 7:1 to 8:1.

In contrast, Davis et al. (1989) interpreted the Palos Verdes anticlinorium and fault along with the Torrance-Wilmington-Belmont (TWB) anticlinorium to the northeast, as overlying a décollement. Shaw and Suppe (1996) considered the Palos Verdes anticlinorium as the hangingwall of a backthrust related to a fault-bend fold, with uplift of the anticlinorium the same as that calculated by Ward and Valensise (1994). The slip rate of the fault underlying the TWB anticlinorium was calculated as 1.2 +/- 0.4 mm/yr. 3D seismic data suggest that the TWB anticlinorium is a tip-line fold developed above a northeast-dipping thrust ramp that offsets and folds basement; the forelimb of this fold contains deformed Pliocene strata (J. Shaw, in prep.).

Well data show that the TWB anticlinorium stopped growing in middle Pico time and is overlain unconformably by undeformed strata (Wright, 1991). This argues against the TWB being linked to the Palos Verdes fold, dated by younger uplifted marine terraces. However, J. Shaw (in prep.) has found that the unconformity and overlying strata in the TWB anticlinorium are, indeed, folded gently about the axial surface bounding the southern edge of the forelimb, consistent with reverse-fault seismicity described by Hauksson (1990), although the slip rate on this structure has slowed down in the Quaternary. The two models linking the Palos Verdes and Compton-Los Alamitos structures (Shaw and Suppe, 1996) are (1) the Compton structure refolds part of the Palos Verdes fault (favored by J. Shaw, in prep.) and (2) the Palos Verdes fault is offset by the Compton ramp, or is a backthrust above the Compton ramp (Davis et al., 1989).

The Palos Verdes fault extends offshore to the southeast, where it is clearly mapped by sidescan sonar (M.V. Gardner, in prep., C. Goldfinger et al., in prep.) and high-resolution seismic-reflection profiles (Francis et al., 1999 and in prep.). At a point about 10 km southeast of the breakwater, the fault bends southward (releasing bend) and breaks up into several youthful traces that cut through the Beta Oil Field (Fischer et al., 1977; Kelsch et al., 1998). The fault appears to bend into a more northerly trend (transtensional) that controls the location of San Gabriel submarine canyon, as shown by multibeam bathymetry of Gardner et al. (2000). The fault splits into two major faults around Lasuen Knoll, a restraining-bend pop-up structure. The principal trace of the Palos Verdes fault lies along the southwest flank of Lasuen Knoll, where it is clearly expressed in seismic profiles (Bohannon et al., 1998; Mallory et al., 2000). The Palos Verdes fault zone continues southeast as the Coronado Bank fault zone with alternating regions of transpressional pop-up structures and broad transtensional sags (Legg, 1985; Legg and Kennedy, 1991; M. Legg and C. Goldfinger, in prep.) Overall, the Palos Verdes-Coronado Bank fault zone is complex and segmented, commonly with two sub-parallel faults. Uplift at left bends and sags at right bends show the right-slip character. The eastern fault zone from Lasuen Knoll to La Jolla submarine canyon is poorly known and may be tied to the Oceanside detachment/thrust fault system (M. Legg, C. Sorlien, and C. Nicholson, in prep).

To the northwest, off Redondo Beach, the fault is not as easy to trace on sidescan sonar (C. Goldfinger, M. Legg, R.S. Yeats, and G.J. Huftile, in prep.). The shelf is cut by the Redondo and Santa Monica submarine canyons (Nardin and Henyey, 1978); uplifted areas on the shelf bring Miocene strata to the surface (Junger and Wagner, 1977). Some authors extend the Palos Verdes fault northwest as a strike-slip fault to an intersection with the Dume fault. An alternative is for various "horsetail" strands to splay westward, including the Redondo Canyon fault. These western splays should have reverse separation and consume slip in Santa Monica Bay on the north side of the Shelf Projection anticline of Nardin and Henyey (1978). Hauksson (1990; see also Davis et al., 1989) showed this region as the northwestern continuation of their Torrance-Wilmington fold and thrust belt. A north-trending graben near the head of Redondo submarine canyon suggests a pull-apart origin at a right stepover on the Palos Verdes fault where it extends offshore. Numerous fault traces have been mapped on the shelf in Santa Monica Bay (Vedder, 1986) although possible nearshore fault traces are presently unknown due to lack of data in the immediate coastal area. The coast-parallel trend of ancient Ballona Creek (Los Angeles River channel) immediately offshore Playa del Rey to Manhattan Beach may be fault-controlled (M. Legg and D. Francis, in prep.).

Earthquakes in Santa Monica Bay with reverse-fault focal mechanisms, with the largest the Malibu earthquakes of January 1, 1979 and January 19, 1989, each with magnitude 5.0 (Hauksson and Saldivar, 1989; Hauksson, 1990), are too far south to be attributed to the Dume fault. These earthquakes may be related to the western splays of the Palos Verdes fault. However, there are also many strike-slip earthquakes in this region, so the northern end of the Palos Verdes fault still remains poorly located.

The overall pattern of a segmented Palos Verdes fault, with alternating areas of extension and contraction, continues in Santa Monica Bay. The predominance of west to west-northwest trending anticlinoria along the southwest flank of the Palos Verdes fault is consistent with a reduction of strike slip northwestward toward the Transverse Ranges, with slip taken up by shortening on folds and horsetail splays.

## Discussion: Problems for SCEC II

### Introduction

The main purpose of this report is to synthesize what we know about the earthquake geology of the Los Angeles metropolitan area rather than analyze the data with respect to conflicting tectonic hypotheses. However, it is possible to see where we stand at the end of SCEC I and point out the major unsolved problems for SCEC II. The questions that we raise today could not have been posed at the time SCEC I began.

### Convergence rate discrepancy between late Quaternary geology and GPS

Walls et al. (1998) compared the convergence rates across the Los Angeles metropolitan area with convergence rates based on geologically-determined slip rates on individual faults.

These rates appeared to be in agreement when the higher rates of Davis et al. (1989) and Davis and Namson (1994) were used (Argus et al., 1999), but recent studies of late Quaternary slip rates, summarized above, suggest that the geological rates in the Los Angeles and San Gabriel basins are slower than the GPS rates would predict. Bawden et al. (2001), after removing GPS sites contaminated by groundwater- and oil-pumping effects, determined an average southward shortening across the Los Angeles Basin of 4.4 +/- 0.8 mm/yr in a direction N35° +/- 5° E. The GPS rates could be a temporary velocity transient, as has been suggested for parts of the Great Basin, but this is less likely in Los Angeles because the GPS and geological rates appear to be in agreement in the Ventura Basin (Huftile and Yeats, 1995; 1996) and opposite the Cucamonga fault east of the San Jose Hills. In fact, the geologically-determined rates are higher than GPS rates in the western Ventura basin.

The principal problem is the unexplained lower slip rate on the Sierra Madre fault between the 1971 rupture zone and the Cucamonga fault (Crook et al., 1987, reinforced by more recently-determined late Quaternary slip rates, discussed above). The shortening across the Sierra Madre, Elysian Park, and Puente Hills faults, together with a contractional component across the Raymond and Whittier strike-slip faults, sums to 3-3.5 mm/yr. The discrepancy could be accounted for by the San Jose fault and a blind reverse fault beneath the northern Puente Hills anticline at Walnut, but this is not yet known. West of the San Fernando Valley, the Santa Susana, San Cayetano, and Oak Ridge faults have slip rates that are high enough to be consistent with GPS results (Huftile and Yeats, 1995; 1996), and this may be the case also for the Cucamonga fault. The Verdugo fault in the eastern San Fernando Valley could take up some of the strain, but the Eagle Rock fault between the Verdugo and Raymond faults has poor geomorphic expression and probably hase a low slip rate.

Some of the shortening could be taken up by folding. The blind Santa Monica Mountains thrust was thought to have a high slip rate by Namson and Davis (1994), but studies of the marine terraces along the Malibu coast show that the slip rate of that thrust is much lower, possibly an order of magnitude lower.

This is a major problem for SCEC II because of the possibility of other faults, as yet unidentified, that take up the missing horizontal convergence indicated by GPS. We don't want to be surprised by another Northridge blind thrust.

**Short-term vs long-term slip rates**

In the western Ventura Basin, the short-term rates are somewhat faster than the long-term rates but are in a general way consistent in that they involve the same faults. In the Los Angeles Basin, the long-term slip rates (2-5 x $10^6$ yrs) on the Las Cienegas and Compton-Los Alamitos faults are much higher than the short-term rates measured in $10^4$-$10^5$ yrs. Strike slip on the

Newport-Inglewood fault appears to have started earlier in the southeastern Los Angeles Basin than farther northwest. High slip rates on both the Raymond and Whittier faults must be considered in light of low total displacement on these faults, evidence that the presently-operating strike-slip phase is relatively young. The northwest-striking right-slip faults of the Peninsular Ranges may have propagated into the Los Angeles metropolitan area only in the Quaternary, implying that slip rates on these faults might approach zero as the Transverse Ranges boundary is approached.

If confirmed by additional work, this leads to a higher weighting of slip rates based on late Quaternary offsets than longer-term rates in probabilistic hazard analyses.

**Offshore faults**

The Newport-Inglewood, Palos Verdes, Santa Monica, and Malibu Coast faults extend offshore, where their geology is poorly understood compared to onshore faults. Newly-emerging technology of side-scan sonar, high-resolution swath bathymetry, high-resolution seismic profiling, and remotely-operated submersibles is expensive, but these techniques, together with piston cores, are necessary to characterize the offshore portions of onshore faults. For example, high-resolution multibeam bathymetry offshore from metropolitan Los Angeles (Gardner et al., 2000; Marlow et al., 2000) has provided a new understanding of the geometry and recency of movement on major offshore faults, including the San Pedro Basin and Avalon Knoll fault zones, both of which have prominent seafloor expression and likely Holocene activity. In addition, some faults are completely offshore, but close enough to metropolitan areas that they will impact the Los Angeles and San Diego metropolitan areas, just as a modern repetition of the December 21, 1812 earthquake would impact coastal cities around the Santa Barbara Channel.

Offshore paleoseismology is possible based on the analysis of turbidites in submarine channels, as has already been shown by work by C. Goldfinger, H. Nelson, and Gorsline et al. (2000). Turbidites at the mouth of Noyo Canyon off the northern California coast have been age-calibrated by AMS dating of foraminiferal tests, giving a paleoseismological record of the northern San Andreas fault for the past 13,000 years, a record consistent with the shorter record available from trench excavations (C. Goldfinger and H. Nelson, in prep.). Gorsline et al. (2000) concluded that the larger, more areally extensive turbidites in Santa Monica Basin were generated by earthquakes. These turbidites were dated using $^{210}$Pb and AMS $^{14}$C and by counting varves. The most recent turbidite might have recorded the 1812 earthquake in the western Transverse Ranges. Recurrence frequency of these large turbidites is 470 years. Submarine fans and turbidite-filled channels in the Borderland can be surveyed with high-resolution seismic imagery combined with piston cores to provide information on fault displacements during individual earthquakes and strong shaking generating turbidites.

The present Group C team comprises terrestrial geologists, with a few notable exceptions, and terrestrial geology has dominated most of the funding. A major problem is the expense of gathering data, but this can be alleviated by forming partnerships with other agencies, including NOAA, NSF, and USGS Marine Geology Branch.

**Strain partitioning**

The early days of SCEC were characterized by lively debate between those advocating a dominance of dip-slip faulting, especially blind thrusting, vs those suggesting that strike-slip faulting is important also. In part, the two camps were using two different time scales. Slip rates based on blind thrusting are based on growth strata deposited over several million years whereas slip rates on strike-slip faults are based on trench excavations and late Quaternary tectonic geomorphology, including stream deflections and shutter ridges.

It appears that both camps are partly correct. Strike slip on the Newport-Inglewood fault does not explain the Central Uplift, atop which the Newport-Inglewood oil fields are located, and strike slip on the Whittier fault does not explain footwall uplift between the Whittier and Brea-Olinda oil fields, nor does it explain uplift of the Coyote Hills. A clue may be seen in examining focal-mechanism solutions in Santa Monica Bay (Hauksson and Saldivar, 1989), which show both strike-slip and reverse-slip solutions. The mainshock of the 1987 Whittier Narrows earthquake was a reverse fault, but the largest aftershock was strike slip, probably on the East Montebello fault. The 1986 Oceanside earthquake (Hauksson and Jones, 1991) had a northwest-trending thrust mechanism although it took place on a restraining bend of the San Diego Trough fault (Legg, 1985). Alternatively, this earthquake may have been related to the blind, low-angle Thirtymile Bank fault (Rivero et al., 2000).

A problem for SCEC II is the question of how dip-slip earthquakes relate to strike-slip earthquakes. Would a Los Angeles cascade include both dip-slip and strike-slip events? Does the fast-moving Raymond strike-slip fault sometimes rupture alone and at other times rupture with the Sierra Madre or Hollywood fault, or with the San Andreas fault? Would a dip-slip event on the Sierra Madre fault reduce strain buildup on the Raymond fault across strike from it, or would a dip-slip event on the Puente Hills blind thrust reduce or add to strain buildup on the Whittier fault?

A corollary to this problem is the accommodation of north-south convergence. Is convergence accompanied by east-west escape-block tectonics, as proposed by Walls et al. (1998) or by crustal thickening, as favored by Argus et al. (1999). Part of the debate in these two papers is influenced by how the right-lateral shear strain on the San Andreas fault is factored out to get at the convergence signal, but the late Quaternary geology is important, too.

Most of the useful late Quaternary slip rate data in Los Angeles have been published in the past five years, as AMS radiocarbon dating has become more widely available. SCEC II has the opportunity of following up on this breakthrough in a focused late Quaternary dating project, including attempts to do paleoseismology on blind thrusts, as has already been accomplished in the San Joaquin Hills (Grant et al., in revision) and is currently being attempted for the Puente Hills blind thrust. A key to the success of this endeavor is a better age-calibrated stratigraphy for the late Quaternary, already begun by the USGS on the Las Cienegas structural shelf and in the Los Angeles Basin west of the Newport-Inglewood fault (Ponti et al., 2001). East of the Newport-Inglewood fault, late Quaternary marine deposits have been dated in the San Joaquin Hills (Grant et al., 1999) and are currently being correlated with marine faunas (Powell et al., submitted). In addition, with the availability of higher-quality imaging and digital elevation models, including TOPSAR, there is a need to quantify tectonic geomorphology to the point that it can contribute to an estimate of slip rates.

**Paleoseismology of blind thrusts**

Study of multichannel seismic profiles and petroleum-industry well data has resulted in the delineation of blind thrusts in the Los Angeles Basin, including the source fault for the 1987 Whittier Narrows earthquake (Dolan et al., 1995; Shaw and Suppe, 1996, Schneider et al., 1996; Shaw and Shearer, 1999; Tsutsumi et al., 2001), but little progress has been made in determining slip rates and recurrence intervals on these faults. High-resolution seismic profiles (Williams et al., 2000; Christofferson et al., 2000), trenching, and analysis of water-well logs (Mueller, 1997; K.J. Mueller and T.K. Rockwell, in prep.) and high-resolution late Quaternary stratigraphy (Ponti et al., 1996; D.J. Ponti, in prep.) are necessary to obtain a paleoseismic history of blind thrusts comparable to that obtained by trenching of surface faults.

**Dates of most recent large earthquakes**

Research by SCEC geologists has demonstrated that many active faults are potentially very hazardous to the Los Angeles metropolitan region because of their proximity to densely-populated areas. The slip rates of many metropolitan faults are difficult to measure because the faults are blind, the slip rates are low, or the data have been destroyed by urbanization. Therefore, it may be difficult to reconcile geologically-derived slip rates with geodetically-measured deformation. However, it would be useful to learn where Los Angeles is in the seismic cycle of potentially-hazardous urban faults. Two historical earthquakes have been correlated to local faults: the 1769 earthquake reported by the Portolá expedition (Grant et al., in revision) and the May 10, 1910 Temescal Valley earthquake on the Elsinore fault (Rockwell, 1989). More paleoseismic data are needed for time-dependent hazard calculations, analysis of deformation rates, and studies of triggered earthquakes and strain partitioning.

The Los Angeles metropolitan area needs a focused study comparable to BAPEX in the San Francisco Bay area. This would include study of the late Quaternary history of the San Jose, Walnut Creek-Indian Hill, Chino, Peralta Hills, and Newport-Inglewood faults, and the Palos Verdes fault northwest of Los Angeles Harbor.

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## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 1:11 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: NASA Santa Susana Field Laboratory
**Attachments:** SSFL-P~2.pdf

Dear Mr. Malinowski,

Please include my email below and particularly the attachment in my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Wed, Sep 25, 2013 at 6:47 AM
Subject: Fwd: NASA Santa Susana Field Laboratory
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

Please include this letter in my public comment on the NASA DEIS.

Thank you.

*Christine L. Rowe*

> Sent: 8/30/2013 4:06:04 A.M. Pacific Daylight Time
> Subj: NASA Santa Susana Field Laboratory
>
> Dear Administrator Bolden,
>
> This week I attended two meetings on the NASA Draft Environmental Impact Statement which I find to be insufficient for the members of my community to make informed decisions related to the cleanup.
>
> Yesterday, I participated as a NASA Section 106 consultant in a meeting at the NASA facilities at Santa Susana.
>
> We learned in the NASA Draft Environmental Impact Statement that all of the Santa Susana Field Laboratory was declared Sacred Lands under an Executive Order.
>
> In looking through the thousands of documents on my computer related to Santa Susana, I found a presentation given to members of DTSC's Public Participation Group - of which I was a member.
> I have attached that Power Point given by DTSC employees.

Since I do not understand the NASA Chain of Command, I respectfully request that you direct the appropriate people to consider my following comments:

1. It is my understanding that the Federal Department of Justice consulted with the Federal Agencies - I assume with NASA. It is my interpretation of the DOJ's conclusion that the Administrative Orders on Consent (AOC) was not signed to comply with SB 990. As a technical stakeholder at many DTSC meetings on the 2009 Proposed Consent Order - I respectfully disagree with that interpretation. The 2010 AOCs were written, in my opinion, to comply with the 2007 Consent Order and SB 990. See page one of the Power Point.
2. If the 9th Circuit Court upholds the lower courts ruling on SB 990, then SB 990 should be null. NASA therefore should consider renegotiating the AOC for a number of reasons.
3. According to the Power Point by DTSC, CEQA review should have been started in 2011 - we are almost into 2014. (page 13 of the Power Point) We have not started a CEQA review.
4. With three Responsible Parties all cleaning the SSFL site at one time, it will be detrimental to my community and the environment to send so many trucks down one route over a very short period of time.
5. The AOC's will not bypass CEQA, the Endangered Species Act, and **Historic preservation. -** page 10
6. As a scientist, you are aware that the first thing that a scientist does is to define a term that they are going to use. The term: "Historic preservation" is not defined in this Power Point, therefore, it can refer to historic structures or archaeological sites (in my opinion) - see page 10
7. In the NASA AOC with DTSC, under possible exceptions, this line discusses the cultural aspects of the site: "Native American artifacts that are formally recognized as Cultural Resources ". This term **artifact** is not defined. (page 43 Adobe of the NASA AOC). http://ssfl.msfc.nasa.gov/documents/governance/NASA_DTSC_Final_AOC_Dec_2010.pdf
8. In our Section 106 Consultation meeting, someone that is much more knowledgeable than me asked "Who did a NEPA and a Section 106 Review prior to NASA signing the AOC". That is my interpretation of that question. We were not given an answer.

In conclusion, I respectfully request that NASA renegotiate the agreements with DTSC. I respectfully request that NASA consider the NASA OIG's comments in terms of this not being a risk based clean up when almost every other comment that I heard at the NASA DEIS meetings were related to offsite risk and future risk.

- Please go back to the 2007 Consent Order and do a risk based clean up.

- I respectfully request that your NEPA / Section 106 Department review any other agreements with the State of California before they are signed.
- And I respectfully request that NASA review the new March 2013 NEPA CEQA Joint document from CEQ.
- Finally, I respectfully request that NASA continue its original EIS process that considered five alternatives - not just one. We now have much more to consider than just the clean up of the site.

We all want this site to be cleaned up. But at the Section 106 meeting yesterday, I believe the key words that I was hearing were **preservation -** preservation of historical resources and cultural resources. **Protection -** protection of the wildlife, the oak trees, and the Native Species.

If NASA can put a "Science Lab" on Mars, NASA can renegotiate a contract with DTSC that protects public health and safety, preserves historical and cultural assets, and protects both the local and global environment. Please help me to preserve and to protect.

Respectfully,

*Christine L. Rowe*
West Hills resident
NASA Section 106 consultant

# Administrative Orders on Consent

**Presentation to the**
**DTSC Public Participation Group**
**May 25, 2011**

# Administrative Orders on Consent: A Path Forward

- Represent a compromise
- Resolve disagreements over interpretations and implementation of SB 990 (Kuehl, 2007)
- Accelerate the process to more quickly get to cleanup
- Provide certainty and eliminate concerns about the unknown outcome of the cleanup process
- Take advantage of U.S. EPA's ongoing site survey and soil sampling work ***and*** U.S. EPA's expertise on radiological contamination

# What are the Administrative Orders on Consent?

- The final agreements between DOE and DTSC and between NASA and DTSC
- Integrate the Agreements in Principle with cleanup and environmental review procedures
- Include key elements that govern the relationship between DOE and DTSC, and NASA and DTSC
- Establish the requirements as binding and enforceable

# A Brief History

- <u>2007</u>

  Legislature passed and Governor signed SB 990

  - Boeing Letter of Intent
  - Cal/EPA Secretary Letter of Intent (with community)

- <u>2008</u>

  Discussed implementation details with RPs

- <u>2009</u>

  Negotiated new agreement with RPs

# A Brief History (continued)

- November 2009
  - Public comment period on agreement
  - Boeing tolling agreement
  - DTSC draft of agreement (based on community comments)
  - Boeing lawsuit

# A Brief History (continued)

- <u>February 2010</u>

  High level conversations

  - Cal/EPA Secretary Adams, DOE Secretary Chu, NASA Administrator Bolden
  - Desire to resolve differences and find path forward

- <u>March 2010</u>

  DOE offer to “clean to background”

# A Brief History (continued)

- March 2010 – August 2010

  Negotiate details of “clean to background”

  - What, who, how
  - Exceptions
  - Enforceability

- September 2010

  NASA agrees to use same approach

# A Brief History (continued)

- September 2010
  - Public comment on Agreements in Principle
- October 2010 – November 2010
  - Public comment on draft Administrative Orders on Consent
- December 2010
  - Administrative Orders on Consent signed

# What do the Administrative Orders on Consent do?

- Integrate the Agreements in Principle
- Clean up to Background Levels
  - No contaminated soils to be “left in place”
  - No contaminated soils to be buried or landfilled on-site
- Direct use of Detection Limits
  - For chemicals = reporting limit
  - For radionuclides = minimum detectable activity

# What do the Administrative Orders on Consent ***NOT*** do?

- Do not bypass other requirements/laws
  - CEQA
  - Endangered Species Act
  - Historic preservation

- Do not include groundwater or soils being contaminated by groundwater

# How will the groundwater be cleaned up?

- The 2007 Consent Agreement (including Boeing, DOE and NASA) is still in effect for groundwater
  - Boeing, DOE and NASA have been and will continue their groundwater investigation and cleanup responsibilities
  - Groundwater (and soils being re-contaminated by groundwater) will be taken care of with the groundwater cleanup

# Public Participation

- Public will have an opportunity to review and comment on ***all*** draft plans and reports
- DTSC to host technical roundtable sessions on key activities and work phases
- PPG will be asked for its input at key decision points
  - DTSC approval of key documents (at a minimum)
    - Lookup Tables
    - Characterization Report
    - Remedial Action Implementation Plan
    - Completion Report

# California Environmental Quality Act

- CEQA Scoping to begin in 2011
- CEQA analysis documents to be made available for public review and comment at the same time as the draft Soils Remedial Action Implementation Plan
- Analysis to take into account mitigation described in Plan

# Funding

- Investigation and cleanup activities to be funded by DOE (or NASA)

- DTSC oversight (and USEPA activities) to be fully funded by DOE (or NASA)

# Regulatory Oversight

- Characterization and cleanup (for both chemicals and radiologic contaminants) of both soils and groundwater are subject to DTSC approval

- U.S.EPA available in a vital technical consultative/advisory role

# US EPA Role

- Continue with radiologic background study and survey of Area IV and Northern Buffer Zone
- Provide local background values and reporting limits for radionuclides
- Provide “split” samples to DTSC during its Area IV/Northern Buffer Zone soil sampling
- Conduct post cleanup radiation assessment to verify cleanup
- Verify that backfill/replacement soils do not exceed local background

# Summary Judgment Order (Judge Conti Decision)

- DOE cannot transfer ownership or possession, or relinquish control over any portion of Area IV until it completes an EIS
- The Court retained jurisdiction until DOE has met its legal obligations
- DOE and DTSC to seek and obtain the support of the plaintiffs in applying for relief from the court’s order to allow the AOC to be carried out

# NASA Administrative Order on Consent

# Primary Differences
## NASA AOC v. DOE AOC

- Area II and portion of Area I
- NASA to focus primarily on chemical contaminants
  - If radiological contamination is discovered, sampling and disposal plans developed as needed
- No role for US EPA (no ongoing investigation or survey work)

# Primary Differences
## NASA AOC v. DOE AOC

- Investigation/chemical data
  - Continue with investigation activities underway
  - DTSC to identify data gaps and direct data gathering

# Primary Differences
## NASA AOC v. DOE AOC

- Confirmation sampling protocol to be developed (similar to DOE's)

- Investigation and cleanup activities to be funded by NASA

- DTSC oversight to be fully funded by NASA

# Boeing Lawsuit
## Recent Court Decision

- DTSC will continue to implement the Administrative Orders on Consent
- DTSC will appeal the court's decision
- DTSC will continue efforts to reach resolution with Boeing

# Questions?

**Dale Till**

| | |
|---|---|
| **From:** | Christine Rowe <crwhnc@gmail.com> |
| **Sent:** | Saturday, January 04, 2014 7:35 PM |
| **To:** | DTSC_SSFL_CEQA |
| **Cc:** | Malinowski, Mark@DTSC; Leclerc, Ray@DTSC |
| **Subject:** | Fwd: NASA Santa Susana Field Laboratory comment |
| **Attachments:** | SSFL-P~2 c.pdf; 3865_draft consent order version 2 0 doe and nasa proposed changes.pdf |

Dear Mr. Malinowski,

Please include the letter below to NASA in my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

From: **Christine Rowe** <crwhnc@gmail.com>
Date: Sat, Sep 7, 2013 at 6:04 PM
Subject: NASA Santa Susana Field Laboratory comment
To: msfc-ssfl-eis@mail.nasa.gov

September 7th, 2013

Dear Mr. Elliott.

I attended two meetings on the NASA Draft Environmental Impact Statement which I find to be insufficient for the members of my community to make informed decisions related to the cleanup.

I participated as a NASA Section 106 consultant in a meeting at the NASA facilities at Santa Susana.

We learned in the NASA Draft Environmental Impact Statement that all of the Santa Susana Field Laboratory was declared Sacred Lands under an Executive Order.

In looking through the thousands of documents on my computer related to Santa Susana, I found a presentation given to members of DTSC's Public Participation Group - of which I was a member.

I have attached that Power Point given by DTSC employees.

As a result of the NASA DEIS related meetings, the Section 106 consultation meeting, and many meetings with NASA and DTSC, these are some of my comments for the record:

1. It is my understanding that the Federal Department of Justice consulted with the Federal Agencies - I assume with NASA. It is my interpretation of the DOJ's conclusion that the Administrative Orders on Consent (AOC) was not signed to comply with SB 990. **(1)** - (page 20 Adobe)
2. As a technical stakeholder at many DTSC meetings on the 2009 Proposed Consent Order - I respectfully disagree with that interpretation. The 2010 AOCs were written, in my opinion, to comply with the 2007 Consent Order and SB 990. See page one of the Power Point by

DTSC. (<u>And please see the attachment called the 2.0 version of the 2009 Draft Consent Order - page 7 Adobe)</u>

3. If the 9th Circuit Court upholds the lower courts ruling on SB 990, in my opinion, then SB 990 should be null. NASA therefore should consider renegotiating the AOC for a number of reasons.
4. According to the Power Point by DTSC, CEQA review should have been started in 2011 - we are almost into 2014. (page 13 of the Power Point by DTSC) We have not started a CEQA review.
5. With three Responsible Parties all cleaning the SSFL site at one time, it will be detrimental to my community and the environment to send so many trucks down one route over a very short period of time.
6. The AOC's will not bypass CEQA, the Endangered Species Act, and **Historic preservation. (**page 10 of the Power Point by DTSC)
7. The first thing that a scientist or an educator does is to define a term that they are going to use. The term: "Historic preservation" is not defined in this Power Point, therefore, it can refer to historic structures or archaeological sites - <u>in my opinion.</u> (see page 10 of the Power Point by DTSC)
8. In the NASA AOC with DTSC, under possible exceptions, this line discusses the cultural aspects of the site: "Native American artifacts that are formally recognized as Cultural Resources ". This term **artifact** is not defined. (page 43 Adobe of the NASA AOC).(2)
9. Please refer to my email regarding the definition of an artifact and other similar terms dated September 5th, 2013.
10. In our Section 106 Consultation meeting, someone that is much more knowledgeable than me asked "Who did a NEPA and a Section 106 Review prior to NASA signing the AOC". That is my interpretation of that question. We were not given an answer.
11. There is a new NEPA CEQA Handbook dated March 2013.(3)

In conclusion, I respectfully request that NASA renegotiate the agreements with DTSC. I respectfully request that NASA consider the NASA OIG's comments in terms of this not being a risk based clean up when almost every other comment that I heard at the NASA DEIS meetings were related to offsite risk and future risk.

- <u>**Please go back to the 2007 Consent Order and do a risk based clean up based on future use or to a maximum of a suburban residential standard**.</u>

- I respectfully request that your NEPA / Section 106 Department review any other agreements with the State of California before they are signed.
- I respectfully request that NASA review the new March 2013 NEPA CEQA Joint document from CEQ.(3)
- Finally, I respectfully request that NASA continue its original EIS process that considered five alternatives - not just one. We now have much more to consider than just the clean up of the site.

We all want this site to be cleaned up. But at the Section 106 meeting, I believe the key words that I was hearing were **preservation** - preservation of historical resources and cultural resources. **Protection** - protection of the wildlife, the oak trees, and the Native Species.

If NASA can put a "Science Lab" on Mars, if NASA can launch LADEE to the moon; then NASA ***can*** renegotiate a contract with DTSC that protects public health and safety, preserves historical and cultural assets, and protects both the local and global environment. Please help me to preserve and to protect.

Respectfully,

*Christine L. Rowe*
West Hills resident
NASA Section 106 consultant

(1) Brief for the United States as Amicus Curiae Supporting Affirmance:
http://www.dtsc-ssfl.com/files/lib_pub_involve/other_docs/66002_US_DOJ_Brief_re_SB990.pdf
(2)Administrative Order on Consent for Remedial Action:
http://ssfl.msfc.nasa.gov/documents/governance/NASA_DTSC_Final_AOC_Dec_2010.pdf
(3) NEPA CEQA Handbook - March 2013:
http://www.whitehouse.gov/sites/default/files/nepa_and_ceqa_draft_handbook.pdf

# Administrative Orders on Consent

**Presentation to the**
**DTSC Public Participation Group**
**May 25, 2011**

# Administrative Orders on Consent: A Path Forward

- Represent a compromise
- Resolve disagreements over interpretations and implementation of SB 990 (Kuehl, 2007)
- Accelerate the process to more quickly get to cleanup
- Provide certainty and eliminate concerns about the unknown outcome of the cleanup process
- Take advantage of U.S. EPA’s ongoing site survey and soil sampling work ***and*** U.S. EPA’s expertise on radiological contamination

# What are the Administrative Orders on Consent?

- The final agreements between DOE and DTSC and between NASA and DTSC
- Integrate the Agreements in Principle with cleanup and environmental review procedures
- Include key elements that govern the relationship between DOE and DTSC, and NASA and DTSC
- Establish the requirements as binding and enforceable

# A Brief History

- 2007

  Legislature passed and Governor signed SB 990

  - Boeing Letter of Intent
  - Cal/EPA Secretary Letter of Intent (with community)

- 2008

  Discussed implementation details with RPs

- 2009

  Negotiated new agreement with RPs

# A Brief History (continued)

- November 2009
  - Public comment period on agreement
  - Boeing tolling agreement
  - DTSC draft of agreement (based on community comments)
  - Boeing lawsuit

# A Brief History (continued)

- <u>February 2010</u>

  High level conversations

  - Cal/EPA Secretary Adams, DOE Secretary Chu, NASA Administrator Bolden
  - Desire to resolve differences and find path forward

- <u>March 2010</u>

  DOE offer to “clean to background”

# A Brief History (continued)

- March 2010 – August 2010

  Negotiate details of “clean to background”

  - What, who, how
  - Exceptions
  - Enforceability

- September 2010

  NASA agrees to use same approach

# A Brief History (continued)

- September 2010
  - Public comment on Agreements in Principle
- October 2010 – November 2010
  - Public comment on draft Administrative Orders on Consent
- December 2010
  - Administrative Orders on Consent signed

# What do the Administrative Orders on Consent do?

- Integrate the Agreements in Principle
- Clean up to Background Levels
  - No contaminated soils to be "left in place"
  - No contaminated soils to be buried or landfilled on-site
- Direct use of Detection Limits
  - For chemicals = reporting limit
  - For radionuclides = minimum detectable activity

# What do the Administrative Orders on Consent ***NOT*** do?

- Do not bypass other requirements/laws
  - CEQA
  - Endangered Species Act
  - Historic preservation

- Do not include groundwater or soils being contaminated by groundwater

# How will the groundwater be cleaned up?

- The 2007 Consent Agreement (including Boeing, DOE and NASA) is still in effect for groundwater
  - Boeing, DOE and NASA have been and will continue their groundwater investigation and cleanup responsibilities
  - Groundwater (and soils being re-contaminated by groundwater) will be taken care of with the groundwater cleanup

# Public Participation

- Public will have an opportunity to review and comment on ***all*** draft plans and reports
- DTSC to host technical roundtable sessions on key activities and work phases
- PPG will be asked for its input at key decision points
  - DTSC approval of key documents (at a minimum)
    - Lookup Tables
    - Characterization Report
    - Remedial Action Implementation Plan
    - Completion Report

# California Environmental Quality Act

- CEQA Scoping to begin in 2011
- CEQA analysis documents to be made available for public review and comment at the same time as the draft Soils Remedial Action Implementation Plan
- Analysis to take into account mitigation described in Plan

# Funding

- Investigation and cleanup activities to be funded by DOE (or NASA)

- DTSC oversight (and USEPA activities) to be fully funded by DOE (or NASA)

# Regulatory Oversight

- Characterization and cleanup (for both chemicals and radiologic contaminants) of both soils and groundwater are subject to DTSC approval

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# Questions?

**DRAFT FOR DISCUSSION PURPOSES ONLY**

**Note: This is an alternative version of the draft order, containing changes that DOE and NASA have proposed to the version of the agreement previously posted. While these changes have been discussed among the representatives of DTSC, DOE, and NASA, this version of the Order has not been agreed to by the three parties. In the interest of transparency, DTSC is making this alternate version available to the public. Comments submitted on both versions will inform the negotiations between DTSC, DOE and NASA as we move towards finalizing the consent cleanup order.**

# DRAFT 2.0

STATE OF CALIFORNIA
ENVIRONMENTAL PROTECTION AGENCY
DEPARTMENT OF TOXIC SUBSTANCES CONTROL

| | |
|---|---|
| In the Matter of:<br>Santa Susana Field Laboratory<br>Simi Hills<br>Ventura County, California<br>CA1800090010 (NASA)<br>CAD000629972 (Boeing/DOE)<br>CA3890090001 (Boeing/DOE)<br><br>The National Aeronautics &<br>Space Administration and<br>The U.S. Department of Energy,<br>(Respondents) | Docket No.<br>CONSENT ORDER FOR RESPONSE ACTION<br><br>Health and Safety Code Sections 25187, 25355.5(a)(1)(C), 25359.20, 58009 and 58010 |

## INTRODUCTION

1.1. Parties. The California Department of Toxic Substances Control (DTSC), the National Aeronautics & Space Administration (NASA), a federal agency, and the U.S. Department of Energy (DOE), a federal agency (Respondents) enter into this Consent Order for Response Action.

1.2. Background. Respondents are the owners and/or operators of hazardous waste management units and facilities at the ~~approximately 2,850-acre~~ Santa Susana Field Laboratory (SSFL), an approximately 2,850-acre location also referred to under this Order as "the Facility" and "the Site," ~~located~~ situated in the Simi Hills ~~in~~ of southeastern Ventura County, California as shown on Attachment 1. The Simi Hills are bordered to the east by the San Fernando Valley and to the north by the Simi Valley. The SSFL is located approximately three miles south of the San Fernando Valley Freeway (118) and approximately five miles north of the Ventura Freeway (101). The SSFL was established in 1947. Activities at the SSFL have included but were not limited to rocket engine testing and research and development of fuels, propellants, nuclear power, and lasers. The SSFL is divided into four administrative areas – Area I, Area II, Area III, and Area IV - and two undeveloped areas. A 41.7-acre portion of Area I and all of Area II, which is 409.5 acres, are owned by the federal government, administered by NASA and operated by Boeing or its predecessors. Historical operations in Area II and the government-owned portion of Area I included rocket engine testing, propellant and fuel storage and loading, and non-hazardous waste incineration (Area II) and production of liquid oxygen (Area I), Additional information about the history of these operations is available at http://www.nasa.gov/ssfl. The Department of Energy (DOE) owns facilities on a 90-acre site within Area IV, which ~~is~~ are collectively known as the "Energy Technology Engineering Center" (ETEC)~~, while~~. Boeing owns the underlying land. The 90-acre ETEC consists primarily of ~~facilities and~~ structures built and owned by DOE and operated by Boeing or its predecessors. Area IV was used for nuclear power research. The history of these operations is described at various places, including DOE's ETEC Closure Project web site at http://www.etec.energy.gov/ and in the "Historical Site Assessment of Area IV, Santa Susana Field Laboratory, Ventura County, California", May 2005 at http://www.etec.energy.gov/Cleanup/Historical-Site-Assessment.html.

The postclosure permit for Areas I and III addresses five surface impoundments and five groundwater treatment systems or towers. The postclosure permit for Area II addresses four surface impoundments and three groundwater treatment systems or towers. The RCRA closure process for these units was initiated in 1985. Evaluations of the surface impoundments continue as part of the investigative work described in this Order. The Thermal Treatment Facility (TTF) located in the southern portion of Area I, in the eastern portion of the Area I Burn Pit, is subject to RCRA closure. Closure requirements may be addressed through the characterization and remediation procedures specified in this Order.

In Area IV, DOE-owned/Boeing-operated facilities include the Hazardous Waste Management Facility (the HWMF) and the Radioactive Materials Handling Facility (RMHF). DTSC issued a permit for the HWMF in 1993 to DOE as owner and Rockwell International Corporation as facility operator (Permit Number: 93-3-TS-002), EPA I.D. Number: CAD000629972). This permit authorized the continued operation of a treatment unit (the Building 133 sodium burn facility) and a storage unit (the Building 29 sodium storage facility). The HWMF is inactive and remains subject to closure requirements. DTSC has approved DOE’s closure plan for the HWMF; however, implementation of the closure plan is on hold. The RMHF is a mixed waste facility for which Interim

Status authority first went into force with the March 22, 1989 Part A submittal to the U.S. Environmental Protection Agency (Interim Status Document EPA I.D. Number: CA3890090001). In September 1997, DTSC required DOE and Boeing to submit a revised Part A application to clarify the hazardous waste operating units at the RMHF eligible for Interim Status and to include a closure plan and schedule for closure. A revised Part A application and Closure Plan for the RMHF were submitted on October 24, 1997. DTSC determined the Part A application complied with the administrative requirements for Interim Status. The RMHF consists of two hazardous waste management storage units (Building 4022, and Building 4621 and its accompanying yard) and a mixed waste treatment unit (Building 4021). Closure of the RMHF is on hold. ~~In each of the Areas I, II, III, and IV described above, and in both of the undeveloped areas described above, t~~There have been releases or potential releases of hazardous substances into the environment that require response actions in each of the Areas I, II, III, and IV described above, and in both of the undeveloped areas described above.

1.3. Authorities.

1.3.1 DTSC issues and enters this Order pursuant to its authority and responsibilities under Health and Safety Code sections 25187, 25355.5(a)(1)(C), 25359.20, 58009 and 58010. Health and Safety Code section 25187 authorizes DTSC to issue an Order to require corrective action when DTSC determines that there is or has been a release of hazardous waste or hazardous waste constituents into the environment from a hazardous waste facility. Health and Safety Code section 25187 further authorizes DTSC, *inter alia*, to implement a response action pursuant to Chapter 6.8 (commencing with Health and Safety Code section 25300). Health and Safety Code section 25355.5 (a)(1)(C) authorizes DTSC to issue an Order establishing a schedule for removing or remedying the release of a hazardous substance, or for correcting the conditions that threaten the release of a hazardous substance, and authorizes DTSC to enter into an enforceable agreement with a potentially responsible party that requires the party to take necessary response action to remove the threat of a release, or to determine the nature and extent of the release and adequately characterize the site, prepare a response action plan, and complete the necessary response actions as required in the approved response action plan. Health and Safety Code section 25359.20 authorizes DTSC to use any legal remedies available pursuant to Chapter 6.8 (commencing with section 25300) or Chapter 6.5 (commencing with section 25100) to compel a responsible party or responsible parties to take or pay for appropriate response action necessary to protect the public health and safety and environment at the SSFL site. Health and Safety Code section 25359.20(b) requires that any response action at the Site be taken in accordance with the provisions of Chapter 6.8.

Health and Safety Code section 58009 authorizes DTSC to commence and maintain all proper and necessary actions and proceedings to enforce its rules and regulations; to enjoin and abate nuisances ~~related to matters within its jurisdiction which~~ that are dangerous to health within its jurisdiction; to compel the performance of any act specifically enjoined upon ~~by~~ any person, office, or board by any law of this State relating to matters within its jurisdiction; or on matters within its jurisdiction, to protect and preserve the public health. Health and Safety Code section 58010 authorizes DTSC to abate nuisances related to matters within its jurisdiction.

Nothing in this Order shall be construed as a concession by DTSC regarding the Federal Respondents' statement of authorities in section 1.3.2 below, and DTSC expressly reserves all rights as specified under section 1.6 below.

1.3.2. NASA and DOE enter into this Order pursuant to their federal authority and responsibilities under sections 104 and 120 of CERCLA, 42 U.S.C. sections 9604 and 9620, the National Contingency Plan (NCP), 40 C.F.R. Part 300, Executive Order 12580, and section 6001 of RCRA, 42 U.S.C. section 6961. Nothing in this Order shall be construed as constituting submission by Federal Respondents to any State authority or jurisdiction under California Health and Safety Code sections 58009 and 58010 or any State authority or jurisdiction beyond the extent that Congress has expressly waived the sovereign immunity of the United States.

1.3.3. DOE's Additional Statement of Authorities. In addition to the authorities cited in Section 1.3.2 above, DOE also enters into this Order pursuant to its authority and responsibilities under the Atomic Energy Act of 1954, as amended (AEA), 42 U.S.C. 2011, et seq, the Energy Reorganization Act of 1974, 42 U.S.C. 5801, et seq., and the Department of Energy Organization Act of 1977, 42 U.S.C. 7101, et seq. It is DOE's legal position that California does not have regulatory authority over DOE with respect to radioactive material. DOE and DTSC agree that the cleanup of the SSFL needs to move forward and wish to cooperate to achieve this end. DOE believes that its legal position is not an obstacle to achieving a cooperative and timely cleanup of the site, including the radioactive materials, in a manner consistent with SB 990 due to factors unique to the site, including the fact that DOE is not the landowner. Without waiving its legal position or the rights reserved in this Order, and as an exercise of comity between DOE and the

State of California, DOE ~~agrees to cooperate with implementation of this amended Consent Order. Therefore, DOE agrees to comply with and be bound by the terms and conditions of this Order~~ shall provide DTSC with information required by this Consent Order in a timely manner, including information concerning radioactive contamination in Area IV, the northern undeveloped land, and any other radioactive contamination at the site that originated from DOE operations in Area IV that is required by this Consent Order. DOE shall also provide to DTSC all information developed by DOE in its preparation of the Environmental Impact Statement for Area IV when that information is available.

In order to complete a cooperative and timely cleanup of the site consistent with SB 990, DOE shall exercise its CERCLA and AEA authorities through a process to determine an appropriate remedy to clean up radioactive contamination in Area IV, the northern undeveloped land and in other areas where contamination exists that originated from DOE operations at the site. This process shall include the rural and suburban residential future land use scenario consistent with SB 990. DOE will involve the public in that process. If necessary, DTSC and DOE will engage in the dispute resolution process described in this Order, and, subject to that process, may also utilize such other informal dispute resolution procedures as the parties agree are appropriate in order to achieve the shared goal of moving the cleanup forward, and resolving any environmental or legal conflicts, without litigation.

1.3.4. No provision of this Order is intended to nor shall be construed to interfere with or supersede the authority of the Los Angeles Regional Water Quality Control Board or State Water Resources Control Board pursuant to the Porter-Cologne Water Quality Control Act, Water Code

Section 13000 et seq., or other provisions of law, or of the California Department of Public Health or other appropriate State and local agencies.  No provision of this Order is intended to limit or interfere with the enforcement powers of the District Attorneys for the Counties of Los Angeles and Ventura for matters within their respective jurisdictions.

1.4. Definition of Terms.  The terms used in this Order are as defined in California Health and Safety Code, Division. 20, Chapters 6.5 and 6.8, and California Code of Regulations, Title 22, Division. 4.5, except as otherwise provided.

"Chemical of Potential Concern (COPC)" shall mean a chemical that is present in the environment at levels that exceed background levels and may cause adverse human health effects and is a result of a release at the Site,.

"Chemical of Potential Ecological Concern (COPEC)" shall mean a chemical that is present in the environment at levels that exceed background levels and may cause adverse health effects in animals or plants and is the result of a release at the Site.

"Mixed Waste" shall mean a waste that contains both hazardous waste and radioactive waste, i.e., source, special nuclear, or byproduct material subject to the Atomic Energy Act of 1954, as amended.

"Radionuclide of Potential Concern (ROPC)" shall mean a radionuclide that is present in the environment at levels that exceed background levels and may cause adverse human health effects and is the result of a release at the Site.

"Radionuclide of Potential Ecological Concern (ROPEC)" shall mean a radionuclide that is present in the environment at levels that exceed background levels and may cause adverse health effects in animals or plants and is the result of a release at the Site.

"Respondent(s)" shall mean one or more of the Respondents identified in Section 1.1 of this Order.

"Remedial Investigation" or "RI" under Chapter 6.8 shall be the functional equivalent to "RCRA Facility Investigation" or "RFI" discussed in sections 3.4 through 3.4.4 of the Consent Order for Corrective Action issued August 16, 2007.

"Feasibility Study" or "FS" under Chapter 6.8 shall be the functional equivalent to "Corrective Measures Study" or "CMS" discussed in sections 3.5 through 3.5.4 of the Consent Order for Corrective Action issued August 16, 2007.

"Response Action Plan" or "RAP" shall be the functional equivalent to the corrective measures selection documentation discussed in sections 3.6 through 3.6.3 of the Consent Order for Corrective Action issued August 16, 2007.

"Remedial Design/Response Action Implementation" or "RD/RA Implementation" shall be the functional equivalent to "Corrective Measures Implementation" or "CMI" discussed in sections 3.7 through 3.7.3 of the Consent Order for Corrective Action issued August 16, 2007.

1.5. Attachments. All attachments to this Order are incorporated herein by this reference.

1.6. Denial of Liability; Reservation of Rights; No Admissions. By issuance of this Order, DTSC does not waive the right to take further enforcement actions. In addition, by entering into this Order, Respondents do not admit to any fact, statement, or recitation set forth in this Order, or to any fact, fault or liability under any federal or State statute or regulation or other provision of law. This Order shall not constitute a release, waiver, covenant not to sue or limitation of any kind, and Respondents and DTSC expressly retain all rights, remedies, defenses, causes of action, powers and authorities, civil or criminal, that Respondents or DTSC have – with respect to any disputes or claims amongst each other or against any other parties – under any statutory, regulatory, constitutional or common law authority, nor shall it be construed or applied in any way to affect the ability of Respondents to seek or obtain relief in federal court or any other court of competent jurisdiction. Without limitation of the aforementioned reservation of rights, Respondents do not admit or consent to the constitutionality, legality, enforceability, or validity of California Health and Safety Code section 25359.20 in whole or in part. DTSC asserts that California Health and Safety Code section 25359.20 is constitutional, legal, enforceable and valid. To the extent that California Health and Safety Code section 25359.20 or any federal or State law or regulation incorporated into, referenced in, or authorizing this Order is subsequently modified, amended, repealed, invalidated, declared unenforceable or superseded, in whole or in part, Respondents' obligations under this Order shall be modified accordingly, including as further provided below in section 4.27 (Severability).

FINDINGS OF FACT

DTSC hereby finds:

2.1. Region IX of the U.S. Environmental Protection Agency (U.S. EPA) issued an Interim Final RCRA Facility Assessment Report (RFA) in July 1991 that identified 122 areas of the SSFL for designation as Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). On November 12, 1992, DTSC issued a Stipulated Enforcement Order to Rockwell International Corporation (Rockwell International, predecessor to Boeing)[1] to impose corrective action requirements at the SSFL based on the 1991 RFA. The 1992 Order required Rockwell International to submit a Current Conditions Report analyzing each area identified in the RFA. The Current Conditions Report was to contain an in-depth investigation of waste generation and release that occurred at each area and a determination of necessary further actions for each area, with a basis for each conclusion. The 1992 Order also required Rockwell International, after submittal of the Current Conditions Report, to submit a draft RCRA Facility Investigation Workplan (RFI Workplan), including plans for each area identified in the Current Conditions Reports as areas appropriate for investigation. The parties contemplated that approval of the RFI Workplan would result in an RFI Report, Corrective Measures Studies and final cleanup of the areas identified in the final Corrective Measures Studies. A Current Conditions Report was prepared by ICF Kaiser Engineers in 1993, on behalf of Rockwell International.

In May 1994, U.S. EPA finalized the RCRA Facility Assessment Report (RFA). When finalized in 1994, the RFA identified three additional areas for a total of 125 SWMUs and AOCs at the SSFL that either have released or may release hazardous wastes or hazardous waste constituents into the environment. During the subsequent RFI phase, 10 additional AOCs were identified at the SSFL. All 135 SWMUs and AOCs are summarized in Attachment 4. They include all five of the Area I and III closed RCRA surface impoundments, the four Area II closed RCRA

[1] Boeing became subject to the Order through its 1996 acquisition of the Rockwell International Corporation, Rocketdyne Division after the Order was issued.

surface impoundments, the Area IV HWMF, and the Area IV RMHF. Leach fields are typically associated with individual SWMUs and not shown individually except in Area IV where they are independent units.

2.2. Based on the RFA, DTSC concluded that further investigation was needed to determine the nature and extent of releases of hazardous wastes or hazardous waste constituents in or from the SWMUs and AOCs listed in Attachment 4. Identified SWMUs and AOCs have been grouped by location for investigation purposes and the groups are called "RFI Sites." A total of 51 RFI Sites have been identified for investigation under the RFI process. The RFI Sites are listed in Attachment 5 and as of the effective date of this Order shall be deemed "RI Sites." A comprehensive description of tasks performed for the RFI surficial media investigation, RFI scope, workplans prepared, and expansion and changes to the RFI, are described in the RCRA Facility Investigation Program Report, Surficial Operable Unit, Santa Susana Field Laboratory dated July 2004 (Program Report). Laboratory information for samples collected through December 31, 2003 is provided in the Program Report.

2.3. Since the early 1980s, SSFL site characterization has proceeded along two parallel paths, one path for Chatsworth Formation groundwater and ~~the other~~ a second path for soils and related surficial media. This approach was formalized by defining the groundwater and surficial media as two Operable Units (OUs) for investigation and other response action purposes. The OUs at the Site are:

I. The Surficial Media OU comprising saturated and unsaturated soil, sediment, surface water, near-surface groundwater, soil vapor, air, biota, and weathered bedrock. Near-surface groundwater is groundwater that occurs within the alluvium or weathered bedrock.

II. The Chatsworth Formation OU, comprising the Chatsworth formation aquifer, and both saturated and unsaturated unweathered (competent) bedrock.

A discussion of the RFI and OUs is presented in the Program Report.

2.4. Based on a September 1990 Comprehensive Monitoring Evaluation (CME) for Chatsworth Formation groundwater conducted by DTSC, Boeing and its predecessor were required to implement a DTSC-approved Site Characterization Plan under the corrective action program. Between 1990 and 2000, several groundwater monitoring wells were installed and sampled, rock core sampling was performed at two locations in the northeast and southeast portions of the site, site fracture data were analyzed, aquifer tests were conducted, and a hydraulic communication study was conducted. The results from these activities were presented in several documents submitted over this period. In September 2000, DTSC approved an investigation of the fractured bedrock and Chatsworth Formation groundwater at the SSFL (Workplan for Additional Field Investigations, Chatsworth Formation Operable Unit, Santa Susana Field Laboratory dated October 2000). Further site characterization is intended to provide an understanding of the complex fracture-dominated groundwater system at SSFL and the movement of constituents of concern (COCs) in the groundwater. As of February 1, 2009, more than 400 shallow and deep wells, and piezometers had been installed on and off the SSFL for the purpose of monitoring and characterizing the groundwater and COCs.

2.4.1. On May 2, 2007, the U. S. Federal District Court of Northern California issued an order granting plaintiff's motion for summary judgment in the case Natural Resources Defense Council, Inc. et al. vs. DOE [Civ. No. 04-CV-04448 SC (BZ)]. On the following day the Court permanently enjoined DOE from transferring ownership or possession, or otherwise relinquishing control over any portion of Area IV until DOE completes an Environmental Impact Statement (EIS) for Area IV and issues a Record of Decision pursuant to the National Environmental Policy Act.

2.4.2. On November 1, 2007, DTSC issued an Imminent and Substantial Determination and Order and Remedial Action Order to Boeing and NASA requiring the removal of asbestos-containing material and other debris associated with SSFL operations from a stream bed on public property ("Sage Ranch"), located adjacent to SSFL, and removal of polycyclic aromatic hydrocarbon-containing clay pigeon fragments from a former shooting range ~~which~~ that was operated by the former Rocketdyne-Atomics International Rifle and Pistol Club, an organization that was separate and independent from Boeing and its predecessors, and also located on Sage Ranch. Soil and debris removal related to the aforementioned asbestos containing-material and other debris from Sage Ranch was completed on December 20, 2007. Although Rockwell International conducted voluntary cleanup of the polycyclic aromatic hydrocarbon-containing clay pigeon fragments and associated lead shot from the former Rocketdyne-Atomics International Rifle and Pistol Club shooting range in 1993, and Boeing conducted voluntary cleanups of these materials in 1998 and 2006, these materials are not the result of SSFL research activities or operations. In 2008, during the removal of the clay pigeon fragments from the former shooting range area, Respondent Boeing discovered 1,163 small rocket motor igniters, lab glassware, and other debris beneath the surface. Some of the rocket motor igniters likely have resulted from SSFL research activities or operations.

2.4.3. In 2007, U.S. EPA conducted a Preliminary Assessment/Site Investigation under CERCLA to determine whether additional federal response at the Site was necessary. The Site scored above the threshold score for listing on the National Priority List (NPL). By letter dated December 6, 2007, U.S. EPA requested the State of California's position on placement of the Site on the NPL. In January 2009, the State of California notified U.S. EPA that it did not concur in placing the Site on the NPL, but reserved the right to change its position on this issue if circumstances change.

2.4.4. On August 16, 2007, Respondents, along with Boeing and DTSC entered into a Consent Order for Corrective Action. ~~Among other things, t~~The August 16, 2007 Order required, among other things, Respondents to submit a corrective action schedule~~,~~ and ~~to~~ take ~~other~~ steps necessary to complete the cleanup of all surficial media by June 30, 2017. As of the date of this Order, Respondents have met all obligations under the Consent Order for Corrective Action.

2.4.5. Pursuant to the provisions of the 2008 Consolidated Appropriations Act, 2008 (H.R. 2764, Public Law 110-161), on July 24, 2008, DOE and U.S. EPA signed an interagency agreement to conduct a comprehensive radiological site characterization for Area IV and a radiological background study for the SSFL. Under this Agreement, DOE transferred $1.5 million to U.S. EPA to fund a radiological background study for the Site and to develop a scope of work for the radiological characterization survey for Area IV. The DOE/EPA Interagency Agreement was amended on February 17, 2009 to reflect the transfer of an additional $1.7 million to U.S. EPA by

DOE. On April 23, 2009, DOE and U.S. EPA Region IX signed an amendment to the Interagency Agreement providing for the transfer of $38.3 million in DOE American Reinvestment and Recovery Act funding to U.S. EPA that fully met DOE's commitment to fund U.S. EPA's December 2008 estimate of costs to develop the radiological characterization survey for Area IV. EPA's radiological site characterization for Area IV will include a Historical Site Assessment and survey that will address not only the 290 acres of Area IV but also the 182 acre northern undeveloped land and any drainages that originate from Area IV and extend into adjacent downstream areas of SSFL potentially impacted by Area IV operations.

2.4.6. DOE's completion of the EIS mentioned in section 2.4.1 of this Order is dependent on and must follow U.S. EPA's completion of the radiological survey of Area IV mentioned in section 2.4.5 of this Order.

2.4.7. Senate Bill (SB) 990 (Health and Safety Code sections 25359.20 (a) through (e)) was signed into law on October 14, 2007 and became effective on January 1, 2008. Section 25359.20(b) requires that "[a] response action taken or approved at the Santa Susana Field Laboratory site shall be conducted in accordance with the provisions of [Chapter 6.8]." This Consent Order for Response Action incorporates terms specific to the response action procedures prescribed by Health and Safety Code, Division 20, Chapter 6.8 rather than the corrective action process carried out under Health and Safety Code Chapter 6.5. Section 25359.20(c) states: "A response action taken or approved pursuant to this chapter for the Santa Susana Field Laboratory site shall be based upon, and be no less stringent than, the provisions of Section 25356.1.5. In calculating the risk, the cumulative risk from radiological and chemical contaminants at the site shall be summed, and the land use assumption shall be either suburban residential or rural residential (agricultural) whichever produces the lower permissible residual concentration for each contaminant. In the case of radioactive contamination, [DTSC] shall use as its risk range point of departure the concentrations in the Preliminary Remediation Goals issued by the Superfund Office of the United States Environmental Protection Agency in effect as of January 1, 2007" and presented in Attachment 6. Sections 25359.20(d) and (e) prohibit the sale, lease, sublease, or other transfer of SSFL property unless the Director of DTSC or his or her designee certifies that the land has undergone complete remediation pursuant to the most protective standards in sections 25359.20(a) through (c), inclusive.

2.5. Potential human and ecologic exposures to chemicals and radionuclides can occur either onsite or as a result of migration to offsite areas. A generalized conceptual site model (CSM) of potential exposure pathways to COCs at SSFL was developed based on field observations, current and future site use scenarios, and data collected during the investigations at the SSFL. The CSM for SSFL is described in the 2005 Standardized Risk Assessment Methodology (SRAM) Work Plan (Rev. 2) approved by DTSC. The SRAM (Rev. 2) was approved before the enactment of SB 990 (see section 2.4.7 of this order) and shall be revised to reflect SB 990 requirements. Attachments 7 and 8 provide a list of potential chemical and radionuclide exposure pathways for human health and ecological risk assessment at the SSFL.

2.6. Types of chemicals associated with rocket engine testing and other research and development activities at the SSFL, and corresponding hazardous substances consequently generated or present at the SSFL are shown on Attachment 9.

2.6.1. A list of COCs has been developed for the nine closed surface impoundments addressed in the two postclosure permits for Areas I and III, and Area II. COCs from the postclosure permits are listed in Attachment 10.

2.7. Numerous investigations have been conducted to assess the presence of contaminants in groundwater beneath the Site. The SSFL is geologically complex consisting of dipping, fractured sandstone and siltstone with several faults. Releases of hazardous substances have migrated offsite through groundwater. Trichloroethylene (TCE) has been identified in the groundwater at the SSFL and in groundwater monitoring wells immediately northeast and offsite of the SSFL. Groundwater characterization activities are ongoing to further assess the nature and extent of groundwater contamination at the SSFL. Various radionuclides have been detected in groundwater at the Site. A list of chemicals and radionuclides in groundwater at the SSFL identified as of the issuance of this Order is provided in Attachment 11.

2.8. The SSFL is located in hilly terrain, with approximately 1,100 feet of topographic relief near the crest of the Simi Hills. Approximately 70 percent of the area within a ~~5~~ five-mile radius of the SSFL is undeveloped. The SSFL contains considerable cultural, historical and natural resources that are unique and valuable. Residential development is located north of the SSFL, and also to the east of the SSFL (on Woolsey Canyon Road and in Dayton Canyon). Residential areas located south of the SSFL are separated from active portions of the SSFL by an undeveloped area. New residential developments are proposed in Dayton Canyon to the east, Woolsey Canyon to the northeast, and in Runkle Canyon to the northwest.

2.9. Surface water from the SSFL drains primarily toward the south into Bell Creek and then eastward to the Los Angeles River with its confluence located in the San Fernando Valley. Surface water in the very north portion of the SSFL drains via various drainages into Meier Canyon and other drainages which lead to the Arroyo Simi located in Simi Valley. Surface water runoff from Happy Valley on the east flows via Dayton Canyon Creek to Chatsworth Creek and then into Bell Creek. Bell Creek subsequently flows southeast to the Los Angeles River.

2.10. Water supply (drinking water) at the SSFL is provided by the Calleguas Water Company. There are currently no domestic water supply wells in use at the SSFL.

2.11. Hazardous substances released from operations at the SSFL have migrated or may migrate into soil, surface water, air, and groundwater (including seeps and springs) pathways. Potential exposures to hazardous substances can occur from direct contact with soils, sediments, weathered bedrock, surface water, air, and groundwater, and by ingestion of plants and animals if any were grown or raised on the Site. The Site is currently not used for growing or raising plants or animals. With the exception of plants that could be maintained in an Engineered Natural Treatment System for surface water control (but would not be consumed), there is currently no known intent to use the Site to grow or raise plants or animals in the future and Respondents Boeing and NASA intend to restrict all future use of groundwater at the Facility.

WORK TO BE PERFORMED

Based on the foregoing legal and factual statements and assertions, it is hereby ordered and agreed that:

3.1. Without waiving its authority under Health and Safety Code section 25359.20 to use legal remedies under either Chapter 6.5 or 6.8, DTSC shall require and oversee Site investigation and remediation pursuant to the provisions of Health and Safety Code, Division 20, Chapter 6.8, Sections 25300-25395 ("Chapter 6.8"), as provided by SB 990 (Health and Safety Code section 25359.20(b)). Remediation under Chapter 6.8 shall continue to ensure that releases of hazardous substances at the Site are appropriately investigated and remediated, that the cleanup is protective of human health and the environment, and that there will be public participation in the decision-making process. Upon the Effective Date of this Consent Order, work performed to date pursuant to the Chapter 6.5 corrective action process and referenced in section 3.4.1(a)-(z), shall continue under this Consent Order, but in accordance with the processes and terminology established by Chapter 6.8. The processes and terminology of Chapter 6.5 and Chapter 6.8 shall be deemed functionally equivalent under this Consent Order. All corrective action work for the Site performed prior to the Effective Date shall be deemed sufficient under this Consent Order, and no modifications of any submittals under the Consent Order for Corrective Action referenced in Section 2.4.3 shall be required, except and only to the extent as such modifications are required by Section 25359.20, or to the extent that new information indicates that such modifications are necessary and appropriate. Except as specified in this Order, Respondents shall perform the work required by this Order in a manner ~~not in~~consistent with the DTSC-approved RI workplans (including RFI workplans approved under Chapter 6.5 corrective action) and amendments or additions, Feasibility Study Workplan, Response Action Implementation Plan, any other DTSC-approved workplans, Health and Safety Code section 25359.20, other applicable State and federal laws and their implementing regulations, and applicable DTSC and U.S. EPA guidance documents identified in Attachment 12, to the extent such guidance documents are ~~not in~~consistent with the implementation ~~requirements~~ of SB 990 under ~~or~~ the terms of this Order.

3.1.1. Chemicals of potential concern (COPCs) and chemicals of potential ecological concern (COPECs) for input into, respectively, the human health and the ecologic risk assessments shall be determined following methods outlined in the SRAM (Rev. 3) described in section 3.2.4 of this Order. Chemicals of concern (COCs) and chemicals of ecological concern (COECs) shall be identified in each of the RI reports as they are prepared. Radionuclides of potential concern (ROPCs) and radionuclides of potential ecological concern (ROPECs) for input into, respectively, the Human Health and the Ecologic Risk Assessments, shall be determined following methods outlined in the SRAM (Rev. 3) described in section 3.2.4 of this Order. Radionuclides of concern (ROCs) and radionuclides of ecological concern (ROECs) shall be identified in each of the RI reports as they are prepared. Respondents shall update already-submitted draft RFI reports with ROCs and ROECs, and the schedule required by section 3.2.1 of this Order shall specify dates for the submittal of those updates.

3.2. Response Action Schedule.

3.2.1. All parties desire to expedite the completion of the investigation and implementation of the final remedy so that the Site can be returned to beneficial use as soon as practicable. DTSC and the Respondents acknowledge and agree that a critical objective of the schedule is to remediate contaminated soils by 2017, and the parties shall work to address issues that could have a substantial impact on Respondents' ability to meet the schedule (e.g., U.S. EPA's Area IV radiological survey). Within 90 days of the effective date of this Order, Respondents shall submit to DTSC for review and approval, in hard copy and electronic format, a revised schedule (with tasks, specific deliverables, lead Respondents, milestones and timelines) for completion of the following by June 30, 2017 in compliance with the terms and conditions of this Order:

1. Completion of DTSC-approved remedies for contaminated soils and weathered bedrock.
2. Completion of construction of DTSC-approved groundwater cleanup remedies in the Chatsworth Formation OU and Surficial Media OU.
3. Completion of construction of any DTSC-approved long-term soil and weathered bedrock cleanup remedy in the Surficial Media OU and unweathered bedrock cleanup remedy in the Chatsworth Formation OU.

Upon approval by DTSC, the revised schedule required by this section shall be incorporated by reference into this Order and all parties to this Order shall comply with the approved schedule. If DTSC disapproves the revised schedule submitted by Respondents, DTSC shall explain the reasons for its disapproval in writing. Respondents shall amend the schedule in response to DTSC's written explanation and resubmit the amended schedule to DTSC within 30 days for review and approval.

3.2.2. Historical Site ~~Assessment~~ Review. In accordance with the DTSC-approved schedule specified in section 3.2.1 of this Order, Respondents shall conduct a review regarding use and ~~prepare and submit to DTSC for review and approval a comprehensive historical site assessment (HSA) of all operations in Areas I and II involving the~~ management of radioactive materials, including a ~~submittal~~ review of historical documents, for Areas I, and II, as specified in section 3.4.4 of this Order~~, that describe the management of radioactive materials~~. The ~~HSA~~ review shall address ~~the potential for placement~~ historic use of soil borrow ~~with radiological contamination~~ material, if any, from Area IV ~~to~~ in other areas of the Site. ~~The U.S. EPA Area IV HSA and survey shall address not only the 290 acres of Area IV but also the 182 acre northern undeveloped land and any drainages that originate from Area IV and extend into adjacent downstream areas of SSFL potentially impacted by Area IV operations.~~ The ~~HSA~~ review shall also include ~~summaries of~~ prior radiological sampling conducted in Areas I, and II. The ~~purpose of the HSA is to~~ review will assist in determining the appropriate scope of the workplan for characterization of radionuclides required by section 3.2.3 and updating the revised RI Reports required by section 3.4.2.

3.2.3. Workplan for Preliminary Assessment of Presence of Radionuclides. In accordance with the DTSC-approved schedule specified in section 3.2.1 of this Order, Respondent NASA shall prepare and submit a preliminary assessment workplan to determine if radionuclide contamination is present in Areas I and II. Information, including historical documents, gathered for the historical site review described in section 3.2.2 shall be summarized and submitted with the workplan and used as the basis for designing the survey of Areas I and II. Survey results under section 3.2.3 through 3.2.3.2 shall be reported in the revised RI Reports required by section 3.4.2.

3.2.3.1. The ~~HSA~~ workplan shall provide information on the scope, type, quantity and location of use of radioactive materials in Areas I and II. The workplan required by Section 3.2.3 shall use this information to classify areas as either Class 1, Class 2, Class 3 or non-impacted according to Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (EPA 402-

R-97-016, Revision 1, August 2000) guidelines. The sample density and surface scanning fractions shall then be determined using MARSSIM guidance.

3.2.3.2. Much of Areas I and II is either precipitous, rocky cliffs, steep hillsides or dense vegetation with no ready access. In preparing the workplan under Section 3.2.3, Respondent NASA shall consider and document the nature and degree of accessibility to these areas and potential investigation technologies that can access these areas. The workplan shall consider radiological data previously collected by Respondent NASA to assist in determining the amounts and types of sampling required. The workplan shall utilize MARSSIM criteria in the sampling/survey design, including accessibility, survey unit classification, and availability of agency approved prior sampling data. In addition, equipment, accessibility criteria, and analytical techniques shall be comparable to those utilized in the U.S. EPA Area IV radiological survey. Respondent NASA may propose to DTSC that no survey be conducted in non-impacted areas, inaccessible areas, or areas where DTSC has determined that prior radiological sampling has sufficiently established the absence of radionuclide contamination.

3.2.4. Standardized Risk Assessment Methodology for Radionuclides and Chemicals. In accordance with the DTSC-approved schedule specified in Section 3.2.1 of this Order, Respondents shall prepare and submit to DTSC for approval a Standardized Risk Assessment Methodology for Radionuclides and Chemicals (SRAM (Rev. 3). The SRAM (Rev. 3) shall incorporate the suburban residential ~~and open space (recreational)~~ and ecological exposure evaluations of SRAM (Rev. 2) for chemicals with amendments and addenda necessary to meet the requirements of this Order. The SRAM (Rev. 3) shall describe procedures and methods to identify and quantify estimated ecological and cumulative human risks associated with both chemicals and radionuclides at the Site, consistent with the requirements of Health and Safety Code section 25359.20. The SRAM (Rev. 3) shall include evaluation procedures for suburban residential and ~~open space (recreational) from SRAM (Rev. 2) as well as the~~ rural residential (agricultural) land use scenarios, and methods to be used to estimate chemical risk- based screening levels (RBSLs) and cumulative radionuclide and chemical risk for human receptors, as required by Health and Safety Code sections 25356.1.5(d) and 25359.20(c). The SRAM (Rev. 3) may incorporate the open space (recreational) exposure evaluations from SRAM (Rev.2) since the Respondents may elect to perform this evaluation for comparison purposes. The SRAM (Rev. 3) shall be subject to public review and comment before ~~it is approved~~ approval by DTSC.

3.2.4.1. Respondents shall submit in the SRAM (Rev.3) a revised generalized Site Conceptual Model (SCM) of potential exposure pathways to include potential exposures to radionuclides and chemicals. Attachment 7 provides a list of potential radionuclide and chemical exposure pathways to be evaluated for use in human health risk assessments at the SSFL. Attachment 8 provides a list of potential radionuclide and chemical exposure pathways to be evaluated for use in ecological risk assessments at the SSFL.

3.2.4.2. Consideration of Background in Selection of COPCs/COPECs and ROPCs/ROPECs in SRAM (Rev. 3). If the concentrations of soil/sediment/weathered bedrock COPCs/COPECs or ROPCs/ROPECs in an area under evaluation are consistent with background concentrations from the SSFL chemical or radionuclide background studies, then those chemicals and radionuclides shall be excluded from further evaluation in the risk assessment for that area.

3.2.5. Compliance with Health and Safety Code section 25359.20. Section 25359.20 specifies a risk based approach to remediation. Under this approach, risk calculations shall be used to determine the response action necessary to achieve acceptable risk levels. The SRAM (Rev. 3) specified in Section 3.2.4 of this Order shall be used to calculate risk for the purpose of determining the response actions specified in sections 3.5, 3.6 and 3.8 of this order. The standards and approach set forth in sections 3.2.5 through 3.2.5.6 are consistent and compliant with the requirements of section 25359.20. Sections 3.2.5.1 through 3.2.5.6 of this Order outline elements of the SRAM (Rev. 3), required by section 3.2.4 of this Order, specify the standards governing its application in the implementation of this Order, and cite guidance documents that Respondents shall use in meeting the requirements of Health and Safety Code section 25359.20

3.2.5.1. Human Health Risk Range and Point of Departure. U.S. EPA CERCLA Guidance shall be used to determine the acceptability of risks. See 40 CFR 300.430(e)(2)(i)(A)(2), incorporated by reference in California Health and Safety Code section 25356.1(d) (incorporating requirements of the NCP). The NCP provides that “for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between $10^{-4}$ and $10^{-6}$ using information on the relationship between dose and response. The $10^{-6}$ risk level shall be used as the point of departure for determining remediation goals for alternatives when Applicable or Relevant and Appropriate Requirements (ARARs) are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.” Respondents shall use the $10^{-6}$ cumulative risk level as the point of departure for determining remediation goals for cancer-causing chemicals and radionuclides. ~~Risk Based Screening Levels (~~RBSLs~~)~~ for chemicals and the Preliminary Remediation Goals specified in Health and Safety Code section 25359.20(c) for radionuclides will be used as the screening levels, described in SRAM (Rev. 3) for purposes of this Order.

3.2.5.2. Human Health Risks Incremental to Background. The estimated chemical and radionuclide cumulative cancer risk shall be compared to cumulative risk at background levels. Evaluation of chemicals and radionuclides shall be performed as described in SRAM (Rev. 3) specified in Section 3.2.4 of this Order. Cleanup of chemicals and radionuclides at or below background concentrations shall not be required. Risk management decisions shall be determined by comparison of site cumulative risk to background cumulative risk. Chemical background shall be determined by the chemical background study described in section 3.4.12 of this Order. The radionuclide background dataset that shall be used in the performance of risk assessments pursuant to the SRAM (Rev. 3) shall consist of the data from the U.S. EPA radionuclide background study described in section 2.4.5 of this Order. Incremental risk shall be compared to the $10^{-6}$ point of departure, when making preliminary recommendations regarding the need for evaluation of an RFI/RI site in the feasibility study (FS). RFI/RI sites with an incremental risk higher than $10^{-6}$ shall be evaluated for inclusion in the Feasibility Study discussed in section 3.5 of this Order. ~~Implementation of a remedial alternative that achieves a cleanup goal with a target incremental risk between 10^-6 and 10^-4 shall be based on risk management decisions using the nine evaluation criteria specified in section 3.5.4.~~

3.2.5.3. Detection Limits. The detection limits employed by U.S. EPA during the survey specified in section 2.4.5 of this order shall be used for all radionuclide testing at the Site. Similarly, reporting limits for chemicals shall be the lowest reasonably attainable in an effort to meet agricultural RBSLs. Detection limits and (chemical) reporting limits shall be set forth in the SRAM (Rev. 3). In cases where a PRG or RBSL falls below the limit of detection (for radionuclides) or the reporting limit (for chemicals), cleanup below the detection limit (for radionuclides) or the reporting limit (for chemicals) shall not be required .

3.2.5.4 Reasonable Maximum Exposure. ~~For the rural residential (agricultural), RME conditions shall be the exposure assumptions used in the derivation of the PRGs specified in section 2.4.7 of this Order. The evaluation of the suburban residential and recreational scenario shall be consistent with procedures in the SRAM (Rev. 2), to be incorporated into SRAM (Rev. 3).~~ Reasonable maximum exposure (RME) shall be calculated as described in USEPA Risk Assessment Guidance for Superfund, Volume 1, Part A, Chapter 6, Section 6.4.1, "Quantifying the Reasonable Maximum Exposure" (EPA/540/1-89/002). RMEs shall be calculated using exposure point concentrations. Exposure point concentrations shall be calculated, as specified in SRAM Rev. 3, and shall consider, as a minimum, the 95% UCL (upper confidence level) of the mean concentrations using software described in section 3.2.5.5.

3.2.5.5. Exposure Point Concentrations. Risk assessments performed for both radionuclides and chemicals shall be based on exposure point concentrations estimated in accordance with U.S. EPA's statistical software program "Scout Version 1.00.01" or subsequent revisions developed by U.S. EPA up until the draft of the SRAM (Rev. 3) is submitted to DTSC. Notwithstanding the guidance referenced in this section, exposure point concentrations shall be estimated for each RFI/RI site. Potential hotspots shall be evaluated in the RFI/RI risk assessments using methods and procedures for COPC/COPEC and ROPC/ROPEC selection and refining EPCs as described in SRAM (Rev. 3). "Hot spot" evaluation ~~for purposes of making risk management decisions shall be defined in the SRAM (Rev. 3).~~ results shall be presented in RFI/RI reports for consideration in risk management decisions during evaluation of potential response actions as specified in Sections 3.5, 3.6, and 3.7 of this Order.

3.2.5.6. Human Exposure Pathways and Parameters. Exposure pathways and parameters for both chemicals and radionuclides used in the development of the rural residential (agricultural) exposure scenarios shall be those used by U.S. EPA in the derivation of the PRGs specified in section 2.4.7 of this Order, except that chemical-specific exposure pathways and parameters shall be added or modified where appropriate. ~~The evaluation of the suburban residential and recreational scenario shall be consistent with procedures in the SRAM (Rev. 2), to be incorporated into SRAM (Rev. 3).~~ The evaluation of the suburban residential scenario for radionuclides and cumulative risk shall be consistent with methods to be specified in SRAM Rev. 3. Evaluation of the open space (recreational) exposures may be performed by the Respondents for comparison purposes and, for chemicals, shall be consistent with the procedures in SRAM (Rev. 2) incorporated into SRAM (Rev. 3) and, for radionuclides, shall be specified in SRAM (Rev. 3). To calculate risk due to surface soil exposures of human receptors (excluding groundwater exposures), depths no greater than the top two feet from ground surface shall be considered. To calculate risks due to subsurface exposures, depths no greater than the top ten feet shall be considered. The use of groundwater from beneath the SSFL shall be considered an incomplete exposure pathway if and when groundwater use is restricted through institutional controls, e.g., recordation of a land use covenant on the use of the groundwater underlying the facility for purposes including, but not limited to, domestic, residential and agricultural uses such as drinking, bathing, showering, food preparation, plant irrigation, and cleaning. An appropriate remedy to address groundwater contamination shall be approved by DTSC. Notwithstanding the recordation of a land use covenant or other institutional controls at the Site, direct exposures via seeps and springs, and indirect exposures via plant uptake and soil vapor at locations where the depth to groundwater is less than six feet shall be considered completed exposures pathways as appropriate.

3.3. Interim Response Actions (IRAs).

3.3.1. IRAs already completed by Respondents under RCRA corrective action are listed in Attachment 13 (Interim Measures Completed). Respondents shall evaluate available data and assess the need for IRAs in addition to those specifically required by this Order, or otherwise carried out by Respondents. IRAs shall be used whenever necessary, appropriate, and when directed by DTSC to control or abate immediate threats to human health or the environment, and to prevent or minimize the spread of contaminants while long-term response action alternatives are being evaluated. The completion of an IRA does not eliminate the area from further assessment.

3.3.2. In the event Respondents identify an immediate or potential threat to human health or the environment, or discover new releases of hazardous substances not previously identified, Respondents shall notify DTSC's SSFL Project Director orally within 48 hours of discovery, and notify DTSC's SSFL Project Director in writing within 10 days of discovery, summarizing the findings, including the immediacy and magnitude of the potential threat to human health or the environment. If required, Respondents shall submit to DTSC an IRA workplan for approval within the time period specified by DTSC. The IRA workplan shall include a schedule for submitting to DTSC an IRA Operation and Maintenance Plan and IRA Plans and Specifications. The IRA workplan, IRA Operation and Maintenance Plan, and IRA Plans and Specifications shall be developed in a manner consistent with the Scope of Work for Interim Response Action Implementation approved by DTSC. If DTSC determines that immediate action is required, DTSC may orally authorize the Respondents to act prior to DTSC's receipt of the IRA workplan.

3.3.3. If DTSC identifies an immediate or potential threat to human health or the environment, discovers new releases of hazardous substances not previously identified, DTSC shall notify Respondents in writing. If required, Respondents shall submit an IRA workplan to DTSC for approval, within the time period specified by DTSC, ~~an IRA workplan that identifes~~ identifying interim response actions that will mitigate the threat. The IRA workplan shall include a schedule for submitting to DTSC an IRA Operation and Maintenance Plan and IRA Plans and Specifications. The IRA workplan, IRA Operation and Maintenance Plan, and IRA Plans and Specifications shall be developed in a manner consistent with the Scope of Work for Interim Response Action Implementation approved by DTSC. If DTSC determines that emergency action is required, DTSC may orally authorize Respondents to act prior to receipt of the IRA workplan.

3.3.4. All IRA workplans shall ensure that the IRAs are designed to mitigate current or potential threats to human health or the environment, and shall, to the extent practicable, be consistent with the objectives of, and contribute to the performance of, all final remedies that may be required at the Site.

3.3.5. ~~Concurrent with the submission of an IRA workplan,~~ Respondents shall submit a corresponding Health and Safety Plan to DTSC for approval ~~a corresponding Health and Safety Plan~~ concurrent with the submission of an IRA workplan.

3.4. Remedial Investigation (RI).

3.4.1. The Parties acknowledge that significant investigation and analysis has occurred during the corrective action investigation that will be used during completion of the RI/FS. DTSC has reviewed the following ~~work plan-related~~ documents associated with the RCRA Facility Investigation (RFI), ~~and~~ which, except to the extent that such documents require amendments or addenda to comply with Health and Safety Code section 25359.20, ~~documents~~ may be used by Respondents in their development of the RI/FS for each OU:

a) Current Conditions Report and Draft RCRA Facility Investigation Work Plan, Areas I and III, Santa Susana Field Laboratory, Ventura County, California (ICF Kaiser Engineers, October 1993).

b) Current Conditions Report and Draft RCRA Facility Investigation Work Plan, Area II and Area I LOX Plant, Santa Susana Field Laboratory, Ventura County, California (ICF Kaiser Engineers, October 1993).

c) Current Conditions Report and Draft RCRA Facility Investigation Work Plan, Area IV, Santa Susana Field Laboratory, Ventura County, California (ICF Kaiser Engineers, October 1993).

d) Sampling and Analysis Plan, Hazardous Waste Facility Post-Closure Permit PC-94/95-3-02, Area II. Santa Susana Field Laboratory, Rockwell International Corporation, Rocketdyne Division (Groundwater Resources Consultants, Inc., June 1995).

e) Sampling and Analysis Plan, Hazardous Waste Facility Post-Closure Permit PC-94/95-3-03, Areas I and III. Santa Susana Field Laboratory, Rockwell International Corporation, Rocketdyne Division (Groundwater Resources Consultants, Inc., June 1995).

f) RCRA Facility Investigation Work Plan Addendum, Santa Susana Field Laboratory, Ventura County, California (Ogden, September 1996).

g) RCRA Facility Investigation Metals Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, California (Ogden, September 1996).

h) Revised Sodium Reactor Experiment (SRE) RFI Workplan Amendment, Santa Susana Field Laboratory, Ventura County, California (Boeing, December 1998).

i) Ecological Validation Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, California (Ogden, May 2000).

j) RCRA Facility Investigation Work Plan Addendum Amendment, Santa Susana Field Laboratory, Ventura County, California (Ogden, June 2000);

k) RCRA Facility Investigation Shallow Zone Groundwater Investigation Work Plan Final, Santa Susana Field Laboratory, Ventura County, California (Ogden, December 2000).

l) Workplan for Additional Field Investigations, Chatsworth Formation Operable Unit, Santa Susana Field Laboratory, Ventura County, California (Montgomery Watson, October 2000)

m) Workplan for Additional Field Investigations, Former Sodium Disposal Facility, Chatsworth Formation Operable Unit, Santa Susana Field Laboratory, Ventura County, California (Montgomery Watson, June 2000).

n) Work Plan for Additional Field Investigations, Former Sodium Disposal Facility (FSDF), Chatsworth Formation Operable Unit, Santa Susana Field Laboratory, Ventura County, California, Revision 2.2 (Montgomery Watson Harza, December 2001).

o) RCRA Facility Investigation Work Plan Addendum Amendment, Building 56 Landfill (SWMU 7.1) Investigation, Santa Susana Field Laboratory, Ventura County, California (Montgomery Watson Harza, May 2003).

p) Happy Valley Interim Measures Work Plan Addendum Amendment, Happy Valley and Building 359 Areas of Concern, Santa Susana Field Laboratory, Ventura County, California (Montgomery Watson Harza , August 2003).

q) RCRA Facility Investigation Work Plan Addendum, Area I and Area II Landfills Investigation Work Plan, Revised Final, SWMU 4.2 and SWMU 5.1, Santa Susana Field Laboratory, Ventura County, California (Montgomery Watson Harza, October 2003).

r) Perchlorate Characterization Work Plan (Revision 1), Santa Susana Field Laboratory, Ventura County, California (Montgomery Watson Harza, December 2003).

s) RCRA Facility Investigation Program Report, Surficial Media Operable Unit, Santa Susana Field Laboratory, Ventura County, California (Montgomery Watson Harza Inc., July 2004).

t) Proposed Drilling, Construction and Testing of Monitor Wells, Area IV, Santa Susana Field Laboratory, Ventura County, California (Haley & Aldrich, August 2004).

u) RCRA Facility Investigation Work Plan Addendum Amendment, Surface Flux and Ambient Air Monitoring, Former Liquid Oxygen (LOX) Plant Site (SWMUs 4.5 and 4.6), Ventura County, California, Revision 1 (MWH Americas, Inc., February 2005).

v) Standardized Risk Assessment Methodology (SRAM) Work Plan, Santa Susana Field Laboratory, Ventura County, California, Revision 2- Final (MWH Americas, Inc., September 2005).

w) RCRA Facility Investigation Vapor Migration Modeling Validation Study Work Plan, Santa Susana Field Laboratory, Ventura County, California (MWH Americas, Inc., November 2005).

x) Vapor Migration Modeling Validation Study Work Plan Amendment, Santa Susana Field Laboratory, Ventura County, California (Boeing, June 2006).

y) WorkPlan, Phase 2, Groundwater Site Conceptual Model, Santa Susana Field Laboratory, Ventura County, California (MWH Americas, Inc., April 2007)

z) WorkPlan, Phase 3, Groundwater Site Conceptual Model, Santa Susana Field Laboratory, Ventura Count, California (MWH Americas, In., June 2007.

3.4.2. Respondents shall submit RI Reports for the Surficial Media OU to DTSC for approval ~~RI Reports for the Surficial Media OU~~ in accordance with the schedule specified in section 3.2.1 and approved by DTSC. The SSFL has been divided into 11 Surficial Media OU Group Reporting Areas as listed on Attachment 14 and shown on the map in Attachment 15. An Ecologic Large Home Range report shall also be prepared. The RI Reports for the Surficial Media OU and the Ecologic Large Home Range report shall address both COCs and ROCs, and shall be developed in a manner consistent with the approved workplans, workplan amendments, and SRAM (Rev. 3) described in section 3.2.4 of this Order. DTSC shall review the Surficial Media OU Reports and notify Respondents in writing of DTSC's approval, conditional approval, or disapproval.

3.4.3. The comprehensive Surficial Media OU RI Reports shall summarize the findings from all investigative phases and areas of the SSFL. The Surficial Media OU RI Reports shall include all current and historical assessment data collected to date for the vicinity of the SWMUs and AOCs investigated in the RI program. The nine surface impoundments discussed in section 1.2 of this Order shall also be addressed and included in the Surficial Media OU RI Reports.

3.4.4. Each Respondent shall submit, along with each Surficial Media OU RI Report, historical records and documentation~~,~~ within its possession and control~~,~~ concerning ~~of all~~ activities associated with each SWMU and AOC. Such historical records and documentation shall be provided in an electronic format searchable by keyword utilizing a search engine technology with capabilities specified in section 3.4.8. This shall include primary historical records that list or describe any known or suspected chemicals or radionuclides stored, handled or released in the study area. Historical information shall include, but need not be limited to, available photographs, drawings, manifests, memoranda, tabulations, lists and any other records regarding the operations conducted in the reporting areas, and the types and sources of chemicals or radionuclides that may have been handled or released in the reporting areas.

3.4.5. Respondents shall submit in a separate report historical and other documents as described in section 3.4.4 that are not submitted with individual Surficial Media OU RI Reports.

3.4.5.1. If Respondents assert that any document submitted pursuant to section 3.4.4 or 3.4.5 contains confidential business information, Respondents shall comply with the provisions of California Code of Regulations, title 22, section 66260.2 and the specific text on the page that Respondents consider to be confidential shall be identified. Documents containing confidential business information are to be provided to DTSC only in hard copy. All other historical documents submitted pursuant to sections 3.4.4 and 3.4.5 of this Order are to be submitted in an electronic format with electronic reference list, searchable by key word.

3.4.5.2. Nothing in sections 3.4.4, 3.4.5, or 3.4.5.1 of this Order shall require Respondents to provide to DTSC any documents protected from disclosure by applicable legal protections, including without limitation the attorney-client privilege and the attorney-work product doctrine, or shall prevent Respondents from asserting that such applicable legal protections prevent disclosure.

3.4.6. Respondents shall demonstrate and certify that they have conducted a reasonable search for the documents required in sections 3.4.4 and 3.4.5 and include a signed copy of the Signature and Certification specified in section 4.4.3 of this Order to certify a reasonable search was completed for each Surficial Media OU RI Report.

3.4.7. Reports prepared by the Respondents or their consultants in support of the Surficial Media OU RI shall be submitted in both hard copy and electronically to DTSC. Electronic copies shall be submitted in an electronic format that ~~allows them to be~~ is searchable by keyword utilizing a search engine technology with capabilities specified in section 3.4.8.

3.4.8. Respondents shall index all investigative reports, workplans, technical memoranda, and supporting historical records specified in section 3.4.4, such that the entire content of all the documents and historical records are searchable, using key words, consistent with the proposal Respondents submitted on December 12, 2008 which provides details of the search engine technology planned, expected performance, and schedule for implementation.

3.4.9. Assessment of Potential Debris Areas Contiguous to SSFL - In accordance with the DTSC-approved schedule specified in section 3.2.1 of this Order, Respondents shall prepare and submit a workplan to DTSC for the evaluation of potential debris disposal areas outside the boundaries of the Facility to determine whether there are any locations where wastes associated with Facility operations may have been disposed. Respondents shall implement the workplan upon DTSC's approval, and the results of the evaluation shall be reported to DTSC. If any wastes from SSFL operations are discovered outside the current boundaries of the Facility, Respondents shall submit workplans for response action with respect to the wastes, and shall implement those workplans within 180 days of approval by DTSC. If DTSC determines that implementation of a workplan for a response action to address such a potential debris area is necessary to control or abate immediate threats to human health or the environment, DTSC shall specify the time frame for workplan implementation in its approval and Respondents shall implement the approved workplan within that specified time frame.

3.4.10. If DTSC determines, based on its evaluation of the Offsite Data Evaluation Report submitted by Respondents on December 13, 2007, that additional work is required, DTSC shall notify Respondents of that work. Respondents shall then propose to DTSC a schedule and scope for further action consistent with any directions given by DTSC.

3.4.11. Respondents shall provide updates to base maps, shape files, and SSFL-related chemical and radiological data for the GIS mapping data base annually until all response actions required under this Order are completed. The first such update shall be submitted within 90 days after the effective date of this Order. Updates thereafter shall be provided to DTSC by January 31 of each year unless DTSC specifies in writing that no updates are necessary for ~~to~~ the base maps, shape files, and SSFL-related chemical and radiological data for the GIS mapping data base~~, are necessary,~~ and that updates may be submitted at a later date, or when the response action is complete.

3.4.12. Respondents shall prepare a Chemical Background Study Workplan for the collection and analysis of offsite chemical soil and sediment samples, data interpretation and analysis, and reporting on the study's results according to the workplan's project-specific data quality objectives (DQOs). Respondents shall coordinate preparation of this workplan with U.S. EPA's background survey of radioactive materials. The activities described in the Chemical Background Study Workplan shall be conducted in coordination with and at the direction of DTSC ~~including,~~ . Such activities include collecting the additional soil and sediment samples from offsite locations to be determined through a selection process that adheres to the DQOs. The new chemical background study shall supplement the existing DTSC-approved soil background dataset.

3.4.13. Respondents shall submit a draft Sitewide Groundwater Remedial Investigation (RI) Report for the Chatsworth Formation Operable Unit (CFOU) to DTSC for ~~approval a draft Sitewide Groundwater Remedial Investigation (RI) Report for the Chatsworth Formation Operable Unit (CFOU)~~ in accordance with Work Plan, Site-Wide Groundwater Characterization, Santa Susana Field Laboratory (CFOU RI Workplan) dated January 2008~~,~~ (as conditionally approved by DTSC on June 2, 2009 and in accordance with the schedule required under section 3.2.1 of this Order). The draft Sitewide Groundwater RI Report shall identify and characterize all sources of contamination, define the nature and extent of contamination in the CFOU, and characterize potential contaminant pathways, rate, and direction of migration. As part of the RI work, the Respondents shall develop a comprehensive Site Conceptual Model (SCM for the flow of Chatsworth Formation groundwater and transport in the vicinity of SSFL. The SCM shall be used to assist in the evaluation of the current and future transport and fate of contaminants. Respondents shall submit to DTSC a draft Sitewide Groundwater RI Report that shall contain a complete and comprehensive evaluation of all groundwater data collected from the Site.

The draft Sitewide Groundwater RI Report shall, at a minimum:

(a) Define the nature and extent of all contaminant releases in the entire groundwater system at the Site, including occurrences in the soil, weathered bedrock, and unweathered bedrock and occurrences in the unsaturated unweathered bedrock.

(b) Fully characterize the fracture network at the Site including the variability across the Site, near faults, and within different rock types (i.e. sandstones, siltstones, and shales) and within different geologic members of the Chatsworth Formation (e.g., Bowl Member and Canyon Member).

(c) Characterize lateral and vertical groundwater flow at the Site.

(d) Assess the effects of the individual faults at the Site on groundwater flow and contaminant movement.

(e) Adequately evaluate the groundwater quality at known seeps and springs.

3.4.13.2. The draft Sitewide Groundwater RI Report shall identify and address the uncertainties associated with all factors affecting groundwater flow and contaminant movement including, but not limited to, the following:

(1) groundwater recharge;

(2) bulk hydraulic conductivity;

(3) measurements of flows taken from seeps and springs and measurements of transpiration from phreatophytes;

(4) the degree of contaminant diffusion versus the effects of dispersion, adsorption, dilution, and degradation on retarding the movement of contaminants; and

(5) the effect of the historical groundwater pumping so that the effects of other natural retardation processes can be assessed and the future movement of the contaminant plumes predicted.

As part of the draft Sitewide Groundwater RI Report, Respondents shall address identified data gaps by inclusion of a Sampling and Analysis Plan (SAP) for additional field data collection. Respondents shall implement the SAP in accordance with the approved schedule and shall submit the results in a final Sitewide Groundwater RI Report for DTSC's review and approval.

3.4.14. Respondents Boeing and NASA shall record, or cause to have recorded, a prohibition, to run with the land, on the use of the groundwater underlying the Facility for all purposes including, but not limited to, domestic, residential and agricultural uses such as drinking, bathing, showering, food preparation, plant irrigation, and cleaning.

3.5. Feasibility Study (FS)

3.5.1. Respondents shall prepare and submit FS workplans to DTSC for the Surficial Media OU and Chatsworth Formation OU (including both groundwater and the unsaturated zone) in accordance with the schedule specified in section 3.2.1 of this Order. The FS workplans for the Surficial Media OU and Chatsworth Formation OU (including both groundwater and the unsaturated zone) are subject to approval by DTSC and shall be developed in a manner consistent with Health and Safety Code Chapter 6.8.

3.5.2. The FS workplans shall detail the methodology for developing and evaluating potential response action measures to remedy chemical and radionuclide contamination at the Site utilizing the SRAM (Rev.3). The FS Workplan shall identify the potential response action measures, including any innovative technologies that may be used for the containment, treatment, remediation, or disposal of contamination. Potential groundwater response action measures shall evaluate all state-of-the-art remedial technologies including but not limited to the following: TCE oxidation using potassium- or sodium-permanganate; nanoscale zero-valent iron particle technology; radio frequency heating; blast-fractured enhanced permeability remediation; steam injection; and enhanced bioremediation. In evaluating response actions involving excavation and offsite disposal, Respondents shall evaluate whether the import fill results in equal or greater risk than in situ soils using risk assessment methodologies approved by DTSC for the Site. Respondents shall expend all reasonable efforts to identify clean import fill alternatives.

3.5.3. Respondents shall complete treatability studies for the viable potential response action technologies that involve treatment except where Respondents can demonstrate to DTSC's satisfaction that treatability studies are not needed. The FS workplans shall include, at a minimum, a summary of the proposed treatability studies including conceptual designs, a schedule for submitting treatability study workplans, or Respondents' justifications for not proposing treatability studies.

3.5.4. Respondents shall submit FS Reports to DTSC for approval in accordance with the DTSC-approved FS workplan schedule. Within 30 days, DTSC shall review the FS reports and notify Respondents in writing of DTSC's approval or disapproval. If DTSC disapproves of the FS reports in whole or in part, it shall explain in writing the reason(s) for its disapproval. The FS reports shall summarize the results of the FS including the following:

(a) documentation of all treatability studies conducted;

(b) development of OU-specific response action objectives, including legal requirements and other promulgated standards that are relevant;

(c) identification and screening of general response actions, response technologies, and process options on an OU specific basis;

(d) evaluation of alternatives based on the criteria contained in the NCP, 40 C.F.R. Part 300 including:

Threshold Criteria:

(1) overall protection of human health and the environment;

(2) compliance with legal requirements and other promulgated standards that are Relevant;

Primary Balancing Criteria:

(1) long-term effectiveness and permanence;

(2) reduction of toxicity, mobility, or volume through treatment;

(3) short-term effectiveness;

(4) implementability;

(5) cost;

Modifying Criteria:

(1) State acceptance;

(2) community acceptance;

(e) the response action criteria specified in Health and Safety Code sections 25356.1 and 25356.1.5.

3.5.4.1. If the use of imported fill as part of a response action involving excavation would result in risks at the Site exceeding the final cleanup levels, Respondents shall propose and DTSC shall consider feasible alternatives identified through the application of the NCP criteria outlined in section 3.5.4.

3.5.5. Impact on Resources. DTSC agrees that specific factors it will consider in its evaluation of the work required to be performed by Respondents under this Order may include, and not be limited to the following: (1) emissions footprint (determined by a quantitative analysis of emissions from heavy equipment operation, transportation and offsite disposal); (2) natural capacity conservation and restoration (determined by a quantitative analysis for habitat preservation and restoration, biomass balance, biodiversity, local and regional watershed impacts, contaminant reduction and overall ecosystem impacts from excavation); and (3) resource conservation and usage (determined by an assessment of major resource requirements and potential natural resource impacts from heavy equipment operation, transportation and offsite disposal). In preparing and reviewing any FS report, Respondents and DTSC respectively shall further examine the net benefit associated with any remedies under consideration as supporting information for the evaluation criteria outlined in section 3.5.4, including 1999 U.S. EPA OSWER Directive 92857-28P and EPA 542-R-08-002 Green Remediation; Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites (EPA 542/R-08/002, April 2008).

3.6. Remedy Selection.

3.6.1. Respondents shall prepare a draft Response Action Plan (RAP). The draft RAP shall be consistent with the NCP and Health and Safety Code sections 25356.1 and 25356.1.5. The draft RAP shall be based on and summarize the approved RI/FS reports, and shall clearly set forth:

(a) health and safety risks posed by the conditions at the Site;

(b) the effect of contamination or pollution levels upon present, future, and probable beneficial uses of contaminated, polluted, or threatened resources;

(c) the effect of alternative response action measures on the reasonable availability of groundwater resources for present, future, and probable beneficial uses;

(d) site-specific characteristics, including the potential for offsite migration of hazardous substances, the surface or subsurface soil, and the hydrogeologic conditions, as well as preexisting background contamination levels;

(e) cost-effectiveness of alternative response action measures. Land disposal shall not be deemed the most cost-effective measure merely on the basis of lower short-term cost;

(f) the potential environmental impacts of alternative response action measures;

(g) a statement of reasons setting forth the basis for the response actions selected. The statement shall include an evaluation of each proposed alternative submitted and evaluate the consistency of the response actions proposed by the plan with the NCP; and

(h) a schedule for implementation of all proposed response actions.

The selection of the remedy from the potential response alternatives established during the FS shall consider: (1) overall protection of human health and the environment; and (2) the impact of the remedy on resources values including emission footprint, natural capacity conservation and restoration, and resource conservation and use. Following DTSC's review, DTSC shall specify any changes to be made in the RAP. The entire review of the RAP, including public review and comment, shall be completed in accordance with the DTSC-approved schedule specified in section 3.2.1 of this Order.

3.6.2. Following the public comment period, DTSC shall approve the final RAP, ~~or~~ identify issues, or provide comments to be added by Respondents to the RAP.

3.6.3. DTSC shall notify Respondents of the final response action(s) selected by DTSC in its approval of the final RAP. The RAP shall include DTSC's reasons for selecting the response action(s). In selecting any final response action, DTSC shall apply the NCP evaluation criteria outlined in section 3.5.4 (and specified in 40 CFR section 300.400 et seq. and incorporated by reference in Health and Safety Code section 25356.1) and the requirements specified in Health and Safety Code section 25356.1.5 (a). DTSC's selection of the final response action(s) in its approval of the final RAP shall not be subject to the dispute resolution procedures of sections 4.20.1 through 4.20.6 but rather Health and Safety Code section 25356.1(g).

3.7. CEQA. Respondents shall provide all information necessary to facilitate DTSC's preparation of a CEQA analysis, including a Site-wide Environmental Impact Report (EIR).

3.8. Remedial Design/Response Action Implementation Workplan (RD/RA Work plan) .

3.8.1. In accordance with the DTSC-approved schedule specified in section 3.2.1 of this Order, Respondents shall submit to DTSC a RD/RA workplan for the Surficial Medial OU and the Chatsworth Formation OU. The RD/RA workplan is the plan and schedule to design, construct, operate, maintain, and monitor the performance of the response action(s) selected in the final RAP. The RD/RA workplan is subject to approval by DTSC. If DTSC disapproves of the RD/RA workplan in whole or in part, it shall explain the reasoning for its disapproval in writing ~~the reasoning for its disapproval~~. The RD/RA workplan shall include the schedule for submittal to DTSC of the following documents:

1. Health and Safety Plan
2. Draft Plans and Specifications
3. Final Plans and Specifications
4. Construction workplan
5. Construction Completion Report
6. Operation and Maintenance Plan; and
7. Final Completion Report

3.8.2 The Operation and Maintenance Plan shall include documentation required to establish a financial assurance mechanism for operation and maintenance of the response action(s). Respondents shall include a detailed cost estimate for implementation of the operation and maintenance of the response action(s) for DTSC review and approval. The financial assurance mechanism(s) must be approved by DTSC as part of the final Operations and Maintenance Plan approval. The financial assurance mechanisms may include any mechanism described in Health and Safety Code section 25355.2. The purpose of establishing a financial assurance mechanism is to demonstrate that Boeing is financially capable of implementing the operations and maintenance of the response action(s) and to enable DTSC to undertake implementation of the operations and maintenance of the response action(s) in the event that Respondents are unable or unwilling to undertake the required actions. Boeing shall annually adjust the mechanism(s) for inflation in accordance with California Code of Regulations, title 22, sections 66264.142 or 66265.142, as those sections apply to owners and operators of facilities and sites subject to Health and Safety Code section 25355.2.

3.9. Land Use Covenants. A land use covenant shall be executed and recorded if limitations or restrictions are to be placed on any portion of the Site because residual hazardous materials, hazardous wastes or constituents, or hazardous substances remain at the property or in the groundwater at levels which are not suitable for unrestricted use of the land. If the approved remedy in the Final RAP includes deed restrictions, Boeing and NASA shall record, or cause to have recorded, the appropriate deed restrictions. Use of Land Use Covenants or any other institutional controls that prohibit use of groundwater shall not ~~constitute a remedy or sole justification for a remedy~~ be a sole determining factor for any groundwater remedy decisions~~, or~~ prevent the transfer of land under Health and Safety Code section 25359.20(d).

3.10. Site Access. Recognizing the open nature of the Site, Respondents shall maintain reasonable precautions to restrict the possibility of unknowing or unauthorized entry of persons or livestock onto the Site.

3.11. Public participation activities shall be conducted in accordance with Health and Safety Code sections 25356.1 and 25358.7. DTSC issued a final Public Participation Plan (PPP) for the SSFL on March 27, 2009. DTSC may periodically update the PPP in consultation with Respondents and the public.

## OTHER REQUIREMENTS AND PROVISIONS

4.1. Project Director. Within 14 days of the effective date of this Order, the Respondents shall each designate a Project Coordinator and shall notify DTSC in writing of the Project Directors selected. Each Project Director shall be responsible for overseeing the implementation of this

Order and for designating a person to act in his/her absence. All communications between Respondents and DTSC, and all documents, report approvals, and other correspondence concerning the activities performed pursuant to this Order shall be directed through their respective Project Directors. Each party may change its Project Director with at least seven days prior written notice to the other parties.

4.2. Web Site. Respondents shall establish and maintain a web~~-based~~ site ~~which~~ that shall be used for posting of documents and information related to the investigation and cleanup of the SSFL. The content of the website shall be solely under the control of DTSC. No changes to the website shall be made without prior DTSC approval.

4.3. DTSC Approval.

4.3.1. Subject to the dispute resolution procedures in sections 4.20.1 through 4.20.6, Respondents shall revise any workplan, report, specification, or schedule in accordance with DTSC's written comments. Respondents shall submit to DTSC any revised documents by the due date specified by DTSC. Revised submittals are subject to DTSC's written approval or disapproval. If DTSC disapproves of any submittal in whole or in part, it shall explain in writing the reason(s) for its disapproval.

4.3.2. Upon receipt of DTSC's written approval, Respondents shall commence work and implement any approved workplan in accordance with the schedule and provisions contained therein.

4.3.3. Any DTSC approved workplan, report, specification, or schedule required by this Order shall be deemed incorporated into this Order.

4.3.4. Any requests for revision of an approved workplan requirement must be in writing. Such requests must be timely and provide justification for any proposed workplan revision. DTSC shall approve such proposed revisions absent good cause not to do so. Any approved workplan modification shall be in writing and shall be incorporated by reference into this Order.

4.3.5. Verbal advice, suggestions, or comments given by DTSC representatives shall not constitute an official approval or disapproval.

4.4. Submittals.

4.4.1. Respondents shall ~~continue to~~ provide DTSC with quarterly progress reports of response action activities conducted pursuant to this Order, in conjunction with the Hazardous Waste Facility Post Closure Progress Reports, on or before the last day of the month in August, November, February, and May.

4.4.2. Any report or other document submitted by each Respondent pertaining to its activities at the Site pursuant to this Order shall be signed and certified by a responsible corporate officer, or a duly authorized representative.

4.4.3. Certification

The certification required above, shall be in the following form:

> I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

4.4.4. Except as provided in section 3.4.5.1, all reports and other documents submitted by the Respondents or their consultants in response to this Order shall be submitted to DTSC in both hard copy and electronically ~~to DTSC~~ as further described herein. Electronic copies of reports, workplans, technical memoranda, and other documents shall be submitted to DTSC in a format that allows ~~them to be searchable by~~ key word searches, in accordance with section 3.4.8. Due to the large size of the various documents to be submitted to DTSC, the hard copy reports shall be categorized into Standard Hard Copy and Review Hard Copy reports. Standard Hard Copy reports shall contain electronic copies of figures, tables, and attachments in appendices on accompanying DVDs, whereas Review Hard Copy reports shall have printed figure, tables, and attachments in appendices. Respondents shall provide ~~four~~ 4 hard copies, one Review Hard Copy and 3 Standard Hard Copies, and 12 electronic copies of all documents, including but not limited to, workplans, reports, and correspondence of 15 pages or longer to DTSC's Regional office in Sacramento, one Review Hard Copy and one electronic copy to the GSU reviewer assigned to review the document, ~~two hard copies and two electronic copies to DTSC's Regional office in Cypress,~~ one electronic copy to the consultant or contractor who maintains the website specified in section 4.2.1 of this Order, and one ~~hard copy~~ Review Hard Copy and one electronic copy to DTSC's Administrative File for SSFL (currently DTSC's Regional Office located in Chatsworth). The number of hard copies required for submittal to DTSC's offices may be modified upon agreement between DTSC and Respondents. Progress reports and correspondence of less than 15 pages are specifically exempted from this copy requirement, and only one copy is required. If progress reports or correspondence contain attachments larger than 8.5 x 11 inches in size, then each submittal must be accompanied by an electronic copy. For documents with very large files size (e.g., the historical documents for the RFI Group Reports) which cannot easily fit onto DVDs, the Respondents may, with prior DTSC approval, submit such documents electronically on hard drives in lieu of the four hard copies and 12 electronic copies specified above. DTSC may designate that additional hard copies or electronic copies (or both) be provided simultaneously to designated repositories. If Respondents assert that any document to be submitted may contain confidential business information, Respondents shall comply with the provisions of California Code of Regulations, title 22, section 66260.2 and the specific text on the page that Respondents consider to be confidential shall be identified. Documents containing confidential business information are to be submitted in hard copy to DTSC.

4.4.5. Unless otherwise specified, all reports, correspondence, approvals, disapprovals, notices, or other submissions relating to this Order shall be in writing and shall be sent to the current Project Directors.

4.5. Proposed Contractor/Consultant.

All work performed by Respondents pursuant to this Order shall be under the direction and supervision of a professional engineer or registered geologist, registered in California, with expertise in hazardous substance site cleanup. Respondents' contractors and consultants shall have the technical expertise sufficient to fulfill their responsibilities. Within 14 days of the effective date of this Order or any contract awarded to implement this Order, Respondents shall notify the DTSC Project Director in writing of the name, title, and qualifications of the professional engineer or registered geologist and of any contractors or consultants and their personnel to be used in carrying out the requirements of this Order. Notifications submitted prior to the effective date of this Order in response to section 4.5 of the August 16, 2007 Consent Order for Corrective Action need to be resubmitted only if the information contained in the notification has changed.

4.6. Quality Assurance.

4.6.1. All sampling and analyses performed by Respondents under this Order shall follow applicable DTSC and U.S. EPA guidance for sampling and analyses. Workplans shall contain or reference a master quality assurance/quality control and chain of custody procedures for all sampling, monitoring, and analytical activities. Any deviations from the approved workplans or quality assurance procedures must be approved by DTSC prior to implementation and~~,~~ must be documented in a manner that provides~~, including~~ reasons for the deviations~~, and~~. Any deviations must be reported in the affected report. ~~Each workplan submitted~~ Quality Assurance Project Plans (QAPP) for SSFL soil and groundwater (and respective related media) shall include:

(1) Project organization and responsibilities with respect to sampling and analysis;

(2) Quality assurance objectives for measurement including accuracy, precision, and method detection limits. In selecting analytical methods, Respondents shall consider obtaining detection limits at or below potentially applicable legal requirements or relevant and appropriate standards, such as Maximum Contaminant Levels (MCLs) or Maximum Contaminant Level Goals (MCLGs), or other project specific standards as defined in SRAM Rev 3;

(3) Sampling procedures;

(4) Sample custody procedures and documentation;

(5) Field and laboratory calibration procedures;

(6) Analytical procedures;

(7) Laboratory to be used certified pursuant to Health and Safety Code section 25198;

(8) Specific routine procedures used to assess data (precision, accuracy and completeness) and response actions;

(9) Reporting procedure for measurement of system performance and data quality;

(10) Data management, data reduction, validation and reporting. Information shall be accessible to downloading into DTSC's system; and

(11) Internal quality control.

4.6.2. Except as provided below, Respondents shall use California State-certified analytical laboratories for all chemical and radiological analyses required to comply with this Order. If a California State-certified laboratory is not available for a particular test required by this Order, Respondents shall use an alternative laboratory identified by Respondents subject to approval by DTSC. The names, addresses, telephone numbers, and California Department of Public Health, Environmental Laboratory Accreditation Program (ELAP) certification numbers of the laboratories Respondents propose to use must be specified in the applicable workplans.

4.6.3. All workplans required under this Order shall include data quality objectives for each data collection activity to ensure that data of known and appropriate quality are obtained and that data are sufficient to support their intended uses.

4.6.4. Respondents shall monitor to ensure that high quality data are obtained by their consultants and contract laboratories. Respondents shall ensure that laboratories used by

Respondents for chemical analyses perform such analyses according to the latest approved edition of "Test Methods for Evaluating Solid Waste, (SW 846)," or other methods deemed satisfactory to DTSC. If methods other than U.S. EPA methods are to be used, Respondents shall specify all such protocols in the affected workplan (e.g., RI workplan). DTSC shall reject any chemical data that do not meet the requirements of the approved workplan, U.S. EPA analytical methods, or quality assurance/quality control procedures, and may require resampling and analysis. Respondents shall ensure that laboratories used by Respondents for radiological analyses perform such analyses according to the latest approved edition of "HASL-300, EML Procedures Manual" or other methods deemed satisfactory to DTSC. If methods other than HASL-300 methods are to be used, Respondents shall specify all such protocols in the affected workplan (e.g., RI workplan). DTSC shall reject any radiological data that do not meet the requirements of the approved workplan, HASL-300 methods, or quality assurance/quality control procedures, and may require resampling and analysis.

4.6.5. Respondents shall ensure that the laboratories used by Respondents for analyses have quality assurance/quality control programs. DTSC may conduct a performance and quality assurance/quality control audit of the laboratories chosen by Respondents before, during, or after sample analyses. Upon request by DTSC, Respondents shall have their selected laboratory perform analyses of samples provided by DTSC to demonstrate laboratory performance. If the audit reveals deficiencies in a laboratory's performance or quality assurance/quality control procedures, resampling and analysis may be required.

4.7. Sampling and Data/Document Availability.

4.7.1. Upon request, Respondents shall ~~submit to~~ provide DTSC with ~~upon request~~ the results of all sampling or tests or other data generated by its employees, agents, consultants, or contractors pursuant to this Order. Respondents shall follow the same signature and certification requirements of sections 4.4.2 and 4.4.3 above for information submitted pursuant to this section.

4.7.2. Notwithstanding any other provisions of this Order, DTSC retains all of its information gathering and inspection authority and rights, including enforcement actions related thereto, under the Health and Safety Code, and any other State or federal law, subject to national security and other restrictions imposed under the Atomic Energy Act of 1954, as amended, applicable executive orders or any other applicable requirements.

4.7.3. Respondents shall notify DTSC in writing at least seven days prior to beginning each separate phase of field work approved under any workplan required by this Order. If Respondents believe they must commence emergency field activities without delay, Respondents shall seek emergency telephone authorization from the DTSC Project Director or, if the Project Director is unavailable, ~~his/her~~ their designee, to commence such activities immediately.

4.7.4. At the request of DTSC, Respondents shall provide or allow DTSC or its authorized representative to take split or duplicate samples of all samples collected by Respondents pursuant to this Order. Similarly, at the request of Respondents, DTSC shall allow Respondents or their authorized representative(s) to take split or duplicate samples of all samples collected by DTSC under this Order.

4.8. Access.

4.8.1. Subject to the Respondents' security and safety procedures, and except as provided in section 4.7.2 of this Order, Respondents shall provide DTSC and its representatives access at all reasonable times, following normal procedures for access onto any property under each Respondent's control to which access is required for implementation of this Order and shall permit such persons to inspect and copy all non-privileged records, files, photographs, documents, including all sampling and monitoring data, that pertain to the investigation and remediation of the Site and that are within the possession or under the control of Respondents or their contractors or consultants.

4.8.2. To the extent that work being performed pursuant to this Order must be conducted beyond the Facility boundary, Respondents shall use their best efforts to obtain access agreements necessary to complete work required by this Order from the present owners or possessors, as appropriate, of such property within 30 days of approval of any workplan for which access is required. "Best efforts" as used in this paragraph shall include, at a minimum, a letter by certified mail from the Respondents to the present owners or possessors of such property requesting an agreement to permit Respondents and DTSC and their authorized representatives access to such property. Respondents shall provide DTSC's Project Director with a copy of any access agreements in their possession. In the event that an agreement for access is not obtained within 30 days of approval of any workplan for which access is required, an unanticipated need for access becomes known to Respondents, or access is revoked by the property owner or possessor, Respondents shall notify DTSC in writing within 14 days thereafter regarding both the efforts undertaken to obtain access and the failure to obtain such agreements. DTSC may, at its discretion, assist Respondents in obtaining access.

4.8.3. Nothing in this section limits or otherwise affects DTSC's right of access and entry pursuant to any applicable State or federal law or regulation.

4.8.4. Nothing in this Order shall be construed to limit or otherwise affect Respondents' liability and obligation to perform response action including such action beyond the Facility boundary.

4.9. Record Preservation.

4.9.1. Respondents shall retain, during the implementation of this Order and for a minimum of ten years after the Acknowledgement of Satisfaction executed pursuant to section 6.0 of this Order, all data, records, and documents that relate to implementation of this Order or to hazardous substance management or disposal. Respondents shall notify DTSC in writing 90 days prior to the destruction of any such records, and shall provide DTSC with the opportunity to take possession of any such records. Such written notification shall reference the effective date, caption, and docket number of this Order and shall be addressed to:

(insert name of designated Project Director)
SSFL Project Director
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

4.9.2. If Respondents retain or employ any agent, consultant, or contractor for the purpose of complying with the requirements of this Order, Respondents shall require any such agents, consultants, or contractors to provide Respondents a copy of all documents produced pursuant to this Order.

4.9.3. All documents pertaining to this Order shall be stored in a manner to afford ease of access by DTSC and its representatives.

4.10. Change in Ownership. No change in ownership or corporate or partnership status relating to the Facility shall in any way alter Respondents' responsibility under this Order. No conveyance of title, easement, or other interest in the Facility, or a portion of the Facility, shall affect Respondents' obligations under this Order. Unless DTSC agrees that such obligations may be transferred to a third party, Respondents shall be responsible for and liable for any failure to carry out all activities required of Respondents by the terms and conditions of this Order, regardless of Respondents' use of employees, agents, contractors, or consultants to perform any such tasks.

4.11. Notice to Contractors and Successors. Respondents shall provide a copy of this Order to all contractors, laboratories, and consultants retained to conduct or monitor any portion of the work performed pursuant to this Order and shall condition all such contracts on compliance with the terms of this Order. Each Respondent shall give written notice of this Order to any successor in interest

prior to transfer of ownership or operation of any portion of the Facility that the Respondents own or operate and shall notify DTSC at least 30 days prior to such transfer. Respondents or their contractors shall provide written notice of this Order to all subcontractors hired to perform any portion of the work required by the Order. Respondents shall nonetheless be responsible, to the extent reasonably within their control, for ensuring that their contractors and subcontractors perform the work contemplated herein in accordance with this Order. With regard to the activities undertaken pursuant to this Order, the defenses available to Respondents shall be those specified in Health and Safety Code section 25323.5 (incorporating by reference Sections 101(35) and 107(b) of CERCLA, 42 U.S.C., section 9601(35) and 9607(b).

4.12. Compliance with Applicable Laws and Regulations. All actions taken pursuant to this Order by any of the Parties shall be undertaken in accordance with applicable local, State, and federal laws and regulations. Respondents shall obtain or cause their representatives to obtain all permits and approvals necessary under such applicable laws and regulations.

4.13. Costs. Respondents are liable for all costs associated with the implementation of this Order, including all costs incurred by DTSC in overseeing the work required by this Order, in accordance with Health and Safety Code sections 25269 through 25269.6, including procedures for dispute resolution. DTSC shall retain all cost records associated with the work performed under this Order as required by State law. DTSC shall make all documents which support the DTSC's cost determination available for inspection upon request, as provided by the Public Records Act.

4.14. Endangerment During Implementation. In the event that DTSC determines that any circumstances or activities (whether or not pursued in compliance with this Order) are creating an imminent and substantial endangerment to the health or welfare of people at the Site or in the surrounding area or to the environment, DTSC may order Respondents to stop further implementation of this Order for such period of time as needed to abate the endangerment. Any deadline in this Order directly affected by an Order to Stop Work under this section shall be extended for the term of the Order to Stop Work.

4.15. Liability. Nothing in this Order shall constitute or be construed as a satisfaction or release from liability for any conditions or claims arising as a result of past, current, or future operations of Respondents. Notwithstanding compliance with the terms of this Order, Respondents may be required to take further actions as are necessary to protect public health or welfare or the environment.

4.16. Government Liabilities. The State of California shall not be liable for injuries or damages to persons or property resulting from acts or omissions by Respondents or related parties specified in section 4.20 in carrying out activities pursuant to this Order, nor shall the State of California be held as a party to any contract entered into by Respondents or its agents in carrying out activities pursuant to the Order.

4.16.1. Availability of Federal Funds -- DOE and NASA. It is the expectation of DTSC that the federal agencies under this Order shall seek sufficient funding through the federal budgetary process to fulfill the requirements under this Order. It is agreed that if inadequate funds are appropriated for such purposes, the federal agencies shall notify DTSC immediately and develop a plan in writing to secure additional funding to carry out the requirements of this Order. Nothing in this Order shall be construed as precluding federal agencies from arguing either that the unavailability of appropriated funds constitutes a force majeure, or that no provisions of this Order shall be interpreted to require the obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. 1301 or 1341. The Parties agree that in any proceeding to enforce the requirements of this Order, federal agencies may raise as a defense that any failure or delay was caused by the unavailability of appropriated funds.

4.17. Reserved.

4.18. Incorporation of Plans and Reports. All plans, schedules, and reports that require DTSC approval and are submitted by Respondents pursuant to this Order and are not the subject of dispute resolution under paragraphs 4.20.1 through 4.20.6 are incorporated in this Order upon approval by DTSC.

4.19. Penalties for Noncompliance.

4.19.1. Respondents shall be liable for stipulated penalties in the amount of $15,000 per day for a material failure to comply with the requirements of this Order, including the making of any false statement or representation in any document submitted for purposes of compliance with this Order. If DTSC can discern that a specific Respondent(s) is responsible for a material failure to comply with the requirements of this Order, DTSC shall proceed only against the responsible Respondent(s) for associated stipulated penalties. “Compliance” by Respondents shall include, but shall not be limited to, completion of the activities under this Order or any workplan or other plan approved under this Order within the specified time schedules established by and approved pursuant to this Order or as otherwise directed by DTSC under this Order.

4.19.2. Following DTSC’s determination that Respondents have materially failed to comply with a requirement of the Order, DTSC shall give Respondents written notification of the violation and describe the noncompliance. DTSC shall send Respondents a written notice of noncompliance with an opportunity to cure by a date designated by DTSC in lieu of or prior to a written demand for the payment of the penalties. Respondents, individually or collectively, may dispute DTSC's finding of noncompliance by invoking the dispute resolution procedures described in Sections 4.20.1 through 4.20.6 herein. All penalties assessed under section 4.19.1 shall begin to accrue on the business day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. The accrual and payment of any proposed penalty shall be tolled during the dispute resolution period. If Respondents do not prevail in dispute resolution, any penalty shall be due to DTSC within 30 days of resolution of the dispute unless appealed to a court of law. If Respondents prevail in dispute resolution, no penalty shall be paid.

4.19.3. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Order and other applicable provisions of law, except that the same facts shall not be relied upon to generate separate and cumulative penalties against a single Respondent. Notwithstanding the provisions of section 4.19.1, 4.19.2, or 4.19.3, DTSC reserves the right to seek additional remedies or sanctions for knowing violations of this Order, including knowingly making any false statement or representation in any document submitted for purposes of compliance with this Order

4.20. Dispute Resolution.

4.20.1. The parties agree to use their best efforts to resolve all disputes informally. The parties acknowledge that the three Respondents to this Order each have differing ownership and operational responsibilities for various portions of the Site and the work addressed in this Order. Each Respondent expressly reserves its right to dispute any finding of noncompliance or written decision, including but not limited to those for which it is not responsible or on which it relies in whole or in part on the actions of another Respondent(s). The parties agree that, except as otherwise specifically provided for by sections 25269.2 and 25269.5 of the Health and Safety Code for cost recovery disputes, and except for an action that challenges in whole or in part the validity, legality, enforceability or constitutionality of Health and Safety Code section 25359.20 (including the resolution of any legal or factual dispute related to or raised in such a challenge, or the determination of which provisions of this Order remain effective following such a challenge (see section 4.27 [Severability]), the procedures contained in this section are the required administrative procedures for resolving disputes arising under this Order. If any Respondent fails to follow the procedures contained in this section, that Respondent shall have waived its rights to further consideration of the disputed issue in any administrative proceeding initiated under this section. Respondents each reserve their respective legal rights to contest or defend against any final decision rendered by DTSC under this Order.

4.20.2. If any Respondent disagrees with any finding of noncompliance or written decision by DTSC pursuant to this Order, such Respondent's Project Director shall orally notify DTSC's Project Director of the dispute. The Project Directors shall attempt to resolve the dispute informally.

4.20.3. If the Project Directors cannot resolve the dispute informally, the disputing Respondent(s) may pursue the matter by placing an objection in writing. The Disputing Respondent's written objection must be forwarded to the DTSC Director or ~~his/her~~ their designee, with a copy to the DTSC Project Director. The written objection must be mailed to the DTSC Director or ~~his/her~~ their designee within 14 days of the disputing Respondent's receipt of DTSC's finding of noncompliance or written decision. The Disputing Respondent's written objection must set forth the specific points of the dispute and the basis for Respondent's position.

4.20.4. DTSC and the disputing Respondent(s) shall have 14 days from DTSC's receipt of each disputing Respondent's written objection to resolve the dispute through formal discussions. This period may be extended by DTSC for good cause. During such period, Respondent(s) may meet or confer with DTSC to discuss the dispute.

4.20.5. After the discussion period, DTSC shall provide the Respondent(s) with its written decision on the dispute, which shall constitute a final agency decision. DTSC's written decision shall reflect any agreements reached during the formal discussion period and be signed by the DTSC Director or ~~his/her~~ their designee.

4.20.6. During the pendency of all dispute resolution procedures set forth in sections 4.20.3 through 4.20.5 of this Order, the time periods for completion of work to be performed under this Order that are affected by such a dispute shall be extended for a period of time not to exceed the actual time taken to resolve the dispute. The existence of such a dispute shall not excuse, toll, or suspend any other compliance obligation or deadline required pursuant to this Order except to the extent that such other compliance obligation or deadline is dependent upon the resolution of the matter which is the subject of such a dispute under this Order, in which case the time periods for completion of such other compliance obligations or deadlines required pursuant to this Order that are affected by such a dispute shall be extended for a period of time not to exceed the actual time taken to resolve the dispute.

4.21. Force Majeure. The Respondents shall cause all work to be performed within the time limits set forth in this Order unless an extension is approved or performance is delayed by events that constitute an event of force majeure. For purposes of this Order, an event of force majeure is an event arising from circumstances beyond the control of the involved Respondents that delays performance of any obligation under this Agreement, provided the involved Respondents have undertaken all appropriate planning and prevention measures to avoid any foreseeable circumstances. Increases in cost of performing the work specified in this Order shall not be considered circumstances beyond the control of the involved Respondents. For purposes of this Order, events which constitute a force majeure shall include, without limitation, events such as acts of God; war; civil commotion; unusually severe weather; labor difficulties; shortages of labor; materials or equipment; government moratorium; delays in obtaining necessary permits due to action or inaction by third parties; failure to obtain access to non-SSFL properties, provided Respondents comply with section 4.8.2.; and earthquake, fire, flood or other casualty. The involved Respondents shall notify DTSC in writing immediately after the occurrence of the force majeure event. Such notification shall describe the anticipated length of the delay, the cause or causes of the delay, the measures taken and to be taken by the involved Respondents to minimize the delay and the timetable by which these measures shall be implemented. If DTSC does not agree that the delay is attributable to a force majeure event, then the matter may be subject to the dispute resolution procedures set forth in sections 4.20.1 through 4.20.6 of this Order.

4.22. Schedule Changes. If Respondents are unable to perform any activity or submit any document by the date specified in the schedule developed pursuant to section 3.2.1 of this Order due to delays by DTSC in completing its review of or response to submittals by Respondents, upon DTSC's completion of such review of or response to such submittals, the schedule shall be automatically adjusted accordingly, unless DTSC and Respondents agree to an alternative schedule, and the new schedule shall be incorporated by reference into this Order. In such event, the provisions of section 4.19 Penalties for Noncompliance shall not apply to Respondents' inability to perform any activity or submit any document under the original schedule; however, section 4.19 Penalties for Noncompliance shall apply to the new schedule unless the schedule is revised pursuant this section 4.22 or Section 4.23.

4.23. Extension Requests. If Respondents are unable to perform any activity or submit any document within the time required under the schedule developed pursuant to section 3.2.1 of this Order, Respondents shall, prior to expiration of the time, request an extension of the time in writing. The extension request shall include a justification for the delay and the proposed new Schedule. All such requests shall be in advance of the date on which the activity or document is due. If DTSC determines that good cause exists for an extension, it shall grant the request and specify a new schedule in writing. "Good cause" shall include delays by DTSC in completing its review of and response to submittals by Respondents to the extent that future deadlines are impacted as specified in the schedule. Respondents shall comply with the new schedule specified by DTSC, which shall be incorporated by reference into this Order.

4.24. Parties Bound. This Order shall apply to and be binding upon Respondents, and their officers, directors, agents, employees, contractors, consultants, receivers, trustees, successors, and assignees, including but not limited to individuals, partners, and subsidiary and parent corporations.

4.25. Compliance with Waste Discharge Requirements. Respondents shall comply with all applicable waste discharge requirements and other Orders issued by the State Water Resources Control Board or a California Regional Water Quality Control Board.

4.26. Time Periods. Unless otherwise specified, time periods begin from the effective date of this Order and "days" means calendar days. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday or federal or State holiday, the period shall run until the next business day.

4.27. Severability. The requirements of this Order are severable. Should a provision or provisions of this Order be determined by a court to be ineffective, or should a court determine that any federal or State law or regulation incorporated into, referenced in, or authorizing this Order is invalid or unenforceable in whole or in part, Respondents shall comply with each and every remaining effective provision.

MODIFICATION

5. 0. This Order may be modified by the mutual agreement of the parties. Any agreed modifications shall be in writing, shall be signed by all Parties, shall have as their effective date the date on which they are signed by DTSC, and shall be deemed incorporated into this Order.

TERMINATION AND SATISFACTION

6. 0. The provisions of this Order shall be deemed satisfied upon the execution by the parties of an Acknowledgment of Satisfaction (Acknowledgment). DTSC shall prepare the

Acknowledgment for Respondents' signatories. The Acknowledgment shall specify that Respondents have demonstrated to the satisfaction of DTSC that the terms of this Order including payment of DTSC's costs have been satisfactorily completed. The Acknowledgment shall affirm Respondents' continuing obligation to preserve all records after the rest of the Order is satisfactorily completed.

EFFECTIVE DATE

7. 0. The effective date of this Order shall be the date on which the Order is signed by DTSC.

NO THIRD PARTY BENEFICIARY

8. 0. The Parties to this Order agree that there are no third party beneficiaries to any of the terms and conditions contained in, or rights and obligations arising out of, this Order.

PREVIOUS ORDER SUPERSEDED

9.0. This Order shall supersede the Consent Order for Corrective Action (P3-07/08-003) entered into by Respondents and DTSC on August 16, 2007.

SIGNATORIES

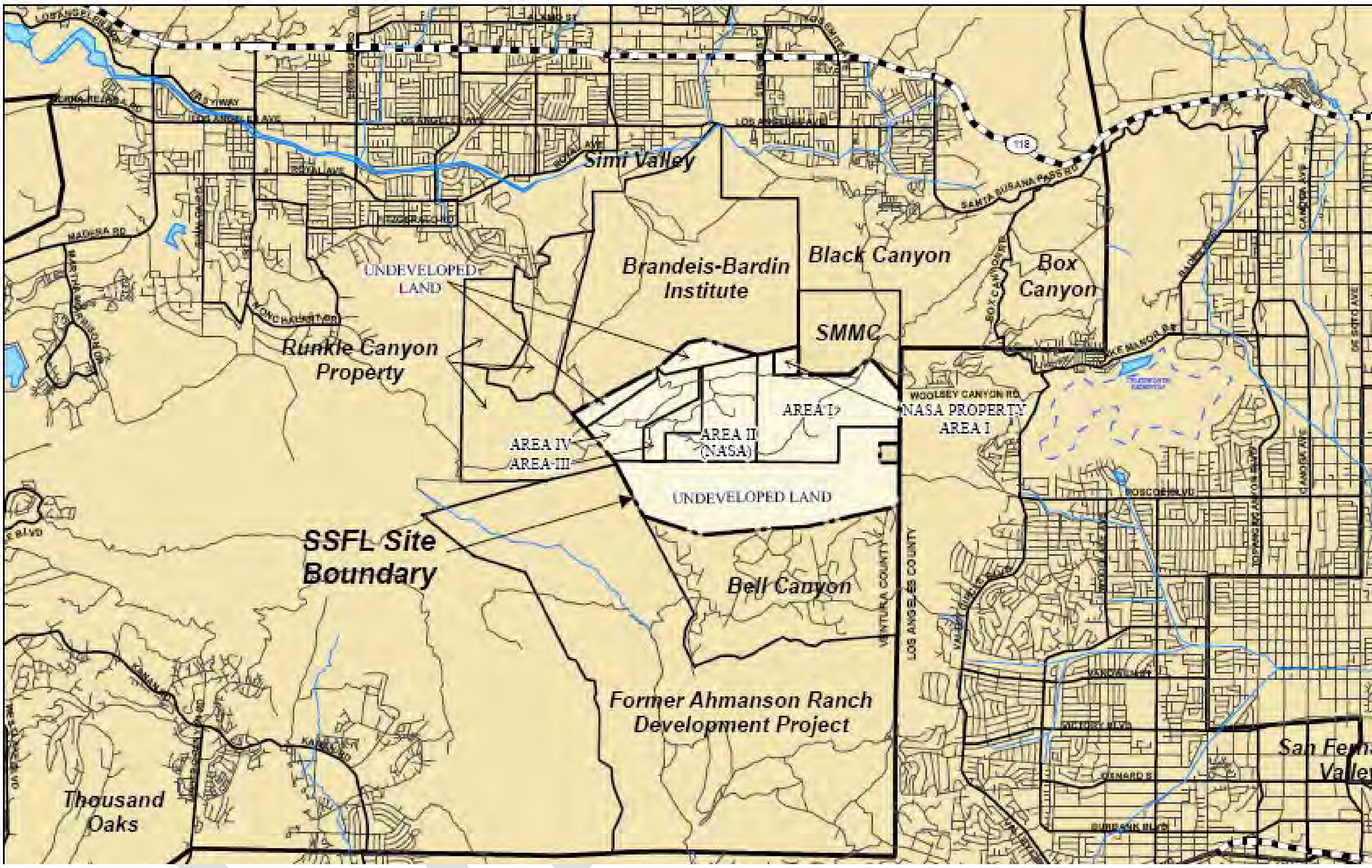
10.0. Each undersigned representative of the Parties to this Order certifies that he or she is fully authorized to enter into the terms and conditions of this Order and to execute and legally bind the Parties to this Order.

DATE: ______________ ______________________________
Maziar Movassaghi
Director
Department of Toxic Substances Control

DATE: ______________ ______________________________
Cynthia V. Anderson
Deputy Chief Operations Officer
Office of Environmental Management
U.S. Department of Energy

DATE: ______________ ______________________________
Robert M. Lightfoot
Acting Director
Marshall Space Flight Center
National Aeronautics and Space Administration

**ATTACHMENT 1**
**Santa Susana Field Laboratory**
**Regional Map**



ATTACHMENT 2 – SSFL PERMITS AND INTERIM STATUS AUTHORIZATIONS

| SSFL AREA | RCRA PERMIT | PERMIT TYPE | PERMITTED UNITS | OWNER / OPERATOR | STATUS | CURRENT ACTIVITY |
|---|---|---|---|---|---|---|
| I | **Interim Status Document** (CAD093365435) | T / S | Thermal Treatment Facility (TTF)<br>OB/OD unit | Boeing | ISD & Facility Inactive, Undergoing Closure | Evaluating cleanup and Closure Plan |
| I & III | **Post-Closure Hazardous Waste Facility Permit** (CAD093365435) | T / S / D | 5 surface impoundments<br>- Advanced Propulsion Test Facility 1 (APTF-1)<br>- Advanced Propulsion Test Facility 2 (APTF-2<br>- Systems Test Laboratory-IV 1 (STL-IV-1)<br>- Systems Test Laboratory-IV 2 (STL-IV-2)<br>- Engineering Chemistry Laboratory Pond<br><br>5 Groundwater Treatment Units (GWTU) and associated Air Stripping Towers (ASTs)<br>- Alfa Test Area GWTU & ASTs<br>- Canyon Area GWTU & ASTs<br>- Area 1 Road Bowl Area GWTU & ASTs<br>- STV-IV GWTU & ASTs<br>- WS-5 Area GWTU UV/Peroxidation Unit | Boeing | Active Permit<br>Effective Date: 05/11/1995<br>Expiration Date: 05/11/2005 | Post-closure care of the surface impoundments.<br><br>Operation and maintenance of the groundwater treatment facility. |
| II | **Post-Closure Hazardous Waste Facility Permit** (CA1800090010) | T / S / D | 4 surface impoundments<br>- Alfa Bravo Skim Pond (ABSP)<br>- Storable Propellants Area Pond 1 (SPA-1)<br>- Storable Propellants Area Pond 2 (SPA-2)<br>- Delta Area Pond (Delta)<br><br>3 Groundwater Treatment Units (GWTU) and associated Air Stripping Towers (ASTs)<br>- Bravo GWTU & ASTs<br>- Delta GWTU & ASTs<br>- RD-9 Area GWTU & UV/Peroxidation Unit | NASA / Boeing | Active Permit<br>Effective Date: 05/11/1995<br>Expiration Date: 05/11/2005 | Post-closure care of the surface impoundments.<br><br>Operation and maintenance of the groundwater treatment facility. |
| II | **Hazardous Waste Facility Permit** (CA1800090010) | S | Hazardous Waste Container Storage Facility, and PCB Storage Area | NASA / Boeing | Clean Closed | Facility Certified Closed 09/30/1998 |
| IV | **Hazardous Waste Facility Permit** (CAD000629972) | T / S | Hazardous Waste Management Unit (HWMF):<br>- Building 133 (sodium treatment facility)<br>- Building 29 (sodium storage facility) | DOE/ Boeing | Permit Active,<br>Facility Inactive,<br>Undergoing Closure<br>Effective Date: 11/30/1993<br>Expiration Date: 11/30/2003 | Closure Plan Approved |
| IV | **Interim Status Document** (CA3890090001) | T / S | Radioactive Materials Handling Facility (RMHF):<br>-Bldg 4022 Mixed Waste Storage<br>-Bldg 4021 Mixed Waste Treatment<br>-Bldg 4621 Mixed Waste Storage | DOE / Boeing | ISD Active | Closure Plan on hold |

TYPE: T = treatment, S = storage, D = disposal
OB/OD = Open Burn / Open Detonation
ISD = Interim Status Document

Boeing = The Boeing Company,
NASA = National Aeronautics and Space Administration
DOE = U.S. Department of Energy

## ATTACHMENT 3
## SSFL SURFACE IMPOUNDMENTS

**Areas I & III**

Advanced Propulsion Test Facility 1, (APTF-1)

Advanced Propulsion Test Facility 2, (APTF-2)

Systems Test Laboratory-IV 1, (STL-IV-1)

Systems Test Laboratory-IV 2, (STL-IV-2)

Engineering Chemistry Laboratory Pond, (ECL)

**Area II**

ALFA Bravo Skim Pond (ABSP)

Storable Propellants Area Pond 1 (SPA-1)

Storable Propellants Area Pond 2 (SPA-2)

Delta Area Pond (Delta).

==

# ATTACHMENT 4
# SOLID WASTE MANAGEMENT UNITS (SWMUs) and AREAS OF CONCERNS (AOCs)

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| **AREA I** | | | | | | |
| 4.5 | LOX Plant Waste Oil Sump and Clarifier | NASA | DTSC | RCRA Corrective Action | RFI | Accelerated cleanup performed during 1993 (removal of clarifier). |
| 4.6 | LOX Plant Asbestos and Drum Disposal Area | NASA | VCEHD/ VCAPCD DTSC | RCRA Corrective Action | RFI | Asbestos cleanup conducted in 1990 under oversight of VCEHD and VCAPCD; NFA required by VCEHD. |
| 4.20 | ~~Rocketdyne-Atomics International Rifle and Pistol Club~~ Offsite Debris Area [a] | | NA | NA | NA | Included in RFA but property belongs to SMMC |
| Area I Leach Fields[b] (16): | | | | | Inactive | There are no active leach fields onsite; formerly under WDR issued by RWQCB. |
| Area I USTs[b] (2): | | | | | | |
| **AREA II** | | | | | | |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| 5.1 | Area II Landfill | NASA | VCEHD/ RWQCB DTSC | RCRA Corrective Action | RFI | DTSC lead for characterization; site action and lead agency determination based on results. |
| 5.2 | ELV Final Assembly, Building 206 | NASA | DTSC | RCRA Corrective Action | RFI | Site expanded during RFI field program to include area near Building 203. |
| 5.3 | Building 231 PCB Storage Facility | NASA | DTSC | Former RCRA Part A Permit | Closed | Closed 1998 by DTSC. |
| 5.4 | RD-9 Area Ultraviolet Light/ Hydrogen Peroxide ($UV/H_2O_2$) Treatment System | NASA | DTSC | RCRA Part B Permit | Standby | Part of groundwater treatment system under jurisdiction of DTSC. Currently inactive on standby. |
| 5.5 | Building 204 Former Waste Oil UST (UT-50) | NASA | DTSC | RCRA Corrective Action | RFI | Former waste oil UST closed by VCEHD in 1991. DTSC requested additional assessment for RFI. |
| 5.6 | Former Area II Incinerator Ash Pile | NASA | DTSC | RCRA Corrective Action | RFI | Accelerated cleanup performed during 1993 (removal of ash pile). |
| 5.8 | HWSA Container Storage Area | Boeing NASA | DTSC | Former RCRA Part A Permit | Closed | Closed 1998 by DTSC. |
| 5.9 | Alfa Test Area | NASA | DTSC | RCRA Corrective Action | RFI | |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| 5.10 | Alfa Test Area Tanks | NASA | DTSC | RCRA Corrective Action | RFI | |
| 5.11 | Alfa Skim and Retention Ponds and Drainage | NASA | DTSC | RCRA Corrective Action | RFI | Previous sampling performed in channels for PC Permit. |
| 5.12 | Alfa/Bravo Skim Pond (ABSP) | NASA | DTSC | PC Permit | Closed | Soil vapor sampling near impoundment performed during RFI (included in Bravo site). Groundwater monitoring ongoing as specified in PC Permit (1995). |
| 5.13 | Bravo Test Area | NASA | DTSC | RCRA Corrective Action | RFI | |
| 5.14 | Bravo Test Stand Waste Tank | NASA | DTSC | RCRA Corrective Action | RFI | |
| 5.15 | Bravo Skim Pond and Drainage | NASA | DTSC | RCRA Corrective Action | RFI | Previous sampling performed in channels for PC Permit. |
| 5.16 | Storable Propellant Area Surface Impound-ment-1 (SPA-1) and Drainage | NASA | DTSC | PC Permit | Closed | Soil vapor sampling near impoundment performed during RFI (included in SPA site); groundwater monitoring ongoing as specified in PC Permit (1995). |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| 5.17 | SPA Surface Impound-ment-2 (SPA-2) and Drainage | NASA | DTSC | PC Permit | Closed | Soil vapor sampling near impoundment performed during RFI (included in SPA site); groundwater monitoring ongoing as specified in PC Permit (1995). |
| 5.18 | Coca Test Area | NASA | DTSC | RCRA Corrective Action | RFI | |
| 5.19 | Coca Skim Pond and Drainage | NASA | DTSC | RCRA Corrective Action | RFI | |
| 5.20 | Propellant Load Facility (PLF) Waste Tank | NASA | DTSC | RCRA Corrective Action | RFI | Tank never used. |
| 5.21 | PLF Ozonator Tank | NASA | DTSC | RCRA Corrective Action | RFI | Ozonator tank received RCRA variance from DTSC. |
| 5.22 | PLF Surface Impound-ment | NASA | DTSC | RCRA Corrective Action | Closed | Closed by DHS in 1989. |
| 5.23 | Delta Test Area | NASA | DTSC | RCRA Corrective Action | RFI | |
| 5.24 | Delta Skim Pond and Drainage | NASA | DTSC | PC Permit | Closed | Soil vapor sampling near impoundment performed during RFI (included with Delta site); groundwater monitoring ongoing as specified in PC Permit (1995). |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| 5.25 | Purge Water Tank near Delta Treatment System | NASA | DTSC | RCRA Corrective Action | NFA | Polypropylene AST intermittently used since 1992 as temporary holding tank for groundwater to transfer to treatment system; DTSC did not request further investigation during 1999/2000 site review. |
| 5.26 | R-2A and R-2B Ponds and Drainage | NASA | DTSC | RCRA Corrective Action | RFI | Surface water discharge from ponds monitored under RWQCB jurisdiction at NPDES outfall locations. |
| 5.27 | Area II Air Stripping Towers (Delta and Bravo) | NASA | DTSC VCAPCD | RCRA Part B Permit | Opera-tional | Part of groundwater treatment system under jurisdiction of DTSC; air discharges permitted by VCAPCD. |
| 5.29 | RD-51 Watershed [c] | (c) | (c) | (c) | (c) | |
| 5.28 | Area II AOCs (combined and listed as a SWMU in RFA) | | | | | |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| Area II – AOC | Building 515 Sewage Treatment Plant (STP) Area | NASA | RWQCB DTSC | NPDES Permit RCRA Corrective Action | Inactive RFI | When operational, discharges from sewage treatment plant under RWQCB jurisdiction (NPDES permit). Site includes Building 211 leach field (Area II AOC) and downslope area near RD-9 groundwater treatment system (SWMU 5.4). |
| Area II – AOC | Storable Propellant Area (SPA) | NASA | DTSC | RCRA Corrective Action | RFI | |
| Area II – AOC | Alfa/Bravo Fuel Farm (ABFF) and Stormwater Basin | NASA | RWQCB DTSC | SPCC RCRA Corrective Action | Operational RFI | Site added to RFI field program when soil impacts observed at fuel farm during underground pipeline removal. |
| Area II – AOC | Coca/Delta Fuel Farm (CDFF) | NASA | DTSC | RCRA Corrective Action | RFI | New AOC added to RFI after DTSC site review (Boeing 1997a). |
| Area II – AOC | Drainage Pipes Under ABSP | NASA | DTSC | PC Permit | Closed | Soil vapor sampling near impoundment drainage performed during RFI (included in Bravo site); groundwater monitoring ongoing as specified in PC Permit (1995). |
| Area II Leach Fields[b] (10): | | | | | Inactive | There are no active leach fields onsite; formerly under WDR Permit issued by RWQCB. |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| Area II – AOC | Area II Service Area, Building 211 | NASA | DTSC | RCRA Corrective Action | RFI | Included with Building 515 STP site (Area II AOC). |
| Area II – AOC | Alfa Control Ctr, Building 208 | NASA | DTSC | RCRA Corrective Action | RFI | At Alfa site (SWMUs 5.9/10/11). |
| Area II – AOC | Alfa Pretest, Building 212 | NASA | DTSC | RCRA Corrective Action | RFI | North of Alfa site (SWMUs 5.9/10/11). |
| Area II – AOC | Bravo Pretest, Building 217 | NASA | DTSC | RCRA Corrective Action | RFI | At Bravo site (SWMUs 5.13/14/15). |
| Area II – AOC | Bravo Recording Ctr, Building 213 | NASA | DTSC | RCRA Corrective Action | RFI | At Bravo site (SWMUs 5.13/14/15). |
| Area II – AOC | Coca Pretest, Building 222 | NASA | DTSC | RCRA Corrective Action | RFI | At Coca site (SWMUs 5.18/19). |
| Area II – AOC | Coca Upper Pretest, Building 234 | NASA | DTSC | RCRA Corrective Action | RFI | At Coca site (SWMUs 5.18/19). Not listed in RFA but included in CCR. |
| Area II – AOC | Coca Control Ctr, Building 218 | NASA | DTSC | RCRA Corrective Action | RFI | At Coca site (SWMUs 5.18/19). Listed incorrectly as Building 216 in RFA. |
| Area II – AOC | Delta Control Ctr, Building 224 | NASA | DTSC | RCRA Corrective Action | RFI | At PLF site (SWMU 5.20/21/22). |
| Area II – AOC | Delta Pretest, Building 223 | NASA | DTSC | RCRA Corrective Action | RFI | At Delta site (SWMU 5.23). |
| Area II USTs[(b)] (4 Sites) | | | | | | |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| Area II – AOC | Building 207 Diesel UST (UT-53) | NASA | VCEHD | LUFT | Closed | Closed 1996. Former diesel UST on north side of Building 207. |
| Area II – AOC | UST across from Alfa/Bravo Fuel Farm (ABFF) (UT-52) | NASA | VCEHD | LUFT | Closed | Closed 1994. Former gasoline UST north of ABFF site (Area II AOC) along road. |
| Area II – AOC | Building 206 Diesel UST (UT-51) | NASA | VCEHD | LUFT | Closed | Closed 1996. Former diesel UST east of Building 206 (ELV site, SWMU 5.2). |
| Area II – AOC | Two Underground Tanks at Plant Services (UT-48 and UT-49) | NASA | VCEHD | LUFT | RFI (Tanks closed) | UT-48 closed 1996; former fuel oil UST located on east side of Building 204. UT-49 closed by VCEHD 1991; former gasoline UST located on south side of Building 204. Additional soil sampling requested by DTSC in area for Building 204 site. |
| **AREA IV** | | | | | | |
| 7.1 | Building 056 Landfill | DOE | DTSC | RCRA Corrective Action | RFI | |
| 7.2 | Building 133 Hazardous Waste Management Facility | DOE | DTSC | RCRA Part B Permit | Inactive | Closure plan approved. Work suspended until completion of EIS |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| 7.3 | Building 886 Former Sodium Disposal Facility (FSDF) | DOE | DTSC | RCRA Corrective Action | RFI | Interim measures completed in 2000 (IT 2002). |
| 7.4 | Old Conserva-tion Yard (OCY) Container Storage Area and Fuel Tanks | DOE | DTSC | RCRA Corrective Action | RFI | |
| 7.5 | Building 100 Trench | DOE | DTSC | RCRA Corrective Action | RFI | |
| 7.6 | Radioactive Materials Handling Facility (RMHF) | DOE | DOE/DHS DTSC | Part A Permit Interim Status | Operational | Site under DTSC/DOE jurisdiction; Part A permit administered by DTSC. Closure plan in preparation. |
| 7.7 | Building 020 | DOE | DTSC | RCRA Corrective Action | RFI | Site investigation pending. |
| 7.11 | Building 029 Reactive Metal Storage Yard | DOE | DTSC | RCRA Part B Permit | Opera-tional | Closure plan submitted to DTSC. |
| 7.12 | Area IV AOCs (combined and listed as a SWMU in RFA) | | | | | |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| Area IV - AOC | Building 059 Former SNAP Reactor Facility | DOE | DOE/DHS DTSC | DOE Closure RCRA Corrective Action | RFI | Under DHS/DOE jurisdiction; demolition, final status surveys and DHS verification surveys completed; pending unrestricted release. Groundwater monitoring ongoing. |
| Area IV-AOC | Building 065 Metals Laboratory Clarifier | DOE | DTSC | RCRA Corrective Action | RFI | New AOC added after DTSC site review in 1999/2000. |
| Area IV-AOC | Building 457 Hazardous Materials Storage Area (HMSA) | DOE | DTSC | RCRA Corrective Action | RFI | New AOC added after DTSC site review in 1999/2000. |
| Area IV Leach Fields (15): | | | | | Inactive | There are no active leach fields onsite; formerly under WDR issued by RWQCB. |
| Area IV – AOC | AI-Z2, Building 064 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | Included in DOE leach fields RFI site (Area IV COC). Incorrectly listed as Building 014 in RFA. |
| Area IV – AOC | AI-Z3, Building 030 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | Included in DOE leach fields RFI site (Area IV AOC). Status of leach field will be addressed in RFI report. |
| Area IV – AOC | AI-Z4, Building 093 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | Incorrectly listed as Building 003 in RFA. Part of DOE leach fields RFI site. |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| Area IV – AOC | AI-Z5, Building 021 | DOE | DTSC | Pending | Pending | Regulatory assignment pending review and approval of RMHF (SWMU 7.6) closure plan (Part A Permit). |
| Area IV – AOC | AI-Z6, Building 028 | DOE | DTSC | RCRA Corrective Action | NFA (not present) | Not located during CCR investigation- facility records confirm the building never had a leach field. DTSC did not require further investigation during 1999/2000 site review. |
| Area IV – AOC | AI-Z7, Building 010/ 012 | DOE | DTSC | RCRA Corrective Action | RFI (removed) | Not located during CCR or RFI. Included in DOE leach fields RFI site (Area IV AOC). Incorrectly listed as Building 012 in RFA and CCR. |
| Area IV – AOC | AI-Z10, Building 383 | DOE | DTSC | RCRA Corrective Action | RFI (removed) | Incorrectly listed as Building 483 in RFA. Included in DOE leach fields RFI site (Area IV AOC). |
| Area IV – AOC | AI-Z11, Building 009 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | Included in DOE leach fields RFI site (Area IV AOC). |
| Area IV – AOC | AI-Z12, Building 020 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | At RIHL RFI site (SWMU 7.7). |
| Area IV – AOC | AI-Z13, Building 373 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | Included in DOE leach fields RFI site (Area IV AOC). |

| SWMU or AOC | Description | Lead Respondent | Regulatory Jurisdiction | Current Regulatory Program | Current Status | Comments |
|---|---|---|---|---|---|---|
| Area IV – AOC | AI-Z14, Building 363 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | Included in DOE leach fields RFI site (Area IV AOC). |
| Area IV – AOC | AI-Z15, Building 353 | DOE | DTSC | RCRA Corrective Action | RFI (re-moved) | Included in DOE leach fields RFI site (Area IV AOC). |
| 7.13 | SRE Watershed(c) | (c) | (c) | (c) | (c) | |

**Notes:** All SWMUs and AOCs (except those added by DTSC during the field program) are described in the RFA Report (SAIC 1994) and CCR (ICF 1993). Site descriptions for all SWMUs/AOCs added during RFI are further described in the RFI WPAA (Ogden 2000b) and this document.

See Acronym List for acronym definitions

(a) The former Rocketdyne-Atomics International Rifle and Pistol Club shooting range on Sage Ranch is an offsite location and is owned by SMMC. It is included in this table because it was listed in the RFA.

(b) Individual leach fields and USTs located in Areas I, II, and III are all associated with existing SWMUs or AOCs, and are being evaluated as part of those sites. Individual Area IV leach fields located outside of other RFI sites have been grouped as RFI sites by owner. Nine of these are being evaluated as a single AOC (DOE Leach Fields RFI site), and two are being evaluated as a separate AOC (Boeing Leach Field RFI site). Of the remaining five leach field sites in Area IV, four are being evaluated with associated RFI sites, and one is pending approval of a RCRA closure plan. Please note that this table reflects corrections to site identification errors in the RFA (e.g., Building 008 listed as an Area I leach field in the RFA, but it is an Area IV warehouse).

(c) The RD-51 and SRE watersheds were identified as SWMUs in the RFA (SAIC 1994) based on radiological sample data collected during initial sampling in 1993 (McLaren Hart 1993). Subsequent resampling of these areas did not detect or confirm initial data (McLaren Hart 1995).

ATTACHMENT 5
RFI SITES

| **RFI Site** SWMU Number or AOC and Name | **Sampling Plan Reference** |
|---|---|
| **AREA I** | |
| **B-1 Area**<br>4.1 B-1 Area<br>AOC Building 312 Leach Field | DTSC site review 1999/2000 |
| **Area I Landfill**<br>4.2 Area I Landfill | Area I & II Landfills Work Plan (MWH 2003e) |
| **Instrument and Equipment Laboratories (IEL)**<br>4.3 Building 324 Instrument Lab, Hazardous Waste Tank<br>4.4 Building 301 Equipment Lab, TCA Unit and Used Product Tank<br>AOC Buildings 301/324 Gasoline USTs (UT-37/UT-38)<br>AOC Building 301 Diesel UST (UT-44)<br>AOC Building 300 Leach Field<br>AOC Building 324 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Liquid Oxygen (LOX) Plant**<br>4.5 LOX Plant Waste Oil Sump and Clarifier<br>4.6 LOX Plant Asbestos and Drum Disposal Area | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Component Test Laboratory III (CTL-III)**<br>4.7 CTL-III<br>AOC Building 413 Leach Field<br>AOC Building 412 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Advanced Propulsion Test Facility (APTF)**<br>4.9 Advanced Propulsion Test Facility<br>AOC APTF Aboveground Tanks | WPA (Ogden 1996) |
| **LETF/CTL-I**<br>4.12 Laser Engineering Test Facility (LETF)/ Component Test Laboratory I (CTL-I)<br>AOC Building 309 Leach Field<br>AOC Building 317 Leach Field<br>AOC Building 423 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Canyon Area**<br>4.14 Canyon Area<br>AOC Building 375 Leach Field<br>AOC Building 382 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Bowl Area** | WPA (Ogden 1996) |

| | | |
|---|---|---|
| 4.15 Bowl Area<br>AOC Building 900 Leach Field<br>AOC Building 901 Leach Field | | DTSC site review 1999/2000 |
| **R-1 Pond**<br>4.16 Area I Reservoir (R-1 Pond) | | WPA (Ogden 1996) |
| **Perimeter Pond**<br><br>4.17 Perimeter Pond | | Identified in WPA DTSC site review 1999/2000 |
| **Building 359 Area**<br>AOC Building 359 Leach Field/Sump<br>AOC Building 376 Leach Field<br>AOC Building 741 Leach Field | | WPA (Ogden 1996) DTSC site review 1999/2000 |
| **Happy Valley**<br>AOC Happy Valley | | WPA (Ogden 1996) |
| **Component Test Laboratory V (CTL-V)**<br>AOC CTL-V<br><br>AOC Building 439 Leach Field | | Letter Work Plan (Boeing 1997); Building 439 Leach Field identified in RFA |
| | **AREA II** | |
| **Area II Landfill**<br><br>5.1 Area II Landfill | | Area I & II Landfills Work Plan (MWH 2003e) |
| **Expendable Launch Vehicle (ELV)**<br>5.2 ELV Final Assembly, Building 206 | | WPA (Ogden 1996) |
| **Building 204 USTs**<br>5.5 Building 204 Former Waste Oil UST (UT-50)<br>AOC Underground Tanks at Plant Services (UT-48 and UT-49) | | WPA (Ogden 1996) |
| **Former Area II Incinerator Ash Pile**<br>5.6 Former Area II Incinerator Ash Pile | | WPA (Ogden 1996) |
| **Hazardous Waste Storage Area (HWSA) Waste Coolant Tank (WCT)**<br>5.7 Hazardous Waste Storage Area Waste Coolant Tank | | WPAA (Ogden 2000b) |

| |
|---|
| **AREA II (Cont'd)** |

| | |
|---|---|
| **Alfa Area**<br>5.9 Alfa Test Area<br>5.10 Alfa Test Area Tanks<br>5.11 Alfa Skim and Retention Ponds and Drainage<br>AOC Building 208 Leach Field<br>AOC Building 212 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Bravo Area**<br>5.13 Bravo Test Area<br>5.14 Bravo Test Stand Waste Tank<br>5.15 Bravo Skim Pond and Drainage<br>AOC Building 213 Leach Field<br>AOC Building 217 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Coca Area**<br>5.18 Coca Test Area<br>5.19 Coca Skim Pond and Drainage<br>AOC Building 222 Leach Field<br>AOC Building 234 Leach Field<br>AOC Building 218 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Propellant Load Facility (PLF)**<br>5.20 PLF Waste Tank<br>5.21 PLF Ozonator Tank<br>5.22 PLF Surface Impoundment (Closed)<br>AOC Building 224 Leach Field | Identified in WPA<br>DTSC site review 1999/2000 |
| **Delta Area**<br>5.23 Delta Test Area<br>AOC Building 223 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **R-2 Ponds**<br>5.26 R-2A and R-2B Ponds and Drainage | Identified in WPA<br>DTSC site review 1999/2000 |
| **Building 515 Sewage Treatment Plant (STP)**<br>AOC Building 515 STP Area<br>AOC Building 211 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Alfa/Bravo Fuel Farm (ABFF)**<br>AOC ABFF and Stormwater Basin | DTSC site review 1997 |
| **Coca/Delta Fuel Farm (CDFF)**<br>AOC CDFF | Letter Work Plan (Boeing 1997) |
| **Storable Propellant Area (SPA)** | WPA (Ogden 1996) |

| | |
|---|---|
| AOC SPA | |
| **AREA III** | |
| **Engineering Chemistry Laboratory (ECL) Area**<br>6.1 ECL Building 270, Waste Tank, and Container Storage Area<br>6.2 ECL Suspect Water Pond<br>6.3 ECL Collection Tank<br>AOC Building 260 ECL Runoff Tanks<br>AOC Building 270 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Compound A Facility**<br>6.4 Building 418 Compound A Facility | WPA (Ogden 1996) |
| **Systems Test Laboratory IV (STL-IV)**<br>6.5 STL-IV Test Area and Ozonator Tank<br>AOC Buildings 253/254 Leach Field | WPA (Ogden 1996)<br>DTSC site review 1999/2000 |
| **Silvernale Reservoir**<br>6.8 Silvernale Reservoir and Drainage | WPA (Ogden 1996) |
| **Environmental Effects Laboratory (EEL)**<br>6.9 EEL | WPA (Ogden 1996) |
| **Sewage Treatment Plant (STP) Pond**<br>AOC Sewage Treatment Plant (STP) Pond | DTSC site review 1999/2000 |
| **AREA IV** | |
| **Building 56 Landfill**<br>7.1 Building 56 Landfill | WPA (Ogden 1996)<br>B56 Landfill WP |
| **Former Sodium Disposal Facility (FSDF)**<br>7.3 Building 886 FSDF | Identified in WPA<br>DTSC site review 1999/2000 |
| **Old Conservation Yard (OCY)**<br>7.4 OCY Container Storage Area and Fuel Tanks | WPA (Ogden 1996) |
| **RFI Site**<br>SWMU Number or AOC and Name | **Sampling Plan Reference** |
| **AREA IV (Cont'd)** | |
| **Building 100 Trench**<br>7.5 Building 100 Trench | DTSC site review 1999/2000 |

| | | |
|---|---|---|
| **Hot Laboratory (HL)**<br>7.7 HL, Building 20<br>AOC Building 20 Leach Field | | WPA (Ogden 1996)<br>(revised in WPAA) |
| **New Conservation Yard (NCY)**<br>7.8 NCY | | WPA (Ogden 1996) |
| **Empire State Atomic Development Authority (ESADA)**<br>7.9 ESADA Chemical Storage Yard | | Identified in WPA<br>DTSC site review<br>1999/2000 |
| **Coal Gasification Process Development Unit (PDU)**<br>7.10 Building 005 Coal Gasification PDU<br>AOC Buildings 005/006 Leach Field | | Identified in WPA<br>DTSC site review<br>1999/2000 |
| **Sodium Reactor Experiment (SRE) Area**<br>AOC SRE<br>AOC Building 003 Leach Field | | Letter Work Plan<br>(Boeing 1997) |
| **Southeast Drum (SE Drum) Storage Yard**<br>AOC SE Drum Storage Yard | | DTSC site review<br>1999/2000 |
| **Pond Dredge Area**<br>AOC Pond Dredge Area | | WPAA (Ogden<br>2000b) |
| **Boeing Area IV Leach Fields**<br>AOC Building 011 Leach Field<br>AOC Building 008 Warehouse | | DTSC site review<br>1999/2000 |
| **Systems for Nuclear Auxiliary Power (SNAP) Facility**<br>AOC Building 59, SNAP Facility | | WPAA (Ogden<br>2000b) |
| **Building 65 Metals Laboratory Clarifier**<br>AOC Building 65, Metals Laboratory Clarifier | | WPAA (Ogden<br>2000b) |
| **Hazardous Materials Storage Area (HMSA)**<br>AOC Building 457, Former HMSA | | WPAA (Ogden<br>2000b) |
| **DOE Leach Fields**<br>AOC Building 009 Leach Field<br>AOC Building 010 Leach Field<br>AOC Building 030 Leach Field<br>AOC Building 064 Leach Field<br>AOC Building 093 Leach Field | | DTSC site review<br>1999/2000 |

| | | |
|---|---|---|
| AOC Building 353 Leach Field<br>AOC Building 363 Leach Field<br>AOC Building 373 Leach Field<br>AOC Building 383 Leach Field | | |

**Summary by Document**

| Document | Total | | Proposed for Sampling | |
|---|---|---|---|---|
| | SWMUs/AOCs | RFI Sites | SWMUs/AOCs | RFI Sites |
| WPA (1996) | 64 | 34 | 40 | 27 |
| WPAA (2000) | 6 | 5 | 7 | 6 |
| DTSC Site Reviews (1997/1998) | 29 | 7 | 52 | 13 |
| Area I/II Landfill WP (2003) | 2 | 2 | 2 | 2 |
| Letter WPs (1997/1998) | 5 | 3 | 5 | 3 |
| **Totals** | **106** | **51** | **106** | **51** |

***Notes:***

1. Sampling plans included in referenced document or as directed during field investigation by DTSC.

2. Because of proximity, Buildings 011 and 008 will be reported together as one RFI site.

3. Only SWMUs and AOCs considered part of each RFI site are listed. No RCRA permitted units or closed USTs are shown, with the exception of tanks for which DTSC has requested additional characterization. All SWMUs and AOCs included in the RFI are listed here and designated in Table 1-3 by "RFI" under "Current Status."

4. Leach Field AOCs originally introduced in the RFA (SAIC 1994).

See Acronym List for acronym definitions

## ATTACHMENT 6

**[EPA PRGs to be inserted]**

# ATTACHMENT 7
# LIST OF SURFICIAL OU AND CHATSWORTH FORMATION OU HUMAN HEALTH EXPOSURE PATHWAYS

| | ~~Rural Residential (Agricultural)~~ | | ~~Suburban Residential~~ | | ~~Recreational~~ | |
|---|---|---|---|---|---|---|
| ~~Exposure Pathway~~ | ~~Radionuclides~~[a] | ~~Chemicals~~ | ~~Radionuclides~~[a] | ~~Chemicals~~ | ~~Radionuclides~~ | ~~Chemicals~~ |
| ~~Direct radiation exposure~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ |
| ~~Soil/sediment pathways:~~ | | | | | | |
| ~~- Ingestion of soil~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ |
| ~~- Dermal contact with soil~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ |
| ~~- Inhalation of particulates in air derived from soil~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ |
| ~~- Inhalation of VOCs in ambient air derived from soil~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ |
| ~~- Inhalation of VOCs in indoor air derived from soil~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ |
| ~~Surface water pathways~~ | | | | | | |
| ~~- Ingestion of surface water~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ |
| ~~- Dermal contact with surface water~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ |
| ~~Groundwater pathways~~ | | | | | | |
| ~~- Ingestion of potable water~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Dermal contact while bathing~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Inhalation of VOCs/volatiles while showering~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Inhalation of VOCs in indoor air derived from groundwater~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Inhalation of VOCs in ambient air derived from groundwater~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ | ~~N/A~~ | ~~X~~ |
| ~~Consumption of Biota:~~ | | | | | | |
| ~~- Fruits & vegetables~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Beef~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Poultry~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Swine~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Eggs~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Milk~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ |
| ~~- Fish~~ | ~~X~~ | ~~X~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ | ~~N/A~~ |

**Human Health Exposure Pathways for Radionuclides and Chemicals by Land Use**

| | Rural Residential (Agricultural) | | Suburban Residential | | Recreational (Optional) | |
|---|---|---|---|---|---|---|
| **Exposure Pathway** | **Radionuclides[a]** | **Chemicals** | **Radionuclides[a]** | **Chemicals** | **Radionuclides** | **Chemicals** |
| Direct radiation exposure | X | N/A | X | N/A | X | N/A |
| Soil/sediment pathways: | | | | | | |
| - Ingestion of soil | X | X | X | X | X | X |
| - Dermal contact with soil | N/A | X | N/A | X | N/A | X |
| - Inhalation of particulates in air derived from soil | X | X | X | X | X | X |
| - Inhalation of VOCs in ambient air derived from soil | N/A | X | N/A | X | N/A | X |
| - Inhalation of VOCs in indoor air derived from soil | N/A | X | N/A | X | N/A | N/A |
| Surface water pathways | | | | | | |
| - Ingestion of surface water | N/A | X | N/A | X | N/A | X |
| - Dermal contact with surface water | N/A | X | N/A | X | N/A | X |
| Groundwater pathways | | | | | | |
| - Ingestion of potable water | X | X | X | X | N/A | N/A |
| - Dermal contact while bathing | N/A | X | N/A | X | N/A | N/A |
| - Inhalation of VOCs/volatiles while showering | X | X | X | X | N/A | N/A |
| - Inhalation of VOCs in indoor air derived from groundwater | N/A | X | N/A | X | N/A | N/A |
| - Inhalation of VOCs in ambient air derived from groundwater | N/A | X | N/A | X | N/A | X |
| Consumption of Biota: | | | | | | |
| - Fruits & vegetables | X | X | X | N/E | N/A | N/A |
| - Beef | X | X | N/A | N/A | N/A | N/A |
| - Poultry | X | X | N/A | N/A | N/A | N/A |
| - Swine | X | X | N/A | N/A | N/A | N/A |
| - Eggs | X | X | N/A | N/A | N/A | N/A |
| - Milk | X | X | N/A | N/A | N/A | N/A |
| - Fish | X | X | N/A | N/A | N/A | N/A |

**Notes:**
[a] Based on default EPA agricultural and residential soil PRGs and tap water PRGs.
N/A – Not applicable.
N/E – May be applicable but not quantitatively evaluated for this receptor.

## ATTACHMENT 8
## LIST OF SURFICIAL OU AND CHATSWORTH FORMATION OU ECOLOGICAL EXPOSURE PATHWAYS

| **Representative Ecological Receptor** | **Evaluated Exposure Pathways**[a] |
|---|---|
| Plant (terrestrial) | • Soil (direct exposure) |
| Soil Invertebrate (terrestrial) | • Soil (direct exposure) |
| Red Tailed Hawk | • Food ingestion (small mammals)<br>• External dose (radionuclides only) |
| Hermit Thrush | • Soil ingestion<br>• Food Ingestion (plants and invertebrates)<br>• Surface water ingestion<br>• Near-surface groundwater (seeps and springs)<br>• Chatsworth formation groundwater (seeps and springs)<br>• External dose (radionuclides only) |
| Deer Mouse | • Soil Ingestion<br>• Food ingestion (plants and invertebrates)<br>• Surface water ingestion<br>• Near-surface groundwater (seeps and springs)<br>• Chatsworth formation groundwater (seeps and springs)<br>• Vapor inhalation (chemicals only) |

| | |
|---|---|
| | • External dose (radionuclides only) |
| Mule Deer | • Soil Ingestion<br>• Food ingestion (plants)<br>• Surface water ingestion<br>• Near-surface groundwater (seeps and springs)<br>• Chatsworth formation groundwater (seeps and springs)<br>• External dose (radionuclides only) |
| Bobcat | • Food ingestion (small mammals)<br>• Surface water ingestion<br>• Near-surface groundwater (seeps and springs)<br>• Chatsworth formation groundwater (seeps and springs)<br>• External dose (radionuclides only) |
| Plant (aquatic) | • Direct exposure to surface water concentrations |
| Invertebrate (aquatic) | • Direct exposure to surface water concentrations |
| Great Blue Heron | • Food ingestion (small mammals, aquatic invertebrates and fish)<br>• Surface water ingestion<br>• Chatsworth formation groundwater (seeps and springs) |

| | | |
|---|---|---|
| | | • Sediment ingestion<br>• External dose (radionuclides only) |

[a]: Exposure pathways applicable to both radionuclides and chemicals unless otherwise specified

ATTACHMENT 9

SSFL
HAZARDOUS SUBSTANCES OF CONCERN ASSOCIATED WITH
ROCKET ENGINE TESTING and OTHER RESEARCH AND DEVELOPMENT ACTIVITIES

● Hazardous substance constituents of concern at the SSFL associated with rocket engine testing include, but are not limited to, the following:

Liquid rocket test fuels - RP-1 (high-grade kerosene), JP-4 (a type of jet fuel) monomethyl hydrazine, hydrazine, derivatives, and liquid hydrogen, as well as various by-product of the combustion of these materials;

Oxidizers - liquid oxygen and nitrogen tetroxide, and various fluorine compounds and inhibited red fuming nitric acid; and

Solvents - trichloroethylene, the primary solvent used at SSFL, used to clean engine components before and after testing.

● Hazardous substances of concern associated with other research and development activities carried out at the SSFL include, but are not limited to, the following:

Halogenated solvents - 1,1,1-trichloroethane, tetrachloroethylene, 1,1-dichloroethane, and chlorofluorocarbons;

Caustic solutions - potassium hydroxide and sodium hydroxide;

Radionuclides;

Reactive metals - sodium and other reactive metals;

"Green Liquor" wastewater - generated from coal gasification operations, containing organics, sulfur compounds, and ash;

Energetic materials - perchlorate, glycidyl azide polymer, hexahydro-1,3,4-trinitro-1,3,5-triazine (RDX), oxtahydro-1,3,5,7-tetranitro-1,2,5,7-tetrazocine (HMX), and other ordnance compounds;

Polychlorinated biphenyls (PCBs) – transformers;

Various chemicals - used in laboratory operations, such as solvents, acids, and bases;

Laboratory wastes - from cleaning laboratory instruments, such as waste solvents, acids and bases;

Waste oil - sumps and clarifiers;,

Construction debris - including concrete, wood, metal and asbestos;

Incinerator ash - dioxin and metals; and

Biocides - cooling tower, water treatment chemicals which include copper and chromium compounds.

# ATTACHMENT 10
# CHEMICALS OF CONCERN
# FROM POST CLOSURE PERMITS
# SSFL

Acetone
Carbon Tetrachloride
Methylene Chloride
Chloroform
Fluoride
Freon 11
Freon 113
Formaldehyde
Ammonia
Nitrate
Methyl Ethyl Ketone
Benzene
Toluene
Xylenes
Ethylbenzene
PCE
TCE
Cis-1,2-DCE
Trans-1,2-DCE
1,1-DCE
Vinyl Chloride
1,1,1-TCA
1,1,2-TCA
1,2-DCA
1,1-DCA
1,4-dioxane
N-nitrosodimethylamine
Nitrobenzene

## ATTACHMENT 11
## LIST OF CHEMICALS AND RADIONUCLIDES IDENTIFIED IN GROUNDWATER AT SSFL

The following list is inclusive of all chemicals detected in at least a single groundwater sample collected from wells at or near the SSFL (regardless of concentration). These chemicals are not necessarily related to releases from the SSFL and include those that occur naturally and are artifacts of work performed in analytical laboratories.

1,1,1-trichloroethane
1,1,2--trichloroethane
1,2-dichloroethane
1,1-dichloroethane
chloroethane
1,4-dioxane

tetrachloroethylene
trichloroethylene
cis-1,2-dichloroethylene
trans-1,2-dichloroethylene
1,1-dichloroethylene
vinyl chloride

n-nitrosodimethylamine
1,2,3-trichloropropane
1,3-dinitrobenzene
nitrobenzene
nitrate
perchlorate
petroleum hydrocarbons (various ranges)
benzene
ethylbenzene
m-, p-, and o-xylenes
toluene
acetone
ammonia as nitrogen
fluoride

carbon tetrachloride
methylene chloride
chloroform
chloromethane

trichlorotrifluoroethane (Freon 113)
trichlorofluoromethane (Freon 11)
dichlorodifluoromethane (Freon 12)

poly-chlorinated di-benzo dioxins/furans
formaldehyde

cadmium
chromium
copper
lead
manganese
nickel
silver
thallium
zinc

The following is a list of all radionuclides detected in at least a single groundwater sample collected from wells at or near SSFL (regardless of concentration). These radionuclides are not all necessarily related to releases from the SSFL and include radionuclides that occur naturally.

| | |
|---|---|
| Actinium | 228 |
| Bismuth | 214 |
| Cesium | 134 |
| Cobalt | 60 |
| Hydrogen | 3 |
| Lead | 210 |
| Lead | 212 |
| Lead | 214 |
| Polonium | 210 |
| Potassium | 40 |
| Radium | 226 |
| Radium | 228 |
| Radon | 222 |
| Strontium | 90 |
| Thallium | 208 |
| Thorium | 228 |
| Thorium | 230 |
| Thorium | 232 |
| Uranium | 233/234 |
| Uranium | 234 |
| Uranium | 235 |
| Uranium | 236 |
| Uranium | 238 |

ATTACHMENT 12

LIST OF APPLICABLE GUIDANCE DOCUMENTS

- Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final (EPA 540/G-89/004, OSWER 9355.3-01,October 1988),
- Proven Technologies and Remedies Guidance – Remediation of Metals in Soil (DTSC, August 2008)
- Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (EPA 402-R-97-016, Revision 1, August 2000)
- U.S. EPA's Pro UCL Version 4.00.02 User Guide
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW 846)
- Environmental Measurements Laboratory (EML) Procedures Manual, HASL-300
- EPA Publication 9285.7-08, "Supplemental Guidance to RAGS: Calculating the Concentration Term"
- EPA 93555.0-01, "Guidance on Surface Soil Cleanup at Hazardous Waste Sites", EPA/600/R-07/038
- California Environmental Protection Agency (Cal-EPA). 1997. Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities. Prepared by Human and Ecological Risk Division, Department of Toxic Substances Control. California Environmental Protection Agency. February.
- Department of Toxic Substances Control (DTSC). 1998-2009. *HERD Ecological Risk Assessment Notes: Numbers 1-5.* California Department of Toxic Substances Control. Human and Ecological Risk Division (HERD).

- DTSC. 1992. Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities. October. Document not provided. Publicly available document.
- DTSC. 1994. Preliminary Endangerment Assessment Guidance Manual. January. Document not provided. Publicly available document.
- DTSC. 1996. Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities, Part A: Overview. State of California, California Environmental Protection Agency. July. Document not provided. Publicly available document.
- United States Environmental Protection Agency (USEPA). 1989a. Risk Assessment Guidance for Superfund (RAGS). Volume I: Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002. December.
- USEPA. 1989b. Risk Assessment Guidance for Superfund. Volume II: Environmental Evaluation Manual. Interim Final. EPA/540/1-89/001A.
- USEPA. 1991a. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors.
- USEPA. 1991b. Role of the Baseline Risk Assessment in Superfund Remedy Selection Decision, OWSER Directive 9355.0-30.
- USEPA. 1992a. Final Exposure Assessment Guidelines.
- USEPA. 1992b. National Toxics Rule Criteria to Protect Freshwater Aquatic Life in California Waters. Criterion for Continuous Concentration (CCC). 40 CFR 131.36.
- USEPA. 1993a. Wildlife Exposure Factors Handbook, Volume I of II. Office of Research and Development. EPA 600/R-93/187a. December.
- USEPA. 1993b. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. EPA/600/R-93/089.
- USEPA. 1996. Ecotox Thresholds. US Environmental Protection Agency. Office of Solid Waste and Emergency Response. EPA 540/F-95/038. January.
- USEPA. 1997a. Exposure Factors Handbook, Volume I: General Factors. Office of Emergency and Remedial Response. EPA/600/P-95/002 Fa. August.
- USEPA. 1997b. Exposure Factors Handbook, Volume II: Food Ingestion Factors. Office of Emergency and Remedial Response. EPA/600/P-95/002 Fa. August.

- USEPA. 1997c. Exposure Factors Handbook, Volume III: Activity Factors. Office of Emergency and Remedial Response. EPA/600/P-95/002 Fa. August.
- USEPA. 1997d. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final. June.
- USEPA. 1998. Guidelines for Ecological Risk Assessment. EPA/630/R-95/002F. April 14.
- USEPA. 1999a. Contact Laboratory Programs National Functional Guidelines for Organic Data Review. February.
- USEPA. 1999b. Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Volume Three. Peer Review Draft. Appendix C Media-to-Receptor Bioconcentration Factors (BCFs). EPA530-D-99-001A. August.
- USEPA 1999c. Data Collected for the Hazardous Waste Identification Rule. Section 10.0 Farm Food Chain and Terrestrial Foodweb Data. US Environmental Protection Agency, Washington DC, Contract No. 68-W-98-085, October.
- USEPA. 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule Part III. 40 CFR Part 131. May 18.
- USEPA. 2001. Risk Assessment Guidance for Superfund (RAGS), Supplemental Guidance for Dermal Risk Assessment, Interim.
- USEPA. 2002a. Guidance for Comparing Background and Chemical Concentrations at Superfund Sites. Office of Solid Waste and Emergency Response.
- USEPA. 2002b. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites, OSWER 9285.6-10. December.
- USEPA. 2002c. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites, OSWER 9285.6-10. December.
- USEPA, 2003. Guidance for Developing Ecological Soil Screening Levels. OSWER 9285.7-55. November.
- USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005.

- USEPA. 2005. Update of Ecological Soil Screening Level (Eco-SSL) Guidance and Contaminant Specific Documents. February-March 2005.
- USEPA. 2007. Guidance for Developing Ecological Soil Screening Levels (Eco-SSL). Attachment 4-1. Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. OSWER Directive 9285.7-55. Issued November 2003. Revised February 2005. Revised April 2007.

ATTACHMENT 13
INTERIM MEASURES COMPLETED

| DATE | NAME | ACTION |
|---|---|---|
| 1999-2000 | Happy Valley Interim Measure | Over 1,600 cubic yards of soil and debris were removed from drainage containing metals/perchorate and geophysical surveys in support of ordnance investigation |
| 2000 | Former Sodium Disposal Facility (FSDF) | Over 20,000 cubic yards of material were excavated to remove elevated concentrations of dioxins, PCBs, and mercury. |
| 2003 - 2004 | Happy Valley Interim Measures | Approximately 8,500 cubic yards of perchlorate impacted soils and surficial weathered bedrock excavated during removal action primarily from the southern Happy Valley Drainage area. Approximately 8,000 cubic yards are undergoing biotreatment of perchlorate. |
| 2004 | Building 203 Interim Cleanup Measure | Interim measures were performed north of Building 203 to remove mercury-impacted soils to prevent migration of mercury in soil downslope. Approximately 3,000 cubic yards of soil and bedrock that contained mercury were excavated. |

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ATTACHMENT 14
RFI GROUP AREA REPORTS FOR SSFL

**RFI Group Report Area**

Group 1A - Boeing

Group 1B - Boeing

Group 2 - NASA

Group 3 - NASA & Boeing

Group 4 - NASA

Group 5 - Boeing & DOE

Group 6 - Boeing & DOE

Group 7 - DOE

Group 8 - Boeing & DOE

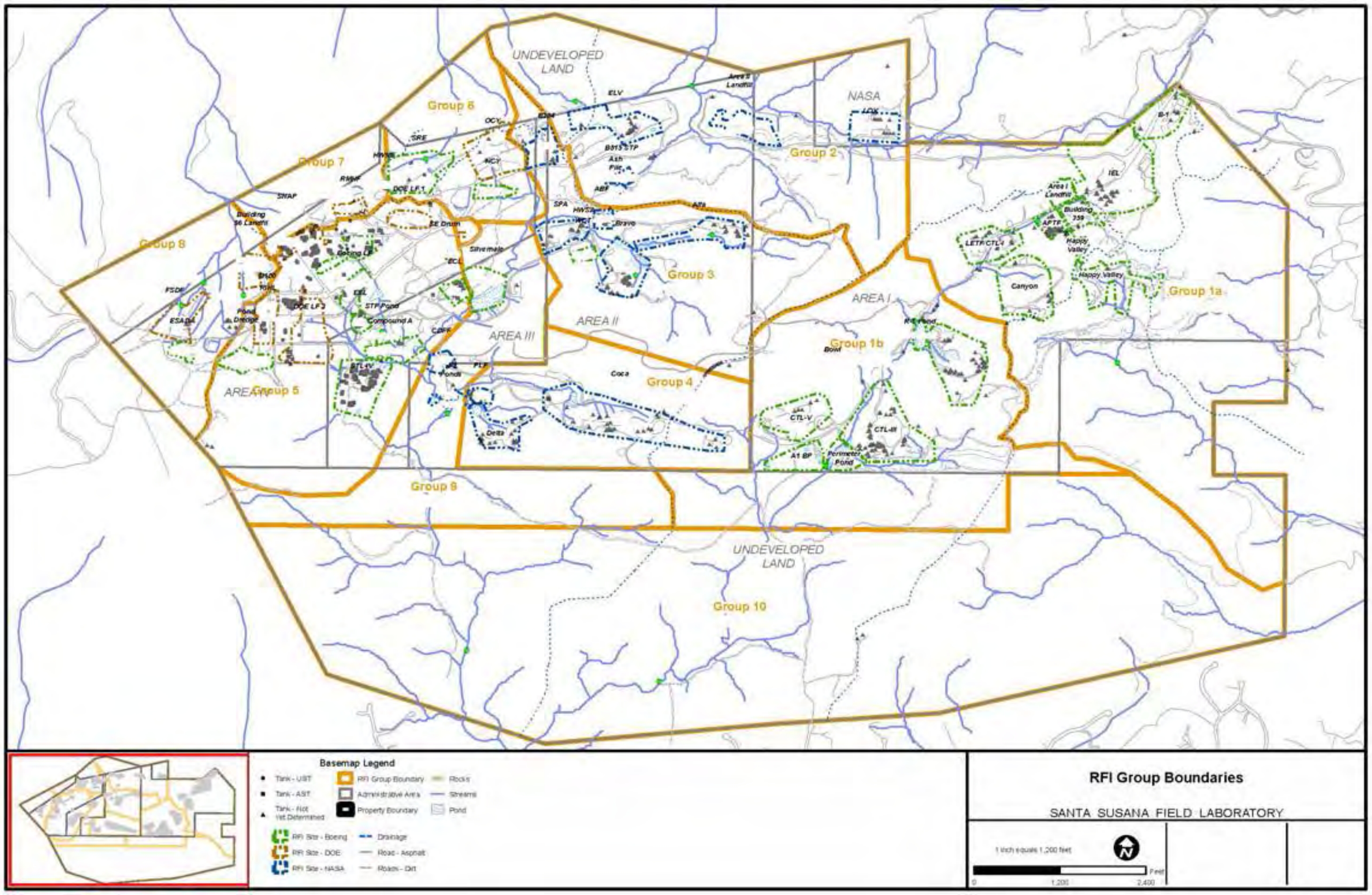
Group 9 - Boeing & NASA (DOE contribution)

Group 10 – Boeing

Eco/Large Home Range

**Note: Group 1A, 2, 4, 5, 6, 8, and 10 Reports were received as of April 1, 2009**

ATTACHMENT 15
SSFL RFI Group Report Areas






DRAFT FOR DISCUSSION PURPOSES ONLY

**Source: Modified from CH2MHill figure dated January 2008 showing RFI Group boundaries**

# Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Saturday, January 04, 2014 8:56 PM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: Native American Contact List

Dear Mr. Malinowski,

Please consider my comments below to NASA for their DEIS in my comments to DTSC for their SSFL CEQA comments.

It is my opinion that personal information such as phone numbers, email contacts, and street addresses should be redacted from agency publications.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Sat, Sep 7, 2013 at 9:42 PM
Subject: Fwd: Native American Contact List
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

In completing the review of Part 3 of the Appendices, I think that the physical contact addresses of the Native Americans should have been redacted.

I also do not believe there should have been a sign in sheet for Section 106 consultants included - couldn't minutes of the meeting have been provided in lieu of that document?

I am sure my contact information is all over the internet. However, this is an FYI for future documents. If you use a sign in sheet - couldn't contact information have been redacted? And there are many more Section 106 consultants than on that sign in sheet. Please don't post all of those in the future.

I just found the Native American Contact list in the Appendices. I have those lists - but I work with the NAHC and the Native Americans.

Did anyone at NASA get approval to post those lists which contain private home phones, personal addresses, etc?

pages 135 - 136 of Part 3 of the Appendices.

This is why I do not sign in much more than my name at meetings - people can get private information just by copying those lists with their cameras or smart phones. It is also why at our City Attorney trained Neighborhood Council Ethics Training - among other trainings - we are taught to BCC.

( Which I took again on Thursday night as a stakeholder).

Respectfully,

*Christine L. Rowe*

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Saturday, January 04, 2014 11:27 PM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: New Community Jewish High School Traffic Report 2011
**Attachments:** TRAFFIC RPT 22622 Vanowen St RevMay 2011.pdf

Dear Mr. Malinowski,

Please consider my comments to NASA below regarding a high school in West Hills. May of these high school students will use the same routes on Topanga Canyon and the 101 freeway as NASA has shown for their truck routes. 60 % of NASA's truck routes are routed to the 101 freeway going south from Roscoe Blvd.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Mon, Sep 9, 2013 at 1:51 AM
Subject: Fwd: New Community Jewish High School Traffic Report 2011
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

I am sending you the Traffic Study for the New Community Jewish High School. This school has been in West Hills with ever expanding enrollment for about a decade. Until just last week, the high school was located on the campus of Shomrei Torah Synogogue on Valley Circle in West Hills.

This new high school would most likely fall within your Region of Influence Roadways.

I read this Traffic Study, and I also made many comments on it which I took to the LADOT. I disagree with routes that were proposed by the traffic consultant based upon discussions that the West Hills Neighborhood Council and local stakeholders had with the high school's representatives.

I was recused on this project due to the State laws regarding living within 500 feet of a project as an elected official. Therefore, I did not have the influence on my Neighborhood Council that I would like to have had since my neighbors and I studied the traffic study in depth

Please consider that these will be af.fluent high school students driving to and from school - there will be very few school buses. The reason that I state that these students are affluent is that their parents will be paying about $30,000 per year per student. Therefore, it is highly unlikely that they will walk to school - many come from Calabasas, and other places in Ventura County; a number of them come from the West Los Angeles area and will be taking the Topanga or Shoup exits and entrances to go and from school if their parents don't drive them.

**Please consider this as a new unforeseen impact if your traffic study was prepared in 2011.**

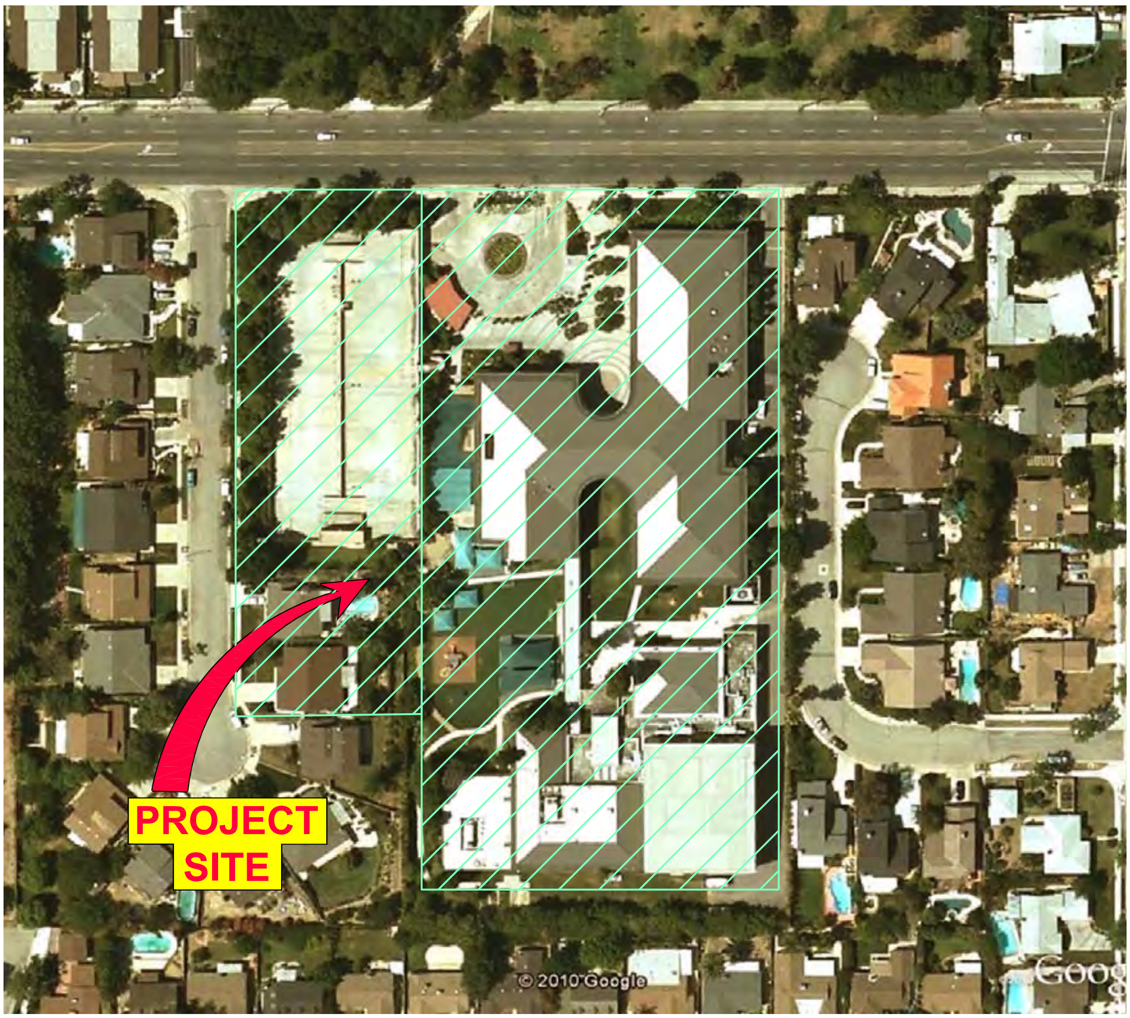
Respectfully submitted.

*Christine L. Rowe*

Overland Traffic Consultants, Inc.

# TRAFFIC IMPACT ANALYSIS FOR NEW COMMUNITY JEWISH HIGH SCHOOL

Located at 22622 Vanowen Street
in the West San Fernando Valley Area
in the City of Los Angeles




Prepared by:
Overland Traffic Consultants, Inc.
27201 Tourney Rd. #206
Santa Clarita, California 91355
(661) 799-8423

APRIL 2011

# TRAFFIC IMPACT ANALYSIS FOR A 450 STUDENT PRIVATE HIGH SCHOOL

22622 Vanowen Street
In the City of Los Angeles

Prepared for:
New Community Jewish High School

Prepared by:

Overland Traffic Consultants, Inc.
27201 Tourney Road #206
Santa Clarita, California 91355
(661) 799 – 8423

April 2011

## EXECUTIVE SUMMARY

The project being analyzed in this traffic study is a new 450 student high school. New Community Jewish High School is a private coed 9th - 12th grade college preparatory school proposed at 22622 Vanowen Street in the City of Los Angeles, as shown in the following aerial photograph. The school will be relocating from its current location on Valley Circle Boulevard with the same number of students. The new school will displace 50,300 square feet of recreational community center and office at the existing building. A portion of both will remain along with a 100 student day care center along with the new high school.

It is estimated that the 450 student enrollment could generate a net of approximately 164 daily trips with approximately 167 inbound and 118 outbound morning peak hour trips and 11 inbound and 7 fewer outbound evening peak hour trips. Due to the low number of evening trips the traffic study focuses on the morning peak hour.

The focus of this traffic study is to evaluate the potential traffic impact created by the new student enrollment at the project site. The traffic volume generated and routing assignment to the study area was determined using assumptions approved by the City of Los Angeles Department of Transportation (LADOT). Intersections and roadways with low volumes of project traffic were not included in this analysis.

Using the criteria established by LADOT, it has been determined that the added traffic volume generated by the proposed high school will significantly impact one of the study intersections in the Existing + Project evaluation and Future with Project evaluation. Project mitigation is proposed to reduce these impacts to a level of insignificance as indicated below.

Existing + Project

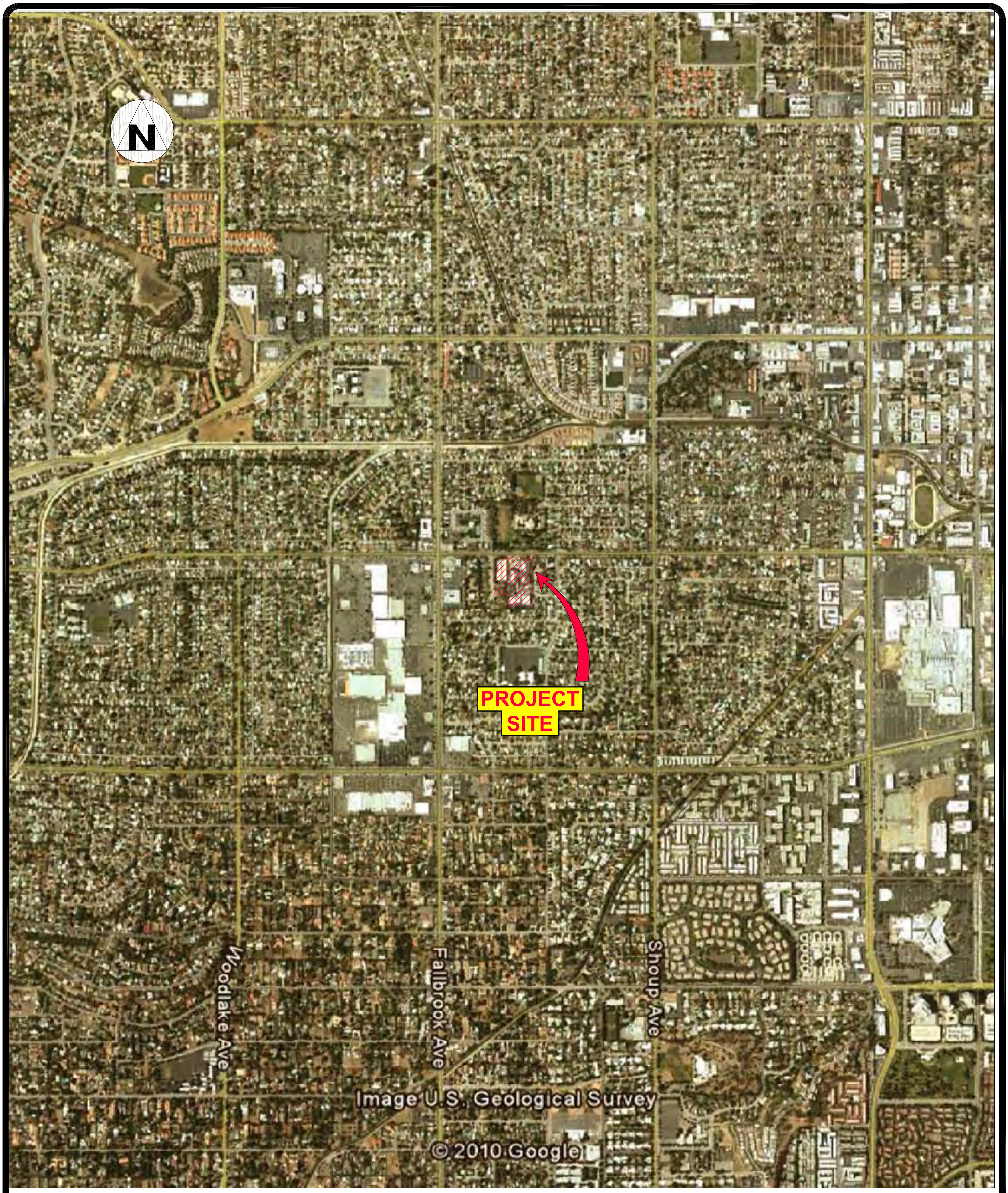
<u>Shoup Avenue & Victory Boulevard</u>

Implement a project specific Transportation Demand Management (TDM) Plan to encourage students, teachers and administrators to use mass transit, rideshare, walk and cycle to and from the school site.  The goal of the TDM plan would be a 30% reduction in vehicle trips to and from the site.

Future With Project

Shoup Avenue & Victory Boulevard

Implement a project specific Transportation Demand Management (TDM) Plan to encourage students, teachers  and administrators to use mass transit, rideshare, walk and cycle to and from the school site.  The goal of the TDM plan would reduce the number of vehicle trips to and from the site by one half.  In addition, a traffic signal improvement is proposed.  This improvement would include the design and installation of a safety improvement for an east and westbound left turn phase on Victory Boulevard, and upgrade to loop detectors, pedestrian indicators, and traffic controller as needed.




5/2011

**PROJECT SETTING**

Overland Traffic Consultants, Inc.
*27201 Tourney Road #206, Santa Clarita, CA 91355*
*(661)799-8423 v, (661)799-8456 f, OTCINC@attbi.com*

TABLE OF CONTENTS

# FIGURES

# TABLES

## CHAPTER 1 INTRODUCTION

As part of the project's environmental review, an evaluation of the potential traffic impact of the proposed development on the surrounding area is required. Therefore, the traffic impact analyses in this traffic study has been conducted using the procedures adopted by the City of Los Angeles Department of Transportation (LADOT) to analyze the potential traffic impact of new development projects. The intersections were evaluated using the LADOT Critical Movement Analysis (CMA) method. The CMA method calculates the operating conditions of each individual study intersection using a ratio of peak hour traffic volume to the intersection's capacity. Any change to the intersection's peak hour operating condition caused by an increase/decrease in traffic volume can be quantified (i.e. traffic impact) using this analysis method.

Potential traffic impacts caused by a development project that exceed limits established by the City of Los Angeles as specified in Department of Transportations Traffic Impact Study. Any significantly impacted intersections are then evaluated for possible traffic mitigation measures.

Pursuant to the City of Los Angeles traffic impact guidelines, the following steps have been taken to develop the future traffic volume estimate:

(a) Traffic counts 2011 existing;
(b) Traffic in (a) plus the proposed project traffic (existing + project);
(c) Base year 2011 plus ambient growth to 2012 (added additional 2% per year);
(d) Traffic in (c) plus related projects (future "without project" scenario);
(e) Traffic in (d) plus the proposed project traffic (future "with project" scenario);
(f) Traffic in (e) plus recommended traffic mitigation, if necessary.

A CMA analysis of the existing and future traffic conditions analysis has been completed at those locations expected to have the highest potential for significant traffic impacts. Morning and afternoon peak hour conditions have been evaluated at 12 key intersections approved by LADOT. The intersections most likely to be affected by the development of the project were selected for analysis. It should be noted that future traffic conditions include the potential construction of the development of 15 other land development projects in the general vicinity of the project site.

These intersections are:

1. Vanowen Street and Woodlake Avenue;
2. Fallbrook Avenue and Vanowen Street;
3. Sale Avenue and Vanowen Street;
4. Shoup Avenue and Vanowen Street;
5. Topanga Canyon Boulevard and Vanowen Street;
6. Criswell Street and Fallbrook Avenue;
7. Fallbrook Avenue and Victory Boulevard;
8. Shoup Avenue and Victory Boulevard;
9. Fallbrook Avenue and Oxnard Street,
10. Oxnard Street and Shoup Avenue,
11. Fallbrook Avenue and Ventura Boulevard; and
12. Eastbound Ventura Freeway Onramp and Ventura Boulevard.

## CHAPTER 2 PROJECT DESCRIPTION

New Community Jewish High School (NCJHS) is a private coed 9$^{th}$-12$^{th}$ grade college preparatory Jewish high school with an enrollment of 450 students proposed at 22622 Vanowen Street. The location of the new school is displayed in Figure 1. The school currently operates at 7353 Valley Circle Boulevard. Upon completion of this project, the school will leave their existing site.

The NCJHS relocation will displace approximately 50,300 square feet of the Jewish recreational community center (Jewish Community Center – (JCC)) and office on their new site. Currently the Vanowen site is used for community center, recreational activities, office and a 100 student preschool. A portion of the existing community center and office uses will remain on the site. It is estimated that one third of the space to be removed is currently used for office and two thirds for community center. The 100 student preschool will remain. Interior renovations will be made to accommodate the new high school. A crescent portion of the back of the building will be enclosed.

Vehicular access to the parking lot will be from Vanowen Street between Fallbrook Avenue and Sale Avenue. Two driveways currently exist at the project site. One driveway will be used for entry only and one driveway for both entry and exit. Left turns will be prohibited both in and out of the property. The driveways will be enhanced to accommodate the new use. There is a circular drive upon entry which is open but monitored by a guard to screen visitors and direct parking. Two lanes are provided on the circular drive. The drop-of and pick-up activities will be conducted within the circular drive with queuing directed to the parking garage.

The entry drive and parking structure provide a total of 269 parking spaces. These parking spaces will be used by the new NCJHS and the existing uses which will remain. A limited number of students are permitted to drive and parking on site. NCJHS offers bus transportation for a fee to/from a wide variety of areas. Transportation details are published at the beginning of each school semester

Families are encouraged to drive in carpools. During the summer, zip code lists are sent to all families to assist in forming carpools. Students with drivers' licenses are permitted to drive to school and must park on school grounds. Students may not leave and return to campus during the school day.

Figure 2 illustrates the existing site and access.

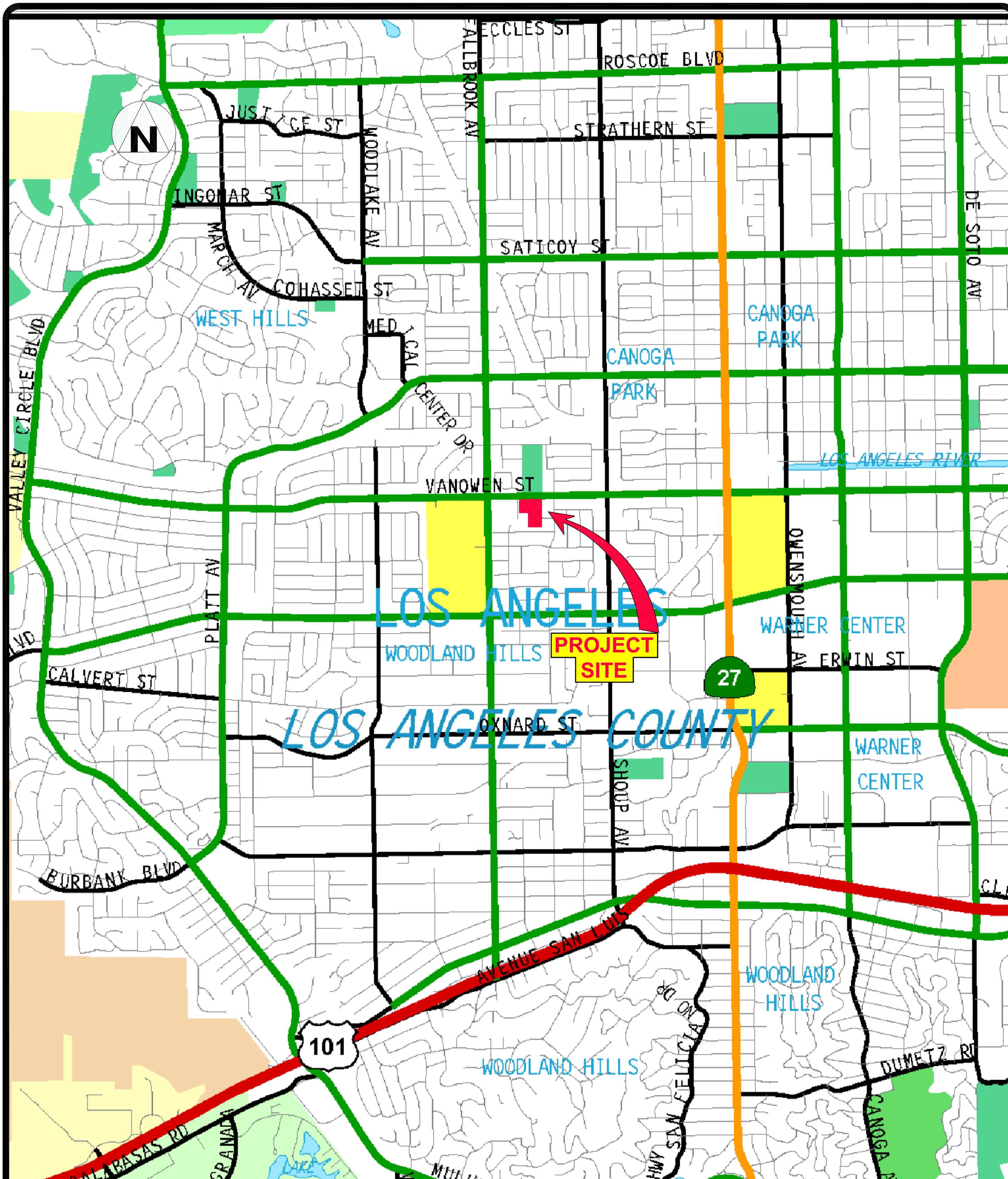



FIGURE 1

1/2011

PROJECT LOCATION

Overland Traffic Consultants, Inc.
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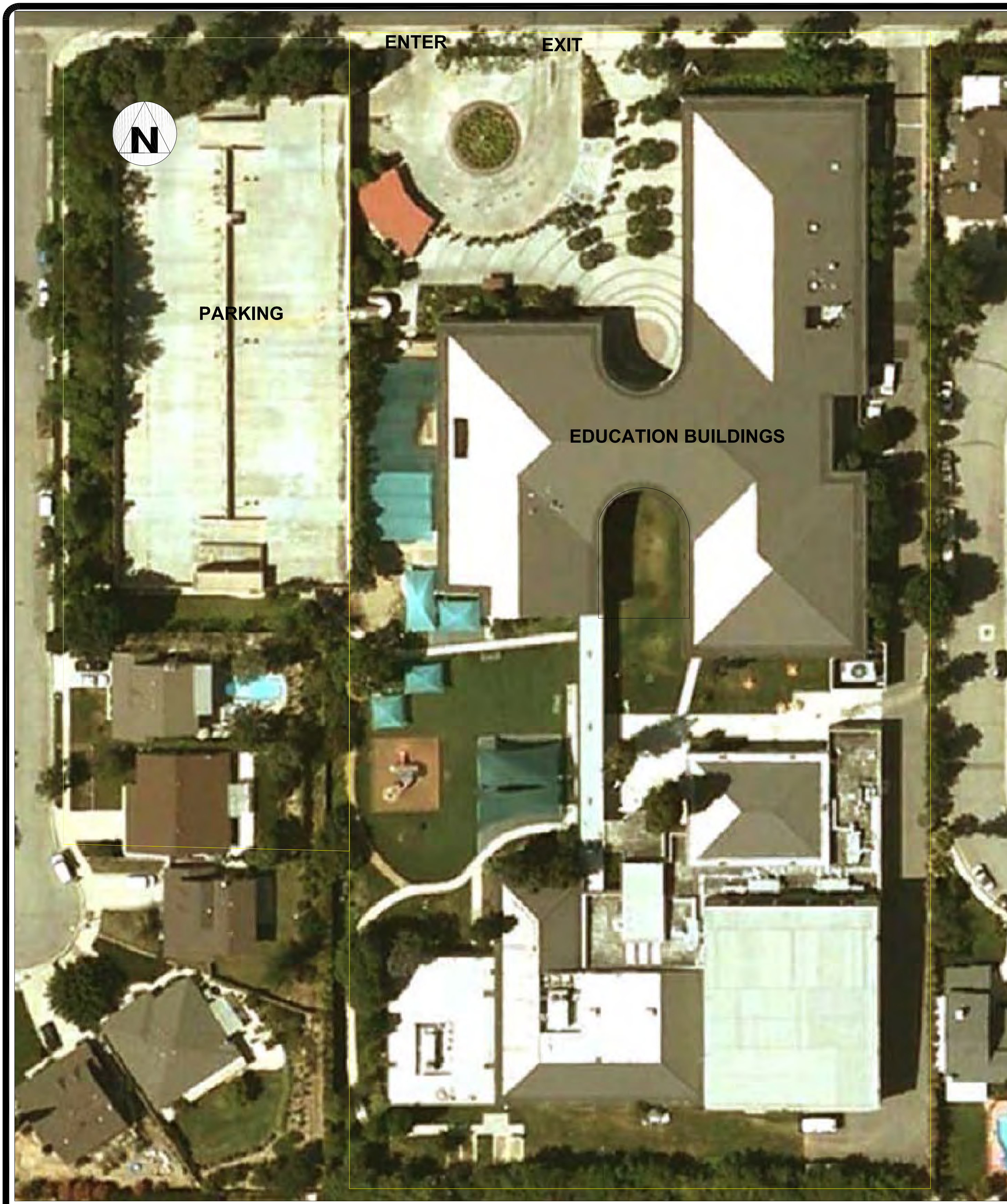


FIGURE 2

3/2011

PROJECT SITE

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## Land Use

The project is located in the Canoga Park – Winnetka – Woodland Hills – West Hills Community Plan area generally bounded by Roscoe Boulevard to the north, Corbin Avenue to the east and the city limits to the west and south. The Community plan area contains 17,894 square acres with 59.7% zoned residential, 5.4% zoned commercial, 3.8% zoned industrial, 11.8% zoned open space/public and 19.3% allocated for streets. Appendix A contains the Community Plan land use information.

In addition to collecting traffic volume data, field surveys were conducted in the study area to determine the roadway and intersection geometry and traffic signal operations. Figure 3 illustrates the study locations, type of intersection traffic control and lane configurations. A brief description of the adjacent roadway facilities is provided below. Street plans of the roadways, city street standards and the general circulation map are provided in Appendix B.

## Freeway and Roadway Characteristics

The Ventura Freeway (U.S. Highway 101) is located approximately 2 miles south of the project site. This east-west freeway provides four mixed flow lanes in each direction in the vicinity of Woodlake Avenue. The closest full access location to the 101 Freeway is via Topanga Canyon Boulevard. Partial freeway access is provided from Woodlake Avenue and Ventura Boulevard. The Ventura Freeway traverses Ventura County, the San Fernando Valley and downtown Los Angeles with an average daily traffic (ADT) volume of 208,000 vehicles per day near Woodlake Avenue. Current non-directional peak hour traffic volume is approximately 15,400 vehicles per hour (VPH).

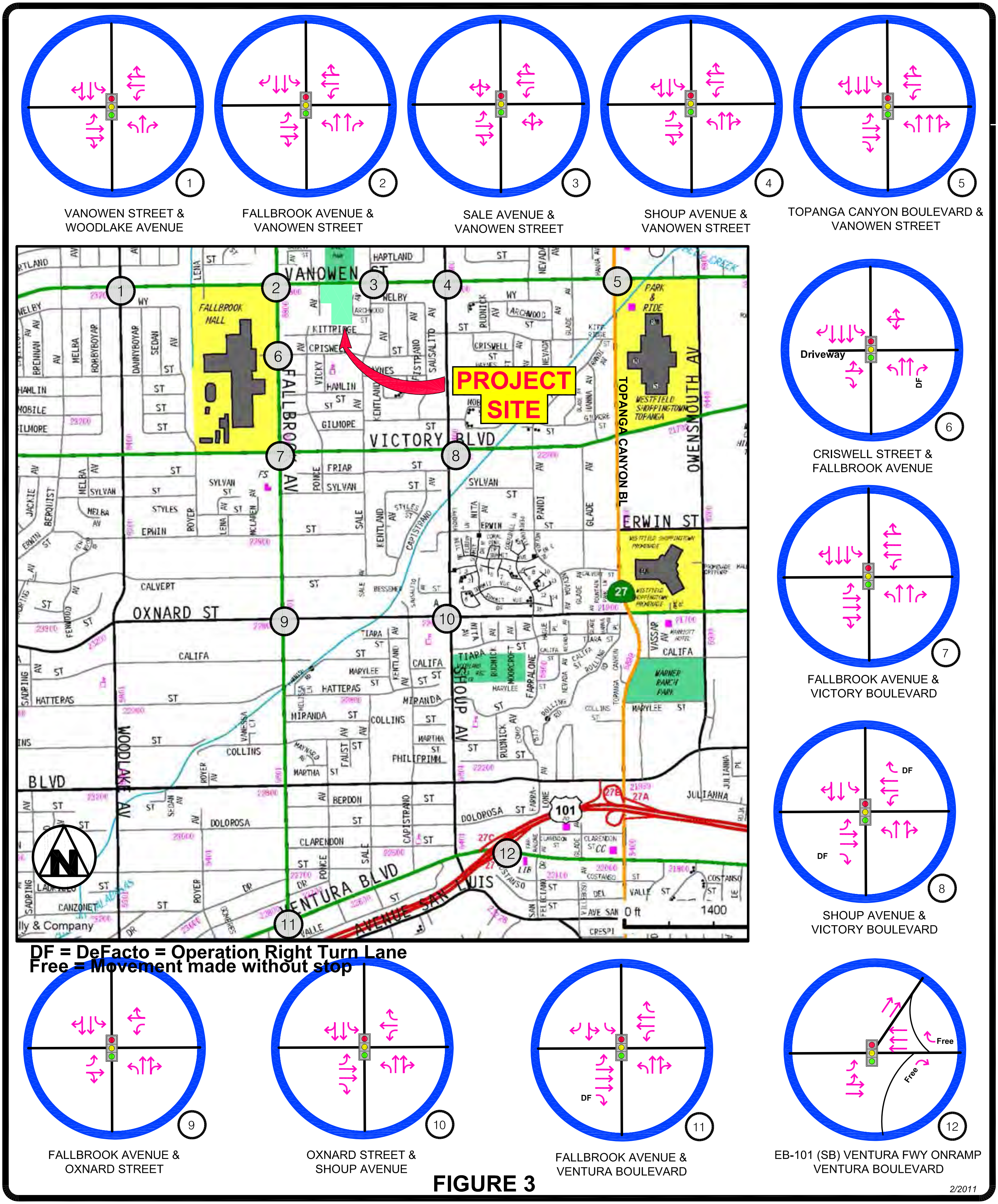


**FIGURE 3**

**INTERSECTION CHARACTERISTICS**


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Woodlake Avenue is a north-south secondary highway in the streets and Highways element of the City's General Plan. Woodlake Avenue provides 1-2 lanes in each direction with median channelization and street parking on both sides. Woodlake Avenue terminates approximately 0.25 miles north of Vanowen Street. The roadway provides direct access to the westbound ramps for Highway 101.

Platt Avenue is a north-south class II major highway with two lanes in each direction, median channelization, class II bike lanes, and on-street parking for both sides of the street in the project vicinity.

Fallbrook Avenue is a north-south designated class II major highway. Fallbrook Avenue geometrics accommodate 2 lanes in each direction with median channelization, a class II bike lane and on-street parking. Between Vanowen Street and Victory Boulevard, a third southbound lane is installed and parking is restricted on the westside of the street, adjacent to the Fallbrook Mall. Traffic signals control the intersections of Fallbrook Avenue with Sherman Way, Vanowen Street, Criswell Street and Victory Boulevard.

Shoup Avenue is a north-south secondary highway with two lanes in each direction, median channelization and unrestricted parking on both sides of the street.

Topanga Canyon Boulevard is a designated north-south State Highway route (SR 126). The roadway provides 2-3 lanes in each direction and median channelization in the study area. SR 126 has predominantly commercial development and is under jurisdiction of the State of California (Caltrans). Topanga Canyon Boulevard provides direct access to the Ventura Freeway.

Vanowen Street is a designated east-west secondary highway that provides two lanes in each direction and on-street parking. Median channelization is provided at all major intersections and where there is sufficient roadway width.

Victory Boulevard is an east-west class II major highway with two lanes in each direction, median channelization and class II bike lanes in the study area. The roadway width varies but is generally 80 feet in width.

Ventura Boulevard is an east-west class II major highway with two to three lanes in each direction, median channelization and regional access along the Ventura Freeway and through limited stop bus routes.

Criswell Street is an east-west collector street with one lane in each direction.  Criswell Street forms a T type intersection with Fallbrook Avenue and is opposite a Fallbrook Mall driveway.

Sale Avenue is a north-south collector street with single family residential frontage. Its intersections with Vanowen Street and Victory Boulevards are traffic signal controlled.

Transit Information

Public transportation in the study area is provided by the Metropolitan Transportation Authority (Metro).  Metro provides route 165 on Vanowen Street.  Metro Route 165 connects to north-south transit lines and ultimately to other east-west lines through the Metro route system.  The transit line is illustrated in Appendix C.

## CHAPTER 4 PROJECT TRAFFIC

This chapter describes the procedures for estimating the potential traffic volume generated by the project and its directional orientation.

Traffic Generation

Traffic-generating characteristics of private high schools as proposed and the recreational community center and office to be displaced have been surveyed by the Institute of Transportation Engineers (ITE). The results of these traffic generation studies have been published in a handbook titled Trip Generation, $8^{th}$ Edition. This publication of traffic generation data is the industry standard for estimating traffic generation for different land uses and is used when analyzing traffic impacts.

The ITE studies indicate that private schools exhibit trip-making characteristics as shown by the average traffic generation rates per student. The trip generation for an community center and office are based on trips per 1,000 square feet. The ITE trip generation rates used in this study and approved by LADOT are shown in Table 1. Table 2 shows estimates of the project traffic volume using the trip rates as displayed in Table 1. The existing uses to remain are not displayed.

Table 1
Project Trip Generation Rates

| | ITE | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| **Description** | **Code** | **Traffic** | **Total** | **In** | **Out** | **Total** | **In** | **Out** |
| Recreational Community Center | 495 | 22.88 | 1.62 | 61% | 39% | 1.45 | 37% | 63% |
| Private School | 536 | 2.48 | 0.81 | 61% | 39% | 0.17 | 43% | 57% |
| Office | 710 | 11.01 | 1.55 | 88% | 12% | 1.49 | 17% | 83% |

Rates are per student for school and per square foot (sf) for community center and office

Table 2
Estimated Project Traffic Generation

| Description | Size | | Daily Traffic | AM Peak Hour Total | AM Peak Hour In | AM Peak Hour Out | PM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out |
|---|---|---|---|---|---|---|---|---|---|
| **Proposed Project** | | | | | | | | | |
| Private High School | 450 | students | 1,116 | 365 | 223 | 142 | 77 | 33 | 44 |
| **Existing to be Removed** | | | | | | | | | |
| Recreational Community Center | 33,533 | sf | 767 | 54 | 33 | 21 | 49 | 18 | 31 |
| Office | 16,767 | sf | 185 | 26 | 23 | 3 | 25 | 4 | 21 |
| Total | 50,300 | sf | 952 | 80 | 56 | 24 | 74 | 22 | 51 |
| **Net Total (Proposed-Existing)** | | | **164** | **285** | **167** | **118** | **3** | **11** | **-7** |

Existing 100 student Day Care, Balance of Office and Community Center to remain
JCC considered 2/3 community center and 1/3 office

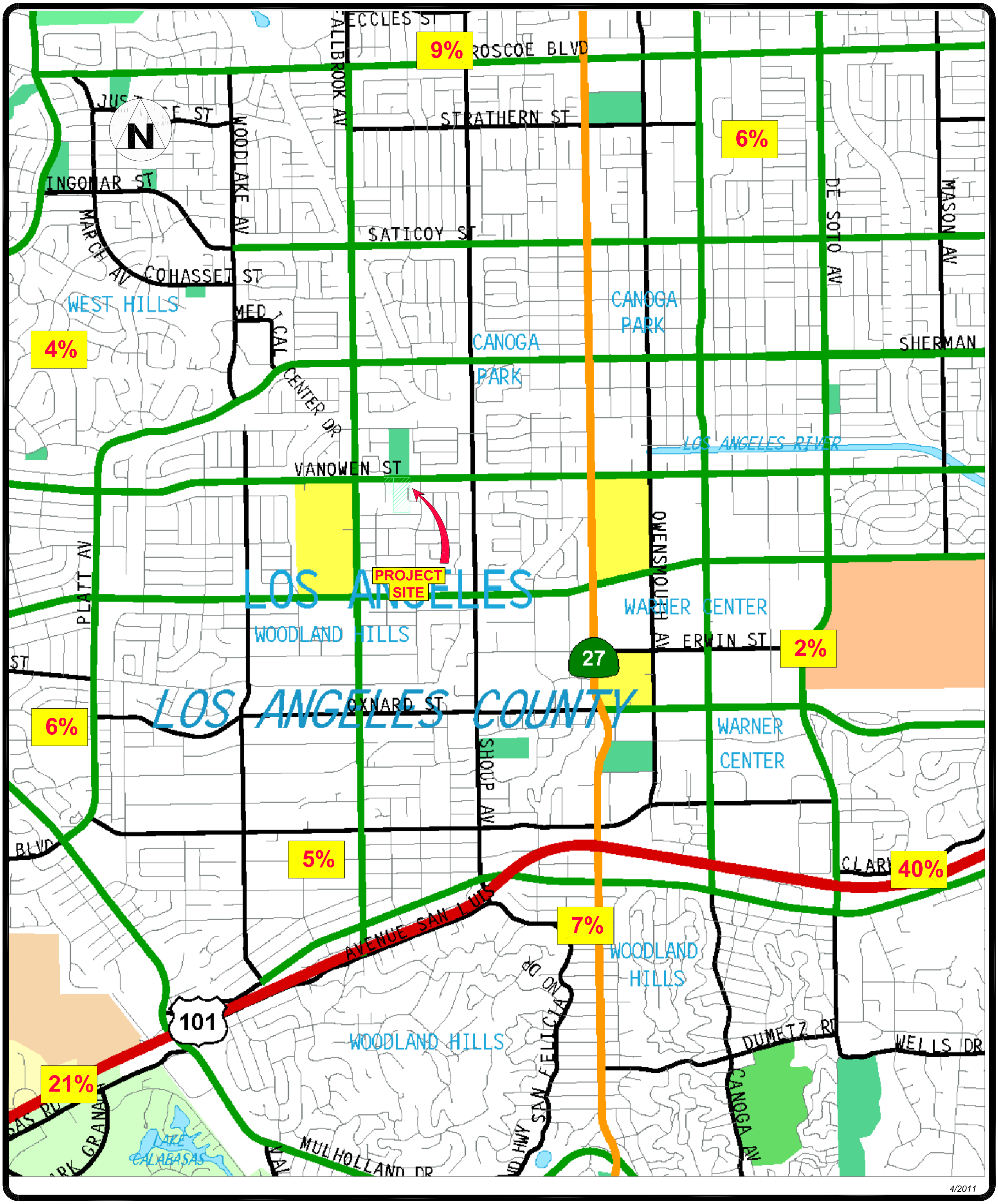
The project will generate a net of 164 daily trips with 285 during the AM Peak Hour and 3 during the PM Peak Hour. Due to the low volumes during the PM Peak Hour no significant traffic impacts are anticipated during the evening. Only the AM Peak Hour is evaluated in further detail.

Distribution of Trip Origins and Destinations

The primary factor affecting the distribution of the school traffic flow is the location of the student population which would generate trip origins and destinations. The estimated directional trip distribution for the new school was developed based on the location of the zip code location for the existing student enrollment as provided in the original traffic study approved by LADOT. The detail on the zip code analysis which determined the project distribution is provided in Appendix D. The closer in overall distribution percentages are provided in Figure 4 which illustrates the estimated project traffic distribution percentages derived from the school database.

Assignment of project traffic volume to surrounding streets

Traffic to and from the school has been assigned to the most direct and reasonable routes considering the school location and surrounding street system. Percentages of the project traffic flows are illustrated in Figure 5. The hourly traffic volume at each study intersections was calculated by multiplying the assigned intersection percentages as shown in Figure 5 to the traffic generation estimates in Table 2. The resulting peak hour traffic volumes are shown in Figure 6 for the morning peak hours.




**PROJECT DISTRIBUTION**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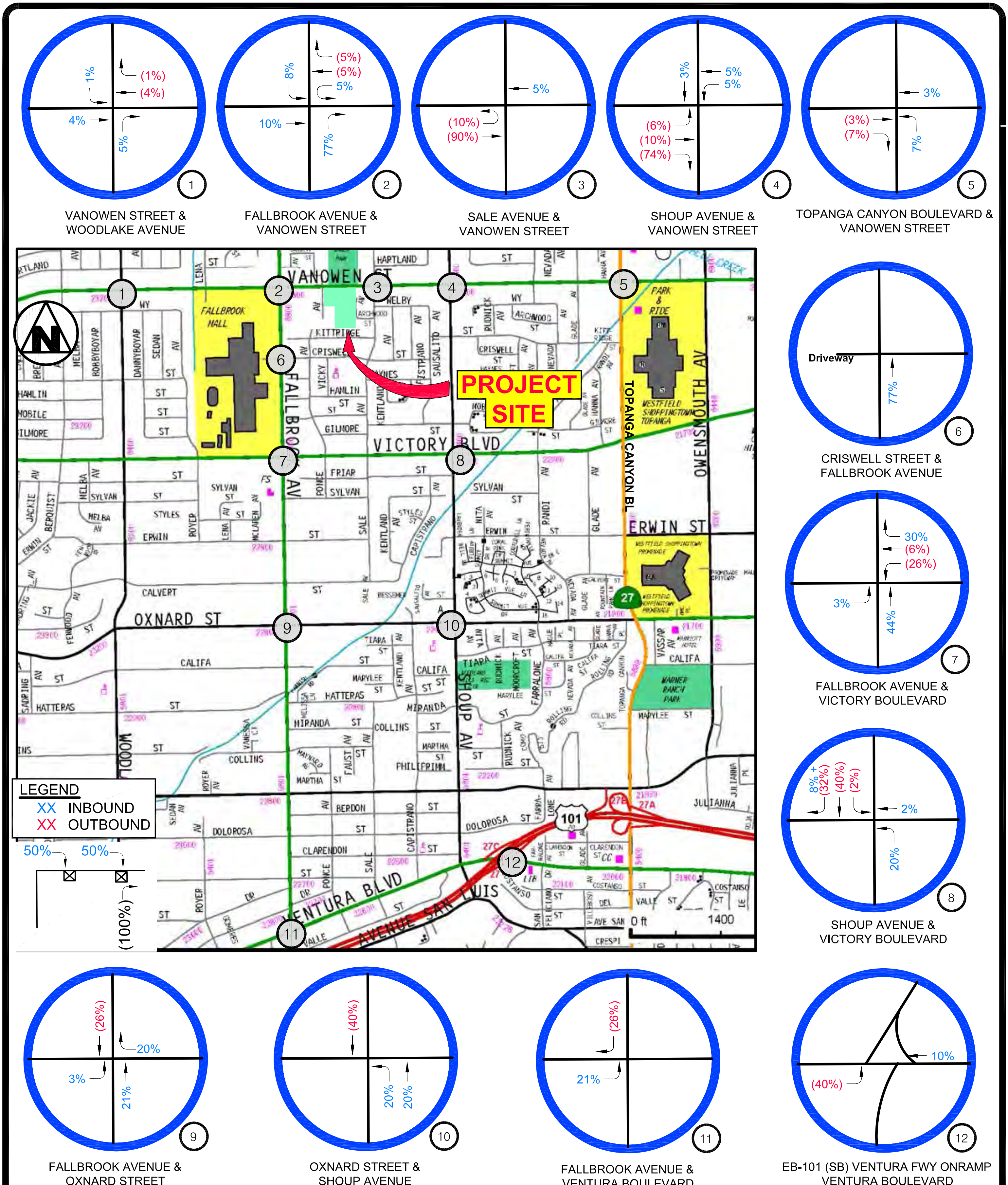


**FIGURE 5**

**PROJECT TRIP DISTRIBUTION AT INTERSECTIONS**


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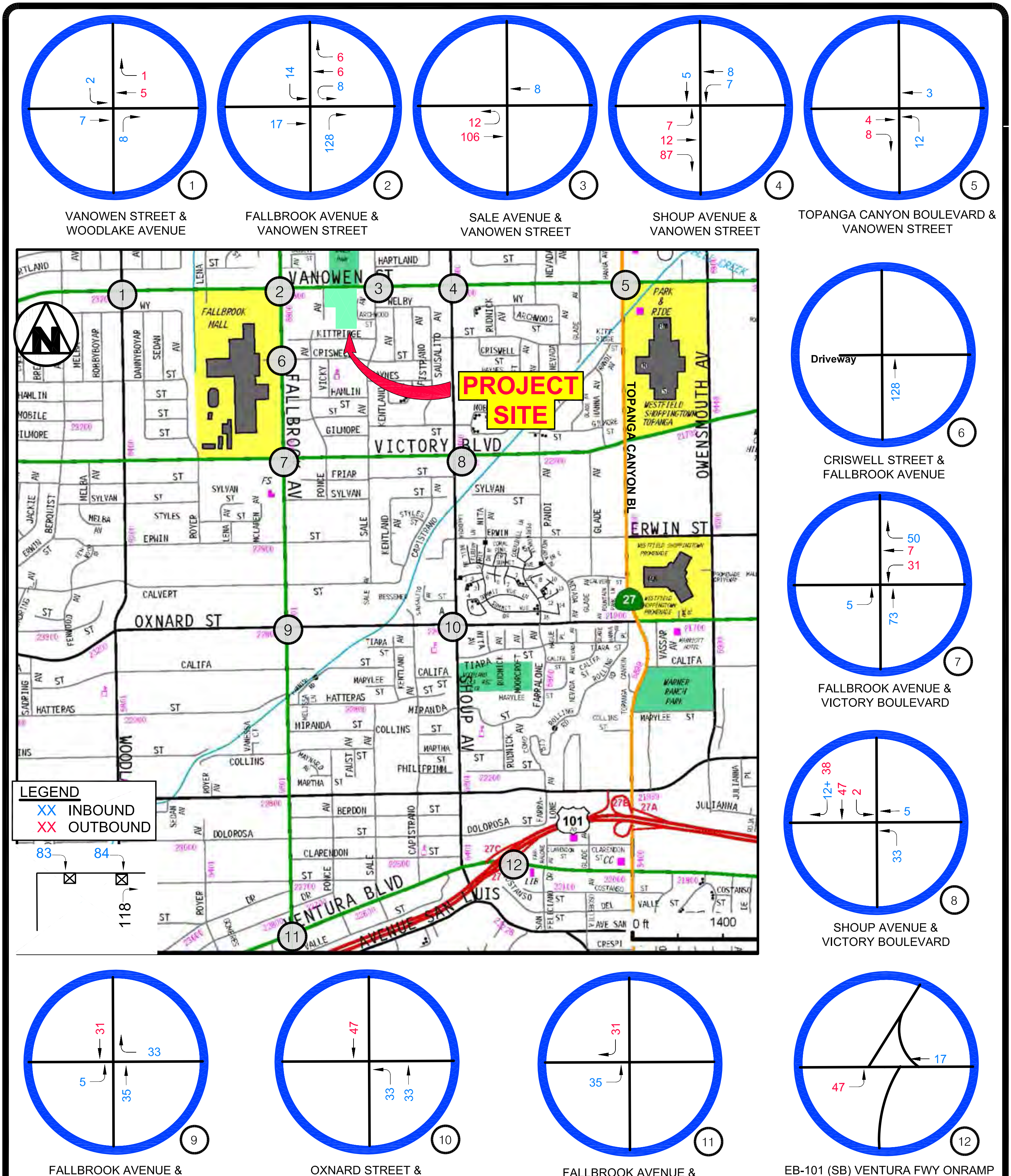

FIGURE 6

**PROJECT ONLY TRIPS**

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Pedestrian Access Evaluation

Figure 7 displays the one mile radius around the project. The major intersections include:

Sherman Way at Woodlake Avenue, Fallbrook Avenue, Shoup Avenue, Topanga Canyon Boulevard

Vanowen Street at Woodlake Avenue, Fallbrook Avenue, Shoup Avenue, Topanga Canyon Boulevard

Victory Boulevard at Woodlake Avenue, Fallbrook Avenue, Shoup Avenue, Topanga Canyon Boulevard

Oxnard Street at Fallbrook Avenue

All 13 of these intersections are signalized with crosswalks for pedestrians. Pedestrian indicators are available for crossing all directions with adequate timing for crossing. Some, but not all, have count down pedestrian indicators. The intersection of Vanowen Street and Victory Boulevard has yellow crosswalks indicating further caution for the adjacent school. In addition to the major intersections, several of the smaller intersections within the mile radius are also signalized including:

Sherman Way at Medical Center Drive, Sherman Way at Farralone,

Vanowen Street at Marlin Avenue, Vanowen Street at Sale Avenue,

Victory Boulevard at Royer Avenue, Victory Boulevard at Sale Avenue, Victory Boulevard at Randi Avenue and

Shoup Avenue at Erwin Street.

These additional signalized locations will assist in pedestrian access to the site. The signal at Vanowen Street and Sale Avenue and Vanowen Street and Fallbrook Avenue are the closest to the project site and will assist with immediate area pedestrian activities.

Fallbrook Avenue has a dedicated bicycle lane on the street which will assist with bicycle access to and from the site in the north and south direction. Sherman Way also has a dedicated bicycle lane on the street which will assist with bicycle access to and from the site in the east-west direction.

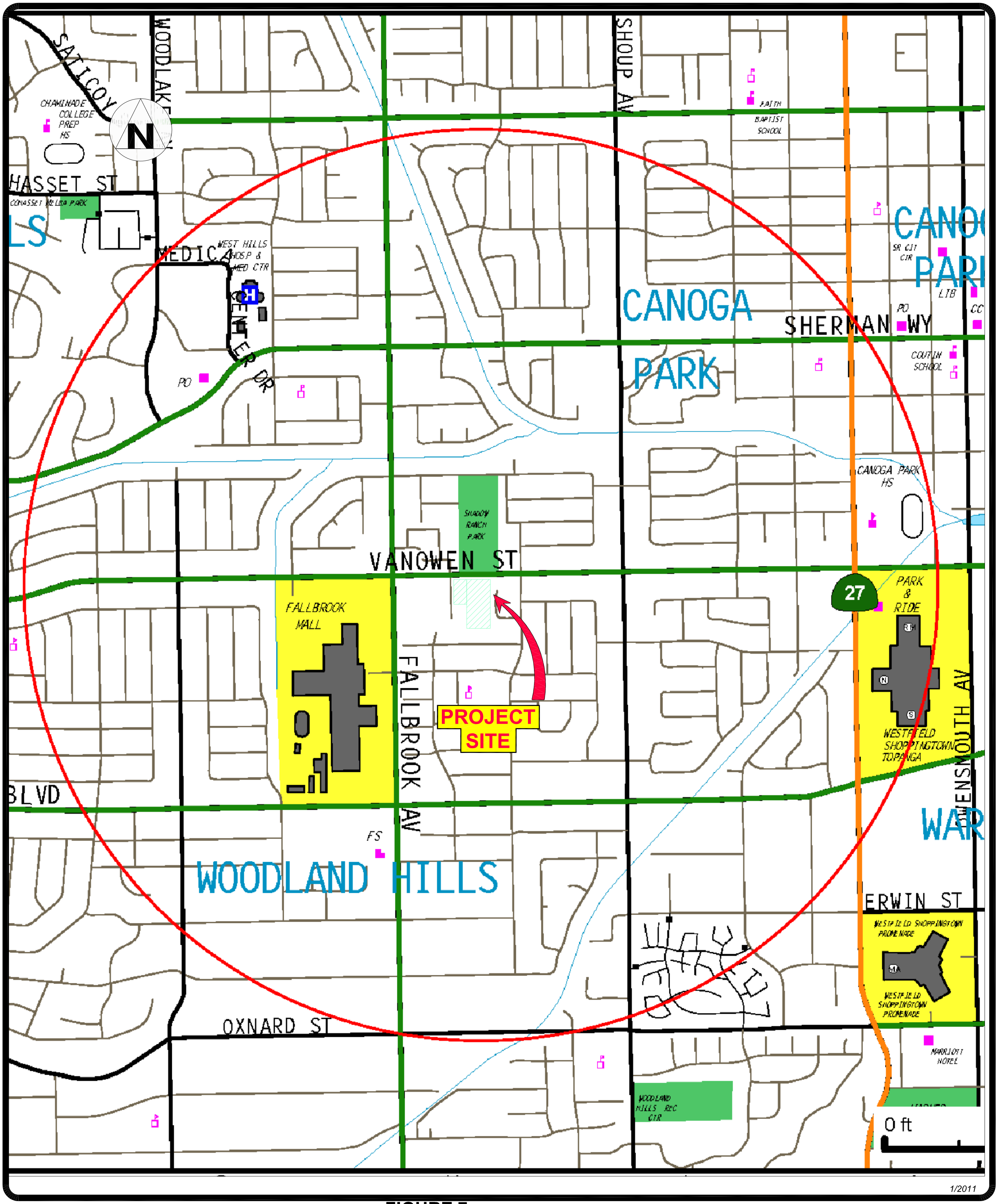


**FIGURE 7**

**ONE MILE RADIUS FROM PROJECT**


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Parking, Site Access, and Circulation

Vehicular site access will be from a one-way entry and two way driveway off of Vanowen Street. Parking is prohibited by red curb on the approach and departure of both driveways and between the two driveways which improves visibility. A two-way left turn lane is provided on Vanowen Street in front of the project site allowing for left and right turns in and out of the site. However, to improve traffic flow on the street and within the site, the driveways will be restricted to right turn only in and out of the property. The entry driveway provides access to the circular drive and to the right for the five levels of garage (two below surface, one at surface, and two above ground levels).

The City of Los Angeles has a policy which requires that school have on-site drop-off/and pick-up areas. Vanowen Street provides a wide curb lane with parking north and south of the project driveways. Student drop off and pick up will be conducted on the circular drive with queuing routed to the parking structure. A queue analysis has been conducted to ensure that vehicles will queue onto the public right-of-way. This analysis indicates a potential demand for up to 27 vehicles queuing. The project will provide space for more than 32 vehicles to queue depending on spacing of the drivers. The drop-off and pick-up activities will be monitored by school personnel to ensure that it is running efficiently. Modifications to the drop-off and pick-up plans will be conducted as necessary. Appendix E provides a detail analysis of the school queues.

The existing school has programs in place for allocating parking permits for students who are old enough to drive, busing and ridesharing. This practice will be continued, expanded and catered to the new project site.

Currently parking around the site is minimally used throughout the weekday. No single land use is creating an on street parking demand. There are no parking restrictions on the north and south side of Vanowen Street. A wide curb lane provides for on street parking on Vanowen Street. Although not observed, there is a park on the north side of Vanowen Street across from the school which is likely to create periodic demand on weekdays peaking in the afternoon. Safety for students must be highlighted to discourage any jaywalking across Vanowen Street. A traffic signal is provided at both Fallbrook Avenue and Sale Avenue east and west of the school. Parking on Vicky Avenue and Sale Avenue should be discouraged due to the residential nature of these two streets.

The project site has an inventory of 269 parking spaces on-site. A meeting with Building and Safety indicated that Los Angeles City code required parking would be based on auditorium square footage of 1 per 35 square feet, plus 1 space per 500 square feet of office space for administrators (not teachers), plus 1 space per nursery school classroom (assuming max of 20 students per room). The gym is strictly for gym (not assembly) usage and events in the gym and auditorium would not coincide. Table 3 displays the Code required parking.

Table 3
Parking Requirements

| Proposed Use | Size | Code Requirement | Required Spaces | Provided | Surplus |
|---|---|---|---|---|---|
| Com Ctr Office | 3,900 sf | 1 per 500 sf | 7.8 | | |
| High School Administration | 6,850 sf | 1 per 500 sf | 13.7 | | |
| Auditorium | 3,712 sf | 1 per 35 sf | 106.1 | | |
| PreSchool | 100 students | 1 per classroom (max 20 students per class) | 5.0 | | |
| **TOTAL** | | | **133** | **269** | **136** |

sf = square feet

The project will be providing 136 parking spaces in excess of that which is required by code.

ITE Parking Demand 4, 2009 provides national parking standards which indicate a parking demand for a high school as 0.23 to 0.31 spaces per student with an average of 0.26 spaces per student average. This indicates a need for between 104 to 140 parking spaces for the high school alone (including staff). The code required parking above requires 120 parking spaces for the school needs. This is within the range of the national standard. Since this is a private school, parking can be managed by school personnel. A selected number of junior and senior parking permits will be provided to assure that adequate parking is provided on-site for the school, remaining office and preschool. The school has indicated a desire to monitor off-site parking so that the school does not spill over into the surrounding residential neighborhoods. When events are planned, the school will lease off-site parking and provide shuttles to and from the project site. No parking impacts are anticipated with the project.

Existing Peak Hour Traffic Volumes

Traffic volume data used in the following peak hour intersectional analysis were based on traffic counts conducted by The Traffic Solution, an independent traffic data collection company. The AM peak period counts were conducted manually from 7:00 AM to 9:00 AM in February 2011. Traffic counts were conducted by counting the number of vehicles at each of the twelve study intersections making each movement. The peak hour volume for each intersection was then determined by finding the four highest consecutive 15-minute volumes for all movements.

Existing peak hour traffic volume at each study intersection is illustrated in Figure 8 for the morning rush hour. Data collection worksheets for the peak hour counts are contained in Appendix F.

Analysis of Existing Traffic Conditions

The traffic conditions analysis was conducted using the Critical Movement Analysis (CMA) method. All study intersections were evaluated using this methodology pursuant to the criteria established by the City of Los Angeles Department of Transportation for signalized intersections. The peak hour traffic counts were used along with current intersection geometrics and traffic controls to determine the intersection's operating condition. The CMA procedure uses a ratio of the traffic volume to the capacity of an intersection. The highest combinations of conflicting traffic volume (V) at an intersection are divided by the intersection capacity value. Intersection capacity (C) represents the maximum volume of vehicles which has a reasonable expectation of passing through an intersection in one hour under typical traffic flow conditions.

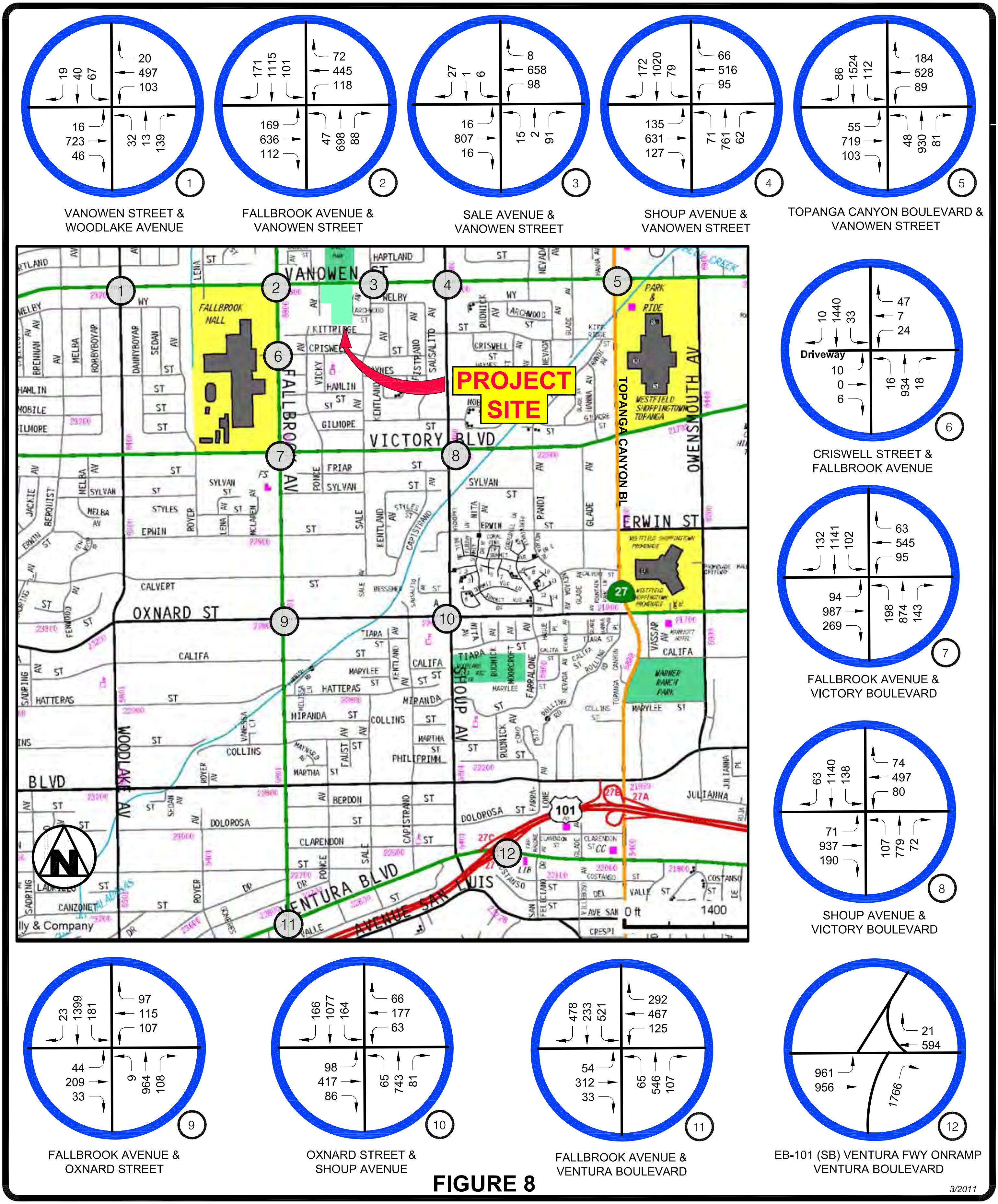


FIGURE 8

## EXISTING TRAFFIC VOLUMES
## AM PEAK HOUR

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The CMA procedure uses a ratio of the traffic volume to the capacity of an intersection. This volume-to-capacity (V/C) ratio defines the proportion of an hour necessary to accommodate all the traffic moving through the intersection assuming all approaches were operating at full capacity. V/C ratios provide an ideal means for quantifying intersection operating characteristics. For example, if an intersection has a CMA value of 0.70, the intersection is operating at 70% capacity with 30% unused capacity.

Once the volume-to-capacity ratio has been calculated, operating characteristics are assigned a level of service grade (A through F) to estimate the level of congestion and stability of the traffic flow. The term "Level of Service" (LOS) is used by traffic engineers to describe the quality of traffic flow. Definitions of the LOS grades are shown in Table 4.

Reductions for traffic signal improvements in the area are included in the analysis. The area currently has Automated Traffic Surveillance and Control (ATSAC) systems improvements which increase capacity at the intersection through computer aided signal progression. The City of Los Angeles has determined that this type of improvement increases capacity by approximately 7%. In the future, the City will supplement all signal systems with an upgrade to the ATSAC system which includes advance loop detection at the intersections and system wide progression computer programming with system wide interaction between the traffic signals. This system is known as the Adaptive Traffic Control System (ATCS) system. An additional 3% capacity increase is estimated with this signal system. The existing and future conditions include ATSAC and ATCS.

Table 4
Level of Service Definitions

| LOS | V/C) Ratio | Operating Conditions |
|---|---|---|
| A | 0.000 – 0.600 | At LOS A, there are no cycles that are fully loaded, and few are even close to loaded. No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation. |
| B | >0.600 – 0.700 | LOS B represents stable operation. An occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted with platoons of vehicles. |
| C | >0.700 – 0.800 | In LOS C stable operation continues. Full signal cycle loading is still intermittent, but more frequent. Occasionally drivers may have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles. |
| D | >0.800 – 0.900 | LOS D encompasses a zone of increasing restriction, approaching instability. Delays to approaching vehicles may be substantial during short peaks within the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive back-ups. |
| E | >0.900 – 1.000 | LOS E represents the most vehicles that any particular intersection approach can accommodate. At capacity (V/C = 1.00) there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles). |
| F | >1.00 | LOS F represents jammed conditions. Back-ups from location downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration; hence, volumes carried are not predictable. V/C values are highly variable, because full utilization of the approach may be prevented by outside conditions. |

By applying these procedures to the intersection data, the CMA values and the corresponding Levels of Service (LOS) for existing traffic conditions were determined for each intersection. The LOS values are summarized in Table 5. Supporting capacity worksheets are contained in Appendix H of this report.

Table 5
Level of Service for Existing Conditions

| No. | Intersection | Peak Hour | Existing CMA | Existing LOS |
|---|---|---|---|---|
| 1 | Vanowen Street & Woodlake Avenue | AM | 0.328 | A |
| 2 | Fallbrook Avenue & Vanowen Street | AM | 0.631 | B |
| 3 | Sale Avenue & Vanowen Street | AM | 0.316 | A |
| 4 | Shoup Avenue & Vanowen Street | AM | 0.661 | B |
| 5 | Topanga Cyn Blvd. & Vanowen Street | AM | 0.828 | D |
| 6 | Criswell Street & Fallbrook Avenue | AM | 0.292 | A |
| 7 | Fallbrook Avenue & Victory Boulevard | AM | 0.726 | C |
| 8 | Shoup Avenue & Victory Boulevard | AM | 0.738 | C |
| 9 | Fallbrook Avenue & Oxnard Street | AM | 0.613 | B |
| 10 | Oxnard Street & Shoup Avenue | AM | 0.541 | A |
| 11 | Fallbrook Avenue & Ventura Boulevard | AM | 0.687 | B |
| 12 | EB (SB) 101 Fwy On & Ventura Boulevard | AM | 0.678 | B |

Analysis of Existing + Project Conditions

An evaluation has been conducted to evaluate potential project impacts to the existing conditions. This has been done by adding the project traffic to the existing traffic. A description of the significant impact definition is provided further in the study under the future conditions Table 8. As noted below in Table 6, one significant traffic impacts occurs. This same significant impact occurs in the future with project conditions. Mitigation is proposed in a further chapter of this report to mitigate to a level of insignificance.

Table 6
Traffic Conditions for Existing + Project

| No. | Intersection | Peak Hour | Existing CMA | Existing LOS | Existing + Project CMA | Existing + Project LOS | | Impact | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Vanowen Street & Woodlake Avenue | AM | 0.328 | A | 0.337 | A | + | 0.009 | No |
| 2 | Fallbrook Avenue & Vanowen Street | AM | 0.631 | B | 0.642 | B | + | 0.011 | No |
| 3 | Sale Avenue & Vanowen Street | AM | 0.316 | A | 0.351 | A | + | 0.035 | No |
| 4 | Shoup Avenue & Vanowen Street | AM | 0.661 | B | 0.700 | C | + | 0.039 | No |
| 5 | Topanga Cyn Blvd. & Vanowen Street | AM | 0.828 | D | 0.829 | D | + | 0.001 | No |
| 6 | Criswell Street & Fallbrook Avenue | AM | 0.292 | A | 0.335 | A | + | 0.043 | No |
| 7 | Fallbrook Avenue & Victory Boulevard | AM | 0.726 | C | 0.749 | C | + | 0.023 | No |
| 8 | Shoup Avenue & Victory Boulevard | AM | 0.738 | C | 0.792 | C | + | 0.054 | **YES** |
| 9 | Fallbrook Avenue & Oxnard Street | AM | 0.613 | B | 0.623 | B | + | 0.010 | No |
| 10 | Oxnard Street & Shoup Avenue | AM | 0.541 | A | 0.579 | A | + | 0.038 | No |
| 11 | Fallbrook Avenue & Ventura Boulevard | AM | 0.687 | B | 0.712 | C | + | 0.025 | No |
| 12 | EB (SB) 101 Fwy On & Ventura Boulevard | AM | 0.678 | B | 0.697 | B | + | 0.019 | No |

Analysis of Future Traffic Conditions

Future traffic volume projections have been developed to analyze the traffic conditions after completion of other planned land developments including the proposed project. Pursuant to the City of Los Angeles traffic impact guidelines, the following steps have been taken to develop the future traffic volume estimate:

(a) Existing traffic plus ambient growth (2 percent total) to 2012 study year;

(b) Traffic in (a) plus related projects (without project scenario);

(c) Traffic in (b) with the proposed project traffic (with project scenario);

(d) Traffic in (c) plus traffic mitigation, if necessary.

The future cumulative analysis includes other development projects located within the study area that are either under construction or planned. As part of this analysis, development information was obtained from the City of Los Angles Department of Transportation and Department of Planning. Development lists were reviewed and checked in the field to identify those projects that could produce additional traffic at the study intersections by the future study year 2012. It should be noted that this project, or any actions taken by the City regarding this project, does not have a direct bearing on these other proposed related projects. The locations of the related projects are shown in Figure 9, with their descriptions provided in Table 7.

To evaluate future traffic conditions with the related projects, estimates of the peak hour trips generated by the other developments were developed or provided by LADOT. The potential net increase in traffic from the related projects is provided in Appendix G. The related project only traffic volumes are provided in Figure 10.

The traffic impact of traffic volume increases has been calculated by adding the existing traffic volume, the ambient growth factor and traffic from other development projects for study year 2012. Future cumulative "without project" peak hour traffic volume estimates are shown in Figure 11 for the morning.

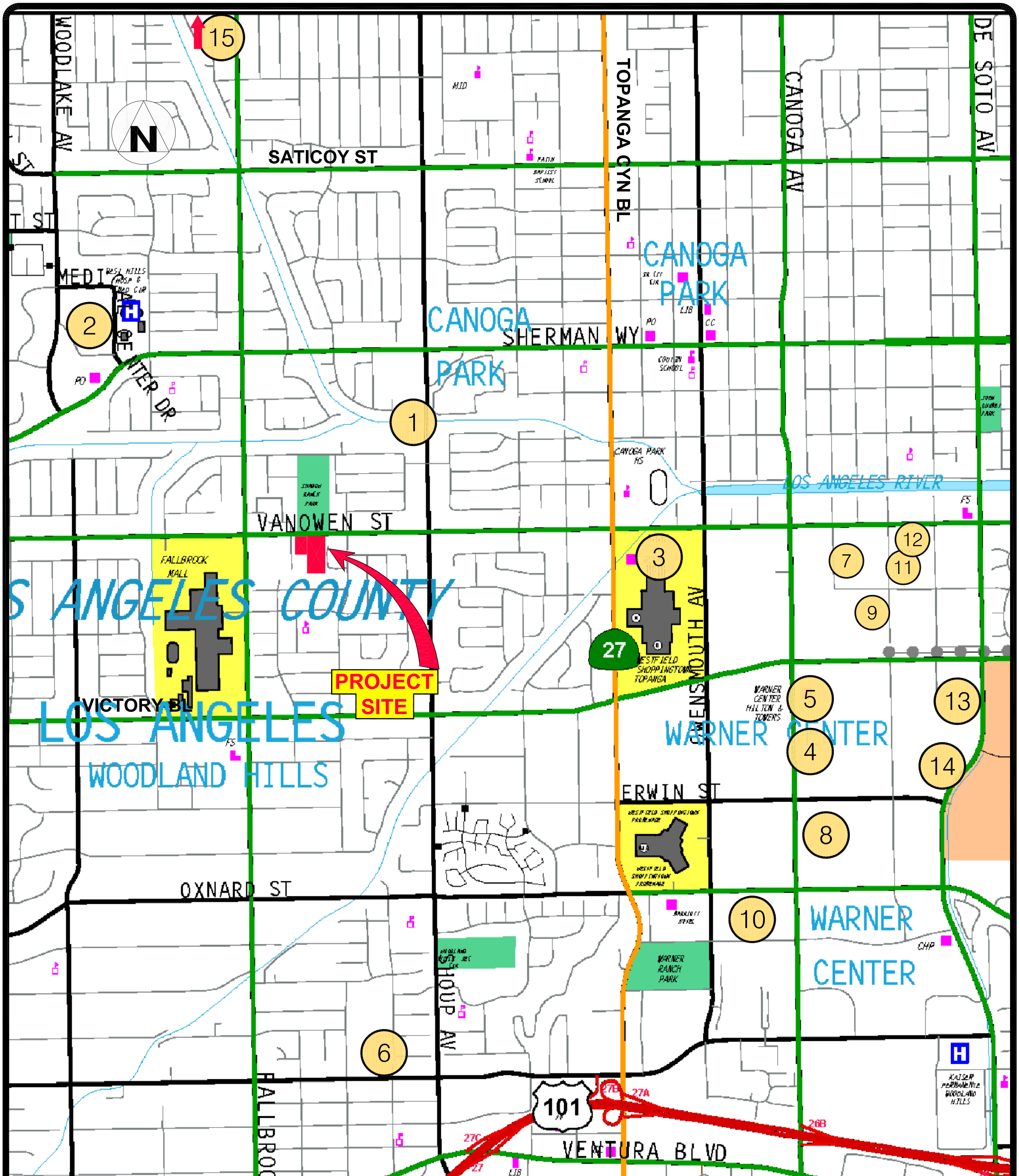


**FIGURE 9**

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**RELATED PROECT LOCATIONS**

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Table 7
Related Projects Descriptions

| No | Location | Planning or DOT Case # | Description | | |
|---|---|---|---|---|---|
| 1 | 7011 Shoup Avenue | SFV 2003-091 | 20 | unit | Single Family Homes |
| | | | 135 | students | Pre-School |
| | | | 360 | students | K-8 Private School |
| 2 | 23135 Sherman Place | SFV 2006-300 | 160 | unit | Apartments |
| 3 | 6600 N Topanga Cyn Bl | SFV 2002-003 | 1,650,000 | sf | Westfield Plaza Expansion |
| | | | | | appx. 60% Complete |
| 4 | 6410 Canoga Avenue | WC-2009-040 | (47,000) | sf | Remove Electronics SS |
| | | | 47,000 | sf | Health Club |
| 5 | 6464 Canoga Avenue | WC-2005-0417 | 154,565 | sf | Office |
| | | | 16,117 | sf | Restaurant |
| | | | (65,903) | sf | Remove Office |
| 6 | 5607 Capistrano Ave | SFV 2004-001 | 1,600 | students | Hughes Magnet School |
| 7 | 6700 Eton Avenue | WC-2005-007 | 441 | unit | Apartments |
| 8 | 6250 Canoga Avenue | WC-2003-008 | 10,000 | sf | Retail |
| | | | 601 | unit | Apartments |
| 9 | 6625 Variel Avenue | WC-2002-006 | 522 | unit | Convert Apt to Condo |
| 10 | 21530 Oxnard St | WC-2006-026 | 30,000 | sf | Aquatic Health Club |
| 11 | 6710 Variel Avenue | WC-2006-033 | 242 | unit | Apartments |
| 12 | 21050 Vanowen Street | WC-2004-023 | 210 | unit | Apartments |
| 13 | 6355 DeSoto Avenue | WC-2004-043 | 421 | unit | Apartments |
| 14 | 6219 DeSoto Avenue | WC-2003-022 | (76,242) | sf | Remove Industrial |
| | | | (76,242) | sf | Remove Office |
| | | | 394 | unit | Senior Apartments |
| | | | 574 | unit | Apartments |
| 15 | 8401 Fallbrook Avenue | SFV 2007-021 | 210,000 | sf | Mixed Use |

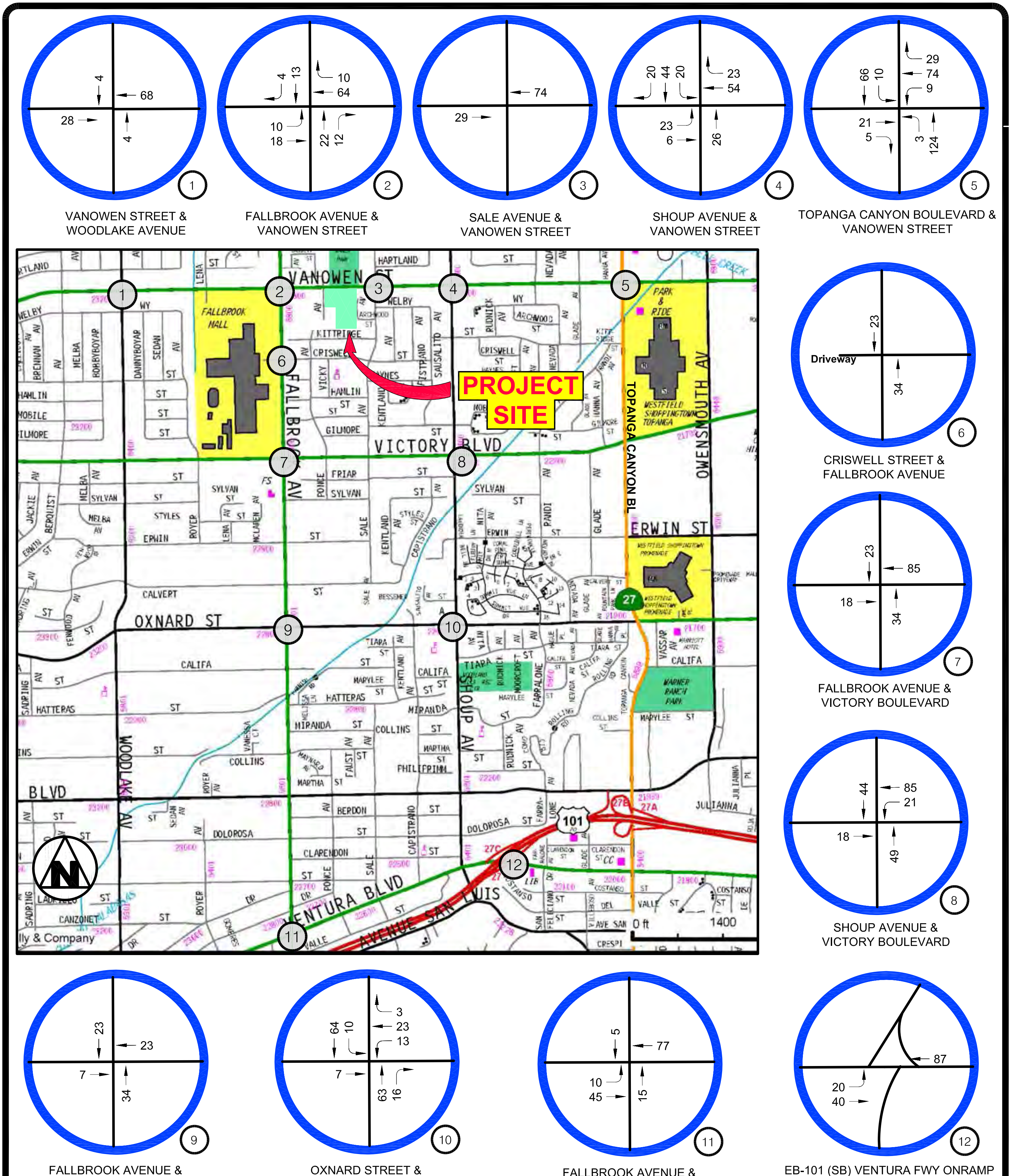


**FIGURE 10**

**RELATED PROJECT ONLY VOLUMES**

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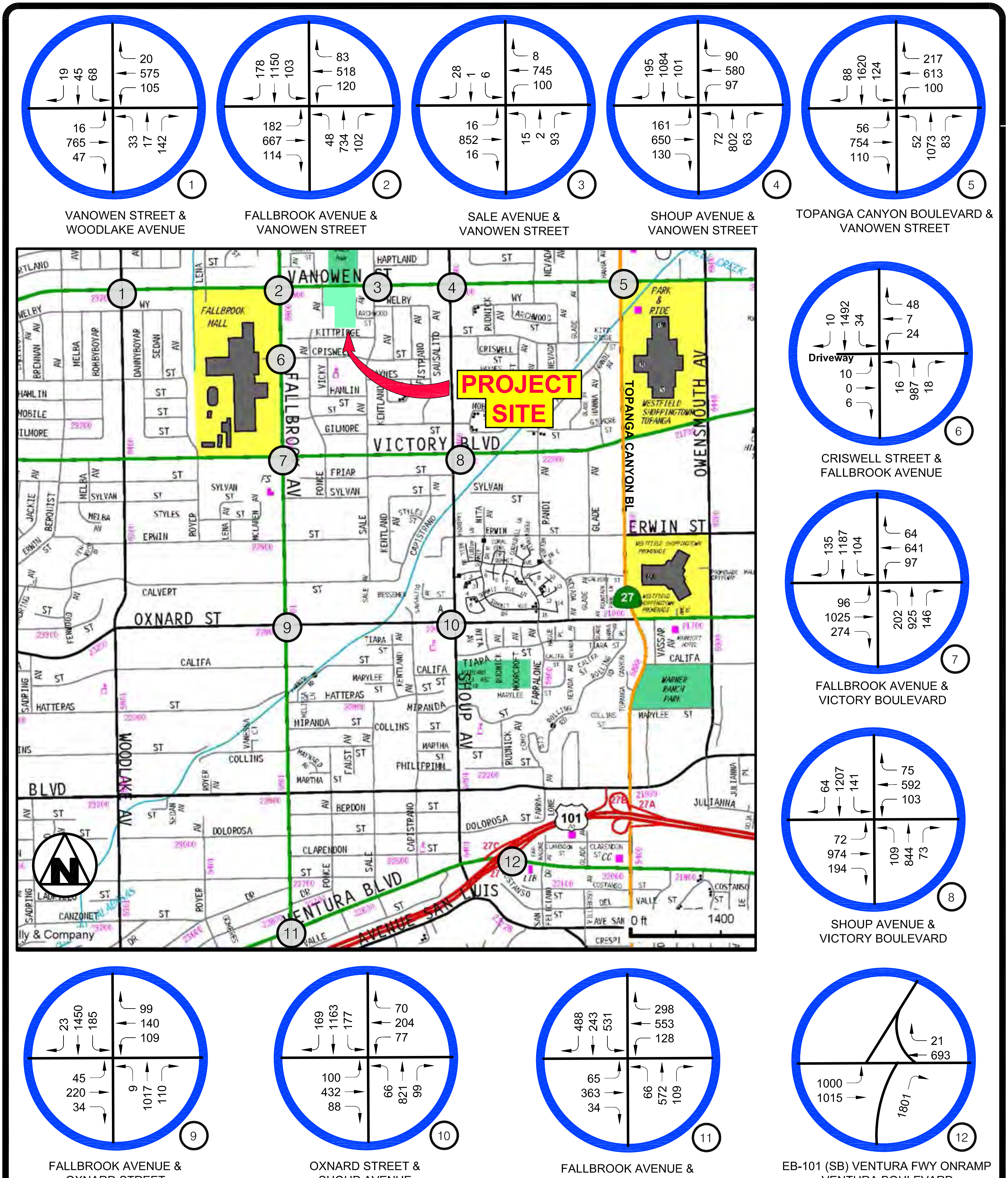


# FIGURE 11

**FUTURE 2012 TRAFFIC VOLUMES**
**WITHOUT PROJECT**
**AM PEAK HOUR**


Overland Traffic Consultants, Inc.
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The impact of a development project is determined by comparing the changes in the traffic conditions between the different growth scenarios at each study intersection. According to the standards adopted by the City of Los Angeles, a traffic impact is considered significant if the related increase in the V/C value equals or exceeds the thresholds shown in Table 8 below and are marked in the following tables as significant, if applicable. Table 9 shows the impact of the ambient traffic growth and traffic from the related projects at the study intersections.

Table 8
Significant Impact Criteria
City of Los Angeles

| LOS | Final V/C Value | Increase in V/C Value |
|---|---|---|
| C | 0.701 - 0.800 | + 0.040 |
| D | 0.801 - 0.900 | + 0.020 |
| E, F | > 0.900 | + 0.010 or more |

Table 9
Future Traffic Conditions Without Project

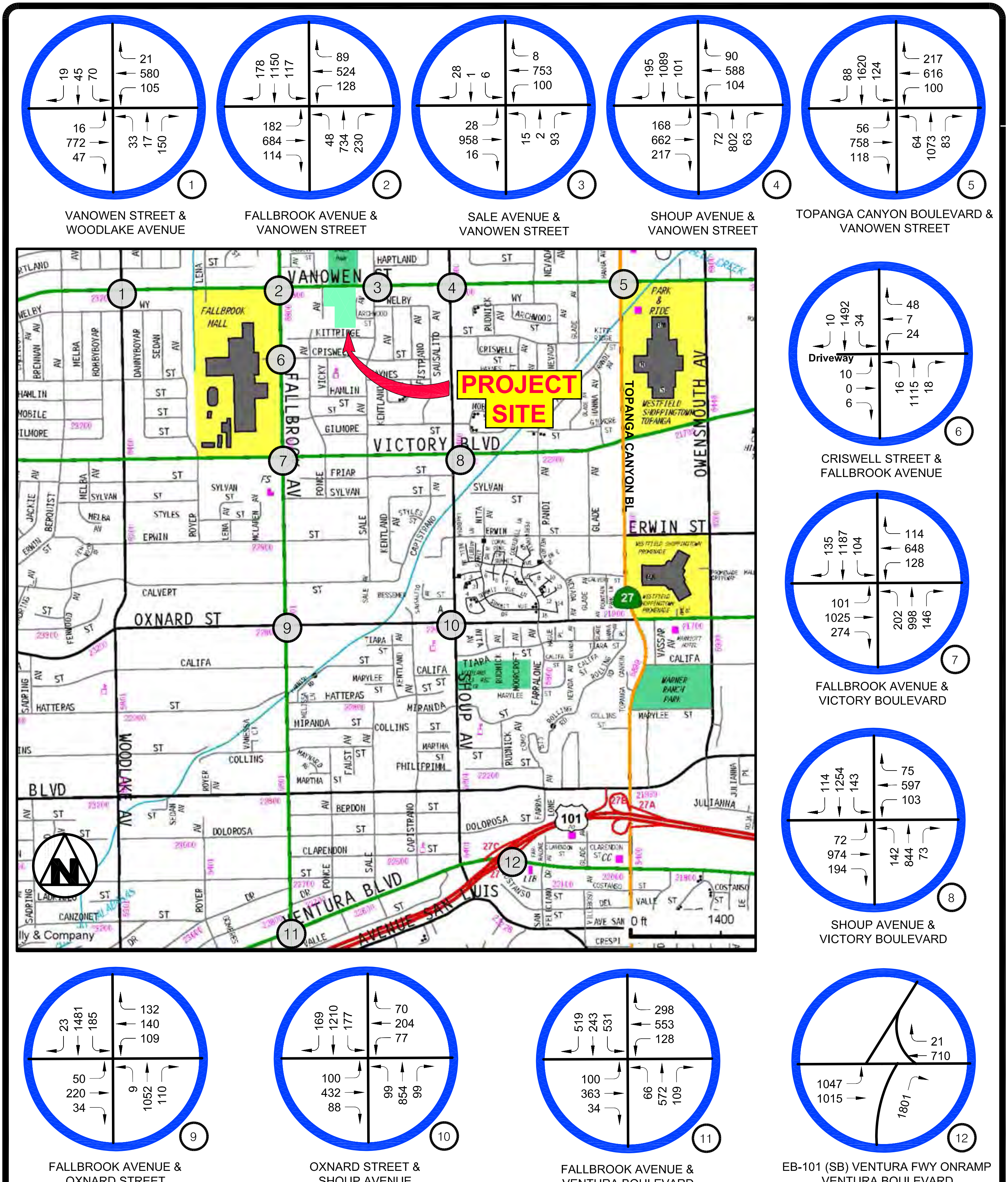
| No. | Intersection | Peak Hour | Existing CMA | Existing LOS | Future (2012) Without Project CMA | Future (2012) Without Project LOS | | Growth |
|---|---|---|---|---|---|---|---|---|
| 1 | Vanowen Street & Woodlake Avenue | AM | 0.328 | A | 0.346 | A | + | 0.018 |
| 2 | Fallbrook Avenue & Vanowen Street | AM | 0.631 | B | 0.656 | B | + | 0.025 |
| 3 | Sale Avenue & Vanowen Street | AM | 0.316 | A | 0.334 | A | + | 0.018 |
| 4 | Shoup Avenue & Vanowen Street | AM | 0.661 | B | 0.706 | C | + | 0.045 |
| 5 | Topanga Cyn Blvd. & Vanowen Street | AM | 0.828 | D | 0.905 | E | + | 0.077 |
| 6 | Criswell Street & Fallbrook Avenue | AM | 0.292 | A | 0.311 | A | + | 0.019 |
| 7 | Fallbrook Avenue & Victory Boulevard | AM | 0.726 | C | 0.753 | C | + | 0.027 |
| 8 | Shoup Avenue & Victory Boulevard | AM | 0.738 | C | 0.789 | C | + | 0.051 |
| 9 | Fallbrook Avenue & Oxnard Street | AM | 0.613 | B | 0.641 | B | + | 0.028 |
| 10 | Oxnard Street & Shoup Avenue | AM | 0.541 | A | 0.590 | A | + | 0.049 |
| 11 | Fallbrook Avenue & Ventura Boulevard | AM | 0.687 | B | 0.747 | C | + | 0.060 |
| 12 | EB (SB) 101 Fwy On & Ventura Boulevard | AM | 0.678 | B | 0.734 | C | + | 0.056 |

The traffic impact of project's traffic volume has been calculated by adding the project volume to the non-project traffic growth.  Table 10 contains the project impact values at the study intersections.  As shown, one of the study intersections is expected to be significantly impacted by project traffic volume using the significant impact criteria established by the City of Los Angeles Department of Transportation.  This impact can be reduced to a level of insignificance through project mitigation as detailed in Chapter 6.  It should be noted that the impact analysis does not consider any changes to the existing intersection configuration (i.e., future roadway improvements). Future cumulative "with project" peak hour traffic volumes are shown in Figure 11.

Table 10

Future Traffic Conditions Without and With Project

| No. | Intersection | Peak Hour | Future (2012) Without Project CMA | Future (2012) Without Project LOS | Future (2012) With Project CMA | Future (2012) With Project LOS | Future (2012) With Project IMPACT | Significant Impact |
|---|---|---|---|---|---|---|---|---|
| 1 | Vanowen Street & Woodlake Avenue | AM | 0.346 | A | 0.355 | A | + 0.009 | No |
| 2 | Fallbrook Avenue & Vanowen Street | AM | 0.656 | B | 0.667 | B | + 0.011 | No |
| 3 | Sale Avenue & Vanowen Street | AM | 0.334 | A | 0.369 | A | + 0.035 | No |
| 4 | Shoup Avenue & Vanowen Street | AM | 0.706 | C | 0.739 | C | + 0.033 | No |
| 5 | Topanga Cyn Blvd. & Vanowen Street | AM | 0.905 | E | 0.906 | E | + 0.001 | No |
| 6 | Criswell Street & Fallbrook Avenue | AM | 0.311 | A | 0.354 | A | + 0.043 | No |
| 7 | Fallbrook Avenue & Victory Boulevard | AM | 0.753 | C | 0.775 | C | + 0.022 | No |
| 8 | Shoup Avenue & Victory Boulevard | AM | 0.789 | C | 0.844 | D | + 0.055 | **YES** |
| 9 | Fallbrook Avenue & Oxnard Street | AM | 0.641 | B | 0.653 | B | + 0.012 | No |
| 10 | Oxnard Street & Shoup Avenue | AM | 0.590 | A | 0.628 | B | + 0.038 | No |
| 11 | Fallbrook Avenue & Ventura Boulevard | AM | 0.747 | C | 0.772 | C | + 0.025 | No |
| 12 | EB (SB) 101 Fwy On & Ventura Boulevard | AM | 0.734 | C | 0.753 | C | + 0.019 | No |




# FIGURE 12

4/2011

**FUTURE 2012 TRAFFIC VOLUMES**
**WITH PROJECT**
**AM PEAK HOUR**

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## Transit Analysis

The proposed project is forecast to generate a net of approximately 164 weekday daily trips with 285 trips during the AM Peak Hour and 3 trips during the PM Peak Hour. As per Congestion Management Program (CMP) 2008 guidelines person trips can be estimated by multiplying the total trips generated by 1.4. The trips assigned to transit may be calculated by multiplying the person trips generated by 3.5%. The CMP Transit trip generation calculation is displayed below in Table 11.

Table 11
Transit Trips

| | **DAILY** | **AM PEAK HOUR** | **PM PEAK HOUR** |
|---|---|---|---|
| **PROJECT TRIPS** (from Table 2 ) | 164 | 285 | 3 |
| PERSON TRIPS (trips x 1.4) | 230 | 399 | 4 |
| **TRANSIT TRIPS** (person trips x 3.5%) | **8** | **14** | **0** |

This level of transit increase is not expected to adversely affect the current ridership of the transit services in the area.

## Impacts on Regional Transportation System

The Congestion Management Program (CMP) was adopted to track regional traffic growth, building permits and transportation improvements. The CMP designated a transportation network including all state highways and some arterials within the County to be monitored by local jurisdictions. If the LOS standard deteriorates on the CMP network, then local jurisdictions must prepare a deficiency plan to be in conformance with the CMP program. Current changes to the CMP program being considered by local officials include adding a countywide trip fee to mitigate regional cumulative impacts.

For purposes of the CMP LOS analysis, a substantial change in freeway segments are defined as an increase or decrease of 0.10 in the demand to capacity ratio and a change in LOS. A CMP traffic impact analysis is required if a project will add 150 or more trips to a freeway segment in either direction and where the project will add 50 or more trips to any CMP monitoring intersection during either the AM or PM weekday peak hour.

The nearest CMP monitoring location is at Topanga Canyon Boulevard and Victory Boulevard. The traffic study shows that the project distribution would not add significant traffic to this location and impacts would not be created at this location. As shown in Figure 6, the proposed project does not exceed the CMP traffic limits. Therefore, no additional CMP analysis is necessary.

Based on the analysis in this study, it has been determined that the added traffic generated by the proposed private high school will significantly impact one of the study intersections using criteria established by the City of Los Angeles. Mitigation is proposed to reduce the impacts to a level of insignificance. This will be done through Transportation Demand Management and signal system improvements.

Existing + Project

Shoup Avenue & Victory Boulevard

Implement a project specific Transportation Demand Management (TDM) Plan to encourage students, teachers and administrators to use mass transit, rideshare, walk and cycle to and from the school site. The goal of the TDM plan would be a 30% reduction in vehicle trips to and from the site. The TDM plan will include items such as school specific bus transport, reduced price bus passes, rideshare matching, limited approval of parking passes for students, off-site parking observations with penalties, bicycle racks, showers for those that walk and cycle and incentives for participating.

This improvement will reduce the impact to a level of insignificance as indicated in table 12a below.

Table 12a
Existing + Project + Mitigation

| | | | Existing | | Existing + Project | | | Existing with Mitigation With Project | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **No.** | **Intersection** | **Peak Hour** | **CMA** | **LOS** | **CMA** | **LOS** | **Impact** | **CMA** | **LOS** | **IMPACT** | **Significant Impact** |
| 8 | Shoup Ave & Victory Blvd | AM | 0.738 | C | 0.792 | C | + 0.054 | 0.776 | C | + 0.038 | No |

Future With Project

Shoup Avenue & Victory Boulevard

Implement a project specific Transportation Demand Management (TDM) Plan to encourage students, teachers  and administrators to use mass transit, rideshare, walk and cycle to and from the school site.  The goal of the TDM plan would be a reduction in vehicle trips to and from the site by half.  In addition, a traffic signal improvement is proposed.  This improvement would include the design and installation of a safety improvement for an east and westbound left turn phase, and upgrade to loop detectors, pedestrian indicators, and traffic controller as needed.  The improvement adding another phase to the traffic signal will reduce the overall capacity at the intersection.  It is anticipated that some of the traffic currently using Shoup Avenue and Victory Boulevard will shift to alternative routes due this reduction in capacity.

Table 12b
With Project + Mitigation

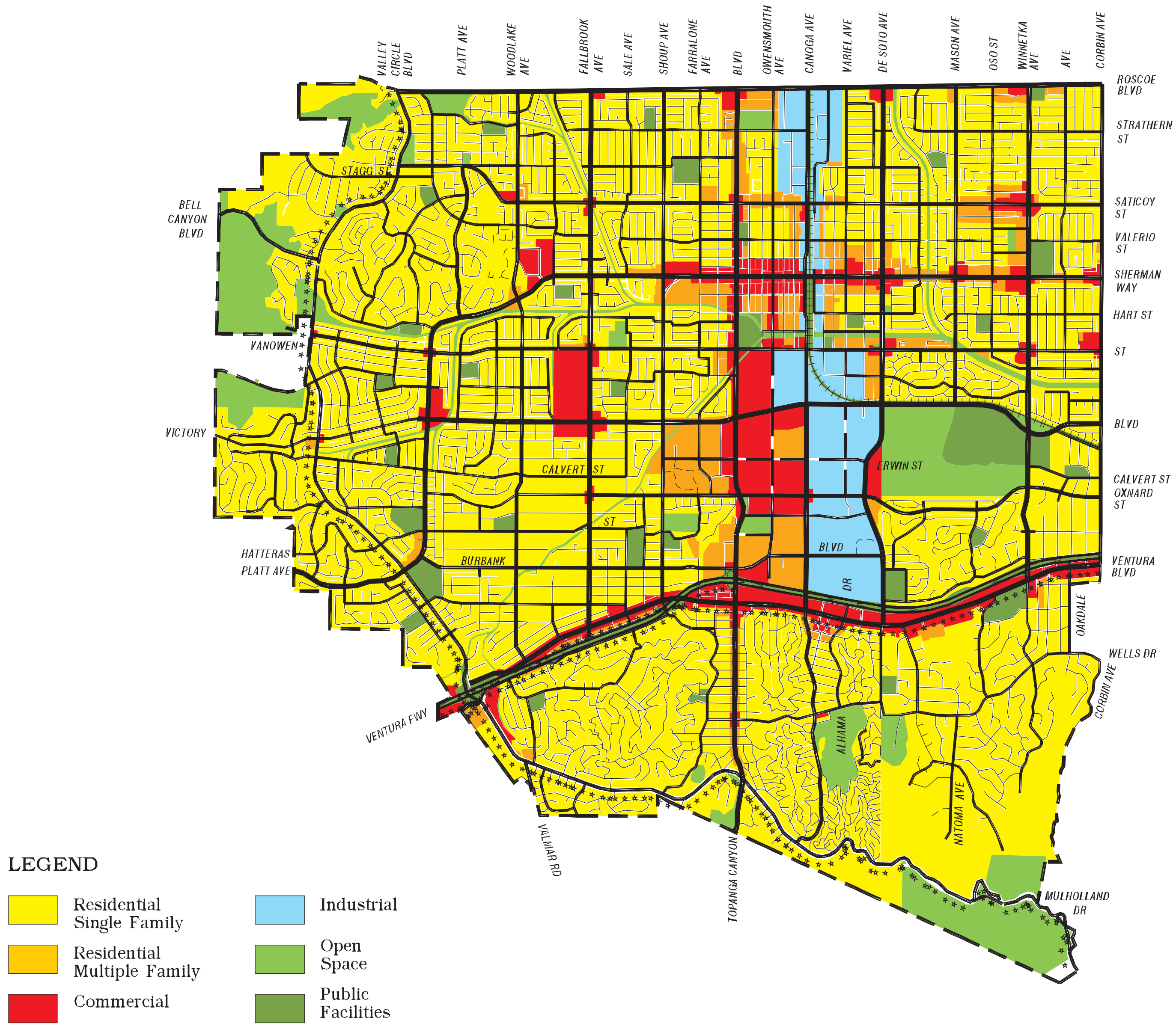
| | | | Future (2012) Without Project | | Future (2012) With Project | | | | Future with Mitigation With Project | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Intersection | Peak Hour | CMA | LOS | CMA | LOS | | IMPACT | CMA | LOS | | IMPACT | Significant Impact |
| 8 | Shoup Ave & Victory Blvd | AM | 0.789 | C | 0.844 | D | + | 0.055 | 0.806 | D | + | 0.017 | No |

# APPENDIX A

# COMMUNITY PLAN LAND USE

# SUMMARY OF LAND USE

| CATEGORY | LAND USE | CORRESPONDING ZONES | NET ACRES | % AREA | TOTAL NET ACRES | TOTAL % AREA |
|---|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | | |
| **Single Family** | | | | | 9,860 | 55.1 |
| | Minimum | OS, A1, A2, RE40 | 1,012 | 5.7 | | |
| | Very Low | RE20, RA, RE15, RE11 | 3,424 | 19.1 | | |
| | Low | RE9, RS, R1, RU, RD6, RD5 | 5,424 | 30.3 | | |
| **Multiple** | | | | | 826 | 4.6 |
| | Low Medium I | R2, RD3, RD4, RZ3, RZ4, RU, RW1 | 162 | 0.9 | | |
| | Low Medium II | RD1.5, RD2 , RW2, RZ2.5 | 156 | 0.9 | | |
| | Medium | R3 | 469 | 2.6 | | |
| | High Medium | R4 | 39 | 0.2 | | |
| **COMMERCIAL** | | | | | 972 | 5.4 |
| | Neighborhood | C1, C1.5, C2, C4 | 167 | 0.9 | | |
| | Limited | CR, C1, C1.5, P | 52 | 0.3 | | |
| | General | CR, C1.5, C2, C4 | 186 | 1.0 | | |
| | Community | CR, C2, C4 | 347 | 2.0 | | |
| | Regional | CR, C1.5, C2, C4, R3, R4, R5 | 220 | 1.2 | | |
| **INDUSTRIAL** | | | | | 677 | 3.8 |
| | Limited | CM, MR1, M1 | 292 | 1.6 | | |
| | Light | MR2, M2 | 385 | 2.2 | | |
| **PARKING** | | | | | 0 | 0.0 |
| | Parking | P, PB | 0 | 0.0 | | |
| **OPEN SPACE/PUBLIC FACILITIES** | | | | | 2,117 | 11.8 |
| | Open Space | OS, A1 | 1,404 | 7.8 | | |
| | Public Facilities | PF | 713 | 4.0 | | |
| **STREETS** | | | | | | |
| | Private Streets | - | 21 | 0.1 | 3,442 | 19.3 |
| | Public Streets | - | 3,421 | 19.2 | | |
| **TOTAL** | | | | | 17,894 | 100.0 |




# GENERALIZED LAND USE

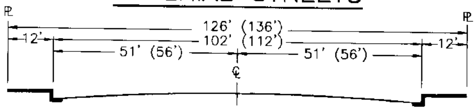
## CANOGA PARK - WINNETKA - WOODLAND HILLS - WEST HILLS

as of April 15 2008-CPC06-2598GPA/ZC PLT:06/02/08

# APPENDIX B

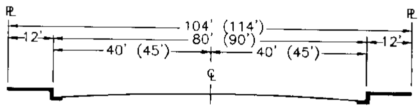
# CIRCULATION MAPS, STREET STANDARDS & STREET PLANS

## ARTERIAL STREETS



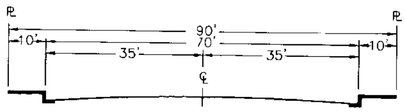

MAJOR HIGHWAY–CLASS I

At intersections with other Major Highways, the larger widths shown in parentheses should be provided, as determined by LADOT, utilizing a Standard Flare Section.




MAJOR HIGHWAY–CLASS II

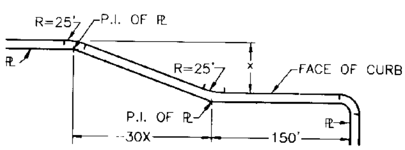
At intersections where LADOT has determined that dual left turn lanes are required, the larger widths shown in parentheses shall be provided, utilizing a Standard Flare Section.




SECONDARY HIGHWAY

### TRANSITIONAL EXTENSIONS

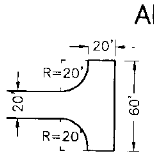
Where a designated Major Highway (Class I or II) or a Secondary Highway crosses another designated arterial street and then changes in designation to a street of lesser standard width, the street of lesser standard width shall be widened on both sides from the intersection to the width of the higher designotion and tapered in a Standard Flare Section, as shown below, to provide on orderly transition.



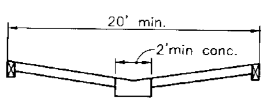

Dimensions shall be measured angle point to angle point.

STANDARD FLARE SECTION
( Plan View )

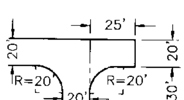
### ALLEYS



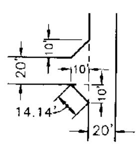

STANDARD TURNING AREA
(Plan View)




STANDARD CROSS-SECTION



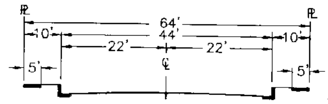

MINIMUM TURNING AREA
(Plan View)




STANDARD CUT-CORNERS FOR 90° INTERSECTION
(Plan View)

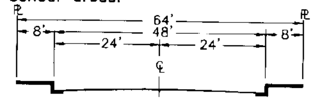
NOTE: Dimensions shown hereon are not to scale.

## NON-ARTERIAL STREETS



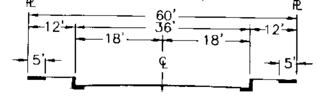

COLLECTOR STREET

For use in quarter mile streets and school areas.



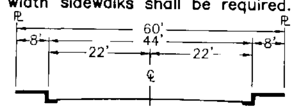

INDUSTRIAL COLLECTOR STREET

For use in industrial areas to assist the flow of local truck traffic within those areas to adjacent arterial streets. A 35' curb return radius is required.



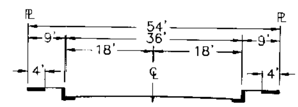

LOCAL STREET

In commercial and multiple residential areas, a 40-foot roadway with 10-foot parkways, and full-width sidewalks shall be required.



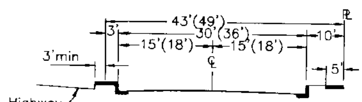

INDUSTRIAL LOCAL STREET

For use in industrial areas. A 35' curb return radius is required.



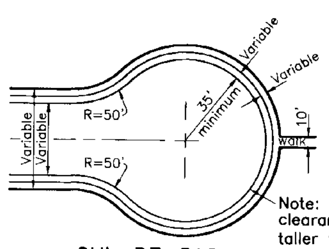

NONCONTINUOUS LOCAL STREET

May include cul-de-sac, loop streets and short connector streets. Where an approved internal pedestrian system is provided the parkway on one side may be reduced to 3-feet.




SERVICE ROAD

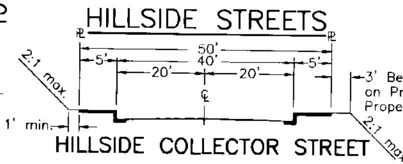
For use on adjoining major or secondary highways, except that the larger widths shown in parentheses shall be provided in multiple residential zones.



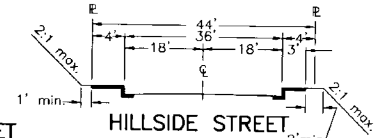

Note: For fire truck clearance, no obstruction taller than 6" shall be permitted within 3 ft. of the curb. On-street parking shall be prohibited.

CUL-DE-SAC
(Plan View)
MAY BE UNSYMMETRICAL

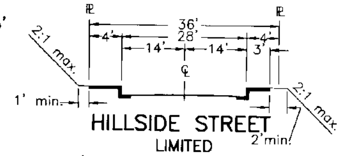
## HILLSIDE STREETS



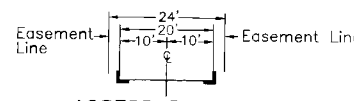

HILLSIDE COLLECTOR STREET




HILLSIDE STREET
LOCAL

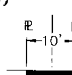



HILLSIDE STREET
LIMITED
(Porking on one side only)

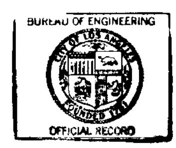



ACCESS ROADWAY
CONDITIONAL

(Limited to 4 dwelling units, and a maximum length of 300 feet. Private Street only)




STANDARD WALKWAY
CROSS – SECTION




PREPARED IN COOPERATION WITH THE DEPARTMENTS OF TRANSPORTATION AND CITY PLANNING

BUREAU OF ENGINEERING — DEPARTMENT OF PUBLIC WORKS — CITY OF LOS ANGELES

# STANDARD STREET DIMENSIONS

STANDARD PLAN S-470-0

| SUPERSEDES | REFERENCES |
|---|---|
| D-22549 | |

SUBMITTED March 25, 1999
Clark W. Robins
ENGINEER OF DESIGN
Rodney Harago
DEPUTY ENGINEER
APPROVED March 31 1999
Thomas Conner
CITY ENGINEER

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| M.F.O., D.L.F., J.E.F. A.D.R. | R. TANABE | L. GANAJA |


APPROVED Frances Banerjee 4.6.99
GENERAL MANAGER, DEPT. OF TRANSPORTATION DATE

Con Howe 4/6/99
DIRECTOR OF PLANNING DATE

ADOPTED MAY 13, 1999
CITY PLANNING COMISSION DATE

VAULT INDEX NUMBER
B-4428

SHEET 1 OF 2 SHEETS

THIS STANDARD PLAN BECOMES EFFECTIVE ON NOVEMBER 10, 1999

# STANDARD STREET CONDITIONS

1. City Council may, by ordinance, adopt specific standards for individual streets which differ from these official standard street dimensions. Community Plans should be reviewed for designation of Pedestrian Priority Street Segments of arterial streets which would require wider sidewalks than those indicated on this Standard Plan.

2. Sidewalk widths for non–arterial streets shall be the minimum shown hereon. Greater widths, up to full width between curb and property line, with tree wells, shall be required where commercial and multiple residential frontage, schools, areas of heavy pedestrian traffic or other special circumstances indicate the need.

3. Except for special conditions or as otherwise provided, sidewalk shall be placed as close to the property line as possible.

4. Where sidewalk is constructed adjacent to the curb it shall have a minimum width of 10 feet inclusive of curb thickness except for hillside streets, noncontinuous local streets and industrial streets.

5. Where sidewalk is constructed on the fill or low side of a hillside street, a berm may be required on private property.

6. Easements may be required in addition to the widths shown hereon, where necessary for the installation of public utilities or for widened sidewalks (minimum 15–foot width) adjacent to transit stations.

7. Fifty–foot curb radii (instead of the standard 35' curb radii) shall be provided for cul–de–sacs in industrial areas.

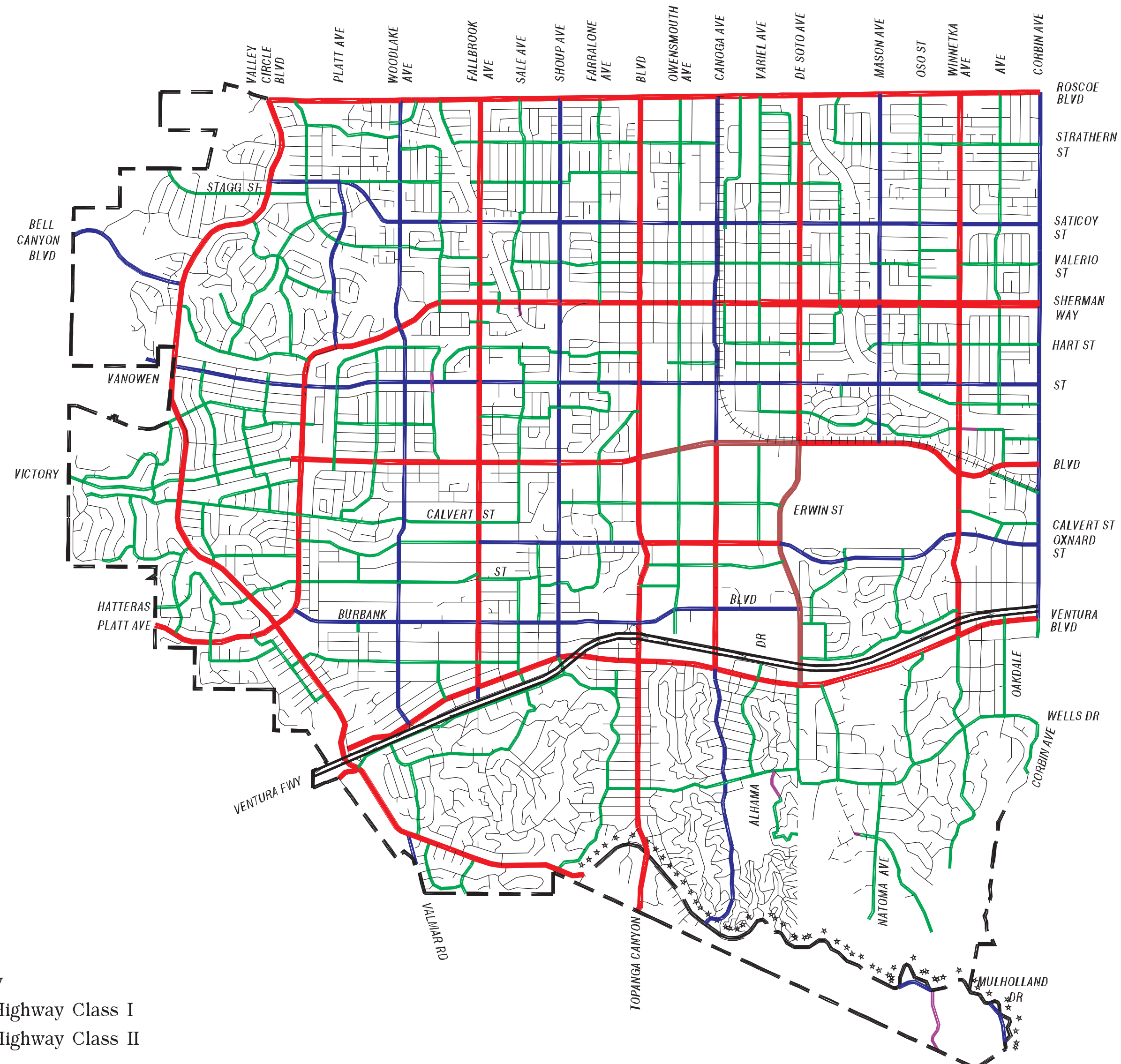
8. Private street development should conform to the standard public street dimensions shown on this sheet, where appropriate. Variations may be approved on a case–by–case basis.

9. For intersections of streets the following dedications shall apply:
   a. Intersections of arterial streets with any other street: 15'x15' cut corner OR 20' curved corner radius.
   b. Intersections of non–arterial and/or hillside streets: 10'x10' cut corner OR 15' curved corner radius.

10. Hillside Collector Streets. In hillside areas where topography or other environmental considerations, documented to the satisfaction of the City Engineer, would render full street improvements infeasible, the roadway width of the hillside collector street may be reduced to no less than 32 feet, provided that parking is limited to one side only.



| STANDARD PLAN NO. S–470–0 | VAULT INDEX NUMBER B-4428 | SHEET 2 OF 2 SHEETS |
|---|---|---|



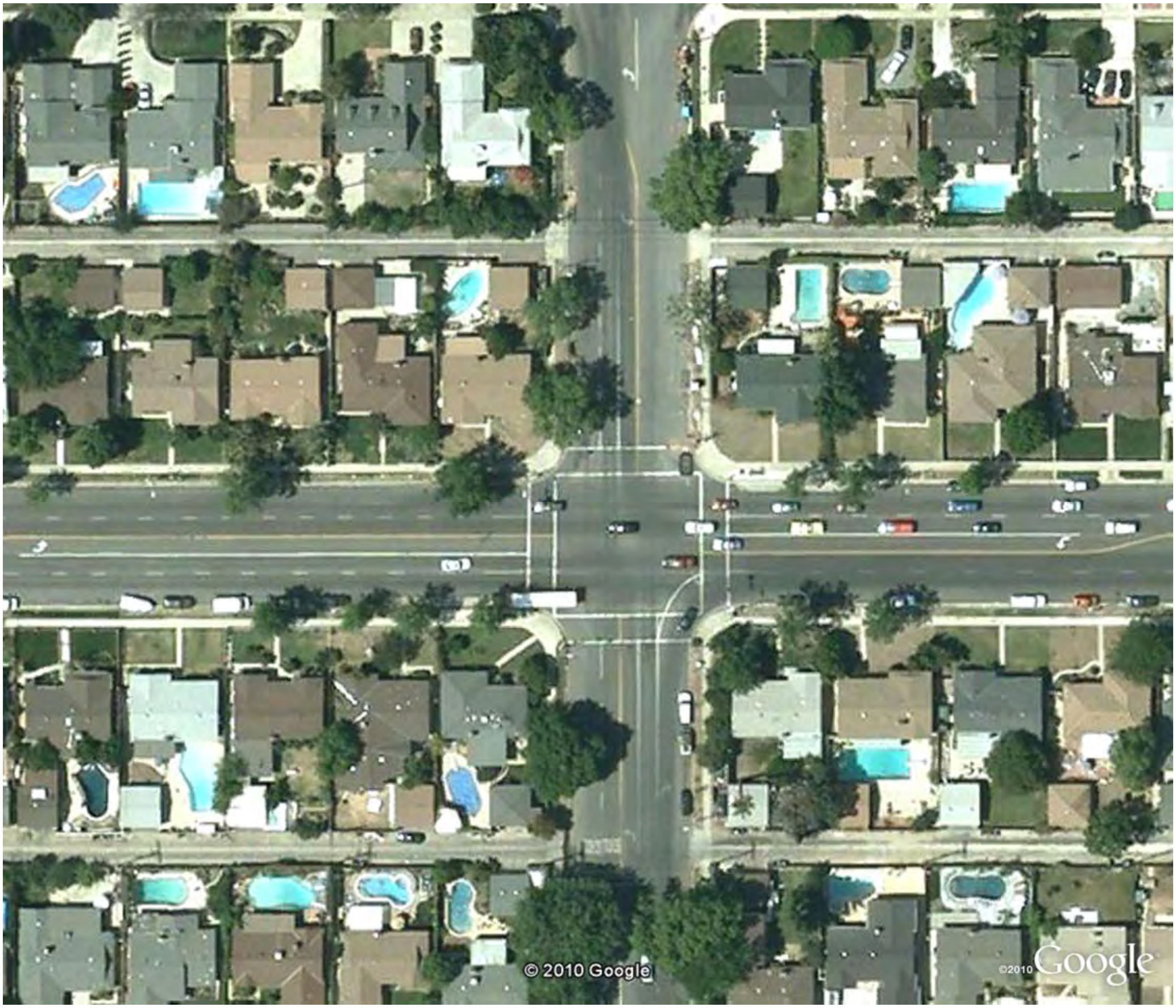

LEGEND

- Freeway
- Major Highway Class I
- Major Highway Class II
- Secondary
- Collector
- Proposed
- Local

# GENERALIZED CIRCULATION

## CANOGA PARK - WINNETKA - WOODLAND HILLS - WEST HILLS

as of:April 15 2008-CPC06-2598GPA/ZC PLT:06/02/08




VANOWEN STREET & WOODLAKE AVENUE


FALLBROOK AVENUE & VANOWEN STREET


SALE AVENUE & VANOWEN STREET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TOPANGA CANYON BOULEVARD & VANOWEN STREET


CRISWELL STREET & FALLBROOK AVENUE


FALLBROOK AVENUE & VICTORY BOULEVARD


SHOUP AVENUE & VICTORY BOULEVARD


FALLBROOK AVENUE & OXNARD STREET


OXNARD STREET & SHOUP AVENUE


FALLBROOK AVENUE & VENTURA BOULEVARD


VENTURA BOULEVARD & VENTURA FREEWAY EB ONRAMP (WEST OF SHOUP)

# APPENDIX C

# TRANSIT ROUTES

MTA AREA MAP

ROSCOE
SATICOY
WEST HILLS
CANOGA PARK
RESEDA
SHERMAN
VANOWEN
VICTORY
OXNARD
West Hills
Medical
Center
Westfield
Topanga
Westfield
Promenade
DE SOTO
PIERCE
COLLEGE
CANOGA
LA Pierce
College
WARNER CENTER
TAMPA
RESEDA
WINNETKA
WHITE OAK
Warner
152
353
163
169
363
645
165
164
150
244
AV787
SC796
245
750
161
243
242
239
154
240
101

# Monday through Friday 165

## Eastbound (Approximate Times)

| WEST HILLS | CANOGA PARK | RESEDA | LAKE BALBOA | VAN NUYS | NORTH HOLLYWOOD | BURBANK | |
|---|---|---|---|---|---|---|---|
| Valley Circle & Valley Circle Terrace | Vanowen & Topanga Canyon | Vanowen & Reseda | Vanowen & Balboa | Vanowen & Van Nuys | Vanowen & Laurel Canyon | Burbank Airport & Empire | Burbank Station |
| E 4:37A | 4:48A | 5:00A | 5:06A | 5:16A | 5:27A | 5:36A | 5:49A |
| E 4:58 | 5:09 | 5:21 | 5:27 | 5:37 | 5:48 | 5:57 | 6:10 |
| E 5:18 | 5:29 | 5:42 | 5:48 | 5:58 | 6:09 | 6:19 | 6:33 |
| E 5:38 | 5:49 | 6:02 | 6:08 | 6:18 | 6:30 | 6:40 | 6:54 |
| 5:57 | 6:08 | 6:22 | 6:28 | 6:38 | 6:50 | 7:00 | 7:15 |
| 6:13 | 6:24 | 6:38 | 6:44 | 6:54 | 7:06 | 7:17 | 7:32 |
| 6:29 | 6:40 | 6:54 | 7:00 | 7:13 | 7:25 | 7:36 | 7:51 |
| — | — | 7:09 | 7:17 | 7:30 | 7:42 | 7:53 | 8:08 |
| 6:56 | 7:08 | 7:24 | 7:32 | 7:47 | 7:59 | 8:10 | 8:25 |
| 7:11 | 7:23 | 7:39 | 7:48 | 8:03 | 8:15 | 8:26 | 8:42 |
| 7:26 | 7:39 | 7:55 | 8:04 | 8:19 | 8:32 | 8:43 | 8:59 |
| 7:42 | 7:55 | 8:11 | 8:20 | 8:35 | 8:48 | 8:59 | 9:15 |
| 7:59 | 8:12 | 8:28 | 8:36 | 8:51 | 9:04 | 9:15 | 9:31 |
| 8:18 | 8:31 | 8:46 | 8:54 | 9:09 | 9:22 | 9:33 | 9:49 |
| 8:36 | 8:49 | 9:04 | 9:12 | 9:27 | 9:40 | 9:51 | 10:07 |
| 9:06 | 9:19 | 9:34 | 9:42 | 9:57 | 10:10 | 10:21 | 10:37 |
| 9:36 | 9:49 | 10:04 | 10:12 | 10:27 | 10:40 | 10:51 | 11:07 |
| 10:06 | 10:19 | 10:34 | 10:42 | 10:57 | 11:10 | 11:21 | 11:37 |
| 10:36 | 10:49 | 11:04 | 11:12 | 11:27 | 11:40 | 11:51 | 12:07P |
| 11:06 | 11:19 | 11:34 | 11:42 | 11:57 | 12:10P | 12:21P | 12:37 |
| 11:36 | 11:49 | 12:04P | 12:12P | 12:28P | 12:41 | 12:52 | 1:08 |
| 12:06P | 12:19P | 12:34 | 12:42 | 12:58 | 1:11 | 1:22 | 1:38 |
| 12:36 | 12:49 | 1:04 | 1:12 | 1:28 | 1:41 | 1:52 | 2:08 |
| — | — | — | C 1:44 | 2:00 | 2:13 | 2:24 | 2:40 |
| — | — | — | C 1:47 | 2:03 | 2:16 | 2:27 | 2:43 |
| — | — | — | C 1:50 | 2:06 | 2:19 | 2:30 | 2:46 |
| 1:17 | 1:30 | 1:45 | 1:53 | 2:09 | 2:22 | 2:33 | 2:49 |
| — | — | — | D 2:04 | 2:20 | 2:33 | 2:44 | 3:00 |
| 1:38 | 1:51 | 2:06 | 2:14 | 2:30 | 2:43 | 2:54 | 3:10 |
| 2:08 | 2:21 | 2:36 | 2:44 | 3:00 | 3:13 | 3:24 | 3:40 |
| — | — | — | B 3:00 | 3:16 | 3:29 | 3:40 | 3:56 |
| 2:36 | 2:49 | 3:04 | 3:12 | 3:28 | 3:41 | 3:52 | 4:08 |
| — | — | — | A 3:16 | 3:32 | 3:45 | — | — |
| — | — | — | A 3:19 | 3:35 | 3:48 | — | — |
| — | — | — | A 3:24 | 3:40 | 3:53 | — | — |
| 2:51 | 3:04 | 3:19 | 3:27 | 3:43 | 3:56 | 4:07 | 4:23 |
| 3:00 | 3:13 | 3:28 | 3:36 | 3:52 | 4:05 | 4:16 | 4:32 |
| 3:09 | 3:22 | 3:37 | 3:45 | 4:01 | 4:13 | 4:24 | 4:40 |
| 3:19 | 3:32 | 3:47 | 3:55 | 4:10 | 4:22 | 4:33 | 4:49 |
| 3:29 | 3:42 | 3:57 | 4:05 | 4:20 | 4:32 | 4:43 | 4:59 |
| 3:39 | 3:52 | 4:07 | 4:15 | 4:30 | 4:42 | 4:53 | 5:09 |
| 3:49 | 4:02 | 4:17 | 4:25 | 4:40 | 4:52 | 5:03 | 5:19 |
| 3:59 | 4:12 | 4:27 | 4:35 | 4:50 | 5:02 | 5:13 | 5:29 |
| 4:09 | 4:22 | 4:37 | 4:45 | 5:00 | 5:12 | 5:23 | 5:39 |
| 4:19 | 4:32 | 4:47 | 4:55 | 5:10 | 5:22 | 5:33 | 5:49 |
| 4:30 | 4:43 | 4:58 | 5:05 | 5:20 | 5:32 | 5:43 | 5:59 |
| 4:40 | 4:53 | 5:08 | 5:15 | 5:30 | 5:42 | 5:53 | 6:09 |
| 4:50 | 5:03 | 5:18 | 5:25 | 5:40 | 5:52 | 6:03 | 6:19 |
| 5:00 | 5:13 | 5:28 | 5:35 | 5:50 | 6:02 | 6:13 | 6:29 |
| 5:10 | 5:23 | 5:38 | 5:45 | 6:00 | 6:12 | 6:23 | 6:39 |
| 5:20 | 5:33 | 5:48 | 5:55 | 6:10 | 6:22 | 6:33 | 6:49 |
| 5:30 | 5:43 | 5:58 | 6:05 | 6:20 | 6:32 | 6:43 | 6:59 |
| 5:45 | 5:58 | 6:13 | 6:20 | 6:35 | 6:47 | 6:58 | 7:14 |
| 6:05 | 6:18 | 6:33 | 6:40 | 6:55 | 7:07 | 7:18 | 7:34 |
| 6:25 | 6:38 | 6:53 | 7:00 | 7:14 | 7:26 | 7:37 | 7:53 |
| 6:56 | 7:09 | 7:23 | 7:30 | 7:43 | 7:54 | 8:04 | 8:20 |
| 7:29 | 7:40 | 7:53 | 8:00 | 8:12 | 8:23 | 8:33 | 8:49 |
| 8:01 | 8:10 | 8:23 | 8:30 | 8:42 | 8:53 | 9:03 | 9:19 |

Monday through Friday 165

## Westbound (Approximate Times)

| BURBANK | | NORTH HOLLYWOOD | VAN NUYS | LAKE BALBOA | RESEDA | CANOGA PARK | WOODLAND HILLS | WEST HILLS |
|---|---|---|---|---|---|---|---|---|
| Burbank Station | Burbank Airport & Empire | Vanowen & Laurel Canyon | Vanowen & Van Nuys | Vanowen & Balboa | Vanowen & Reseda | Vanowen & Topanga Canyon | Warner Center Transit Hub | Valley Circle & Valley Circle Terrace |
| 4:35A | 4:49A | 4:59A | 5:09A | 5:21A | 5:27A | 5:40A | — | 5:51A |
| 5:05 | 5:19 | 5:29 | 5:39 | 5:51 | 5:57 | 6:10 | — | 6:21 |
| 5:24 | 5:38 | 5:48 | 5:59 | 6:11 | 6:17 | 6:30 | — | 6:41 |
| 5:38 | 5:52 | 6:03 | 6:14 | 6:26 | 6:32 | 6:45 | — | 6:56 |
| — | — | 6:13 | 6:24 | 6:36 | 6:42 | 6:55 | — | 7:07 |
| 5:56 | 6:10 | 6:21 | 6:32 | 6:44 | 6:50 | 7:04 | 7:13A | — |
| — | — | 6:29 | 6:40 | 6:52 | 6:59 | 7:13 | — | 7:25 |
| 6:12 | 6:26 | 6:37 | 6:48 | 7:00 | 7:07 | 7:21 | — | 7:33 |
| — | — | 6:45 | 6:56 | 7:08 | 7:16 | 7:30 | — | 7:42 |
| 6:26 | 6:40 | 6:51 | 7:02 | 7:15 | 7:23 | 7:37 | — | 7:49 |
| — | — | 6:54 | 7:05 | 7:19 | 7:27 | 7:41 | 7:50 | — |
| 6:32 | 6:46 | 6:57 | 7:08 | 7:23 | 7:31 | 7:45 | 7:54 | — |
| — | — | 7:00 | 7:12 | 7:27 | 7:35 | 7:49 | — | 8:01 |
| — | — | 7:04 | 7:16 | 7:31 | 7:39 | 7:53 | — | — |
| 6:41 | 6:56 | 7:07 | 7:20 | 7:35 | 7:43 | 7:57 | — | 8:09 |
| — | — | 7:11 | 7:24 | 7:39 | 7:47 | 8:01 | 8:10 | — |
| — | — | 7:15 | 7:28 | 7:43 | 7:51 | 8:05 | 8:14 | — |
| 6:53 | 7:08 | 7:19 | 7:32 | 7:47 | 7:55 | 8:09 | — | 8:21 |
| — | — | 7:23 | 7:36 | 7:51 | 7:59 | 8:13 | 8:22 | — |
| — | — | 7:27 | 7:40 | 7:55 | 8:03 | 8:17 | 8:26 | — |
| 7:06 | 7:22 | 7:33 | 7:46 | 8:01 | 8:08 | 8:22 | 8:31 | — |
| — | — | 7:41 | 7:54 | 8:07 | 8:14 | 8:28 | — | 8:40 |
| 7:27 | 7:43 | 7:54 | 8:07 | 8:19 | 8:26 | 8:40 | — | 8:52 |
| 7:41 | 7:57 | 8:09 | 8:22 | 8:34 | 8:41 | 8:55 | — | 9:07 |
| 8:00 | 8:17 | 8:29 | 8:42 | 8:54 | 9:01 | 9:15 | — | 9:27 |
| 8:25 | 8:42 | 8:54 | 9:07 | 9:19 | 9:26 | 9:40 | — | 9:52 |
| 8:55 | 9:12 | 9:24 | 9:37 | 9:49 | 9:56 | 10:10 | — | 10:22 |
| 9:25 | 9:42 | 9:54 | 10:07 | 10:19 | 10:26 | 10:40 | — | 10:52 |
| 9:55 | 10:12 | 10:24 | 10:37 | 10:49 | 10:56 | 11:10 | — | 11:22 |
| 10:25 | 10:42 | 10:54 | 11:07 | 11:19 | 11:26 | 11:40 | — | 11:52 |
| 10:55 | 11:12 | 11:24 | 11:37 | 11:49 | 11:56 | 12:10P | — | 12:22P |
| 11:25 | 11:42 | 11:54 | 12:07P | 12:19P | 12:26P | 12:40 | — | 12:52 |
| 11:55 | 12:12P | 12:24P | 12:37 | 12:49 | 12:56 | 1:10 | — | 1:22 |
| 12:25P | 12:42 | 12:54 | 1:07 | 1:19 | 1:26 | 1:40 | — | 1:52 |
| — | — | — | — | — | C 1:49 | 2:03 | 2:12P | — |
| 12:55 | 1:12 | 1:24 | 1:37 | 1:49 | 1:56 | 2:10 | — | 2:22 |
| 1:25 | 1:43 | 1:54 | 2:07 | 2:19 | 2:26 | 2:40 | — | 2:52 |
| 1:55 | 2:13 | 2:24 | 2:37 | 2:49 | 2:57 | 3:12 | — | 3:24 |
| 2:18 | 2:36 | 2:47 | 3:01 | 3:14 | 3:22 | 3:37 | — | 3:49 |
| — | — | — | — | — | F 3:22 | 3:37 | — | 3:49 |
| 2:32 | 2:50 | 3:02 | 3:16 | 3:29 | 3:37 | 3:52 | — | 4:04 |
| 2:48 | 3:06 | 3:18 | 3:32 | 3:45 | 3:53 | 4:08 | — | 4:20 |
| 2:57 | 3:15 | 3:27 | 3:41 | 3:54 | 4:02 | 4:17 | — | 4:29 |
| 3:07 | 3:25 | 3:37 | 3:51 | 4:04 | 4:11 | 4:26 | — | 4:38 |
| 3:17 | 3:35 | 3:47 | 4:01 | 4:14 | 4:21 | 4:36 | — | 4:48 |
| 3:27 | 3:45 | 3:57 | 4:11 | 4:24 | 4:31 | 4:46 | — | 4:58 |
| 3:42 | 4:00 | 4:12 | 4:26 | 4:39 | 4:46 | 5:01 | — | 5:13 |
| 3:57 | 4:15 | 4:27 | 4:41 | 4:54 | 5:01 | 5:16 | — | 5:28 |
| 4:17 | 4:35 | 4:47 | 5:01 | 5:14 | 5:21 | 5:36 | — | 5:47 |
| 4:37 | 4:55 | 5:07 | 5:21 | 5:34 | 5:41 | 5:56 | — | 6:08 |
| 5:02 | 5:20 | 5:32 | 5:46 | 5:59 | 6:06 | 6:19 | — | 6:31 |
| 5:28 | 5:46 | 5:58 | 6:11 | 6:24 | 6:31 | 6:43 | — | 6:55 |
| 5:55 | 6:13 | 6:25 | 6:37 | 6:49 | 6:56 | 7:08 | — | 7:20 |
| 6:21 | 6:39 | 6:50 | 7:02 | 7:14 | 7:21 | 7:33 | — | 7:45 |
| 6:51 | 7:09 | 7:20 | 7:32 | 7:44 | 7:51 | 8:03 | — | 8:14 |
| 7:30 | 7:48 | 7:58 | 8:09 | 8:20 | 8:26 | 8:38 | — | 8:49 |
| 8:30 | 8:47 | 8:57 | 9:08 | 9:19 | 9:25 | 9:37 | — | — |
| 9:30 | 9:47 | 9:57 | 10:08 | 10:19 | 10:25 | 10:37 | — | — |

## Holiday Schedule

Sunday & Holiday schedule will operate on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.

## *Horarios en los días feriados*

*Los horarios de domingos y días festivos serán en New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day y Christmas Day.*

## Special Notes

- A Starts at Vanowen & Amestoy school days only.
- B Starts at Vanowen & Balboa school days only.
- C Starts at Vanowen & Amestoy. Tuesday school days only.
- D Starts at Vanowen & Balboa. Tuesday school days only.
- E Trips begin westbound at Vanowen St. & Platt Ave. 3 minutes before time shown.
- F Starts at Vanowen & Amestoy school days except Tuesday.

## *Avisos especiales*

- A *Comienza en Vanowen y Amestoy días de escuela solamente.*
- B *Comienza en Vanowen y Balboa días de escuela solamente.*
- C *Comienza en Vanowen y Amestoy. Martes días de escuela solamente.*
- D *Comienza en Vanowen y Balboa. Martes días de escuela solamente.*
- E *Viaje se origina en Vanowen y Platt tres minutos des pues de la hora mostrada.*
- F *Comienza en Vanowen y Amestoy los días de escuela solamente menos los martes.*

# Saturday Schedule 165

Effective Dec 12 2010

## Eastbound (Approximate Times)

| Valley Circle & Valley Circle Terrace | Vanowen & Topanga Canyon | Vanowen & Reseda | Vanowen & Balboa | Vanowen & Van Nuys | Vanowen & Laurel Canyon | Burbank Airport & Empire | Burbank Station |
|---|---|---|---|---|---|---|---|
| E 5:15A | 5:26A | 5:38A | 5:44A | 5:54A | 6:04A | 6:14A | 6:28A |
| 6:22 | 6:34 | 6:48 | 6:54 | 7:05 | 7:15 | 7:25 | 7:39 |
| 7:26 | 7:38 | 7:52 | 7:58 | 8:09 | 8:19 | 8:29 | 8:44 |
| 8:25 | 8:37 | 8:51 | 8:57 | 9:09 | 9:19 | 9:29 | 9:45 |
| 9:25 | 9:37 | 9:51 | 9:57 | 10:09 | 10:20 | 10:30 | 10:47 |
| 10:24 | 10:36 | 10:50 | 10:56 | 11:09 | 11:20 | 11:30 | 11:47 |
| 11:23 | 11:35 | 11:50 | 11:56 | 12:09P | 12:21P | 12:33 | 12:51 |
| 12:22P | 12:35 | 12:50 | 12:56 | 1:09 | 1:21 | 1:33 | 1:51 |
| 1:22 | 1:35 | 1:50 | 1:56 | 2:09 | 2:21 | 2:34 | 2:52 |
| 2:22 | 2:35 | 2:50 | 2:56 | 3:09 | 3:21 | 3:34 | 3:52 |
| 3:22 | 3:35 | 3:50 | 3:56 | 4:09 | 4:21 | 4:34 | 4:52 |
| 4:23 | 4:36 | 4:51 | 4:57 | 5:09 | 5:20 | 5:33 | 5:51 |
| 5:23 | 5:36 | 5:51 | 5:57 | 6:09 | 6:20 | 6:30 | 6:48 |
| 6:24 | 6:37 | 6:51 | 6:57 | 7:09 | 7:20 | 7:30 | 7:46 |
| 7:25 | 7:37 | 7:50 | 7:57 | 8:09 | 8:20 | 8:30 | 8:46 |

# Saturday Schedule 165

## Westbound (Approximate Times)

| BURBANK | | NORTH HOLLYWOOD | VAN NUYS | LAKE BALBOA | RESEDA | CANOGA PARK | WEST HILLS |
|---|---|---|---|---|---|---|---|
| Burbank Station | Burbank Airport & Empire | Vanowen & Laurel Canyon | Vanowen & Van Nuys | Vanowen & Balboa | Vanowen & Reseda | Vanowen & Topanga Canyon | Valley Circle & Valley Circle Terrace |
| 4:54A | 5:07A | 5:16A | 5:26A | 5:37A | 5:43A | 5:56A | 6:06A |
| 5:24 | 5:37 | 5:46 | 5:56 | 6:07 | 6:13 | 6:26 | 6:36 |
| 5:53 | 6:06 | 6:15 | 6:25 | 6:36 | 6:42 | 6:55 | 7:05 |
| 6:20 | 6:34 | 6:44 | 6:55 | 7:06 | 7:12 | 7:25 | 7:35 |
| 6:50 | 7:04 | 7:14 | 7:25 | 7:36 | 7:42 | 7:55 | 8:05 |
| 7:19 | 7:33 | 7:43 | 7:55 | 8:06 | 8:12 | 8:25 | 8:35 |
| 7:47 | 8:02 | 8:12 | 8:25 | 8:36 | 8:42 | 8:55 | 9:06 |
| 8:16 | 8:31 | 8:42 | 8:55 | 9:06 | 9:12 | 9:25 | 9:36 |
| 8:45 | 9:01 | 9:12 | 9:25 | 9:36 | 9:43 | 9:56 | 10:07 |
| 9:15 | 9:31 | 9:42 | 9:55 | 10:06 | 10:13 | 10:27 | 10:38 |
| 9:45 | 10:01 | 10:12 | 10:25 | 10:36 | 10:43 | 10:57 | 11:08 |
| 10:14 | 10:31 | 10:42 | 10:55 | 11:06 | 11:13 | 11:27 | 11:38 |
| 10:43 | 11:00 | 11:11 | 11:25 | 11:36 | 11:43 | 11:57 | 12:08P |
| 11:12 | 11:30 | 11:41 | 11:55 | 12:06P | 12:13P | 12:28P | 12:39 |
| 11:42 | 11:59 | 12:11P | 12:25P | 12:36 | 12:43 | 12:58 | 1:09 |
| 12:12P | 12:30P | 12:41 | 12:55 | 1:06 | 1:13 | 1:28 | 1:39 |
| 12:41 | 1:00 | 1:11 | 1:25 | 1:36 | 1:43 | 1:58 | 2:09 |
| 1:11 | 1:30 | 1:41 | 1:55 | 2:06 | 2:12 | 2:27 | 2:38 |
| 1:41 | 2:00 | 2:11 | 2:25 | 2:36 | 2:42 | 2:56 | 3:07 |
| 2:12 | 2:31 | 2:42 | 2:55 | 3:06 | 3:12 | 3:26 | 3:37 |
| 2:40 | 3:01 | 3:12 | 3:25 | 3:36 | 3:42 | 3:56 | 4:07 |
| 3:10 | 3:31 | 3:42 | 3:55 | 4:06 | 4:12 | 4:26 | 4:37 |
| 3:41 | 4:01 | 4:12 | 4:25 | 4:36 | 4:42 | 4:56 | 5:07 |
| 4:11 | 4:31 | 4:42 | 4:55 | 5:06 | 5:12 | 5:26 | 5:37 |
| 4:41 | 5:01 | 5:12 | 5:25 | 5:36 | 5:42 | 5:56 | 6:07 |
| 5:12 | 5:31 | 5:42 | 5:55 | 6:06 | 6:12 | 6:26 | 6:36 |
| 5:42 | 6:01 | 6:12 | 6:25 | 6:36 | 6:42 | 6:55 | 7:05 |
| 6:16 | 6:35 | 6:45 | 6:58 | 7:08 | 7:14 | 7:27 | 7:36 |
| 6:54 | 7:12 | 7:22 | 7:33 | 7:43 | 7:49 | 8:01 | 8:12 |
| 7:30 | 7:47 | 7:57 | 8:08 | 8:19 | 8:25 | 8:37 | 8:48 |
| 8:30 | 8:47 | 8:57 | 9:08 | 9:19 | 9:25 | 9:37 | — |
| 9:30 | 9:47 | 9:57 | 10:08 | 10:19 | 10:25 | 10:37 | — |

# Sunday and Holiday Schedule 165

## Eastbound (Approximate Times)

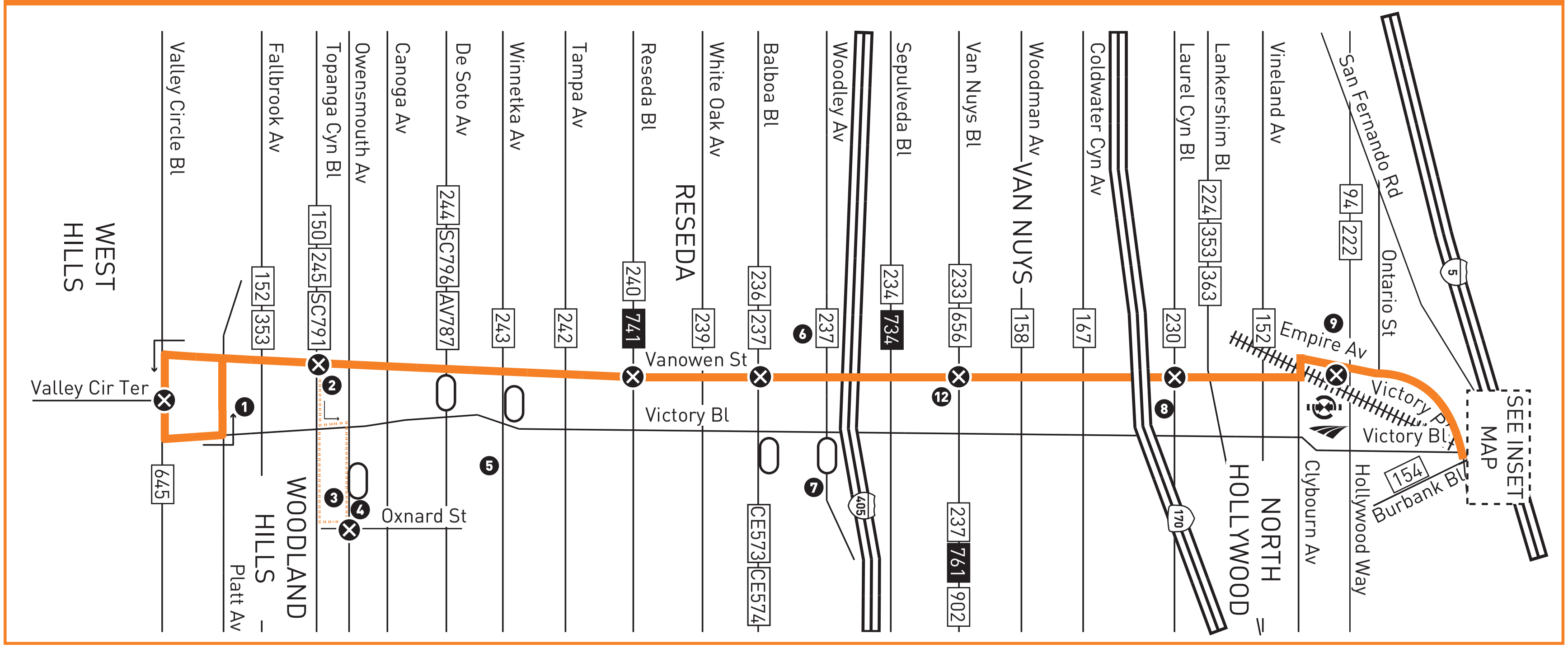
| WEST HILLS | CANOGA PARK | RESEDA | LAKE BALBOA | VAN NUYS | NORTH HOLLYWOOD | BURBANK | |
|---|---|---|---|---|---|---|---|
| Valley Circle & Valley Circle Terrace | Vanowen & Topanga Canyon | Vanowen & Reseda | Vanowen & Balboa | Vanowen & Van Nuys | Vanowen & Laurel Canyon | Burbank Airport & Empire | Burbank Station |
| E 6:45A | 6:56A | 7:09A | 7:15A | 7:26A | 7:36A | 7:44A | 7:58A |
| E 7:15 | 7:26 | 7:39 | 7:45 | 7:56 | 8:06 | 8:15 | 8:29 |
| 7:40 | 7:51 | 8:04 | 8:10 | 8:21 | 8:31 | 8:40 | 8:54 |
| 8:10 | 8:21 | 8:34 | 8:40 | 8:51 | 9:01 | 9:10 | 9:24 |
| 8:40 | 8:51 | 9:04 | 9:10 | 9:22 | 9:32 | 9:41 | 9:56 |
| 9:09 | 9:21 | 9:34 | 9:40 | 9:52 | 10:02 | 10:11 | 10:26 |
| 9:39 | 9:51 | 10:04 | 10:10 | 10:22 | 10:33 | 10:43 | 10:59 |
| 10:09 | 10:21 | 10:34 | 10:40 | 10:52 | 11:03 | 11:13 | 11:29 |
| 10:39 | 10:51 | 11:04 | 11:10 | 11:22 | 11:33 | 11:42 | 11:58 |
| 11:09 | 11:21 | 11:34 | 11:40 | 11:52 | 12:04P | 12:14P | 12:30P |
| 11:39 | 11:51 | 12:05P | 12:11P | 12:24P | 12:36 | 12:46 | 1:03 |
| 12:10P | 12:23P | 12:37 | 12:43 | 12:56 | 1:08 | 1:18 | 1:35 |
| 12:42 | 12:55 | 1:09 | 1:15 | 1:28 | 1:40 | 1:50 | 2:07 |
| 1:14 | 1:27 | 1:41 | 1:47 | 2:00 | 2:12 | 2:22 | 2:39 |
| 1:46 | 1:59 | 2:13 | 2:19 | 2:32 | 2:44 | 2:54 | 3:12 |
| 2:18 | 2:31 | 2:45 | 2:51 | 3:04 | 3:16 | 3:26 | 3:44 |
| 2:51 | 3:04 | 3:18 | 3:24 | 3:37 | 3:49 | 3:59 | 4:17 |
| 3:24 | 3:37 | 3:51 | 3:57 | 4:10 | 4:22 | 4:32 | 4:50 |
| 3:57 | 4:10 | 4:24 | 4:30 | 4:42 | 4:54 | 5:04 | 5:22 |
| 4:31 | 4:43 | 4:57 | 5:03 | 5:15 | 5:27 | 5:37 | 5:55 |
| 5:04 | 5:16 | 5:30 | 5:36 | 5:48 | 6:00 | 6:09 | 6:25 |
| 5:37 | 5:49 | 6:03 | 6:09 | 6:21 | 6:33 | 6:42 | 6:58 |
| 6:11 | 6:23 | 6:36 | 6:42 | 6:54 | 7:05 | 7:14 | 7:30 |
| 6:49 | 7:01 | 7:14 | 7:20 | 7:31 | 7:42 | 7:51 | 8:07 |
| 7:32 | 7:43 | 7:56 | 8:02 | 8:13 | 8:24 | 8:33 | 8:49 |

# Sunday and Holiday Schedule 165

## Westbound (Approximate Times)

| BURBANK | | NORTH HOLLYWOOD | VAN NUYS | LAKE BALBOA | RESEDA | CANOGA PARK | WEST HILLS |
|---|---|---|---|---|---|---|---|
| Burbank Station | Burbank Airport & Empire | Vanowen & Laurel Canyon | Vanowen & Van Nuys | Vanowen & Balboa | Vanowen & Reseda | Vanowen & Topanga Canyon | Valley Circle & Valley Circle Terrace |
| 6:15A | 6:29A | 6:38A | 6:47A | 6:57A | 7:03A | 7:15A | 7:24A |
| 6:45 | 6:59 | 7:08 | 7:17 | 7:27 | 7:33 | 7:45 | 7:54 |
| 7:15 | 7:29 | 7:38 | 7:47 | 7:57 | 8:03 | 8:15 | 8:24 |
| 7:45 | 7:59 | 8:08 | 8:17 | 8:27 | 8:33 | 8:45 | 8:54 |
| 8:15 | 8:29 | 8:38 | 8:47 | 8:57 | 9:03 | 9:15 | 9:24 |
| 8:45 | 8:59 | 9:08 | 9:17 | 9:27 | 9:33 | 9:46 | 9:55 |
| 9:13 | 9:27 | 9:37 | 9:47 | 9:57 | 10:03 | 10:16 | 10:25 |
| 9:41 | 9:56 | 10:06 | 10:17 | 10:27 | 10:33 | 10:46 | 10:57 |
| 10:09 | 10:24 | 10:34 | 10:46 | 10:57 | 11:04 | 11:17 | 11:28 |
| 10:37 | 10:54 | 11:04 | 11:16 | 11:27 | 11:34 | 11:47 | 11:58 |
| 11:07 | 11:24 | 11:34 | 11:46 | 11:57 | 12:04P | 12:18P | 12:29P |
| 11:39 | 11:56 | 12:06P | 12:18P | 12:29P | 12:36 | 12:50 | 1:01 |
| 12:11P | 12:29P | 12:39 | 12:51 | 1:02 | 1:09 | 1:23 | 1:34 |
| 12:44 | 1:02 | 1:12 | 1:24 | 1:35 | 1:41 | 1:55 | 2:06 |
| 1:17 | 1:35 | 1:45 | 1:57 | 2:08 | 2:14 | 2:28 | 2:40 |
| 1:50 | 2:08 | 2:18 | 2:30 | 2:41 | 2:47 | 3:00 | 3:12 |
| 2:22 | 2:41 | 2:51 | 3:03 | 3:14 | 3:20 | 3:33 | 3:44 |
| 2:55 | 3:14 | 3:24 | 3:36 | 3:47 | 3:53 | 4:06 | 4:17 |
| 3:28 | 3:47 | 3:57 | 4:09 | 4:20 | 4:26 | 4:39 | 4:50 |
| 4:01 | 4:20 | 4:30 | 4:42 | 4:53 | 4:59 | 5:12 | 5:23 |
| 4:34 | 4:53 | 5:03 | 5:15 | 5:26 | 5:32 | 5:45 | 5:56 |
| 5:07 | 5:26 | 5:36 | 5:48 | 5:59 | 6:05 | 6:18 | 6:29 |
| 5:40 | 5:59 | 6:09 | 6:21 | 6:32 | 6:38 | 6:51 | 7:02 |
| 6:14 | 6:32 | 6:42 | 6:54 | 7:05 | 7:11 | 7:24 | 7:35 |
| 6:48 | 7:06 | 7:16 | 7:27 | 7:38 | 7:44 | 7:57 | 8:09 |
| 7:30 | 7:47 | 7:57 | 8:08 | 8:19 | 8:26 | 8:38 | — |
| 8:30 | 8:47 | 8:57 | 9:08 | 9:19 | 9:25 | 9:37 | — |
| 9:30 | 9:47 | 9:57 | 10:08 | 10:19 | 10:25 | 10:37 | — |

## ROUTE MAP




## INSET MAP


## MAP NOTES

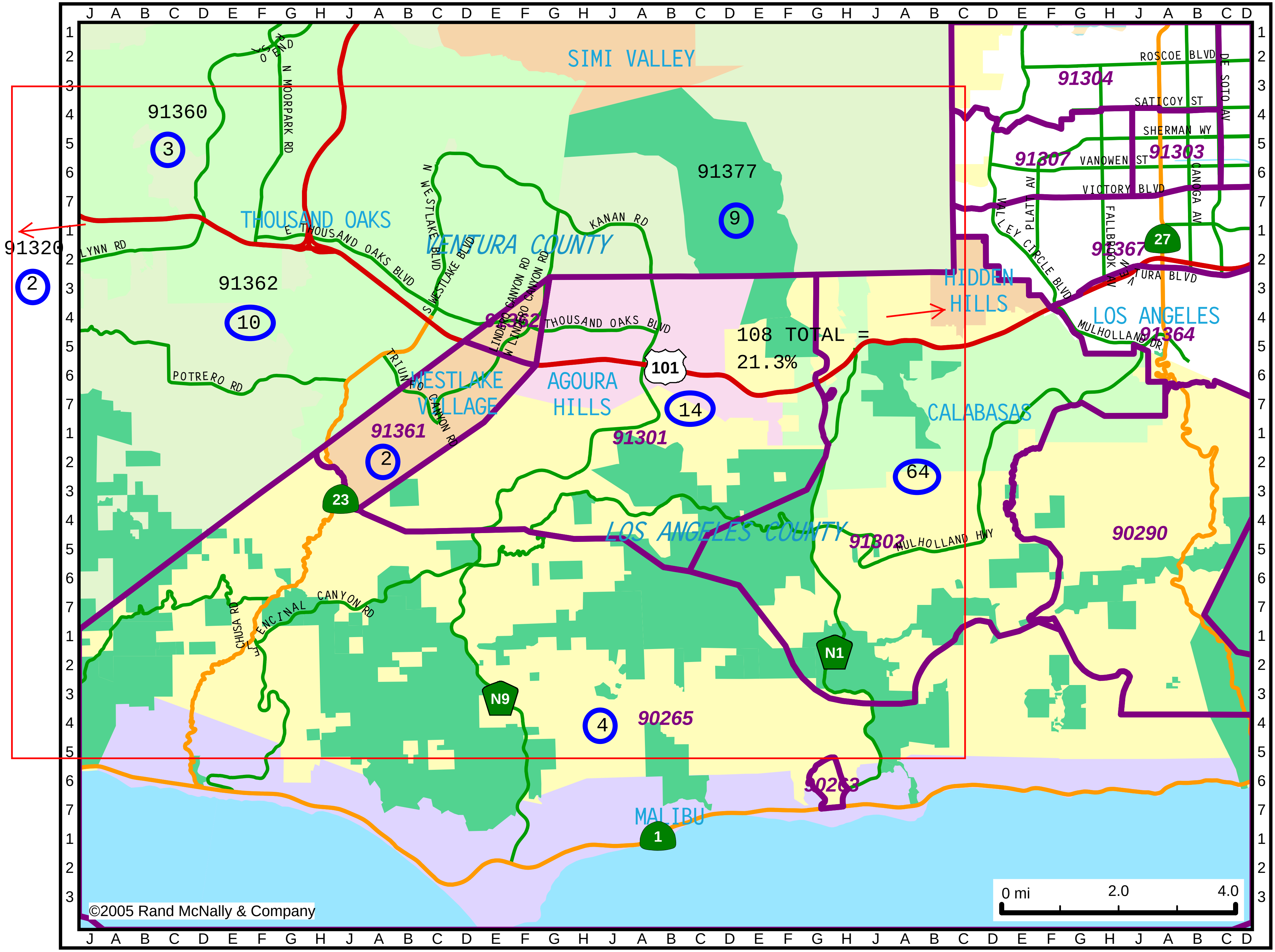
1. **Fallbrook Center**
2. **Westfield Topanga**
3. **Westfield Promenade**
4. **Warner Center Transit Hub**
   Metro 161, 164, 245, 645, 750, Metro Orange Line
5. **Pierce College**
6. **Van Nuys Airport**
7. **Sepulveda Dam Recreation**
8. **Valley Plaza**
9. **Bob Hope Airport**
10. **Burbank High School**
11. **Burbank Station**
12. **Van Nuys High School**

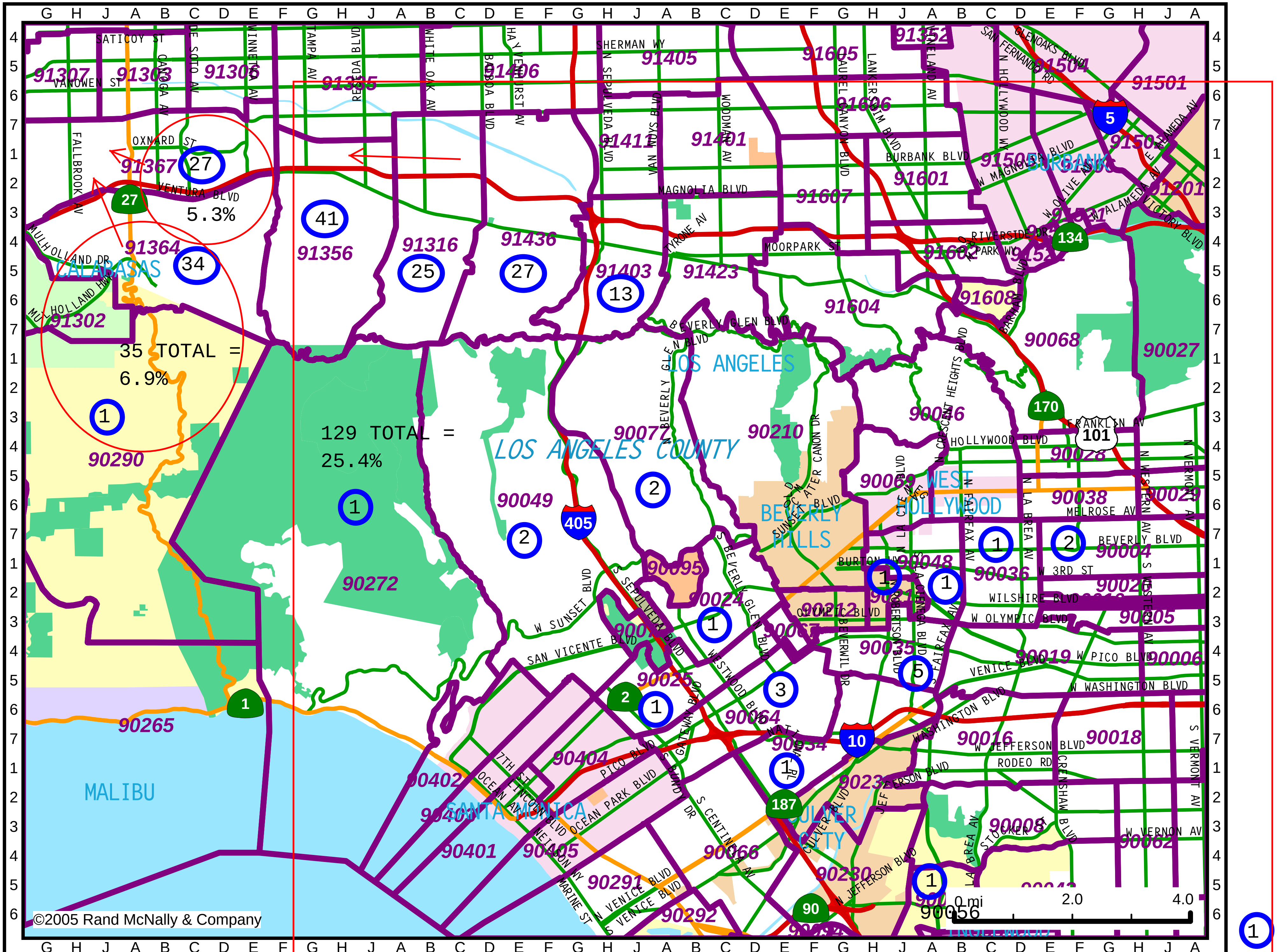
## LEGEND

- Line 165
- Line 165 Shortline
- Timepoint
- Metro Orange Line Station
- Transit Center
- Metrolink Station
- Amtrak Station
- AV Antelope Valley Transit Authority
- BB Burbank Bus
- CE LADOT Commuter Express
- SC Santa Clarita Transit

# APPENDIX D

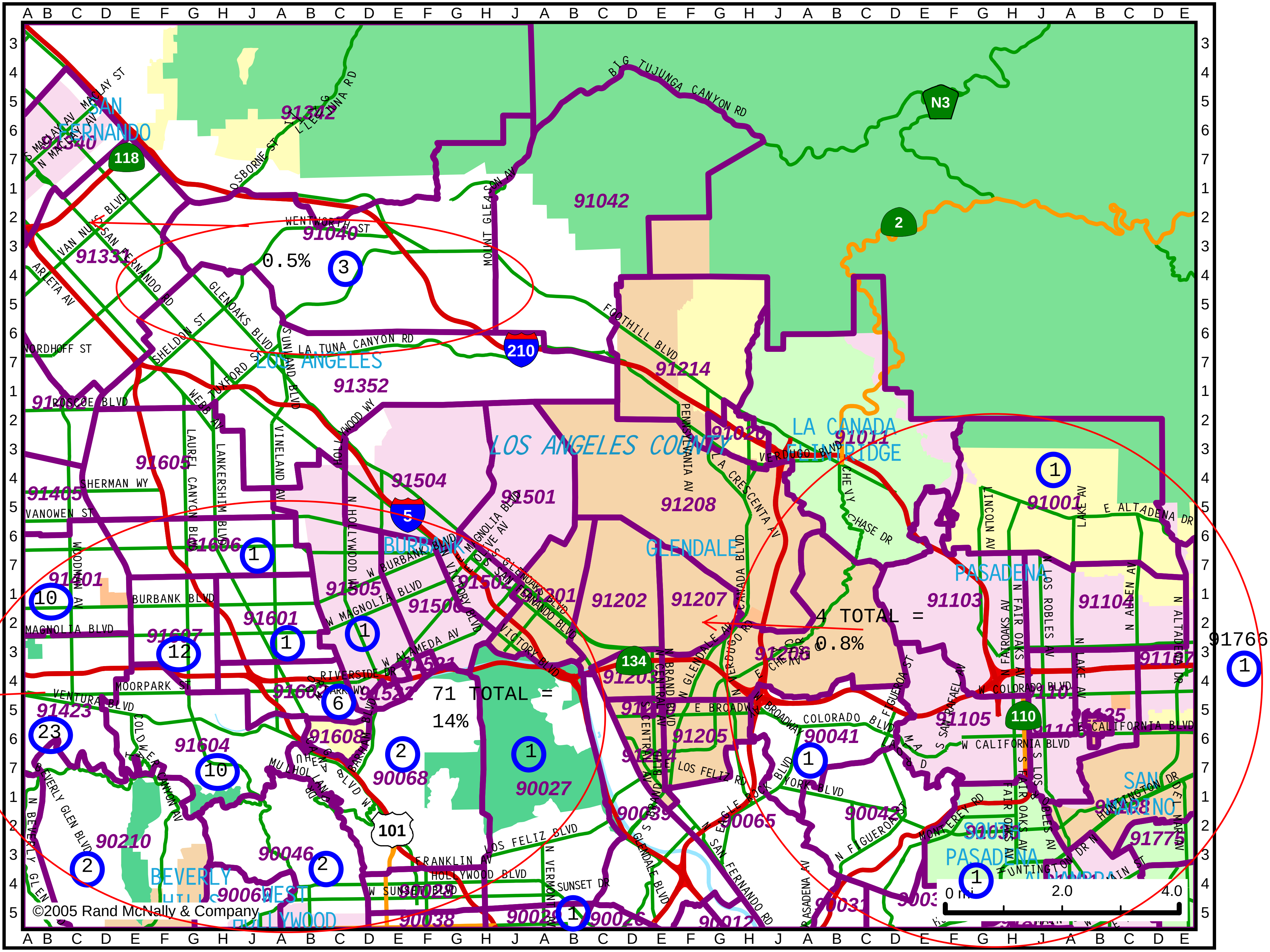
# ZIP CODE ANALYSIS

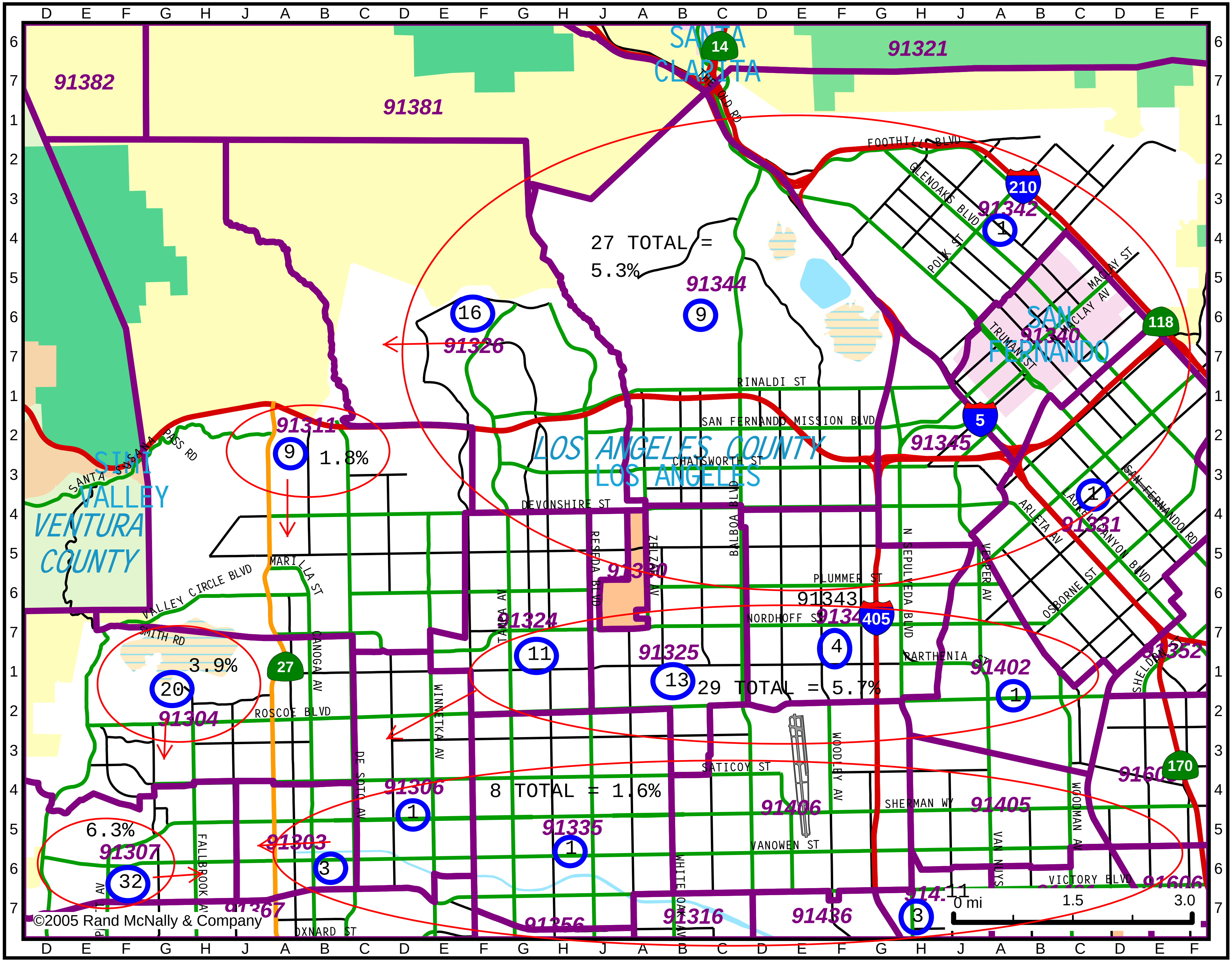

SIMI VALLEY
THOUSAND OAKS
VENTURA COUNTY
WESTLAKE VILLAGE
AGOURA HILLS
HIDDEN HILLS
LOS ANGELES
CALABASAS
LOS ANGELES COUNTY
MALIBU
91360
91362
91320
91377
91361
91301
91302
91304
91307
91303
91367
91364
90290
90265
90263
108 TOTAL =
21.3%
3
10
2
9
14
64
4
101
23
27
N1
N9
1
LYNN RD
E THOUSAND OAKS BLVD
N MOORPARK RD
POTRERO RD
KANAN RD
THOUSAND OAKS BLVD
N WESTLAKE BLVD
S WESTLAKE BLVD
LINDERO CANYON RD
TRIUNFO CANYON RD
MULHOLLAND HWY
MULHOLLAND DR
ROSCOE BLVD
SATICOY ST
SHERMAN WY
VANOWEN ST
VICTORY BLVD
DE SOTO AV
CANOGA AV
PLATT AV
FALLBROOK AV
VALLEY CIRCLE BLVD
VENTURA BLVD
CANYON RD
ENCINAL
CHUSA RD
0 mi
2.0
4.0
©2005 Rand McNally & Company



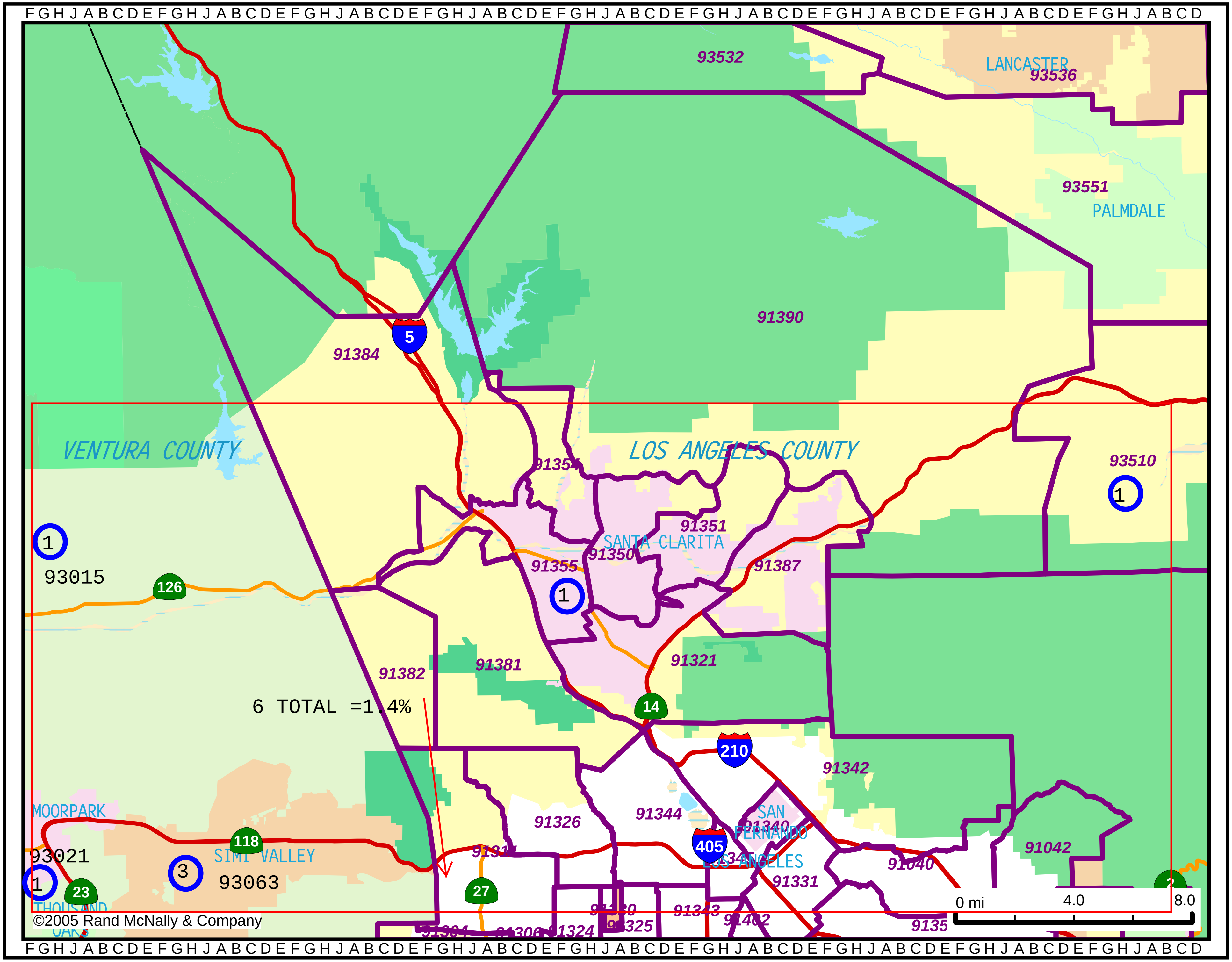

1 90250 - Hawthorne

92603


SAN FERNANDO
LOS ANGELES
BURBANK
GLENDALE
LA CANADA FLINTRIDGE
PASADENA
SOUTH PASADENA
SAN MARINO
BEVERLY HILLS
WEST HOLLYWOOD
LOS ANGELES COUNTY
91342
91340
91331
91040
91042
91352
91214
91020
91011
91001
91402
91605
91405
91504
91501
91208
91606
91401
91505
91506
91502
91201
91202
91207
91103
91104
91601
91607
91602
91522
91203
91206
91423
91604
91608
90068
90027
91205
91105
91107
90041
90210
90046
90039
90065
90042
91030
91775
90069
90028
90038
90029
0.5%
4 TOTAL =
0.8%
71 TOTAL =
14%
91766
BIG TUJUNGA CANYON RD
FOOTHILL BLVD
LA TUNA CANYON RD
VENTURA BLVD
BURBANK BLVD
MAGNOLIA BLVD
RIVERSIDE DR
COLORADO BLVD
LOS FELIZ BLVD
SUNSET BLVD
HOLLYWOOD BLVD
E CALIFORNIA BLVD
E ALTADENA DR
0 mi
2.0
4.0
©2005 Rand McNally & Company



91382
91381
SANTA CLARITA
91321
91342
91344
27 TOTAL = 5.3%
91326
91340
SAN FERNANDO
91311
1.8%
LOS ANGELES COUNTY
LOS ANGELES
SIMI VALLEY
VENTURA COUNTY
91345
91331
91343
91324
91325
91304
3.9%
29 TOTAL = 5.7%
91402
91306
8 TOTAL = 1.6%
91406
91405
91335
91303
91307
6.3%
91367
91356
91316
91436
91352
FOOTHILL BLVD
GLENOAKS BLVD
RINALDI ST
SAN FERNANDO MISSION BLVD
CHATSWORTH ST
DEVONSHIRE ST
PLUMMER ST
NORDHOFF ST
PARTHENIA ST
ROSCOE BLVD
SATICOY ST
SHERMAN WY
VANOWEN ST
VICTORY BLVD
OXNARD ST
RESEDA BLVD
BALBOA BLVD
N SEPULVEDA BLVD
WOODLEY AV
WINNETKA AV
DE SOTO AV
CANOGA AV
FALLBROOK AV
VALLEY CIRCLE BLVD
SMITH RD
0 mi 1.5 3.0
©2005 Rand McNally & Company



VENTURA COUNTY
LOS ANGELES COUNTY
LANCASTER
PALMDALE
SANTA CLARITA
MOORPARK
SIMI VALLEY
SAN FERNANDO
LOS ANGELES
93532
93536
93551
91390
91384
93510
91354
91351
91350
91355
91387
93015
1
6 TOTAL =1.4%
91382
91381
91321
91342
91326
91344
91340
91042
91040
91331
93021
3
93063
0 mi
4.0
8.0

# APPENDIX E

# QUEUE ANALYSIS

Overland Traffic Consultants, Inc.

Overland Traffic Consultants
27201 Tourney Road, # 206
Santa Clarita, CA 91355
Phone (661) 799 - 8423
Fax: (661) 799 – 8456
E-mail:liz@overlandtraffic.com
www.overlandtraffic.com

Drop-off/Pick-Up Queue Evaluation
New Community Jewish High School Campus – 22622 Vanowen Street

The objective of the queue analysis is to determine potential queues associated with thee school operation and development of a school arrival/pick-up program with sufficient capacity to serve the needs of the school and at the same time provide for a safe and efficient loading/unloading procedure.

The trips to the school are typically dispersed across a broader time range during the morning drop-off event than at the afternoon pick-up event at schools. The afternoon pick-up event attracts parents trying to "get in line first" in order to leave the queue as soon as possible upon release of the students from school. This effort can create lengthy queues during the pick up activities. A relief is provided when there are after school activities such as sports, arts and academic clubs.

A conservative rough estimate of the number of vehicles, based upon the April site plan, indicates that over 32 vehicles can queue while 4 are in the process of dropping off or picking up and up to six vehicles are exiting. The number of vehicles in each of the conditions can increase or decrease based upon size of the vehicles, spacing between them, how long it takes to exit onto Vanowen Street and how long it takes to conduct the dropping up or picking up.

There are several options available for our use to consider the queue lengths. These options include a "rule of thumb" by North Carolina Department of Transportation (DOT) and a General Purpose Queuing Model by New Alternatives, Inc. These options provide varying results and shown below.

OPTION 1 – Rule of Thumb

The State of North Carolina DOT indicates a rule of thumb of 6% of the student population for the AM Peak demand and 10% for the PM Peak demand. The trip generation for the site is the necessary input. Trip generation for 450 private school students and 100 nursery school students is 445 AM Peak Hour trips and 300 PM Peak Hour trips. The results of option 1 indicate a maximum queue length of the following:

AM Peak Hour: 445 * 6% = 27 vehicles
PM Peak Hour: 300 * 10% = 30 vehicles

Option 2 - General Purpose Queuing Model by New Alternatives

The queuing model requires inputs for the arrival rate (how many cars are arriving during a specific time period), the service rate (once a vehicle reaches the front of the queue, how long does it take for the student to get in or out and for the vehicle to exit), and the number of stations being serviced (how many cars are actively discharging or have a student entering a vehicle at one time). The model is limited in that the overall arrival rate cannot exceed the service rate with the number of stations. A 15 second and 20 second service rate per vehicle were considered with 2 vehicles being serviced at one time. The results are as follows:

15 seconds for student to get in or out :

Arrivals broken down into 110 vehicles every 15 minutes

Turnover of 2 vehicles every 20 seconds

Queue length - 12 vehicles

Three Minutes wait time in queue

20 seconds for student to get in our out:

Arrivals broken down into 88 vehicles every 15 minutes

Turnover of 2 vehicles every 20 seconds

Queue length - 16 vehicles

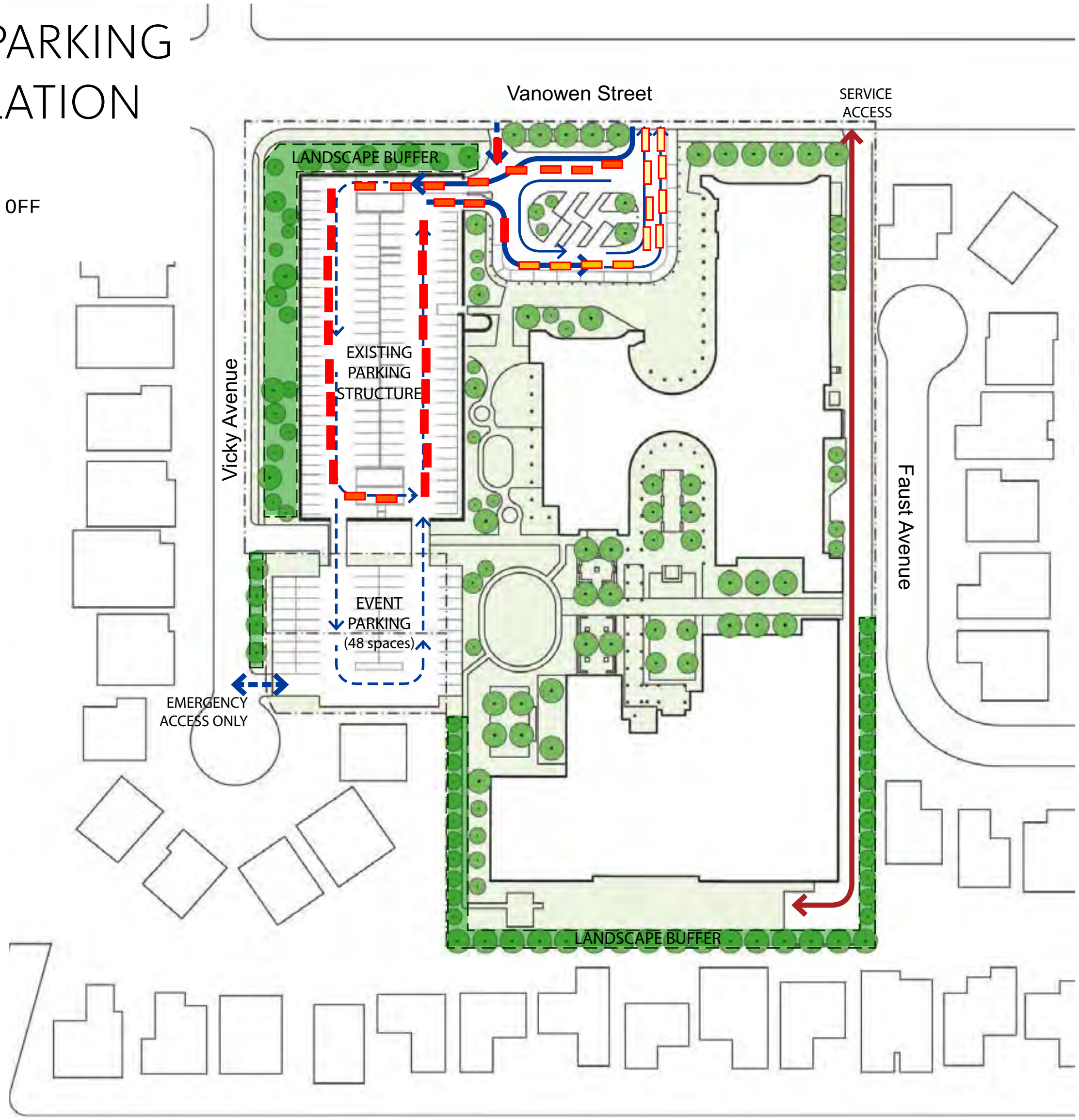
One and one-half Minutes wait time in queue

Worksheets for this queue analysis are attached.

Queues can be managed through Transportation Demand Management Programs

# PROPOSED PARKING AND CIRCULATION

QUEUE VEHICLES
VEHICLES DROPPING OFF
EXITING VEHICLES




EXISTING PARKING

| | | | |
|---|---|---|---|
| **Provided in existing parking structure** | | | **269** |
| Standard | 179 | 67% | |
| Compact | 74 | 28% | |
| HC | 16 | | |
| **Additional Parking at Driveway** | | | **6** |
| Curb | | 6 | |
| **Total Existing Parking** | | | **275** |

REQUIRED PARKING

| | *Program SF* | *Area Ratio space/sf* | *No of Spaces* |
|---|---|---|---|
| Preschool(1/class) | 6731 | 1/5 | 5 |
| JCC Offices | 3900 | 1/500 | 8 |
| Auditorium | 3712 | 1/35 | 106 |
| HS Admin | 7550 | 1/500 | 15 |
| **Total Required** | | | **134** |

PROVIDED PARKING

| | | | |
|---|---|---|---|
| **Provided in existing parking structure** | | | **269** |
| Standard | 179 | 67% | |
| Compact | 74 | 28% | |
| HC | 16 | | |
| **Additional Parking at Driveway** | | | **18** |
| Curb | 13 | | |
| HC at Drive | 5 | | |
| **Total Proposed Parking** | | | **287** |

* Parking provided in structure may increase due to increase percentage of compact spaces and restriping.

DRAFT

0' 25' 50' 100'

# GENERAL PURPOSE QUEUEING MODEL

## INPUTS

NCJHS - Vanowen
West Hills, Ca
Wednesday, April 6, 2011
Test 2 - 20 second service rate

PROBLEM TYPE 7
MULTIPLE-CHANNELS, SINGLE-PHASE
Poisson Arrivals, Exponential Service Times

Mean Arrival & Mean Service Rates are Cars per Peak 15 Minutes
Mean Arrival Rate = 85.
Mean Service Rate = 45.

Number of Servers (S) = 2

## OUTPUTS

### PROBABILITY STATISTICS

**Probability of Exactly N Units in the System for N <= S**

| Number of Units (N) | Percent |
|---|---|
| 0 | 2.857 |
| 1 | 5.397 |
| 2 | 5.097 |

**Probability of Exactly N Units in the System for N >= S**

| Number of Units (N) | Percent |
|---|---|
| 2 | 5.097 |
| 3 | 4.814 |
| 4 | 4.546 |
| 5 | 4.294 |
| 6 | 4.055 |
| 7 | 3.830 |
| 8 | 3.617 |
| 9 | 3.416 |
| 10 | 3.226 |
| 11 | 3.047 |
| 12 | 2.878 |

### UNIT STATISTICS (Cars)

| | |
|---|---|
| Mean Number of Units in the System = | 17.500 |
| Mean Number of Units in Queue = | 15.600 |

### TIME STATISTICS (Peak 15 Minutes)

| | |
|---|---|
| Mean Time in the System = | .210 |
| = 3.1 minutes | |
| Mean Wait Time = | .180 |
| = 2.7 minutes | |

**SERVICE FACILITY USE/IDLE STATISTICS**

| | |
|---|---|
| Use Percent = | 97.1% |
| Idle Percent = | 2.9% |

# GENERAL PURPOSE QUEUEING MODEL

## INPUTS

NCJHS - Vanowen
West Hills, Ca
Wednesday, April 6, 2011
Test 1 - 15 second service rate

PROBLEM TYPE 7
MULTIPLE-CHANNELS, SINGLE-PHASE
Poisson Arrivals, Exponential Service Times

Mean Arrival & Mean Service Rates are Cars per Peak 15 Minutes
Mean Arrival Rate = 110.
Mean Service Rate = 60.

Number of Servers (S) = 2

## OUTPUTS

### PROBABILITY STATISTICS

**Probability of Exactly N Units in the System for N <= S**

| Number of Units (N) | Percent |
|---|---|
| 0 | 4.348 |
| 1 | 7.971 |
| 2 | 7.307 |

**Probability of Exactly N Units in the System for N >= S**

| Number of Units (N) | Percent |
|---|---|
| 2 | 7.307 |
| 3 | 6.698 |
| 4 | 6.140 |
| 5 | 5.628 |
| 6 | 5.159 |
| 7 | 4.729 |
| 8 | 4.335 |
| 9 | 3.974 |
| 10 | 3.643 |
| 11 | 3.339 |
| 12 | 3.061 |

### UNIT STATISTICS (Cars)

| | |
|---|---|
| Mean Number of Units in the System = | 11.500 |
| Mean Number of Units in Queue = | 9.640 |

### TIME STATISTICS (Peak 15 Minutes)

| | |
|---|---|
| Mean Time in the System = | .100 |
| = 1.5 minutes | |
| Mean Wait Time = | .088 |
| = 1.3 minutes | |

**SERVICE FACILITY USE/IDLE STATISTICS**

| | |
|---|---|
| Use Percent = | 95.7% |
| Idle Percent = | 4.3% |

# APPENDIX F

# TRAFFIC VOLUME DATA

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Woodlake Ave

**East/West** Vanowen St

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 15 | 4 | 26 | 55 |
| **BIKES** | 0 | 0 | 1 | 0 |
| **BUSES** | 2 | 2 | 23 | 22 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 57 | 7.45 | 60 | 7.30 | 259 | 7.45 | 239 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 191 | 7.15 | 136 | 7.15 | 816 | 7.30 | 663 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach** / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | N-S | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 29 | 12 | 123 | 164 | *7-8* | 60 | 47 | 24 | 131 | 295 | 1 | 0 | 2 | 0 |
| *8-9* | 27 | 5 | 103 | 135 | *8-9* | 46 | 13 | 12 | 71 | 206 | 1 | 2 | 3 | 3 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 56 | 17 | 226 | 299 | TOTAL | 106 | 60 | 36 | 202 | 501 | 2 | 2 | 5 | 3 |

**EASTBOUND Approach** / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | E-W | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 17 | 562 | 48 | 627 | *7-8* | 103 | 451 | 12 | 566 | 1193 | 1 | 0 | 2 | 2 |
| *8-9* | 6 | 586 | 16 | 608 | *8-9* | 54 | 336 | 23 | 413 | 1021 | 3 | 0 | 5 | 2 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 23 | 1148 | 64 | 1235 | TOTAL | 157 | 787 | 35 | 979 | 2214 | 4 | 0 | 7 | 4 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_001 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Woodlake Ave | | | Woodlake Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 6 | 0 | 21 | 9 | 3 | 4 | 3 | 78 | 6 | 8 | 38 | 3 | 179 |
| 7:15 AM | 2 | 2 | 22 | 12 | 6 | 4 | 2 | 110 | 4 | 10 | 59 | 2 | 235 |
| 7:30 AM | 6 | 2 | 40 | 21 | 27 | 9 | 3 | 132 | 18 | 42 | 137 | 2 | 439 |
| 7:45 AM | 12 | 7 | 34 | 16 | 8 | 6 | 8 | 226 | 17 | 36 | 184 | 3 | 557 |
| 8:00 AM | 9 | 3 | 45 | 18 | 3 | 1 | 4 | 222 | 9 | 13 | 91 | 7 | 425 |
| 8:15 AM | 5 | 1 | 20 | 12 | 2 | 3 | 1 | 143 | 2 | 12 | 85 | 8 | 294 |
| 8:30 AM | 5 | 0 | 15 | 7 | 6 | 3 | 1 | 90 | 2 | 13 | 64 | 1 | 207 |
| 8:45 AM | 7 | 1 | 17 | 9 | 2 | 5 | 0 | 102 | 3 | 13 | 64 | 7 | 230 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 52 | 16 | 214 | 104 | 57 | 35 | 22 | 1103 | 61 | 147 | 722 | 33 | 2566 |
| **APPROACH %'s :** | 18.44% | 5.67% | 75.89% | 53.06% | 29.08% | 17.86% | 1.85% | 93.00% | 5.14% | 16.30% | 80.04% | 3.66% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 32 | 13 | 139 | 67 | 40 | 19 | 16 | 723 | 46 | 103 | 497 | 20 | 1715 |
| **PEAK HR FACTOR :** | 0.807 | | | 0.553 | | | 0.782 | | | 0.695 | | | 0.770 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_001 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Woodlake Ave | | | Woodlake Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | | | 0 | 1 | | | 0 | 1 | | | 2 | 1 | 5 |
| 7:15 AM | | | 0 | 0 | | | 1 | 3 | | | 2 | 0 | 6 |
| 7:30 AM | | | 0 | 1 | | | 0 | 2 | | | 6 | 0 | 9 |
| 7:45 AM | | | 2 | 0 | | | 0 | 4 | | | 3 | 0 | 9 |
| 8:00 AM | | | 0 | 0 | | | 0 | 7 | | | 3 | 0 | 10 |
| 8:15 AM | | | 0 | 0 | | | 0 | 2 | | | 2 | 0 | 4 |
| 8:30 AM | | | 0 | 0 | | | 0 | 0 | | | 2 | 0 | 2 |
| 8:45 AM | | | 0 | 0 | | | 0 | 3 | | | 1 | 0 | 4 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 22 | 0 | 0 | 21 | 1 | 49 |
| **APPROACH %'s :** | 0.00% | 0.00% | 100.00% | 100.00% | 0.00% | 0.00% | 4.35% | 95.65% | 0.00% | 0.00% | 95.45% | 4.55% | |

| **PEAK HR START TIME :** | 715 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 16 | 0 | 0 | 14 | 0 | 34 |
| **PEAK HR FACTOR :** | 0.250 | | | 0.250 | | | 0.607 | | | 0.583 | | | 0.850 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_001 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Woodlake Ave | | | Woodlake Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 2 | 0 | 1 | | 0 | 0 | | 1 | 0 | 0 | 5 | 0 | 9 |
| 7:15 AM | 0 | 0 | 1 | | 0 | 0 | | 1 | 1 | 2 | 3 | 1 | 9 |
| 7:30 AM | 1 | 1 | 0 | | 1 | 1 | | 1 | 1 | 1 | 3 | 0 | 10 |
| 7:45 AM | 0 | 0 | 2 | | 2 | 0 | | 3 | 1 | 4 | 9 | 0 | 21 |
| 8:00 AM | 0 | 0 | 0 | | 0 | 0 | | 3 | 0 | 2 | 4 | 0 | 9 |
| 8:15 AM | 0 | 0 | 1 | | 0 | 0 | | 7 | 0 | 0 | 6 | 0 | 14 |
| 8:30 AM | 0 | 0 | 3 | | 0 | 0 | | 3 | 0 | 0 | 7 | 0 | 13 |
| 8:45 AM | 1 | 0 | 2 | | 0 | 0 | | 4 | 0 | 1 | 7 | 0 | 15 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 4 | 1 | 10 | 0 | 3 | 1 | 0 | 23 | 3 | 10 | 44 | 1 | 100 |
| **APPROACH %'s :** | 26.67% | 6.67% | 66.67% | 0.00% | 75.00% | 25.00% | 0.00% | 88.46% | 11.54% | 18.18% | 80.00% | 1.82% | |

| **PEAK HR START TIME :** | 745 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 0 | 6 | 0 | 2 | 0 | 0 | 16 | 1 | 6 | 26 | 0 | 57 |
| **PEAK HR FACTOR :** | 0.500 | | | 0.250 | | | 0.607 | | | 0.615 | | | 0.679 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-001
N/S Street: Woodlake Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 8:30 AM | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| **TOTALS** | **3** | **2** | **1** | **1** | **2** | **5** | **1** | **3** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **3** | **0** | **2** | **2** | **2** | **0** | **0** |

**PREPARED BY NATIONAL DATA & SURVEYING SERVICES**

PROJECT#: 11-5049-001
N/S Street: Woodlake Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **1** | **0** | **0** | **0** | **0** | **0** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Fallbrook Ave

**East/West** Vanowen St

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 30 | 48 | 17 | 17 |
| **BIKES** | 3 | 8 | 3 | 7 |
| **BUSES** | 14 | 18 | 26 | 14 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 256 | 7.45 | 421 | 7.30 | 280 | 8.00 | 212 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 869 | 7.45 | 1440 | 7.15 | 946 | 7.30 | 653 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 50 | 556 | 63 | 669 |
| *8-9* | 44 | 671 | 103 | 818 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 94 | 1227 | 166 | 1487 |

**SOUTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 89 | 1057 | 144 | 1290 |
| *8-9* | 90 | 974 | 133 | 1197 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 179 | 2031 | 277 | 2487 |

| | **TOTAL** | **XING S/L** | | **XING N/L** | |
|---|---|---|---|---|---|
| Hours | N-S | Ped | Sch | Ped | Sch |
| *7-8* | 1959 | 6 | 3 | 6 | 1 |
| *8-9* | 2015 | 8 | 1 | 2 | 1 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 3974 | 14 | 4 | 8 | 2 |

**EASTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 148 | 524 | 80 | 752 |
| *8-9* | 142 | 558 | 94 | 794 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 290 | 1082 | 174 | 1546 |

**WESTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 110 | 427 | 48 | 585 |
| *8-9* | 132 | 324 | 59 | 515 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 242 | 751 | 107 | 1100 |

| | **TOTAL** | **XING W/L** | | **XING E/L** | |
|---|---|---|---|---|---|
| Hours | E-W | Ped | Sch | Ped | Sch |
| *7-8* | 1337 | 12 | 6 | 2 | 2 |
| *8-9* | 1309 | 17 | 7 | 8 | 2 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 2646 | 29 | 13 | 10 | 4 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_002 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 10 | 64 | 9 | 19 | 151 | 5 | 27 | 94 | 11 | 20 | 45 | 7 | 462 |
| 7:15 AM | 11 | 123 | 10 | 20 | 257 | 22 | 25 | 94 | 9 | 30 | 75 | 6 | 682 |
| 7:30 AM | 7 | 145 | 14 | 24 | 333 | 51 | 33 | 138 | 30 | 25 | 147 | 7 | 954 |
| 7:45 AM | 16 | 208 | 29 | 23 | 292 | 59 | 55 | 181 | 28 | 32 | 146 | 28 | 1097 |
| 8:00 AM | 13 | 204 | 23 | 33 | 257 | 34 | 50 | 186 | 38 | 29 | 67 | 15 | 949 |
| 8:15 AM | 11 | 141 | 22 | 21 | 233 | 27 | 31 | 131 | 16 | 32 | 85 | 22 | 772 |
| 8:30 AM | 9 | 148 | 27 | 13 | 227 | 35 | 34 | 111 | 21 | 30 | 78 | 9 | 742 |
| 8:45 AM | 9 | 161 | 29 | 16 | 241 | 28 | 24 | 118 | 18 | 38 | 84 | 12 | 778 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 86 | 1194 | 163 | 169 | 1991 | 261 | 279 | 1053 | 171 | 236 | 727 | 106 | 6436 |
| **APPROACH %'s :** | #NAME? | 82.74% | 11.30% | 6.98% | 82.24% | 10.78% | 18.56% | 70.06% | 11.38% | 22.08% | 68.01% | 9.92% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 47 | 698 | 88 | 101 | 1115 | 171 | 169 | 636 | 112 | 118 | 445 | 72 | 3772 |
| **PEAK HR FACTOR :** | | 0.823 | | | 0.850 | | | 0.837 | | | 0.771 | | 0.860 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_002 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Fallbrook Ave | | | Fallbrook Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 1 | 1 | | 0 | 2 | 1 | 1 | 2 | 0 | 0 | 1 | | 9 |
| 7:15 AM | 0 | 3 | | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | | 10 |
| 7:30 AM | 2 | 2 | | 0 | 3 | 2 | 1 | 3 | 1 | 0 | 3 | | 17 |
| 7:45 AM | 0 | 1 | | 0 | 1 | 1 | 0 | 7 | 0 | 0 | 2 | | 12 |
| 8:00 AM | 0 | 2 | | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 2 | | 9 |
| 8:15 AM | 0 | 1 | | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | | 4 |
| 8:30 AM | 0 | 1 | | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | | 4 |
| 8:45 AM | 0 | 0 | | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 2 | | 7 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 3 | 11 | 0 | 2 | 11 | 5 | 6 | 19 | 1 | 1 | 13 | 0 | 72 |
| **APPROACH %'s :** | 21.43% | 78.57% | 0.00% | 11.11% | 61.11% | 27.78% | 23.08% | 73.08% | 3.85% | 7.14% | 92.86% | 0.00% | |

| **PEAK HR START TIME :** | 715 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 2 | 8 | 0 | 1 | 7 | 3 | 4 | 13 | 1 | 0 | 9 | 0 | 48 |
| **PEAK HR FACTOR :** | 0.625 | | | 0.550 | | | 0.643 | | | 0.750 | | | 0.706 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_002 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 1 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 7:15 AM | 0 | 1 | 1 | 0 | 3 | 0 | 1 | 2 | 0 | 2 | 1 | 0 | 11 |
| 7:30 AM | 2 | 3 | 0 | 1 | 6 | 1 | 2 | 0 | 1 | 0 | 2 | 0 | 18 |
| 7:45 AM | 0 | 2 | 0 | 1 | 5 | 2 | 2 | 2 | 0 | 1 | 3 | 0 | 18 |
| 8:00 AM | 0 | 3 | 2 | 1 | 4 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 15 |
| 8:15 AM | 0 | 2 | 0 | 1 | 5 | 2 | 0 | 3 | 0 | 0 | 1 | 1 | 15 |
| 8:30 AM | 0 | 4 | 0 | 0 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 9 |
| 8:45 AM | 2 | 4 | 0 | 4 | 3 | 4 | 0 | 0 | 0 | 1 | 2 | 0 | 20 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 5 | 22 | 3 | 8 | 29 | 11 | 5 | 10 | 2 | 5 | 11 | 1 | 112 |
| **APPROACH %'s :** | 16.67% | 73.33% | 10.00% | 16.67% | 60.42% | 22.92% | 29.41% | 58.82% | 11.76% | 29.41% | 64.71% | 5.88% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 2 | 10 | 2 | 4 | 20 | 5 | 4 | 6 | 2 | 2 | 8 | 1 | 66 |
| **PEAK HR FACTOR :** | | 0.700 | | | 0.906 | | | 0.750 | | | 0.688 | | 0.917 |

**CONTROL :** Signalized

**PREPARED BY NATIONAL DATA & SURVEYING SERVICES**

PROJECT#: 11-5049-002
N/S Street: Fallbrook Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 2 |
| 7:30 AM | 0 | 1 | 2 | 0 | 1 | 0 | 3 | 3 |
| 7:45 AM | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 |
| 8:00 AM | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 |
| 8:15 AM | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 |
| 8:30 AM | 0 | 0 | 2 | 1 | 3 | 2 | 0 | 3 |
| 8:45 AM | 1 | 1 | 1 | 0 | 2 | 0 | 2 | 8 |
| **TOTALS** | **3** | **5** | **9** | **5** | **6** | **4** | **7** | **22** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 1 | 2 | 0 | 2 | 0 | 1 | 0 |
| 7:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 8:15 AM | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| **TOTALS** | **1** | **1** | **3** | **1** | **2** | **2** | **6** | **7** |

**PREPARED BY NATIONAL DATA & SURVEYING SERVICES**

PROJECT#: 11-5049-002
N/S Street: Fallbrook Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 8:00 AM | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 8:15 AM | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 1 |
| 8:30 AM | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| 8:45 AM | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 |
| **TOTALS** | **0** | **1** | **3** | **6** | **3** | **4** | **0** | **4** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Sale Ave

**East/West** Vanowen St

Day: Thursday    Date: February 17, 2011    Weather: SUNNY

Hours: 7-10AM 3-6PM    Chekrs: 0

School Day: YES    District: 0    I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 5 | 2 | 32 | 68 |
| **BIKES** | 0 | 0 | 3 | 2 |
| **BUSES** | 1 | 0 | 22 | 23 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 40 | 8.00 | 11 | 7.15 | 268 | 8.00 | 270 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 119 | 7.45 | 40 | 7.15 | 870 | 7.30 | 816 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 8 | 2 | 59 | 69 |
| *8-9* | 16 | 2 | 89 | 107 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 24 | 4 | 148 | 176 |

**SOUTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 5 | 0 | 32 | 37 |
| *8-9* | 9 | 2 | 16 | 27 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 14 | 2 | 48 | 64 |

| | **TOTAL** | **XING S/L** | | **XING N/L** | |
|---|---|---|---|---|---|
| Hours | N-S | Ped | Sch | Ped | Sch |
| *7-8* | 106 | 3 | 0 | 4 | 0 |
| *8-9* | 134 | 5 | 0 | 2 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 240 | 8 | 0 | 6 | 0 |

**EASTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 10 | 641 | 6 | 657 |
| *8-9* | 12 | 706 | 15 | 733 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 22 | 1347 | 21 | 1390 |

**WESTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 60 | 574 | 5 | 639 |
| *8-9* | 68 | 542 | 6 | 616 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 128 | 1116 | 11 | 1255 |

| | **TOTAL** | **XING W/L** | | **XING E/L** | |
|---|---|---|---|---|---|
| Hours | E-W | Ped | Sch | Ped | Sch |
| *7-8* | 1296 | 0 | 0 | 0 | 0 |
| *8-9* | 1349 | 1 | 0 | 0 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 2645 | 1 | 0 | 0 | 0 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_003 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Sale Ave | | | Sale Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 1 | 0 | 15 | 2 | 0 | 5 | 1 | 100 | 0 | 4 | 62 | 0 | 190 |
| 7:15 AM | 0 | 1 | 11 | 1 | 0 | 10 | 2 | 130 | 1 | 2 | 89 | 1 | 248 |
| 7:30 AM | 1 | 0 | 7 | 0 | 0 | 9 | 4 | 169 | 3 | 13 | 166 | 3 | 375 |
| 7:45 AM | 5 | 0 | 24 | 2 | 0 | 8 | 3 | 216 | 2 | 33 | 221 | 1 | 515 |
| 8:00 AM | 8 | 2 | 30 | 1 | 1 | 7 | 5 | 249 | 7 | 40 | 139 | 2 | 491 |
| 8:15 AM | 1 | 0 | 30 | 3 | 0 | 3 | 4 | 173 | 4 | 12 | 132 | 2 | 364 |
| 8:30 AM | 1 | 0 | 16 | 3 | 0 | 4 | 1 | 125 | 2 | 7 | 102 | 1 | 262 |
| 8:45 AM | 5 | 0 | 12 | 1 | 0 | 2 | 1 | 133 | 1 | 5 | 126 | 1 | 287 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 22 | 3 | 145 | 13 | 1 | 48 | 21 | 1295 | 20 | 116 | 1037 | 11 | 2732 |
| **APPROACH %'s :** | 12.94% | 1.76% | 85.29% | 20.97% | 1.61% | 77.42% | 1.57% | 96.93% | 1.50% | 9.97% | 89.09% | 0.95% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 15 | 2 | 91 | 6 | 1 | 27 | 16 | 807 | 16 | 98 | 658 | 8 | 1745 |
| **PEAK HR FACTOR :** | 0.675 | | | 0.850 | | | 0.804 | | | 0.749 | | | 0.847 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_003 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| **NS/EW Streets:** | Sale Ave | | | Sale Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 0 | | | | | | | 2 | | 2 | 2 | | 6 |
| 7:15 AM | 0 | | | | | | | 3 | | 0 | 2 | | 5 |
| 7:30 AM | 0 | | | | | | | 2 | | 0 | 3 | | 5 |
| 7:45 AM | 0 | | | | | | | 6 | | 1 | 2 | | 9 |
| 8:00 AM | 0 | | | | | | | 4 | | 2 | 4 | | 10 |
| 8:15 AM | 1 | | | | | | | 2 | | 1 | 0 | | 4 |
| 8:30 AM | 0 | | | | | | | 0 | | 0 | 2 | | 2 |
| 8:45 AM | 0 | | | | | | | 3 | | 1 | 1 | | 5 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 7 | 16 | 0 | 46 |
| **APPROACH %'s :** | 100.00% | 0.00% | 0.00% | | | | 0.00% | 100.00% | 0.00% | 30.43% | 69.57% | 0.00% | |

| **PEAK HR START TIME :** | 715 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 3 | 11 | 0 | 29 |
| **PEAK HR FACTOR :** | 0.000 | | | 0.000 | | | 0.625 | | | 0.583 | | | 0.725 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_003 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Sale Ave | | | Sale Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 0 | 3 | | 5 |
| 7:15 AM | 1 | 1 | 0 | 0 | 0 | | 0 | 2 | 0 | 1 | 7 | | 12 |
| 7:30 AM | 0 | 0 | 2 | 0 | 0 | | 0 | 5 | 0 | 2 | 7 | | 16 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | | 0 | 4 | 0 | 2 | 10 | | 16 |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | | 0 | 3 | 0 | 0 | 9 | | 13 |
| 8:15 AM | 0 | 0 | 1 | 0 | 0 | | 1 | 4 | 0 | 0 | 9 | | 15 |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | | 0 | 3 | 0 | 0 | 8 | | 12 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | | 0 | 7 | 1 | 0 | 10 | | 18 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 1 | 1 | 3 | 1 | 1 | 0 | 1 | 30 | 1 | 5 | 63 | 0 | 107 |
| **APPROACH %'s :** | 20.00% | 20.00% | 60.00% | 50.00% | 50.00% | 0.00% | 3.13% | 93.75% | 3.13% | 7.35% | 92.65% | 0.00% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 0 | 3 | 0 | 1 | 0 | 1 | 16 | 0 | 4 | 35 | 0 | 60 |
| **PEAK HR FACTOR :** | 0.375 | | | 0.250 | | | 0.850 | | | 0.813 | | | 0.938 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-003
N/S Street: Sale Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 |
| **TOTALS** | **1** | **5** | **3** | **5** | **0** | **0** | **1** | **0** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-003
N/S Street: Sale Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **2** | **3** | **0** | **0** | **0** | **0** | **0** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Shoup Ave

**East/West** Vanowen St

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 19 | 40 | 50 | 60 |
| **BIKES** | 1 | 3 | 2 | 2 |
| **BUSES** | 3 | 4 | 27 | 21 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 253 | 7.45 | 413 | 7.45 | 282 | 8.00 | 216 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 906 | 7.30 | 1308 | 7.15 | 946 | 7.30 | 721 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach** / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | N-S | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 40 | 642 | 48 | 730 | *7-8* | 83 | 985 | 153 | 1221 | 1951 | 1 | 2 | 2 | 0 |
| *8-9* | 77 | 630 | 50 | 757 | *8-9* | 62 | 822 | 88 | 972 | 1729 | 1 | 0 | 0 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 117 | 1272 | 98 | 1487 | TOTAL | 145 | 1807 | 241 | 2193 | 3680 | 2 | 2 | 2 | 0 |

**EASTBOUND Approach** / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | E-W | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 104 | 511 | 108 | 723 | *7-8* | 77 | 455 | 55 | 587 | 1310 | 1 | 0 | 0 | 0 |
| *8-9* | 116 | 578 | 104 | 798 | *8-9* | 84 | 446 | 54 | 584 | 1382 | 1 | 0 | 0 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 220 | 1089 | 212 | 1521 | TOTAL | 161 | 901 | 109 | 1171 | 2692 | 2 | 0 | 0 | 0 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_004 | **Day:** THURSDAY

**City:** City of West Hills | **Date:** 2/17/2011

AM

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 7 | 80 | 11 | 24 | 164 | 13 | 18 | 84 | 15 | 11 | 46 | 9 | 482 |
| 7:15 AM | 7 | 134 | 5 | 15 | 206 | 17 | 21 | 96 | 27 | 10 | 83 | 8 | 629 |
| 7:30 AM | 8 | 206 | 9 | 22 | 284 | 48 | 29 | 123 | 25 | 27 | 131 | 17 | 929 |
| 7:45 AM | 18 | 209 | 21 | 21 | 312 | 73 | 34 | 176 | 40 | 27 | 156 | 16 | 1103 |
| 8:00 AM | 28 | 183 | 18 | 18 | 235 | 30 | 42 | 185 | 37 | 19 | 128 | 13 | 936 |
| 8:15 AM | 17 | 163 | 14 | 18 | 189 | 21 | 30 | 147 | 25 | 22 | 101 | 20 | 767 |
| 8:30 AM | 11 | 136 | 11 | 12 | 203 | 19 | 18 | 112 | 16 | 26 | 86 | 8 | 658 |
| 8:45 AM | 20 | 144 | 5 | 12 | 179 | 14 | 24 | 97 | 23 | 16 | 97 | 13 | 644 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 116 | 1255 | 94 | 142 | 1772 | 235 | 216 | 1020 | 208 | 158 | 828 | 104 | 6148 |
| **APPROACH %'s :** | 7.92% | 85.67% | 6.42% | 6.61% | 82.46% | 10.94% | 14.96% | 70.64% | 14.40% | 14.50% | 75.96% | 9.54% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 71 | 761 | 62 | 79 | 1020 | 172 | 135 | 631 | 127 | 95 | 516 | 66 | 3735 |
| **PEAK HR FACTOR :** | | 0.901 | | | 0.783 | | | 0.846 | | | 0.851 | | 0.847 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_004 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | | 0 | 0 | 0 | 0 | 0 | | 2 | 0 | | 3 | 0 | 5 |
| 7:15 AM | | 0 | 0 | 0 | 0 | 0 | | 3 | 0 | | 2 | 1 | 6 |
| 7:30 AM | | 1 | 0 | 0 | 0 | 0 | | 3 | 0 | | 2 | 0 | 6 |
| 7:45 AM | | 0 | 1 | 0 | 1 | 0 | | 5 | 0 | | 5 | 0 | 12 |
| 8:00 AM | | 0 | 0 | 1 | 1 | 1 | | 6 | 0 | | 3 | 0 | 12 |
| 8:15 AM | | 1 | 0 | 0 | 0 | 0 | | 5 | 0 | | 2 | 0 | 8 |
| 8:30 AM | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 1 | 0 | 1 |
| 8:45 AM | | 0 | 0 | 0 | 0 | 0 | | 2 | 1 | | 2 | 0 | 5 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 2 | 1 | 1 | 2 | 1 | 0 | 26 | 1 | 0 | 20 | 1 | 55 |
| **APPROACH %'s :** | 0.00% | 66.67% | 33.33% | 25.00% | 50.00% | 25.00% | 0.00% | 96.30% | 3.70% | 0.00% | 95.24% | 4.76% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 2 | 1 | 1 | 2 | 1 | 0 | 19 | 0 | 0 | 12 | 0 | 38 |
| **PEAK HR FACTOR :** | | 0.750 | | | 0.333 | | | 0.792 | | | 0.600 | | 0.792 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_004 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 0 | 1 | 4 | 1 | 12 |
| 7:15 AM | 0 | 5 | 0 | 0 | 6 | 0 | 1 | 4 | 0 | 0 | 8 | 1 | 25 |
| 7:30 AM | 0 | 4 | 0 | 0 | 5 | 0 | 0 | 6 | 1 | 0 | 5 | 1 | 22 |
| 7:45 AM | 0 | 3 | 1 | 1 | 3 | 2 | 1 | 7 | 0 | 1 | 10 | 1 | 30 |
| 8:00 AM | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 12 | 0 | 1 | 6 | 0 | 25 |
| 8:15 AM | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 19 |
| 8:30 AM | 0 | 0 | 2 | 0 | 3 | 0 | 1 | 1 | 1 | 0 | 6 | 0 | 14 |
| 8:45 AM | 1 | 2 | 0 | 0 | 4 | 2 | 1 | 4 | 1 | 0 | 7 | 0 | 22 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 1 | 15 | 3 | 2 | 33 | 5 | 4 | 43 | 3 | 3 | 53 | 4 | 169 |
| **APPROACH %'s :** | 5.26% | 78.95% | 15.79% | 5.00% | 82.50% | 12.50% | 8.00% | 86.00% | 6.00% | 5.00% | 88.33% | 6.67% | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR START TIME :** | 715 AM | | | | | | | | | | | | TOTAL |
| **PEAK HR VOL :** | 0 | 12 | 1 | 2 | 18 | 3 | 2 | 29 | 1 | 2 | 29 | 3 | 102 |
| **PEAK HR FACTOR :** | 0.650 | | | 0.958 | | | 0.667 | | | 0.708 | | | 0.850 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-004
N/S Street: Shoup Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **1** | **1** | **1** | **1** | **0** | **0** | **2** | **0** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **2** | **0** | **0** | **0** | **0** |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-004
N/S Street: Shoup Ave
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 7:15 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **1** | **2** | **1** | **1** | **2** | **0** | **1** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Topanga Canyon Blvd

**East/West** Vanowen St

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 71 | 162 | 35 | 66 |
| **BIKES** | 1 | 2 | 1 | 0 |
| **BUSES** | 54 | 14 | 28 | 41 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 306 | 7.45 | 514 | 7.45 | 292 | 8.00 | 261 | 7.30 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 1123 | 7.30 | 1808 | 7.30 | 916 | 7.30 | 857 | 7.15 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach** / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | N-S | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 40 | 906 | 82 | 1028 | *7-8* | 93 | 1557 | 69 | 1719 | 2747 | 3 | 2 | 13 | 94 |
| *8-9* | 42 | 958 | 96 | 1096 | *8-9* | 106 | 1538 | 80 | 1724 | 2820 | 5 | 0 | 10 | 3 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 82 | 1864 | 178 | 2124 | TOTAL | 199 | 3095 | 149 | 3443 | 5567 | 8 | 2 | 23 | 97 |

**EASTBOUND Approach** / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | E-W | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 58 | 568 | 85 | 711 | *7-8* | 101 | 458 | 225 | 784 | 1495 | 5 | 5 | 20 | 43 |
| *8-9* | 73 | 644 | 101 | 818 | *8-9* | 83 | 487 | 80 | 650 | 1468 | 5 | 0 | 22 | 1 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 131 | 1212 | 186 | 1529 | TOTAL | 184 | 945 | 305 | 1434 | 2963 | 10 | 5 | 42 | 44 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_005 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Topanga Canyon Blvd | | | Topanga Canyon Blvd | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 2 | 149 | 16 | 15 | 318 | 11 | 15 | 97 | 18 | 11 | 64 | 23 | 739 |
| 7:15 AM | 8 | 210 | 21 | 18 | 378 | 11 | 10 | 117 | 15 | 20 | 86 | 39 | 933 |
| 7:30 AM | 18 | 237 | 23 | 25 | 355 | 16 | 18 | 168 | 28 | 30 | 134 | 85 | 1137 |
| 7:45 AM | 7 | 263 | 18 | 33 | 427 | 26 | 8 | 168 | 22 | 29 | 144 | 64 | 1209 |
| 8:00 AM | 12 | 178 | 24 | 31 | 378 | 22 | 21 | 225 | 33 | 19 | 136 | 17 | 1096 |
| 8:15 AM | 11 | 252 | 16 | 23 | 364 | 22 | 8 | 158 | 20 | 11 | 114 | 18 | 1017 |
| 8:30 AM | 10 | 223 | 29 | 22 | 325 | 16 | 17 | 136 | 21 | 21 | 104 | 25 | 949 |
| 8:45 AM | 8 | 240 | 24 | 28 | 385 | 18 | 13 | 104 | 26 | 20 | 97 | 16 | 979 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 76 | 1752 | 171 | 195 | 2930 | 142 | 110 | 1173 | 183 | 161 | 879 | 287 | 8059 |
| **APPROACH %'s :** | 3.80% | 87.64% | 8.55% | 5.97% | 89.68% | 4.35% | 7.50% | 80.01% | 12.48% | 12.13% | 66.24% | 21.63% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 48 | 930 | 81 | 112 | 1524 | 86 | 55 | 719 | 103 | 89 | 528 | 184 | 4459 |
| **PEAK HR FACTOR :** | | 0.919 | | | 0.886 | | | 0.786 | | | 0.804 | | 0.922 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_005 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Topanga Canyon Blvd | | | Topanga Canyon Blvd | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | | 3 | 1 | 2 | 1 | | 0 | 3 | | 1 | 3 | 0 | 14 |
| 7:15 AM | | 5 | 0 | 0 | 2 | | 1 | 2 | | 0 | 4 | 2 | 16 |
| 7:30 AM | | 5 | 0 | 0 | 3 | | 0 | 1 | | 0 | 1 | 5 | 15 |
| 7:45 AM | | 6 | 0 | 0 | 0 | | 5 | 2 | | 2 | 5 | 1 | 21 |
| 8:00 AM | | 10 | 0 | 0 | 1 | | 6 | 2 | | 2 | 4 | 0 | 25 |
| 8:15 AM | | 10 | 0 | 0 | 3 | | 3 | 1 | | 3 | 2 | 2 | 24 |
| 8:30 AM | | 10 | 0 | 0 | 0 | | 0 | 0 | | 0 | 1 | 1 | 12 |
| 8:45 AM | | 4 | 0 | 0 | 2 | | 1 | 1 | | 0 | 2 | 0 | 10 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 53 | 1 | 2 | 12 | 0 | 16 | 12 | 0 | 8 | 22 | 11 | 137 |
| **APPROACH %'s :** | 0.00% | 98.15% | 1.85% | 14.29% | 85.71% | 0.00% | 57.14% | 42.86% | 0.00% | 19.51% | 53.66% | 26.83% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 31 | 0 | 0 | 7 | 0 | 14 | 6 | 0 | 7 | 12 | 8 | 85 |
| **PEAK HR FACTOR :** | | 0.775 | | | 0.583 | | | 0.625 | | | 0.844 | | 0.850 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_005 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Topanga Canyon Blvd | | | Topanga Canyon Blvd | | | Vanowen St | | | Vanowen St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 2 | 4 | 0 | 0 | 18 | 1 | 0 | 0 | 0 | 2 | 4 | 6 | 37 |
| 7:15 AM | 1 | 9 | 0 | 0 | 21 | 1 | 0 | 2 | 0 | 1 | 5 | 0 | 40 |
| 7:30 AM | 0 | 6 | 2 | 0 | 8 | 1 | 0 | 5 | 1 | 2 | 4 | 0 | 29 |
| 7:45 AM | 2 | 9 | 1 | 0 | 26 | 2 | 1 | 3 | 1 | 3 | 4 | 0 | 52 |
| 8:00 AM | 0 | 7 | 1 | 1 | 18 | 1 | 1 | 4 | 0 | 2 | 7 | 0 | 42 |
| 8:15 AM | 0 | 5 | 0 | 0 | 22 | 0 | 0 | 3 | 0 | 1 | 5 | 0 | 36 |
| 8:30 AM | 0 | 9 | 2 | 1 | 16 | 1 | 2 | 6 | 1 | 2 | 5 | 1 | 46 |
| 8:45 AM | 1 | 10 | 0 | 0 | 24 | 0 | 1 | 4 | 0 | 2 | 10 | 0 | 52 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 6 | 59 | 6 | 2 | 153 | 7 | 5 | 27 | 3 | 15 | 44 | 7 | 334 |
| **APPROACH %'s :** | 8.45% | 83.10% | 8.45% | 1.23% | 94.44% | 4.32% | 14.29% | 77.14% | 8.57% | 22.73% | 66.67% | 10.61% | |

| **PEAK HR START TIME :** | 800 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 1 | 31 | 3 | 2 | 80 | 2 | 4 | 17 | 1 | 7 | 27 | 1 | 176 |
| **PEAK HR FACTOR :** | | 0.795 | | | 0.875 | | | 0.611 | | | 0.729 | | 0.846 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-005
N/S Street: Topanga Canyon Blvd
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 2 | 1 | 2 | 0 | 5 | 0 | 1 | 1 |
| 7:15 AM | 0 | 2 | 1 | 0 | 1 | 3 | 1 | 0 |
| 7:30 AM | 1 | 2 | 0 | 0 | 4 | 1 | 0 | 0 |
| 7:45 AM | 2 | 3 | 0 | 0 | 5 | 1 | 0 | 2 |
| 8:00 AM | 1 | 1 | 1 | 0 | 6 | 2 | 0 | 2 |
| 8:15 AM | 2 | 3 | 1 | 0 | 5 | 2 | 1 | 1 |
| 8:30 AM | 2 | 0 | 0 | 1 | 3 | 0 | 0 | 0 |
| 8:45 AM | 1 | 0 | 0 | 2 | 1 | 3 | 1 | 0 |
| **TOTALS** | **11** | **12** | **5** | **3** | **30** | **12** | **4** | **6** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 3 | 3 | 0 | 1 | 1 | 1 | 0 | 0 |
| 7:15 AM | 21 | 13 | 1 | 0 | 1 | 0 | 0 | 0 |
| 7:30 AM | 32 | 14 | 0 | 0 | 29 | 2 | 5 | 0 |
| 7:45 AM | 6 | 2 | 0 | 0 | 9 | 0 | 0 | 0 |
| 8:00 AM | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **64** | **33** | **1** | **1** | **41** | **3** | **5** | **0** |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-005
N/S Street: Topanga Canyon Blvd
E/W Street: Vanowen St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **1** | **0** | **1** | **1** | **0** | **1** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Fallbrook Ave

**East/West** Criswell St

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 41 | 101 | 0 | 4 |
| **BIKES** | 0 | 10 | 0 | 0 |
| **BUSES** | 13 | 13 | 0 | 2 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 279 | 8.00 | 442 | 7.45 | 10 | 8.45 | 30 | 8.15 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 996 | 7.30 | 1541 | 7.30 | 30 | 8.00 | 83 | 7.45 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach** / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | N-S | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 10 | 789 | 8 | 807 | *7-8* | 20 | 1361 | 8 | 1389 | 2196 | 1 | 1 | 0 | 2 |
| *8-9* | 29 | 832 | 16 | 877 | *8-9* | 25 | 1206 | 21 | 1252 | 2129 | 4 | 3 | 0 | 1 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 39 | 1621 | 24 | 1684 | TOTAL | 45 | 2567 | 29 | 2641 | 4325 | 5 | 4 | 0 | 3 |

**EASTBOUND Approach** / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | E-W | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 7 | 1 | 2 | 10 | *7-8* | 16 | 2 | 25 | 43 | 53 | 6 | 0 | 2 | 1 |
| *8-9* | 16 | 3 | 11 | 30 | *8-9* | 22 | 7 | 49 | 78 | 108 | 13 | 2 | 2 | 3 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 23 | 4 | 13 | 40 | TOTAL | 38 | 9 | 74 | 121 | 161 | 19 | 2 | 4 | 4 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_006 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Fallbrook Ave | | | Fallbrook Ave | | | Criswell St | | | Criswell St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | |
| 7:00 AM | 1 | 131 | 0 | 1 | 207 | 3 | 2 | 0 | 1 | 1 | 0 | 2 | 349 |
| 7:15 AM | 2 | 162 | 1 | 3 | 294 | 2 | 2 | 1 | 0 | 2 | 1 | 4 | 474 |
| 7:30 AM | 2 | 224 | 3 | 4 | 394 | 2 | 1 | 0 | 1 | 6 | 0 | 7 | 644 |
| 7:45 AM | 5 | 242 | 4 | 10 | 419 | 1 | 2 | 0 | 0 | 6 | 1 | 8 | 698 |
| 8:00 AM | 4 | 262 | 8 | 15 | 334 | 3 | 4 | 0 | 2 | 0 | 3 | 17 | 652 |
| 8:15 AM | 5 | 206 | 3 | 4 | 293 | 4 | 3 | 0 | 3 | 12 | 3 | 15 | 551 |
| 8:30 AM | 10 | 160 | 3 | 3 | 265 | 3 | 6 | 1 | 1 | 7 | 0 | 10 | 469 |
| 8:45 AM | 10 | 180 | 2 | 1 | 251 | 11 | 3 | 2 | 5 | 3 | 1 | 6 | 475 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 39 | 1567 | 24 | 41 | 2457 | 29 | 23 | 4 | 13 | 37 | 9 | 69 | 4312 |
| **APPROACH %'s :** | 2.39% | 96.13% | 1.47% | 1.62% | 97.23% | 1.15% | 57.50% | 10.00% | 32.50% | 32.17% | 7.83% | 60.00% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 16 | 934 | 18 | 33 | 1440 | 10 | 10 | 0 | 6 | 24 | 7 | 47 | 2545 |
| **PEAK HR FACTOR :** | | 0.883 | | | 0.862 | | | 0.667 | | | 0.650 | | 0.912 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_006 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Criswell St | | | Criswell St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | |
| 7:00 AM | | 1 | | 1 | 2 | | | | | 1 | | 1 | 6 |
| 7:15 AM | | 2 | | 0 | 2 | | | | | 0 | | 0 | 4 |
| 7:30 AM | | 5 | | 0 | 2 | | | | | 0 | | 0 | 7 |
| 7:45 AM | | 1 | | 0 | 2 | | | | | 0 | | 0 | 3 |
| 8:00 AM | | 2 | | 0 | 0 | | | | | 0 | | 0 | 2 |
| 8:15 AM | | 0 | | 0 | 1 | | | | | 0 | | 0 | 1 |
| 8:30 AM | | 1 | | 0 | 3 | | | | | 0 | | 0 | 4 |
| 8:45 AM | | 1 | | 0 | 0 | | | | | 0 | | 0 | 1 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 13 | 0 | 1 | 12 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 28 |
| **APPROACH %'s :** | 0.00% | 100.00% | 0.00% | 7.69% | 92.31% | 0.00% | | | | 50.00% | 0.00% | 50.00% | |

| **PEAK HR START TIME :** | 700 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 9 | 0 | 1 | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 20 |
| **PEAK HR FACTOR :** | 0.450 | | | 0.750 | | | 0.000 | | | 0.250 | | | 0.714 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_006 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Criswell St | | | Criswell St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | |
| 7:00 AM | | 3 | | 1 | 10 | | | | | | | 1 | 15 |
| 7:15 AM | | 5 | | 0 | 10 | | | | | | | 0 | 15 |
| 7:30 AM | | 9 | | 0 | 9 | | | | | | | 1 | 19 |
| 7:45 AM | | 4 | | 0 | 10 | | | | | | | 1 | 15 |
| 8:00 AM | | 3 | | 0 | 20 | | | | | | | 0 | 23 |
| 8:15 AM | | 4 | | 1 | 13 | | | | | | | 0 | 18 |
| 8:30 AM | | 7 | | 1 | 9 | | | | | | | 0 | 17 |
| 8:45 AM | | 6 | | 0 | 17 | | | | | | | 1 | 24 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 41 | 0 | 3 | 98 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 146 |
| **APPROACH %'s :** | 0.00% | 100.00% | 0.00% | 2.97% | 97.03% | 0.00% | | | | 0.00% | 0.00% | 100.00% | |

| **PEAK HR START TIME :** | 800 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 20 | 0 | 2 | 59 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 82 |
| **PEAK HR FACTOR :** | | 0.714 | | | 0.763 | | | 0.000 | | | 0.250 | | 0.854 |

**CONTROL :** Signalized

**PREPARED BY NATIONAL DATA & SURVEYING SERVICES**

PROJECT#: 11-5049-006
N/S Street: Fallbrook Ave
E/W Street: Criswell St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 8:00 AM | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 1 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 2 |
| 8:45 AM | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| **TOTALS** | **0** | **0** | **0** | **5** | **2** | **2** | **11** | **8** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 |
| 8:15 AM | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **1** | **2** | **1** | **3** | **0** | **4** | **1** | **1** |

**PREPARED BY NATIONAL DATA & SURVEYING SERVICES**

PROJECT#: 11-5049-006
N/S Street: Fallbrook Ave
E/W Street: Criswell St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| **TOTALS** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **8** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Fallbrook Ave

**East/West** Victory Blvd

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 30 | 39 | 45 | 37 |
| **BIKES** | 1 | 4 | 2 | 1 |
| **BUSES** | 14 | 13 | 17 | 13 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 339 | 7.45 | 413 | 7.30 | 425 | 7.45 | 229 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 1237 | 7.30 | 1406 | 7.30 | 1385 | 7.30 | 731 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 148 | 735 | 104 | 987 |
| *8-9* | 191 | 749 | 122 | 1062 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 339 | 1484 | 226 | 2049 |

**SOUTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 85 | 1048 | 119 | 1252 |
| *8-9* | 125 | 929 | 111 | 1165 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 210 | 1977 | 230 | 2417 |

| | **TOTAL** | **XING S/L** | | **XING N/L** | |
|---|---|---|---|---|---|
| Hours | N-S | Ped | Sch | Ped | Sch |
| *7-8* | 2239 | 5 | 2 | 8 | 1 |
| *8-9* | 2227 | 2 | 0 | 7 | 6 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 4466 | 7 | 2 | 15 | 7 |

**EASTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 73 | 770 | 212 | 1055 |
| *8-9* | 88 | 837 | 251 | 1176 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 161 | 1607 | 463 | 2231 |

**WESTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 83 | 489 | 49 | 621 |
| *8-9* | 105 | 486 | 85 | 676 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 188 | 975 | 134 | 1297 |

| | **TOTAL** | **XING W/L** | | **XING E/L** | |
|---|---|---|---|---|---|
| Hours | E-W | Ped | Sch | Ped | Sch |
| *7-8* | 1676 | 5 | 3 | 7 | 0 |
| *8-9* | 1852 | 7 | 4 | 3 | 4 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 3528 | 12 | 7 | 10 | 4 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_007 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Victory Blvd | | | Victory Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | |
| 7:00 AM | 21 | 119 | 16 | 13 | 171 | 18 | 5 | 101 | 31 | 18 | 55 | 11 | 579 |
| 7:15 AM | 19 | 145 | 14 | 23 | 209 | 23 | 19 | 148 | 29 | 13 | 88 | 10 | 740 |
| 7:30 AM | 46 | 217 | 33 | 29 | 340 | 39 | 20 | 200 | 57 | 26 | 147 | 10 | 1164 |
| 7:45 AM | 56 | 237 | 41 | 18 | 312 | 38 | 27 | 302 | 84 | 23 | 182 | 18 | 1338 |
| 8:00 AM | 51 | 240 | 43 | 29 | 275 | 26 | 30 | 291 | 66 | 22 | 105 | 16 | 1194 |
| 8:15 AM | 45 | 180 | 26 | 26 | 214 | 29 | 17 | 194 | 62 | 24 | 111 | 19 | 947 |
| 8:30 AM | 42 | 154 | 20 | 39 | 220 | 17 | 17 | 133 | 62 | 26 | 107 | 15 | 852 |
| 8:45 AM | 49 | 162 | 29 | 29 | 195 | 33 | 22 | 193 | 59 | 24 | 144 | 33 | 972 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 329 | 1454 | 222 | 206 | 1936 | 223 | 157 | 1562 | 450 | 176 | 939 | 132 | 7786 |
| **APPROACH %'s :** | 16.41% | 72.52% | 11.07% | 8.71% | 81.86% | 9.43% | 7.24% | 72.01% | 20.75% | 14.11% | 75.30% | 10.59% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 198 | 874 | 143 | 102 | 1141 | 132 | 94 | 987 | 269 | 95 | 545 | 63 | 4643 |
| **PEAK HR FACTOR :** | | 0.909 | | | 0.843 | | | 0.817 | | | 0.788 | | 0.868 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_007 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Victory Blvd | | | Victory Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | |
| 7:00 AM | | 2 | | 1 | 1 | 1 | | 2 | | | 0 | 0 | 7 |
| 7:15 AM | | 2 | | 0 | 2 | 0 | | 1 | | | 3 | 0 | 8 |
| 7:30 AM | | 5 | | 0 | 1 | 0 | | 3 | | | 2 | 0 | 11 |
| 7:45 AM | | 1 | | 0 | 2 | 0 | | 4 | | | 2 | 0 | 9 |
| 8:00 AM | | 2 | | 0 | 0 | 0 | | 4 | | | 1 | 0 | 7 |
| 8:15 AM | | 0 | | 0 | 2 | 0 | | 0 | | | 2 | 0 | 4 |
| 8:30 AM | | 2 | | 0 | 3 | 0 | | 2 | | | 1 | 0 | 8 |
| 8:45 AM | | 0 | | 0 | 0 | 0 | | 1 | | | 1 | 1 | 3 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 14 | 0 | 1 | 11 | 1 | 0 | 17 | 0 | 0 | 12 | 1 | 57 |
| **APPROACH %'s :** | 0.00% | 100.00% | 0.00% | 7.69% | 84.62% | 7.69% | 0.00% | 100.00% | 0.00% | 0.00% | 92.31% | 7.69% | |

| **PEAK HR START TIME :** | 715 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 10 | 0 | 0 | 5 | 0 | 0 | 12 | 0 | 0 | 8 | 0 | 35 |
| **PEAK HR FACTOR :** | | 0.500 | | | 0.625 | | | 0.750 | | | 0.667 | | 0.795 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_007 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Victory Blvd | | | Victory Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | |
| 7:00 AM | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 7 |
| 7:15 AM | 1 | 1 | 0 | 0 | 4 | 0 | 0 | 4 | 1 | 0 | 4 | 0 | 15 |
| 7:30 AM | 2 | 2 | 0 | 0 | 4 | 0 | 1 | 2 | 4 | 1 | 3 | 0 | 19 |
| 7:45 AM | 2 | 2 | 0 | 1 | 1 | 0 | 1 | 3 | 4 | 1 | 3 | 0 | 18 |
| 8:00 AM | 1 | 2 | 0 | 1 | 6 | 3 | 0 | 5 | 0 | 3 | 3 | 0 | 24 |
| 8:15 AM | 0 | 2 | 1 | 0 | 9 | 1 | 0 | 4 | 0 | 1 | 6 | 0 | 24 |
| 8:30 AM | 3 | 2 | 2 | 1 | 3 | 0 | 1 | 4 | 1 | 3 | 3 | 1 | 24 |
| 8:45 AM | 0 | 3 | 1 | 0 | 2 | 2 | 1 | 6 | 1 | 2 | 2 | 0 | 20 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 10 | 16 | 4 | 3 | 30 | 6 | 4 | 28 | 13 | 12 | 24 | 1 | 151 |
| **APPROACH %'s :** | 33.33% | 53.33% | 13.33% | 7.69% | 76.92% | 15.38% | 8.89% | 62.22% | 28.89% | 32.43% | 64.86% | 2.70% | |

| **PEAK HR START TIME :** | 800 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 4 | 9 | 4 | 2 | 20 | 6 | 2 | 19 | 2 | 9 | 14 | 1 | 92 |
| **PEAK HR FACTOR :** | 0.607 | | | 0.700 | | | 0.719 | | | 0.857 | | | 0.958 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-007
N/S Street: Fallbrook Ave
E/W Street: Victory Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 |
| 7:15 AM | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 1 |
| 7:30 AM | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 7:45 AM | 1 | 1 | 0 | 1 | 0 | 2 | 0 | 2 |
| 8:00 AM | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 |
| 8:15 AM | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 8:30 AM | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 1 | 1 | 1 | 0 | 0 | 3 | 1 |
| **TOTALS** | **7** | **8** | **3** | **4** | **2** | **8** | **7** | **5** |

*School-Aged Pedestrians*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 3 |
| 8:30 AM | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **5** | **2** | **2** | **0** | **1** | **3** | **0** | **7** |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-007
N/S Street: Fallbrook Ave
E/W Street: Victory Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **2** | **1** | **0** | **0** | **1** | **0** | **0** | **4** |

City Of Los Angeles
Department Of Transportation

# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Shoup Ave

**East/West** Victory Blvd

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 17 | 29 | 31 | 54 |
| **BIKES** | 1 | 1 | 6 | 2 |
| **BUSES** | 4 | 3 | 16 | 7 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 265 | 8.00 | 402 | 7.45 | 338 | 7.45 | 200 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 969 | 7.30 | 1356 | 7.30 | 1222 | 7.30 | 687 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 85 | 618 | 52 | 755 |
| *8-9* | 97 | 661 | 80 | 838 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 182 | 1279 | 132 | 1593 |

**SOUTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 126 | 1031 | 67 | 1224 |
| *8-9* | 113 | 971 | 51 | 1135 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 239 | 2002 | 118 | 2359 |

| **TOTAL** | **XING S/L** | | **XING N/L** | |
|---|---|---|---|---|
| N-S | Ped | Sch | Ped | Sch |
| 1979 | 0 | 0 | 5 | 2 |
| 1973 | 3 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 3952 | 3 | 0 | 6 | 2 |

**EASTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 58 | 711 | 136 | 905 |
| *8-9* | 76 | 835 | 190 | 1101 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 134 | 1546 | 326 | 2006 |

**WESTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 73 | 429 | 68 | 570 |
| *8-9* | 79 | 468 | 53 | 600 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 152 | 897 | 121 | 1170 |

| **TOTAL** | **XING W/L** | | **XING E/L** | |
|---|---|---|---|---|
| E-W | Ped | Sch | Ped | Sch |
| 1475 | 2 | 2 | 1 | 0 |
| 1701 | 3 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 3176 | 5 | 2 | 2 | 0 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_008 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Victory Blvd | | | Victory Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 10 | 78 | 6 | 20 | 181 | 9 | 8 | 100 | 22 | 11 | 53 | 6 | 504 |
| 7:15 AM | 19 | 131 | 11 | 29 | 208 | 10 | 12 | 142 | 25 | 17 | 67 | 13 | 684 |
| 7:30 AM | 25 | 189 | 16 | 33 | 294 | 24 | 15 | 200 | 31 | 20 | 133 | 25 | 1005 |
| 7:45 AM | 28 | 213 | 19 | 44 | 337 | 19 | 21 | 254 | 56 | 23 | 152 | 20 | 1186 |
| 8:00 AM | 26 | 212 | 24 | 32 | 291 | 12 | 22 | 254 | 52 | 21 | 125 | 17 | 1088 |
| 8:15 AM | 28 | 165 | 13 | 29 | 218 | 8 | 13 | 229 | 51 | 16 | 87 | 12 | 869 |
| 8:30 AM | 20 | 136 | 13 | 31 | 239 | 17 | 13 | 161 | 31 | 19 | 100 | 11 | 791 |
| 8:45 AM | 20 | 144 | 26 | 19 | 210 | 13 | 26 | 168 | 53 | 17 | 136 | 8 | 840 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 176 | 1268 | 128 | 237 | 1978 | 112 | 130 | 1508 | 321 | 144 | 853 | 112 | 6967 |
| **APPROACH %'s :** | 11.20% | 80.66% | 8.14% | 10.18% | 85.00% | 4.81% | 6.64% | 76.98% | 16.39% | 12.98% | 76.92% | 10.10% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 107 | 779 | 72 | 138 | 1140 | 63 | 71 | 937 | 190 | 80 | 497 | 74 | 4148 |
| **PEAK HR FACTOR :** | | 0.914 | | | 0.838 | | | 0.905 | | | 0.835 | | 0.874 |

**CONTROL :**

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_008 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Victory Blvd | | | Victory Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 1 | 0 | | | 0 | 0 | 0 | 3 | 1 | | 1 | | 6 |
| 7:15 AM | 0 | 1 | | | 0 | 0 | 0 | 1 | 0 | | 0 | | 2 |
| 7:30 AM | 0 | 1 | | | 0 | 1 | 0 | 2 | 0 | | 1 | | 5 |
| 7:45 AM | 0 | 0 | | | 0 | 1 | 1 | 2 | 0 | | 0 | | 4 |
| 8:00 AM | 0 | 0 | | | 0 | 0 | 0 | 2 | 0 | | 1 | | 3 |
| 8:15 AM | 0 | 1 | | | 0 | 0 | 0 | 2 | 1 | | 3 | | 7 |
| 8:30 AM | 0 | 0 | | | 0 | 0 | 0 | 1 | 0 | | 0 | | 1 |
| 8:45 AM | 0 | 0 | | | 1 | 0 | 0 | 0 | 0 | | 1 | | 2 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 1 | 3 | 0 | 0 | 1 | 2 | 1 | 13 | 2 | 0 | 7 | 0 | 30 |
| **APPROACH %'s :** | 25.00% | 75.00% | 0.00% | 0.00% | 33.33% | 66.67% | 6.25% | 81.25% | 12.50% | 0.00% | 100.00% | 0.00% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 8 | 1 | 0 | 5 | 0 | 19 |
| **PEAK HR FACTOR :** | 0.500 | | | 0.500 | | | 0.833 | | | 0.417 | | | 0.679 |

**CONTROL :**

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_008 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Victory Blvd | | | Victory Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | |
| 7:00 AM | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 7 |
| 7:15 AM | 0 | 1 | 0 | 0 | 3 | 2 | 1 | 4 | 0 | 0 | 7 | 1 | 19 |
| 7:30 AM | 1 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 9 | 2 | 20 |
| 7:45 AM | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 1 | 3 | 1 | 12 |
| 8:00 AM | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 4 | 0 | 1 | 3 | 0 | 13 |
| 8:15 AM | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 6 | 0 | 2 | 6 | 2 | 22 |
| 8:30 AM | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 6 | 1 | 1 | 4 | 2 | 20 |
| 8:45 AM | 0 | 0 | 3 | 0 | 5 | 0 | 2 | 2 | 1 | 2 | 2 | 1 | 18 |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| TOTAL VOLUMES : | 5 | 8 | 4 | 2 | 23 | 4 | 3 | 25 | 3 | 8 | 37 | 9 | 131 |
| APPROACH %'s : | 29.41% | 47.06% | 23.53% | 6.90% | 79.31% | 13.79% | 9.68% | 80.65% | 9.68% | 14.81% | 68.52% | 16.67% | |
| PEAK HR START TIME : | 800 AM | | | | | | | | | | | | TOTAL |
| PEAK HR VOL : | 3 | 3 | 4 | 2 | 12 | 1 | 2 | 18 | 2 | 6 | 15 | 5 | 73 |
| PEAK HR FACTOR : | | 0.625 | | | 0.625 | | | 0.786 | | | 0.650 | | 0.830 |

**CONTROL :**

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-008
N/S Street: Shoup Ave
E/W Street: Victory Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 8:45 AM | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| **TOTALS** | **4** | **2** | **0** | **3** | **1** | **1** | **3** | **2** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **2** | **0** | **0** | **0** | **0** | **0** | **2** | **0** |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-008
N/S Street: Shoup Ave
E/W Street: Victory Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **3** | **2** | **3** | **0** | **1** | **0** | **0** | **1** |

# City Of Los Angeles
## Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Fallbrook Ave

**East/West** Oxnard St

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 43 | 85 | 3 | 7 |
| **BIKES** | 3 | 7 | 1 | 4 |
| **BUSES** | 13 | 12 | 0 | 1 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 297 | 8.00 | 522 | 7.45 | 101 | 7.45 | 102 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 1110 | 7.30 | 1659 | 7.30 | 288 | 7.30 | 323 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach** / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | N-S | Ped (XING S/L) | Sch (XING S/L) | Ped (XING N/L) | Sch (XING N/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 7 | 849 | 70 | 926 | *7-8* | 113 | 1309 | 21 | 1443 | 2369 | 1 | 0 | 3 | 1 |
| *8-9* | 14 | 904 | 122 | 1040 | *8-9* | 196 | 1139 | 17 | 1352 | 2392 | 1 | 0 | 3 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 21 | 1753 | 192 | 1966 | TOTAL | 309 | 2448 | 38 | 2795 | 4761 | 2 | 0 | 6 | 1 |

**EASTBOUND Approach** / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | E-W | Ped (XING W/L) | Sch (XING W/L) | Ped (XING E/L) | Sch (XING E/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 30 | 150 | 21 | 201 | *7-8* | 77 | 90 | 61 | 228 | 429 | 3 | 1 | 1 | 0 |
| *8-9* | 29 | 146 | 25 | 200 | *8-9* | 99 | 61 | 98 | 258 | 458 | 2 | 0 | 1 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 59 | 296 | 46 | 401 | TOTAL | 176 | 151 | 159 | 486 | 887 | 5 | 1 | 2 | 0 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_009 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| **NS/EW Streets:** | Fallbrook Ave | | | Fallbrook Ave | | | Oxnard St | | | Oxnard St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | |
| 7:00 AM | 0 | 145 | 5 | 16 | 199 | 4 | 0 | 14 | 3 | 2 | 4 | 10 | 402 |
| 7:15 AM | 0 | 174 | 14 | 24 | 250 | 1 | 2 | 21 | 1 | 16 | 6 | 7 | 516 |
| 7:30 AM | 4 | 253 | 21 | 25 | 359 | 7 | 8 | 43 | 7 | 31 | 36 | 13 | 807 |
| 7:45 AM | 2 | 244 | 30 | 47 | 453 | 8 | 19 | 71 | 9 | 27 | 43 | 29 | 982 |
| 8:00 AM | 1 | 265 | 28 | 57 | 319 | 2 | 13 | 63 | 12 | 26 | 22 | 28 | 836 |
| 8:15 AM | 2 | 202 | 29 | 52 | 268 | 6 | 4 | 32 | 5 | 23 | 14 | 27 | 664 |
| 8:30 AM | 6 | 219 | 31 | 46 | 247 | 4 | 4 | 22 | 0 | 17 | 11 | 18 | 625 |
| 8:45 AM | 4 | 197 | 34 | 40 | 262 | 2 | 8 | 29 | 8 | 31 | 13 | 24 | 652 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 19 | 1699 | 192 | 307 | 2357 | 34 | 58 | 295 | 45 | 173 | 149 | 156 | 5484 |
| **APPROACH %'s :** | 0.99% | 88.95% | 10.05% | 11.38% | 87.36% | 1.26% | 14.57% | 74.12% | 11.31% | 36.19% | 31.17% | 32.64% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 9 | 964 | 108 | 181 | 1399 | 23 | 44 | 209 | 33 | 107 | 115 | 97 | 3289 |
| **PEAK HR FACTOR :** | | 0.919 | | | 0.789 | | | 0.722 | | | 0.806 | | 0.837 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_009 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Oxnard St | | | Oxnard St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | |
| 7:00 AM | | 2 | | | 2 | 0 | | | | | 0 | | 4 |
| 7:15 AM | | 2 | | | 2 | 0 | | | | | 0 | | 4 |
| 7:30 AM | | 5 | | | 1 | 0 | | | | | 0 | | 6 |
| 7:45 AM | | 0 | | | 2 | 0 | | | | | 1 | | 3 |
| 8:00 AM | | 2 | | | 0 | 0 | | | | | 0 | | 2 |
| 8:15 AM | | 1 | | | 1 | 1 | | | | | 0 | | 3 |
| 8:30 AM | | 1 | | | 3 | 0 | | | | | 0 | | 4 |
| 8:45 AM | | 0 | | | 0 | 0 | | | | | 0 | | 0 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 13 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 26 |
| **APPROACH %'s :** | 0.00% | 100.00% | 0.00% | 0.00% | 91.67% | 8.33% | | | | 0.00% | 100.00% | 0.00% | |

| **PEAK HR START TIME :** | 700 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 9 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 17 |
| **PEAK HR FACTOR :** | 0.450 | | | 0.875 | | | 0.000 | | | 0.250 | | | 0.708 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_009 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Oxnard St | | | Oxnard St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 3 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | |
| 7:00 AM | 0 | 5 | | 0 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 14 |
| 7:15 AM | 1 | 5 | | 0 | 11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 18 |
| 7:30 AM | 0 | 7 | | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| 7:45 AM | 0 | 7 | | 1 | 11 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 23 |
| 8:00 AM | 0 | 1 | | 0 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 17 |
| 8:15 AM | 1 | 5 | | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 8:30 AM | 0 | 7 | | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 13 |
| 8:45 AM | 0 | 4 | | 1 | 9 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 16 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 2 | 41 | 0 | 2 | 80 | 3 | 1 | 1 | 1 | 3 | 1 | 3 | 138 |
| **APPROACH %'s :** | 4.65% | 95.35% | 0.00% | 2.35% | 94.12% | 3.53% | 33.33% | 33.33% | 33.33% | 42.86% | 14.29% | 42.86% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 1 | 20 | 0 | 1 | 49 | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 77 |
| **PEAK HR FACTOR :** | 0.750 | | | 0.850 | | | 0.250 | | | 0.375 | | | 0.837 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-009
N/S Street: Fallbrook Ave
E/W Street: Oxnard St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 7:15 AM | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 8:30 AM | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 8:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **4** | **2** | **1** | **1** | **1** | **1** | **4** | **1** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7:15 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **0** |

**PREPARED BY NATIONAL DATA & SURVEYING SERVICES**

PROJECT#: 11-5049-009
N/S Street: Fallbrook Ave
E/W Street: Oxnard St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 7:30 AM | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| **TOTALS** | **0** | **2** | **1** | **2** | **3** | **1** | **0** | **6** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Shoup Ave

**East/West** Oxnard St

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 19 | 56 | 9 | 7 |
| **BIKES** | 0 | 3 | 1 | 2 |
| **BUSES** | 4 | 4 | 1 | 1 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 249 | 7.45 | 442 | 7.45 | 187 | 8.00 | 92 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 900 | 7.30 | 1441 | 7.30 | 638 | 7.45 | 309 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach** / **SOUTHBOUND Approach** / **TOTAL** / **XING S/L** / **XING N/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | N-S | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 35 | 582 | 50 | 667 | *7-8* | 120 | 1043 | 124 | 1287 | 1954 | 0 | 0 | 0 | 0 |
| *8-9* | 78 | 631 | 80 | 789 | *8-9* | 141 | 913 | 164 | 1218 | 2007 | 9 | 3 | 5 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 113 | 1213 | 130 | 1456 | TOTAL | 261 | 1956 | 288 | 2505 | 3961 | 9 | 3 | 5 | 0 |

**EASTBOUND Approach** / **WESTBOUND Approach** / **TOTAL** / **XING W/L** / **XING E/L**

| Hours | Lt | Th | Rt | Total | Hours | Lt | Th | Rt | Total | E-W | Ped | Sch | Ped | Sch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7-8* | 71 | 270 | 46 | 387 | *7-8* | 51 | 122 | 42 | 215 | 602 | 5 | 1 | 2 | 0 |
| *8-9* | 102 | 400 | 107 | 609 | *8-9* | 51 | 139 | 58 | 248 | 857 | 1 | 0 | 12 | 3 |
| *9-10* | 0 | 0 | 0 | 0 | *9-10* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | *3-4* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | *4-5* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | *5-6* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 173 | 670 | 153 | 996 | TOTAL | 102 | 261 | 100 | 463 | 1459 | 6 | 1 | 14 | 3 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_010 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Oxnard St | | | Oxnard St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | |
| 7:00 AM | 6 | 64 | 3 | 14 | 183 | 16 | 10 | 25 | 8 | 8 | 9 | 12 | 358 |
| 7:15 AM | 2 | 113 | 8 | 23 | 216 | 20 | 16 | 50 | 8 | 7 | 11 | 6 | 480 |
| 7:30 AM | 10 | 190 | 13 | 34 | 278 | 39 | 13 | 78 | 14 | 15 | 43 | 11 | 738 |
| 7:45 AM | 17 | 207 | 25 | 48 | 340 | 47 | 31 | 114 | 15 | 21 | 56 | 13 | 934 |
| 8:00 AM | 18 | 195 | 21 | 38 | 252 | 43 | 28 | 124 | 34 | 15 | 46 | 24 | 838 |
| 8:15 AM | 20 | 151 | 22 | 44 | 207 | 37 | 26 | 101 | 23 | 12 | 32 | 18 | 693 |
| 8:30 AM | 13 | 125 | 18 | 28 | 207 | 44 | 22 | 86 | 27 | 10 | 24 | 9 | 613 |
| 8:45 AM | 23 | 151 | 18 | 29 | 224 | 34 | 25 | 87 | 21 | 13 | 34 | 6 | 665 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 109 | 1196 | 128 | 258 | 1907 | 280 | 171 | 665 | 150 | 101 | 255 | 99 | 5319 |
| **APPROACH %'s :** | 7.61% | 83.46% | 8.93% | 10.55% | 78.00% | 11.45% | 17.34% | 67.44% | 15.21% | 22.20% | 56.04% | 21.76% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 65 | 743 | 81 | 164 | 1077 | 166 | 98 | 417 | 86 | 63 | 177 | 66 | 3203 |
| **PEAK HR FACTOR :** | | 0.893 | | | 0.809 | | | 0.808 | | | 0.850 | | 0.857 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_010 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Oxnard St | | | Oxnard St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | |
| 7:00 AM | | 0 | 0 | | 0 | | | | 0 | | 0 | | 0 |
| 7:15 AM | | 1 | 0 | | 0 | | | | 0 | | 0 | | 1 |
| 7:30 AM | | 1 | 0 | | 0 | | | | 1 | | 0 | | 2 |
| 7:45 AM | | 0 | 0 | | 0 | | | | 0 | | 1 | | 1 |
| 8:00 AM | | 0 | 0 | | 1 | | | | 0 | | 0 | | 1 |
| 8:15 AM | | 1 | 0 | | 1 | | | | 0 | | 0 | | 2 |
| 8:30 AM | | 0 | 1 | | 1 | | | | 0 | | 0 | | 2 |
| 8:45 AM | | 0 | 0 | | 1 | | | | 0 | | 0 | | 1 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 3 | 1 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 10 |
| **APPROACH %'s :** | 0.00% | 75.00% | 25.00% | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 100.00% | 0.00% | 100.00% | 0.00% | |

| **PEAK HR START TIME :** | 800 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 1 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| **PEAK HR FACTOR :** | 0.500 | | | 1.000 | | | 0.000 | | | 0.000 | | | 0.750 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_010 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | Shoup Ave | | | Shoup Ave | | | Oxnard St | | | Oxnard St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | |
| 7:00 AM | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 8 |
| 7:15 AM | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 7:30 AM | 0 | 3 | 1 | 0 | 9 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 16 |
| 7:45 AM | 0 | 0 | 0 | 1 | 5 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 10 |
| 8:00 AM | 0 | 2 | 0 | 2 | 6 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 13 |
| 8:15 AM | 1 | 2 | 0 | 0 | 5 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 12 |
| 8:30 AM | 1 | 2 | 0 | 0 | 5 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 13 |
| 8:45 AM | 2 | 2 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 11 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 4 | 14 | 1 | 3 | 45 | 8 | 2 | 5 | 2 | 1 | 5 | 1 | 91 |
| **APPROACH %'s :** | 21.05% | 73.68% | 5.26% | 5.36% | 80.36% | 14.29% | 22.22% | 55.56% | 22.22% | 14.29% | 71.43% | 14.29% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 1 | 7 | 1 | 3 | 25 | 4 | 2 | 4 | 2 | 0 | 2 | 0 | 51 |
| **PEAK HR FACTOR :** | | 0.563 | | | 0.800 | | | 0.667 | | | 0.500 | | 0.797 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-010
N/S Street: Shoup Ave
E/W Street: Oxnard St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 |
| 8:00 AM | 0 | 0 | 1 | 2 | 0 | 4 | 0 | 1 |
| 8:15 AM | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 8:30 AM | 0 | 3 | 2 | 1 | 3 | 2 | 0 | 0 |
| 8:45 AM | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| **TOTALS** | **1** | **4** | **5** | **4** | **6** | **8** | **1** | **5** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **1** | **2** | **0** | **3** | **0** | **1** |

**PREPARED BY NATIONAL DATA & SURVEYING SERVICES**

PROJECT#: 11-5049-010
N/S Street: Shoup Ave
E/W Street: Oxnard St
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 7:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **2** | **1** | **0** | **0** | **1** | **0** | **2** |

City Of Los Angeles
Department Of Transportation

# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** Fallbrook Ave

**East/West** Ventura Blvd

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 22 | 36 | 15 | 50 |
| **BIKES** | 4 | 3 | 0 | 3 |
| **BUSES** | 9 | 9 | 11 | 18 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 201 | 7.30 | 343 | 7.45 | 133 | 7.45 | 254 | 7.45 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 733 | 7.30 | 1257 | 7.30 | 413 | 7.30 | 922 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 59 | 459 | 86 | 604 |
| *8-9* | 45 | 525 | 126 | 696 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 104 | 984 | 212 | 1300 |

**SOUTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 498 | 189 | 404 | 1091 |
| *8-9* | 444 | 197 | 443 | 1084 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 942 | 386 | 847 | 2175 |

| | **TOTAL** | **XING S/L** | | **XING N/L** | |
|---|---|---|---|---|---|
| Hours | N-S | Ped | Sch | Ped | Sch |
| *7-8* | 1695 | 29 | 0 | 5 | 0 |
| *8-9* | 1780 | 24 | 0 | 6 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 3475 | 53 | 0 | 11 | 0 |

**EASTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 66 | 268 | 25 | 359 |
| *8-9* | 64 | 256 | 14 | 334 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 130 | 524 | 39 | 693 |

**WESTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 104 | 403 | 259 | 766 |
| *8-9* | 131 | 499 | 276 | 906 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 235 | 902 | 535 | 1672 |

| | **TOTAL** | **XING W/L** | | **XING E/L** | |
|---|---|---|---|---|---|
| Hours | E-W | Ped | Sch | Ped | Sch |
| *7-8* | 1125 | 14 | 0 | 0 | 0 |
| *8-9* | 1240 | 11 | 0 | 0 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 2365 | 25 | 0 | 0 | 0 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_011 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Ventura Blvd | | | Ventura Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1.5 | 0.5 | 1 | 1 | 3 | 0 | 1 | 2 | 1 | |
| 7:00 AM | 9 | 71 | 22 | 108 | 27 | 65 | 10 | 45 | 2 | 16 | 61 | 44 | 480 |
| 7:15 AM | 10 | 106 | 12 | 107 | 30 | 80 | 12 | 51 | 2 | 18 | 86 | 52 | 566 |
| 7:30 AM | 25 | 151 | 20 | 141 | 50 | 120 | 19 | 69 | 4 | 26 | 106 | 78 | 809 |
| 7:45 AM | 15 | 124 | 24 | 136 | 72 | 127 | 14 | 98 | 16 | 37 | 132 | 78 | 873 |
| 8:00 AM | 14 | 148 | 32 | 139 | 61 | 126 | 10 | 78 | 11 | 37 | 113 | 80 | 849 |
| 8:15 AM | 11 | 123 | 31 | 105 | 50 | 105 | 11 | 67 | 2 | 25 | 116 | 56 | 702 |
| 8:30 AM | 13 | 120 | 27 | 91 | 39 | 94 | 23 | 53 | 1 | 24 | 116 | 66 | 667 |
| 8:45 AM | 7 | 122 | 32 | 104 | 43 | 110 | 15 | 54 | 0 | 33 | 136 | 68 | 724 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 104 | 965 | 200 | 931 | 372 | 827 | 114 | 515 | 38 | 216 | 866 | 522 | 5670 |
| **APPROACH %'s :** | 8.20% | 76.04% | 15.76% | 43.71% | 17.46% | 38.83% | 17.09% | 77.21% | 5.70% | 13.47% | 53.99% | 32.54% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 65 | 546 | 107 | 521 | 233 | 478 | 54 | 312 | 33 | 125 | 467 | 292 | 3233 |
| **PEAK HR FACTOR :** | | 0.916 | | | 0.919 | | | 0.779 | | | 0.895 | | 0.926 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_011 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| NS/EW Streets: | Fallbrook Ave | | | Fallbrook Ave | | | Ventura Blvd | | | Ventura Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1.5 | 0.5 | 1 | 1 | 3 | 0 | 1 | 2 | 1 | |
| 7:00 AM | | 1 | 1 | 0 | 1 | | 3 | | | 1 | 2 | 0 | 9 |
| 7:15 AM | | 0 | 1 | 0 | 2 | | 2 | | | 1 | 2 | 0 | 8 |
| 7:30 AM | | 1 | 1 | 0 | 1 | | 2 | | | 2 | 1 | 2 | 10 |
| 7:45 AM | | 0 | 0 | 0 | 1 | | 1 | | | 1 | 1 | 0 | 4 |
| 8:00 AM | | 1 | 1 | 0 | 0 | | 1 | | | 1 | 1 | 0 | 5 |
| 8:15 AM | | 1 | 0 | 0 | 1 | | 1 | | | 1 | 0 | 0 | 4 |
| 8:30 AM | | 0 | 1 | 1 | 2 | | 0 | | | 1 | 0 | 0 | 5 |
| 8:45 AM | | 0 | 0 | 0 | 0 | | 1 | | | 0 | 1 | 0 | 2 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 4 | 5 | 1 | 8 | 0 | 11 | 0 | 0 | 8 | 8 | 2 | 47 |
| **APPROACH %'s :** | 0.00% | 44.44% | 55.56% | 11.11% | 88.89% | 0.00% | 100.00% | 0.00% | 0.00% | 44.44% | 44.44% | 11.11% | |

| **PEAK HR START TIME :** | 700 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 2 | 3 | 0 | 5 | 0 | 8 | 0 | 0 | 5 | 6 | 2 | 31 |
| **PEAK HR FACTOR :** | 0.625 | | | 0.625 | | | 0.667 | | | 0.650 | | | 0.775 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_011 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | Fallbrook Ave | | | Fallbrook Ave | | | Ventura Blvd | | | Ventura Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 1 | 2 | 0 | 1.5 | 0.5 | 1 | 1 | 3 | 0 | 1 | 2 | 1 | |
| 7:00 AM | | 2 | 1 | 1 | 1 | 3 | 2 | 1 | 0 | 2 | 2 | 0 | 15 |
| 7:15 AM | | 1 | 1 | 0 | 1 | 4 | 1 | 1 | 0 | 0 | 5 | 1 | 15 |
| 7:30 AM | | 1 | 2 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 13 |
| 7:45 AM | | 1 | 1 | 2 | 2 | 3 | 0 | 3 | 1 | 0 | 3 | 2 | 18 |
| 8:00 AM | | 0 | 1 | 0 | 0 | 3 | 1 | 2 | 0 | 2 | 6 | 0 | 15 |
| 8:15 AM | | 4 | 0 | 3 | 1 | 2 | 1 | 1 | 0 | 3 | 6 | 2 | 23 |
| 8:30 AM | | 3 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 2 | 11 |
| 8:45 AM | | 3 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 3 | 2 | 13 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 15 | 7 | 10 | 6 | 20 | 5 | 9 | 1 | 11 | 28 | 11 | 123 |
| **APPROACH %'s :** | 0.00% | 68.18% | 31.82% | 27.78% | 16.67% | 55.56% | 33.33% | 60.00% | 6.67% | 22.00% | 56.00% | 22.00% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 6 | 4 | 8 | 4 | 10 | 2 | 6 | 1 | 5 | 17 | 6 | 69 |
| **PEAK HR FACTOR :** | | 0.625 | | | 0.786 | | | 0.563 | | | 0.636 | | 0.750 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-011
N/S Street: Fallbrook Ave
E/W Street: Ventura Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 1 | 5 | 5 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 1 | 3 | 5 | 0 | 0 | 0 | 5 |
| 7:30 AM | 0 | 2 | 2 | 5 | 0 | 0 | 0 | 5 |
| 7:45 AM | 0 | 1 | 2 | 2 | 0 | 0 | 1 | 2 |
| 8:00 AM | 0 | 2 | 2 | 7 | 0 | 0 | 1 | 3 |
| 8:15 AM | 0 | 0 | 3 | 5 | 0 | 0 | 0 | 2 |
| 8:30 AM | 0 | 4 | 2 | 2 | 0 | 0 | 0 | 4 |
| 8:45 AM | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 |
| **TOTALS** | **0** | **11** | **20** | **33** | **0** | **0** | **3** | **22** |

*School-Aged Pedestrians*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-011
N/S Street: Fallbrook Ave
E/W Street: Ventura Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| TIME | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **1** | **0** | **2** | **1** | **0** | **3** | **3** |

City Of Los Angeles
Department Of Transportation
# MANUAL TRAFFIC COUNT SUMMARY

STREET:
**North/South** EB Fwy Ramp w/o Shoup

**East/West** Ventura Blvd

Day: Thursday Date: February 17, 2011 Weather: SUNNY

Hours: 7-10AM 3-6PM Chekrs: 0

School Day: YES District: 0 I/S CODE 0

| | N/B | S/B | E/B | W/B |
|---|---|---|---|---|
| **DUAL-WHEELED** | 22 | 0 | 37 | 23 |
| **BIKES** | 0 | 0 | 0 | 1 |
| **BUSES** | 3 | 0 | 4 | 12 |

| | N/B | TIME | S/B | TIME | E/B | TIME | W/B | TIME |
|---|---|---|---|---|---|---|---|---|
| *AM PK 15 MIN* | 463 | 7.45 | 0 | 7.00 | 547 | 8.00 | 189 | 8.00 |
| *PM PK 15 MIN* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |
| *AM PK HOUR* | 1779 | 7.30 | 0 | 7.00 | 1956 | 7.15 | 640 | 7.30 |
| *PM PK HOUR* | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 | 0 | 3.00 |

**NORTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 0 | 0 | 1477 | 1477 |
| *8-9* | 0 | 0 | 1746 | 1746 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 3223 | 3223 |

**SOUTHBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 0 | 0 | 0 | 0 |
| *8-9* | 0 | 0 | 0 | 0 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 |

| | **TOTAL** | **XING S/L** | | **XING N/L** | |
|---|---|---|---|---|---|
| Hours | N-S | Ped | Sch | Ped | Sch |
| *7-8* | 1477 | 1 | 0 | 1 | 2 |
| *8-9* | 1746 | 1 | 0 | 1 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 3223 | 2 | 0 | 2 | 2 |

**EASTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 908 | 840 | 0 | 1748 |
| *8-9* | 892 | 787 | 0 | 1679 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 1800 | 1627 | 0 | 3427 |

**WESTBOUND Approach**

| Hours | Lt | Th | Rt | Total |
|---|---|---|---|---|
| *7-8* | 0 | 437 | 25 | 462 |
| *8-9* | 0 | 614 | 22 | 636 |
| *9-10* | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 1051 | 47 | 1098 |

| | **TOTAL** | **XING W/L** | | **XING E/L** | |
|---|---|---|---|---|---|
| Hours | E-W | Ped | Sch | Ped | Sch |
| *7-8* | 2210 | 0 | 0 | 0 | 0 |
| *8-9* | 2315 | 0 | 0 | 0 | 0 |
| *9-10* | 0 | 0 | 0 | 0 | 0 |
| *3-4* | 0 | 0 | 0 | 0 | 0 |
| *4-5* | 0 | 0 | 0 | 0 | 0 |
| *5-6* | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 4525 | 0 | 0 | 0 | 0 |

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_012 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | EB Fwy Ramp w/o Shoup | | | EB Fwy Ramp w/o Shoup | | | Ventura Blvd | | | Ventura Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | |
| 7:00 AM | | | 228 | | | | 196 | 136 | | | 53 | 13 | 626 |
| 7:15 AM | | | 332 | | | | 223 | 183 | | | 83 | 1 | 822 |
| 7:30 AM | | | 441 | | | | 255 | 232 | | | 148 | 3 | 1079 |
| 7:45 AM | | | 461 | | | | 224 | 280 | | | 141 | 7 | 1113 |
| 8:00 AM | | | 441 | | | | 280 | 260 | | | 176 | 4 | 1161 |
| 8:15 AM | | | 423 | | | | 202 | 194 | | | 129 | 7 | 955 |
| 8:30 AM | | | 424 | | | | 196 | 162 | | | 151 | 3 | 936 |
| 8:45 AM | | | 448 | | | | 204 | 159 | | | 139 | 5 | 955 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 0 | 3198 | 0 | 0 | 0 | 1780 | 1606 | 0 | 0 | 1020 | 43 | 7647 |
| **APPROACH %'s :** | 0.00% | 0.00% | 100.00% | | | | 52.57% | 47.43% | 0.00% | 0.00% | 95.95% | 4.05% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 0 | 1766 | 0 | 0 | 0 | 961 | 966 | 0 | 0 | 594 | 21 | 4308 |
| **PEAK HR FACTOR :** | 0.958 | | | 0.000 | | | 0.892 | | | 0.854 | | | 0.928 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_012 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

AM

| NS/EW Streets: | EB Fwy Ramp w/o Shoup | | | EB Fwy Ramp w/o Shoup | | | Ventura Blvd | | | Ventura Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | |
| 7:00 AM | | | 0 | | | | 0 | 0 | | | 0 | 0 | 0 |
| 7:15 AM | | | 0 | | | | 0 | 0 | | | 0 | 0 | 0 |
| 7:30 AM | | | 0 | | | | 0 | 1 | | | 3 | 0 | 4 |
| 7:45 AM | | | 1 | | | | 0 | 0 | | | 1 | 1 | 3 |
| 8:00 AM | | | 2 | | | | 0 | 0 | | | 2 | 0 | 4 |
| 8:15 AM | | | 0 | | | | 1 | 0 | | | 1 | 2 | 4 |
| 8:30 AM | | | 0 | | | | 0 | 1 | | | 2 | 0 | 3 |
| 8:45 AM | | | 0 | | | | 1 | 0 | | | 0 | 0 | 1 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 9 | 3 | 19 |
| **APPROACH %'s :** | 0.00% | 0.00% | 100.00% | | | | 50.00% | 50.00% | 0.00% | 0.00% | 75.00% | 25.00% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 7 | 3 | 15 |
| **PEAK HR FACTOR :** | 0.375 | | | 0.000 | | | 0.500 | | | 0.833 | | | 0.938 |

**CONTROL :** Signalized

# Intersection Turning Movement

**Prepared by:**

## National Data & Surveying Services

**Project ID:** CA11_5049_012 **Day:** THURSDAY

**City:** City of West Hills **Date:** 2/17/2011

**AM**

| **NS/EW Streets:** | EB Fwy Ramp w/o Shoup | | | EB Fwy Ramp w/o Shoup | | | Ventura Blvd | | | Ventura Blvd | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NORTHBOUND | | | SOUTHBOUND | | | EASTBOUND | | | WESTBOUND | | | |
| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
| LANES: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | |
| 7:00 AM | | | 6 | | | | 5 | 2 | | | 3 | 0 | 16 |
| 7:15 AM | | | 1 | | | | 2 | 2 | | | 0 | 0 | 5 |
| 7:30 AM | | | 6 | | | | 2 | 2 | | | 3 | 0 | 13 |
| 7:45 AM | | | 1 | | | | 1 | 2 | | | 2 | 0 | 6 |
| 8:00 AM | | | 2 | | | | 3 | 4 | | | 7 | 0 | 16 |
| 8:15 AM | | | 1 | | | | 1 | 4 | | | 3 | 0 | 9 |
| 8:30 AM | | | 5 | | | | 3 | 1 | | | 1 | 0 | 10 |
| 8:45 AM | | | 0 | | | | 1 | 2 | | | 3 | 1 | 7 |

| | NL | NT | NR | SL | ST | SR | EL | ET | ER | WL | WT | WR | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL VOLUMES :** | 0 | 0 | 22 | 0 | 0 | 0 | 18 | 19 | 0 | 0 | 22 | 1 | 82 |
| **APPROACH %'s :** | 0.00% | 0.00% | 100.00% | | | | 48.65% | 51.35% | 0.00% | 0.00% | 95.65% | 4.35% | |

| **PEAK HR START TIME :** | 730 AM | | | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PEAK HR VOL :** | 0 | 0 | 10 | 0 | 0 | 0 | 7 | 12 | 0 | 0 | 15 | 0 | 44 |
| **PEAK HR FACTOR :** | | 0.417 | | | 0.000 | | | 0.679 | | | 0.536 | | 0.688 |

**CONTROL :** Signalized

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-012
N/S Street: EB Fwy Ramp w/o Shoup
E/W Street: Ventura Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*Adult Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **2** | **1** | **1** | **0** | **0** | **0** | **0** |

*School-Aged Pedestrians*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

## PREPARED BY NATIONAL DATA & SURVEYING SERVICES

PROJECT#: 11-5049-012
N/S Street: EB Fwy Ramp w/o Shoup
E/W Street: Ventura Blvd
DATE: 2/17/2011 DAY: Thursday
CITY: City of West Hills

**A M**

*BIKES*

| T I M E | NORTH LEG | | SOUTH LEG | | EAST LEG | | WEST LEG | |
|---|---|---|---|---|---|---|---|---|
| | EB | WB | EB | WB | NB | SB | NB | SB |
| 7:00 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTALS** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **0** |

# APPENDIX G

# RELATED PROJECT TRIPS

RELATED PROJECTS

| No | Location | Planning or DOT Case # | Description | | | Daily | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7011 Shoup Avenue | SFV 2003-091 | 20 | unit | Single Family Homes | 191 | 4 | 11 | 15 | 13 | 7 | 20 |
| | | | 135 | students | Pre-School | 544 | 51 | 46 | 97 | 47 | 53 | 100 |
| | | | 360 | students | K-8 Private School | 2,196 | 178 | 146 | 324 | 103 | 117 | 220 |
| | | | | | | 2,931 | 233 | 203 | 436 | 163 | 177 | 340 |
| 2 | 23135 Sherman Place | SFV 2006-300 | 160 | unit | Apartments | 1,064 | 36 | 70 | 106 | 78 | 63 | 141 |
| 3 | 6600 N Topanga Cyn Bl | SFV 2002-003 | 1,650,000 | sf | Westfield Plaza Expansion | 70,851 | 106 | 66 | 172 | 419 | 453 | 872 |
| | | | | | appx. 60% Complete | | | | | | | |
| 4 | 6410 Canoga Avenue | WC-2009-040 | (47,000) | sf | Remove Electronics SS | (1,482) | (6) | (3) | (9) | (60) | (54) | (114) |
| | | | 47,000 | sf | Health Club | 1,238 | 19 | 26 | 45 | 78 | 74 | 152 |
| | | | | | | (244) | 13 | 23 | 36 | 18 | 20 | 38 |
| 5 | 6464 Canoga Avenue | WC-2005-0417 | 154,565 | sf | Office | 1,660 | 208 | 28 | 236 | 38 | 187 | 225 |
| | | | 16,117 | sf | Restaurant | 615 | 29 | 27 | 56 | 32 | 21 | 53 |
| | | | (65,903) | sf | Remove Office | (861) | (106) | (14) | (120) | (23) | (114) | (137) |
| | | | | | | 1,414 | 131 | 41 | 172 | 47 | 94 | 141 |
| 6 | 5607 Capistrano Ave | SFV 2004-001 | 1,600 | students | Hughes Magnet School | 9,430 | 416 | 352 | 768 | 105 | 119 | 224 |
| 7 | 6700 Eton Avenue | WC-2005-007 | 441 | unit | Apartments | 2,933 | 44 | 181 | 225 | 176 | 97 | 273 |
| 8 | 6250 Canoga Avenue | WC-2003-008 | 10,000 | sf | Retail | 443 | 6 | 6 | 12 | 16 | 17 | 33 |
| | | | 601 | unit | Apartments | 3,997 | 60 | 246 | 307 | 227 | 122 | 349 |
| | | | | | | 4,440 | 66 | 252 | 319 | 243 | 139 | 382 |
| 9 | 6625 Variel Avenue | WC-2002-006 | 522 | unit | Convert Apt to Condo | 3,176 | (102) | 65 | (37) | 148 | (49) | 99 |
| 10 | 21530 Oxnard St | WC-2006-026 | 30,000 | sf | Aquatic Health Club | 17 | 4 | 7 | 11 | 39 | 46 | 85 |
| 11 | 6710 Variel Avenue | WC-2006-033 | 242 | unit | Apartments | 1,609 | 24 | 99 | 123 | 97 | 53 | 150 |
| 12 | 21050 Vanowen Street | WC-2004-023 | 210 | unit | Apartments | 1,397 | 21 | 86 | 107 | 84 | 46 | 130 |
| 13 | 6355 DeSoto Avenue | WC-2004-043 | 421 | unit | Apartments | 2,800 | 42 | 173 | 215 | 168 | 93 | 261 |
| 14 | 6219 DeSoto Avenue | WC-2003-022 | (76,242) | sf | Remove Industrial | (531) | (62) | (8) | (70) | (9) | (66) | (75) |
| | | | (76,242) | sf | Remove Office | (839) | (104) | (14) | (118) | (19) | (95) | (114) |
| | | | 394 | unit | Senior Apartments | 1,371 | 18 | 33 | 51 | 38 | 25 | 63 |
| | | | 574 | unit | Apartments | 3,817 | 57 | 235 | 293 | 230 | 126 | 356 |
| | | | | | | 3,818 | (90) | 246 | 156 | 239 | (10) | 230 |
| 15 | 8401 Fallbrook Avenue | SFV 2007-021 | 210,000 | sf | Mixed Use | 4,230 | 451 | 107 | 558 | 40 | 415 | 455 |

# APPENDIX H

# LEVEL OF SERVICE WORKSHEETS

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | WOODLAKE AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | East-West Street: | VANOWEN STREET | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | Existing | Ambient Growth | Related Projects | Project | Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | 2011 EXISTING COND. Volume | No. of Lanes | Lane Volume | 2011 W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | 2011 W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 32 | 1 | 32 | 0 | 32 | 1 | 32 | 0 | 32 | 1 | 32 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 13 | 1 | 13 | 0 | 13 | 1 | 13 | 0 | 13 | 1 | 13 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 139 | 1 | 88 | 0 | 139 | 1 | 88 | 0 | 139 | 1 | 88 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 67 | 1 | 67 | 0 | 67 | 1 | 67 | 0 | 67 | 1 | 67 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 40 | 1 | 30 | 0 | 40 | 1 | 30 | 0 | 40 | 1 | 30 |
| | Through-Right | | 1 | 30 | | | 1 | 30 | | | 1 | 30 |
| | Right | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 723 | 1 | 385 | 0 | 723 | 1 | 385 | 0 | 723 | 1 | 385 |
| | Through-Right | | 1 | 385 | | | 1 | 385 | | | 1 | 385 |
| | Right | 46 | 0 | 46 | 0 | 46 | 0 | 46 | 0 | 46 | 0 | 46 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 103 | 1 | 103 | 0 | 103 | 1 | 103 | 0 | 103 | 1 | 103 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 497 | 1 | 259 | 0 | 497 | 1 | 259 | 0 | 497 | 1 | 259 |
| | Through-Right | | 1 | 259 | | | 1 | 259 | | | 1 | 259 |
| | Right | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| CRITICAL VOLUMES | North-South: | | | 155 | | | | 155 | | | | 155 |
| | East-West: | | | 488 | | | | 488 | | | | 488 |
| | SUM: | | | 642 | | | | 642 | | | | 642 |
| VOLUME/CAPACITY (V/C) RATIO: | | | | 0.428 | | | | 0.428 | | | | 0.428 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | | | | 0.328 | | | | 0.328 | | | | 0.328 |
| LEVEL OF SERVICE (LOS): | | | | A | | | | A | | | | A |

| | MOVEMENT | 2011 W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | 2011 W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 0 | 32 | 1 | 32 | 0 | 32 | 1 | 32 |
| | Left-Through | | | 0 | 0 | | | 0 | 0 |
| | Through | 0 | 13 | 1 | 13 | 0 | 13 | 1 | 13 |
| | Through-Right | | | 0 | 0 | | | 0 | 0 |
| | Right | 8 | 147 | 1 | 96 | 0 | 147 | 1 | 96 |
| | Left-Through-Right | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 2 | 69 | 1 | 69 | 0 | 69 | 1 | 69 |
| | Left-Through | | | 0 | 0 | | | 0 | 0 |
| | Through | 0 | 40 | 1 | 30 | 0 | 40 | 1 | 30 |
| | Through-Right | | | 1 | 30 | | | 1 | 30 |
| | Right | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 |
| | Left-Through-Right | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 |
| | Left-Through | | | 0 | 0 | | | 0 | 0 |
| | Through | 7 | 730 | 1 | 388 | 0 | 730 | 1 | 388 |
| | Through-Right | | | 1 | 388 | | | 1 | 388 |
| | Right | 0 | 46 | 0 | 46 | 0 | 46 | 0 | 46 |
| | Left-Through-Right | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 0 | 103 | 1 | 103 | 0 | 103 | 1 | 103 |
| | Left-Through | | | 0 | 0 | | | 0 | 0 |
| | Through | 5 | 502 | 1 | 262 | 0 | 502 | 1 | 262 |
| | Through-Right | | | 1 | 262 | | | 1 | 262 |
| | Right | 1 | 21 | 0 | 21 | 0 | 21 | 0 | 21 |
| | Left-Through-Right | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | | 0 | 0 | | | 0 | 0 |
| CRITICAL VOLUMES | North-South: | | | | 165 | | | | 165 |
| | East-West: | | | | 491 | | | | 491 |
| | SUM: | | | | 656 | | | | 656 |
| VOLUME/CAPACITY (V/C) RATIO: | | | | | 0.437 | | | | 0.437 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | | | | | 0.337 | | | | 0.337 |
| LEVEL OF SERVICE (LOS): | | | | | A | | | | A |

NO INPUT ALLOWED

INPUT DATA CELL

## PROJECT IMPACT

Change in *v/c* due to project: 0.009 Δ*v/c* after mitigation: 0.009

Significant impacted? NO Fully mitigated? N/A

# CMA Calculation Worksheet

| I/S #: | North-South Street: | WOODLAKE AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | East-West Street: | VANOWEN STREET | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Phases | | | | 2 | | | | 2 | | | | 2 | | | | 2 | | | | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | | | | 0 | | | | 0 | | | | 0 | | | | 0 | | | | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- | 0 | SB--- | 0 | NB--- | 0 | SB--- | 0 | NB--- | | SB--- | 0 | NB--- | 0 | SB--- | 0 | NB--- | 0 | SB--- | 0 |
| | EB--- | 0 | WB--- | 0 | EB--- | 0 | WB--- | 0 | EB--- | | WB--- | 0 | EB--- | 0 | WB--- | 0 | EB--- | 0 | WB--- | 0 |
| ATSAC-1 or ATCS-2? | | | | 2 | | | | 2 | | | | 2 | | | | 2 | | | | 2 |
| Override Capacity | | | | 0 | | | | 0 | | | | 0 | | | | 0 | | | | 0 |

| | | *2011* EXISTING COND. | | | *2012* W/ AMBIENT GROWTH | | | | *2012* W/ RELATED PROJECTS | | | | *2012* W/ PROJECT | | | | *2012* W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 32 | 1 | 32 | 1 | 33 | 1 | 33 | 0 | 33 | 1 | 33 | 0 | 33 | 1 | 33 | 0 | 33 | 1 | 33 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 13 | 1 | 13 | 0 | 13 | 1 | 13 | 4 | 17 | 1 | 17 | 0 | 17 | 1 | 17 | 0 | 17 | 1 | 17 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 139 | 1 | 88 | 3 | 142 | 1 | 89 | 0 | 142 | 1 | 89 | 8 | 150 | 1 | 97 | 0 | 150 | 1 | 97 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 67 | 1 | 67 | 1 | 68 | 1 | 68 | 0 | 68 | 1 | 68 | 2 | 70 | 1 | 70 | 0 | 70 | 1 | 70 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 40 | 1 | 30 | 1 | 41 | 1 | 30 | 4 | 45 | 1 | 32 | 0 | 45 | 1 | 32 | 0 | 45 | 1 | 32 |
| | Through-Right | | 1 | 30 | | | 1 | 30 | | | 1 | 32 | | | 1 | 32 | | | 1 | 32 |
| | Right | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 723 | 1 | 385 | 14 | 737 | 1 | 392 | 28 | 765 | 1 | 406 | 7 | 772 | 1 | 410 | 0 | 772 | 1 | 410 |
| | Through-Right | | 1 | 385 | | | 1 | 392 | | | 1 | 406 | | | 1 | 410 | | | 1 | 410 |
| | Right | 46 | 0 | 46 | 1 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 103 | 1 | 103 | 2 | 105 | 1 | 105 | 0 | 105 | 1 | 105 | 0 | 105 | 1 | 105 | 0 | 105 | 1 | 105 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 497 | 1 | 259 | 10 | 507 | 1 | 264 | 68 | 575 | 1 | 298 | 5 | 580 | 1 | 301 | 0 | 580 | 1 | 301 |
| | Through-Right | | 1 | 259 | | | 1 | 264 | | | 1 | 298 | | | 1 | 301 | | | 1 | 301 |
| | Right | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 1 | 21 | 0 | 21 | 0 | 21 | 0 | 21 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| CRITICAL VOLUMES | | | *North-South:* | 155 | | | *North-South:* | 158 | | | *North-South:* | 158 | | | *North-South:* | 168 | | | *North-South:* | 168 |
| | | | *East-West:* | 488 | | | *East-West:* | 497 | | | *East-West:* | 511 | | | *East-West:* | 515 | | | *East-West:* | 515 |
| | | | *SUM:* | 642 | | | *SUM:* | 655 | | | *SUM:* | 669 | | | *SUM:* | 682 | | | *SUM:* | 682 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | | | 0.428 | | | | 0.437 | | | | 0.446 | | | | 0.455 | | | | 0.455 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | | | 0.328 | | | | 0.337 | | | | 0.346 | | | | 0.355 | | | | 0.355 |
| LEVEL OF SERVICE (LOS): | | | | A | | | | A | | | | A | | | | A | | | | A |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.009 | Δ*v/c* after mitigation: | 0.009 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | East-West Street: | VANOWEN STREET | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | Existing Cond. | W/ Ambient Growth | W/ Related Projects | W/ Project | W/ Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- SB--- 0<br>EB--- WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2011 W/ AMBIENT GROWTH | | | | 2011 W/ RELATED PROJECTS | | | | 2011 W/ PROJECT | | | | 2011 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 47 | 1 | 47 | 0 | 47 | 1 | 47 | 0 | 47 | 1 | 47 | 0 | 47 | 1 | 47 | 0 | 47 | 1 | 47 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 698 | 2 | 349 | 0 | 698 | 2 | 349 | 0 | 698 | 2 | 349 | 0 | 698 | 2 | 349 | 0 | 698 | 2 | 349 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 88 | 1 | 29 | 0 | 88 | 1 | 29 | 0 | 88 | 1 | 29 | 128 | 216 | 1 | 153 | 0 | 216 | 1 | 153 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 101 | 1 | 101 | 0 | 101 | 1 | 101 | 0 | 101 | 1 | 101 | 14 | 115 | 1 | 115 | 0 | 115 | 1 | 115 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1115 | 2 | 558 | 0 | 1115 | 2 | 558 | 0 | 1115 | 2 | 558 | 0 | 1115 | 2 | 558 | 0 | 1115 | 2 | 558 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 171 | 1 | 87 | 0 | 171 | 1 | 87 | 0 | 171 | 1 | 87 | 0 | 171 | 1 | 87 | 0 | 171 | 1 | 87 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 169 | 1 | 169 | 0 | 169 | 1 | 169 | 0 | 169 | 1 | 169 | 0 | 169 | 1 | 169 | 0 | 169 | 1 | 169 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 636 | 1 | 374 | 0 | 636 | 1 | 374 | 0 | 636 | 1 | 374 | 17 | 653 | 1 | 383 | 0 | 653 | 1 | 383 |
| | Through-Right | | 1 | 374 | | | 1 | 374 | | | 1 | 374 | | | 1 | 383 | | | 1 | 383 |
| | Right | 112 | 0 | 112 | 0 | 112 | 0 | 112 | 0 | 112 | 0 | 112 | 0 | 112 | 0 | 112 | 0 | 112 | 0 | 112 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 118 | 1 | 118 | 0 | 118 | 1 | 118 | 0 | 118 | 1 | 118 | 8 | 126 | 1 | 126 | 0 | 126 | 1 | 126 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 445 | 1 | 259 | 0 | 445 | 1 | 259 | 0 | 445 | 1 | 259 | 6 | 451 | 1 | 265 | 0 | 451 | 1 | 265 |
| | Through-Right | | 1 | 259 | | | 1 | 259 | | | 1 | 259 | | | 1 | 265 | | | 1 | 265 |
| | Right | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 6 | 78 | 0 | 78 | 0 | 78 | 0 | 78 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | Existing Cond. | W/ Ambient Growth | W/ Related Projects | W/ Project | W/ Traffic Mitigation |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 605 | 605 | 605 | 605 | 605 |
| | *East-West:* | 492 | 492 | 492 | 509 | 509 |
| | *SUM:* | 1097 | 1097 | 1097 | 1113 | 1113 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.731 | 0.731 | 0.731 | 0.742 | 0.742 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.631 | 0.631 | 0.631 | 0.642 | 0.642 |
| LEVEL OF SERVICE (LOS): | | B | B | B | B | B |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.011 | Δ*v/c* after mitigation: | 0.011 |
| Significant impacted? | NO | Fully mitigated? | N/A |

LADOT Moving Los Angeles Forward

# CMA Calculation Worksheet

| I/S #: | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | East-West Street: | VANOWEN STREET | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2012 W/ AMBIENT GROWTH | | | | 2012 W/ RELATED PROJECTS | | | | 2012 W/ PROJECT | | | | 2012 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 47 | 1 | 47 | 1 | 48 | 1 | 48 | 0 | 48 | 1 | 48 | 0 | 48 | 1 | 48 | 0 | 48 | 1 | 48 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 698 | 2 | 349 | 14 | 712 | 2 | 356 | 22 | 734 | 2 | 367 | 0 | 734 | 2 | 367 | 0 | 734 | 2 | 367 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 88 | 1 | 29 | 2 | 90 | 1 | 30 | 12 | 102 | 1 | 42 | 128 | 230 | 1 | 166 | 0 | 230 | 1 | 166 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 101 | 1 | 101 | 2 | 103 | 1 | 103 | 0 | 103 | 1 | 103 | 14 | 117 | 1 | 117 | 0 | 117 | 1 | 117 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1115 | 2 | 558 | 22 | 1137 | 2 | 569 | 13 | 1150 | 2 | 575 | 0 | 1150 | 2 | 575 | 0 | 1150 | 2 | 575 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 171 | 1 | 87 | 3 | 174 | 1 | 88 | 4 | 178 | 1 | 87 | 0 | 178 | 1 | 87 | 0 | 178 | 1 | 87 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 169 | 1 | 169 | 3 | 172 | 1 | 172 | 10 | 182 | 1 | 182 | 0 | 182 | 1 | 182 | 0 | 182 | 1 | 182 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 636 | 1 | 374 | 13 | 649 | 1 | 381 | 18 | 667 | 1 | 390 | 17 | 684 | 1 | 399 | 0 | 684 | 1 | 399 |
| | Through-Right | | 1 | 374 | | | 1 | 381 | | | 1 | 390 | | | 1 | 399 | | | 1 | 399 |
| | Right | 112 | 0 | 112 | 2 | 114 | 0 | 114 | 0 | 114 | 0 | 114 | 0 | 114 | 0 | 114 | 0 | 114 | 0 | 114 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 118 | 1 | 118 | 2 | 120 | 1 | 120 | 0 | 120 | 1 | 120 | 8 | 128 | 1 | 128 | 0 | 128 | 1 | 128 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 445 | 1 | 259 | 9 | 454 | 1 | 264 | 64 | 518 | 1 | 301 | 6 | 524 | 1 | 307 | 0 | 524 | 1 | 307 |
| | Through-Right | | 1 | 259 | | | 1 | 264 | | | 1 | 301 | | | 1 | 307 | | | 1 | 307 |
| | Right | 72 | 0 | 72 | 1 | 73 | 0 | 73 | 10 | 83 | 0 | 83 | 6 | 89 | 0 | 89 | 0 | 89 | 0 | 89 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 605 | 617 | 623 | 623 | 623 |
| | *East-West:* | 492 | 502 | 511 | 527 | 527 |
| | *SUM:* | 1097 | 1118 | 1134 | 1150 | 1150 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.731 | 0.746 | 0.756 | 0.767 | 0.767 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.631 | 0.646 | 0.656 | 0.667 | 0.667 |
| LEVEL OF SERVICE (LOS): | | B | B | B | B | B |

NO INPUT ALLOWED

INPUT DATA CELL

## PROJECT IMPACT

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.011 | Δ*v/c* after mitigation: | 0.011 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | SALE AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | East-West Street: | VANOWEN STREET | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | | | | 2011 W/ AMBIENT GROWTH | | | | 2011 W/ RELATED PROJECTS | | | | 2011 W/ PROJECT | | | | 2011 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Phases | | | | 2 | | | | 2 | | | | 2 | | | | 2 | | | | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | | | | 0 | | | | 0 | | | | 0 | | | | 0 | | | | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 | | SB--- 0 | | NB--- 0 | | SB--- 0 | | NB--- | | SB--- 0 | | NB--- 0 | | SB--- 0 | | NB--- 0 | | SB--- 0 | |
| | EB--- 0 | | WB--- 0 | | EB--- 0 | | WB--- 0 | | EB--- | | WB--- 0 | | EB--- 0 | | WB--- 0 | | EB--- 0 | | WB--- 0 | |
| ATSAC-1 or ATCS-2? | | | | 2 | | | | 2 | | | | 2 | | | | 2 | | | | 2 |
| Override Capacity | | | | 0 | | | | 0 | | | | 0 | | | | 0 | | | | 0 |

| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 91 | 0 | 91 | 0 | 91 | 0 | 91 | 0 | 91 | 0 | 91 | 0 | 91 | 0 | 91 | 0 | 91 | 0 | 91 |
| | Left-Through-Right | | 1 | 108 | | | 1 | 108 | | | 1 | 108 | | | 1 | 108 | | | 1 | 108 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 27 | 0 | 27 | 0 | 27 | 0 | 27 | 0 | 27 | 0 | 27 | 0 | 27 | 0 | 27 | 0 | 27 | 0 | 27 |
| | Left-Through-Right | | 1 | 34 | | | 1 | 34 | | | 1 | 34 | | | 1 | 34 | | | 1 | 34 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 12 | 28 | 1 | 28 | 0 | 28 | 1 | 28 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 807 | 1 | 412 | 0 | 807 | 1 | 412 | 0 | 807 | 1 | 412 | 106 | 913 | 1 | 465 | 0 | 913 | 1 | 465 |
| | Through-Right | | 1 | 412 | | | 1 | 412 | | | 1 | 412 | | | 1 | 465 | | | 1 | 465 |
| | Right | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 98 | 1 | 98 | 0 | 98 | 1 | 98 | 0 | 98 | 1 | 98 | 0 | 98 | 1 | 98 | 0 | 98 | 1 | 98 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 658 | 1 | 333 | 0 | 658 | 1 | 333 | 0 | 658 | 1 | 333 | 8 | 666 | 1 | 337 | 0 | 666 | 1 | 337 |
| | Through-Right | | 1 | 333 | | | 1 | 333 | | | 1 | 333 | | | 1 | 337 | | | 1 | 337 |
| | Right | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | Existing | | Ambient | | Related | | Project | | Mitigation | |
|---|---|---|---|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 114 | *North-South:* | 114 | *North-South:* | 114 | *North-South:* | 114 | *North-South:* | 114 |
| | *East-West:* | 510 | *East-West:* | 510 | *East-West:* | 510 | *East-West:* | 563 | *East-West:* | 563 |
| | *SUM:* | 624 | *SUM:* | 624 | *SUM:* | 624 | *SUM:* | 677 | *SUM:* | 677 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.416 | | 0.416 | | 0.416 | | 0.451 | | 0.451 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.316 | | 0.316 | | 0.316 | | 0.351 | | 0.351 |
| LEVEL OF SERVICE (LOS): | | A | | A | | A | | A | | A |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.035    Δ*v/c* after mitigation: 0.035

Significant impacted? NO    Fully mitigated? N/A

# CMA Calculation Worksheet

LADOT Moving Los Angeles Forward

| I/S #: | North-South Street: | SALE AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | East-West Street: | VANOWEN STREET | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | Existing | Ambient Growth | Related Projects | W/ Project | Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2012 W/ AMBIENT GROWTH | | | | 2012 W/ RELATED PROJECTS | | | | 2012 W/ PROJECT | | | | 2012 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | 15 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 91 | 0 | 91 | 2 | 93 | 0 | 93 | 0 | 93 | 0 | 93 | 0 | 93 | 0 | 93 | 0 | 93 | 0 | 93 |
| | Left-Through-Right | | 1 | 108 | | | 1 | 110 | | | 1 | 110 | | | 1 | 110 | | | 1 | 110 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 27 | 0 | 27 | 1 | 28 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 |
| | Left-Through-Right | | 1 | 34 | | | 1 | 35 | | | 1 | 35 | | | 1 | 35 | | | 1 | 35 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 12 | 28 | 1 | 28 | 0 | 28 | 1 | 28 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 807 | 1 | 412 | 16 | 823 | 1 | 420 | 29 | 852 | 1 | 434 | 106 | 958 | 1 | 487 | 0 | 958 | 1 | 487 |
| | Through-Right | | 1 | 412 | | | 1 | 420 | | | 1 | 434 | | | 1 | 487 | | | 1 | 487 |
| | Right | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 98 | 1 | 98 | 2 | 100 | 1 | 100 | 0 | 100 | 1 | 100 | 0 | 100 | 1 | 100 | 0 | 100 | 1 | 100 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 658 | 1 | 333 | 13 | 671 | 1 | 340 | 74 | 745 | 1 | 377 | 8 | 753 | 1 | 381 | 0 | 753 | 1 | 381 |
| | Through-Right | | 1 | 333 | | | 1 | 340 | | | 1 | 377 | | | 1 | 381 | | | 1 | 381 |
| | Right | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 Existing | 2012 W/ Ambient Growth | 2012 W/ Related Projects | 2012 W/ Project | 2012 W/ Traffic Mitigation |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | North-South: | 114 | 116 | 116 | 116 | 116 |
| | East-West: | 510 | 520 | 534 | 587 | 587 |
| | SUM: | 624 | 636 | 650 | 703 | 703 |
| VOLUME/CAPACITY (V/C) RATIO: | | 0.416 | 0.424 | 0.434 | 0.469 | 0.469 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | | 0.316 | 0.324 | 0.334 | 0.369 | 0.369 |
| LEVEL OF SERVICE (LOS): | | A | A | A | A | A |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.035 | Δ*v/c* after mitigation: 0.035

Significant impacted? NO | Fully mitigated? N/A

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | SHOUP AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | East-West Street: | VANOWEN STREET | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | Existing Cond. | W/ Ambient Growth | W/ Related Projects | W/ Project | W/ Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- SB--- 0<br>EB--- WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | *2011* EXISTING COND. | | | *2011* W/ AMBIENT GROWTH | | | | *2011* W/ RELATED PROJECTS | | | | *2011* W/ PROJECT | | | | *2011* W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 71 | 1 | 71 | 0 | 71 | 1 | 71 | 0 | 71 | 1 | 71 | 0 | 71 | 1 | 71 | 0 | 71 | 1 | 71 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 761 | 1 | 412 | 0 | 761 | 1 | 412 | 0 | 761 | 1 | 412 | 0 | 761 | 1 | 412 | 0 | 761 | 1 | 412 |
| | Through-Right | | 1 | 412 | | | 1 | 412 | | | 1 | 412 | | | 1 | 412 | | | 1 | 412 |
| | Right | 62 | 0 | 62 | 0 | 62 | 0 | 62 | 0 | 62 | 0 | 62 | 0 | 62 | 0 | 62 | 0 | 62 | 0 | 62 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 79 | 1 | 79 | 0 | 79 | 1 | 79 | 0 | 79 | 1 | 79 | 0 | 79 | 1 | 79 | 0 | 79 | 1 | 79 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1020 | 1 | 596 | 0 | 1020 | 1 | 596 | 0 | 1020 | 1 | 596 | 5 | 1025 | 1 | 599 | 0 | 1025 | 1 | 599 |
| | Through-Right | | 1 | 596 | | | 1 | 596 | | | 1 | 596 | | | 1 | 599 | | | 1 | 599 |
| | Right | 172 | 0 | 172 | 0 | 172 | 0 | 172 | 0 | 172 | 0 | 172 | 0 | 172 | 0 | 172 | 0 | 172 | 0 | 172 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 135 | 1 | 135 | 0 | 135 | 1 | 135 | 0 | 135 | 1 | 135 | 7 | 142 | 1 | 142 | 0 | 142 | 1 | 142 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 631 | 1 | 379 | 0 | 631 | 1 | 379 | 0 | 631 | 1 | 379 | 12 | 643 | 1 | 429 | 0 | 643 | 1 | 429 |
| | Through-Right | | 1 | 379 | | | 1 | 379 | | | 1 | 379 | | | 1 | 429 | | | 1 | 429 |
| | Right | 127 | 0 | 127 | 0 | 127 | 0 | 127 | 0 | 127 | 0 | 127 | 87 | 214 | 0 | 214 | 0 | 214 | 0 | 214 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 95 | 1 | 95 | 0 | 95 | 1 | 95 | 0 | 95 | 1 | 95 | 7 | 102 | 1 | 102 | 0 | 102 | 1 | 102 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 516 | 1 | 291 | 0 | 516 | 1 | 291 | 0 | 516 | 1 | 291 | 8 | 524 | 1 | 295 | 0 | 524 | 1 | 295 |
| | Through-Right | | 1 | 291 | | | 1 | 291 | | | 1 | 291 | | | 1 | 295 | | | 1 | 295 |
| | Right | 66 | 0 | 66 | 0 | 66 | 0 | 66 | 0 | 66 | 0 | 66 | 0 | 66 | 0 | 66 | 0 | 66 | 0 | 66 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | Existing Cond. | W/ Ambient Growth | W/ Related Projects | W/ Project | W/ Traffic Mitigation |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 667 | 667 | 667 | 670 | 670 |
| | *East-West:* | 474 | 474 | 474 | 531 | 531 |
| | *SUM:* | 1141 | 1141 | 1141 | 1200 | 1200 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.761 | 0.761 | 0.761 | 0.800 | 0.800 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.661 | 0.661 | 0.661 | 0.700 | 0.700 |
| LEVEL OF SERVICE (LOS): | | B | B | B | B | B |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.039 | Δ*v/c* after mitigation: 0.039

Significant impacted? NO | Fully mitigated? N/A

# CMA Calculation Worksheet

| I/S #: | North-South Street: | SHOUP AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | East-West Street: | VANOWEN STREET | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0, SB--- 0, EB--- 0, WB--- 0 | NB--- 0, SB--- 0, EB--- 0, WB--- 0 | NB---, SB--- 0, EB---, WB--- 0 | NB--- 0, SB--- 0, EB--- 0, WB--- 0 | NB--- 0, SB--- 0, EB--- 0, WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2012 W/ AMBIENT GROWTH | | | | 2012 W/ RELATED PROJECTS | | | | 2012 W/ PROJECT | | | | 2012 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 71 | 1 | 71 | 1 | 72 | 1 | 72 | 0 | 72 | 1 | 72 | 0 | 72 | 1 | 72 | 0 | 72 | 1 | 72 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 761 | 1 | 412 | 15 | 776 | 1 | 420 | 26 | 802 | 1 | 433 | 0 | 802 | 1 | 433 | 0 | 802 | 1 | 433 |
| | Through-Right | | 1 | 412 | | | 1 | 420 | | | 1 | 433 | | | 1 | 433 | | | 1 | 433 |
| | Right | 62 | 0 | 62 | 1 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 79 | 1 | 79 | 2 | 81 | 1 | 81 | 20 | 101 | 1 | 101 | 0 | 101 | 1 | 101 | 0 | 101 | 1 | 101 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1020 | 1 | 596 | 20 | 1040 | 1 | 608 | 44 | 1084 | 1 | 640 | 5 | 1089 | 1 | 642 | 0 | 1089 | 1 | 642 |
| | Through-Right | | 1 | 596 | | | 1 | 608 | | | 1 | 640 | | | 1 | 642 | | | 1 | 642 |
| | Right | 172 | 0 | 172 | 3 | 175 | 0 | 175 | 20 | 195 | 0 | 195 | 0 | 195 | 0 | 195 | 0 | 195 | 0 | 195 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 135 | 1 | 135 | 3 | 138 | 1 | 138 | 23 | 161 | 1 | 161 | 7 | 168 | 1 | 168 | 0 | 168 | 1 | 168 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 631 | 1 | 379 | 13 | 644 | 1 | 387 | 6 | 650 | 1 | 390 | 12 | 662 | 1 | 439 | 0 | 662 | 1 | 439 |
| | Through-Right | | 1 | 379 | | | 1 | 387 | | | 1 | 390 | | | 1 | 439 | | | 1 | 439 |
| | Right | 127 | 0 | 127 | 3 | 130 | 0 | 130 | 0 | 130 | 0 | 130 | 87 | 217 | 0 | 217 | 0 | 217 | 0 | 217 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 95 | 1 | 95 | 2 | 97 | 1 | 97 | 0 | 97 | 1 | 97 | 7 | 104 | 1 | 104 | 0 | 104 | 1 | 104 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 516 | 1 | 291 | 10 | 526 | 1 | 297 | 54 | 580 | 1 | 335 | 8 | 588 | 1 | 339 | 0 | 588 | 1 | 339 |
| | Through-Right | | 1 | 291 | | | 1 | 297 | | | 1 | 335 | | | 1 | 339 | | | 1 | 339 |
| | Right | 66 | 0 | 66 | 1 | 67 | 0 | 67 | 23 | 90 | 0 | 90 | 0 | 90 | 0 | 90 | 0 | 90 | 0 | 90 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 667 | 680 | 712 | 715 | 715 |
| | *East-West:* | 474 | 483 | 496 | 543 | 543 |
| | *SUM:* | 1141 | 1164 | 1208 | 1258 | 1258 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.761 | 0.776 | 0.806 | 0.839 | 0.839 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.661 | 0.676 | 0.706 | 0.739 | 0.739 |
| LEVEL OF SERVICE (LOS): | | B | B | C | C | C |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.033 | Δ*v/c* after mitigation: | 0.033 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | TOPANGA CYN BLVD | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | East-West Street: | VANOWEN STREET | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2011 W/ AMBIENT GROWTH | 2011 W/ RELATED PROJECTS | 2011 W/ PROJECT | 2011 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 3 | 3 | 3 | 3 | 3 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 1 | 1 | 1 | 1 | 1 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 3 WB--- 0 | NB--- 0 SB--- 0 EB--- 3 WB--- 0 | NB--- SB--- 0 EB--- 3 WB--- 0 | NB--- 0 SB--- 0 EB--- 3 WB--- 0 | NB--- 0 SB--- 0 EB--- 3 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2011 W/ AMBIENT GROWTH | | | | 2011 W/ RELATED PROJECTS | | | | 2011 W/ PROJECT | | | | 2011 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 48 | 1 | 48 | 0 | 48 | 1 | 48 | 0 | 48 | 1 | 48 | 12 | 60 | 1 | 60 | 0 | 60 | 1 | 60 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 930 | 2 | 337 | 0 | 930 | 2 | 337 | 0 | 930 | 2 | 337 | 0 | 930 | 2 | 337 | 0 | 930 | 2 | 337 |
| | Through-Right | | 1 | 337 | | | 1 | 337 | | | 1 | 337 | | | 1 | 337 | | | 1 | 337 |
| | Right | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 112 | 1 | 112 | 0 | 112 | 1 | 112 | 0 | 112 | 1 | 112 | 0 | 112 | 1 | 112 | 0 | 112 | 1 | 112 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1524 | 2 | 537 | 0 | 1524 | 2 | 537 | 0 | 1524 | 2 | 537 | 0 | 1524 | 2 | 537 | 0 | 1524 | 2 | 537 |
| | Through-Right | | 1 | 537 | | | 1 | 537 | | | 1 | 537 | | | 1 | 537 | | | 1 | 537 |
| | Right | 86 | 0 | 86 | 0 | 86 | 0 | 86 | 0 | 86 | 0 | 86 | 0 | 86 | 0 | 86 | 0 | 86 | 0 | 86 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 55 | 1 | 55 | 0 | 55 | 1 | 55 | 0 | 55 | 1 | 55 | 0 | 55 | 1 | 55 | 0 | 55 | 1 | 55 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 719 | 2 | 360 | 0 | 719 | 2 | 360 | 0 | 719 | 2 | 360 | 4 | 723 | 2 | 362 | 0 | 723 | 2 | 362 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 103 | 1 | 55 | 0 | 103 | 1 | 55 | 0 | 103 | 1 | 55 | 8 | 111 | 1 | 51 | 0 | 111 | 1 | 51 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 89 | 1 | 89 | 0 | 89 | 1 | 89 | 0 | 89 | 1 | 89 | 0 | 89 | 1 | 89 | 0 | 89 | 1 | 89 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 528 | 1 | 356 | 0 | 528 | 1 | 356 | 0 | 528 | 1 | 356 | 3 | 531 | 1 | 358 | 0 | 531 | 1 | 358 |
| | Through-Right | | 1 | 356 | | | 1 | 356 | | | 1 | 356 | | | 1 | 358 | | | 1 | 358 |
| | Right | 184 | 0 | 184 | 0 | 184 | 0 | 184 | 0 | 184 | 0 | 184 | 0 | 184 | 0 | 184 | 0 | 184 | 0 | 184 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 EXISTING COND. | 2011 W/ AMBIENT GROWTH | 2011 W/ RELATED PROJECTS | 2011 W/ PROJECT | 2011 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | North-South: | 874 | 874 | 874 | 874 | 874 |
| | East-West: | 449 | 449 | 449 | 451 | 451 |
| | SUM: | 1322 | 1322 | 1322 | 1324 | 1324 |
| VOLUME/CAPACITY (V/C) RATIO: | | 0.928 | 0.928 | 0.928 | 0.929 | 0.929 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | | 0.828 | 0.828 | 0.828 | 0.829 | 0.829 |
| LEVEL OF SERVICE (LOS): | | D | D | D | D | D |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in v/c due to project: | 0.001 | Δv/c after mitigation: | 0.001 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

| I/S #: | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | North-South Street: | TOPANGA CYN BLVD | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
| | East-West Street: | VANOWEN STREET | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 Existing Cond. | 2012 W/ Ambient Growth | 2012 W/ Related Projects | 2012 W/ Project | 2012 W/ Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 3 | 3 | 3 | 3 | 3 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 1 | 1 | 1 | 1 | 1 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 3 WB--- 0 | NB--- 0 SB--- 0 EB--- 3 WB--- 0 | NB--- SB--- 0 EB--- 3 WB--- 0 | NB--- 0 SB--- 0 EB--- 3 WB--- 0 | NB--- 0 SB--- 0 EB--- 3 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | 2011 EXISTING COND. Volume | No. of Lanes | Lane Volume | 2012 W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 48 | 1 | 48 | 1 | 49 | 1 | 49 | 3 | 52 | 1 | 52 | 12 | 64 | 1 | 64 | 0 | 64 | 1 | 64 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 930 | 2 | 337 | 19 | 949 | 2 | 344 | 124 | 1073 | 2 | 385 | 0 | 1073 | 2 | 385 | 0 | 1073 | 2 | 385 |
| | Through-Right | | 1 | 337 | | | 1 | 344 | | | 1 | 385 | | | 1 | 385 | | | 1 | 385 |
| | Right | 81 | 0 | 81 | 2 | 83 | 0 | 83 | 0 | 83 | 0 | 83 | 0 | 83 | 0 | 83 | 0 | 83 | 0 | 83 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 112 | 1 | 112 | 2 | 114 | 1 | 114 | 10 | 124 | 1 | 124 | 0 | 124 | 1 | 124 | 0 | 124 | 1 | 124 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1524 | 2 | 537 | 30 | 1554 | 2 | 547 | 66 | 1620 | 2 | 569 | 0 | 1620 | 2 | 569 | 0 | 1620 | 2 | 569 |
| | Through-Right | | 1 | 537 | | | 1 | 547 | | | 1 | 569 | | | 1 | 569 | | | 1 | 569 |
| | Right | 86 | 0 | 86 | 2 | 88 | 0 | 88 | 0 | 88 | 0 | 88 | 0 | 88 | 0 | 88 | 0 | 88 | 0 | 88 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 55 | 1 | 55 | 1 | 56 | 1 | 56 | 0 | 56 | 1 | 56 | 0 | 56 | 1 | 56 | 0 | 56 | 1 | 56 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 719 | 2 | 360 | 14 | 733 | 2 | 367 | 21 | 754 | 2 | 377 | 4 | 758 | 2 | 379 | 0 | 758 | 2 | 379 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 103 | 1 | 55 | 2 | 105 | 1 | 56 | 5 | 110 | 1 | 58 | 8 | 118 | 1 | 54 | 0 | 118 | 1 | 54 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 89 | 1 | 89 | 2 | 91 | 1 | 91 | 9 | 100 | 1 | 100 | 0 | 100 | 1 | 100 | 0 | 100 | 1 | 100 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 528 | 1 | 356 | 11 | 539 | 1 | 363 | 74 | 613 | 1 | 415 | 3 | 616 | 1 | 416 | 0 | 616 | 1 | 416 |
| | Through-Right | | 1 | 356 | | | 1 | 363 | | | 1 | 415 | | | 1 | 416 | | | 1 | 416 |
| | Right | 184 | 0 | 184 | 4 | 188 | 0 | 188 | 29 | 217 | 0 | 217 | 0 | 217 | 0 | 217 | 0 | 217 | 0 | 217 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | 2011 Existing Cond. | 2012 W/ Ambient Growth | 2012 W/ Related Projects | 2012 W/ Project | 2012 W/ Traffic Mitigation |
|---|---|---|---|---|---|
| CRITICAL VOLUMES *North-South:* | 874 | 891 | 954 | 954 | 954 |
| *East-West:* | 449 | 457 | 477 | 479 | 479 |
| *SUM:* | 1322 | 1349 | 1431 | 1433 | 1433 |
| VOLUME/CAPACITY *(V/C)* RATIO: | 0.928 | 0.946 | 1.005 | 1.006 | 1.006 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | 0.828 | 0.846 | 0.905 | 0.906 | 0.906 |
| LEVEL OF SERVICE (LOS): | D | D | E | E | E |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.001 | Δ*v/c* after mitigation: | 0.001 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | East-West Street: | CRISWELL STREET | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2011 W/ AMBIENT GROWTH | 2011 W/ RELATED PROJECTS | 2011 W/ PROJECT | 2011 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2011 W/ AMBIENT GROWTH | | | | 2011 W/ RELATED PROJECTS | | | | 2011 W/ PROJECT | | | | 2011 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 934 | 2 | 467 | 0 | 934 | 2 | 467 | 0 | 934 | 2 | 467 | 128 | 1062 | 2 | 531 | 0 | 1062 | 2 | 531 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 18 | 1 | 6 | 0 | 18 | 1 | 6 | 0 | 18 | 1 | 6 | 0 | 18 | 1 | 6 | 0 | 18 | 1 | 6 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 33 | 1 | 33 | 0 | 33 | 1 | 33 | 0 | 33 | 1 | 33 | 0 | 33 | 1 | 33 | 0 | 33 | 1 | 33 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1440 | 3 | 480 | 0 | 1440 | 3 | 480 | 0 | 1440 | 3 | 480 | 0 | 1440 | 3 | 480 | 0 | 1440 | 3 | 480 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 10 | 1 | 5 | 0 | 10 | 1 | 5 | 0 | 10 | 1 | 5 | 0 | 10 | 1 | 5 | 0 | 10 | 1 | 5 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 |
| | Left-Through | | 1 | 10 | | | 1 | 10 | | | 1 | 10 | | | 1 | 10 | | | 1 | 10 |
| | Through | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 6 | 1 | 0 | 0 | 6 | 1 | 0 | 0 | 6 | 1 | 0 | 0 | 6 | 1 | 0 | 0 | 6 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 | 0 | 47 |
| | Left-Through-Right | | 1 | 78 | | | 1 | 78 | | | 1 | 78 | | | 1 | 78 | | | 1 | 78 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 EXISTING COND. | 2011 W/ AMBIENT GROWTH | 2011 W/ RELATED PROJECTS | 2011 W/ PROJECT | 2011 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | North-South: | 500 | 500 | 500 | 564 | 564 |
| | East-West: | 88 | 88 | 88 | 88 | 88 |
| | SUM: | 588 | 588 | 588 | 652 | 652 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.392 | 0.392 | 0.392 | 0.435 | 0.435 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.292 | 0.292 | 0.292 | 0.335 | 0.335 |
| LEVEL OF SERVICE (LOS): | | A | A | A | A | A |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.043 | Δ*v/c* after mitigation: | 0.043 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

| I/S #: | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | East-West Street: | CRISWELL STREET | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- SB--- 0<br>EB--- WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2012 W/ AMBIENT GROWTH | | | | 2012 W/ RELATED PROJECTS | | | | 2012 W/ PROJECT | | | | 2012 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 | 0 | 16 | 1 | 16 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 934 | 2 | 467 | 19 | 953 | 2 | 476 | 34 | 987 | 2 | 493 | 128 | 1115 | 2 | 557 | 0 | 1115 | 2 | 557 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 18 | 1 | 6 | 0 | 18 | 1 | 6 | 0 | 18 | 1 | 6 | 0 | 18 | 1 | 6 | 0 | 18 | 1 | 6 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 33 | 1 | 33 | 1 | 34 | 1 | 34 | 0 | 34 | 1 | 34 | 0 | 34 | 1 | 34 | 0 | 34 | 1 | 34 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1440 | 3 | 480 | 29 | 1469 | 3 | 490 | 23 | 1492 | 3 | 497 | 0 | 1492 | 3 | 497 | 0 | 1492 | 3 | 497 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 10 | 1 | 5 | 0 | 10 | 1 | 5 | 0 | 10 | 1 | 5 | 0 | 10 | 1 | 5 | 0 | 10 | 1 | 5 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 |
| | Left-Through | | 1 | 10 | | | 1 | 10 | | | 1 | 10 | | | 1 | 10 | | | 1 | 10 |
| | Through | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 6 | 1 | 0 | 0 | 6 | 1 | 0 | 0 | 6 | 1 | 0 | 0 | 6 | 1 | 0 | 0 | 6 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 | 0 | 24 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 47 | 0 | 47 | 1 | 48 | 0 | 48 | 0 | 48 | 0 | 48 | 0 | 48 | 0 | 48 | 0 | 48 | 0 | 48 |
| | Left-Through-Right | | 1 | 78 | | | 1 | 80 | | | 1 | 80 | | | 1 | 80 | | | 1 | 80 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| CRITICAL VOLUMES — North-South: | 500 | 510 | 527 | 591 | 591 |
| East-West: | 88 | 90 | 90 | 90 | 90 |
| SUM: | 588 | 600 | 617 | 681 | 681 |
| VOLUME/CAPACITY (V/C) RATIO: | 0.392 | 0.400 | 0.411 | 0.454 | 0.454 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | 0.292 | 0.300 | 0.311 | 0.354 | 0.354 |
| LEVEL OF SERVICE (LOS): | A | A | A | A | A |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.043 — Δ*v/c* after mitigation: 0.043

Significant impacted? NO — Fully mitigated? N/A

# CMA Calculation Worksheet

EXISTING + PROJECT

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I/S #: 7 | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
| | East-West Street: | VICTORY BOULEVARD | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | Existing | Ambient Growth | Related Projects | W/ Project | W/ Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 4 | 4 | 4 | 4 | 4 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | *2011* EXISTING COND. | | | *2011* W/ AMBIENT GROWTH | | | | *2011* W/ RELATED PROJECTS | | | | *2011* W/ PROJECT | | | | *2011* W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 198 | 1 | 198 | 0 | 198 | 1 | 198 | 0 | 198 | 1 | 198 | 0 | 198 | 1 | 198 | 0 | 198 | 1 | 198 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 874 | 2 | 437 | 0 | 874 | 2 | 437 | 0 | 874 | 2 | 437 | 73 | 947 | 2 | 474 | 0 | 947 | 2 | 474 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 143 | 1 | 96 | 0 | 143 | 1 | 96 | 0 | 143 | 1 | 96 | 0 | 143 | 1 | 80 | 0 | 143 | 1 | 80 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 102 | 1 | 102 | 0 | 102 | 1 | 102 | 0 | 102 | 1 | 102 | 0 | 102 | 1 | 102 | 0 | 102 | 1 | 102 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1141 | 2 | 424 | 0 | 1141 | 2 | 424 | 0 | 1141 | 2 | 424 | 0 | 1141 | 2 | 424 | 0 | 1141 | 2 | 424 |
| | Through-Right | | 1 | 424 | | | 1 | 424 | | | 1 | 424 | | | 1 | 424 | | | 1 | 424 |
| | Right | 132 | 0 | 132 | 0 | 132 | 0 | 132 | 0 | 132 | 0 | 132 | 0 | 132 | 0 | 132 | 0 | 132 | 0 | 132 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 94 | 1 | 94 | 0 | 94 | 1 | 94 | 0 | 94 | 1 | 94 | 5 | 99 | 1 | 99 | 0 | 99 | 1 | 99 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 987 | 2 | 419 | 0 | 987 | 2 | 419 | 0 | 987 | 2 | 419 | 0 | 987 | 2 | 419 | 0 | 987 | 2 | 419 |
| | Through-Right | | 1 | 419 | | | 1 | 419 | | | 1 | 419 | | | 1 | 419 | | | 1 | 419 |
| | Right | 269 | 0 | 269 | 0 | 269 | 0 | 269 | 0 | 269 | 0 | 269 | 0 | 269 | 0 | 269 | 0 | 269 | 0 | 269 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 95 | 1 | 95 | 0 | 95 | 1 | 95 | 0 | 95 | 1 | 95 | 31 | 126 | 1 | 126 | 0 | 126 | 1 | 126 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 545 | 2 | 203 | 0 | 545 | 2 | 203 | 0 | 545 | 2 | 203 | 7 | 552 | 2 | 222 | 0 | 552 | 2 | 222 |
| | Through-Right | | 1 | 203 | | | 1 | 203 | | | 1 | 203 | | | 1 | 222 | | | 1 | 222 |
| | Right | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 50 | 113 | 0 | 113 | 0 | 113 | 0 | 113 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | Existing | Ambient Growth | Related Projects | W/ Project | W/ Mitigation |
|---|---|---|---|---|---|
| CRITICAL VOLUMES — *North-South:* | 622 | 622 | 622 | 622 | 622 |
| *East-West:* | 514 | 514 | 514 | 545 | 545 |
| *SUM:* | 1136 | 1136 | 1136 | 1167 | 1167 |
| VOLUME/CAPACITY *(V/C)* RATIO: | 0.826 | 0.826 | 0.826 | 0.849 | 0.849 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | 0.726 | 0.726 | 0.726 | 0.749 | 0.749 |
| LEVEL OF SERVICE (LOS): | C | C | C | C | C |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.023 | Δ*v/c* after mitigation: 0.023

Significant impacted? NO | Fully mitigated? N/A

# CMA Calculation Worksheet

| I/S #: | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | East-West Street: | VICTORY BOULEVARD | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 4 | 4 | 4 | 4 | 4 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- SB--- 0<br>EB--- WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | 2011 EXISTING COND. Volume | No. of Lanes | Lane Volume | 2012 W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 198 | 1 | 198 | 4 | 202 | 1 | 202 | 0 | 202 | 1 | 202 | 0 | 202 | 1 | 202 | 0 | 202 | 1 | 202 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 874 | 2 | 437 | 17 | 891 | 2 | 446 | 34 | 925 | 2 | 463 | 73 | 998 | 2 | 499 | 0 | 998 | 2 | 499 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 143 | 1 | 96 | 3 | 146 | 1 | 97 | 0 | 146 | 1 | 97 | 0 | 146 | 1 | 82 | 0 | 146 | 1 | 82 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 102 | 1 | 102 | 2 | 104 | 1 | 104 | 0 | 104 | 1 | 104 | 0 | 104 | 1 | 104 | 0 | 104 | 1 | 104 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1141 | 2 | 424 | 23 | 1164 | 2 | 433 | 23 | 1187 | 2 | 440 | 0 | 1187 | 2 | 440 | 0 | 1187 | 2 | 440 |
| | Through-Right | | 1 | 424 | | | 1 | 433 | | | 1 | 440 | | | 1 | 440 | | | 1 | 440 |
| | Right | 132 | 0 | 132 | 3 | 135 | 0 | 135 | 0 | 135 | 0 | 135 | 0 | 135 | 0 | 135 | 0 | 135 | 0 | 135 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 94 | 1 | 94 | 2 | 96 | 1 | 96 | 0 | 96 | 1 | 96 | 5 | 101 | 1 | 101 | 0 | 101 | 1 | 101 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 987 | 2 | 419 | 20 | 1007 | 2 | 427 | 18 | 1025 | 2 | 433 | 0 | 1025 | 2 | 433 | 0 | 1025 | 2 | 433 |
| | Through-Right | | 1 | 419 | | | 1 | 427 | | | 1 | 433 | | | 1 | 433 | | | 1 | 433 |
| | Right | 269 | 0 | 269 | 5 | 274 | 0 | 274 | 0 | 274 | 0 | 274 | 0 | 274 | 0 | 274 | 0 | 274 | 0 | 274 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 95 | 1 | 95 | 2 | 97 | 1 | 97 | 0 | 97 | 1 | 97 | 31 | 128 | 1 | 128 | 0 | 128 | 1 | 128 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 545 | 2 | 203 | 11 | 556 | 2 | 207 | 85 | 641 | 2 | 235 | 7 | 648 | 2 | 254 | 0 | 648 | 2 | 254 |
| | Through-Right | | 1 | 203 | | | 1 | 207 | | | 1 | 235 | | | 1 | 254 | | | 1 | 254 |
| | Right | 63 | 0 | 63 | 1 | 64 | 0 | 64 | 0 | 64 | 0 | 64 | 50 | 114 | 0 | 114 | 0 | 114 | 0 | 114 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | North-South: | 622 | 635 | 642 | 642 | 642 |
| | East-West: | 514 | 524 | 530 | 561 | 561 |
| | SUM: | 1136 | 1159 | 1172 | 1203 | 1203 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.826 | 0.843 | 0.853 | 0.875 | 0.875 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.726 | 0.743 | 0.753 | 0.775 | 0.775 |
| LEVEL OF SERVICE (LOS): | | C | C | C | C | C |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.022 | Δ*v/c* after mitigation: | 0.022 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | North-South Street: SHOUP AVENUE | Year of Count: 2011 | Ambient Growth: (%): 2 | Conducted by: LCULHANE | Date: 2/28/2011 | | |
| | East-West Street: VICTORY BOULEVARD | Projection Year: 2011 | Peak Hour: AM | Reviewed by: | Project: NCJHS - VANOWEN | | |

| | Existing | Ambient Growth | Related Projects | W/ Project | W/ Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 / EB--- 0 WB--- 0 | NB--- 0 SB--- 0 / EB--- 0 WB--- 0 | NB--- SB--- 0 / EB--- WB--- 0 | NB--- 0 SB--- 0 / EB--- 0 WB--- 0 | NB--- 0 SB--- 0 / EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2011 W/ AMBIENT GROWTH | | | | 2011 W/ RELATED PROJECTS | | | | 2011 W/ PROJECT | | | | 2011 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 107 | 1 | 107 | 0 | 107 | 1 | 107 | 0 | 107 | 1 | 107 | 33 | 140 | 1 | 140 | -10 | 130 | 1 | 130 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 779 | 1 | 426 | 0 | 779 | 1 | 426 | 0 | 779 | 1 | 426 | 0 | 779 | 1 | 426 | 0 | 779 | 1 | 426 |
| | Through-Right | | 1 | 426 | | | 1 | 426 | | | 1 | 426 | | | 1 | 426 | | | 1 | 426 |
| | Right | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 | 0 | 72 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 138 | 1 | 138 | 0 | 138 | 1 | 138 | 0 | 138 | 1 | 138 | 2 | 140 | 1 | 140 | 0 | 140 | 1 | 140 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1140 | 1 | 602 | 0 | 1140 | 1 | 602 | 0 | 1140 | 1 | 602 | 47 | 1187 | 1 | 650 | -14 | 1173 | 1 | 636 |
| | Through-Right | | 1 | 602 | | | 1 | 602 | | | 1 | 602 | | | 1 | 650 | | | 1 | 636 |
| | Right | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 0 | 63 | 50 | 113 | 0 | 113 | -15 | 98 | 0 | 98 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 71 | 1 | 71 | 0 | 71 | 1 | 71 | 0 | 71 | 1 | 71 | 0 | 71 | 1 | 71 | 0 | 71 | 1 | 71 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 937 | 2 | 469 | 0 | 937 | 2 | 469 | 0 | 937 | 2 | 469 | 0 | 937 | 2 | 469 | 0 | 937 | 2 | 469 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 190 | 1 | 137 | 0 | 190 | 1 | 137 | 0 | 190 | 1 | 137 | 0 | 190 | 1 | 120 | 0 | 190 | 1 | 125 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 80 | 1 | 80 | 0 | 80 | 1 | 80 | 0 | 80 | 1 | 80 | 0 | 80 | 1 | 80 | 0 | 80 | 1 | 80 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 497 | 2 | 249 | 0 | 497 | 2 | 249 | 0 | 497 | 2 | 249 | 5 | 502 | 2 | 251 | 0 | 502 | 2 | 251 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 74 | 1 | 5 | 0 | 74 | 1 | 5 | 0 | 74 | 1 | 5 | 0 | 74 | 1 | 4 | 0 | 74 | 1 | 4 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| CRITICAL VOLUMES | | | *North-South:* | 709 | | | *North-South:* | 709 | | | *North-South:* | 709 | | | *North-South:* | 790 | | | *North-South:* | 766 |
| | | | *East-West:* | 549 | | | *East-West:* | 549 | | | *East-West:* | 549 | | | *East-West:* | 549 | | | *East-West:* | 549 |
| | | | *SUM:* | 1257 | | | *SUM:* | 1257 | | | *SUM:* | 1257 | | | *SUM:* | 1339 | | | *SUM:* | 1314 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | | | 0.838 | | | | 0.838 | | | | 0.838 | | | | 0.892 | | | | 0.876 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | | | 0.738 | | | | 0.738 | | | | 0.738 | | | | 0.792 | | | | 0.776 |
| LEVEL OF SERVICE (LOS): | | | | C | | | | C | | | | C | | | | C | | | | C |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.054 | Δ*v/c* after mitigation: | 0.038 |
| Significant impacted? | YES | Fully mitigated? | YES |

# CMA Calculation Worksheet

| I/S #: | North-South Street: | SHOUP AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | East-West Street: | VICTORY BOULEVARD | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 3 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- SB--- 0<br>EB--- WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 | NB--- 0 SB--- 0<br>EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | 2011 EXISTING COND. Volume | No. of Lanes | Lane Volume | 2012 W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 107 | 1 | 107 | 2 | 109 | 1 | 109 | 0 | 109 | 1 | 109 | 33 | 142 | 1 | 142 | -31 | 111 | 1 | 111 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 779 | 1 | 426 | 16 | 795 | 1 | 434 | 49 | 844 | 1 | 459 | 0 | 844 | 1 | 459 | -42 | 802 | 1 | 436 |
| | Through-Right | | 1 | 426 | | | 1 | 434 | | | 1 | 459 | | | 1 | 459 | | | 1 | 436 |
| | Right | 72 | 0 | 72 | 1 | 73 | 0 | 73 | 0 | 73 | 0 | 73 | 0 | 73 | 0 | 73 | -4 | 69 | 0 | 69 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 138 | 1 | 138 | 3 | 141 | 1 | 141 | 0 | 141 | 1 | 141 | 2 | 143 | 1 | 143 | -15 | 128 | 1 | 128 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1140 | 1 | 602 | 23 | 1163 | 1 | 614 | 44 | 1207 | 1 | 636 | 47 | 1254 | 1 | 684 | -87 | 1167 | 1 | 625 |
| | Through-Right | | 1 | 602 | | | 1 | 614 | | | 1 | 636 | | | 1 | 684 | | | 1 | 625 |
| | Right | 63 | 0 | 63 | 1 | 64 | 0 | 64 | 0 | 64 | 0 | 64 | 50 | 114 | 0 | 114 | -31 | 83 | 0 | 83 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 71 | 1 | 71 | 1 | 72 | 1 | 72 | 0 | 72 | 1 | 72 | 0 | 72 | 1 | 72 | -7 | 65 | 1 | 65 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 937 | 2 | 469 | 19 | 956 | 2 | 478 | 18 | 974 | 2 | 487 | 0 | 974 | 2 | 487 | -49 | 925 | 2 | 462 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 190 | 1 | 137 | 4 | 194 | 1 | 139 | 0 | 194 | 1 | 139 | 0 | 194 | 1 | 123 | -10 | 184 | 1 | 128 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 80 | 1 | 80 | 2 | 82 | 1 | 82 | 21 | 103 | 1 | 103 | 0 | 103 | 1 | 103 | -10 | 93 | 1 | 93 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 497 | 2 | 249 | 10 | 507 | 2 | 253 | 85 | 592 | 2 | 296 | 5 | 597 | 2 | 298 | -33 | 564 | 2 | 282 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 74 | 1 | 5 | 1 | 75 | 1 | 5 | 0 | 75 | 1 | 5 | 0 | 75 | 1 | 4 | -4 | 71 | 1 | 8 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 EXISTING COND. | 2012 W/ AMBIENT GROWTH | 2012 W/ RELATED PROJECTS | 2012 W/ PROJECT | 2012 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | North-South: | 709 | 723 | 745 | 826 | 736 |
| | East-West: | 549 | 559 | 589 | 589 | 555 |
| | SUM: | 1257 | 1282 | 1334 | 1416 | 1291 |
| VOLUME/CAPACITY (V/C) RATIO: | | 0.838 | 0.855 | 0.889 | 0.944 | 0.906 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | | 0.738 | 0.755 | 0.789 | 0.844 | 0.806 |
| LEVEL OF SERVICE (LOS): | | C | C | C | D | D |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.055

Significant impacted? YES

Δ*v/c* after mitigation: 0.017

Fully mitigated? YES

# CMA Calculation Worksheet

EXISTING + PROJECT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I/S #: 9 | North-South Street: | FALLBROOK AVENUE | Year of Count: 2011 | Ambient Growth: (%): 2 | Conducted by: LCULHANE | Date: | 2/28/2011 |
| | East-West Street: | OXNARD STREET | Projection Year: 2011 | Peak Hour: AM | Reviewed by: | Project: | NCJHS - VANOWEN |

| | Existing | Ambient Growth | Related Projects | W/ Project | Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | 2011 EXISTING COND. | | | 2011 W/ AMBIENT GROWTH | | | | 2011 W/ RELATED PROJECTS | | | | 2011 W/ PROJECT | | | | 2011 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 9 | 1 | 9 | 0 | 9 | 1 | 9 | 0 | 9 | 1 | 9 | 0 | 9 | 1 | 9 | 0 | 9 | 1 | 9 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 964 | 1 | 536 | 0 | 964 | 1 | 536 | 0 | 964 | 1 | 536 | 35 | 999 | 1 | 554 | 0 | 999 | 1 | 554 |
| | Through-Right | | 1 | 536 | | | 1 | 536 | | | 1 | 536 | | | 1 | 554 | | | 1 | 554 |
| | Right | 108 | 0 | 108 | 0 | 108 | 0 | 108 | 0 | 108 | 0 | 108 | 0 | 108 | 0 | 108 | 0 | 108 | 0 | 108 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 181 | 1 | 181 | 0 | 181 | 1 | 181 | 0 | 181 | 1 | 181 | 0 | 181 | 1 | 181 | 0 | 181 | 1 | 181 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1399 | 1 | 711 | 0 | 1399 | 1 | 711 | 0 | 1399 | 1 | 711 | 31 | 1430 | 1 | 727 | 0 | 1430 | 1 | 727 |
| | Through-Right | | 1 | 711 | | | 1 | 711 | | | 1 | 711 | | | 1 | 727 | | | 1 | 727 |
| | Right | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 44 | 1 | 44 | 0 | 44 | 1 | 44 | 0 | 44 | 1 | 44 | 5 | 49 | 1 | 49 | 0 | 49 | 1 | 49 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 209 | 0 | 0 | 0 | 209 | 0 | 0 | 0 | 209 | 0 | 0 | 0 | 209 | 0 | 0 | 0 | 209 | 0 | 0 |
| | Through-Right | | 1 | 242 | | | 1 | 242 | | | 1 | 242 | | | 1 | 242 | | | 1 | 242 |
| | Right | 33 | 0 | 33 | 0 | 33 | 0 | 33 | 0 | 33 | 0 | 33 | 0 | 33 | 0 | 33 | 0 | 33 | 0 | 33 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 107 | 1 | 107 | 0 | 107 | 1 | 107 | 0 | 107 | 1 | 107 | 0 | 107 | 1 | 107 | 0 | 107 | 1 | 107 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 115 | 0 | 0 | 0 | 115 | 0 | 0 | 0 | 115 | 0 | 0 | 0 | 115 | 0 | 0 | 0 | 115 | 0 | 0 |
| | Through-Right | | 1 | 212 | | | 1 | 212 | | | 1 | 212 | | | 1 | 245 | | | 1 | 245 |
| | Right | 97 | 0 | 97 | 0 | 97 | 0 | 97 | 0 | 97 | 0 | 97 | 33 | 130 | 0 | 130 | 0 | 130 | 0 | 130 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | Existing | Ambient Growth | Related Projects | W/ Project | Traffic Mitigation |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 720 | 720 | 720 | 736 | 736 |
| | *East-West:* | 349 | 349 | 349 | 349 | 349 |
| | *SUM:* | 1069 | 1069 | 1069 | 1085 | 1085 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.713 | 0.713 | 0.713 | 0.723 | 0.723 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.613 | 0.613 | 0.613 | 0.623 | 0.623 |
| LEVEL OF SERVICE (LOS): | | B | B | B | B | B |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.010 — Δ*v/c* after mitigation: 0.010

Significant impacted? NO — Fully mitigated? N/A

# CMA Calculation Worksheet

| I/S #: | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | East-West Street: | OXNARD STREET | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | Existing | Ambient Growth | Related Projects | W/ Project | Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | 2011 EXISTING COND. Volume | No. of Lanes | Lane Volume | 2012 W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 9 | 1 | 9 | 0 | 9 | 1 | 9 | 0 | 9 | 1 | 9 | 0 | 9 | 1 | 9 | 0 | 9 | 1 | 9 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 964 | 1 | 536 | 19 | 983 | 1 | 547 | 34 | 1017 | 1 | 564 | 35 | 1052 | 1 | 581 | 0 | 1052 | 1 | 581 |
| | Through-Right | | 1 | 536 | | | 1 | 547 | | | 1 | 564 | | | 1 | 581 | | | 1 | 581 |
| | Right | 108 | 0 | 108 | 2 | 110 | 0 | 110 | 0 | 110 | 0 | 110 | 0 | 110 | 0 | 110 | 0 | 110 | 0 | 110 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 181 | 1 | 181 | 4 | 185 | 1 | 185 | 0 | 185 | 1 | 185 | 0 | 185 | 1 | 185 | 0 | 185 | 1 | 185 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1399 | 1 | 711 | 28 | 1427 | 1 | 725 | 23 | 1450 | 1 | 737 | 31 | 1481 | 1 | 752 | 0 | 1481 | 1 | 752 |
| | Through-Right | | 1 | 711 | | | 1 | 725 | | | 1 | 737 | | | 1 | 752 | | | 1 | 752 |
| | Right | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 | 0 | 23 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 44 | 1 | 44 | 1 | 45 | 1 | 45 | 0 | 45 | 1 | 45 | 5 | 50 | 1 | 50 | 0 | 50 | 1 | 50 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 209 | 0 | 0 | 4 | 213 | 0 | 0 | 7 | 220 | 0 | 0 | 0 | 220 | 0 | 0 | 0 | 220 | 0 | 0 |
| | Through-Right | | 1 | 242 | | | 1 | 247 | | | 1 | 254 | | | 1 | 254 | | | 1 | 254 |
| | Right | 33 | 0 | 33 | 1 | 34 | 0 | 34 | 0 | 34 | 0 | 34 | 0 | 34 | 0 | 34 | 0 | 34 | 0 | 34 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 107 | 1 | 107 | 2 | 109 | 1 | 109 | 0 | 109 | 1 | 109 | 0 | 109 | 1 | 109 | 0 | 109 | 1 | 109 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 115 | 0 | 0 | 2 | 117 | 0 | 0 | 23 | 140 | 0 | 0 | 0 | 140 | 0 | 0 | 0 | 140 | 0 | 0 |
| | Through-Right | | 1 | 212 | | | 1 | 216 | | | 1 | 239 | | | 1 | 272 | | | 1 | 272 |
| | Right | 97 | 0 | 97 | 2 | 99 | 0 | 99 | 0 | 99 | 0 | 99 | 33 | 132 | 0 | 132 | 0 | 132 | 0 | 132 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | 2011 Existing Cond. | 2012 W/ Ambient Growth | 2012 W/ Related Projects | 2012 W/ Project | 2012 W/ Traffic Mitigation |
|---|---|---|---|---|---|
| CRITICAL VOLUMES North-South: | 720 | 734 | 748 | 766 | 766 |
| East-West: | 349 | 356 | 363 | 363 | 363 |
| SUM: | 1069 | 1090 | 1111 | 1129 | 1129 |
| VOLUME/CAPACITY *(V/C)* RATIO: | 0.713 | 0.727 | 0.741 | 0.753 | 0.753 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | 0.613 | 0.627 | 0.641 | 0.653 | 0.653 |
| LEVEL OF SERVICE (LOS): | B | B | B | B | B |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.012 — Δ*v/c* after mitigation: 0.012

Significant impacted? NO — Fully mitigated? N/A

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | SHOUP AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | East-West Street: | OXNARD STREET | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2011 W/ AMBIENT GROWTH | 2011 W/ RELATED PROJECTS | 2011 W/ PROJECT | 2011 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 2 | 2 | 2 | 2 | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 0 | 0 | 0 | 0 | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- SB--- 0 EB--- WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 | NB--- 0 SB--- 0 EB--- 0 WB--- 0 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2011 W/ AMBIENT GROWTH | | | | 2011 W/ RELATED PROJECTS | | | | 2011 W/ PROJECT | | | | 2011 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 65 | 1 | 65 | 0 | 65 | 1 | 65 | 0 | 65 | 1 | 65 | 33 | 98 | 1 | 98 | 0 | 98 | 1 | 98 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 743 | 1 | 412 | 0 | 743 | 1 | 412 | 0 | 743 | 1 | 412 | 33 | 776 | 1 | 429 | 0 | 776 | 1 | 429 |
| | Through-Right | | 1 | 412 | | | 1 | 412 | | | 1 | 412 | | | 1 | 429 | | | 1 | 429 |
| | Right | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 | 0 | 81 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 164 | 1 | 164 | 0 | 164 | 1 | 164 | 0 | 164 | 1 | 164 | 0 | 164 | 1 | 164 | 0 | 164 | 1 | 164 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1077 | 1 | 622 | 0 | 1077 | 1 | 622 | 0 | 1077 | 1 | 622 | 47 | 1124 | 1 | 645 | 0 | 1124 | 1 | 645 |
| | Through-Right | | 1 | 622 | | | 1 | 622 | | | 1 | 622 | | | 1 | 645 | | | 1 | 645 |
| | Right | 166 | 0 | 166 | 0 | 166 | 0 | 166 | 0 | 166 | 0 | 166 | 0 | 166 | 0 | 166 | 0 | 166 | 0 | 166 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 98 | 1 | 98 | 0 | 98 | 1 | 98 | 0 | 98 | 1 | 98 | 0 | 98 | 1 | 98 | 0 | 98 | 1 | 98 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 417 | 2 | 209 | 0 | 417 | 2 | 209 | 0 | 417 | 2 | 209 | 0 | 417 | 2 | 209 | 0 | 417 | 2 | 209 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 86 | 1 | 54 | 0 | 86 | 1 | 54 | 0 | 86 | 1 | 54 | 0 | 86 | 1 | 37 | 0 | 86 | 1 | 37 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 63 | 1 | 63 | 0 | 63 | 1 | 63 | 0 | 63 | 1 | 63 | 0 | 63 | 1 | 63 | 0 | 63 | 1 | 63 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 177 | 1 | 177 | 0 | 177 | 1 | 177 | 0 | 177 | 1 | 177 | 0 | 177 | 1 | 177 | 0 | 177 | 1 | 177 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 66 | 1 | 0 | 0 | 66 | 1 | 0 | 0 | 66 | 1 | 0 | 0 | 66 | 1 | 0 | 0 | 66 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 EXISTING COND. | 2011 W/ AMBIENT GROWTH | 2011 W/ RELATED PROJECTS | 2011 W/ PROJECT | 2011 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 687 | 687 | 687 | 743 | 743 |
| | *East-West:* | 275 | 275 | 275 | 275 | 275 |
| | *SUM:* | 962 | 962 | 962 | 1018 | 1018 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.641 | 0.641 | 0.641 | 0.679 | 0.679 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.541 | 0.541 | 0.541 | 0.579 | 0.579 |
| LEVEL OF SERVICE (LOS): | | A | A | A | A | A |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in *v/c* due to project: | 0.038 | Δ*v/c* after mitigation: | 0.038 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

| I/S #: | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 10 | North-South Street: SHOUP AVENUE | Year of Count: 2011 | Ambient Growth: (%): 2 | Conducted by: LCULHANE | Date: 2/28/2011 | | | | |
| | East-West Street: OXNARD STREET | Projection Year: 2012 | Peak Hour: AM | Reviewed by: | Project: NCJHS - VANOWEN | | | | |

| | 2011 EXISTING COND. | | | | 2012 W/ AMBIENT GROWTH | | | | 2012 W/ RELATED PROJECTS | | | | 2012 W/ PROJECT | | | | 2012 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Phases | | | | 2 | | | | 2 | | | | 2 | | | | 2 | | | | 2 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | | | | 0 | | | | 0 | | | | 0 | | | | 0 | | | | 0 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- | 0 | SB--- | 0 | NB--- | 0 | SB--- | 0 | NB--- | | SB--- | 0 | NB--- | 0 | SB--- | 0 | NB--- | 0 | SB--- | 0 |
| | EB--- | 0 | WB--- | 0 | EB--- | 0 | WB--- | 0 | EB--- | | WB--- | 0 | EB--- | 0 | WB--- | 0 | EB--- | 0 | WB--- | 0 |
| ATSAC-1 or ATCS-2? | | | | 2 | | | | 2 | | | | 2 | | | | 2 | | | | 2 |
| Override Capacity | | | | 0 | | | | 0 | | | | 0 | | | | 0 | | | | 0 |

| | MOVEMENT | 2011 EXISTING COND. Volume | No. of Lanes | Lane Volume | 2012 W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | 2012 W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 65 | 1 | 65 | 1 | 66 | 1 | 66 | 0 | 66 | 1 | 66 | 33 | 99 | 1 | 99 | 0 | 99 | 1 | 99 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 743 | 1 | 412 | 15 | 758 | 1 | 420 | 63 | 821 | 1 | 460 | 33 | 854 | 1 | 476 | 0 | 854 | 1 | 476 |
| | Through-Right | | 1 | 412 | | | 1 | 420 | | | 1 | 460 | | | 1 | 476 | | | 1 | 476 |
| | Right | 81 | 0 | 81 | 2 | 83 | 0 | 83 | 16 | 99 | 0 | 99 | 0 | 99 | 0 | 99 | 0 | 99 | 0 | 99 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 164 | 1 | 164 | 3 | 167 | 1 | 167 | 10 | 177 | 1 | 177 | 0 | 177 | 1 | 177 | 0 | 177 | 1 | 177 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 1077 | 1 | 622 | 22 | 1099 | 1 | 634 | 64 | 1163 | 1 | 666 | 47 | 1210 | 1 | 689 | 0 | 1210 | 1 | 689 |
| | Through-Right | | 1 | 622 | | | 1 | 634 | | | 1 | 666 | | | 1 | 689 | | | 1 | 689 |
| | Right | 166 | 0 | 166 | 3 | 169 | 0 | 169 | 0 | 169 | 0 | 169 | 0 | 169 | 0 | 169 | 0 | 169 | 0 | 169 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 98 | 1 | 98 | 2 | 100 | 1 | 100 | 0 | 100 | 1 | 100 | 0 | 100 | 1 | 100 | 0 | 100 | 1 | 100 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 417 | 2 | 209 | 8 | 425 | 2 | 213 | 7 | 432 | 2 | 216 | 0 | 432 | 2 | 216 | 0 | 432 | 2 | 216 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 86 | 1 | 54 | 2 | 88 | 1 | 55 | 0 | 88 | 1 | 55 | 0 | 88 | 1 | 38 | 0 | 88 | 1 | 38 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 63 | 1 | 63 | 1 | 64 | 1 | 64 | 13 | 77 | 1 | 77 | 0 | 77 | 1 | 77 | 0 | 77 | 1 | 77 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 177 | 1 | 177 | 4 | 181 | 1 | 181 | 23 | 204 | 1 | 204 | 0 | 204 | 1 | 204 | 0 | 204 | 1 | 204 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 66 | 1 | 0 | 1 | 67 | 1 | 0 | 3 | 70 | 1 | 0 | 0 | 70 | 1 | 0 | 0 | 70 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | 2011 EXISTING COND. | | 2012 W/ AMBIENT GROWTH | | 2012 W/ RELATED PROJECTS | | 2012 W/ PROJECT | | 2012 W/ TRAFFIC MITIGATION | |
|---|---|---|---|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | North-South: | 687 | North-South: | 700 | North-South: | 732 | North-South: | 789 | North-South: | 789 |
| | East-West: | 275 | East-West: | 281 | East-West: | 304 | East-West: | 304 | East-West: | 304 |
| | SUM: | 962 | SUM: | 981 | SUM: | 1036 | SUM: | 1092 | SUM: | 1092 |
| VOLUME/CAPACITY (V/C) RATIO: | | 0.641 | | 0.654 | | 0.690 | | 0.728 | | 0.728 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | | 0.541 | | 0.554 | | 0.590 | | 0.628 | | 0.628 |
| LEVEL OF SERVICE (LOS): | | A | | A | | A | | B | | B |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

| | | | |
|---|---|---|---|
| Change in v/c due to project: | 0.038 | Δv/c after mitigation: | 0.038 |
| Significant impacted? | NO | Fully mitigated? | N/A |

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | FALLBROOK AVENUE | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | East-West Street: | VENTURA BOULEVARD | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | 2011 EXISTING COND. | 2011 W/ AMBIENT GROWTH | 2011 W/ RELATED PROJECTS | 2011 W/ PROJECT | 2011 W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| No. of Phases | 4 | 4 | 4 | 4 | 4 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 1 | 1 | 1 | 1 | 1 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 3 EB--- 0 WB--- 3 | NB--- 0 SB--- 3 EB--- 0 WB--- 3 | NB--- SB--- 3 EB--- WB--- 3 | NB--- 0 SB--- 3 EB--- 0 WB--- 3 | NB--- 0 SB--- 3 EB--- 0 WB--- 3 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | 2011 EXISTING COND. Volume | No. of Lanes | Lane Volume | 2011 W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | 2011 W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume | 2011 W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | 2011 W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 65 | 1 | 65 | 0 | 65 | 1 | 65 | 0 | 65 | 1 | 65 | 0 | 65 | 1 | 65 | 0 | 65 | 1 | 65 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 546 | 1 | 327 | 0 | 546 | 1 | 327 | 0 | 546 | 1 | 327 | 0 | 546 | 1 | 327 | 0 | 546 | 1 | 327 |
| | Through-Right | | 1 | 327 | | | 1 | 327 | | | 1 | 327 | | | 1 | 327 | | | 1 | 327 |
| | Right | 107 | 0 | 107 | 0 | 107 | 0 | 107 | 0 | 107 | 0 | 107 | 0 | 107 | 0 | 107 | 0 | 107 | 0 | 107 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 521 | 1 | 287 | 0 | 521 | 1 | 287 | 0 | 521 | 1 | 287 | 0 | 521 | 1 | 287 | 0 | 521 | 1 | 287 |
| | Left-Through | | 1 | 467 | | | 1 | 467 | | | 1 | 467 | | | 1 | 467 | | | 1 | 467 |
| | Through | 233 | 0 | 0 | 0 | 233 | 0 | 0 | 0 | 233 | 0 | 0 | 0 | 233 | 0 | 0 | 0 | 233 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 478 | 1 | 424 | 0 | 478 | 1 | 424 | 0 | 478 | 1 | 424 | 31 | 509 | 1 | 420 | 0 | 509 | 1 | 420 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 54 | 1 | 54 | 0 | 54 | 1 | 54 | 0 | 54 | 1 | 54 | 35 | 89 | 1 | 89 | 0 | 89 | 1 | 89 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 312 | 3 | 104 | 0 | 312 | 3 | 104 | 0 | 312 | 3 | 104 | 0 | 312 | 3 | 104 | 0 | 312 | 3 | 104 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 33 | 1 | 1 | 0 | 33 | 1 | 1 | 0 | 33 | 1 | 1 | 0 | 33 | 1 | 1 | 0 | 33 | 1 | 1 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 125 | 1 | 125 | 0 | 125 | 1 | 125 | 0 | 125 | 1 | 125 | 0 | 125 | 1 | 125 | 0 | 125 | 1 | 125 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 467 | 2 | 234 | 0 | 467 | 2 | 234 | 0 | 467 | 2 | 234 | 0 | 467 | 2 | 234 | 0 | 467 | 2 | 234 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 292 | 1 | 5 | 0 | 292 | 1 | 5 | 0 | 292 | 1 | 5 | 0 | 292 | 1 | 5 | 0 | 292 | 1 | 5 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | EXISTING COND. | W/ AMBIENT GROWTH | W/ RELATED PROJECTS | W/ PROJECT | W/ TRAFFIC MITIGATION |
|---|---|---|---|---|---|
| CRITICAL VOLUMES North-South: | 794 | 794 | 794 | 794 | 794 |
| East-West: | 288 | 288 | 288 | 323 | 323 |
| SUM: | 1081 | 1081 | 1081 | 1116 | 1116 |
| VOLUME/CAPACITY *(V/C)* RATIO: | 0.787 | 0.787 | 0.787 | 0.812 | 0.812 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | 0.687 | 0.687 | 0.687 | 0.712 | 0.712 |
| LEVEL OF SERVICE (LOS): | B | B | B | C | C |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.025 — Δ*v/c* after mitigation: 0.025

Significant impacted? NO — Fully mitigated? N/A

# CMA Calculation Worksheet

| I/S #: | | | | | | |
|---|---|---|---|---|---|---|
| 11 | North-South Street: FALLBROOK AVENUE | Year of Count: 2011 | Ambient Growth: (%): 2 | Conducted by: LCULHANE | Date: 2/28/2011 |
| | East-West Street: VENTURA BOULEVARD | Projection Year: 2012 | Peak Hour: AM | Reviewed by: | Project: NCJHS - VANOWEN |

| | Existing | Ambient Growth | Related Projects | W/ Project | Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 4 | 4 | 4 | 4 | 4 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 1 | 1 | 1 | 1 | 1 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 0 SB--- 3 EB--- 0 WB--- 3 | NB--- 0 SB--- 3 EB--- 0 WB--- 3 | NB--- SB--- 3 EB--- WB--- 3 | NB--- 0 SB--- 3 EB--- 0 WB--- 3 | NB--- 0 SB--- 3 EB--- 0 WB--- 3 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | | 2011 EXISTING COND. | | | 2012 W/ AMBIENT GROWTH | | | | 2012 W/ RELATED PROJECTS | | | | 2012 W/ PROJECT | | | | 2012 W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MOVEMENT | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 65 | 1 | 65 | 1 | 66 | 1 | 66 | 0 | 66 | 1 | 66 | 0 | 66 | 1 | 66 | 0 | 66 | 1 | 66 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 546 | 1 | 327 | 11 | 557 | 1 | 333 | 15 | 572 | 1 | 341 | 0 | 572 | 1 | 341 | 0 | 572 | 1 | 341 |
| | Through-Right | | 1 | 327 | | | 1 | 333 | | | 1 | 341 | | | 1 | 341 | | | 1 | 341 |
| | Right | 107 | 0 | 107 | 2 | 109 | 0 | 109 | 0 | 109 | 0 | 109 | 0 | 109 | 0 | 109 | 0 | 109 | 0 | 109 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 521 | 1 | 287 | 10 | 531 | 1 | 292 | 0 | 531 | 1 | 292 | 0 | 531 | 1 | 292 | 0 | 531 | 1 | 292 |
| | Left-Through | | 1 | 467 | | | 1 | 477 | | | 1 | 482 | | | 1 | 482 | | | 1 | 482 |
| | Through | 233 | 0 | 0 | 5 | 238 | 0 | 0 | 5 | 243 | 0 | 0 | 0 | 243 | 0 | 0 | 0 | 243 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 478 | 1 | 424 | 10 | 488 | 1 | 432 | 0 | 488 | 1 | 422 | 31 | 519 | 1 | 418 | 0 | 519 | 1 | 418 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 54 | 1 | 54 | 1 | 55 | 1 | 55 | 10 | 65 | 1 | 65 | 35 | 100 | 1 | 100 | 0 | 100 | 1 | 100 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 312 | 3 | 104 | 6 | 318 | 3 | 106 | 45 | 363 | 3 | 121 | 0 | 363 | 3 | 121 | 0 | 363 | 3 | 121 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 33 | 1 | 1 | 1 | 34 | 1 | 1 | 0 | 34 | 1 | 1 | 0 | 34 | 1 | 1 | 0 | 34 | 1 | 1 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 125 | 1 | 125 | 3 | 128 | 1 | 128 | 0 | 128 | 1 | 128 | 0 | 128 | 1 | 128 | 0 | 128 | 1 | 128 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 467 | 2 | 234 | 9 | 476 | 2 | 238 | 77 | 553 | 2 | 277 | 0 | 553 | 2 | 277 | 0 | 553 | 2 | 277 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 292 | 1 | 5 | 6 | 298 | 1 | 6 | 0 | 298 | 1 | 6 | 0 | 298 | 1 | 6 | 0 | 298 | 1 | 6 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| CRITICAL VOLUMES | | | North-South: | 794 | | | North-South: | 810 | | | North-South: | 822 | | | North-South: | 822 | | | North-South: | 822 |
| | | | East-West: | 288 | | | East-West: | 293 | | | East-West: | 342 | | | East-West: | 377 | | | East-West: | 377 |
| | | | SUM: | 1081 | | | SUM: | 1103 | | | SUM: | 1164 | | | SUM: | 1199 | | | SUM: | 1199 |
| VOLUME/CAPACITY (V/C) RATIO: | | | | 0.787 | | | | 0.802 | | | | 0.847 | | | | 0.872 | | | | 0.872 |
| V/C LESS ATSAC/ATCS ADJUSTMENT: | | | | 0.687 | | | | 0.702 | | | | 0.747 | | | | 0.772 | | | | 0.772 |
| LEVEL OF SERVICE (LOS): | | | | B | | | | C | | | | C | | | | C | | | | C |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.025 — Δ*v/c* after mitigation: 0.025

Significant impacted? NO — Fully mitigated? N/A

# CMA Calculation Worksheet

EXISTING + PROJECT

| I/S #: | North-South Street: | EB 101 FWY ONRAMP | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: | 2/28/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | East-West Street: | VENTURA BOULEVARD | Projection Year: | 2011 | Peak Hour: | AM | Reviewed by: | | Project: | NCJHS - VANOWEN |

| | Existing | Ambient Growth | Related Projects | Project | Traffic Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 3 | 3 | 3 | 3 | 3 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 2 | 2 | 2 | 2 | 2 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | *2011* EXISTING COND. | | | *2011* W/ AMBIENT GROWTH | | | | *2011* W/ RELATED PROJECTS | | | | *2011* W/ PROJECT | | | | *2011* W/ TRAFFIC MITIGATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume | Added Volume | Total Volume | No. of Lanes | Lane Volume |
| NORTHBOUND | Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 1766 | 1 | 0 | 0 | 1766 | 1 | 0 | 0 | 1766 | 1 | 0 | 0 | 1766 | 1 | 0 | 0 | 1766 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 961 | 1 | 529 | 0 | 961 | 1 | 529 | 0 | 961 | 1 | 529 | 47 | 1008 | 1 | 554 | 0 | 1008 | 1 | 554 |
| | Left-Through | | 1 | 910 | | | 1 | 910 | | | 1 | 910 | | | 1 | 932 | | | 1 | 932 |
| | Through | 956 | 1 | 478 | 0 | 956 | 1 | 478 | 0 | 956 | 1 | 478 | 0 | 956 | 1 | 478 | 0 | 956 | 1 | 478 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 594 | 3 | 198 | 0 | 594 | 3 | 198 | 0 | 594 | 3 | 198 | 17 | 611 | 3 | 204 | 0 | 611 | 3 | 204 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 21 | 1 | 0 | 0 | 21 | 1 | 0 | 0 | 21 | 1 | 0 | 0 | 21 | 1 | 0 | 0 | 21 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | Existing | Ambient Growth | Related Projects | Project | Traffic Mitigation |
|---|---|---|---|---|---|
| CRITICAL VOLUMES — *North-South:* | 0 | 0 | 0 | 0 | 0 |
| *East-West:* | 1108 | 1108 | 1108 | 1135 | 1135 |
| *SUM:* | 1108 | 1108 | 1108 | 1135 | 1135 |
| VOLUME/CAPACITY *(V/C)* RATIO: | 0.778 | 0.778 | 0.778 | 0.797 | 0.797 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | 0.678 | 0.678 | 0.678 | 0.697 | 0.697 |
| LEVEL OF SERVICE (LOS): | B | B | B | B | B |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.019    Δ*v/c* after mitigation: 0.019

Significant impacted? NO    Fully mitigated? N/A

# CMA Calculation Worksheet

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| I/S #: | North-South Street: | EB 101 FWY ONRAMP | Year of Count: | 2011 | Ambient Growth: (%): | 2 | Conducted by: | LCULHANE | Date: 2/28/2011 |
| 12 | East-West Street: | VENTURA BOULEVARD | Projection Year: | 2012 | Peak Hour: | AM | Reviewed by: | | Project: NCJHS - VANOWEN |

| | Existing | Ambient | Related | Project | Mitigation |
|---|---|---|---|---|---|
| No. of Phases | 3 | 3 | 3 | 3 | 3 |
| Opposed Ø'ing: N/S-1, E/W-2 or Both-3? | 2 | 2 | 2 | 2 | 2 |
| Right Turns: FREE-1, NRTOR-2 or OLA-3? | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 | NB--- 1 SB--- 0 EB--- 0 WB--- 1 |
| ATSAC-1 or ATCS-2? | 2 | 2 | 2 | 2 | 2 |
| Override Capacity | 0 | 0 | 0 | 0 | 0 |

| | MOVEMENT | *2011* EXISTING COND. Volume | No. of Lanes | Lane Volume | *2012* W/ AMBIENT GROWTH Added Volume | Total Volume | No. of Lanes | Lane Volume | *2012* W/ RELATED PROJECTS Added Volume | Total Volume | No. of Lanes | Lane Volume | *2012* W/ PROJECT Added Volume | Total Volume | No. of Lanes | Lane Volume | *2012* W/ TRAFFIC MITIGATION Added Volume | Total Volume | No. of Lanes | Lane Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTHBOUND | Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 1766 | 1 | 0 | 35 | 1801 | 1 | 0 | 0 | 1801 | 1 | 0 | 0 | 1801 | 1 | 0 | 0 | 1801 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| SOUTHBOUND | Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| EASTBOUND | Left | 961 | 1 | 529 | 19 | 980 | 1 | 539 | 20 | 1000 | 1 | 550 | 47 | 1047 | 1 | 576 | 0 | 1047 | 1 | 576 |
| | Left-Through | | 1 | 910 | | | 1 | 929 | | | 1 | 958 | | | 1 | 979 | | | 1 | 979 |
| | Through | 956 | 1 | 478 | 19 | 975 | 1 | 488 | 40 | 1015 | 1 | 508 | 0 | 1015 | 1 | 508 | 0 | 1015 | 1 | 508 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| WESTBOUND | Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Left-Through | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Through | 594 | 3 | 198 | 12 | 606 | 3 | 202 | 87 | 693 | 3 | 231 | 17 | 710 | 3 | 237 | 0 | 710 | 3 | 237 |
| | Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Right | 21 | 1 | 0 | 0 | 21 | 1 | 0 | 0 | 21 | 1 | 0 | 0 | 21 | 1 | 0 | 0 | 21 | 1 | 0 |
| | Left-Through-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |
| | Left-Right | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | | 0 | 0 |

| | | 2011 Existing | 2012 W/ Ambient Growth | 2012 W/ Related Projects | 2012 W/ Project | 2012 W/ Traffic Mitigation |
|---|---|---|---|---|---|---|
| CRITICAL VOLUMES | *North-South:* | 0 | 0 | 0 | 0 | 0 |
| | *East-West:* | 1108 | 1131 | 1189 | 1215 | 1215 |
| | *SUM:* | 1108 | 1131 | 1189 | 1215 | 1215 |
| VOLUME/CAPACITY *(V/C)* RATIO: | | 0.778 | 0.793 | 0.834 | 0.853 | 0.853 |
| *V/C* LESS ATSAC/ATCS ADJUSTMENT: | | 0.678 | 0.693 | 0.734 | 0.753 | 0.753 |
| LEVEL OF SERVICE (LOS): | | B | B | C | C | C |

NO INPUT ALLOWED

INPUT DATA CELL

**PROJECT IMPACT**

Change in *v/c* due to project: 0.019

Δ*v/c* after mitigation: 0.019

Significant impacted? NO

Fully mitigated? N/A

## Dale Till

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Sunday, January 05, 2014 12:09 AM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: NPDES Permits, NEPA, and Section 106

Dear Mr. Malinowski,

Please include my comments below to NASA as part of my comments to DTSC for their SSFL CEQA analysis. I am not sure if DTSC is aware that Boeing's NPDES permit is up for renewal next year. Below are factors NASA must consider regarding their surface water discharges.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Wed, Sep 11, 2013 at 4:46 AM
Subject: NPDES Permits, NEPA, and Section 106
To: msfc-ssfl-eis@mail.nasa.gov,

Dear Mr. Elliott,

I have asked many times why there was no CEQA analysis for the ISRA action.

While I do understand that NASA was under Boeing's NPDES permit,

please read the following document.

It is my understanding that Boeing's permit is up for renewal next year. NASA may want to take these requirements below into consideration.

Respectfully submitted.

*Christine L. Rowe*
NASA SSFL Section 106 Consulting Party

http://cfpub.epa.gov/npdes/fedlaws.cfm?program_id=45

# National Pollutant Discharge Elimination System (NPDES)

Recent Additions | Contact Us Search NPDES:

EPA Home > OW Home > OWM Home > NPDES Home > NPDES Permit Program Basics > Other Federal Laws

Applications

eNOI

Permitted Universe and Backlog Reduction

State Program Information

Statutes and Regulations

Tools for Permit Writers

Water Quality and Technology-Based Permitting

Integrated Municipal Plans

Emerging Topics

NPDES Permit Program Basics Home

# Other Federal Laws

**NOTICE**: All the links on this page are external links and link to non-EPA sites. Links to non-EPA sites do not imply any official EPA endorsement of, or responsibility for, the opinions, ideas, data or products presented at those locations, or guarantee the validity of the information provided. Links to non-EPA servers are provided solely as a pointer to information on topics related to environmental protection that may be useful to EPA staff and the public.

Other laws, besides the Clean Water Act, may apply to the NPDES permit program. The following links are provided to help you learn more about some of these laws that may affect NPDES implementation. Because these laws are implemented by other Federal agencies, many of the links provided below are to Web sites outside of EPA. EPA is not responsible for the information provided on those Web sites. A brief discussion of how some of those laws relate to the NPDES program is also found at in the NPDES regulations at 40 CFR 122.49.

**1.** Endangered Species Act (ESA), 16 U.S.C. 1531 et seq. - The ESA was enacted to protect and conserve endangered and threatened species and critical habitat. The Fish and Wildlife Service (FWS) in the Department of the Interior and the National Marine Fisheries Service (NMFS) in the National Oceanic and Atmospheric Administration (within the Department of Commerce) share responsibility for administration of the ESA.

Section 7 of the ESA requires that Federal agencies consult with the Services to ensure that any projects authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species. The ESA section 7 regulations are found at 50 CFR part 402.

**2.** National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq. - NEPA requires that agencies conduct environmental impact reviews ("Environmental Assessments" and "Environmental Impact Statements") for major Federal actions significantly affecting the quality of the human environment. The President's Council on Environmental Quality coordinates federal environmental efforts to comply with NEPA.. Within EPA, the Office of Federal Activities under the Office of Enforcement and Compliance Assurance (OECA) is responsible for EPA's implementation of NEPA. EPA's NEPA regulations are found at 40 CFR part 6. With respect to NPDES permits, section 511of the Clean Water Act establishes that only EPA-issued permits to "new sources" (dischargers subject to New Source Performance Standards) are subject to NEPA's environmental review procedures prior to permit issuance. States may have their own state law versions of NEPA.

**3.** National Historic Preservation Act (NHPA), 16 U.S.C. 470 et seq. - Section 106 of the Act and implementing regulations (36 CFR part 800) require the Regional Administrator, before issuing a license (permit), to adopt measures when feasible to mitigate potential adverse effects of the licensed activity and properties listed or eligible for listing in the National Register of Historic Places. The Act's requirements are to be implemented in cooperation with State Historic Preservation Officers and upon notice to, and when appropriate, in consultation with the Advisory Council on Historic

**NPDES Permit Program Basics Information**

Recent Additions

FAQs

Publications

Regulations

Training & Meetings

Links

Contacts

You will need Adobe Reader to view some of the files on this page. Files are best viewed in Internet Explorer and Adobe 8.0 or higher. SeeEPA's PDF page to learn more.

Preservation. The Advisory Council provides national oversight for the NHPA.

**4.** Coastal Zone Management Act (CZMA), 16 U.S.C. 1451 et seq. - CZMA was enacted to protect the Nation's coastal zone and is implemented through State-Federal partnerships. Section 307(c) of CZMA prohibits the issuance of NPDES permits for activities affecting land or water use in coastal zones unless the permit applicant certifies that the proposed activity complies with the State Coastal Zone Management Program. CZMA overseen by the Office of Ocean and Coastal Resource Management which is part of the National Oceanic and Atmospheric Administration, within the Department of Commerce. CZMA's implementing regulations are found at 15 CFR part 930.

**5.** The Wild and Scenic Rivers Act, 16 U.S.C. 1273 et seq. - Section 7 of the Act prohibits the Regional Administrator from assisting by license or otherwise the construction of any water resources project that would have a direct, adverse effect on the values for which a national wild and scenic river was established.

**6.** Fish and Wildlife Coordination Act, 16 U.S.C. 661 et seq. - This Act requires that the Regional Administrator, before issuing a permit proposing or authorizing the impoundment (with certain exemptions), diversion, or other control or modification of any body of water, consult with the United States Fish and Wildlife Service, Department of the Interior, and the appropriate State agency exercising jurisdiction over wildlife resources to conserve those resources.

**7.** Essential Fish Habitat Provisions (EFH) of the Magnuson-Stevens Act. EFH promotes the protection of essential fish habitat in the review of projects conducted under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat. EFH requires that EPA consult with the National Marine Fisheries Service for any EPA-issued permits which may adversely affect essential fish habitat identified under the Magnuson-Stevens Act. The EFH consultation interim final regulations were promulgated on December 19, 1997. They are codified at 50 CFR 600. A electronic copy of the Federal Register Notice for this rule can be found on the NMFS Sustainable Fisheries Website.

**Dale Till**

---

**From:** Christine Rowe <crwhnc@gmail.com>
**Sent:** Saturday, January 04, 2014 11:31 PM
**To:** DTSC_SSFL_CEQA
**Cc:** Malinowski, Mark@DTSC; Leclerc, Ray@DTSC
**Subject:** Fwd: Pierce College 2010 Master Plan Addendum
**Attachments:** Addendum Revised 060110.pdf

Dear Mr. Malinowski,

Please include my comment below to NASA as part of my DTSC SSFL CEQA comments.

Thank you.

*Christine L. Rowe*
West Hills resident

Date: Mon, Sep 9, 2013 at 1:34 AM
Subject: Fwd: Pierce College 2010 Master Plan Addendum
To: msfc-ssfl-eis@mail.nasa.gov

Dear Mr. Elliott,

Attached is the Pierce College 2010 Master Plan addendum. On roughly page 65 of this document, you should see intersections that will also be impacted by your project, for example the Victory and Topanga intersection if your trucks go to the south.

As I have stated, this is to make you aware of some traffic that could impact your proposed routes, or the number of trucks that NASA may assume that they can safely send off the SSFL site per day.

Respectfully submitted.

*Christine L. Rowe*

# ADDENDUM

# TO THE 2002 FINAL EIR

*for the proposed*

## Los Angeles Pierce College 2010 Master Plan Update of the 2002 Master Plan

*Prepared for*

Los Angeles Community College District

*Prepared by*

ICF International

**JUNE 2010**

# Table of Contents



## Appendices



## List of Figures

## List of Tables

## Acronyms and Abbreviations

| | |
|---|---|
| 2002 EIR | 2002 Los Angeles Pierce College Facilities Master Plan Environmental Impact Report |
| 2002 FEIR | 2002 Los Angeles Pierce College Facilities Master Plan Final Environmental Impact Report |
| 2002 Master Plan | 2002 Los Angeles Pierce College Facilities Master Plan |
| 2006 CAT Report | Climate Action Team Report to Governor Schwarzenegger and the Legislature |
| 2010 Master Plan Update | Los Angeles Pierce College 2010 Master Plan Update |
| ADA | Americans with Disabilities Act |
| AQMP | Air Quality Management Plan |
| ARB | Air Resources Board |
| Basin | South Coast Air Basin |
| BMP | best management practice |
| Caltrans | California Department of Transportation |
| carbon dioxide equivalent | $CO_2e$ |
| CAT | Climate Action Team |
| CBC | California Building Code |
| CDMG | California Division of Mines and Geology |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| $CH_4$ | methane |
| CNEL | Community Noise Exposure Level |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| College | Los Angeles Pierce College |
| dBA | A-weighted decibels |
| DBH | diameter at breast height |
| FTE | full-time equivalent |
| GHG | greenhouse gas |
| HVAC | heating, ventilation and air-conditioning |
| LACCD | Los Angeles Community College District |
| LADOT | Los Angeles Department of Transportation |
| LADWP | Los Angeles Department of Water and Power |
| LAUSD | Los Angeles Unified School District |

| | |
|---|---|
| LEED | Leadership in Energy and Environmental Design |
| LOS | level of service |
| LST | Localized Significance Threshold |
| LUST | leaking underground storage tank |
| MBTA | Migratory Bird Treaty Act |
| mg/kg | milligrams per kilogram |
| MMT $CO_2e$ | million metric tons of carbon dioxide equivalent |
| $N_2O$ | nitrous oxide |
| $NO_X$ | nitrogen oxides |
| $O_3$ | ozone |
| OSHA | Occupational Safety and Health Administration |
| PM10 | particulate matter |
| PM2.5 | fine particulate matter |
| RCPG | Regional Comprehensive Plan and Guide |
| RWQCB | Regional Water Quality Control Board |
| SCAG | Southern California Association of Governments |
| SCAQMD | South Coast Air Quality Management District |
| $SO_X$ | oxides of sulfur |
| SUSMP | Standard Urban Stormwater Mitigation Plan |
| TACs | toxic air contaminants |
| THP | total petroleum hydrocarbons |
| TIA | Transportation Impact Assessment |
| TIMP | Transportation Improvement Mitigation Program |
| UBC | Uniform Building Code |
| UST | underground storage tank |
| V/C | volume to capacity |
| VMT | vehicle miles travelled |
| WCSP | Warner Center Specific Plan |
| ZIMAS | Zoning Information and Map Access System |

# ADDENDUM AND ENVIRONMENTAL CHECKLIST FORM

## 1. Project Title

Los Angeles Pierce College 2010 Master Plan Update

## 2. California Environmental Quality Act Lead Agency Name and Address

Los Angeles Community College District
770 Wilshire Boulevard
Los Angeles, CA 90017

## 3. Contact Person and Phone Number

Dr. Joy McCaslin, President, Los Angeles Pierce College
Phone: 818.719.6408

## 4. Purpose of Addendum

This addendum to the 2002 Los Angeles Pierce College Facilities Master Plan Final Environmental Impact Report (2002 FEIR) analyzes potential environmental impacts that would result from implementation of the Los Angeles Pierce College 2010 Master Plan Update. The 2002 FEIR evaluated the impacts of implementation of the 2002 Master Plan.

The proposed 2010 Master Plan Update, as described in this addendum, does not create any of the conditions described in Section 15162 of the State CEQA Guidelines that call for the preparation of a subsequent EIR. No new significant impacts would occur, and no previously examined significant effects would be substantially more severe than shown in the 2002 FEIR. Thus, an addendum to the certified 2002 FEIR is the appropriate environmental documentation for the proposed 2010 Master Plan Update.

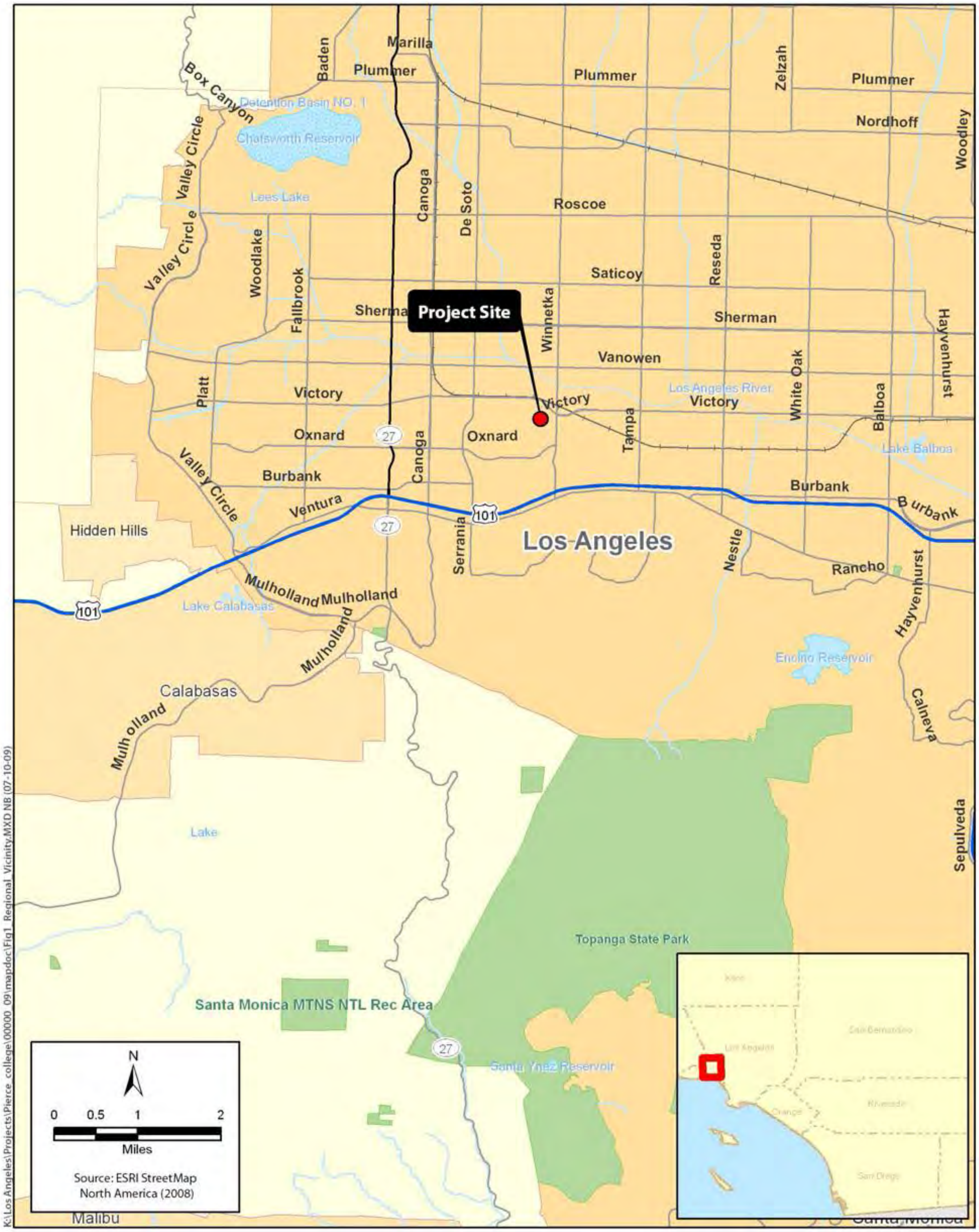
## 5. Project Location

Los Angeles Pierce College (College) is located in the western portion of the San Fernando Valley in the City and County of Los Angeles. Regional access to the College is provided by two freeways, the Ventura Freeway (U.S. 101) and the San Diego Freeway (Interstate 405). The Ventura Freeway is located approximately 0.5 mile south of the College, and the San Diego Freeway is located approximately 6 miles to the east. Figure 1 provides a map of the Los Angeles region in which the College is located.

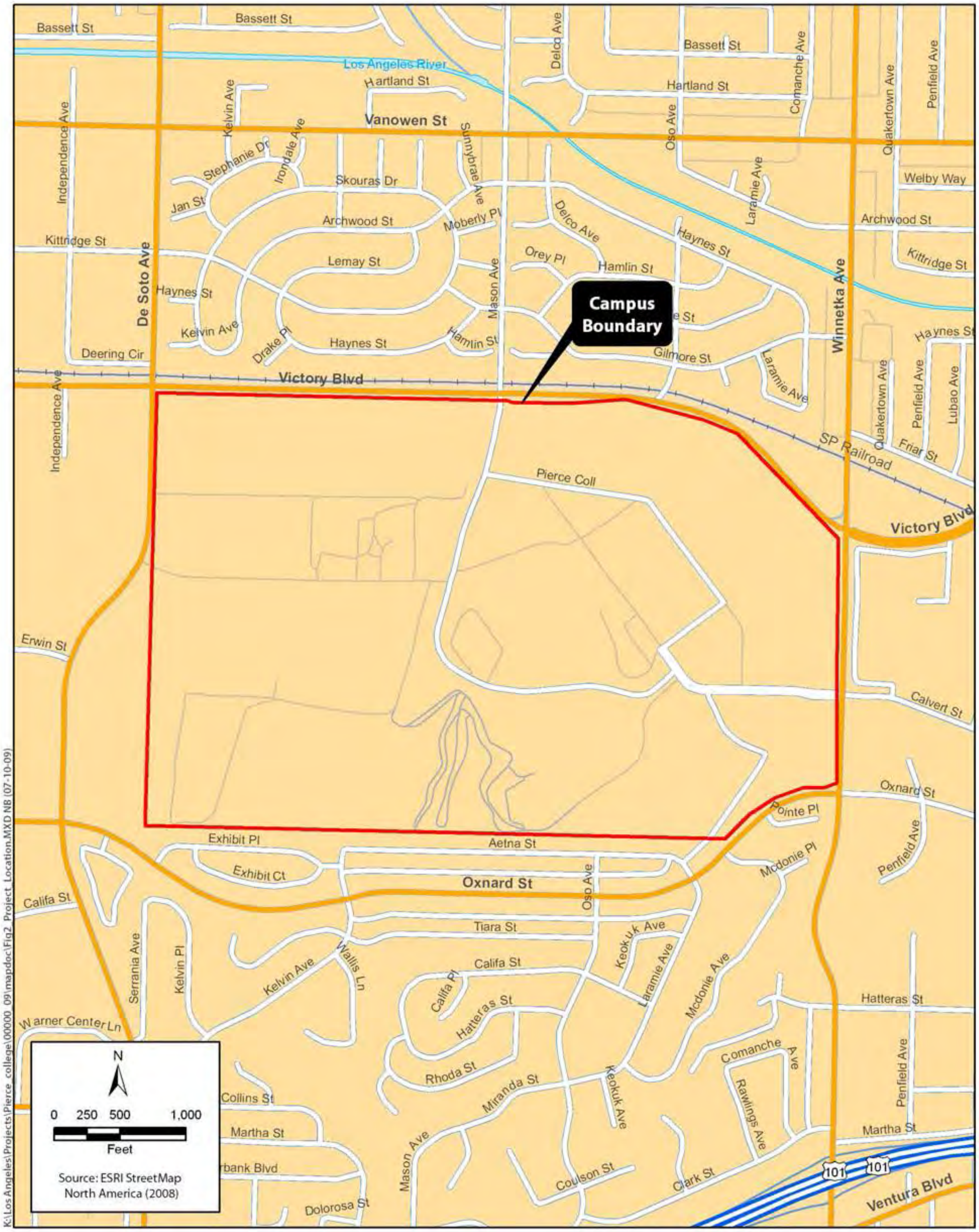
Pierce College is located at 6201 Winnetka Avenue in the community of Woodland Hills in the City of Los Angeles. The College is located in the Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan Area, one of 35 community plan areas in the City of Los Angeles. The College is bounded by Victory Boulevard to the north, Oxnard Street to the south, Winnetka Avenue to the east, and De Soto Avenue to the west. The College, which is located east of the Warner Center Business District, encompasses a total land area of approximately 426 acres. Figure 2 shows the project site and the surrounding area.

Although the College is located in the Los Angeles metropolitan area, the 426-acre campus setting includes 2,200 trees, numerous rose bushes, a nature preserve, a botanical garden, and a forest area that boasts giant redwoods. Most of the College’s educational buildings are located in the core area of the campus. Other important campus areas include the athletic/recreational and horticultural areas. Approximately 226 acres are devoted to an agricultural laboratory/farm that features an equestrian center and small herds of cattle, sheep, and goats.

## Figure 1: Regional Location Map



## Figure 2: Project Vicinity Map




K:\Los Angeles\Projects\Pierce_college\00000_09\mapdoc\Fig2_Project_Location.MXD NB (07-10-09)

The Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan Area covers approximately 29 square miles in the western portion of the City of Los Angeles. According to the Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan (adopted), approximately 59% of the total land uses in this community plan area are residential uses.[1] Open space uses make up 12% of the total uses; commercial uses, 5%; and industrial uses, 4%.[2] Approximately 12% of the land uses are open space-related uses, while 19% are street uses.[3]

## 6. Project Sponsor's Name and Address

Los Angeles Pierce College
6201 Winnetka Avenue
Woodland Hills, CA 91371

## 7. Assessor's Parcel Number: 2149007902

## 8. General Plan Designation: Open Space and Public Facilities

## 9. Zoning: Open Space (OS-1XL), Public Facilities (PF-1XL)

## 10. Background

The 2002 Los Angeles Pierce College Facilities Master Plan (2002 Master Plan) was recently revised to accommodate changes pertaining to student enrollment projections and facility requirements. This addendum for the proposed Los Angeles Pierce College 2010 Master Plan Update (2010 Master Plan Update) has been prepared in accordance with the California Environmental Quality Act (CEQA) Guidelines, Section 15063, to determine whether the proposed 2010 Master Plan Update would result in a new significant effect on the environment that was not previously identified in the 2002 Los Angeles Pierce College Facilities Master Plan Environmental Impact Report (2002 EIR). The Los Angeles Community College District (LACCD) is the lead agency for the proposed 2010 Master Plan Update.

Pierce College, a two-year community college that was founded in 1947, is located in the southwest corner of the San Fernando Valley in the City of Los Angeles. More specifically, the College is located within the community of Woodland Hills and occupies approximately 426 acres. Pierce College includes educational and administrative facilities, agricultural land and facilities, surface parking lots, athletic fields and sports facilities, and open space. Approximately 226 of the College's 426 acres provide space for a farm, which is used as part of the College's agricultural program.

Pierce College is one of nine colleges in the LACCD and is fully accredited by the Western Association of Schools and College. It offers courses in 100 disciplines and has a student population of approximately 23,000 each semester.[4]

In 2002, the LACCD approved the Los Angeles Pierce College Facilities Master Plan. The master plan established a physical framework for the College and supported the school's mission as it expands its facilities to meet future demand. Project objectives of the 2002 Master Plan included creating a more active and productive College, improving the image of the school, enhancing land resources, creating public/private partnerships, developing new educational programs, and providing facilities to meet projected enrollment by 2010.

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[1] Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan. Available: <http://cityplanning.lacity.org/complan/pdf/cpksumlu.pdf>. Accessed: June 28, 2009.
[2] Ibid.
[3] Ibid.
[4] About Pierce College. Available: <http://www.piercecollege.edu/pierce_about.asp>. Accessed: June 25, 2009.

The 2002 Master Plan includes the following four types of projects:

- new construction,
- reconstruction and renovation,
- demolition, and
- public/private partnership projects.

A total of 33 projects were proposed under the 2002 Master Plan. However, subsequent to adoption of the 2002 Master Plan, six of the nine public/private partnership projects were cancelled. One of the new construction projects and one of the renovation projects were also cancelled. Additionally, four of the structures proposed for demolition under the 2002 Master Plan are no longer to be demolished. The remaining projects are either under construction or still scheduled for construction and/or renovation. Table 1 shows the status of the projects proposed under the 2002 Master Plan. Figure 3 shows the locations of the 2002 Master Plan projects.

**Table 1: Status of Projects Proposed under the 2002 Los Angeles Pierce College Facilities Master Plan**

| No. | Project Name | Construction Schedule as of 2002 | Current Status May 2010 |
|---|---|---|---|
| **New Construction Projects** | | | |
| 1 | Agriculture/Science/Nursing Building (renamed Center for the Sciences) | March 2004–Aug. 2005 | Currently under construction |
| 2 | Technology Center (renamed the Green Technologies Building under the 2010 Master Plan Update) | May 2004–May 2005 | Feb. 2012–Jan. 2014 |
| 3 | Child Development Center | Feb. 2004–Jan. 2005 | Currently under construction |
| 4 | Central Maintenance and Operations Facility (renamed the Maintenance and Operations Facility under the 2010 Master Plan Update) | Nov. 2005–Nov. 2007 | Aug. 2010–Sept. 2011 |
| 5 | New Gardner's Maintenance and Operations Facility (renamed the Maintenance and Operations Facility under the 2010 Master Plan Update) | May 2004–Dec. 2004 | Aug. 2010–Sept. 2011 |
| 6 | New Refrigeration Plant Maintenance and Operations Facility (renamed the Maintenance and Operations Facility under the 2010 Master Plan Update) | March 2005–Feb. 2006 | Aug. 2010–Sept. 2011 |
| 7 | Automotive Maintenance and Operations Facility, Student Food Services Facility (renamed the Automotive and New Technical Education Facilities under the 2010 Master Plan Update) | Sept. 2006–Sept. 2007 | Feb. 2012–June 2013 |
| 8 | Horticulture Classroom Building and Greenhouse (renamed the Horticulture/ Animal Science Lab under the 2010 Master Plan Update) | Dec. 2003–Dec. 2004 | Jan. 2011–Jan. 2012 |
| NA | Water Reclamation Facility | Aug. 2004–Dec. 2005 | Cancelled |
| 9 | Campus Police Station | On hold | Completed |
| 10 | Equestrian Education Center | Feb. 2004–Aug. 2004 | Completed |
| 11 | Admissions/Counseling/Student Services Building | Sept. 2004–Feb. 2006 | Completed |
| **Reconstruction, Renovation, and Modernization Projects (Proposition A Bond Projects)** | | | |
| 12 | Life Science/Chemistry/Physics Building | Sept. 2005–March 2006 | To be completed Oct. 2012 |
| 13 | Administration Building (lobby renovation, exterior renovation, interior renovation) | Aug. 2002–Aug. 2006 | To be completed Oct. 2012 |
| 14 | Campus Center | Sept. 2008–Sept. 2009 | To be completed Oct. 2012 |

| No. | Project Name | Construction Schedule as of 2002 | Current Status May 2010 |
|---|---|---|---|
| 15 | Computer Science/Computer Learning Center | May 2005–Jan. 2006 | To be completed Oct. 2012 |
| 16 | Library | Apr. 2004–Oct. 2006 | Completed |
| 17 | Behavioral Science, Social Science, Math, Business Education, English | Feb. 2004–Oct. 2004 | To be completed Oct. 2012 |
| 18 | Facility Offices | Jan. 2004–Sept. 2004 | Completed |
| 19 | Fine Arts and Music | March 2005–Nov. 2005 | To be completed Aug. 2010 |
| 20 | Theatre Building (proposed performing arts and Americans with Disabilities Act [ADA] improvements) | Sept. 2003–July 2006 | March 2011–Sept. 2011 |
| 21 | Animal Science Facilities | | Completed |
| 22 | Life Science/Natural Resources Management | Aug. 2003–Jan. 2004 | Cancelled |
| 23 | Physical Education Facilities | On hold | Completed |
| 24 | Roadway, Walkway, Grounds, Parking Lot, and Entrance Improvements | Sept. 2003–Jan. 2010 | Ongoing (completion in June 2013) |
| NA | Restroom/ADA Renovations | Jan. 2003–Sept. 2009 | Oct. 2012 |
| | **Proposition A Bond Projects—Demolition Projects** | | |
| NA | Remaining Bungalows/Trailers | Jan. 2004–March 2004 | Completed |
| NA | Child Development Center | Contingent on Los Angeles County Metropolitan Transportation Authority (Metro) agreement | Completed |
| NA | Business Office/Student Store | Prior to construction of new Technology Center | Completed |
| NA | Cafeteria/Associated Student Organization Trailer | Upon finding a partner for Student Dormitory Partnership | Cancelled |
| NA | Small Structures in Canyon de Lana | Aug. 2003–Jan. 2004 | Cancelled |
| NA | Agricultural Sciences Building and Plant Facilities | Prior to construction for Phase II of Exhibition/ Events Center and Sciences Partnership Building | Cancelled |
| NA | Soils Lab/Horticulture Unit (proposed horticulture/animal science lab under the 2010 Master Plan Update) | Upon finding a suitable partner for the Sciences Building Partnership | Partial demolition has occurred |
| NA | Storage Structure in Horticulture Area | Dec. 2003–Dec. 2004 | Cancelled |
| | **Public/Private Partnerships Projects** | | |
| 25 | Agriculture Education Experiences and Programs | Begin in Jan. 2003 | In Progress |
| 26 | Produce Stand | Begin in Jan. 2003 | In Progress |
| 27 | Agricultural Fields | Begin in Jan. 2003 | In Progress |
| 28 | Sciences Partnership Building | Feb. 2007–July 2008 | Cancelled |
| 29 | Horticulture Partnership | May 2003–Dec. 2004 | Cancelled |
| 30 | Viticulture Partnership | Jan. 2004–Oct. 2004 | Cancelled |
| 31 | East Student Dormitory | Sept. 2008–Aug. 2009 | Cancelled |
| 32 | Student Housing Partnership | Sept. 2006–Aug. 2007 | Cancelled |
| 33 | Life-Long Learning Residences Partnership | Aug. 2008–Aug. 2009 | Cancelled |

Source: Swinerton Consulting, 2009, 2010.

## Figure 3: Locations of 2002 Master Plan Projects

## 11. Project Purpose and Need

The purpose of the proposed 2010 Master Plan Update is to allow the College the flexibility to account for changing conditions, including student enrollment projections. The 2010 Master Plan Update emphasizes efficient use of the College's resources to meet its educational mission and strategic plan. The 2010 Master Plan Update would build upon the 2002 Master Plan and establish a framework for the College's future, aligning its physical environment with its mission and academic plan. The 2002 Master Plan was developed to guide projects, many of which are nearly complete, initiated under Bond A/AA. With the passage of Measure J, this updated plan creates a flexible approach that ensures the efficient use of resources, sets priorities, and develops strategies for implementation.

## 12. Project Description and Background

Measure J, which passed in November 2008, authorized the LACCD to issue general obligation bonds to fund specific projects certified by the Board of Trustees of the district. Projects could include acquiring or leasing land and/or facilities, improving and repairing security and infrastructure, expanding education to meet the needs of the community, or acquiring furnishings and equipment for modernization, renovation, improvement, and new construction projects.

With the passage of Measure J, the College has updated its master plan to guide its future development. The proposed 2010 Master Plan Update modifies the master plan that was adopted in 2002. Since 2002, a number of individual projects have been cancelled or modified, as indicated in Table 1. Also, student enrollment has been on the decline the last few years; therefore, future enrollment projections have been revised. The recent state budget cuts, as well as increased opportunities for distance learning, have also affected enrollment.

The 2002 Los Angeles Pierce College Facilities Master Plan Final Environmental Impact Report (2002 FEIR) was prepared by ICF Jones & Stokes (then Myra L. Frank & Associates) to identify environmental impacts related to the 2002 Master Plan. The level of impact after mitigation was considered significant for the following issue areas: aesthetics, air quality, historic resources, and transportation (Myra L. Frank & Associates 2002). All other impacts were considered less than significant or less than significant with implementation of proposed mitigation measures.

Pierce College, like other agencies funded by the State of California, has experienced major budget cuts. The result has been a reversal of the enrollment growth trends that occurred over the past 5 years. The budget cuts have forced the College to reduce the section of classes it will offer for the 2009–2010 academic year by 17.5%. The College expects an average enrollment reduction of 8%–10%, pending final spring 2010 enrollment. The California community colleges have been encouraged to reduce their course offerings substantially, and the LACCD has responded by directing all nine colleges to meet significantly reduced enrollment targets. The College has complied with this directive for 2009–2010 and anticipates doing so again in 2010–2011."[5]

It was noted in the 2002 Master Plan that Pierce College had a full-time-equivalent (FTE) student enrollment of 13,591. Under the 2002 Master Plan, 2010 was used as the buildout year. Currently, the projected FTE student enrollment for 2010 is 14,500. (In the 2002 Master Plan, the estimated FTE enrollment for 2010 was 15,960.) The current 2008–2009 FTE student enrollment is 16,079. (In 2002, it was estimated at 15,100.)

The proposed 2010 Master Plan Update's buildout year is 2015. The estimated FTE student enrollment for 2014–2015 is 15,500. Projections show the College adding 1,909 FTE students between 2002 and 2015 (15,500 in 2015 less 13,591 in 2002).

Table 2 shows the FTE levels for 2002, the existing conditions (2008–2009), and project buildout (2015).

[5] Email communication with Pierce College staff member Nabil Abu-Ghazaleh, December 23, 2009.

**Table 2: Existing and Projected Student Enrollment at Pierce College**

| Year | Student Enrollment (FTE) | Student Head Count |
|---|---|---|
| 2002 Master Plan EIR | | |
| 2002 (baseline) | 13,591 | |
| 2010 (buildout year) | 15,960 | 22,880 |
| 2010 Master Plan Update | | |
| 2008–2009 (existing) | 16,079 | 22,164 |
| 2010 (projected) | 14,500 | 21,610 |
| 2015 (buildout year) | 15,500 | 22,931 |
| Source: Los Angeles Pierce College (November 16 and 30, 2009, email communication). | | |

Under the proposed 2010 Master Plan Update, six modified construction projects are proposed for the College, and four renovation projects are proposed. Table 3 describes the individual projects proposed under the Los Angeles Pierce College 2010 Master Plan Update. Figure 4 identifies the locations of the projects proposed under the Los Angeles Pierce College 2010 Master Plan Update.

**Table 3: New/Added and Modified Projects Proposed under Los Angeles Pierce College 2010 Master Plan Update**

| No | Project Name | Approximate Size (sq ft) | Construction Schedule |
|---|---|---|---|
| New Construction | | | |
| 1 | Green Technologies Building* | 70,000 | May 2012–May 2014 |
| 2 | Digital Arts and Media Building | 70,000 | Oct. 2012–Nov. 2014 |
| 3 | Library Learning Crossroads Building | 80,000 | Feb. 2011–Oct. 2012 |
| 4 | Expanded Automotive and New Technical Educational Facilities | 20,000-square-foot addition to existing building | Feb. 2012–June 2013 |
| 5 | Maintenance and Operations Facility** | 30,000 | Aug. 2010–Sept. 2011 |
| 6 | Horticulture/Animal Science*** | 15,451 | Jan. 2011–Jan 2012 |
| Total Square Footage | | 285,451 | |
| Renovations and Demolitions | | | |
| 7 | Demolish Existing Library | No new square footage | Existing library to be demolished. New construction of digital arts and media building |
| 8 | Performing Arts ADA Improvements and ADA Landscaping**** | No new square footage | March 2011–Sept. 2011 |
| 9 | Stadium Area Improvements | No new square footage | Feb. 2011–Aug. 2011 |
| 10 | Infrastructure and Central Plant Extensions | No new square footage | July 2007–Jan. 2010 |

Source: Swinerton Consulting (August 2009 and May 2010 personal communication).

* Modification of 2002 Technology Center.
** Modification of 2002 maintenance and operations facility.
*** Modification of 2002 horticulture classroom building, greenhouse, and renovation.
**** Modification of 2002 theater.

## Figure 4: Locations of Los Angeles Pierce College 2010 Master Plan Update Projects

### *Pierce College 2010 Master Plan Update Construction Projects*

Under the proposed 2010 Master Plan Update, three of the projects that had been proposed under the 2002 Master Plan would be modified.

- The 2002 Technology Center would be modified to consist of a 70,000-square-foot Green Technologies Building. The proposed Green Technologies Building would house the College's new Green Technologies Program, with classroom and applied learning spaces that employ new technologies. The building would be certified under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program, as would all new construction.
- The 2002 Maintenance and Operations facility would also be modified under the proposed 2010 Master Plan Update. Under the 2002 Master Plan, a new 20,000-square-foot Central Plant Facilities Building, a 15,000-square-foot warehouse, secured/sheltered (carport) parking for 40 vehicles, an 11,710-square-foot warehouse, and 6,670 square feet of garage space were proposed. These 2002-proposed facilities totaled 53,380 square feet. Under the 2010 Master Plan Update, these facilities would be consolidated into one structure totaling approximately 30,000 square feet.
- In addition, the 2002 horticulture classroom building, greenhouse, and renovation has become the Horticulture/Animal Science Building, and the 2002 theater is now limited to performing arts/Americans with Disabilities Act (ADA) improvements.

New proposed 2010 Master Plan Update construction is as follows:

- A 70,000-square-foot Digital Arts and Media Building would be developed. The building, which would be LEED certified, would serve as a bridge between the existing applied technologies, liberal arts, and fine arts programs.
- A Library "Learning Crossroads" Building would be developed as a hybrid building under the proposed 2010 Master Plan Update. The 80,000-square-foot structure would be the center of campus activity and would include a library, student union space, learning center, resource center, technology resources, food services, and an art gallery. As a hybrid building, the proposed structure would reduce the amount of square footage required for individual stand-alone facilities.
- An Expanded Automotive Facility and New Technical Educational Facilities; approximately 20,000 square feet of additional space is proposed under the 2010 Master Plan Update.

### *Renovations*

Renovation work would include the following:

- ADA improvements for the performing arts building,
- stadium area improvements,
- infrastructure and central plant extensions, and
- renovation of the horticulture/animal science and student learning environments.

Table 4 compares the environmental impacts of the 2002 Master Plan with those of the proposed 2010 Master Plan Update. As shown in the table, both the 2002 Master Plan and the 2010 Master Plan Update would result in either no impacts or less-than-significant impacts related to agricultural resources, land use, mineral resources, population and housing, and recreation. With mitigation incorporated, both the 2002 and 2010 plans would result in less-than-significant

**Table 4: Comparison of Environmental Impacts – 2002 Pierce College Master Plan and 2010 Master Plan Update**

| Environmental Resource Area | 2002 Pierce College Master Plan | 2010 Master Plan Update |
|---|---|---|
| Aesthetics | Significant after Mitigation. | Less than Significant.<br>No new significant impacts identified. |
| Agricultural Resources | No Impact. | Less than Significant.<br>No new significant impacts identified. |
| Air Quality | Significant after Mitigation. | Significant after Mitigation.<br>Significant impacts are less severe. |
| Biological Resources | Less than Significant with Mitigation. | Less than Significant with Mitigation.<br>No new significant impacts identified. |
| Cultural Resources | Significant after Mitigation.* | Significant after Mitigation.*<br>Significant impacts are less severe. |
| Geology and Soils | Less than Significant with Mitigation. | Less than Significant with Mitigation.<br>No new significant impacts identified. |
| Hazards and Hazardous Materials | Less than Significant with Mitigation. | Less than Significant with Mitigation. |
| Hydrology and Water Quality | Less than Significant with Mitigation. | Less than Significant with Mitigation.<br>No new significant impacts identified. |
| Land Use and Planning | Less than Significant. | Less than Significant.<br>No new significant impacts identified. |
| Mineral Resources | No Impact. | No Impact.<br>No new significant impacts identified. |
| Noise | Less than Significant with Mitigation. | Less than Significant with Mitigation.<br>No new significant impacts identified. |
| Population and Housing | Less than Significant. | Less than Significant.<br>No new significant impacts identified. |
| Public Services | Less than Significant with Mitigation. | Less than Significant with Mitigation.<br>No new significant impacts identified. |
| Recreation | Less than Significant. | Less than Significant.<br>No new significant impacts identified. |
| Transportation | Significant after Mitigation. | Less than Significant with Mitigation.<br>No new significant impacts identified. |
| Utilities and Service Systems | Less than Significant with Mitigation. | Less than Significant with Mitigation.<br>No new significant impacts identified. |

* Significant and unmitigable if retention of the business office/student store and Quonset hut (Exposition Hall) building is not feasible and those buildings are demolished.

Source: ICF Jones & Stokes, 2009.

impacts related to biological resources, geology, hazards, hydrology, noise, public services, and transportation and utilities. Under the 2002 plan, significant unavoidable impacts on aesthetics were identified; less-than-significant aesthetics impacts are anticipated under the 2010 Master Plan Update. Under the 2002 Master Plan, significant unavoidable impacts on air quality and cultural resources were identified. With mitigation, less severe significant air quality and cultural impacts would occur under the proposed 2010 Master Plan Update.

## 13. Construction Phasing

With the required approvals and permits in place, construction activities would be expected to begin in 2010 and end in 2014. The infrastructure and central plant extensions began in 2007 and would continue under the proposed 2010 Master Plan Update.

Table 3, included above, shows the construction schedule for all projects proposed under the Los Angeles Pierce College 2010 Master Plan Update.

## 14. Surrounding Land Uses and Setting

As stated above, the College is located in a developed area of the City of Los Angeles. The area immediately surrounding the College is developed with mostly residential uses. Residential uses are located to the north, south, southeast, and southwest, while Warner Center is located immediately west of the College. The Metro Orange Line includes a station at the College along Winnetka Avenue and a second station at De Soto Avenue and Victory Boulevard.

## 15. Other Public Agencies Whose Approval May Be Required (e.g., permits, financing approval, or participation agreement)

- State of California
  - Division of the State Architect
  - Department of Food and Agriculture
  - Department of General Services
  - Department of Toxic Substances Control
  - State Fire Marshal
- Regional Water Quality Control Board (National Pollutant Discharge Elimination System Permit)
- South Coast Air Quality Management District (stationary-source permits)
- Los Angeles County Metropolitan Transportation Authority
- County of Los Angeles
  - Department of Health Services
  - Department of Public Works
- City of Los Angeles
  - Department of Water and Power
  - Fire Department
  - Public Works Department (grading permit)
  - Bureau of Engineering
  - Bureau of Sanitation
  - Department of Transportation

## ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below (☒) could be affected by this project, involving at least one impact that is a "potentially significant impact," as indicated by the checklist on the following pages.

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Aesthetics | ☐ | Hazards and Hazardous Materials | ☐ | Public Services |
| ☐ | Agriculture Resources | ☐ | Hydrology/Water Quality | ☐ | Recreation |
| ☒ | Air Quality | ☐ | Land Use/Planning | ☐ | Transportation/Traffic |
| ☐ | Biological Resources | ☐ | Mineral Resources | ☐ | Utilities/Service Systems |
| ☒ | Cultural Resources | ☐ | Noise | ☐ | Mandatory Findings of Significance |
| ☐ | Geology/Soils | ☐ | Population/Housing | | |

## EVALUATION OF ENVIRONMENTAL IMPACTS

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|
| **1. AESTHETICS. Would the project:** | | | | |
| **a) Have a substantial adverse effect on a scenic vista?** | ☐ | ☐ | ☒ | ☐ |

**No Impact (designated scenic vistas).** A review of the Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan indicates that no officially designated scenic vistas or views have been identified in the immediate vicinity of Pierce College. The nearest designated scenic vistas are along the Mulholland Scenic Parkway and the Ventura/Cahuenga Boulevard corridor; however, the proposed 2010 Master Plan Update would not affect views from these referenced scenic vantage point locations because of the moderate nature of the design changes that would occur, the separating distance, the elevated configuration of the Ventura Freeway, and intervening development and topography. Hence, no impact on such officially designated scenic views would occur as a result of the revised project.

**Less-than-Significant Impact (unofficial on-campus scenic vistas)**. Detailed visual analysis of the Pierce College campus and its visual setting was provided in the 2002 FEIR. That analysis identified several unofficial scenic views at the Pierce College campus that are considered scenic resources of the neighboring communities but concluded that impacts on such views, occurring as a result of 2002 Master Plan project components, would be less than significant. Scenic resources include the undeveloped rolling hills in the southern portion of the campus and the agricultural fields in the northwest corner of the campus adjacent to De Soto Avenue and Victory Boulevard. The southwest portion of the campus offers panoramic views of other areas of the campus, the San Fernando Valley, and the Santa Susana Mountains to the north. In contrast to the 2002 Master Plan (e.g., previously proposed Viticulture Partnership), the proposed 2010 Master Plan Update would locate only one facility on the undeveloped open space in the southern portion of the campus. The one-story approximately 30,000-square-foot Maintenance and Operations (M&O) facility is currently proposed where the Lifelong Learning Center Residential facility parking lot—comparable in size to the M&O facility—was previously proposed in 2002. This area is characterized by nearly flat-to-rolling terrain that transitions to a steep grade along the southern border of the campus. The existing dense vegetation, consisting of trees and tall shrubbery, serves to largely (but not completely) block views across this portion of the campus, as well as views south and southeast to off-campus locations, and views north into the campus. For purposes of comparison, the site for the proposed M&O facility is a lowered area and is much less visible to sensitive south-of-campus viewers than is the hilly area in the south central area of campus to the west, adjoining the theater building (an area that is highly visible to south-of-campus residents). Design of the M&O facility would include building it into the higher terrain found on the south and southeast edges of the building site to keep its elevation low and diminish its visual prominence as well as installing replacement landscaping of sufficient density and height to screen north-facing views onto the campus by sensitive viewers. Views from Oxnard Street, south of the campus, would not be significantly affected because the roofline of the M&O facility would not protrude above the horizon; only the roof would be partially visible.

The 2010 Master Plan projects would not significantly modify the agricultural fields in the northwest corner of the campus. The extensive agricultural fields to the north and south of El Rancho Drive would, therefore, remain intact, and the open space character of the setting would not be significantly changed because of the relatively small scale and massing of the proposed features in contrast to the expansive character of most informal views across the campus. Therefore, these views of campus open space would continue to be available to the general public, students, and faculty who use the adjacent pedestrian trails. In addition, informal views of key off-campus visual resources, such as the Chalk Hills to the south or to the more distant Santa Susana Mountains and Simi Hills (approximately 5 to 6 miles to the north and northwest, respectively), would not be adversely affected by the projects proposed as part of the 2010 Master Plan Update (see Photos 1–6 in Appendix A). Therefore, the visual impact would remain less than significant.

| | | | | |
|---|---|---|---|---|
| **b) Substantially damage scenic resources, including trees, rock outcroppings, and historic buildings, within a state scenic highway?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** As described above in response 1(a), the nearest scenic highways are Mulholland Scenic Parkway and the Ventura/Cahuenga Boulevard corridor, which are located approximately 2.5 miles and 0.6 mile, respectively, south of the College. Given the distance from Pierce College, topographic differences, mature vegetation, and intervening development, including the elevated configuration of the Ventura Freeway through Woodland Hills, the possibility of unencumbered sightlines of development under the proposed 2010 Master Plan Update occurring from scenic highways would be precluded. No impacts would occur.

| | | | | |
|---|---|---|---|---|
| **c) Substantially degrade the existing visual character or quality of the site and its surroundings?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The proposed 2010 Master Plan Update would include the retention and renovation of existing classroom buildings. It would not introduce new buildings, student activity spaces, or parking facilities in the undeveloped open space in the southern portion of the campus. As described in response 1(a), above, the southern portion of the College is considered a scenic resource for the neighboring communities. In addition, the 2010 Master Plan Update would not significantly modify the agricultural fields in the northwest corner of the campus. The approximately 480-acre expanse of agricultural land to the north along Victory Boulevard would remain intact, as would the agricultural fields/open space to the south across El Rancho Drive. New construction is proposed primarily within the campus core, an area where there is no uniformity in scale or architectural design among the extant buildings. As with existing development, any proposed development in the campus core would be oriented along the campus' existing northwest-to-southeast spine and sited to improve circulation and integrate exterior and interior campus spaces. Such development would take full advantage of the varied surrounding landscape and topographic features. Although core development would not be uniform in terms of height or massing, all new development would be sympathetically integrated and compatible with existing campus development in terms of scale, architectural style, color, materials, and landscape design. The proposed 2010 Master Plan Update would not substantially degrade the existing visual character or quality of the site or its surroundings. This would remain a less-than-significant impact.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **d) Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 EIR identified less-than-significant impacts related to light and glare resulting from construction and operation of projects identified in the 2002 Master Plan. In addition to the renovation of existing buildings, the proposed 2010 Master Plan Update would include the construction of new buildings, parking lots, and way-finding features, as well as the installation of new landscape elements, in a manner that would be compatible with the existing campus environment. New sources of nighttime lighting would be added and, in limited instances, would be visible from outside the campus; however, the revised project's lighting design features (i.e., LEED-based efficient designs and cut-off shielded fixtures angled to be at least 45 degrees below horizontal) and the sizeable intervening distances that separate sensitive viewers from light sources would preclude significant impacts and/or render such lighting only negligibly noticeable. New signage and lighting along walkways and in parking areas would incorporate LEED-certified, energy-efficient units with filtering devices. In addition, fixtures would be positioned and directed to the ground to avoid spillover and sky-glow lighting effects. Most of the new lighting would be for the central part of the College and located far away from nearby residential uses. As such, the potential for spillover and glare impacts on adjacent residential properties would be low. New buildings and structures would be designed with appropriate colors and textures, as well as non-reflective materials. These would be integrated into the adjoining landscape so as not to produce significant glare, spillover light, or sky-glow effects. This would be considered a less-than-significant impact.

| |
|---|
| **2. AGRICULTURE RESOURCES: In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:** |

| | | | | |
|---|---|---|---|---|
| **a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 FEIR found that approximately 12 to 13 acres of land designated as Prime or Unique Farmland would be converted for the development of projects such as the equestrian education center, the child development center, and the new maintenance and operations facility. This development would affect less than 5% of the designated Prime and Unique Farmland on campus. It was concluded that, given the relatively small amount of farmland that would be developed and the fact that the proposed facilities would fulfill the master plan goal of enhancing land resources and would be consistent with the College's agricultural educational mission, the overall impact would not be significant.

A number of the projects identified in the 2002 FEIR would be carried forward under the proposed 2010 Master Plan Update. However, the water reclamation facility, which, previously, could have been placed on Prime or Unique Farmland, would not be carried forward under the proposed 2010 Master Plan Update, thereby reducing the level of significance of previously estimated impacts. Therefore, because no new projects would be placed on Prime or Unique Farmland, impacts would remain as previously estimated in the 2002 EIR, less than significant.

| | | | | |
|---|---|---|---|---|
| **b) Conflict with existing zoning for agricultural use or a Williamson Act contract?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** There is no Land Conservation Act (i.e., Williamson Act) contract for the site. The College is zoned as Open Space and Public Facilities. Therefore, the proposed 2010 Master Plan Update would not conflict with any Williamson Act contract or agricultural zoning. No impact would occur.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|
| **c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The proposed 2010 Master Plan Update would enhance the land resources of Pierce College. Many of the projects are geared toward the agricultural character of the school and would benefit the agricultural uses on campus. As was the case with the 2002 Master Plan, the proposed 2010 Master Plan Update would also fulfill the College's goal of enhancing land resources and would be consistent with the College's agricultural educational mission. Therefore, no impacts would occur.

| | | | | |
|---|---|---|---|---|
| **3. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:** | | | | |
| **a) Conflict with or obstruct implementation of the applicable air quality plan?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The project site is located within the South Coast Air Basin (Basin). The South Coast Air Quality Management District (SCAQMD) is required, pursuant to the federal Clean Air Act, to reduce emissions of criteria pollutants for which the Basin is in nonattainment (i.e., ozone [$O_3$], particulate matter [PM10], and fine particulate matter [PM2.5]). As such, the project would be subject to the SCAQMD's Air Quality Management Plan (AQMP). The AQMP contains a comprehensive list of pollution control strategies to reduce emissions and achieve ambient air quality standards. These strategies are developed, in part, according to regional population, housing, and employment projections prepared by the Southern California Association of Governments (SCAG).

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties. It addresses regional issues related to transportation, the economy, community development, and the environment. With respect to air quality planning, SCAG has prepared the Regional Comprehensive Plan and Guide (RCPG), including the Growth Management and Regional Mobility chapters, which form the basis for the land use and transportation control portions of the AQMP. These documents are used in the preparation of the air quality forecasts and consistency analyses included in the AQMP. Both the RCPG and AQMP are based, in part, on projections that originated from county and city general plans.

The proposed 2010 Master Plan Update would involve the renovation and expansion of an existing development. The revised project is consistent with both the general plan designation and local zoning.

Because the project is consistent with the local general plan and the RCPG (SCAG 1996), pursuant to SCAQMD guidelines, the proposed 2010 Master Plan Update is considered consistent with the region's AQMP. As such, proposed 2010 Master Plan Update-related emissions are accounted for in the AQMP, which is crafted to bring the Basin into attainment for all criteria pollutants. No impacts would occur, and no mitigation measures are necessary.

| | | | | |
|---|---|---|---|---|
| **b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?** | ☒ | ☐ | ☐ | ☐ |

**Potentially Significant (as in the 2002 FEIR but less severe).** As discussed in response 3(a), the project site is located within the Basin. State and federal air quality standards are often exceeded in many parts of the Basin. A discussion of the project's potential short-term construction-period and long-term operational-period air quality impacts is provided below.

**Regional Construction Impacts**

Construction of the proposed 2010 Master Plan Update has the potential to generate air quality impacts due to the use of heavy-duty construction equipment on the project site, construction workers traveling to and from the project site, and deliveries of building materials to the project site. Combustion emissions, primarily nitrogen oxides ($NO_X$), would emanate from the use of on-site construction equipment, such as graders, wheeled loaders, and cranes. During the finishing phase of construction, the application of architectural coatings (i.e., paints) and other materials could release emissions from reactive organic compounds (ROCs).

The proposed 2010 Master Plan Update would result in the construction of approximately 301,451 square feet of new academic space. A more detailed discussion pertaining to proposed new facilities and the renovation/modernization of existing facilities can be found in the Project Description and Background section of this addendum.

Construction is anticipated to start in June 2010 and conclude by February 2014. To provide a conservative estimate of potential worst-case impacts, the impact analysis assumes that up to six projects will be completed within the first two years after approval of this addendum. This assumption is conservative in that it concentrates a high level of construction activity at the earliest feasible date of the proposed 2010 Master Plan Update's overall development period. This point is particularly noteworthy since construction emissions are directly related to the amount and intensity of construction activities (i.e., emissions increase as the amount of construction increases), and emissions factors for certain components of project construction (i.e., construction workers' trips and delivery vehicle trips) decrease over time in response to the introduction of greater numbers of vehicles that emit lower relative levels of pollutant emissions.

The quantity, duration, and intensity of construction activity would have a substantial effect on the amount of construction emissions, as well as related pollutant concentrations, occurring at any one time. As such, the emissions forecasts provided herein reflect a specific set of conservative assumptions that are based on an expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. Because of this conservative assumption, actual emissions could be less than those forecast. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner burning construction equipment fleet mix and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). The construction equipment mix and the duration for each construction stage are detailed in the URBEMIS 2007 printout sheets, which are provided in the air quality appendix.

A conservative estimate of the revised project's worst-case construction emissions is provided in the table below. As shown therein, short-term emissions during construction are expected to exceed SCAQMD regional significance thresholds for $NO_X$. As such, impacts would be significant without incorporation of mitigation measures.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

**Table 5. Forecast of Regional Construction Emissions**

| Construction Phase | Criteria Pollutant Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | ROC | $NO_X$ | CO | $SO_X$ | PM10 | PM2.5 |
| **Single Project** | | | | | | |
| Demolition[a] | 3 | 28 | 14 | <1 | 22 | 6 |
| Site Grading | 3 | 25 | 14 | <1 | 11 | 3 |
| Structure Erection/Finishing | 12 | 9 | 8 | <1 | 1 | 1 |
| **Six Concurrent Projects** | | | | | | |
| Demolition[a] | 3 | 28 | 14 | <1 | 22 | 6 |
| Site Grading | 18 | 150 | 81 | <1 | 66 | 19 |
| Structure Erection/Finishing | 70 | 55 | 47 | <1 | 4 | 3 |
| **Maximum Regional Project Emissions** | **70** | **150** | **81** | <1 | **66** | **19** |
| SCAQMD Regional Emissions Threshold (lbs/day) | 75 | 100 | 550 | 150 | 150 | 55 |
| **Exceed Threshold?** | **No** | **Yes** | **No** | **No** | **No** | **No** |

[a] Demolition occurs only for one project and is therefore not factored in the “concurrent” emissions estimates.
CO = carbon monoxide; $SO_x$ = oxides of sulfur.
URBEMIS 2007 outputs are provided in the air quality appendix.
Source: ICF Jones & Stokes, 2009.

### Mitigation Measures

The following measure shall be implemented to reduce emissions from equipment. As described in the 2002 EIR, this measure would reduce emissions by approximately 10 percent. (However, as described in the 2002 EIR, construction-period air quality impacts were considered significant and unavoidable because of the larger building program than that proposed in this update.)

### 2002 EIR Mitigation Measures

**AQ-1** Turn off equipment when not in use for longer than 5 minutes.

In addition to the mitigation above, which was included in the 2002 EIR, the following measure shall be employed to reduce emissions of NOX, ROC, PM10, and PM2.5 further in all off-road equipment:

**AQ-2** Use EPA Tier 2 emissions-compliant equipment or newer.

### Residual Impacts

Implementation of mitigation measure AQ-1 would result in a reduction of all criteria pollutant emissions by approximately 10 percent. Implementation of mitigation measure AQ-2 would, on average, reduce $NO_X$ emissions from construction equipment operating on site by 55 percent, ROC emissions by 77 percent, and combustion-source particulate emissions (PM10 and PM2.5) by 55 percent.

As shown in the following table, with implementation of mitigation measures AQ-1 and AQ-2, regional $NO_X$ emissions would be reduced to a level below the respective SCAQMD threshold. In addition, mass regional ROC, PM10, and PM2.5 emissions would be reduced to levels below their previous less-than-significant levels.

**Table 6. Forecast of Mitigated Regional Construction Emissions**

| Construction Phase | Criteria Pollutant Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | ROC | $NO_X$ | CO | $SO_X$ | PM10 | PM2.5 |
| **Single Project** | | | | | | |
| Demolition[a] | 2 | 25 | 14 | <1 | 21 | 5 |
| Site Grading | 1 | 11 | 14 | <1 | 10 | 3 |
| Structure Erection/Finishing | 11 | 4 | 8 | <1 | <1 | <1 |
| **Six Concurrent Projects** | | | | | | |
| Demolition[a] | 2 | 25 | 14 | <1 | 21 | 5 |
| Site Grading | 4 | 68 | 81 | <1 | 62 | 15 |
| Structure Erection/Finishing | 65 | 27 | 47 | <1 | 2 | 2 |
| **Maximum Regional Project Emissions** | **65** | **68** | **81** | <1 | **62** | **15** |
| SCAQMD Regional Emissions Threshold (lbs/day) | 75 | 100 | 550 | 150 | 150 | 55 |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** |

[a] Demolition occurs only for one project and is therefore not factored in the “concurrent” emissions estimates.
URBEMIS 2007 outputs are provided in the air quality appendix.
Source: ICF Jones & Stokes, 2009.

### Localized Construction Impacts

When quantifying mass emissions for localized analysis, only emissions that occur on site are considered. Consistent with SCAQMD Localized Significance Threshold (LST) methodology guidelines, emissions related to off-site delivery/haul truck activity and employee trips are not considered in the evaluation of localized impacts (SCAQMD 2003). As shown in the following table, localized emissions for all criteria pollutants would remain below their respective SCAQMD LST. As such, localized impacts that may result from construction-period air pollutant emissions would be less than significant. No additional mitigation measures are necessary.

**Table 7. Forecast of Localized Construction Emissions**

| Construction Phase | Criteria Pollutant Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | ROC | $NO_X$ | CO | $SO_X$ | PM10 | PM2.5 |
| **Pierce College** | | | | | | |
| Demolition | <1 | 3 | 5 | <1 | 20 | 4 |
| Site Grading | 1 | 11 | 13 | <1 | 10 | 3 |
| Structure Erection/Finishing | 11 | 4 | 5 | <1 | <1 | <1 |
| **Worst Case On-site Total**[a] | **11** | **11** | **13** | <1 | **20** | **4** |
| SCAQMD Localized Significance Threshold (lbs/day)[b] | — | 212 | 1,510 | — | 35 | 8 |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** |

[a] Maximum concurrent localized project emissions for ROC, $NO_X$, and CO occur during the 1-month period when construction, architectural coating, and paving overlap. Maximum PM10 emissions occur during the 1-month demolition phase. All other maximums occur during grading/excavation.

[b] These localized thresholds were taken from tables provided in the SCAQMD LST methodology guidance document, which are based on the following: 1) The project site is located in SCAQMD Source Receptor Area No. 6, 2) sensitive receptors are located within 50 meters of construction activity, and 3) the maximum site area to be disturbed is 5 acres.

URBEMIS 2007 outputs are provided in the air quality appendix.

Source: ICF Jones & Stokes, 2009.

### Regional Operational Impacts

SCAQMD has also established significance thresholds to evaluate potential impacts associated with long-term project operations. Regional air pollutant emissions associated with project operations would be generated from the consumption of electricity and natural gas and the operation of on-road vehicles. Pollutant emissions associated with energy demand (i.e., electricity generation and natural gas consumption) are classified by SCAQMD as regional stationary-source emissions. Electricity is considered an area source because it is produced at various locations inside and outside of the Basin. Because it is not possible to isolate where electricity is produced, these emissions are conservatively considered to occur within the Basin and be regional in nature. Criteria pollutant emissions associated with the production and consumption of energy were calculated using emission factors from SCAQMD's *CEQA Air Quality Handbook* (appendix to Chapter 9) (SCAQMD 1993).

Mobile-source emissions were calculated using the URBEMIS 2007 emissions inventory model, which multiplies the estimate of daily vehicle miles travelled (VMT) by applicable EMFAC2007 emissions factors. The URBEMIS 2007 model output and worksheets for calculating regional operational daily emissions are provided in the air quality appendix. As shown in the following table, while the revised project's regional emissions would exceed most regional SCAQMD thresholds, emissions are expected to remain below emission levels previously calculated for the 2002 Master Facilities Plan. Therefore, regional operational emissions would not result in more severe significant long-term regional air quality impacts.

**Table 8. Forecast of Regional Operational Emissions**

| | Criteria Pollutant Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | ROC | $NO_X$ | CO | $SO_X$ | PM10 | PM2.5 |
| **Pierce College** | | | | | | |
| 2010 Master Plan | 117 | 99 | 1,379 | 1 | 83 | 76 |
| 2002 Master Plan | 170 | 108 | 1,506 | 1 | 90 | 83 |
| SCAQMD Regional Emissions Threshold (lbs/day) | 55 | 55 | 550 | 150 | 150 | 55 |
| **Exceed Threshold?** | **Yes** | **Yes** | **Yes** | **No** | **No** | **Yes** |
| **More Severe Significant Impact?** | **No** | **No** | **No** | **No** | **No** | **No** |

[a] Mobile emissions calculated using the URBEMIS 2007 emissions model. Model output sheets are provided in the air quality appendix.

[b] Emissions due to project-related electricity generation based on guidance provided in SCAQMD's *CEQA Air Quality Handbook*. Worksheets are provided in the air quality appendix.

URBEMIS 2007 outputs are provided in the air quality appendix.

Source: ICF Jones & Stokes, 2009.

**Local Operational Impacts**

Within an urban setting, vehicle exhaust is the primary source of CO. Consequently, the highest CO concentrations are generally found close to congested intersections. Under typical meteorological conditions, CO concentrations tend to decrease as the distance from the emissions source (i.e., congested intersection) increases. For purposes of providing a conservative worst-case impact analysis, CO concentrations are typically analyzed at congested intersections, because if impacts are less than significant close to the congested intersections, impacts will also be less than significant at more distant locations.

Project traffic during the operational phase would have the potential to create local CO impacts. SCAQMD recommends a hot-spot evaluation of potential local CO impacts when volume-to-capacity ratios are increased by 2 percent at intersections with a level of service (LOS) of C or worse. Given these criteria and information provided in the traffic impact study prepared by Fehr and Peers (2010), two intersections were selected for analysis.

Local area CO concentrations were projected using the CALINE 4 traffic pollutant dispersion model. The analysis of CO impacts followed the protocol recommended by the California Department of Transportation (Caltrans), published as the *Transportation Project-level Carbon Monoxide Protocol* (Caltrans 1997). It is also consistent with SCAQMD's CO modeling protocol procedures, with all four corners of each intersection analyzed to determine whether project development would result in a CO concentration that exceeds federal or state CO standards.

The project's AM and PM 1- and 8-hour CO levels for project year 2015 CO concentrations are presented in the table below. As shown therein, the proposed 2010 Master Plan Update would not have a significant impact related to 1- or 8-hour local CO concentrations from mobile-source emissions.

Because significant impacts would not occur at those intersections with the highest traffic volumes, which are located adjacent to sensitive receptors, no significant impacts are anticipated to occur at any other location in the study area. This is because the conditions that yield CO hot spots would not be any worse than those that would occur at the analyzed intersections. Consequently, sensitive receptors included in this analysis would not be significantly affected by the CO emissions from the net increase in traffic that would occur under the project. Because the project would not cause an exceedance or exacerbate an existing exceedance of an ambient air quality standard, the project's localized operational air quality impacts would be less than significant. No mitigation measures are necessary.

**Table 9. Local Area Carbon Monoxide Dispersion Analysis**

| Intersection | Peak Period[a] | Maximum 1-hour 2015 Base Concentration (ppm)[b] | Maximum 1-hour 2015 with-Project Concentration (ppm)[c] | Significant 1-hour Concentration Impact?[d] | Maximum 8-hour 2015 Base Concentration (ppm)[e] | Maximum 8-hour 2015 with-Project Concentration (ppm)[f] | Significant 8-hour Concentration Impact?[d] |
|---|---|---|---|---|---|---|---|
| De Soto at Victory | AM | 8.0 | 8.0 | No | 6.5 | 6.5 | No |
| | PM | 8.3 | 8.3 | No | 6.7 | 6.7 | No |
| Winnetka at U.S. 101 Eastbound Ramp | AM | 7.5 | 7.6 | No | 6.1 | 6.2 | No |
| | PM | 7.5 | 7.5 | No | 6.1 | 6.1 | No |

Notes:

CALINE4 dispersion model output sheets and EMFAC2007 emissions factors are provided in the air quality appendix.

ppm = parts per million

[a] Peak-hour traffic volumes are based on the traffic impact analysis prepared for the project by Fehr and Peers (2010).

[b] SCAQMD 2015 1-hour ambient background concentration (6.6 ppm) + 2015 base traffic CO 1-hour contribution.

[c] SCAQMD 2015 1-hour ambient background concentration (6.6 ppm) + 2015 with-project traffic CO 1-hour contribution.

[d] The state standard for the 1-hour average CO concentration is 20 ppm, and the 8-hour average concentration is 9.0 ppm.

[e] SCAQMD 2015 8-hour ambient background concentration (5.5 ppm) + 2015 base traffic CO 8-hour contribution.

[f] SCAQMD 2015 8-hour ambient background concentration (5.5 ppm) + 2015 with-project traffic CO 8-hour contribution.

Source: ICF Jones & Stokes, 2009.

With respect to the revised project's on-site mass emissions, the following table shows that on-site operational-period emissions would be below SCAQMD's LSTs. Impacts from emissions of these criteria pollutants would be less than significant.

**Table 10. Forecast of Localized Operational Emissions**

| | Criteria Pollutant Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | **ROC** | **$NO_X$** | **CO** | **$SO_X$** | **PM10** | **PM2.5** |
| On-site Area-Source Emissions | 2 | 3 | 4 | <1 | <1 | <1 |
| SCAQMD Localized Significance Threshold (lbs/day)[a] | — | 212 | 1,510 | — | 9 | 2 |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** |

[a] These localized thresholds were taken from tables provided in the SCAQMD LST methodology guidance document, which is based on the following: 1) The project site is located in SCAQMD Source Receptor Area No. 6, 2) sensitive receptors are located within 50 meters of the project, and 3) the maximum site to be disturbed is 5 acres.

URBEMIS 2007 outputs are provided in the air quality appendix.

Source: ICF Jones & Stokes, 2009.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** SCAQMD's approach for assessing cumulative impacts is based on the AQMP forecasts of attainment of ambient air quality standards, in accordance with the requirements of the federal and state Clean Air Acts. As discussed earlier in response 3(a), the proposed 2010 Master Plan Update would be consistent with the AQMP, which is intended to bring the Basin into attainment for all criteria pollutants. In addition, the mass regional emissions calculated for the proposed 2010 Master Plan Update in response 3(b) show no new impacts. As such, the revised project would not result in a new cumulative impact. No additional mitigation measures are required.

| | | | | |
|---|---|---|---|---|
| **d) Expose sensitive receptors to substantial pollutant concentrations?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** As described in response 3(b), above, mitigated construction and operation of the proposed 2010 Master Plan Update would not result in any substantial localized air pollution impacts and therefore would not expose any nearby sensitive receptors to substantial pollutant concentrations.

| | | | | |
|---|---|---|---|---|
| **e) Create objectionable odors affecting a substantial number of people?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting sites, refineries, landfills, dairies, and fiberglass molding facilities (SCAQMD 1993). The proposed 2010 Master Plan Update does not include any uses identified by the SCAQMD as being associated with odors. Therefore, it would not be expected to produce objectionable odors.

Potential odor sources during construction include asphalt paving material and architectural coatings and solvents. SCAQMD Rules 1108 and 1113 limit the amount of volatile organic compounds from cutback asphalt and architectural coatings and solvents, respectively. In compliance with SCAQMD rules, no construction activities or materials would be proposed that would create a significant level of objectionable odor. As such, potential impacts during short-term construction would be less than significant.

| | | | | |
|---|---|---|---|---|
| **4. BIOLOGICAL RESOURCES. Would the project:** | | | | |
| **a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Biological surveys of Pierce College were conducted in 2002 during the preparation of the 2002 FEIR. In addition, an updated survey was conducted by an ICF Jones & Stokes biologist on August 3, 2009. While not observed during the 2009 survey, large numbers of Canada geese are known to feed and roost (rest) in the agricultural fields in the western portion of the campus during the winter months (generally November to March). Also, while not included on any list of sensitive species, Canada geese are considered to be a locally sensitive species because of the lack of feeding and resting habitat for this species in coastal southern California.

None of the projects included in the 2002 Master Plan that were proposed for the agricultural fields in the western portion of the campus were constructed (see Table 1 for status of 2002 projects). The 2010 Master Plan Update does not propose any substantial projects in the agricultural fields; therefore, the potential to affect Canada geese is limited. However, should any construction activities occur in the agricultural fields, the mitigation measure proposed in the 2002 EIR, and included below, would be implemented. Implementation of mitigation measure BR-1 would mitigate significant impacts (through habitat modifications) to the same level of less than significant.

**2002 EIR Mitigation Measures**

**BR-1** To avoid significant impacts on Canada geese, a locally sensitive species, Pierce College shall attempt to avoid construction activities in the agricultural portions of the campus during the winter months when geese are present. If construction activities in agricultural areas during winter cannot be avoided, then several months prior to the scheduled initiation of construction activities, Pierce College shall plant low-growing herbaceous crops (alfalfa, grains) or wild grass favored by Canada geese in portions of the agricultural fields that would not be affected by construction activities to provide alternative feeding habitat for the geese. Human disturbance in the enhanced area shall be prohibited until the geese migrate from the area or until construction activities in the agricultural fields are complete. In addition, because the project includes permanent removal of some feeding and roosting habitat for geese, a mitigation plan shall be developed to minimize permanent impacts on the Canada geese population at the campus. The plan shall be developed by campus biology instructors who are familiar with the areas on campus used by Canada geese in conjunction with experts who are familiar with successful management of the wintering geese populations at Sepulveda Basin, the Salton Sea, and/or Central Valley. The plan shall include the following measures:

- An evaluation of the extent of use by geese of agricultural areas that are to be removed from agricultural use as part of the master plan. The number of acres to be enhanced for geese shall be directly proportional on a 1:1 basis to the number of acres to be removed from agricultural production. Such acreage will have been used by geese during one or more of the past 5 years.
- An evaluation of the remaining agricultural areas on campus that would be appropriate to enhance for roosting (resting) and foraging for geese. The enhancement areas shall be appropriate for maintaining limited human disturbance, for planting crops known to be used in other areas of California for geese foraging (rye grass, corn, sorghum, millet), and for providing a sufficient take-off area for geese so they don’t feel boxed in.
- A planting plan that specifies the timing of planting, pre-planting, and post-planting methods (e.g., harvesting crops to prepare them for geese foraging) to maximize use by geese; methods for limiting human disturbance; and methods for limiting encroachment by geese into areas outside the enhancement site where they may suffer mortality because of campus traffic or other campus uses.
- Monitoring and reporting methods so that the success of the enhancement can be measured for a minimum of 5 years following the first planting. Monitoring shall be conducted a minimum of once monthly during each winter, and a monitoring report shall be prepared once annually. Population monitoring shall take into account the wide fluctuations in the geese population on campus that has occurred over the last several decades.

As with the 2002 Master Plan, the facilities proposed as part of the proposed 2010 Master Plan Update would result in the removal of trees and other vegetation that could support nesting birds and raptors protected by the federal Migratory Bird Treaty Act (MBTA) and/or California Fish and Game Code. Direct impacts on active nests would be considered a significant impact on special-status species. Implementation of mitigation measure BR-2, identified in the EIR prepared for the 2002 Master Plan (and provided below), would mitigate this impact to the same level of less than significant.

**BR-2** To avoid violations of the MBTA or California Fish and Game Code Section 3503, Pierce College shall attempt to limit grubbing and the removal of trees and buildings during the bird breeding season (approximately March 1 to September 1 [as early as February 1 for raptors]). If the bird breeding season cannot be avoided, Pierce College shall retain a qualified ornithologist to initiate surveys of the construction zone 30 days prior to the initiation of construction and weekly thereafter, with the last survey not more than 3 days prior to the initiation of construction, to minimize the potential for nesting following the survey and prior to construction. If the ornithologist detects any occupied nest or nests of native birds within the construction zone, Pierce College will conspicuously flag off the area(s) supporting bird nests, providing a minimum buffer of 300 feet between the nests and limits of construction (500 feet for raptors). The construction crew will be instructed to avoid any activities in this zone until the bird nests are no longer occupied, per a subsequent survey by the ornithologist.

No new impacts or mitigation measures are proposed under the 2010 Master Plan Update. The findings of the 2002 EIR remain valid.

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| **b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** ICF Jones & Stokes conducted a field inspection on August 3, 2009, to identify any changes in the existing environmental setting compared with that of the 2002 FEIR. No changes to the environmental setting were observed. The proposed 2010 Master Plan Update does not include any improvements or development within Canyon de Lana, which is the only area on the project site that was found during the 2009 survey to support riparian habitat or other sensitive natural communities. Components of the proposed 2010 Master Plan Update would remove only agricultural uses, including trees and shrubs. Therefore, no impacts on riparian habitat or sensitive natural communities would occur as a result on the proposed 2010 Master Plan Update.

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| **c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 EIR stated that the pond renovation work in the Canyon de Lana area may result in a significant impact if proposed renovation required the discharge of fill material into the streambed of Canyon de Lana. Pierce College will obtain an individual permit under Section 404 of the Clean Water Act if needed. A Streambed Alteration Agreement will be obtained by Pierce College if activities associated with pond renovation result in a violation of Section 1600 of the Fish and Game Code or significant impacts on protected wetlands. The 2002 EIR included mitigation measure BR-4 to avoid violations of wetland laws. The mitigation required Pierce College to retain a qualified wetland specialist to conduct wetland delineations as necessary.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
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The proposed 2010 Master Plan Update does not include any improvements or development within Canyon de Lana, which is the only area on the subject property that was found during the 2009 survey to support areas that have the potential to be regulated under the Clean Water Act. The nearest construction project would be approximately 1,000 feet northwest of the Canyon de Lana area. Therefore, the potential for indirect impacts (including from dust, noise, or runoff) would be low. Components of the proposed 2010 Master Plan Update would not result in significant impacts on federally protected wetlands, as defined by Section 404 of the Clean Water Act.

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| **d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors or impede the use of native wildlife nursery sites?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The eastern portion of the Pierce College campus is primarily developed with educational and recreational facilities and does not serve as a wildlife corridor. The western portion of the campus is currently sparsely developed and supports open agricultural fields, grasslands, and Canyon de Lana. This area would provide a local corridor for wildlife on the campus; however, the campus is surrounded by development and therefore does not provide a connected corridor for wildlife to undeveloped areas off site. Furthermore, the limited amount of proposed development within the western portion of the campus would not interfere substantially with the movement of wildlife within or through the campus. Native wildlife nursery sites do not occur within or immediately adjacent to the subject property; therefore, their use would not be impeded as a result of the proposed 2010 Master Plan Update. This would be considered a less-than-significant impact.

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| **e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The project site is located in the City of Los Angeles. The city's Protected Tree Ordinance (Los Angeles Municipal Code Section 46.00, Ordinance No. 153,478) regulates the relocation or removal of all native oak trees (excluding scrub oak), California black walnut trees, California sycamore trees, and California bay trees of at least 4 inches in diameter at breast height (DBH). These tree species are defined as "protected" by the City of Los Angeles. The ordinance prohibits, without a permit, the removal of any regulated protected tree, including "acts that inflict damage upon root systems or other parts of the tree...," and requires that all regulated protected trees that are removed be replaced on at least a 2:1 basis with trees that are of a protected variety.

Native trees, including oaks and sycamores, occur within the Canyon de Lana area and the Arboretum area, but not in the construction area. Construction of facilities proposed under the proposed 2010 Master Plan Update is not anticipated to result in impacts on trees protected by the city's Protected Tree Ordinance. Therefore, impacts related to local policies and ordinances protecting biological resources would be less than significant.

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| **f) Conflict with the provisions of an adopted habitat conservation plan, natural conservation community plan, other approved local, regional, or state habitat conservation plan?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The project site is not located within the jurisdiction of any approved habitat conservation plan or natural community conservation plan. No impact is anticipated to occur.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
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| **5. CULTURAL RESOURCES. Would the project:** | | | | |
| **a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?** | ☒ | ☐ | ☐ | ☐ |

**Potentially Significant (as in the 2002 FEIR but less severe).** An intensive-level historical resources survey of Pierce College was conducted in 2002 during preparation of the 2002 FEIR. After a review of the survey and the proposed 2010 Master Plan Update, it was determined that adverse changes related to the significance of historical resources would not be expected to occur as a result of the update. The proposed 2010 Master Plan Update does not include any substantial level of remodeling or demolition of existing key campus buildings (i.e., the permanent academic buildings within the core of the campus, extending east from Mason Street to include the Horticulture Complex). Instead, it would retain and renovate existing classroom buildings, use landscape design and other non-intrusive means to strengthen pedestrian circulation through the campus core, and locate new buildings, student activity spaces, and parking facilities where no historical resources are located. New buildings that are nearing completion, as well as proposed future buildings, are designed in a Mediterranean style with light-colored stucco exterior walls and terra cotta tile roofs. This design approach is compatible with the College's surviving Spanish Revival/Mission Revival buildings. For this reason, it is unlikely that the revised design would introduce new, incompatible atmospheric design elements into the historic setting of the historical resources.

One listed State Historical Landmark has been identified on the Pierce College campus. Known as Old Trapper's Lodge, this historical resource (State Historical Landmark No. 939) is a folk art sculpture installation that was created by artist John Ehn (1897–1981). It is located approximately 50 feet west of the agricultural education building and just east of the equestrian center in a vest pocket-sized park. However, the proposed 2010 Master Plan Update would not affect Old Trapper's Lodge. It neither calls for relocation, demolition, or disassembly and reinstallation of the features that make up Old Trapper's Lodge nor adverse atmospheric changes to the setting.

In addition to the referenced historical resource, 12 other buildings are identified as potential historical resources in the 2002 FEIR. These consist of a small number of key campus buildings that survived from the first three years of the College's existence (1947–1950): Exposition Hall (the Quonset hut in which the College's first classes and student assemblies were held in 1947), the business office/student store building, and the 10 faculty office cottages (located between the student store and Stadium Way). The business office/student store building and office cottages were designed by Los Angeles architect Albert B. Gardner in the Spanish Revival/Mission Revival style. The 2002 EIR describes Exposition Hall as "not architecturally noteworthy," but it may be historically significant because of its close association with key school-wide academic activities during the first year of the College's existence. A finding in the 2002 FEIR states that in the event that the College chooses to demolish the Exposition Hall Quonset hut, a significant and unavoidable impact on a historic resource will result. The business office/student store building was largely demolished as part of the implementation of the 2002 Master Plan. The proposed 2010 Master Plan Update does not call for the demolition, alteration, or relocation of the faculty cottages; however, construction of the new 70,000-square-foot Green Technologies Building is proposed on the site of the Facilities Plant yard, which is where three of the campus' known surviving Quonset hut buildings are located. Demolition of all three Quonset huts is being proposed to accommodate the revised project. During February 2010, with the assistance of the College, intensive research by ICF authenticated the Exposition Hall Quonset hut, its current location within the Facilities Plant yard, its original location (circa 1947–1952), as well as the building's condition and degree of alteration. The building was then visited and photo-documented so that its current condition and setting could be visually assessed. Because the location of Exposition Hall within the Facilities Plant compound has been documented and all the structures at that location are proposed for demolition, the revised project would result in a significantly adverse impact on this resource if pertinent mitigation measures are not established and implemented to ensure its preservation.

The integrity of Exposition Hall as a historic resource and the ability of the building to convey its historical significance were assessed using the National Park Service criteria (found in National Register Bulletin 15). Given the aforementioned criteria, Exposition Hall was found to retain essential physical features that convey its historical identity (National Register Bulletin 15, Section VII). In addition, moving the building from its original location on campus to its current location was found not to have significantly impaired its ability to convey the historical associations for which it is significant (National Register Bulletin 15, Section VII, Criteria Consideration B – Moved Buildings).

The location of the Exposition Hall Quonset hut has been authenticated within the Facilities Plant compound. The existing buildings at that location are slated for demolition for the proposed Green Technologies Building. Although altered and moved, demolition of Exposition Hall would nonetheless be a significant adverse impact under CEQA. because the building retains a sufficient degree of physical design characteristics to convey its historic identity.

To address potential impacts on Exposition Hall, the mitigation measure presented below is proposed under the 2010 Master Plan Update.

**HR-1** The Exposition Hall Quonset hut shall be moved to a new location on campus where its original association with the College's early agricultural/animal husbandry education curriculum can best be interpreted. Appropriate potential locations include the Agricultural Education complex, the Equestrian Center, or the agricultural fields south of El Rancho Drive in vicinity of the Feed Mill Quonset hut. Prior to relocating Exposition Hall, the College shall prepare a preservation plan to ensure the preservation and maintenance of the building. The preservation plan shall describe the history of the resource and its character-defining design/structural features, document its current condition and the feasibility of moving the building, and outline what actions must be taken, consistent with the Secretary of the Interior's Standards, to competently relocate and rehabilitate the building. It shall also include an interpretive plan component that will provide the step-by-step strategy the College will use for interpreting the history of the resource for the educational benefit of Pierce College students. Plan approval for the Green Technologies Building by the Office of the State Architect shall be made contingent upon the completion of the preservation plan and its adoption by the LACCD Board of Trustees.

Consistent with the findings in the 2002 FEIR, were the College to propose demolition of the Exposition Hall Quonset hut, or were it to propose substantial alteration inconsistent with the building's preservation plan, that action would result in a significant and unavoidable effect on a historical resource under CEQA.

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| **b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** An intensive archaeological resources survey of Pierce College was conducted in 2002 during preparation of the 2002 FEIR. No archaeological resources were identified during that survey. However, areas of sensitivity were defined, one in the southwestern corner of the College at Canyon de Lana where a water source was found and the other, a nature trail area, in the southeastern corner of the College where prehistoric Native American artifacts have reportedly been found in the past (Horne 2002). Pierce College indicated that, according to its records, the water source in Canyon de Lana is not naturally occurring. The proposed 2009 Master Plan Update would reduce impacts in areas of sensitivity through the elimination of several projects that lie outside of the developed campus core. No projects are scheduled for Canyon de Lana; however, the horticulture/animal science facility is still planned for the southeastern corner of the College under the proposed 2009 Master Plan Update.

On July 29, 2009, an archaeological field inspection of Pierce College was conducted by ICF Jones & Stokes personnel. No cultural resources were observed within the project area during this effort. Conditions described in the 2002 survey report were essentially the same in 2009. For this reason, the same mitigation measures as specified in the 2002 EIR would reduce impacts associated with the proposed 2009 Master Plan Update to a less-than-significant level. These mitigation measures are listed below.

**2002 EIR Mitigation Measures**

**AR-1** If buried cultural resources are discovered during construction, all work must be halted in the vicinity of the archaeological discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the archaeological resource. In areas of archaeological sensitivity, such as in the vicinity of the water sources in the Canyon de Lana and the Chalk Hills in the southeastern corner of the campus, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources shall monitor project-related ground-disturbing activities. Specifically, monitoring is recommended during construction of the horticulture/animal science and maintenance and operations facility.

**AR-2** Provisions for the disposition of recovered prehistoric artifacts shall be made in consultation with culturally affiliated Native Americans.

**AR-3** In the event of an accidental discovery of any human remains, the procedures specified in Health and Safety Code Section 7050.5, CEQA Section 15064.5 (e), and Public Resources Code Section 5097.98 shall be implemented.

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| **c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Pierce College is situated on the edge of the Chalk Hills in the western San Fernando Valley. Flat portions of the campus are underlain by Quaternary alluvial fan deposits and scattered areas of artificial fill. The top few feet of these alluvial fan deposits are unlikely to contain significant vertebrate fossils, but the underlying alluvium of late Pleistocene age is known to contain vertebrate fossils. The hills in the southern part of the campus are made up of Late Miocene age Modelo Formation, which is composed of marine sedimentary rock that is likely to contain significant fossil resources. This bedrock is exposed at or near the ground surface.

A records search for paleontological resources was conducted in 2002 for the 2002 FEIR. This search indicated that fossil resources had not been identified on the Pierce College campus, but resources had been found in the same geologic formations nearby. Conditions at the College campus have not changed; therefore, the same mitigation measures specified in the 2002 EIR would reduce impacts associated with the proposed 2010 Master Plan Update to a less-than-significant level. These mitigation measures are listed below.

**2002 EIR Mitigation Measures**

**PR-1** The monitoring of excavation in areas identified as likely to contain paleontological resources shall be conducted by a qualified paleontological monitor. The monitor shall be equipped to salvage fossils and samples of sediments as they are unearthed to avoid construction delays. The monitor shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units, previously described, are not present or, if present, are determined by qualified paleontological personnel to have a low potential to contain fossil resources.

**PR-2** Recovered specimens shall be prepared to a point of identification and permanent preservation, including the washing of sediments to recover small invertebrates and vertebrates.

**PR-3** Specimens shall be curated into a professional, accredited museum repository with permanent retrievable storage.

**PR-4** A report of findings, with an appended itemized inventory of specimens, shall be prepared. The report and inventory, when submitted to Pierce College, would signify completion of the program to mitigate impacts on paleontological resources.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
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| **d) Disturb any human remains, including those interred outside of formal cemeteries?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant. Impact.** No human remains or cemeteries are known to be present on the Pierce College campus. An archaeological resources survey of Pierce College was conducted in 2002, and no human remains were found. If human remains are discovered during construction, the coroner and designated Native American representatives would be notified in accordance with Public Resources Code Section 5097.98, Health and Safety Code Section 7050.5, and CEQA Section 15064.5(e), as specified in AR-3, above. Therefore, a less-than-significant impact would occur.

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| **6. GEOLOGY AND SOILS. Would the project:** | | | | |
| **a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:** | | | | |
| **i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 FIER found that the project site is not located within an Alquist-Priolo Earthquake Fault Zone and that no known active faults cross through the project area or within the immediate vicinity of the project area. [6] With respect to the proposed 2010 Master Plan Update, conditions on the project site have not changed; the impacts considered in the 2002 FEIR regarding ground rupture within the project area remain the same. Therefore, primary ground rupture is not anticipated, and impacts would be less than significant.

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| **ii) Strong seismic ground shaking?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 FEIR found that the project would be subject to ground shaking associated with earthquakes on faults of both the San Andreas and Transverse Ranges fault systems. The campus itself is located in the vicinity of many major active faults, including the Northridge thrust, Santa Susana, and San Fernando faults. These faults are considered potentially significant sources of ground shaking. However, these ground motion hazards are not unusual for the San Fernando Valley area. It was found in the 2002 EIR that this hazard would represent a less-than-significant impact provided that design and construction conforms to all applicable provisions of the State of California, Division of the State Architect, and the guidelines set forth in the 1998 California Building Code (CBC). The CBC is based on the 1997 Uniform Building Code (UBC) and sets forth regulations concerning proper earthquake design and engineering. Construction would also conform to the 1997 UBC earthquake design criteria for Seismic Zone 4.

Impacts related to seismic ground shaking would remain the same under the proposed 2010 Master Plan Update as those described in the 2002 FEIR. The proposed 2010 Master Plan Update would also include proper design and construction guidelines, as required by the previous EIR, to reduce impacts from ground shaking. Impacts would remain less than significant.

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| **iii) Seismic-related ground failure, including liquefaction?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** Liquefaction is a phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of strong earthquake-induced ground shaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of granular sediments and the magnitude and frequency of earthquakes in the surrounding region. Saturated, unconsolidated silt, sand, and silty sand within

[6] California Division of Mines and Geology. 2001. *Seismic Hazard Zone Report for the Canoga 7.5-Minute Quadrangle, Los Angeles County, California*. Seismic Hazard Zone Report 007.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
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50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena may include lateral spreading, ground oscillation, loss of bearing strength, and subsidence. Lateral spreading comprises the movement of surficial blocks of sediment due to liquefaction and commonly occurs on gentle slopes of 0.3 to 3 degrees.

The 2002 FEIR found that low-lying portions of the project area are within a California Division of Mines and Geology (CDMG) Seismic Hazard Mapping Program liquefaction hazard zone.[7] Additionally, is was found that, although no historical liquefaction had been reported in the Canoga quadrangle, there was evidence of lateral spreading in the Northridge and Reseda areas after the Northridge earthquake. Furthermore, localized areas of shallow groundwater and unconsolidated sediments may exist within the project site and could lead to liquefaction phenomena. However, it was concluded that much of the campus is underlain by bedrock, and the remainder of the campus is underlain by fine-grained alluvial/colluvial material that would not be susceptible to liquefaction phenomena. Consequently, liquefaction-related phenomena would not pose a significant problem.

With respect to the proposed 2010 Master Plan Update, impacts from liquefaction would remain the same as those identified under the 2002 FEIR. As such, impacts would remain less than significant.

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| **iv) Landslides?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 FEIR found that impacts from landslides would not occur. The proposed 2010 Master Plan Update site is not located in an area susceptible to landslide hazards. Because the location proposed for the project would not change from that described in the 2002 EIR, it is concluded that no new impacts from landslides would occur under the proposed 2010 Master Plan Update. No impact would occur.

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| **b) Result in substantial soil erosion or the loss of topsoil?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 FEIR found that impacts from soil erosion or the loss of topsoil would not occur because the area is fully developed. Because the proposed 2010 Master Plan Update would occupy the same project site, it is concluded that no new impacts would occur from soil erosion or the loss of topsoil. Additionally, the proposed 2010 Master Plan Update would reduce the amount of building square footage proposed. As such, impacts would be less than those assumed under the 2002 Master Plan. There would be no new impacts.

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| **c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 FEIR identified corrosion, compaction, and expansion as the soil characteristics that could have significant impacts on the design of new buildings and facilities. Corrosive soils could damage buried utilities and foundations. Loose alluvial soils and undocumented fill may be subject to compaction or settlement due to changes in foundation loads or in soil moisture content, which could result from rainfall, landscape irrigation, utility leakage, roof drainage, and/or perched groundwater. Potential impacts are related to unacceptable settlement or heave for structures, concrete slabs supported on grade, and pavement supported on the aforementioned types of soil. The 2002 FEIR provided that all earthwork and grading would meet the code requirements of the State of California and follow the recommendations of the geotechnical report created for the project. Further mitigation measures were provided to reduce impacts to less-than-significant levels. With respect to the proposed 2010 Master Plan Update, the impact from unsuitable soils would pose a less-than-significant impact provided that the same appropriate mitigation measures are implemented during design and construction. Impacts would remain less than significant with mitigation incorporated.

[7] California Division of Mines and Geology. 1998. *Seismic Hazard Zone Map, Canoga Quadrangle*.

**2002 EIR Mitigation Measures**

The six mitigation measures listed below from the 2002 FEIR would reduce impacts anticipated under the proposed 2010 Master Plan Update to a less-than-significant level.

**Construction Mitigation**

To minimize hazards to construction workers from unstable temporary slopes, the following measures shall be implemented by the construction contractor(s):

**GE-1** All earthwork and grading shall meet the requirements of State of California codes and shall be performed in accordance with the recommendations in the geotechnical investigation conducted for each proposed project at the Pierce College campus, and

**GE-2** All excavation and shoring systems shall meet the minimum requirements of the Occupational Safety and Health Administration (OSHA).

**Operational Mitigation**

Because of the potential for strong seismic ground shaking, unsuitable soils, and soil liquefaction, the following mitigation measures shall be implemented:

**2002 EIR Mitigation Measures**

**GS-1** Geotechnical investigations shall be performed by qualified licensed professionals before final design of any structures, and recommendations provided in these reports should be implemented, as appropriate;

**GS-2** **Ground Shaking.** Design and construction of structures for the revised project shall conform to all applicable provisions of the State of California, Division of the State Architect, and the guidelines set forth in the 1998 California Building Code. The CBC is based on the 1997 Uniform Building Code and sets forth regulations concerning proper earthquake design and engineering. In addition, design and construction shall conform to the 1997 UBC earthquake design criteria for Seismic Zone 4.

**GS-3** **Liquefaction.** If liquefiable soils are identified by geotechnical investigations for project structures, then mitigation should be implemented. Appropriate mitigation, which could include the use of piles, deep foundations, dynamic densification, ground improvement, grouting, or removal of suspect soils, is dependent on site-specific conditions, which should be identified by the geotechnical investigation.

**GS-4** **Unsuitable Soil Conditions.** The geotechnical investigation of proposed facilities should fully characterize the presence and extent of corrosive, expansive, or loose compactable soil. After consideration of the collected data, appropriate mitigation can be designed. Mitigation options could include the following: removal of unsuitable subgrade soils and replacement with engineered fill, installation of cathodic protection systems to protect buried metal utilities, use of coated or nonmetallic (i.e., concrete or PVC) pipes that are not susceptible to corrosion, construction of foundations using sulfate-resistant concrete, support of structures on deep-pile foundation systems, densification of compactable subgrade soils with in situ techniques, and placement of moisture barriers above and around expansive subgrade soils to help prevent variations in soil moisture content.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
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| **d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 FEIR found that the expansion potential of soil within the project area could vary from very low for soils in sandy materials to very high for soils on lean clay units. The alluvium in several areas on campus is moderately expansive. Expansive soils are characterized by their ability to undergo significant volume change (shrink and swell) due to variations in soil moisture content. Potential impacts are related to unacceptable settlement or heave for structures, concrete slabs supported on grade, and pavement supported on the aforementioned types of soil. The 2002 EIR found that the impact from unsuitable soils would be less than significant provided that appropriate mitigation measures are implemented during design and construction of 2002 proposed projects. This finding remains the same for the proposed 2010 Master Plan Update.

Mitigation measures that will be carried forward as part of the proposed 2010 Master Plan Update are listed below.

**2002 EIR Mitigation Measures**

**Construction Mitigation**

To minimize hazards to construction workers from unstable temporary slopes, the following measures shall be implemented by the construction contractor(s):

**GE-1** All earthwork and grading shall meet the requirements of State of California codes and shall be performed in accordance with the recommendations in the geotechnical investigation conducted for each proposed project at the Pierce College campus, and

**GE-2** All excavation and shoring systems shall meet the minimum requirements of OSHA.

**Operational Mitigation**

Because of the potential for strong seismic ground shaking, unsuitable soils, and soil liquefaction, the following mitigation measures shall be implemented:

**2002 EIR Mitigation Measures**

**GS-1** Geotechnical investigations shall be performed by qualified licensed professionals before final design of any structures, and recommendations provided in these reports should be implemented, as appropriate;

**GS-2** **Ground Shaking.** Design and construction of structures for the revised project shall conform to all applicable provisions of the State of California, Division of the State Architect, and the guidelines set forth in the 1998 California Building Code. The CBC is based on the 1997 Uniform Building Code and sets forth regulations concerning proper earthquake design and engineering. In addition, design and construction shall conform to the 1997 UBC earthquake design criteria for Seismic Zone 4.

**GS-3** **Liquefaction.** If liquefiable soils are identified by geotechnical investigations for project structures, then mitigation should be implemented. Appropriate mitigation, which could include the use of piles, deep foundations, dynamic densification, ground improvement, grouting, or removal of suspect soils, is dependent on site-specific conditions, which should be identified by the geotechnical investigation.

**GS-4** **Unsuitable Soil Conditions.** The geotechnical investigation of proposed facilities should fully characterize the presence and extent of corrosive, expansive, or loose compactable soil. After consideration of the collected data, appropriate mitigation can be designed. Mitigation options could include the following: removal of unsuitable subgrade soils and replacement with engineered fill, installation of cathodic protection systems to protect buried metal utilities, use of coated or nonmetallic (i.e., concrete or PVC) pipes that are not susceptible to corrosion, construction of foundations using sulfate-resistant concrete, support of structures on deep-pile

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
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foundation systems, densification of compactable subgrade soils with in situ techniques, and placement of moisture barriers above and around expansive subgrade soils to help prevent variations in soil moisture content.

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| **e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 FEIR did not find any impacts associated with the incapability of soils to adequately support the use of septic tanks or alternative wastewater disposal systems. The project site would not change under the proposed 2010 Master Plan Update. Therefore, impacts would be similar to those identified under the 2002 FEIR. No impact is anticipated to occur.

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| **7. GREENHOUSE GAS EMISSIONS. Would the project:** | | | | |
| **a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** At present, a quantitative CEQA threshold does not exist that would be applicable to the revised project. The Governor's Office of Planning and Research (OPR) Technical Advisory on CEQA and Climate Change suggests that in the absence of regulatory guidance or standards, lead agencies such as LACCD must undertake a project-by-project analysis that is consistent with available guidance and current CEQA practice to ascertain project impacts under CEQA.

It is unknown by what amount the revised project would need to reduce project-related greenhouse gas (GHG) emissions to provide its share of GHG reduction and meet the Assembly Bill 32 (AB 32) statewide GHG reduction target of 1990-level GHG emissions by 2020. As such, LACCD has adopted a qualitative threshold of "a level of project-related GHG emissions that is less than 'Business as Usual' (BAU) as defined by OPR in the above-referenced technical advisory."

Project-related GHG emissions were estimated for carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$) for 2020. GHG emissions were not specifically analyzed in 2002 as analysis of the emissions was not required at the time. The results, provided below in Table 11, are presented in units of carbon dioxide equivalent ($CO_2e$) and take into account the GHG emissions reductions that would occur as a result of the several LEED energy- and water-efficiency design features that would be incorporated into the revised project.

**Table 11. Estimate of Revised Project-Related Greenhouse Gas Emissions in Metric Tons per Year**

| Emission Source | 2020 BAU Emissions | GHG Emissions Reductions Related to LEED Measures | 2020 Emissions with LEED Efficiency Measures | Percent Reduction from BAU[a] |
|---|---|---|---|---|
| Mobile Source | 40,657 | — | 40,657 | — |
| Natural Gas Combustion | 3,146 | (315) | 2,831 | 10.0% |
| Electricity Demand-Related | 7,311 | (731) | 6,580 | 10.0% |
| Water Consumption-Related | 53 | (11) | 42 | 20.0% |
| **Total Revised Project** | **51,167** | **(880)** | **50,110** | **2.1%** |

[a] LEED Silver Certification will require minimum energy and water use efficiencies of 10% and 20%, respectively, when compared to "business as usual" for new construction. Actual efficiency ratings could exceed these minimum requirements.

Source: ICF International 2010. Calculations are provided in the air quality appendix.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

As shown above in Table 11, GHG emissions related to energy use and water consumption would be reduced by 10% and 20%, respectively, from BAU emission levels with adoption of LEED design measures. Overall revised project-related GHG emissions, which include mobile-source emissions, would be reduced by 880 metric tons per year, or 2.1% below BAU. As such, revised project GHG emissions would be less than significant.

**Mitigation Measures**

Construction-period Measures

**AQ-3** Require construction equipment to use the best available technology to reduce emissions.

**AQ-4** Minimize, reuse, and recycle construction-related waste.

**AQ-5** Minimize grading, earthmoving, and other energy-intensive construction practices.

**AQ-6** Landscape to preserve natural vegetation and maintain watershed integrity.

**AQ-7** Use recycled, low-carbon, and otherwise climate-friendly building materials, such as salvaged and recycled-content materials, for buildings, hard surfaces, and non-plant landscaping.

Operational-period Measures

**AQ-8** Increase exterior wall and attic/roof insulation beyond Title 24 requirements.

**AQ-9** Use light-colored roof materials to reflect heat.

**AQ-10** Use double-paned windows.

**AQ-11** Use energy-efficient low-sodium parking lot lights.

**AQ-12** Use energy-efficient and automated controls for lighting.

**AQ-13** Use energy-efficient and automated controls for air conditioners.

**AQ-14** Use energy-efficient appliances.

**AQ-15** Use solar or low-emission water heaters.

**AQ-16** For vehicles that will serve the proposed 2010 Master Plan Update on a frequent basis (e.g., forklifts), require use of alternative fuels and measures to maximize fleet efficiency.

**Residual Impacts**

Given the relatively small amount of GHG emissions that would be emitted from this revised project during short-term construction and long-term operations, with implementation of the above-prescribed mitigation measures, the proposed 2010 Master Plan Update's GHG emissions, without considering other cumulative global emissions, would not be large enough to cause substantial climate change directly. Thus, revised project emissions are considered less than significant.

| | | | | |
|---|---|---|---|---|
| **b)** Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** AB 32 identified a target level of GHG emissions in California for 2020 of 427 million metric tons (MMT) of $CO_2e$, which is approximately 28.5% less than the 2020 BAU emissions estimate of 596 MMT $CO_2e$ (California Air Resources Board [CARB]). To achieve this GHG reduction, there will have to be widespread reductions in GHG emissions across California. Some of these reductions will come from changes in vehicle emission and mileage standards, the use of alternative sources of electricity, and higher energy efficiency standards for existing facilities, among other measures. The remainder of the necessary GHG reductions will need to come from lower carbon intensities, compared with BAU conditions, at new facilities. Therefore, this analysis uses a threshold of significance that is in conformance with the state's goals.

On December 12, 2008, CARB adopted the AB 32 Scoping Plan, which details specific GHG emission-reduction measures that target specific GHG emissions sources. Revised project-related GHG emissions would be reduced as a result of several AB 32 Scoping Plan measures. The Scoping Plan considers a range of actions, which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms (e.g., cap-and-trade system), among other actions. Some pertinent examples include the following:

- Mobile-source GHG emission-reduction measures:
  - Pavley emissions standards (19.8% reduction),
  - Low-carbon fuel standard (7.2% reduction),
  - Vehicle efficiency measures (2.8% reduction); and
- Energy-production-related GHG emission-reduction measures:
  - Natural gas transmission and distribution efficiency measures (7.4% reduction),
  - Natural gas extraction efficiency measures (1.6% reduction),
  - Renewables (electricity) portfolio standard (33.0% reduction).

These reductions in mobile-source and energy-production GHG emissions would be in addition to those that would be utilized for the revised project discussed above, which are related to LEED design measures that would reduce project-specific GHG emissions related to energy consumption and water use by 10% and 20%, respectively. Overall, the revised project would be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by 2020. Project-related GHG emissions would be less than significant.

A project's consistency with implementing programs and regulations to achieve the statewide GHG emissions-reduction goals established under Executive Order S-3-05 and AB 32 cannot yet be evaluated because the programs and regulations are still under development. Nonetheless, the Climate Action Team (CAT), established by Executive Order S-3-05, has recommended strategies for implementation at the statewide level to meet the goals of the executive order. In the absence of an adopted plan or program, the CAT's strategies serve as current statewide approaches to reducing the state's GHG emissions. Because no other GHG emissions plan or program has been adopted that would apply to the revised project, consistency with the CAT's strategies is assessed to determine if the revised project's contribution to cumulative GHG emissions is considerable.

In its report to the governor and the legislature, the CAT recommended strategies that could be implemented by various state boards, departments, commissions, and other agencies to reduce GHG emissions. The CAT strategies relevant to the revised project, as well as the implementing agencies and the revised project design features or mitigation measures which would be consistent with the strategies, are listed in Table 12. Given the analysis in Table 12, the revised project would minimize its contribution to GHG emissions and global climate because of its consistency with these strategies.

**Table 12 Revised Project Consistency with Climate Action Team Strategies**

| CAT Strategy | Implementing Agency | Revised Project Consistency |
|---|---|---|
| Vehicle Climate Change Standards | Air Resources Board | The revised project would be consistent with this strategy to the extent that new passenger vehicles and light trucks are purchased by the project's users, starting with the 2009 model year. |
| Hydrofluorocarbon Reduction Strategies | Air Resources Board | Revised project air-conditioning systems would comply with the latest standards for new systems. Consumer products containing hydrofluorocarbons would comply with California Air Resources Board regulations, when adopted. |
| Building Energy Efficiency Standards in Place | Energy Commission | The revised project will meet or exceed California energy standards or energy-efficient lighting requirements. |
| Appliance Energy Efficiency Standards in Place | Energy Commission | The revised project will meet or exceed California energy standards or energy-efficient lighting requirements. |
| Water Use Efficiency | Department of Water Resources | The revised project will meet or exceed California water use and conservation standards. |
| Source: California Climate Action Team. Final 2006 Climate Action Team Report to the Governor and Legislature, March 2006; compiled by ICF International, January 2010. | | |

With implementation of the design features, the revised project would be consistent with applicable plans, policies, and regulations. Impacts from project construction and operation related to GHG emissions plans, policies, and regulations would be less than significant. No mitigation is required.

| **8. HAZARDS AND HAZARDOUS MATERIALS. Would the project:** | | | | |
|---|---|---|---|---|
| **a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 FEIR determined that the impact from use and storage of hazardous materials at Pierce College would be less than significant if anticipated areas of construction and ground disturbance would not overlap with hazardous material storage and use areas and if specified mitigation measures pertaining to remediation of asbestos-containing material and lead-based paint would be completed before any new construction or demolition of existing buildings. According to records obtained by hazardous materials specialty firm Winzler & Kelley Consulting Engineers in August 2009, hazardous materials investigations have been conducted at the College. As a standard practice, the College and its hazardous materials subconsultant prepare hazardous materials studies for new building projects prior to construction, and the hazardous materials reports are made part of the bid package and provided to the general contractor in advance of construction. Remediation is carried out as recommended by the hazardous materials consultant.

According to a report prepared in October 2005 by Leymaster Environmental Consulting, two underground storage tanks (USTs) and associated piping and fuel dispensers were removed from the College in March 2005. Both USTs were 10,000 gallons in volume. Seven soil samples were collected at the site on March 29, 2005. One of the samples from beneath the fuel dispenser contained 250 milligrams per kilogram (mg/kg) of total petroleum hydrocarbons (TPH) as diesel. Two additional soil samples were collected on September 27, 2005. These samples were collected from beneath the fuel dispenser at depths of 5 and 10 feet. (The previous March 25, 2005, sample was collected beneath the fuel dispenser at approximately 2 feet.) TPH as diesel was not detected from the September 27, 2005, samples. The report concluded that, based on the lack of detectable TPH in the deeper samples, the 250 mg/kg of TPH in the March 2005 sample did not constitute a threat to groundwater, and no further investigation was recommended at the site.

Only one other operational UST is known to exist at the College. One UST is operational and used by the sheriff's station. Therefore, it is unlikely that the proposed construction would encounter any additional USTs. If, during construction of the 2010 Master Plan Update projects, USTs are encountered, 2002 EIR mitigation measures HM-1 and HM-2 will be implemented. Phase I studies conducted for the individual building projects included soil testing, and, to date, no herbicide or pesticide contamination has been reported. Nonetheless, soil testing for future 2010 Master Plan Update projects shall be undertaken in accordance with 2002 mitigation measure HM-3.

As a standard practice, the College conducts asbestos and lead-based paint surveys for its demolition projects. Asbestos and lead-based paint are handled and disposed of according to state and county standards. The College will continue to implement mitigation measure HM-4 for any future demolition, including that proposed in the 2010 Master Plan Update. This level of impact would remain the same under the proposed 2010 Master Plan Update. Therefore, impacts would remain less than significant with mitigation incorporated.

The mitigation measures listed below will be carried forward from the 2002 EIR as part the proposed 2010 Master Plan Update. The measures must be completed prior to construction of each revised project to allow development of appropriate worker protection and waste management plans that describe the proper handling, treatment, and storage of hazardous waste from the revised projects.

**2002 EIR Mitigation Measures**

**HM-1** **Moderate Potential Sites.** A thorough review of available environmental records, a thorough historical land use assessment, and a site-specific inspection shall be completed. A record review shall identify data that confirm remediation of on-site and off-site contamination of former leaking underground storage tank (LUST) sites or agency-certified closure of the site. Tanks that are not reported shall undergo further record review to determine the status, condition, contents, and number of tanks. At sites with inactive or improperly abandoned underground storage tank (USTs), the tanks may be old and in poor condition and, therefore, shall be thoroughly evaluated for condition and possible leaks. A detailed site inspection of hazardous material storage areas in or near proposed project areas shall be performed to determine if leaks or spills may have caused potential environmental contamination. Results of the record review or visual inspection that indicate contamination may be present in a proposed project area shall cause sites with medium potential to be treated as sites with high potential.

Relocation of the plant facilities buildings and appurtenances will require removal and relocation of their two USTs. Removal of the active USTs in the plant facilities vehicle maintenance area shall be monitored by a qualified professional for evidence of leaks. If any evidence of leakage is noted, a site assessment shall be performed and appropriate remediation completed.

**HM-2** **High Potential Site.** Current agency records of the site with high potential (P. L. Porter Company) shall be reviewed to assess and verify the extent of potential contamination of surface and underlying soil as well as shallow groundwater. If the review indicates contamination may have spread to the revised project area on campus, an investigation shall be designed and performed to verify the presence and extent of contamination at the site. A qualified and approved environmental consultant shall perform the review and investigation. Results shall be reviewed and approved by the Los Angeles County Fire Department, Health Hazardous Materials Division, or California Department of Toxic Substances Control prior to construction. The investigation shall include collecting samples for laboratory analysis and quantification of contaminant levels within the proposed excavation and surface disturbance areas. Subsurface investigation for sites with high potential shall determine appropriate worker protection and hazardous material handling and disposal procedures appropriate for the subject site.

Construction activities that require dewatering may require treatment of contaminated groundwater prior to discharge. Appropriate regulatory agencies, such as the California Environmental Protection Agency, the Regional Water Quality Control Board (RWQCB), and the Los Angeles County Fire Department, Health Hazardous Materials Division, shall be notified in advance of construction, and discharge permits identifying discharge points, quantities, and groundwater treatment (if necessary) shall be identified and obtained.

Areas with contaminated soil determined to be hazardous waste shall be excavated by personnel who have been trained under the OSHA-recommended 40-hour safety program (29 Code of Federal Regulations [CFR] Section 1910.120), with an approved plan for excavation, control of contaminant releases to the air, and off-site transport or on-site treatment. Health and safety plans prepared by a qualified and approved industrial hygienist shall be developed to protect the public and all workers in the construction area. Health and safety plans shall be reviewed and approved by the appropriate agencies, such as the Los Angeles County Fire Department, Health Hazardous Materials Division, or California Department of Toxic Substances Control.

**HM-3** **Residual Pesticides/Herbicides.** Soil samples shall be collected in construction areas where the land has historically or is currently being farmed to verify and delineate the possibility of and extent of pesticide and/or herbicide contamination. Excavated materials containing elevated levels of pesticide or herbicide require and shall undergo special handling and disposal procedures. Standard dust suppression procedures shall be used in construction areas to reduce airborne emissions of these contaminants and reduce the risk of exposure to workers and the public. Regulatory agencies for the State of California and County of Los Angeles shall be contacted to plan handling, treatment, and/or disposal options.

**HM-4** **Asbestos-Containing Material and Lead-Based Paint.** Records of previously completed asbestos-containing material and lead-based paint remediation at the College shall be reviewed. A survey of buildings, structures, and pavement areas to be removed or demolished to assess the presence and extent of asbestos-containing materials and lead-based paint shall be conducted. A qualified and approved environmental specialist shall conduct this study prior to final project design. The investigation shall include collecting samples for laboratory analysis and quantification of contaminant levels in the buildings and structures proposed for demolition and in pavement disturbance areas. According to these findings, appropriate measures for handling, removal, and disposal of the materials can be developed. Regulatory agencies for the State of California and Los Angeles County shall be contacted to plan handling, treatment, and/or disposal options.

| | | | | |
|---|---|---|---|---|
| **b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 FEIR determined that the impact from use and storage of hazardous materials at Pierce College would be less than significant if anticipated areas of construction and ground disturbance would not overlap with hazardous material storage and use areas and if specified mitigation measures pertaining to remediation of asbestos-containing material and lead-based paint would be completed before any new construction or demolition of existing buildings. This level of impact would remain the same under the revised project. The mitigation measures (HM-1–HM-4) described above under impact response 7(a) would be carried forward. Therefore, impacts would remain less than significant with mitigation incorporated.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|
| **c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Various types of hazardous materials and hazardous waste are stored on campus. These include paints, solvents, and small quantities of biological waste. Additionally, a number of different types of chemicals used for instructional purposes are stored on campus. The chemicals are safely stored and/or locked away. No new buildings are proposed that would result in the storage, transport, or use of hazardous wastes in substantial amounts compared to existing conditions.

The 2002 FEIR identified, within and surrounding the project, two hazardous sites with moderate potential and one site with high potential to affect the proposed 2010 Master Plan Update. The plant facilities building, located within the footprint of Pierce College, was regarded as a site with moderate potential to emit hazardous materials. Under the 2002 EIR, the plant facilities building was to have been demolished and, therefore, would have created a significant impact. However, under the proposed 2010 Master Plan Update, the plant facilities building would no longer be demolished and would, therefore, no longer create a significant impact. Mitigation measures were provided in the 2002 EIR to prevent further contamination from the two remaining sites; such mitigation would continue to be required as part of the proposed 2010 Master Plan Update. These mitigation measures (HM-1–HM-4) are described above under impact response 7(a). As such, no new impacts would be created. Impacts would remain the same if not less because of the removal of demolition of the plant facilities building from the list of master plan projects. Impacts would be less than significant with mitigation.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|
| **d) Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** In support of the analysis conducted for the 2002 FEIR, field reconnaissance of the project site and surrounding project area was conducted to verify current conditions. The field reconnaissance component of the study relied on a visual survey of surface conditions by an environmental geologist to identify sites where storage containers (chemicals, paint, oil) were present or evidence of stained soil or corroded pavement was visible, suggesting chemical spillage on the ground. This survey concentrated on the project site and sites identified in the 2002 Master Plan EDR database report. A site reconnaissance of the Pierce College campus was conducted in the presence of Pierce College personnel who were familiar with campus hazardous material use, storage, and disposal. Reconnaissance of the area surrounding the campus was limited to viewing properties from adjacent public streets and alleys; no attempt was made to gain access to any properties except the open parking lot areas. The 2002 Master Plan would not have placed housing or structures on top of any parcel designated by the EDR report as lying within an area susceptible to moderate or high hazardous impacts. However, there were three sites located with a 0.25 mile of the project site that were included as part of the EDR report. Mitigation measures were prescribed as part of the 2002 Master Plan to reduce any impacts on the project because of the proximity of these hazardous sites. These mitigation measures (HM-1–HM-4) are described above under impact response 7(a). An update to the previous EDR report was produced. No new hazardous sites were found to occur on the site (EDR 2009). Therefore, impacts would remain as previously estimated, and mitigation measures HM-1–HM-4 would be carried forward as part of the proposed 2010 Master Plan Update. Therefore, impacts would remain less than significant with mitigation.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|
| **e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 EIR found no impact related to safety hazards from proximity to airports. Because the location of the project would not change and no new airports have been developed in the immediate vicinity, impacts would remain the same as those previously analyzed. No impact is anticipated to occur.

| | | | | |
|---|---|---|---|---|
| **f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 EIR found no impact related to safety hazards from proximity to airports. Because the project location discussed in the proposed 2010 Master Plan Update has not changed and no new airstrips have been developed within 2 miles, no impact would occur as a result of the proposed 2010 Master Plan Update..

| | | | | |
|---|---|---|---|---|
| **g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 EIR addressed issues related to potential impacts on emergency services in the Public Services section of the EIR. Specifically, it discussed the ability of the police and fire departments to arrive promptly at the scene of an emergency. The new events center would have increased the need for additional emergency services by increasing the number of visitors to the campus. The previous EIR included emergency response mitigation measures. These mitigation measures would be carried over as part of the proposed 2010 Master Plan Update. The master plan is designed to improve accessibility to the campus for the emergency provider through roadway and street improvements as well as updated infrastructure. It is also designed to increase the success of any applicable emergency plan. Impacts would remain less than significant with mitigation.

The mitigation measure related to emergency response that would be carried over to the proposed 2010 Master Plan Update is as follows:

**2002 EIR Mitigation Measures**

**PPS-2** Pierce College shall design and implement a Special Event Security Plan, in coordination with the Los Angeles County Sheriff's Department and the Los Angeles Police Department, for the new events center. Issues addressed may include security needs, emergency evacuation procedures, and money handling issues.

| | | | | |
|---|---|---|---|---|
| **h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including areas where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The Public Services section of the 2002 EIR addressed potential impacts from fires, including impacts related to the ability of the fire department to access the scene of a fire. According to the Zoning Information and Map Access System for the City of Los Angeles (ZIMAS), the proposed 2010 Master Plan Update would be located in an area that is designated as a Very High Fire Hazard Severity Zone (City of Los Angeles 2004). The previous EIR included measures to decrease the potential for fires to occur on campus as well as fire code and regulation compliance measures. These mitigation measures would be carried over as part of the proposed 2010 Master Plan Update. Furthermore, in contrast to the previous master plan, the proposed 2010 Master Plan Update would not include on-campus housing and, therefore, would not place housing within an area of high fire hazard. Impacts would be less than previously anticipated in the 2002 EIR. The mitigation measures are as follows:

**FPS-1** The College shall consult with the city engineer and the fire department regarding appropriate standards (e.g., lane widths, grades, cut corners, etc.) for private streets and entry gates to ensure adequate access for fire department vehicles and equipment.

**FPS-2** All landscaping shall use fire-resistant plants and materials.

**FPS-3** Sprinkler systems shall be required throughout any structure to be built, in accordance with state codes and standards established by the State of California, Division of the State Architect, and State Fire Marshal.

**FPS-4** The revised project shall comply with all applicable codes and regulations administered by the State of California, Division of the State Architect, and State Fire Marshal.

Impacts would remain less than significant with mitigation.

| **9. HYDROLOGY AND WATER QUALITY. Would the project:** | | | | |
|---|---|---|---|---|
| **a) Violate any water quality standards or waste discharge requirements?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Similar to the 2002 FEIR, the proposed 2010 Master Plan Update would include projects that would create new sources of runoff and water discharge. However, the projects would comply with Section 404 of the federal Clean Water Act by implementing a Standard Urban Stormwater Mitigation Plan (SUSMP) to decrease impacts from runoff.

Furthermore, the 2002 Master Plan included improvements such as detention basins and water quality ponds to reduce polluted runoff and meet water quality standards established for the region; these elements would be carried forward as part the proposed 2010 Master Plan Update. Under the 2010 Master Plan Update, all new buildings will be certified under the LEED program, in accordance with the policy adopted by the Board of Trustees in May 2002. In addition, the 2010 Master Plan Update will include a series of campus-wide strategies to improve water conservation, as described below. Although a water reclamation facility was proposed in the 2002 Master Plan, it was dependent upon the expansion of City of Los Angeles graywater distribution lines to the campus, and thus, speculative. Therefore, the 2002 EIR analysis did not include the water reclamation facility in its wastewater calculations and analyzed impacts assuming no reclamation facility would be constructed. Currently, the City's plans to extend graywater distribution lines in the valley are on hold. Wastewater, as a result of the 2010 Master Plan update, would be treated similar to how wastewater is currently treated at the campus. However, some of the conservation methods incorporated into the design and campus planning would result in the reduction of water use and conservation of water over existing levels.

**Maximizing Water Conservation**

New buildings and landscape elements will incorporate appropriate water conservation strategies that focus on reducing the use of potable water. These strategies will include the use of efficient irrigation, low-maintenance and native plant species, low-flow plumbing fixtures, and automatic sensors. Reclaimed water will be used for irrigation should it become available at the campus.

**Managing Stormwater**

Stormwater management strategies would incorporate natural landscape elements to address issues related to water quantity and quality. Swales, bio-retention basins, green roofs, and permeable or porous paving materials will be used to manage stormwater by reducing runoff and the amount of contaminants.

No new impacts are anticipated, and impacts would remain as previously analyzed, less than significant with mitigation.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

The following mitigation measures will be carried forward as part of the proposed 2010 Master Plan Update:

**2002 EIR Mitigation Measures**

**SW-1** A Standard Urban Stormwater Mitigation Plan shall be developed in accordance with Los Angeles County stormwater permit requirements, and

**SW-2** Water quality ponds shall be implemented, where feasible, as a best management practice (BMP) to capture and treat polluted runoff from parking lots.

**SW-3** Vegetated swales and retention areas along pedestrian circulation routes, in parking lots, and around buildings will be constructed to capture stormwater runoff and allow groundwater recharge.

**SW-4** A campus-wide approach to stormwater catchment and appropriate plant ecology will be implemented to reduce infrastructure loads during rain events, increase groundwater availability, and reduce annual irrigation needs.

| | | | | |
|---|---|---|---|---|
| **b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 FEIR found that building renovations, new building construction, and development of the agricultural fields would have no adverse effects on groundwater resources. The campus relies on water delivered by the Los Angeles Department of Water and Power (LADWP) through existing pipelines, which were to be improved to meet the needs of the 2002 Master Plan. These improvements would be carried forward as part of the proposed 2010 Master Plan Update. The College does not have any active wells on campus and therefore does not pump groundwater for its water needs. Because impacts on groundwater resources would not change under the proposed 2010 Master Plan Update, it is expected that impacts would remain the same as or less than previously analyzed. There would be no impacts on groundwater.

| | | | | |
|---|---|---|---|---|
| **c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off site?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Under the proposed 2010 Master Plan Update, the existing drainage pattern would not be altered significantly. The 2002 EIR found that the eastern portion of the campus has an existing storm drain network with a well-planned hierarchy of storm drain diameters to accommodate increased flow as the network collects additional runoff flowing toward the Los Angeles River.[8] Campus facilities personnel state that the existing system performs adequately in this portion of the campus. Under the proposed 2010 Master Plan Update, the new and renovated facilities proposed for this portion of the campus would increase the amount of runoff flowing into the existing system. As discussed in the 2002 EIR, improvements would be made through the addition of new storm drains that would increase runoff collection capacity and maintain an adequate level of service for this portion of campus. However, the cancellation of the science partnerships would reduce the previously estimated runoff and drainage impacts. Although development of the equestrian education center, the child development center building, and the agricultural partnerships would remain under the proposed 2010 Master Plan Update, impacts would remain less than significant with mitigation.

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[8] Psomas. 2002. *Draft Preliminary Utility Evaluation for Pierce College Los Angeles Community College District*. February 11.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

The mitigation measures previously described in the 2002 EIR would be carried forward for the proposed 2010 Master Plan Update. The measures are as follows:

**2002 EIR Mitigation Measures**

**FD-1** Detention basins or other appropriate drainage facilities shall be installed, and the storm drain system shall be improved to (a) meet anticipated increases in runoff from new facilities and impervious surfaces and (b) bring the western portion of campus up to an adequate level of service and reduce flooding; and

**FD-2** Earth berms, channels, or vegetated swales shall be provided to capture runoff from agricultural fields to reduce topsoil runoff.

| | | | | |
|---|---|---|---|---|
| **d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** See impact discussion under response 8(a). As stated above, the proposed 2010 Master Plan Update would include projects that would create new sources of runoff and water discharge similar to projects proposed under the 2002 Master Plan. However, master plan parking lot development and pedestrian improvements that would be carried forward would comply with Section 404 of the federal Clean Water Act by implementing a SUSMP to decrease impacts from runoff. Furthermore, the 2002 Master Plan included improvements such as detention basins and water quality ponds to reduce polluted runoff and meet water quality standards established for the region; these elements would be carried forward as part the proposed 2010 Master Plan Update. As such, no new impacts are anticipated, and impacts would remain as previously analyzed, less than significant with mitigation.

The following mitigation measures will be carried forward as part of the proposed 2010 Master Plan Update:

**2002 EIR Mitigation Measures**

**SW-1** A Standard Urban Stormwater Mitigation Plan shall be developed in accordance with Los Angeles County stormwater permit requirements, and

**SW-2** Water quality ponds shall be implemented, where feasible, as a BMP to capture and treat polluted runoff from parking lots.

These mitigation measures would be adequate in reducing adverse effects on surface waters to levels below significant. No streams or rivers would be altered under the 2002 Master Plan or 2010 Master Plan Update.

| | | | | |
|---|---|---|---|---|
| **e) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** See impact discussion under response 8(a). As stated above, the proposed 2010 Master Plan Update would include projects that would create new sources of runoff and water discharge similar to projects proposed under the 2002 Master Plan. However, with respect to parking lot development and pedestrian improvements that would be carried forward as part of the proposed 2010 Master Plan Update, the project would comply with Section 404 of the federal Clean Water Act by implementing a SUSMP to decrease impacts from runoff. Furthermore, the 2002 Master Plan included improvements such as detention basins and water quality ponds to reduce polluted runoff and meet water quality standards established for the region; these elements would be carried forward as part the proposed 2010 Master

Plan Update. As such, no new impacts are anticipated, and impacts would remain as previously analyzed, less than significant with mitigation.

The following mitigation measures will be carried forward as part of the proposed 2010 Master Plan Update:

**2002 EIR Mitigation Measures**

**SW-1** A Standard Urban Stormwater Mitigation Plan shall be developed in accordance with Los Angeles County stormwater permit requirements, and

**SW-2** Water quality ponds shall be implemented, where feasible, as a BMP to capture and treat polluted runoff from parking lots.

| | | | | |
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| **f) Otherwise substantially degrade water quality?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The previous master plan included a public/private agricultural partnership that would have transformed 21 to 23 acres of underutilized fields into productive agricultural uses for the community and the College campus. This would have greatly increased the amount of water needed on campus as well as the amount of contaminated water from irrigation runoff. However, under the 2010 Master Plan Update, the College does not propose such substantial changes and, rather, would maintain and enhance the existing fields and operations. Therefore, impacts on water quality would be less than previously anticipated. Additionally, the mitigation measures carried forward and described under impact discussion 8(a) (SW-1 and SW-2) would further reduce any impacts on water quality. Impacts would remain less than significant with mitigation.

| | | | | |
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| **g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** Proposed Pierce College development would not place residential structures in or near a 100-year floodplain. All construction and project operations occurring under the proposed 2010 Master Plan Update, as also found in the 2002 EIR, would be within Zone X-delineated land. Zone X is defined as areas with a 0.2% chance of flooding in any year over a 500-year period. Therefore, the project would not create a significant level of risk to properties or people by placing them in a floodplain. No impact would occur.

| | | | | |
|---|---|---|---|---|
| **h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** Proposed development on Pierce College would not place structures in or near a 100-year floodplain. All construction and project operations occurring under the proposed 2010 Master Plan Update, as also found in the 2002 EIR, would be within Zone X-delineated land. Zone X is defined as areas with a 0.2% chance of flooding in any year over a 500-year period. Therefore, the project would not create a significant level of risk to properties or people by placing them in a floodplain. No impact would occur.

| | | | | |
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| **i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The proposed 2010 Master Plan Update would not place people in an area where they would be susceptible to loss, injury, or death from flooding. However, as concluded in the 2002 EIR, deficient drainage conditions contribute to flooding on the western portion of campus. Although the agriculture private/public partnership proposed as part of the 2010 Master Plan Update is not as extensive as that proposed in 2002, similar impacts are assumed. As such, no new impacts are anticipated, and impacts would remain as previously analyzed, less than significant with mitigation incorporated.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

The following mitigation measures will be carried forward as part of the proposed 2010 Master Plan Update:

**2002 EIR Mitigation Measures**

**FD-1** Detention basins or other appropriate drainage facilities shall be installed, and the storm drain system shall be improved to (a) meet anticipated increases in runoff from new facilities and impervious surfaces and (b) bring the western portion of the campus up to an adequate level of service and reduce flooding.

**FD-2** Earth berms, channels, or vegetated swales shall be provided to capture runoff from agricultural fields to reduce topsoil runoff.

| | | | | |
|---|---|---|---|---|
| **j) Inundation by seiche, tsunami, or mudflow?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 EIR did not address impacts related to seiche, tsunami, or mudflow. The College campus is not located in an area that would be subject to these types of occurrences. It is far enough inland from any coastline so that it would not incur impacts from tsunamis. Because of its current state of development and urban surrounding, the campus would not be subject to seiche or mudflow. Therefore, because the 2002 EIR did not find any impacts related to these occurrences and because the proposed 2010 Master Plan Update improvements would still be limited to the boundaries of Pierce College, impacts would remain the same. No impact is anticipated to occur.

| | | | | |
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| **10. LAND USE AND PLANNING. Would the project:** | | | | |
| **a) Physically divide an established community?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The proposed 2010 Master Plan Update is an update to a master plan for an existing College. The proposed improvements would not divide an already established community because the community and College have co-existed for a number of years; the College would not expand outside its existing footprint but would renovate and restructure its current layout and building uses. As noted in the 2002 FEIR, construction activities would include demolition of various existing structures, excavation and grading of specific sites on campus, construction of new facilities, and renovation and modernization of existing facilities. However, four of the eight demolition projects originally planned under the 2002 Master Plan would no longer be carried out under the proposed 2010 Master Plan Update, thereby reducing previously analyzed impacts. The remaining construction activities would result in some temporary, localized, site-specific disruptions for land uses in the area. These would be related primarily to construction-related traffic from trucks and equipment in the area, possible partial and/or complete street and lane closures, disruptions related to access to facilities and parking, increased noise and vibration, and changes in air emissions (see the air quality, noise, and traffic and circulation analyses for further discussion). Therefore, impacts would remain less than significant.

| | | | | |
|---|---|---|---|---|
| **b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** Applicable land use plans for the proposed 2010 Master Plan Update are the City of Los Angeles General Plan and Zoning Code and the Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan. The city's general plan currently labels the project area with multiple land uses designations: Public Facilities, Open Space, and Neighborhood Office Commercial (ZIMAS 2004). The zoning code is consistent with these designations; the project area is zoned for Commercial (C4-D2), Open Space (OS), and Public Facilities (PF) (ZIMAS 2004). Educational facilities are an allowed use under the Public Facilities designation. With the open space that would be preserved under the proposed update, the proposed 2010 Master Plan Update would remain consistent with both the general plan and the community plan. Furthermore, the College has operated in this area for 62 years. Previous updates and revisions to the general and community plans recognize that the project site is dedicated to Pierce College, and both plans acknowledge the benefit of the school to the area. As such, no new impacts are expected to occur. Within the community plan, Pierce College has been described as an important part of the history of the area. Its agricultural program is one of the few remaining connections to the community's agrarian past. The proposed 2010 Master Plan Update would revitalize the agrarian nature of the College through the agricultural/equestrian educational centers. The community plan recognizes the need for continued development of equestrian, hiking, and bicycle trails in the area. No impacts were found within the 2002 EIR. As such, any impacts would be similar to those identified in the 2002 EIR. No new impacts would occur.

| | | | | |
|---|---|---|---|---|
| **c) Conflict with any applicable habitat conservation plan or natural communities conservation plan?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The College supports no substantive areas of native vegetation, aside from the Ecological Studies Preserve in Canyon de Lana in the southwest corner of the campus, which supports restored native vegetation planted during the 1960s, and the Arboretum in the southeastern portion of the College, which supports some planted tree species native to southern California. Otherwise, biological resources on campus are limited to agricultural fields and large areas of open space that are dominated by non-native weedy vegetation, various (primarily non-native) horticultural tree species, and ornamental shrubs. There are no habitat conservation plans or natural community conservation plans for which the proposed 2010 Master Plan Update would be in conflict. As such, impacts would remain the same as those previously determined, and there would be no new impacts.

| **11. MINERAL RESOURCES. Would the project:** | | | | |
|---|---|---|---|---|
| **a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 FEIR did not identify any unique geological features or important mineral resources that would be affected by the proposed 2010 Master Plan Update. Therefore, because the proposed 2010 Master Plan Update improvements would continue to be limited to the boundaries of the Pierce College campus, impacts would remain the same. There would be no impact.

| | | | | |
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| **b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** See impact discussion under response 10(a). The 2002 Master Plan did not identify any mineral resources on the College campus. Implementation of the 2010 Master Plan Update would occur on the same site. Therefore, impacts resulting from the loss of availability of an important mineral resource recovery site are not expected to occur.

| **12. NOISE. Would the project result in:** | | | | |
|---|---|---|---|---|
| **a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The EIR for the 2002 Master Plan concluded the project would comply with City of Los Angeles Noise Ordinance limits on temporary construction noise and permanent operational noise after implementation of construction noise mitigation measures. The noise ordinance specifies the maximum noise level for powered equipment or powered hand tools.[9] Any powered equipment or powered hand tool that produces noise exceeding 75 dBA at a distance of 50 feet from construction and industrial machinery is prohibited. However, the above noise limitation shall not apply where compliance is technically infeasible.

Some of the facilities proposed by the 2002 Master Plan that were either unusually noisy or close to residential areas at the campus boundary have been cancelled. These include the following: 1) the agricultural education experiences facility and 2) the horticultural partnership facility. The 2010 Master Plan Update includes only two new facilities within 500 feet of residential areas: 1) the revised and relocated new M&O Facility (within 500 feet of dwellings at the southeast boundary) and 2) the Horticultural/Animal Science Facility (within 450 feet of homes at the west boundary). At the M&O Facility, all activities would be enclosed within the building and operations activities would not generate any unusually noise activities audible to nearby residents. Large material deliveries would be infrequent and no more than once a month on an average. These deliveries would occur between 9 a.m. and 6 p.m. The Horticultural/Animal Science Facility is a classroom building similar to existing buildings on the campus.

Construction noise is regulated under Section 41.40 of the Los Angeles Municipal Code. Construction activity is prohibited from causing “loud noises to the disturbance of persons occupying sleeping quarters” at night (defined as 9 p.m. to 7 a.m.). In addition, construction within 500 feet of residential buildings is prohibited on Sunday and during nighttime hours (defined as 6 p.m. to 8 a.m.) on Saturday or holidays. All construction contractors will be required to comply with these work-hour limitations. The construction noise mitigation measures previously described in the 2002 EIR would be carried forward for the proposed 2010 Master Plan Update.

**2002 EIR Mitigation Measures**

**N-1** Noise control devices, such as equipment mufflers, enclosures, and barriers, shall be used where feasible and appropriate based on the noise sources and the distance to the closest sensitive receptors.

**N-2** All sound-reducing devices and restrictions shall be maintained throughout the construction period.

**N-3** Construction schedules shall be coordinated with academic affairs personnel to minimize noise impacts on students and faculty.

Regarding new facilities proposed under the 2010 Master Plan Update, permanent operational noise could be generated by heating, ventilation, and air-conditioning (HVAC) equipment and outdoor operations such as activity at loading docks. The proposed M&O facility would be configured to locate outdoor activities inward and away from any nearby residents. Noise from such equipment and operations is regulated under Section 112.02 of the Los Angeles Noise Ordinance. Daytime and nighttime noise levels at the boundaries of the closest parcels zoned for residential and commercial use are not allowed to exceed 5 A-weighted decibels (dBA) beyond ambient background levels. All noise-generating equipment installed at the campus would be required to comply with this regulation. Most of the new buildings are at least 1,000 feet from sensitive off-site residential receptors; therefore, in most cases, noise will not be an issue. Most currently available HVAC equipment is relatively quiet; therefore, it is unlikely to cause nighttime noise impacts, even at sensitive receptors (as close as 100 feet). However, some new buildings would be close to off-site residential areas and sensitive on-site school rooms; therefore, HVAC equipment would have the potential to cause noise impacts. Noise impacts would be reduced to less-than-significant levels by the added implementation of the new mitigation measures provided below.

**N-4** Exterior noise sources associated with an individual new building or facility shall be controlled to achieve an aggregate noise source level of 62 dBA at 50 feet. That allowable noise emission ensures compliance with the daytime and nighttime exterior noise limits at the closest residential and commercial parcels outside the campus, as defined by Section 112.02 and Sections 111.02 and 111.03 of the Los Angeles Municipal Code. The upper-bound noise limit was calculated using the following assumptions:

[9] City of Los Angeles. *Los Angeles Municipal Code*, Section 112.05.

- the closest off-campus residential area is 370 feet from any proposed facility (the horticulture/animal science facility),
- the lower bound allowable nighttime noise level at that residential area is 45 dBA (based on default ambient noise levels specified by the city noise ordinance), and
- the allowable lower-bound noise emission rate at the horticulture/animal science facility (to achieve the lower-bound ambient noise limit) is 62 dBA at 50 feet, assuming a sound propagation rate of 6 dBA per doubling of distance and not accounting for excess attenuation by barriers or ground absorption.

| | | | | |
|---|---|---|---|---|
| **b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The EIR for the 2002 Master Plan did not consider ground vibration or groundborne noise. A supplemental impact assessment is provided below.

The highest levels of ground vibration would be generated during temporary building demolition and building construction activity. It is anticipated that pile driving will not be required to construct new buildings. Given that assumption, vibration levels generated during building demolition and building construction are not expected to be discernible, even at nearby school buildings. The highest ground vibration levels are expected to be generated by jackhammers and hoe rams, which are used to demolish building foundations, and by vibratory rollers, which are used to level new parking lots. Ground vibration levels from such equipment generally dissipate to below discernible levels within 25 to 50 feet of the source.[10] It is unlikely that jackhammers and vibratory rollers would be used at such close distances for extended periods; therefore, in most cases, the vibration impacts would be indiscernible and less than significant. However, it is possible that a limited number of school buildings near future construction zones might contain research equipment that is exceptionally sensitive to vibration (e.g., electron microscopes). In those unusual circumstances, temporary ground vibration caused by construction activity might have the potential to disrupt research equipment. Vibration impacts from such unusual circumstances would be reduced to less-than-significant levels by implementation of the following mitigation measures:

**N-5** Use of vibration-generating construction equipment at new facilities shall be coordinated with Academic Affairs personnel to minimize potential vibration impacts on exceptionally sensitive research equipment. If requested by the Academic Affairs office, a construction vibration control study will be required for specific vibration-sensitive buildings. Vibration control measures could include the following:

- preparation of a vibration control plan;
- prediction of temporary vibration levels during construction, which will be compared to acceptable vibration levels for sensitive equipment;
- specification of low-vibration construction equipment;
- vibration monitoring before and during construction activity; and
- coordination with research staff to temporarily discontinue use of sensitive equipment during critical construction activity.

Operation of the new buildings would not cause discernible ground vibration at any nearby dwellings or existing school buildings. Passenger cars, delivery trucks, and HVAC equipment used during normal operations cause negligible ground vibration.[11]

There would be no impact from groundborne noise during construction or operation. This issue is typically important only in limited circumstances involving large (usually underground) vibration sources and exceptionally sensitive indoor use areas, (e.g., a new train tunnel underneath an existing concert hall). Construction and operation of the new buildings would not cause groundborne noise at nearby buildings.

[10] Federal Transit Administration, 2006.
[11] Ibid.

| **Issues** | **Potentially Significant** | **Less-than-Significant Impact with Mitigation Incorporated** | **Less-than-Significant Impact** | **No Impact** |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** There are two issues related to this impact:

- Noise increases at existing on-site and off-site receptors caused by HVAC equipment and other outdoor noise sources at new buildings. Details on the impact assessment and proposed mitigation are provided in response 11(a). The impact would be less than significant after mitigation is incorporated; and

- Increased traffic noise along off-site public streets serving the campus. This impact would be less than significant, and no mitigation is required. Details are provided below.

The EIR for the 2002 Master Plan included baseline monitoring results for representative homes and apartments. It concluded that the traffic volume increases associated with the 2002 Master Plan would not be high enough to cause a significant increase in traffic noise. However, the existing noise environment has changed since the previous EIR was certified because of the recent completion of the Orange Line. In addition, the proposed 2010 Master Plan Update, as described in the 2010 Master Plan Update, would increase student enrollment to a level above the number that was estimated under the 2002 Master Plan. For these reasons, the traffic noise impact assessment was updated to reflect the changed conditions.

The significance criteria used to assess traffic noise are the same as those described in the 2002 EIR. The *L.A. CEQA Thresholds Guide* (City of Los Angeles 2006) establishes noise compatibility criteria for various land uses, as listed in Table 13, below. Noise compatibility is based on the outdoor 24-hour Community Noise Exposure Level (CNEL).

The *L.A. CEQA Thresholds Guide* indicates that a significant noise increase would be triggered by either of the following conditions:

- If the noise level after project buildout triggers either the Normally Acceptable or Conditionally Acceptable categories, and the project-related noise increase is 5 dBA CNEL or greater; or

- If the noise level after project buildout triggers either the Normally Unacceptable or Clearly Unacceptable categories, and the project-related noise increase is 3 dBA CNEL or greater.

The EIR for the 2002 Master Plan included baseline noise monitoring at representative homes and businesses outside the campus. To support the 2010 Master Plan Update, noise monitoring was repeated at the same locations and at approximately the same time of day. The results of the supplemental 2009 baseline monitoring are shown in Table 14, below. Noise levels measured in September 2009 were lower than the noise levels measured in 2002.

The baseline noise monitoring consisted of short-term spot measurements taken during the mid-afternoon period when traffic noise levels are generally highest, while the land use compatibility categories are based on the 24-hour CNEL.

**Table 13: Community Noise Exposure Levels (Exterior) and Land Use Compatibility**

| Land Use | Community Noise Exposure Level, dBA | | | |
|---|---|---|---|---|
| | Normally Acceptable | Conditionally Acceptable | Normally Unacceptable | Clearly Unacceptable |
| Single-Family Residence | 50–60 | 55–70 | 70–75 | Above 70 |
| Multi-Family Residence | 50–65 | 60–70 | 70–75 | Above 70 |
| Hotel/Motel | 50–65 | 60–70 | 70–80 | Above 80 |
| Auditorium | — | 50–70 | — | Above 65 |
| Sports Arena | — | 50–75 | — | Above 70 |
| Parks | 50–70 | — | 67–75 | Above 72 |
| Office Building/Commercial | 50–70 | 67–77 | Above 75 | — |
| Industrial/Manufacturing | 50–75 | 70–80 | Above 75 | — |

Normally Acceptable: Development is acceptable.
Conditionally Acceptable: Noise abatement should be considered as part of the development.
Normally Unacceptable: Development should generally be discouraged.
Clearly Unacceptable: Development should generally not be built.
Source: City of Los Angeles, *L.A. CEQA Thresholds Guide*, 2006.

**Table 14: Noise Measurements at Noise Sensitive Uses**

| Site Number | Location and Land Use | Noise Level Measured in 2002 ($L_{eq}$, dBA) | Time and Duration of the Supplemental Measurement | Supplemental Noise Levels ($L_{eq}$ or CNEL, dBA)[1, 2] |
|---|---|---|---|---|
| R-1 | De Soto Avenue, north of Victory Boulevard (Residential) | 79 | 9/23/09, 16:50 | 69 |
| R-2 | Mason Street, north of Victory Boulevard (Residential) | 76 | 9/23/09, 17:40 | 67 |
| R-3 | Victory Boulevard, east of Mason Street (Residential) | 76 | 9/23/09, 18:10 | 69 |
| R-4 | Winnetka Avenue, at the Adult Technical School (Commercial) | 78 | 9/23/09, 18:50 | 68 |
| R-5 | Winnetka Avenue, north of Oxnard Street (Residential) | 80 | 9/23/09, 19:25 | 70 |
| R-6 | Oxnard Street, east of De Soto Avenue (Residential) | 75 | 9/23/09, 20:20 | 71 |

$L_{eq}$ = noise level equivalent.
[1] $L_{eq}$ noise reading during the measurement duration.
[2] Mid-afternoon $L_{eq}$ levels assumed to be similar to 24-hour CNEL levels.
Source: ICF Jones & Stokes, 2009.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

Because the dominant noise measured during the supplemental monitoring was traffic noise and the noise measurements were taken near the peak noise hour, it can generally be assumed that the measured $L_{eq}$ noise levels are roughly equal to the 24-hour CNEL (Federal Transit Administration 2006). Given that assumption, the measured $L_{eq}$ noise levels can be used to determine land use noise compatibility categories at each measurement location. In all cases, the existing noise levels, as of September 2009, were high enough to trigger the Normally Unacceptable or Clearly Unacceptable categories. Therefore, according to the *L.A. CEQA Thresholds Guide*, a significant impact would be triggered by a traffic noise increase of 3 dBA (peak-hour $L_{eq}$ or CNEL) or more. This is the same traffic noise impact criterion that was used for the 2002 EIR.

The 2002 EIR demonstrated that to trigger the 3 dBA traffic noise impact criterion, the proposed 2010 Master Plan Update would have to cause a project-related traffic volume increase of 100% (defined as the 2015 cumulative with-project traffic volume minus the 2015 cumulative no-project base volume). The forecast traffic increases caused by the 2010 Master Plan Update would be much lower than that threshold. The updated traffic report (Fehr and Peers 2010) indicates that the forecast increases in peak-hour traffic volumes at the most heavily traveled roadways would be only 1% to 13%, which corresponds to traffic noise increases of less than 1 dBA. Given this analysis, the permanent increases in traffic noise would be less than significant, and no mitigation is required.

| | | | | |
|---|---|---|---|---|
| **d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Temporary short-term noise impacts at existing campus buildings could result during construction of new buildings as part of the 2010 Master Plan Update. The 2002 EIR concluded that this impact would be less than significant after implementation of construction noise mitigation. The conclusions of this supplemental analysis are the same. Details regarding the impact assessment and the required construction noise mitigation measures are presented in response 11(a).

| | | | | |
|---|---|---|---|---|
| **e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 EIR did not consider potential impacts from airport noise. The campus is more than 5 miles west-southwest of the closest general aviation airport (Van Nuys Airport) and more than 12 miles west of the closest commercial airport (Bob Hope/Burbank Airport). The Van Nuys Airport runway is oriented north/south, and the campus is nearly due west of the airport. Therefore, there is no potential for campus buildings to be subjected to excessive aircraft noise. No mitigation is required.

| | | | | |
|---|---|---|---|---|
| **f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The campus is more than 5 miles from the nearest general aviation airport (Van Nuys Airport). Therefore, the private airport would cause no noise impact at campus buildings. No mitigation is required.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

| 13. POPULATION AND HOUSING. Would the project: | | | | |
|---|---|---|---|---|
| **a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 FEIR found that the project would not induce substantial population growth directly or indirectly. During construction, the project would employ workers who would more than likely commute to and from the work site and not relocate their households. The Los Angeles metropolitan area has a large pool of construction labor from which to draw. With completion of the projects described in the 2002 EIR, the number of College employees would increase by 168. The previously planned science partnerships would have also increased the number of employees; however, because these partnerships are no longer part of the proposed 2010 Master Plan Update, impacts from increased population would be less than what was previously described. The 2002 EIR found that less-than-significant impacts related to population growth would occur; as such, impacts related to population under the proposed 2010 Master Plan Update would remain the same.

| | | | | |
|---|---|---|---|---|
| **b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 EIR found that housing would not be displaced and that there would be no impacts. The proposed 2010 Master Plan Update would not change this conclusion because it also would not remove any type or form of housing. No impact would occur.

| | | | | |
|---|---|---|---|---|
| **c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 EIR found that people would not be displaced and there would be no impacts. The proposed 2010 Master Plan Update would not change this conclusion because it also would not displace any persons from the project area, thereby necessitating the construction of replacement housing. There would be no impact.

| 14. PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: | | | | |
|---|---|---|---|---|
| **a) Fire protection?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 FEIR found that less-than-significant impacts related to fire services would occur from implementation of the master plan. According to the 2002 EIR, the 2002 Master Plan proposed approximately 500,000 total gross square feet of new building space and 400 to 450 housing units. As shown in Table 3 the 2010 Master Plan Update, approximately 285,451 square feet of new building space would be provided. Therefore, the 2010 Master Plan Update would provide less new building space when compared to the 2002 Master Plan.

Because buildout under the proposed 2010 Master Plan Update would not increase the number of students beyond the number forecast under the 2002 EIR (see Table 2) and because the science public/private partnership projects described in the 2002 EIR are no longer included as part of the proposed 2010 Master Plan Update, impacts would not be greater than what was described in the 2002 EIR. Furthermore, the removal of the previously planned student housing projects would reduce the number of associated emergency calls to the fire department, calls that were originally anticipated as part of the 2002 Master Plan.

Temporary construction would affect fire department access to the College. This impact would remain under the proposed 2010 Master Plan Update because of street closures or other access impairments. The mitigation measures described in the 2002 EIR would be carried forward as part of the proposed 2010 Master Plan Update. Because no new impacts would be created, impacts would remain less than significant.

**2002 EIR Mitigation Measures**

**FPS-1** The College shall consult with the city engineer and the fire department regarding appropriate standards (e.g., lane widths, grades, cut corners, etc.) for private streets and entry gates to ensure adequate access for fire department vehicles and equipment.

**FPS-2** All landscaping shall use fire-resistant plants and materials.

**FPS-3** Sprinkler systems shall be required throughout any structure to be built, in accordance with state codes and standards established by the State of California, Division of the State Architect, State Fire Marshal.

**FPS-4** The revised project shall comply with all applicable codes and regulations administered by the State of California, Division of the State Architect, and State Fire Marshal.

| | | | | |
|---|---|---|---|---|
| **b) Police protection?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Police protection services for the LACCD are provided by the Los Angeles County Sheriff's Department (LASD). The 2002 EIR found that less-than-significant impacts related to police services would result from the master plan with mitigation incorporated. As noted in the response to 13(a), above, student enrollment in the buildout year (2015) under the proposed 2010 Master Plan Update would not be greater than the enrollment figure projected in the 2002 EIR. Furthermore, removal of the previously planned student housing projects and the science public/private partnerships would reduce the number of associated emergency calls to the police department, calls that were originally anticipated as part of the 2002 Master Plan. Temporary construction impacts would remain under the proposed 2010 Master Plan Update because of street closures, which could diminish.. The mitigation measures previously described in the 2002 EIR would be carried forward as part of the proposed 2010 Master Plan Update. Because no new impacts would be created, impacts would remain less than significant with mitigation incorporated.

**2002 EIR Mitigation Measures**

**PPS-1** Pierce College shall implement security features (i.e., improved lighting, improved landscaping, and additional security phones) as part of the proposed projects described in the master plan.

**PPS-2** Pierce College shall design and implement a Special Event Security Plan, in coordination with the Los Angeles County Sheriff's Department and the Los Angeles Police Department, for the new events center. Issues addressed may include security needs, emergency evacuation procedures, and money handling issues.

| | | | | |
|---|---|---|---|---|
| **c) Schools?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** Pierce College is located in the Los Angeles Unified School District's (LAUSD's) District C, which covers an area of approximately 70 square miles. This district is located in the southern portion of the west and central portions of the San Fernando Valley. District C includes the following communities: Encino, Reseda, Sherman Oaks, Tarzana, Van Nuys, Warner Center, and Winnetka as well as portions of Studio City, Valley Village, and Woodland Hills. The 2002 EIR found that although increases in student enrollment would have occurred because of development expected as part of the master plan, they would not have significantly affected any one school within the district and would not have over-burdened the school system. The 2002 Master Plan included the development of 400 to 450 housing units, which will no longer be carried forward as part of the proposed 2010 Master Plan Update. Additionally, the science public/private partnerships, which were part of the 2002 Master Plan, would have increased the number of employees as well as residents in the project area. Because these partnerships are no longer being carried forward, these previously estimated impacts will no longer occur as part of the proposed 2010 Master Plan Update. Impacts would be less than originally estimated and would remain less than significant.

| | | | | |
|---|---|---|---|---|
| **d) Parks?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 EIR found that although increased enrollment would occur, it would not negatively affect the recreational resources of the project area or surrounding area, and impacts would be less than significant. Through the removal of the student housing element and some of the public/private partnerships, impacts originally anticipated from increased student and employee use of parks would be reduced under the proposed 2010 Master Plan Update. As such, impacts would be less than previously anticipated and would remain less than significant.

| | | | | |
|---|---|---|---|---|
| **e) Other public facilities?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 EIR provided no impact analysis pertaining to other public facilities. However, because the campus already provides libraries, health care facilities, student services, etc., it is assumed that these facilities were regarded as incurring no impacts under the 2002 Master Plan. Because the proposed 2010 Master Plan Update would no longer include the student housing element and some of the public/private partnerships, any impacts would be less than previously anticipated. Therefore, there would be no impact.

| **15. RECREATION.** | | | | |
|---|---|---|---|---|
| **a) Would the project increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 FEIR found that despite increases in the number of students and employees, recreational facilities and parks located in the vicinity of Pierce College would not be overburdened and would not experience an increase in use that would accelerate deterioration. Implementation of the previous master plan would have included projects that would have renovated and modernized existing recreational and athletic facilities on the campus. Also, public/private partnerships would have enhanced existing areas of the campus, including the horticulture area and quad area (creating a new botanical garden), which would have provided students and employees with additional green spaces. The proposed 2010 Master Plan Update still includes the renovation and modernization of the existing recreational and athletic facilities; however, some of the previously planned public/private partnership projects would not be carried forward as part of the proposed 2010 Master Plan Update. Although the removal of the partnership projects would mean that additional green spaces would not be created, it would not reduce any of the existing recreational uses at the campus. Therefore, impacts would be similar to those previously anticipated and would remain less than significant.

| | | | | |
|---|---|---|---|---|
| **b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The previous EIR found that no significant impacts would occur from the renovation and modernization of the existing recreational and athletic facilities, planned for completion in October of this year. Additionally, some of the public/private partnerships previously planned would not be carried forward as part of the proposed 2010 Master Plan Update. No new or expanded recreational facilities are planned as part of the proposed 2010 Master Plan Update; therefore, impacts would remain less than significant.

| **Issues** | **Potentially Significant** | **Less-than-Significant Impact with Mitigation Incorporated** | **Less-than-Significant Impact** | **No Impact** |
|---|---|---|---|---|

| **16. TRANSPORTATION/TRAFFIC. Would the project:** | | | | |
|---|---|---|---|---|
| **a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** Fehr and Peers prepared a traffic and parking study for the 2010 Master Plan Update in January 2010. Because the 2002 EIR analyzed projects only until 2010, a new traffic analysis was required to study impacts up to 2015, which is the horizon year for the 2010 Master Plan Update. The 2010 report is included in its entirety as an appendix to this document. The study analyzed potential revised project-generated traffic impacts on the street and highway system surrounding and serving the Pierce College campus. The following traffic scenarios were analyzed in the study:

- Existing (2009) Conditions – The analysis of existing traffic conditions provided a basis for the study. The existing-conditions analysis included an assessment of streets, traffic volumes, operating conditions, transit services, and on-campus parking conditions;

- Year 2015 Cumulative-Base (No-Project) Conditions – The objective of this scenario was to project the future operating conditions that could be expected to result from regional growth and related projects in the vicinity of the project site, without consideration of the proposed 2010 Master Plan Update; and

- Year 2015 Cumulative-Plus-Project Conditions – The objective of this scenario was to identify the potential impacts of the proposed 2010 Master Plan Update on future operating conditions, with traffic expected to be generated by buildout of the proposed 2010 Master Plan Update added to the base traffic forecasts.

The study evaluated the potential for traffic impacts at 32 intersections in the vicinity of the Pierce College campus during the weekday AM and PM peak hours. The study relied on established Los Angeles Department of Transportation (LADOT) threshold criteria, which are used to determine if a project will have a significant traffic impact at a specific intersection. According to LADOT criteria, a project impact would be considered significant if the conditions in Table 15 are met.

**Table 15: Los Angeles Department of Transportation Threshold Criteria**

| **Intersection Condition with Project Traffic** | | **Project-Related Increase in V/C Ratio** |
|---|---|---|
| **LOS** | **V/C Ratio** | |
| C | > 0.70–0.80 | Equal to or greater than 0.04 |
| D | > 0.80–0.90 | Equal to or greater than 0.02 |
| E, F | > 0.90 | Equal to or greater than 0.01 |

Note:
LOS = level of service; V/C = volume to capacity.
Source: Fehr and Peers, 2010.

**Existing Conditions**

Table 16 summarizes the existing AM and PM peak-hour volume-to-capacity (V/C) ratios and corresponding levels of service at each of the study intersections. As can be seen, 11 of the 32 intersections currently operate at LOS E or F during the AM and/or PM peak hours. These intersections are as follows:

- De Soto Avenue and Saticoy Street,
- De Soto Avenue and Sherman Way,
- De Soto Avenue and Vanowen Street,
- Topanga Canyon Boulevard and Victory Boulevard,
- De Soto Avenue and Victory Boulevard,
- Winnetka Avenue and Victory Boulevard,
- Corbin Avenue and Victory Boulevard,
- Tampa Avenue and Victory Boulevard,
- Wilbur Avenue and Victory Boulevard,
- Reseda Avenue and Victory Boulevard, and
- Winnetka Avenue and Ventura Boulevard.

The remaining study intersections operate at fair to good levels of service (LOS D or better) during both the AM and PM peak hours.

**2015 Cumulative Base Conditions – Without Proposed 2010 Master Plan Update**

The traffic analysis prepared for the 2010 Master Plan Update analyzed potential future traffic conditions under 2015 cumulative base conditions, assuming no growth on the Pierce College campus between the 2002 FTE baseline and 2015. Table 16, included below, summarizes these results.

**Table 16: Existing (2008–2009) Intersection Levels of Service**

| | | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | **Intersection** | **V/C** | **LOS** | **V/C** | **LOS** |
| *1. | De Soto Av and Saticoy St | 0.870 | D | 0.905 | E |
| *2. | Mason Av and Saticoy St | 0.834 | D | 0.789 | C |
| *3. | Winnetka Av and Saticoy St | 0.775 | C | 0.823 | D |
| **4. | De Soto Av and Sherman Way | 0.735 | C | 0.958 | E |
| **5. | Mason Av and Sherman Way | 0.710 | C | 0.627 | B |
| **6. | Winnetka Av and Sherman Way | 0.810 | D | 0.814 | D |
| **7. | De Soto Av and Vanowen St | 0.815 | D | 0.936 | E |
| *8. | Mason Av and Vanowen St | 0.805 | D | 0.681 | B |
| *9. | Winnetka Av and Vanowen St | 0.874 | D | 0.875 | D |
| **10. | Shoup Av and Victory Blvd | 0.865 | D | 0.874 | D |
| **11. | Topanga Canyon Blvd and Victory Blvd | 0.679 | B | 0.910 | E |
| **12. | Canoga Av and Victory Blvd | 0.607 | B | 0.861 | D |
| **13. | De Soto Av and Victory Blvd | 0.836 | D | 1.004 | F |
| **14. | Mason Av and Victory Blvd | 0.752 | C | 0.719 | C |

| | | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | **Intersection** | **V/C** | **LOS** | **V/C** | **LOS** |
| **15. | Winnetka Av and Victory Blvd | 0.982 | E | 0.912 | E |
| **16. | Topham St and Victory Blvd | 0.243 | A | 0.200 | A |
| **17. | Corbin Av and Victory Blvd | 0.907 | E | 0.925 | E |
| **18. | Tampa Av and Victory Blvd | 0.930 | E | 1.056 | F |
| **19. | Wilbur Av and Victory Blvd | 0.975 | E | 0.852 | D |
| **20. | Reseda Blvd and Victory Blvd | 0.949 | E | 0.970 | E |
| **21. | De Soto Av and El Rancho Dr | 0.429 | A | 0.394 | A |
| **22. | De Soto Av and Erwin St | 0.612 | B | 0.451 | A |
| **23. | Winnetka Av and Calvert St | 0.545 | A | 0.430 | A |
| **24. | De Soto Av and Oxnard St | 0.737 | C | 0.625 | B |
| **25. | Winnetka Av and Oxnard St | 0.763 | C | 0.640 | B |
| **26. | De Soto Av and Burbank Blvd West | 0.564 | A | 0.583 | A |
| **27. | De Soto Av and U.S. 101 WB Ramps | 0.618 | B | 0.649 | B |
| **28. | De Soto Av and U.S. 101 EB Ramps | 0.729 | C | 0.583 | A |
| **29. | De Soto Av and Ventura Blvd | 0.764 | C | 0.662 | B |
| **30. | Winnetka Av and U.S. 101 WB Ramps | 0.553 | A | 0.504 | A |
| **31. | Winnetka Av and U.S. 101 EB Ramps | 0.685 | B | 0.666 | B |
| **32. | Winnetka Av and Ventura Blvd | 0.885 | D | 0.911 | E |

Notes:
* Intersection is currently operating under ATSAC system.
* *Intersection is currently operating under ATCS system.
EB = eastbound; WB = westbound.
Source: Fehr and Peers, 2010.

The following 13 study intersections are projected to operate at LOS E or F during one or both of the peak hours under 2015 cumulative base conditions (see Table 17):

- De Soto Avenue and Saticoy Street,
- De Soto Avenue and Sherman Way,
- Winnetka Avenue and Vanowen Street,
- Shoup Avenue and Victory Boulevard
- Topanga Canyon Boulevard and Victory Boulevard,
- Canoga Avenue and Victory Boulevard,
- De Soto Avenue and Victory Boulevard,
- Winnetka Avenue and Victory Boulevard,
- Corbin Avenue and Victory Boulevard
- Tampa Avenue and Victory Boulevard,
- Wilbur Avenue and Victory Boulevard,
- Reseda Avenue and Victory Boulevard, and
- Winnetka Avenue and Ventura Boulevard.

Table 17 reveals a slight deterioration in future operating conditions when compared with existing conditions, with 11 of the intersections operating at LOS E or F during one or both of the peak hours. Thus, background traffic growth and traffic generated by related projects would have some impact on operating conditions in the study area even without consideration of potential growth on the Pierce College campus.

**2015 Cumulative Conditions – With Proposed 2010 Master Plan Update**

The traffic study analyzed cumulative-plus-project traffic volumes to determine potential future operating conditions and traffic impacts with the addition of incremental project-generated traffic associated with buildout of the master plan through 2015 (see Table 17).

As indicated in Table 17, 13 of the study intersections are projected to operate at LOS E or F during one or both peak hours under cumulative-plus-project conditions. Application of the City of Los Angeles' significance criteria indicate that the project would create significant traffic impacts at one study intersection:

- Winnetka Avenue and Victory Boulevard.

This impact would be generated by the estimated general growth in academic-related traffic to/from the campus between the 2002 campus base year and the 2015 master plan buildout year. However, the mitigation below would reduce impacts at the affected intersection.

**Table 17: Intersection Level of Service Analysis – Cumulative Base and Cumulative-Plus-Project Conditions**

| | Intersection | Peak Hour | Cumulative Base 2015 | | Cumulative + Project 2015 | | Project Increase in V/C | Significant Project Impact | With-Project Mitigation | | Project Increase in V/C | Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | V/C | LOS | V/C | LOS | | | V/C | LOS | | |
| *1. | De Soto Av and Saticoy St | AM | 0.933 | E | 0.935 | E | 0.002 | NO | | | | |
| | | PM | 0.984 | E | 0.987 | E | 0.003 | NO | | | | |
| *2. | Mason Av and Saticoy St | AM | 0.885 | D | 0.892 | D | 0.007 | NO | | | | |
| | | PM | 0.839 | D | 0.843 | D | 0.004 | NO | | | | |
| *3. | Winnetka Av and Saticoy St | AM | 0.829 | D | 0.833 | D | 0.004 | NO | | | | |
| | | PM | 0.877 | D | 0.879 | D | 0.002 | NO | | | | |
| **4. | De Soto Av and Sherman Way | AM | 0.796 | C | 0.800 | C | 0.004 | NO | | | | |
| | | PM | 1.041 | F | 1.043 | F | 0.002 | NO | | | | |
| **5. | Mason Av and Sherman Way | AM | 0.755 | C | 0.764 | C | 0.009 | NO | | | | |
| | | PM | 0.672 | B | 0.676 | B | 0.004 | NO | | | | |
| **6. | Winnetka Av and Sherman Way | AM | 0.872 | D | 0.878 | D | 0.006 | NO | | | | |
| | | PM | 0.872 | D | 0.875 | D | 0.003 | NO | | | | |
| **7. | De Soto Av and Vanowen St | AM | 0.852 | D | 0.853 | D | 0.001 | NO | | | | |
| | | PM | 0.876 | D | 0.878 | D | 0.002 | NO | | | | |
| *8. | Mason Av and Vanowen St | AM | 0.848 | D | 0.859 | D | 0.011 | NO | | | | |
| | | PM | 0.727 | C | 0.732 | C | 0.005 | NO | | | | |
| *9. | Winnetka Av and Vanowen St | AM | 0.931 | E | 0.938 | E | 0.007 | NO | | | | |
| | | PM | 0.939 | E | 0.945 | E | 0.006 | NO | | | | |
| **10. | Shoup Av and Victory Blvd | AM | 0.943 | E | 0.947 | E | 0.004 | NO | | | | |
| | | PM | 0.875 | D | 0.879 | D | 0.004 | NO | | | | |
| **11. | Topanga Cyn Blvd and Victory Blvd | AM | 0.744 | C | 0.748 | C | 0.004 | NO | | | | |
| | | PM | 0.975 | E | 0.981 | E | 0.006 | NO | | | | |

| | Intersection | Peak Hour | Cumulative Base 2015 | | Cumulative + Project 2015 | | Project Increase in V/C | Significant Project Impact | With-Project Mitigation | | Project Increase in V/C | Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | V/C | LOS | V/C | LOS | | | V/C | LOS | | |
| **12. | Canoga Av and Victory Blvd | AM | 0.705 | C | 0.712 | C | 0.007 | NO | | | | |
| | | PM | 0.957 | E | 0.963 | E | 0.006 | NO | | | | |
| **13. | De Soto Av and Victory Blvd | AM | 0.798 | C | 0.808 | D | 0.010 | NO | | | | |
| | | PM | 0.987 | E | 0.993 | E | 0.006 | NO | | | | |
| **14. | Mason Av and Victory Blvd | AM | 0.701 | C | 0.706 | C | 0.005 | NO | | | | |
| | | PM | 0.662 | B | 0.674 | B | 0.012 | NO | | | | |
| **15. | Winnetka Av and Victory Blvd | AM | 1.051 | F | 1.067 | F | 0.016 | YES | 0.958 | E | -0.093 | NO |
| | | PM | 0.971 | E | 0.988 | E | 0.017 | YES | 0.944 | E | -0.027 | NO |
| **16. | Topham St and Victory Blvd | AM | 0.149 | A | 0.155 | A | 0.006 | NO | | | | |
| | | PM | 0.107 | A | 0.111 | A | 0.004 | NO | | | | |
| **17. | Corbin Av and Victory Blvd | AM | 0.974 | E | 0.981 | E | 0.007 | NO | | | | |
| | | PM | 1.006 | F | 1.010 | F | 0.004 | NO | | | | |
| **18. | Tampa Av and Victory Blvd | AM | 1.003 | F | 1.007 | F | 0.004 | NO | | | | |
| | | PM | 1.146 | F | 1.149 | F | 0.003 | NO | | | | |
| **19. | Wilbur Av and Victory Blvd | AM | 1.066 | F | 1.067 | F | 0.001 | NO | | | | |
| | | PM | 0.932 | E | 0.934 | E | 0.002 | NO | | | | |
| **20. | Reseda Blvd and Victory Blvd | AM | 1.030 | F | 1.035 | F | 0.005 | NO | | | | |
| | | PM | 1.059 | F | 1.061 | F | 0.002 | NO | | | | |
| **21. | De Soto Av and El Rancho Dr | AM | 0.467 | A | 0.468 | A | 0.001 | NO | | | | |
| | | PM | 0.416 | A | 0.430 | A | 0.014 | NO | | | | |
| **22. | De Soto Av and Erwin St | AM | 0.678 | B | 0.678 | B | 0.000 | NO | | | | |
| | | PM | 0.512 | A | 0.515 | A | 0.003 | NO | | | | |

| | Intersection | Peak Hour | Cumulative Base 2015 | | Cumulative + Project 2015 | | Project Increase in V/C | Significant Project Impact | With-Project Mitigation | | Project Increase in V/C | Residual Impacts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | V/C | LOS | V/C | LOS | | | V/C | LOS | | |
| **23. | Winnetka Av and Calvert St | AM | 0.555 | A | 0.582 | A | 0.027 | NO | | | | |
| | | PM | 0.453 | A | 0.463 | A | 0.010 | NO | | | | |
| **24. | De Soto Av and Oxnard St | AM | 0.813 | D | 0.815 | D | 0.002 | NO | | | | |
| | | PM | 0.691 | B | 0.694 | B | 0.003 | NO | | | | |
| **25. | Winnetka Av and Oxnard St | AM | 0.818 | D | 0.824 | D | 0.006 | NO | | | | |
| | | PM | 0.680 | B | 0.689 | B | 0.009 | NO | | | | |
| **26. | De Soto Av and Burbank Blvd West | AM | 0.631 | B | 0.633 | B | 0.002 | NO | | | | |
| | | PM | 0.641 | B | 0.644 | B | 0.003 | NO | | | | |
| **27. | De Soto Av and U.S. 101 WB Ramps | AM | 0.683 | B | 0.686 | B | 0.003 | NO | | | | |
| | | PM | 0.708 | C | 0.711 | C | 0.003 | NO | | | | |
| **28. | De Soto Av and U.S. 101 EB Ramps | AM | 0.795 | C | 0.797 | C | 0.002 | NO | | | | |
| | | PM | 0.641 | B | 0.643 | B | 0.002 | NO | | | | |
| **29. | De Soto Av and Ventura Blvd | AM | 0.832 | D | 0.835 | D | 0.003 | NO | | | | |
| | | PM | 0.732 | C | 0.733 | C | 0.001 | NO | | | | |
| **30. | Winnetka Av and U.S. 101 WB Ramps | AM | 0.584 | A | 0.594 | A | 0.010 | NO | | | | |
| | | PM | 0.534 | A | 0.545 | A | 0.011 | NO | | | | |
| **31. | Winnetka Av and U.S. 101 EB Ramps | AM | 0.729 | C | 0.737 | C | 0.008 | NO | | | | |
| | | PM | 0.701 | C | 0.713 | C | 0.012 | NO | | | | |
| **32. | Winnetka Av and Ventura Blvd | AM | 0.962 | E | 0.962 | E | 0.000 | NO | | | | |
| | | PM | 0.992 | E | 0.992 | E | 0.000 | NO | | | | |

Notes:

* Intersection is currently operating under ATSAC system.

** Intersection is currently operating under ATCS system.
Source: Fehr and Peers, 2010.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

**Mitigation Measures**

The traffic analysis prepared for the proposed update identified the following mitigation measure to reduce impacts on the affected intersection, which is identical to the mitigation measure for this intersection in the 2002 FEIR. (See Table 3-49 No. 15 from the 2002 FEIR). The following physical and/or operational improvements shall be implemented at the affected intersection:

**TR-1** **Winnetka Avenue and Victory Boulevard.** Intersection impacts may be mitigated during both peak periods with the provision of dual left-turn lanes on both the eastbound and westbound approaches on Victory Boulevard. This mitigation will require the acquisition of 4 feet of right-of-way from the north side of Victory Boulevard, east and west of Winnetka Avenue. The mitigation will also require the removal of approximately 32 on-street parking spaces along the eastbound approach and departure of Victory Boulevard on either side of Winnetka Avenue. This will result in changing existing lane configurations for both the westbound and eastbound approaches on Victory Boulevard at Winnetka Avenue from one left-turn lane, two through lanes, and one shared through/right-turn lane to two left-turn lanes, two through lanes, and one shared through/right-turn lane. (A figure to illustrate the proposed intersection mitigation is included in Appendix C.)

The proposed mitigation is identified as cumulative mitigation in the Warner Center Specific Plan (WCSP) Transportation Improvement Mitigation Program (TIMP). The WCSP TIMP states that future intersection improvements are to be funded, in part, by Warner Center Transportation Impact Assessment (TIA) fees from development within Warner Center.[12] However, these improvements are not fully funded by the Warner Center TIA fee because the WCSP determined that a portion of the need for these improvements would be generated by existing traffic and future development in the area outside of Warner Center (such as growth at Pierce College).

**Residual Impacts**

Implementation of mitigation measure TR-1 would fully mitigate the revised project's impacts at the affected intersection. Thus, with the proposed intersection improvements identified herein, the intersection impacts would be less than significant.

| | | | | |
|---|---|---|---|---|
| **b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The traffic and parking analysis conducted by Fehr and Peers identified two Congestion Management Program (CMP) arterial monitoring locations where the proposed 2010 Master Plan Update may add 50 or more trips per hour:

- Topanga Canyon Boulevard and Victory Boulevard, and
- Winnetka Boulevard and Victory Boulevard.[13]

[12] Kaku Associates Inc. 2000. *Draft Transportation Technical Report for the Warner Center Specific Plan Transportation Improvement and Management Program Restudy and Supplemental Environmental Impact Report.* October.
[13] Fehr and Peers. 2010. *Traffic and Parking Study for the Pierce College Facilities Master Plan Update Environmental Impact Report.* January.

Under 2015 conditions, the proposed 2010 Master Plan Update is projected to create a significant impact on one of the two CMP arterial monitoring intersections: Winnetka Avenue/Victory Boulevard. However, with implementation of intersection mitigation measure TR-1, described in response 15(a), above, this impact would be mitigated to less-than-significant levels.

Two other study intersections, Winnetka Boulevard/Ventura Boulevard and Reseda Boulevard/Victory Boulevard, are also CMP arterial monitoring intersections. However, according to the traffic analysis prepared for the 2010 Master Plan Update, fewer than 50 project trips are projected to traverse these intersections in the AM or PM peak hours. Therefore, CMP analysis of these intersections was not required.[14]

In addition, one CMP mainline freeway monitoring location (U.S. 101 at Winnetka Avenue) was identified, an area where the proposed 2010 Master Plan Update may add 150 or more trips per hour in either direction. According to the traffic analysis, the proposed 2010 Master Plan Update is expected to add the greatest number of new trips to the segment of U.S. 101 east of Winnetka Avenue.

Given the CMP significance criteria, no significant impact is projected to occur at the U.S. 101 monitoring location east of Winnetka Avenue under the proposed 2010 Master Plan Update. Because the proposed 2010 Master Plan Update is expected to contribute the greatest number of new trips to this segment, and because the revised project's impact at this location would not be significant, the revised project would not have significant impacts elsewhere on the freeway system. This would be considered a less-than-significant impact.

**Mitigation Measures**

The mitigation measure related to the Winnetka Avenue/Victory Boulevard intersection in response 15(a) would also reduce impacts on CMP intersections.

**Residual Impacts**

Implementation of mitigation measures would reduce traffic impacts to less-than-significant levels.

| | | | | |
|---|---|---|---|---|
| **c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The proposed 2010 Master Plan Update would update an existing master plan based on changing conditions, including student enrollment. The 2010 Master Plan Update would include new construction and renovation and demolition projects. The proposed 2010 Master Plan Update would not result in a change in air traffic patterns or result in any air safety risks. The proposed 2010 Master Plan Update does not propose tall buildings that would require air traffic to be rerouted. No impact is anticipated to occur.

| | | | | |
|---|---|---|---|---|
| **d) Substantially increase hazards related to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e. g., farm equipment)?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** See response 15(c), above. Implementation of the new construction and renovation and demolition projects proposed under the 2010 Master Plan Update would not increase hazards related to a design feature or incompatible uses. No impact would occur.

[14] Ibid.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|
| **e) Result in inadequate emergency access?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** Existing vehicular access to the Pierce College campus is available from four access points, as described below.

- Brahma Drive – Brahma Drive is an internal street that provides access from Winnetka Avenue on the east side of the campus. Brahma Drive intersects Winnetka Avenue opposite Calvert Street; its intersection with Winnetka Avenue/Calvert Street is controlled by a traffic signal. On campus, Brahma Drive provides access to Lot 1 and connects to Stadium Way, which, in turn, ultimately connects to Mason Street.
- Mason Street – Mason Street is an internal street that provides access from Victory Boulevard on the north side of the campus. Mason Street intersects Victory Boulevard opposite Mason Avenue; its intersection with Victory Boulevard is signalized. On campus, Mason Street provides access to parking lot 7. It then intersects with Olympic Drive and El Rancho Drive and continues as Stadium Way, ultimately connecting with Brahma Drive.
- El Rancho Drive – El Rancho Drive is an internal street that provides access from a signalized intersection with De Soto Avenue on the west side of the campus. On campus, El Rancho Drive connects to Mason Street/Stadium Way.
- Lot 7 Driveway – In addition to the three signalized access points described above, there is an unsignalized driveway from parking lot 7, leading directly to Victory Boulevard east of Mason Avenue.

Additional internal streets that provide circulation on the campus include the following:

- Olympic Drive – Olympic Drive runs along the south side of parking lot 7 and has a security gate at the east end of the lot. Beyond the security gate, it continues into the campus core, becoming part of the internal system, with a second gate near the sheriff's substation.
- Stadium Way – Stadium Way is the primary through route around the south side of the campus core. It connects Brahma Drive with Mason Street and El Rancho Drive and provides access to Shepard Stadium and several student parking lots.

Proposed vehicular access under the 2010 Master Plan Update would not change the existing access, as described above. Similarly, emergency access to the campus would not change under the 2010 Master Plan Update. However, as described earlier, diminished access to the College would occur temporarily during construction activities (see Public Services, responses 13(a) and 13(b), above). Projects included under the proposed update would comply with all applicable City of Los Angeles codes and regulations related to emergency access (see also Hazards and Hazardous Materials, response 7(g), for a mitigation measure related to emergency access.)

Implementation of the 2010 Master Plan Update is not anticipated to result in a permanent impact related to inadequate emergency access. Mitigation measures included in the 2002 EIR have also been included in this document. This would be considered a less-than-significant impact.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|
| **f) Result in inadequate parking capacity?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** A traffic and parking impact analysis was conducted for the proposed 2010 Master Plan Update by Fehr and Peers in January 2010. The 2010 Master Plan Update would affect future parking at the College. The major proposed changes would include the following:

- Of the seven main student lots, most would be retained in roughly their existing size, while parking lot 6 would be reduced in size;
- Certain smaller existing parking lots would be eliminated, generally in or adjacent to the core area of the campus at locations where future buildings would be constructed;

- Curb parking on many internal campus streets would be eliminated (including El Rancho Drive, Mason Street, Olympic Drive, Pierce Lane, and the auto shop roadway). Curb parking would remain on Stadium Way, including the portion to be realigned with Brahma Drive; and
- Approximately 40 new spaces would be provided at the new maintenance and operations facility.

Under existing conditions, the campus has approximately 4,116 on-site and off-site parking spaces. Of these spaces, approximately 3,845 are located on-site in parking facilities, while approximately 271 are off-campus spaces on surrounding streets.

The 2010 Master Plan Update proposes some minor changes to the future parking supply serving the College. There would be a loss of approximately 32 on-street parking spaces as a result of proposed mitigation measure TR-1 near the intersection of Victory Boulevard and Winnetka Avenue. Therefore, under the 2010 Master Plan Update, 4,084 parking spaces would be available. According to the parking study prepared for the proposed 2010 Master Plan Update, the estimated future supply of parking available to support activities on campus (3,958 spaces) would be adequate to accommodate projected peak parking needs at buildout (2,887 spaces for weekdays and 2,226 spaces for weeknights). Surpluses of about 1,200 (weekday) to 1,800 spaces (weeknight) are projected. (The parking analysis is included in its entirety in Appendix C.)

Because a parking surplus would continue to occur, implementation of the 2010 Master Plan Update would not result in inadequate parking capacity. No impact would occur.

| | | | | |
|---|---|---|---|---|
| **g) Conflict with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks)?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** Implementation of projects included under the 2010 Master Plan Update would consist of new construction and renovation and demolition projects on the campus. The proposed 2010 Master Plan Updates would not conflict with policies that support alternative transportation (e.g., bus turnouts, bicycle racks). The proposed update would maintain the existing roadways on the project site and would not conflict with any policies adopted by the city that address alternative modes of transportation. No impact would occur.

| **17. UTILITIES AND SERVICE SYSTEMS. Would the project:** | | | | |
|---|---|---|---|---|
| **a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 FEIR found that although increased wastewater flows would occur, the flows would not be significant enough to exceed the wastewater treatment requirements of the Regional Water Quality Control Board. Although a water reclamation facility was proposed in the 2002 Master Plan, it was dependent upon the expansion of City of Los Angeles graywater distribution lines to the campus. Therefore, the 2002 EIR analysis did not include the water reclamation facility in its wastewater calculations.

As indicated in Table 2, FTE enrollment anticipated under 2015 buildout conditions would be greater than existing FTE enrollment estimates. However, FTE enrollment under 2015 buildout conditions would be slightly less than the FTE enrollment estimates under buildout conditions previously analyzed in the 2002 EIR. Additionally, the proposed 2010 Master Plan Update assumes a reduction in impacts because of the removal of student housing and the science public/private partnerships, which were part of the 2002 Master Plan. This reduction in impacts is anticipated to occur even without the development of a water reclamation facility, which was proposed in 2002 but never constructed. Table 18 shows projected wastewater generation based on buildout-year FTE enrollment levels.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

**Table 18: Projected Wastewater Generation Based on FTE Enrollment**

| Measured Item | Unit | Wastewater Generation Rate | Wastewater Flow (gallons per day [gpd]) |
|---|---|---|---|
| **2002 Master Plan EIR**<br>2010 Buildout Year | 15,960 students | 1.8 gpd/student | 28,728 |
| **2010 Master Plan Update**<br>2015 Buildout Year | 15,500 students | 1.8 gpd/student | 27,900 |

Source: ICF Jones & Stokes, 2010.

The proposed 2010 Master Plan Update would follow the "green," energy-efficient, sustainable design guidelines set forth under the LEED program. Proposed buildings would be LEED certified. In addition, the proposed 2010 Master Plan Update would include a series of campus-wide strategies to improve water conservation. These include strategies that focus on reducing the use of potable water. Other strategies include the use of efficient irrigation, low-maintenance and native plant species, low-flow plumbing fixtures, and automatic sensors. Stormwater management strategies and landscaping recommendations are also included.

Pierce College has already begun following green design guidelines in existing buildings and will apply such elements throughout the proposed 2010 Master Plan Update. High-efficiency wastewater fixtures would be installed on campus during construction and renovation. These fixtures help to decrease the amount of sewage generated on the campus. As such, impacts would be less than previously anticipated and would remain less than significant. Although no significant impacts were anticipated, the mitigation measures prescribed in the 2002 Master Plan will be carried forward as part of the proposed 2010 Master Plan Update. These mitigation measures include the following:

**2002 EIR Mitigation Measures**

**WW-1** Existing campus sewer lines shall be flushed on a regular basis to mitigate negative effects of below-criteria velocity flows, and

**WW-2** All new construction and renovation shall include water conservation measures, such as low-flush toilets.

| | | | | |
|---|---|---|---|---|
| **b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** See the response to impact 16(a). The proposed 2010 Master Plan Update assumes a reduction in associated impacts because of the removal of student housing and the science public/private partnerships, which were part of the 2002 Master Plan. Impacts of the 2015 buildout conditions would be slightly less than the impacts of the buildout conditions analyzed in the 2002 EIR. Additionally, the proposed 2010 Master Plan Update would follow the "green," energy-efficient, sustainable design guidelines set forth under the LEED program. The College has already begun implementing these design guidelines in existing buildings and will continue to apply such elements throughout the proposed 2010 Master Plan Update. High-efficiency wastewater fixtures would be installed on campus during construction and renovation. These fixtures help to decrease the amount of sewage generated at the College. As such, impacts would be less than previously anticipated and would remain less than significant.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| **c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** The 2002 EIR found that significant impacts would occur at those storms drains that were, at the time, performing inadequately. The area in question is south of Victory Boulevard and west of Mason Street, which would flood during large runoff events. As noted in the 2002 Master Plan's Preliminary Utility Evaluation Report, it was found that improvements and upgrades made as part of the parking lot 7 replacement project would help area storm drains to accommodate any increased storm flows that could have occurred due to development in the academic core of the campus. These improvements, as required by the mitigation measure prescribed in the 2002 Master Plan, would reduce impacts in the Victory Boulevard drainage area. With completion of the parking lot 7 replacement project, it is anticipated that the proposed 2010 Master Plan Update improvements will result in no new impacts related to stormwater drainage facilities. The proposed 2010 Master Plan Update would not increase the amount of development anticipated under the 2002 Master Plan. Finally, the mitigation measure developed for the 2002 Master Plan would be carried forward as part of the proposed 2010 Master Plan Update, and impacts would remain less than significant with mitigation. The mitigation measure is as follows:

**SD-1** The area west of Mason Street and south of Victory Boulevard shall be upgraded during development of the specific projects in that area (as was done with parking lot 7) to develop a system that can adequately handle existing and future runoff. Proposed enhancements may include those identified in the Preliminary Utility Evaluation Report.

| | | | | |
|---|---|---|---|---|
| **d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?** | ☐ | ☒ | ☐ | ☐ |

**Less-than-Significant Impact with Mitigation Incorporated.** It was found in the 2002 EIR that the projected increase in water consumption would not exceed LADWP's available supplies. However, potential issues were raised about possible pressure loss due to pipe friction, which could decrease the amount of water the system would provide to a level below the anticipated demand of the College. However mitigation measures were presented as part of the 2002 EIR to reduce these impacts. These mitigation measures will be carried forward as part of the proposed 2010 Master Plan Update. Finally, as noted earlier, student housing is no longer proposed and the impacts of the 2015 buildout conditions would not be greater than the impacts of the buildout conditions analyzed in the 2002 EIR. Therefore, water demand would not be greater than the demand originally anticipated under the 2002 Master Plan.

Pierce College has already begun implementing "green" design elements based on the national LEED guidelines pertaining to sustainable standards for existing buildings and will continue to apply these design elements throughout the master plan process. The College intends to plant water-efficient landscaping, install high-efficiency fixtures, and possibly use gray water for non-potable applications. These strategies will help to reduce demands on the water supply and the system. However, due to the potential for impacts related to pressure loss, mitigation measures are carried forward from the 2002 EIR. These are as follows:

**2002 EIR Mitigation Measures**

**WS-1** A 12-inch pipeline shall be installed from the main campus along El Rancho Drive to a new 12-inch service line off of De Soto Avenue or an 8-inch service line shall be installed at Victory Boulevard along the east edge of parking lot 7, a 12-inch main line shall be installed along the east edge of parking lot 7, and either a new 12-inch service line off of De Soto Avenue or a new main line along El Rancho Drive from the main campus shall be installed to provide adequate fire service to the proposed equestrian education center; and

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

**WS-2** Three new 12-inch distribution lines shall be installed to convey fire flows to the vicinity of the proposed new facilities while providing tie points to the existing distribution piping. (College to confirm whether WS-2 has been implemented already.)

| | | | | |
|---|---|---|---|---|
| **e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** See response to impact 16(a). As stated above, the proposed 2010 Master Plan Update would reduce impacts because of the removal of student housing and the science public/private partnerships, which were part of the 2002 Master Plan. Additionally, the proposed 2010 Master Plan Update would follow the "green," energy-efficient, sustainable design guidelines set forth under the LEED program. Pierce College has already begun implementing these design guidelines in existing buildings and would continue to apply such elements throughout the implementation process for the proposed 2010 Master Plan Update. High-efficiency wastewater fixtures would be installed on campus during construction and renovation. These fixtures would help to decrease the amount of sewage generated at the College. As such, impacts would be less than previously anticipated and would remain less than significant.

| | | | | |
|---|---|---|---|---|
| **f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The 2002 Master Plan found that the projected increases in solid waste that could occur under the plan would be negligible and that local area landfills would have adequate capacity to meet project demands. The 2002 EIR assumed an FTE enrollment of 15,960 under the 2010 buildout year. Currently, a 15,500 FTE enrollment is assumed for the buildout year of 2015. This would result in a decrease (by 460) in FTE enrollment under the proposed 2010 Master Plan Update. Additionally, the proposed 2010 Master Plan Update would not include the previously planned student housing or the science public/private partnerships; these changes would result in solid waste reductions. As stated previously, the projects included under the proposed 2010 Master Plan Update would follow "green," energy-efficient, sustainable design guidelines as set forth under the LEED program. The College has, in fact, already started implementing these guidelines in existing buildings and has also implemented waste diversion practices. When appropriate, existing building equipment will be reused in the new and renovated facilities. A construction waste management plan will be considered to recycle or salvage construction, demolition, and land clearing waste. As such, impacts will remain less than significant.

| | | | | |
|---|---|---|---|---|
| **g) Comply with federal, state, and local statutes and regulations related to solid waste?** | ☐ | ☐ | ☐ | ☒ |

**No Impact.** The 2002 EIR found no impacts related to complying with federal, state, and local statutes or regulations pertaining to solid waste. The College consistently diverts its solid waste (above the required 50% diversion rate) and will continue to do so throughout the master plan implementation process. Additionally, the proposed 2010 Master Plan Update would follow "green," energy-efficient, sustainable design guidelines as set forth under the LEED program. The College has, in fact, already started implementing these guidelines in existing buildings and has also implemented waste diversion practices. When appropriate, existing building equipment will be reused in the new and renovated facilities. Finally, a construction waste management plan would be considered to recycle or salvage construction, demolition, and land clearing waste. As such, there would be no new impacts.

| Issues | Potentially Significant | Less-than-Significant Impact with Mitigation Incorporated | Less-than-Significant Impact | No Impact |
|---|---|---|---|---|

| 18. MANDATORY FINDINGS OF SIGNIFICANCE. | | | | |
|---|---|---|---|---|
| **a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact.** The analysis in this addendum concluded that no new unavoidable significant impacts on the environment would occur. Applicable 2002 mitigation measures, in addition to new mitigation measures proposed for air quality, biological resources, geology, hazardous materials, cultural resources, hydrology, noise, public services, transportation, and utilities, would be adequate to mitigate any potential impacts related to the proposed 2010 Master Plan Update. Mitigation measures would reduce impacts to less-than-significant levels. In addition, most of the impacts from the 2010 Master Plan Update projects would be construction related and therefore temporary and short term. Once constructed, the buildings would be more energy efficient than the existing buildings on campus, including the ones they would replace, resulting in long-term benefits in terms of energy conservation and efficiency. Therefore, implementation of the proposed 2010 Master Plan Update is not anticipated to degrade the quality of the environment. This would be considered a less-than-significant impact.

| | | | | |
|---|---|---|---|---|
| **b) Does the project have impacts that are individually limited but cumulatively considerable? ("cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?** | ☐ | ☐ | ☒ | ☐ |

**Less-than-Significant Impact**. A significant impact may occur if the proposed 2010 Master Plan Update, in conjunction with related projects, would result in impacts that are less than significant when viewed separately but significant when viewed together. All potential impacts of the proposed 2010 Master Plan Update have been identified, and mitigation measures have been prescribed, where applicable, to reduce potential impacts to less-than-significant levels. None of these potential impacts is considered cumulatively considerable, and implementation of the mitigation measures identified in this addendum would ensure that no cumulative impacts would occur as a result of the proposed 2010 Master Plan Update.

Although related projects are proposed in the project vicinity, the cumulative impacts to which the proposed 2010 Master Plan Update would contribute would be less than significant, as discussed in the previous sections. The 2002 FEIR analyzed a total 45 related projects while 32 related projects are identified for the 2010 Master Plan Update. The 2010 related projects can be found in Table 5 of the Traffic Study provided as Appendix C.

Similar to the 2002 related projects, the 2010 related projects would include mostly commercial, retail and residential projects. Some institutional (school) uses are also proposed. In 2002, seven residential, seven institutional, two transportation, and one light industrial projects were proposed in the surrounding area. The remaining 27 were commercial, retail, or mixed-use projects. Of the 32 related projects included in the 2010 analysis, ten are residential, six are institutional and the remaining 16 are commercial, retail or mixed use. Four of the projects included in the 2010 analysis are the same as included under the 2002 FEIR. (These include residential uses at 6000 De Soto Ave., retail uses at 5960 Canoga Ave., fast food uses at 20956 Ventura Blvd., and institutional uses at 22555 Oxnard St.)

All potential impacts of the proposed 2010 Master Plan Update would be reduced to less-than-significant levels with implementation of the mitigation measures provided in the previous sections. None of these potential impacts is considered cumulatively considerable, and implementation of the mitigation measures identified in this addendum would ensure that no significant cumulative impacts would occur as a result of the proposed 2010 Master Plan Update. Cumulative impacts would be considered less than or similar to impacts determined in 2002.

| | | | | |
|---|---|---|---|---|
| **c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?** | ☐ | ☐ | ☐ | ☒ |

**No Impact**. All potential impacts of the proposed 2010 Master Plan Update have been identified, and mitigation measures have been prescribed, where applicable, to reduce all potential impacts to less-than-significant levels. Upon implementation of mitigation measures, the proposed 2010 Master Plan Update would not have the potential to result in substantial adverse impacts on human beings either directly or indirectly.

| | | | | |
|---|---|---|---|---|
| **d) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?** | ☐ | ☐ | ☐ | ☒ |

**No Impact**. The revised project would result in long-term benefits by designing the buildings and campus improvements to current codes and sustainability standards. Additionally, with the greater emphasis on reduction of GHG emissions at the District level, more sustainable practices and features are included in the 2010 Master Plan Update than what existed in the 2002 Master Plan. The revised project is also more in line with the enrollment trends at the College and better responds to the needs of the College curriculum. The revised project would result in short-term disruptions due to construction activities on the campus, but in the long-term it would result in construction of energy-efficient and state-of-the-art facilities. Therefore, the 2010 Master Plan Update would not result in any long-term environmental harm at the cost of short-term gains.

The revised project would not result in new significant impacts or exacerbate previously identified significant impacts. Mitigation measures included in the 2002 EIR in addition to added proposed mitigation measures would reduce all potentially significant impacts to less than significant levels. None of the conditions described in Section 15162 requiring the preparation of a subsequent EIR have occurred. Therefore, this addendum is considered to be the appropriate environmental document for the proposed 2010 Master Plan Update. The revised project would not achieve short-term environmental goals to the disadvantage of long-term environmental goals.

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# APPENDICES

# APPENDIX A
## AESTHETIC RESOURCES PHOTOGRAPHIC DOCUMENTATION

## PHOTO 1: SWEEPING VIEW LOOKING NORTHWEST TOWARDS SANTA SUSANA MOUNTAINS (from Equestrian Center)

Source: ICF Jones & Stokes. August 2009

## PHOTO 2: SOUTH-FACING VIEW TOWARD CHALK HILLS (from El Rancho Road)

Source: ICF Jones & Stokes. August 2009

## PHOTO 3: VIEW NORTHWEST FROM CHALK HILLS ACROSS THE CAMPUS (the Santa Susana Mountains Appearing as a Backdrop)

Source: ICF Jones & Stokes. August 2009

## PHOTO 4: VIEW NORTHWEST FROM CHALK HILLS IN THE FAR SOUTHWEST CORNER OF THE CAMPUS (Canyon de Lana)

Source: ICF Jones & Stokes. August 2009

## PHOTO 5: VIEW NORTHWEST FROM CHALK HILLS

Source: ICF Jones & Stokes. August 2009

## PHOTO 6: VIEW SOUTHWEST FROM EQUESTRIAN CENTER (Shows Close-in Development Blocking Some Views From/Into the Campus)

Source: ICF Jones & Stokes. July 2009

# APPENDIX B
AIR QUALITY DATA SHEETS

**CONSERVATIVE ESTIMATE OF UNMITIGATED CONSTRUCTION EMISSIONS (pounds per day)**

| | ROC | $NO_X$ | CO | $SO_X$ | $PM_{10}$[a] | $PM_{2.5}$[a] | $CO_2$ |
|---|---|---|---|---|---|---|---|
| **Demolition Emissions** | | | | | | | |
| On-site Total | 1.14 | 7.68 | 4.68 | - | 20.67 | 4.72 | 700.30 |
| Fugitive Dust | - | - | - | - | 20.08 | 4.18 | - |
| Off-Road Diesel | 1.14 | 7.68 | 4.68 | - | 0.59 | 0.54 | 700.30 |
| Off-site Total | 1.62 | 20.74 | 8.99 | 0.03 | 0.95 | 0.81 | 2,938.22 |
| On-Road Diesel | 1.59 | 20.68 | 7.94 | 0.03 | 0.94 | 0.81 | 2,813.83 |
| Worker Trips | 0.03 | 0.06 | 1.05 | - | 0.01 | - | 124.39 |
| **Grand Total** | **2.76** | **28.42** | **13.67** | **0.03** | **21.62** | **5.53** | **3,638.52** |
| **Site Grading Emissions** | | | | | | | |
| On-site Total | 3.00 | 24.99 | 12.46 | - | 11.03 | 3.19 | 2,247.32 |
| Fugitive Dust | - | - | - | - | 9.78 | 2.04 | - |
| Off-Road Diesel | 3.00 | 24.99 | 12.46 | - | 1.25 | 1.15 | 2,247.32 |
| Off-site Total | 0.03 | 0.06 | 1.05 | - | 0.01 | - | 124.39 |
| On-Road Diesel | - | - | - | - | - | - | - |
| Worker Trip | 0.03 | 0.06 | 1.05 | - | 0.01 | - | 124.39 |
| **Grand Total** | **3.03** | **25.05** | **13.51** | **-** | **11.04** | **3.19** | **2,371.71** |
| **Building Erection/Finishing Emissions** | | | | | | | |
| On-site Total | 11.58 | 8.51 | 4.68 | - | 0.54 | 0.50 | 893.39 |
| Off-Road Diesel, Bldg Cnst | 1.11 | 8.51 | 4.68 | - | 0.54 | 0.50 | 893.39 |
| Arch Coatings Off-Gas | 10.47 | - | - | - | - | - | - |
| Asphalt Off-Gas | - | - | - | - | - | - | - |
| Off-Road Diesel, Asphalt | - | - | - | - | - | - | - |
| Off-site Total | 0.12 | 0.59 | 3.15 | - | 0.05 | 0.03 | 445.55 |
| Worker Trips, Bldg Cnst | 0.08 | 0.16 | 2.68 | - | 0.03 | 0.01 | 342.26 |
| Vendor Trips, Bldg Cnst | 0.04 | 0.42 | 0.35 | - | 0.02 | 0.02 | 88.10 |
| Worker Trips, Arch Coatings | - | - | - | - | - | - | - |
| On-Road Diesel, Asphalt | - | - | - | - | - | - | - |
| Worker Trips, Asphalt | - | 0.01 | 0.12 | - | - | - | 15.19 |
| **Grand Total** | **11.70** | **9.10** | **7.83** | **-** | **0.59** | **0.53** | **1,338.94** |
| **On-site Emissions Totals** | | | | | | | |
| Demolition | 1.1 | 7.7 | 4.7 | - | 20.7 | 4.7 | 700.3 |
| Site Grading | 3.0 | 25.0 | 12.5 | - | 11.0 | 3.2 | 2,247.3 |
| Building Erection/Finishing | 11.6 | 8.5 | 4.7 | - | 0.5 | 0.5 | 893.4 |
| **Maximum On-site Emissions** | **12** | **25** | **12** | **-** | **21** | **5** | **2,247** |
| Localized Significance Threshold[b] | -- | 212 | 1,510 | -- | 35 | 8 | -- |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** |
| **Regional Emissions Totals** | | | | | | | |
| Demolition | 2.8 | 28.4 | 13.7 | 0.0 | 21.6 | 5.5 | 3,638.5 |
| Site Grading | 3.0 | 25.1 | 13.5 | - | 11.0 | 3.2 | 2,371.7 |
| Building Erection/Finishing | 11.7 | 9.1 | 7.8 | - | 0.6 | 0.5 | 1,338.9 |
| **Maximum Regional Emissions** | **12** | **28** | **14** | **0** | **22** | **6** | **3,639** |
| Regional Significance Threshold | 75 | 100 | 550 | 150 | 150 | 55 | -- |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** |

Notes:

URBEMIS print-out sheets and fugitive PM calculation worksheet are attached.

[a] Fugitive $PM_{10}$ and $PM_{2.5}$ emissions estimates take into account compliance with SCAQMD Rule 403 requirements for fugitive dust suppression, which require that no visible dust be present beyond the site boundaries.

[b] The project site is located in SCAQMD SRA No. 6. These LSTs are based on the site location SRA, distance to nearest sensitive receptor location from the project site (50 meters), and project area that could be under construction on any given day (five acres).

**CONSERVATIVE ESTIMATE OF MITIGATED CONSTRUCTION EMISSIONS (pounds per day)**

| | ROC | $NO_X$ | CO | $SO_X$ | $PM_{10}$ [a] | $PM_{2.5}$ [a] | $CO_2$ |
|---|---|---|---|---|---|---|---|
| **Demolition Emissions** | | | | | | | |
| On-site Total | 0.27 | 3.45 | 4.68 | - | 20.35 | 4.43 | 700.30 |
| Fugitive Dust | - | - | - | - | 20.08 | 4.18 | - |
| Off-Road Diesel | 0.27 | 3.45 | 4.68 | - | 0.27 | 0.25 | 700.30 |
| Off-site Total | 1.62 | 20.74 | 8.99 | 0.03 | 0.95 | 0.81 | 2,938.22 |
| On-Road Diesel | 1.59 | 20.68 | 7.94 | 0.03 | 0.94 | 0.81 | 2,813.83 |
| Worker Trips | 0.03 | 0.06 | 1.05 | - | 0.01 | - | 124.39 |
| **Grand Total** | **1.89** | **24.19** | **13.67** | **0.03** | **21.30** | **5.24** | **3,638.52** |
| **Site Grading Emissions** | | | | | | | |
| On-site Total | 0.71 | 11.27 | 12.46 | - | 10.34 | 2.55 | 2,247.32 |
| Fugitive Dust | - | - | - | - | 9.78 | 2.04 | - |
| Off-Road Diesel | 0.71 | 11.27 | 12.46 | - | 0.56 | 0.51 | 2,247.32 |
| Off-site Total | 0.03 | 0.06 | 1.05 | - | 0.01 | - | 124.39 |
| On-Road Diesel | - | - | - | - | - | - | - |
| Worker Trip | 0.03 | 0.06 | 1.05 | - | 0.01 | - | 124.39 |
| **Grand Total** | **0.74** | **11.33** | **13.51** | **-** | **10.35** | **2.55** | **2,371.71** |
| **Building Erection/Finishing Emissions** | | | | | | | |
| On-site Total | 10.73 | 3.83 | 4.68 | - | 0.26 | 0.24 | 893.39 |
| Off-Road Diesel, Bldg Cnst | 0.26 | 3.83 | 4.68 | - | 0.26 | 0.24 | 893.39 |
| Arch Coatings Off-Gas | 10.47 | - | - | - | - | - | - |
| Asphalt Off-Gas | - | - | - | - | - | - | - |
| Off-Road Diesel, Asphalt | - | - | - | - | - | - | - |
| Off-site Total | 0.12 | 0.59 | 3.15 | - | 0.05 | 0.03 | 445.55 |
| Worker Trips, Bldg Cnst | 0.08 | 0.16 | 2.68 | - | 0.03 | 0.01 | 342.26 |
| Vendor Trips, Bldg Cnst | 0.04 | 0.42 | 0.35 | - | 0.02 | 0.02 | 88.10 |
| Worker Trips, Arch Coatings | - | - | - | - | - | - | - |
| On-Road Diesel, Asphalt | - | - | - | - | - | - | - |
| Worker Trips, Asphalt | - | 0.01 | 0.12 | - | - | - | 15.19 |
| **Grand Total** | **10.85** | **4.42** | **7.83** | **-** | **0.31** | **0.27** | **1,338.94** |
| **On-site Emissions Totals** | | | | | | | |
| Demolition | 0.3 | 3.4 | 4.7 | - | 20.3 | 4.4 | 700.3 |
| Site Grading | 0.7 | 11.3 | 12.5 | - | 10.3 | 2.6 | 2,247.3 |
| Building Erection/Finishing | 10.7 | 3.8 | 4.7 | - | 0.3 | 0.2 | 893.4 |
| **Maximum On-site Emissions** | **11** | **11** | **12** | **-** | **20** | **4** | **2,247** |
| Localized Significance Threshold[b] | -- | 212 | 1,510 | -- | 35 | 8 | -- |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** |
| **Regional Emissions Totals** | | | | | | | |
| Demolition | 1.9 | 24.2 | 13.7 | 0.0 | 21.3 | 5.2 | 3,638.5 |
| Site Grading | 0.7 | 11.3 | 13.5 | - | 10.3 | 2.6 | 2,371.7 |
| Building Erection/Finishing | 10.9 | 4.4 | 7.8 | - | 0.3 | 0.3 | 1,338.9 |
| **Maximum Regional Emissions** | **11** | **24** | **14** | **0** | **21** | **5** | **3,639** |
| Regional Significance Threshold | 75 | 100 | 550 | 150 | 150 | 55 | -- |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** |

Notes:

URBEMIS print-out sheets and fugitive PM calculation worksheet are attached.

[a] Fugitive $PM_{10}$ and $PM_{2.5}$ emissions estimates take into account compliance with SCAQMD Rule 403 requirements for fugitive dust suppression, which require that no visible dust be present beyond the site boundaries.

[b] The project site is located in SCAQMD SRA No. 6. These LSTs are based on the site location SRA, distance to nearest sensitive receptor location from the project site (50 meters), and project area that could be under construction on any given day (five acres).

# Pierce College

## Regional Emission Calculations (lbs/day)

| | ROC | NOx | CO | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| **Existing Condition** | | | | | | |
| Mobile | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Area | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Stationary | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Total Existing** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| **Project Condition** | | | | | | |
| Mobile | 23.0 | 32.0 | 286.0 | 0.0 | 65.0 | 13.0 |
| Area | 2.0 | 3.0 | 4.0 | 0.0 | 0.0 | 0.0 |
| Stationary | 0.1 | 11.0 | 1.9 | 1.1 | 0.4 | 0.3 |
| **Total Project** | **25.1** | **46.0** | **291.9** | **1.1** | **65.4** | **13.4** |
| **Net Project Emissions** | | | | | | |
| Net Mobile | 23.0 | 32.0 | 286.0 | 0.0 | 65.0 | 13.0 |
| Net Area | 2.0 | 3.0 | 4.0 | 0.0 | 0.0 | 0.0 |
| Net Stationary | 0.1 | 11.0 | 1.9 | 1.1 | 0.4 | 0.3 |
| Total Net | 25.1 | 46.0 | 291.9 | 1.1 | 65.4 | 13.4 |
| SCAQMD Significance Threshold | 55 | 55 | 550 | 150 | 150 | 55 |
| **Difference** | **(30)** | **(9)** | **(258)** | **(149)** | **(85)** | **(42)** |
| **Significant?** | **No** | **No** | **No** | **No** | **No** | **No** |

## Electricity Usage

| Land Use | 1,000 Sqft | Electricity Usage Rate [a] (kWh\sq.ft\yr) | Total Electricity Usage (KWh\year) | (MWh\Day) | CO | ROC | NOx | PM10 | SOx |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Emission Factors (lbs/MWh) [b] | 0.2 | 0.01 | 1.15 | 0.04 | 0.12 |
| **Existing** | | | | | Emissions from Electricity Consumption (lbs/day) | | | | |
| Office | 0.0 | 12.95 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Retail | 0.0 | 13.55 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hotel/Motel | 0.0 | 9.95 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Restaurant | 0.0 | 47.45 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Food Store | 0.0 | 53.30 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Warehouse | 0.0 | 4.35 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| College/University | 0.0 | 11.55 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| High School | 0.0 | 10.50 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Elementary School | 0.0 | 5.90 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hospital | 0.0 | 21.70 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Miscellaneous | 0.0 | 10.50 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Residential (DU) | 0.0 | 5,627 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Total Existing** | | | **0** | **0.000** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **Project** | | | | | | | | | |
| Office | 0.0 | 12.95 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Retail | 0.0 | 13.55 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hotel/Motel | 0.0 | 9.95 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Restaurant | 0.0 | 47.45 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Food Store | 0.0 | 53.3 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Warehouse | 0.0 | 4.35 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| College/University | 301.0 | 11.55 | 3,476,550 | 9.525 | 1.905 | 0.095 | 10.954 | 0.381 | 1.143 |
| High School | 0.0 | 10.5 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Elementary School | 0.0 | 5.9 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hospital | 0.0 | 21.7 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Miscellaneous | 0.0 | 10.5 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Residential (DU) | 0.0 | 5,627 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Total Project** | | | **3,476,550** | **9.525** | **1.91** | **0.10** | **10.95** | **0.38** | **1.14** |
| **Net Emissions From Electricity Usage** | | | | | **1.91** | **0.10** | **10.95** | **0.38** | **1.14** |

## Summary of Stationary Emissions

| | CO | ROC | NOx | PM10 | SOx |
|---|---|---|---|---|---|
| Total Existing Emissions (lbs/day) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total Project Emissions (lbs/day) | 1.91 | 0.10 | 10.95 | 0.38 | 1.14 |
| **Total Net Emissions (lbs/day)** | **1.91** | **0.10** | **10.95** | **0.38** | **1.14** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[b] Emission Factors from Table A9-11-B, CEQA Air Quality Handbook, SCAQMD, 1993.

[c] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[d] Emission Factors from Table A9-12-B, CEQA Air Quality Handbook, SCAQMD, 1993.

[e] The emission factors for NOx in lbs per million cuft of natural gas are 120 for nonresidential uses and 80 for residential uses.

# Pierce College

## Regional Greenhouse Gas Emission Calculations (lbs/day)

| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| **Existing Condition** | | | | |
| Mobile | - | - | - | - |
| Area | - | - | - | - |
| Stationary | - | - | - | - |
| **Total Existing** | **-** | **-** | **-** | **-** |
| **Project Condition** | | | | |
| Mobile | 38,881.00 | 8.45 | 8.11 | 41,572.76 |
| Area | 5,779.00 | 0.64 | 0.01 | 5,795.88 |
| Stationary | 13,442.08 | 0.71 | 0.05 | 13,471.15 |
| **Total Project** | **58,102.09** | **9.80** | **8.17** | **60,839.79** |
| **Net Project Emissions** | | | | |
| Net Mobile | 38,881.00 | 8.45 | 8.11 | 41,572.76 |
| Net Area | 5,779.00 | 0.64 | 0.01 | 5,795.88 |
| Net Stationary | 13,442.08 | 0.71 | 0.05 | 13,471.15 |
| Total Net | 58,102.09 | 9.80 | 8.17 | 60,839.79 |
| SCAQMD Significance Threshold | -- | -- | -- | -- |
| **Difference** | **--** | **--** | **--** | **--** |
| **Significant?** | **No** | **No** | **No** | **No** |

# Stationary Sources

## Electricity Usage

| Land Use | 1,000 Sqft | Electricity Usage Rate [a] (kWh\sq.ft\yr) | Total Electricity Usage (KWh\year) | Total Electricity Usage (MWh\day) | $CO_2$ 804.54 | $CH_4$ 0.0067 | $N_2O$ 0.0037 | $CO_2e$ 21/310[c] |
|---|---|---|---|---|---|---|---|---|
| | | | | | Emission Factors (lbs/MWh) [b] | | | |
| **Existing** | | | | | Emissions from Electricity (lbs/day) | | | |
| Office | 0.0 | 12.95 | - | - | - | - | - | - |
| Retail | 0.0 | 13.55 | - | - | - | - | - | - |
| Hotel/Motel | 0.0 | 9.95 | - | - | - | - | - | - |
| Restaurant | 0.0 | 47.45 | - | - | - | - | - | - |
| Food Store | 0.0 | 53.30 | - | - | - | - | - | - |
| Warehouse | 0.0 | 4.35 | - | - | - | - | - | - |
| College/University | 0.0 | 11.55 | - | - | - | - | - | - |
| High School | 0.0 | 10.50 | - | - | - | - | - | - |
| Elementary School | 0.0 | 5.90 | - | - | - | - | - | - |
| Hospital | 0.0 | 21.70 | - | - | - | - | - | - |
| Miscellaneous | 0.0 | 10.50 | - | - | - | - | - | - |
| Residential (DU) | 0.0 | 5,627 | - | - | - | - | - | - |
| | **Total Existing** | | **-** | **-** | **-** | **-** | **-** | **-** |
| **Project** | | | | | | | | |
| Office | 0.0 | 12.95 | - | - | - | - | - | - |
| Retail | 0.0 | 13.55 | - | - | - | - | - | - |
| Hotel/Motel | 0.0 | 9.95 | - | - | - | - | - | - |
| Restaurant | 0.0 | 47.45 | - | - | - | - | - | - |
| Food Store | 0.0 | 53.3 | - | - | - | - | - | - |
| Warehouse | 0.0 | 4.35 | - | - | - | - | - | - |
| College/University | 301.0 | 11.55 | 3,476,550.00 | 9.52 | 7,663.08 | 0.06 | 0.04 | 7,675.27 |
| High School | 0.0 | 10.5 | - | - | - | - | - | - |
| Elementary School | 0.0 | 5.9 | - | - | - | - | - | - |
| Hospital | 0.0 | 21.7 | - | - | - | - | - | - |
| Miscellaneous | 0.0 | 10.5 | - | - | - | - | - | - |
| Residential (DU) | 0.0 | 5,627 | - | - | - | - | - | - |
| | **Total Project** | | **3,476,550.00** | **9.52** | **7,663.08** | **0.06** | **0.04** | **7,675.27** |
| | **Net Emissions From Electricity Usage** | | | | **7,663.08** | **0.06** | **0.04** | **7,675.27** |

# Area Sources

## Natural Gas Usage

| Land Use | 1,000 Sqft | Natural Gas Usage Rate [d] (cu.ft\sq.ft\mo) | Total Natural Gas Usage (cu.ft\mo) | Total Natural Gas Usage (Btu/day)[f] | $CO_2$ 53.05 | $CH_4$ 0.0059 | $N_2O$ 0.0001 | $CO_2e$ 21/310[c] |
|---|---|---|---|---|---|---|---|---|
| | | | | | Emission Factors (kg/MMBtu) [e] | | | |
| **Existing** | | | | | Emissions from Natural Gas (lbs/day) | | | |
| Office | 0.0 | 2.0 | - | - | - | - | - | - |
| Retail | 0.0 | 2.9 | - | - | - | - | - | - |
| Hotel/Motel | 0.0 | 4.8 | - | - | - | - | - | - |
| Restaurant | 0.0 | 4.8 | - | - | - | - | - | - |
| Food Store | 0.0 | 2.9 | - | - | - | - | - | - |
| Warehouse | 0.0 | 2.0 | - | - | - | - | - | - |
| College/University | 0.0 | 4.8 | - | - | - | - | - | - |
| High School | 0.0 | 2.9 | - | - | - | - | - | - |
| Elementary School | 0.0 | 2.0 | - | - | - | - | - | - |
| Hospital | 0.0 | 4.8 | - | - | - | - | - | - |
| Miscellaneous | 0.0 | 2.9 | - | - | - | - | - | - |
| Residential (Single Family DU) | 0.0 | 6,665 | - | - | - | - | - | - |
| Residential (Multi-Family DU) | 0.0 | 4,012 | - | - | - | - | - | - |
| | **Total Existing** | | **-** | **-** | **-** | **-** | **-** | **-** |
| **Project** | | | | | | | | |
| Office | 0.0 | 2.0 | - | - | - | - | - | - |
| Retail | 0.0 | 2.9 | - | - | - | - | - | - |
| Hotel/Motel | 0.0 | 4.8 | - | - | - | - | - | - |
| Restaurant | 0.0 | 4.8 | - | - | - | - | - | - |
| Food Store | 0.0 | 2.9 | - | - | - | - | - | - |
| Warehouse | 0.0 | 2.0 | - | - | - | - | - | - |
| College/University | 0.0 | 4.8 | **1,444,800.00** | **49,412,160.00** | 5,779.00 | 0.64 | 0.01 | 5,795.88 |
| High School | 0.0 | 2.9 | - | - | - | - | - | - |
| Elementary School | 0.0 | 2.0 | - | - | - | - | - | - |
| Hospital | 0.0 | 4.8 | - | - | - | - | - | - |
| Miscellaneous | 0.0 | 2.9 | - | - | - | - | - | - |
| Residential (Single Family DU) | 0.0 | 6,665 | - | - | - | - | - | - |
| Residential (Multi-Family DU) | 0.0 | 4,012 | - | - | - | - | - | - |
| | **Total Project** | | **1,444,800.00** | **49,412,160.00** | **5,779.00** | **0.64** | **0.01** | **5,795.88** |
| | **Net Emissions From Natural Gas Usage** | | | | **5,779.00** | **0.64** | **0.01** | **5,795.88** |

## Summary of Stationary and Area Source Emissions

| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
|---|---|---|---|---|
| Total Existing Emissions (lbs/day) | - | - | - | - |
| Total Project Emissions (lbs/day) | ######## | 0.71 | 0.05 | ####### |
| **Total Net Emissions (lbs/day)** | **########** | **0.71** | **0.05** | **#######** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[b] Emission Factors from Table C.1 and Table C.2, General Reporting Protocol, California Climate Action Registry, March 2007.

[c] Global Warming Potential is 21 for $CH_4$ and 310 for $N_2O$, General Reporting Protocol, California Climate Action Registry, March 2007.

[d] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[e] Emission Factors from Table C.5 and Table C.6, General Reporting Protocol, California Climate Action Registry, March 2007.

[f] 1 Cubic Foot of natural gas = 1,026 Btu. Energy Information Administration. Available http://www.eia.doe.gov/basics/conversion_basics.html

## Mobile Sources

| Vehicle Type | Percent Type 0 | VMT by Type 0 | Emission Factors[a] $CH_4$ | Emission Factors[a] $N_2O$ | $CH_4$ | $N_2O$ | $CO_2e$ 21/310[b] |
|---|---|---|---|---|---|---|---|
| **Existing** | | | | | Emissions from Mobile Sources (lbs/day) | | |
| Light Auto | 0.0 | - | 0.06 | 0.08 | - | - | - |
| Light Truck < 3750 lbs | 0.0 | - | 0.11 | 0.14 | - | - | - |
| Light Truck 3751-5750 lbs | 0.0 | - | 0.11 | 0.14 | - | - | - |
| Med Truck 5751-8500 lbs | 0.0 | - | 0.18 | 0.09 | - | - | - |
| Lite-Heavy Truck 8501-10,000 lbs | 0.0 | - | 0.18 | 0.09 | - | - | - |
| Lite-Heavy Truck 10,001-14,000 lbs | 0.0 | - | 0.18 | 0.09 | - | - | - |
| Med-Heavy Truck 14,001-33,000 lbs | 0.0 | - | 0.08 | 0.05 | - | - | - |
| Heavy-Heavy Truck 33,001-60,000 lbs | 0.0 | - | 0.08 | 0.05 | - | - | - |
| Other Bus | 0.0 | - | 0.08 | 0.05 | - | - | - |
| Urban Bus | 0.0 | - | 0.08 | 0.05 | - | - | - |
| Motorcycle | 0.0 | - | 0.42 | 0.01 | - | - | - |
| School Bus | 0.0 | - | 0.08 | 0.05 | - | - | - |
| Motor Home | 0.0 | - | 0.11 | 0.14 | - | - | - |
| **Total Existing** | | | **1.75** | **1.03** | **-** | **-** | **-** |

| Vehicle Type | Percent Type 100 | VMT by Type 37701.15 | Emission Factors[a] $CH_4$ | Emission Factors[a] $N_2O$ | $CH_4$ | $N_2O$ | $CO_2e$ 21/310[b] |
|---|---|---|---|---|---|---|---|
| **Project** | | | | | | | |
| Light Auto | 51.1 | 19,265.29 | 0.06 | 0.08 | 2.55 | 3.40 | 1,106.84 |
| Light Truck < 3750 lbs | 7.3 | 2,752.18 | 0.11 | 0.14 | 0.67 | 0.85 | 277.35 |
| Light Truck 3751-5750 lbs | 23.1 | 8,708.97 | 0.11 | 0.14 | 2.11 | 2.69 | 877.63 |
| Med Truck 5751-8500 lbs | 10.8 | 4,071.72 | 0.18 | 0.09 | 1.62 | 0.81 | 284.38 |
| Lite-Heavy Truck 8501-10,000 lbs | 1.7 | 640.92 | 0.18 | 0.09 | 0.25 | 0.13 | 44.76 |
| Lite-Heavy Truck 10,001-14,000 lbs | 0.5 | 188.51 | 0.18 | 0.09 | 0.07 | 0.04 | 13.17 |
| Med-Heavy Truck 14,001-33,000 lbs | 0.9 | 339.31 | 0.08 | 0.05 | 0.06 | 0.04 | 12.85 |
| Heavy-Heavy Truck 33,001-60,000 lbs | 0.6 | 226.21 | 0.08 | 0.05 | 0.04 | 0.02 | 8.57 |
| Other Bus | 0.1 | 37.70 | 0.08 | 0.05 | 0.01 | 0.00 | 1.43 |
| Urban Bus | 0.1 | 37.70 | 0.08 | 0.05 | 0.01 | 0.00 | 1.43 |
| Motorcycle | 2.8 | 1,055.63 | 0.42 | 0.01 | 0.98 | 0.02 | 27.74 |
| School Bus | 0.1 | 37.70 | 0.08 | 0.05 | 0.01 | 0.00 | 1.43 |
| Motor Home | 0.9 | 339.31 | 0.11 | 0.14 | 0.08 | 0.10 | 34.19 |
| **Total Project** | | | **1.75** | **1.03** | **8.45** | **8.11** | **2,691.76** |
| **Net Emissions From Mobile Sources** | | | | | **8.45** | **8.11** | **2,691.76** |

[a] Emission factors from Table C.4, General Reporting Protocol, California Climate Action Registry, March 2007.

[b] Global Warming Potential is 21 for $CH_4$ and 310 for $N_2O$, General Reporting Protocol, California Climate Action Registry, March 2007.

**10/2/2009 12:15:42 PM**

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\Los Angeles\3_Projects_Air Quality\Pierce College\Impact Analysis\Pierce Construction.urb924

Project Name: Pierce Construction

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

| | ROG | NOx | CO | SO2 | PM10 Dust | PM10 Exhaust | PM10 | PM2.5 Dust | PM2.5 Exhaust | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 TOTALS (lbs/day unmitigated) | 3.04 | 28.42 | 13.67 | 0.03 | 20.18 | 1.44 | 21.61 | 4.21 | 1.32 | 5.53 | 3,638.52 |
| 2011 TOTALS (lbs/day unmitigated) | 11.70 | 9.09 | 7.83 | 0.00 | 0.02 | 0.57 | 0.59 | 0.01 | 0.52 | 0.53 | 1,338.94 |

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

| | ROG | NOx | CO | SO2 | PM10 Dust | PM10 Exhaust | PM10 | PM2.5 Dust | PM2.5 Exhaust | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Slice 7/15/2010-8/13/2010 Active Days: 22 | 2.76 | **28.42** | **13.67** | **0.03** | **20.18** | **1.44** | **21.61** | **4.21** | **1.32** | **5.53** | **3,638.52** |
| Demolition 07/15/2010-08/14/2010 | 2.76 | 28.42 | 13.67 | 0.03 | 20.18 | 1.44 | 21.61 | 4.21 | 1.32 | 5.53 | 3,638.52 |
| Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 20.08 | 0.00 | 20.08 | 4.18 | 0.00 | 4.18 | 0.00 |
| Demo Off Road Diesel | 1.14 | 7.68 | 4.68 | 0.00 | 0.00 | 0.59 | 0.59 | 0.00 | 0.54 | 0.54 | 700.30 |
| Demo On Road Diesel | 1.59 | 20.68 | 7.94 | 0.03 | 0.09 | 0.85 | 0.94 | 0.03 | 0.78 | 0.81 | 2,813.83 |
| Demo Worker Trips | 0.03 | 0.06 | 1.05 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 124.39 |
| Time Slice 8/16/2010-9/30/2010 Active Days: 34 | 3.04 | 25.05 | 13.51 | 0.00 | 5.99 | 1.25 | 7.25 | 1.25 | 1.15 | 2.40 | 2,371.71 |
| Mass Grading 08/15/2010-09/30/2010 | 3.04 | 25.05 | 13.51 | 0.00 | 5.99 | 1.25 | 7.25 | 1.25 | 1.15 | 2.40 | 2,371.71 |
| Mass Grading Dust | 0.00 | 0.00 | 0.00 | 0.00 | 5.99 | 0.00 | 5.99 | 1.25 | 0.00 | 1.25 | 0.00 |
| Mass Grading Off Road Diesel | 3.00 | 24.99 | 12.46 | 0.00 | 0.00 | 1.25 | 1.25 | 0.00 | 1.15 | 1.15 | 2,247.32 |
| Mass Grading On Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Grading Worker Trips | 0.03 | 0.06 | 1.05 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 124.39 |
| Time Slice 10/1/2010-12/31/2010 Active Days: 66 | 1.34 | 9.80 | 8.08 | 0.00 | 0.02 | 0.60 | 0.62 | 0.01 | 0.56 | 0.56 | 1,323.82 |
| Building 10/01/2010-09/30/2011 | 1.34 | 9.80 | 8.08 | 0.00 | 0.02 | 0.60 | 0.62 | 0.01 | 0.56 | 0.56 | 1,323.82 |
| Building Off Road Diesel | 1.21 | 9.16 | 4.81 | 0.00 | 0.00 | 0.58 | 0.58 | 0.00 | 0.53 | 0.53 | 893.39 |
| Building Vendor Trips | 0.04 | 0.46 | 0.38 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.02 | 0.02 | 88.10 |
| Building Worker Trips | 0.09 | 0.17 | 2.88 | 0.00 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 | 0.01 | 342.33 |
| Time Slice 1/3/2011-5/31/2011 Active Days: 107 | 1.23 | 9.08 | 7.71 | 0.00 | 0.02 | 0.57 | 0.59 | 0.01 | 0.52 | 0.53 | 1,323.74 |
| Building 10/01/2010-09/30/2011 | 1.23 | 9.08 | 7.71 | 0.00 | 0.02 | 0.57 | 0.59 | 0.01 | 0.52 | 0.53 | 1,323.74 |
| Building Off Road Diesel | 1.11 | 8.51 | 4.68 | 0.00 | 0.00 | 0.54 | 0.54 | 0.00 | 0.50 | 0.50 | 893.39 |
| Building Vendor Trips | 0.04 | 0.42 | 0.35 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.02 | 0.02 | 88.10 |
| Building Worker Trips | 0.08 | 0.16 | 2.68 | 0.00 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 | 0.01 | 342.26 |
| Time Slice 6/1/2011-9/30/2011 Active Days: 88 | 11.70 | 9.09 | 7.83 | 0.00 | 0.02 | 0.57 | 0.59 | 0.01 | 0.52 | 0.53 | 1,338.94 |
| Building 10/01/2010-09/30/2011 | 1.23 | 9.08 | 7.71 | 0.00 | 0.02 | 0.57 | 0.59 | 0.01 | 0.52 | 0.53 | 1,323.74 |
| Building Off Road Diesel | 1.11 | 8.51 | 4.68 | 0.00 | 0.00 | 0.54 | 0.54 | 0.00 | 0.50 | 0.50 | 893.39 |
| Building Vendor Trips | 0.04 | 0.42 | 0.35 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.02 | 0.02 | 88.10 |
| Building Worker Trips | 0.08 | 0.16 | 2.68 | 0.00 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 | 0.01 | 342.26 |
| Coating 06/01/2011-09/30/2011 | 10.47 | 0.01 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 15.19 |
| Architectural Coating | 10.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coating Worker Trips | 0.00 | 0.01 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 15.19 |

Phase Assumptions

Phase: Demolition 7/15/2010 - 8/14/2010 - Default Demolition Description

Building Volume Total (cubic feet): 478010

Building Volume Daily (cubic feet): 47800

On Road Truck Travel (VMT): 663.89

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

**10/2/2009 12:15:42 PM**

Phase: Mass Grading 8/15/2010 - 9/30/2010 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 1.97

Maximum Daily Acreage Disturbed: 0.49

Fugitive Dust Level of Detail: Default

12.22 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 10/1/2010 - 9/30/2011 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 6/1/2011 - 9/30/2011 - Type Your Description Here

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

**10/9/2009 01:31:51 PM**

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\Los Angeles\3_Projects_Air Quality\Pierce College\Impact Analysis\Urbemis\Pierce Operations.urb924

Project Name: Pierce College Operations

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

| | ROG | NOx | CO | SO2 | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day, unmitigated) | 2.09 | 2.93 | 4.00 | 0.00 | 0.02 | 0.02 | 3,499.63 |

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

| | ROG | NOx | CO | SO2 | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day, unmitigated) | 20.69 | 28.69 | 255.35 | 0.40 | 65.12 | 12.67 | 38,852.43 |

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

| | ROG | NOx | CO | SO2 | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day, unmitigated) | 22.78 | 31.62 | 259.35 | 0.40 | 65.14 | 12.69 | 42,352.06 |

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

| Source | ROG | NOx | CO | SO2 | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|---|
| Natural Gas | 0.21 | 2.91 | 2.45 | 0.00 | 0.01 | 0.01 | 3,496.82 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Hearth - No Summer Emissions | | | | | | | |
| Landscape | 0.12 | 0.02 | 1.55 | 0.00 | 0.01 | 0.01 | 2.81 |
| Consumer Products | 0.00 | | | | | | |
| Architectural Coatings | 1.76 | | | | | | |
| TOTALS (lbs/day, unmitigated) | 2.09 | 2.93 | 4.00 | 0.00 | 0.02 | 0.02 | 3,499.63 |

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

| Source | ROG | NOX | CO | SO2 | PM10 | PM25 | CO2 |
|---|---|---|---|---|---|---|---|
| Junior college (2 yrs) | 20.69 | 28.69 | 255.35 | 0.40 | 65.12 | 12.67 | 38,852.43 |
| TOTALS (lbs/day, unmitigated) | 20.69 | 28.69 | 255.35 | 0.40 | 65.12 | 12.67 | 38,852.43 |

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2015  Temperature (F): 80  Season: Summer

Emfac: Version  : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

| Land Use Type | Acreage | Trip Rate | Unit Type | No. Units | Total Trips | Total VMT |
|---|---|---|---|---|---|---|
| Junior college (2 yrs) | | 13.77 | 1000 sq ft | 301.45 | 4,150.97 | 37,701.15 |
| | | | | | 4,150.97 | 37,701.15 |

**10/9/2009 01:31:51 PM**

Vehicle Fleet Mix

| Vehicle Type | Percent Type | Non-Catalyst | Catalyst | Diesel |
|---|---|---|---|---|
| Light Auto | 50.9 | 0.2 | 99.6 | 0.2 |
| Light Truck < 3750 lbs | 7.3 | 1.4 | 95.9 | 2.7 |
| Light Truck 3751-5750 lbs | 23.2 | 0.0 | 100.0 | 0.0 |
| Med Truck 5751-8500 lbs | 10.8 | 0.0 | 100.0 | 0.0 |
| Lite-Heavy Truck 8501-10,000 lbs | 1.7 | 0.0 | 82.4 | 17.6 |
| Lite-Heavy Truck 10,001-14,000 lbs | 0.5 | 0.0 | 60.0 | 40.0 |
| Med-Heavy Truck 14,001-33,000 lbs | 0.9 | 0.0 | 22.2 | 77.8 |
| Heavy-Heavy Truck 33,001-60,000 lbs | 0.6 | 0.0 | 0.0 | 100.0 |
| Other Bus | 0.1 | 0.0 | 0.0 | 100.0 |
| Urban Bus | 0.1 | 0.0 | 0.0 | 100.0 |
| Motorcycle | 2.9 | 48.3 | 51.7 | 0.0 |
| School Bus | 0.1 | 0.0 | 0.0 | 100.0 |
| Motor Home | 0.9 | 0.0 | 88.9 | 11.1 |

Travel Conditions

| | Residential | | | Commercial | | |
|---|---|---|---|---|---|---|
| | Home-Work | Home-Shop | Home-Other | Commute | Non-Work | Customer |
| Urban Trip Length (miles) | 12.7 | 7.0 | 9.5 | 13.3 | 7.4 | 8.9 |
| Rural Trip Length (miles) | 17.6 | 12.1 | 14.9 | 15.4 | 9.6 | 12.6 |
| Trip speeds (mph) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| % of Trips - Residential | 32.9 | 18.0 | 49.1 | | | |
| % of Trips - Commercial (by land use) | | | | | | |
| Junior college (2 yrs) | | | | 5.0 | 2.5 | 92.5 |

Title : Los Angeles County Avg Annual CYr 2015 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/09/30 10:26:29
Scen Year: 2015 -- All model years in the range 1971 to 2015 selected
Season : Annual
Area : Los Angeles
****************************************************************************************

Year: 2015 -- Model Years 1971 to 2015 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Los Angeles County Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

| Speed MPH | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH | ALL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2.599 | 4.806 | 4.154 | 5.713 | 11.687 | 5.805 | 9.211 | 16.755 | 7.249 | 26.271 | 27.934 | 18.977 | 24.611 | 4.354 |
| 4 | 2.527 | 4.624 | 4.036 | 5.504 | 11.687 | 5.805 | 9.211 | 16.755 | 7.249 | 26.271 | 27.934 | 18.977 | 24.611 | 4.256 |
| 5 | 2.458 | 4.454 | 3.925 | 5.309 | 11.687 | 5.805 | 9.211 | 16.755 | 7.249 | 26.271 | 27.934 | 18.977 | 24.611 | 4.164 |
| 6 | 2.393 | 4.294 | 3.819 | 5.128 | 10.729 | 5.338 | 8.493 | 15.52 | 6.675 | 23.978 | 26.884 | 17.473 | 22.587 | 3.993 |
| 7 | 2.331 | 4.145 | 3.718 | 4.958 | 9.871 | 4.918 | 7.846 | 14.369 | 6.158 | 21.936 | 25.92 | 16.122 | 20.775 | 3.833 |
| 8 | 2.272 | 4.006 | 3.622 | 4.8 | 9.101 | 4.541 | 7.263 | 13.298 | 5.693 | 20.115 | 25.034 | 14.905 | 19.151 | 3.685 |
| 9 | 2.216 | 3.875 | 3.531 | 4.651 | 8.41 | 4.202 | 6.737 | 12.303 | 5.274 | 18.488 | 24.22 | 13.809 | 17.692 | 3.547 |
| 10 | 2.163 | 3.753 | 3.444 | 4.511 | 7.789 | 3.896 | 6.261 | 11.38 | 4.896 | 17.032 | 23.472 | 12.82 | 16.38 | 3.418 |
| 11 | 2.112 | 3.639 | 3.361 | 4.38 | 7.229 | 3.62 | 5.83 | 10.527 | 4.554 | 15.727 | 22.786 | 11.925 | 15.199 | 3.298 |
| 12 | 2.063 | 3.531 | 3.281 | 4.256 | 6.724 | 3.371 | 5.44 | 9.74 | 4.245 | 14.555 | 22.156 | 11.116 | 14.135 | 3.186 |
| 13 | 2.016 | 3.429 | 3.205 | 4.139 | 6.268 | 3.146 | 5.086 | 9.018 | 3.965 | 13.503 | 21.58 | 10.383 | 13.173 | 3.081 |
| 14 | 1.971 | 3.334 | 3.132 | 4.029 | 5.855 | 2.942 | 4.764 | 8.358 | 3.711 | 12.555 | 21.053 | 9.718 | 12.304 | 2.983 |
| 15 | 1.928 | 3.244 | 3.063 | 3.925 | 5.482 | 2.757 | 4.472 | 7.758 | 3.48 | 11.701 | 20.572 | 9.114 | 11.518 | 2.892 |
| 16 | 1.887 | 3.159 | 2.996 | 3.827 | 5.144 | 2.589 | 4.206 | 7.218 | 3.271 | 10.93 | 20.134 | 8.566 | 10.805 | 2.806 |
| 17 | 1.848 | 3.079 | 2.932 | 3.733 | 4.837 | 2.436 | 3.963 | 6.734 | 3.08 | 10.234 | 19.738 | 8.066 | 10.159 | 2.726 |
| 18 | 1.81 | 3.003 | 2.87 | 3.645 | 4.558 | 2.297 | 3.742 | 6.307 | 2.906 | 9.604 | 19.381 | 7.612 | 9.573 | 2.652 |
| 19 | 1.773 | 2.931 | 2.811 | 3.561 | 4.305 | 2.171 | 3.54 | 5.918 | 2.748 | 9.034 | 19.06 | 7.197 | 9.04 | 2.581 |
| 20 | 1.738 | 2.862 | 2.754 | 3.481 | 4.075 | 2.056 | 3.355 | 5.709 | 2.604 | 8.517 | 18.775 | 6.819 | 8.556 | 2.519 |
| 21 | 1.704 | 2.798 | 2.699 | 3.405 | 3.865 | 1.951 | 3.187 | 5.512 | 2.472 | 8.049 | 18.523 | 6.474 | 8.115 | 2.46 |
| 22 | 1.672 | 2.736 | 2.646 | 3.333 | 3.674 | 1.856 | 3.033 | 5.326 | 2.352 | 7.623 | 18.305 | 6.159 | 7.714 | 2.405 |
| 23 | 1.64 | 2.678 | 2.596 | 3.265 | 3.501 | 1.768 | 2.892 | 5.151 | 2.242 | 7.237 | 18.118 | 5.871 | 7.349 | 2.352 |
| 24 | 1.61 | 2.623 | 2.547 | 3.199 | 3.343 | 1.689 | 2.763 | 4.986 | 2.141 | 6.886 | 17.962 | 5.608 | 7.017 | 2.302 |
| 25 | 1.581 | 2.57 | 2.5 | 3.137 | 3.198 | 1.616 | 2.645 | 4.829 | 2.049 | 6.567 | 17.836 | 5.368 | 6.714 | 2.254 |
| 26 | 1.553 | 2.52 | 2.455 | 3.078 | 3.067 | 1.55 | 2.537 | 4.682 | 1.966 | 6.278 | 17.741 | 5.148 | 6.438 | 2.209 |
| 27 | 1.525 | 2.473 | 2.411 | 3.021 | 2.948 | 1.49 | 2.438 | 4.543 | 1.889 | 6.015 | 17.675 | 4.948 | 6.188 | 2.166 |
| 28 | 1.499 | 2.428 | 2.369 | 2.968 | 2.839 | 1.435 | 2.347 | 4.412 | 1.819 | 5.776 | 17.638 | 4.765 | 5.96 | 2.125 |
| 29 | 1.474 | 2.385 | 2.329 | 2.916 | 2.741 | 1.385 | 2.265 | 4.289 | 1.755 | 5.56 | 17.631 | 4.598 | 5.753 | 2.087 |
| 30 | 1.45 | 2.345 | 2.289 | 2.868 | 2.651 | 1.339 | 2.189 | 4.173 | 1.697 | 5.364 | 17.655 | 4.446 | 5.566 | 2.05 |
| 31 | 1.426 | 2.306 | 2.252 | 2.821 | 2.57 | 1.298 | 2.121 | 4.064 | 1.645 | 5.186 | 17.708 | 4.307 | 5.396 | 2.015 |
| 32 | 1.403 | 2.269 | 2.216 | 2.777 | 2.497 | 1.261 | 2.058 | 3.963 | 1.597 | 5.027 | 17.793 | 4.182 | 5.244 | 1.982 |
| 33 | 1.381 | 2.235 | 2.181 | 2.735 | 2.432 | 1.227 | 2.002 | 3.867 | 1.553 | 4.883 | 17.91 | 4.068 | 5.106 | 1.951 |
| 34 | 1.36 | 2.202 | 2.147 | 2.695 | 2.373 | 1.197 | 1.95 | 3.779 | 1.514 | 4.754 | 18.06 | 3.966 | 4.984 | 1.921 |
| 35 | 1.34 | 2.171 | 2.114 | 2.657 | 2.321 | 1.169 | 1.904 | 3.696 | 1.479 | 4.639 | 18.245 | 3.874 | 4.874 | 1.893 |
| 36 | 1.32 | 2.142 | 2.083 | 2.621 | 2.275 | 1.145 | 1.862 | 3.62 | 1.448 | 4.538 | 18.465 | 3.792 | 4.778 | 1.867 |
| 37 | 1.301 | 2.114 | 2.053 | 2.587 | 2.234 | 1.124 | 1.825 | 3.55 | 1.42 | 4.448 | 18.723 | 3.719 | 4.694 | 1.842 |
| 38 | 1.283 | 2.089 | 2.024 | 2.555 | 2.2 | 1.106 | 1.793 | 3.485 | 1.396 | 4.371 | 19.02 | 3.655 | 4.622 | 1.819 |
| 39 | 1.265 | 2.065 | 1.996 | 2.525 | 2.17 | 1.09 | 1.764 | 3.427 | 1.374 | 4.305 | 19.359 | 3.599 | 4.56 | 1.798 |
| 40 | 1.249 | 2.042 | 1.97 | 2.497 | 2.146 | 1.076 | 1.739 | 3.374 | 1.356 | 4.249 | 19.743 | 3.552 | 4.51 | 1.778 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: DE SOTO AND VICTORY AMNP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

| | | |
|---|---|---|
| U= .5 M/S | Z0= 100. CM | ALT= 0. (M) |
| BRG= WORST CASE | VD= .0 CM/S | |
| CLAS= 7 (G) | VS= .0 CM/S | |
| MIXH= 1000. M | AMB= .0 PPM | |
| SIGTH= 5. DEGREES | TEMP= 15.6 DEGREE (C) | |

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| A. NF | 7 | -450 | 7 | -150 | AG | 1080 | 2.1 | .0 | 19.5 |
| B. NA | 7 | -150 | 7 | 0 | AG | 1010 | 3.4 | .0 | 13.5 |
| C. ND | 7 | 0 | 7 | 150 | AG | 1031 | 2.4 | .0 | 13.5 |
| D. NE | 7 | 150 | 7 | 450 | AG | 1031 | 2.1 | .0 | 19.5 |
| E. SF | -7 | 450 | -7 | 150 | AG | 1658 | 2.1 | .0 | 19.5 |
| F. SA | -7 | 150 | -7 | 0 | AG | 1577 | 3.7 | .0 | 13.5 |
| G. SD | -7 | 0 | -7 | -150 | AG | 1952 | 2.9 | .0 | 13.5 |
| H. SE | -7 | -150 | -7 | -450 | AG | 1952 | 2.1 | .0 | 19.5 |
| I. WF | 450 | 7 | 150 | 7 | AG | 2024 | 2.1 | .0 | 19.5 |
| J. WA | 150 | 7 | 0 | 7 | AG | 1509 | 3.4 | .0 | 13.5 |
| K. WD | 0 | 7 | -150 | 7 | AG | 1665 | 2.4 | .0 | 13.5 |
| L. WE | -150 | 7 | -450 | 7 | AG | 1665 | 2.1 | .0 | 19.5 |
| M. EF | -450 | -7 | -150 | -7 | AG | 1171 | 2.1 | .0 | 19.5 |
| N. EA | -150 | -7 | 0 | -7 | AG | 1086 | 3.3 | .0 | 13.5 |
| O. ED | 0 | -7 | 150 | -7 | AG | 1285 | 2.3 | .0 | 13.5 |
| P. EE | 150 | -7 | 450 | -7 | AG | 1285 | 2.1 | .0 | 19.5 |
| Q. NL | 0 | 0 | 2 | -150 | AG | 70 | 3.4 | .0 | 9.9 |
| R. SL | 0 | 0 | -2 | 150 | AG | 81 | 3.4 | .0 | 9.9 |
| S. WL | 0 | 0 | 150 | 2 | AG | 515 | 3.2 | .0 | 9.9 |
| T. EL | 0 | 0 | -150 | -2 | AG | 85 | 3.2 | .0 | 9.9 |

III. RECEPTOR LOCATIONS

| RECEPTOR | X | Y | Z |
|---|---|---|---|
| 1. NE3 | 17 | 17 | 1.8 |
| 2. SE3 | 17 | -17 | 1.8 |
| 3. SW3 | -17 | -17 | 1.8 |
| 4. NW3 | -17 | 17 | 1.8 |

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | 187. | 1.2 | .0 | .4 | .0 | .0 | .0 | .0 | .1 | .2 |
| 2. SE3 | 277. | 1.1 | .0 | .2 | .0 | .0 | .0 | .0 | .2 | .0 |
| 3. SW3 | 81. | 1.3 | .0 | .1 | .0 | .0 | .0 | .0 | .3 | .0 |
| 4. NW3 | 97. | 1.4 | .0 | .0 | .0 | .0 | .0 | .3 | .0 | .0 |

| RECEPTOR | CONC/LINK (PPM) I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | .0 | .3 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 |
| 2. SE3 | .0 | .0 | .1 | .1 | .0 | .4 | .0 | .0 | .0 | .0 | .0 | .0 |
| 3. SW3 | .1 | .2 | .0 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .1 | .0 |
| 4. NW3 | .0 | .6 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .1 | .0 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: DE SOTO AND VICTORY AMWP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

| | | |
|---|---|---|
| U= .5 M/S | Z0= 100. CM | ALT= 0. (M) |
| BRG= WORST CASE | VD= .0 CM/S | |
| CLAS= 7 (G) | VS= .0 CM/S | |
| MIXH= 1000. M | AMB= .0 PPM | |
| SIGTH= 5. DEGREES | TEMP= 15.6 DEGREE (C) | |

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| | LINK COORDINATES (M) | | | | | | | | |
| A. NF | 7 | -450 | 7 | -150 | AG | 1101 | 2.1 | .0 | 19.5 |
| B. NA | 7 | -150 | 7 | 0 | AG | 1029 | 3.4 | .0 | 13.5 |
| C. ND | 7 | 0 | 7 | 150 | AG | 1035 | 2.4 | .0 | 13.5 |
| D. NE | 7 | 150 | 7 | 450 | AG | 1035 | 2.1 | .0 | 19.5 |
| E. SF | -7 | 450 | -7 | 150 | AG | 1682 | 2.1 | .0 | 19.5 |
| F. SA | -7 | 150 | -7 | 0 | AG | 1593 | 3.7 | .0 | 13.5 |
| G. SD | -7 | 0 | -7 | -150 | AG | 1982 | 2.9 | .0 | 13.5 |
| H. SE | -7 | -150 | -7 | -450 | AG | 1982 | 2.1 | .0 | 19.5 |
| I. WF | 450 | 7 | 150 | 7 | AG | 2037 | 2.1 | .0 | 19.5 |
| J. WA | 150 | 7 | 0 | 7 | AG | 1519 | 3.4 | .0 | 13.5 |
| K. WD | 0 | 7 | -150 | 7 | AG | 1676 | 2.4 | .0 | 13.5 |
| L. WE | -150 | 7 | -450 | 7 | AG | 1676 | 2.1 | .0 | 19.5 |
| M. EF | -450 | -7 | -150 | -7 | AG | 1224 | 2.1 | .0 | 19.5 |
| N. EA | -150 | -7 | 0 | -7 | AG | 1139 | 3.3 | .0 | 13.5 |
| O. ED | 0 | -7 | 150 | -7 | AG | 1351 | 2.3 | .0 | 13.5 |
| P. EE | 150 | -7 | 450 | -7 | AG | 1351 | 2.1 | .0 | 19.5 |
| Q. NL | 0 | 0 | 2 | -150 | AG | 72 | 3.4 | .0 | 9.9 |
| R. SL | 0 | 0 | -2 | 150 | AG | 89 | 3.4 | .0 | 9.9 |
| S. WL | 0 | 0 | 150 | 2 | AG | 518 | 3.2 | .0 | 9.9 |
| T. EL | 0 | 0 | -150 | -2 | AG | 85 | 3.2 | .0 | 9.9 |

III. RECEPTOR LOCATIONS

| RECEPTOR | X | Y | Z |
|---|---|---|---|
| | COORDINATES (M) | | |
| 1. NE3 | 17 | 17 | 1.8 |
| 2. SE3 | 17 | -17 | 1.8 |
| 3. SW3 | -17 | -17 | 1.8 |
| 4. NW3 | -17 | 17 | 1.8 |

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CONC/LINK (PPM) | | | | | | | |
| 1. NE3 | 187. | 1.3 | .0 | .4 | .0 | .0 | .0 | .0 | .1 | .2 |
| 2. SE3 | 277. | 1.2 | .0 | .2 | .0 | .0 | .0 | .0 | .2 | .0 |
| 3. SW3 | 81. | 1.3 | .0 | .1 | .0 | .0 | .0 | .0 | .3 | .0 |
| 4. NW3 | 97. | 1.4 | .0 | .0 | .0 | .0 | .0 | .3 | .0 | .0 |

| RECEPTOR | I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CONC/LINK (PPM) | | | | | | | | | | | |
| 1. NE3 | .0 | .3 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 |
| 2. SE3 | .0 | .0 | .1 | .1 | .0 | .5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 3. SW3 | .1 | .2 | .0 | .0 | .0 | .0 | .4 | .0 | .0 | .0 | .1 | .0 |
| 4. NW3 | .0 | .6 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .1 | .0 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: DE SOTO AND VICTORY PMNP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

| | | |
|---|---|---|
| U= .5 M/S | Z0= 100. CM | ALT= 0. (M) |
| BRG= WORST CASE | VD= .0 CM/S | |
| CLAS= 7 (G) | VS= .0 CM/S | |
| MIXH= 1000. M | AMB= .0 PPM | |
| SIGTH= 5. DEGREES | TEMP= 15.6 DEGREE (C) | |

II. LINK VARIABLES

| LINK DESCRIPTION | LINK COORDINATES (M) X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| A. NF | 7 | -450 | 7 | -150 | AG | 1784 | 2.1 | .0 | 19.5 |
| B. NA | 7 | -150 | 7 | 0 | AG | 1711 | 4.2 | .0 | 13.5 |
| C. ND | 7 | 0 | 7 | 150 | AG | 1818 | 2.7 | .0 | 13.5 |
| D. NE | 7 | 150 | 7 | 450 | AG | 1818 | 2.1 | .0 | 19.5 |
| E. SF | -7 | 450 | -7 | 150 | AG | 1203 | 2.1 | .0 | 19.5 |
| F. SA | -7 | 150 | -7 | 0 | AG | 1095 | 3.7 | .0 | 13.5 |
| G. SD | -7 | 0 | -7 | -150 | AG | 1288 | 2.4 | .0 | 13.5 |
| H. SE | -7 | -150 | -7 | -450 | AG | 1288 | 2.1 | .0 | 19.5 |
| I. WF | 450 | 7 | 150 | 7 | AG | 1507 | 2.1 | .0 | 19.5 |
| J. WA | 150 | 7 | 0 | 7 | AG | 1251 | 3.2 | .0 | 13.5 |
| K. WD | 0 | 7 | -150 | 7 | AG | 1403 | 2.3 | .0 | 13.5 |
| L. WE | -150 | 7 | -450 | 7 | AG | 1403 | 2.1 | .0 | 19.5 |
| M. EF | -450 | -7 | -150 | -7 | AG | 2482 | 2.1 | .0 | 19.5 |
| N. EA | -150 | -7 | 0 | -7 | AG | 2036 | 3.7 | .0 | 13.5 |
| O. ED | 0 | -7 | 150 | -7 | AG | 2467 | 2.6 | .0 | 13.5 |
| P. EE | 150 | -7 | 450 | -7 | AG | 2467 | 2.1 | .0 | 19.5 |
| Q. NL | 0 | 0 | 2 | -150 | AG | 73 | 3.4 | .0 | 9.9 |
| R. SL | 0 | 0 | -2 | 150 | AG | 108 | 3.4 | .0 | 9.9 |
| S. WL | 0 | 0 | 150 | 2 | AG | 256 | 3.1 | .0 | 9.9 |
| T. EL | 0 | 0 | -150 | -2 | AG | 446 | 3.1 | .0 | 9.9 |

III. RECEPTOR LOCATIONS

| RECEPTOR | COORDINATES (M) X | Y | Z |
|---|---|---|---|
| 1. NE3 | 17 | 17 | 1.8 |
| 2. SE3 | 17 | -17 | 1.8 |
| 3. SW3 | -17 | -17 | 1.8 |
| 4. NW3 | -17 | 17 | 1.8 |

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | 187. | 1.6 | .0 | .8 | .0 | .0 | .0 | .0 | .0 | .1 |
| 2. SE3 | 277. | 1.7 | .0 | .4 | .0 | .0 | .0 | .0 | .1 | .0 |
| 3. SW3 | 83. | 1.5 | .0 | .2 | .0 | .0 | .0 | .0 | .2 | .0 |
| 4. NW3 | 97. | 1.3 | .0 | .0 | .2 | .0 | .0 | .2 | .0 | .0 |

| RECEPTOR | CONC/LINK (PPM) I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | .0 | .2 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 2. SE3 | .0 | .0 | .0 | .1 | .0 | .8 | .0 | .0 | .0 | .0 | .0 | .0 |
| 3. SW3 | .1 | .1 | .0 | .0 | .0 | .0 | .7 | .0 | .0 | .0 | .0 | .0 |
| 4. NW3 | .0 | .5 | .0 | .0 | .0 | .0 | .1 | .2 | .0 | .0 | .0 | .0 |

```
           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1

               JOB:   DE SOTO AND VICTORY   PMWP
               RUN: Hour 1          (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide

   I.  SITE VARIABLES

          U=    .5 M/S             Z0= 100. CM           ALT=     0. (M)
        BRG= WORST CASE            VD=   .0 CM/S
       CLAS=     7 (G)             VS=   .0 CM/S
       MIXH= 1000. M              AMB=   .0 PPM
      SIGTH=    5. DEGREES       TEMP= 15.6 DEGREE (C)

  II.  LINK VARIABLES

       LINK      *  LINK COORDINATES (M)   *              EF     H     W
    DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*-------------------------*------------------------------
 A. NF           *     7  -450     7  -150 *  AG   1804   2.1     .0  19.5
 B. NA           *     7  -150     7     0 *  AG   1724   4.2     .0  13.5
 C. ND           *     7     0     7   150 *  AG   1833   2.7     .0  13.5
 D. NE           *     7   150     7   450 *  AG   1833   2.1     .0  19.5
 E. SF           *    -7   450    -7   150 *  AG   1213   2.1     .0  19.5
 F. SA           *    -7   150    -7     0 *  AG   1102   3.7     .0  13.5
 G. SD           *    -7     0    -7  -150 *  AG   1314   2.4     .0  13.5
 H. SE           *    -7  -150    -7  -450 *  AG   1314   2.1     .0  19.5
 I. WF           *   450     7   150     7 *  AG   1550   2.1     .0  19.5
 J. WA           *   150     7     0     7 *  AG   1279   3.2     .0  13.5
 K. WD           *     0     7  -150     7 *  AG   1433   2.3     .0  13.5
 L. WE           *  -150     7  -450     7 *  AG   1433   2.1     .0  19.5
 M. EF           *  -450    -7  -150    -7 *  AG   2508   2.1     .0  19.5
 N. EA           *  -150    -7     0    -7 *  AG   2062   3.7     .0  13.5
 O. ED           *     0    -7   150    -7 *  AG   2495   2.6     .0  13.5
 P. EE           *   150    -7   450    -7 *  AG   2495   2.1     .0  19.5
 Q. NL           *     0     0     2  -150 *  AG     80   3.4     .0   9.9
 R. SL           *     0     0    -2   150 *  AG    111   3.4     .0   9.9
 S. WL           *     0     0   150     2 *  AG    271   3.1     .0   9.9
 T. EL           *     0     0  -150    -2 *  AG    446   3.1     .0   9.9

 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *     X      Y      Z
 ------------*---------------------
 1. NE3      *     17     17   1.8
 2. SE3      *     17    -17   1.8
 3. SW3      *    -17    -17   1.8
 4. NW3      *    -17     17   1.8

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *       * PRED  *                CONC/LINK
             *  BRG  * CONC  *                  (PPM)
  RECEPTOR   * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
-------------*-------*-------*----------------------------------------
 1. NE3      *  187. *   1.6 *   .0   .8   .0   .0   .0   .0   .0   .1
 2. SE3      *  277. *   1.7 *   .0   .4   .0   .0   .0   .0   .1   .0
 3. SW3      *   83. *   1.5 *   .0   .2   .0   .0   .0   .0   .2   .0
 4. NW3      *   97. *   1.4 *   .0   .0   .2   .0   .0   .2   .0   .0

             *                          CONC/LINK
             *                            (PPM)
  RECEPTOR   *   I    J    K    L    M    N    O    P    Q    R    S    T
 ------------*------------------------------------------------------------
 1. NE3      *   .0   .2   .0   .0   .0   .0   .2   .0   .0   .0   .0   .0
 2. SE3      *   .0   .0   .0   .1   .0   .8   .0   .0   .0   .0   .0   .0
 3. SW3      *   .1   .1   .0   .0   .0   .0   .7   .0   .0   .0   .0   .0
 4. NW3      *   .0   .5   .0   .0   .0   .0   .1   .2   .0   .0   .0   .0
```

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: WINNETKA AND US101 EB RAMPS AMNP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

| | | |
|---|---|---|
| U= .5 M/S | Z0= 100. CM | ALT= 0. (M) |
| BRG= WORST CASE | VD= .0 CM/S | |
| CLAS= 7 (G) | VS= .0 CM/S | |
| MIXH= 1000. M | AMB= .0 PPM | |
| SIGTH= 5. DEGREES | TEMP= 15.6 DEGREE (C) | |

II. LINK VARIABLES

| LINK DESCRIPTION | LINK COORDINATES (M) X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| A. NF | 5 | -450 | 5 | -150 | AG | 836 | 2.1 | .0 | 15.0 |
| B. NA | 5 | -150 | 5 | 0 | AG | 836 | 2.8 | .0 | 9.9 |
| C. ND | 5 | 0 | 5 | 150 | AG | 1021 | 2.2 | .0 | 9.9 |
| D. NE | 5 | 150 | 5 | 450 | AG | 1021 | 2.1 | .0 | 15.0 |
| E. SF | -5 | 450 | -5 | 150 | AG | 1428 | 2.1 | .0 | 15.0 |
| F. SA | -5 | 150 | -5 | 0 | AG | 951 | 2.9 | .0 | 9.9 |
| G. SD | -5 | 0 | -5 | -150 | AG | 1181 | 2.2 | .0 | 9.9 |
| H. SE | -5 | -150 | -5 | -450 | AG | 1181 | 2.1 | .0 | 15.0 |
| I. WF | 450 | 2 | 150 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| J. WA | 150 | 2 | 0 | 2 | AG | 0 | 4.0 | .0 | 9.9 |
| K. WD | 0 | 2 | -150 | 2 | AG | 0 | 2.6 | .0 | 9.9 |
| L. WE | -150 | 2 | -450 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| M. EF | -450 | -2 | -150 | -2 | AG | 626 | 2.1 | .0 | 10.5 |
| N. EA | -150 | -2 | 0 | -2 | AG | 230 | 4.0 | .0 | 9.9 |
| O. ED | 0 | -2 | 150 | -2 | AG | 688 | 4.4 | .0 | 9.9 |
| P. EE | 150 | -2 | 450 | -2 | AG | 688 | 2.1 | .0 | 10.5 |
| Q. NL | 0 | 0 | 2 | -150 | AG | 0 | 2.7 | .0 | 9.9 |
| R. SL | 0 | 0 | -2 | 150 | AG | 477 | 2.9 | .0 | 9.9 |
| S. WL | 0 | 0 | 150 | 2 | AG | 0 | 4.0 | .0 | 9.9 |
| T. EL | 0 | 0 | -150 | -2 | AG | 396 | 4.4 | .0 | 9.9 |

III. RECEPTOR LOCATIONS

| RECEPTOR | COORDINATES (M) X | Y | Z |
|---|---|---|---|
| 1. NE3 | 12 | 8 | 1.8 |
| 2. SE3 | 12 | -8 | 1.8 |
| 3. SW3 | -12 | -8 | 1.8 |
| 4. NW3 | -12 | 8 | 1.8 |

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | 264. | .7 | .0 | .0 | .1 | .0 | .0 | .1 | .0 | .0 |
| 2. SE3 | 354. | .9 | .0 | .0 | .3 | .0 | .1 | .1 | .0 | .0 |
| 3. SW3 | 6. | .9 | .0 | .0 | .0 | .0 | .0 | .4 | .0 | .0 |
| 4. NW3 | 97. | .7 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 |

| RECEPTOR | CONC/LINK (PPM) I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .3 |
| 2. SE3 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .1 | .0 | .0 |
| 3. SW3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .1 |
| 4. NW3 | .0 | .0 | .0 | .0 | .0 | .0 | .3 | .0 | .0 | .0 | .0 | .0 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: WINNETKA AND US101 EB RAMPS AMWP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

```
   U=    .5 M/S            Z0= 100. CM            ALT=     0. (M)
 BRG= WORST CASE           VD=   .0 CM/S
CLAS=     7 (G)            VS=   .0 CM/S
MIXH= 1000. M             AMB=   .0 PPM
SIGTH=    5. DEGREES      TEMP= 15.6 DEGREE (C)
```

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| A. NF | 5 | -450 | 5 | -150 | AG | 857 | 2.1 | .0 | 15.0 |
| B. NA | 5 | -150 | 5 | 0 | AG | 857 | 2.8 | .0 | 9.9 |
| C. ND | 5 | 0 | 5 | 150 | AG | 1042 | 2.2 | .0 | 9.9 |
| D. NE | 5 | 150 | 5 | 450 | AG | 1042 | 2.1 | .0 | 15.0 |
| E. SF | -5 | 450 | -5 | 150 | AG | 1445 | 2.1 | .0 | 15.0 |
| F. SA | -5 | 150 | -5 | 0 | AG | 955 | 2.9 | .0 | 9.9 |
| G. SD | -5 | 0 | -5 | -150 | AG | 1185 | 2.2 | .0 | 9.9 |
| H. SE | -5 | -150 | -5 | -450 | AG | 1185 | 2.1 | .0 | 15.0 |
| I. WF | 450 | 2 | 150 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| J. WA | 150 | 2 | 0 | 2 | AG | 0 | 4.2 | .0 | 9.9 |
| K. WD | 0 | 2 | -150 | 2 | AG | 0 | 2.6 | .0 | 9.9 |
| L. WE | -150 | 2 | -450 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| M. EF | -450 | -2 | -150 | -2 | AG | 626 | 2.1 | .0 | 10.5 |
| N. EA | -150 | -2 | 0 | -2 | AG | 230 | 4.2 | .0 | 9.9 |
| O. ED | 0 | -2 | 150 | -2 | AG | 701 | 4.4 | .0 | 9.9 |
| P. EE | 150 | -2 | 450 | -2 | AG | 701 | 2.1 | .0 | 10.5 |
| Q. NL | 0 | 0 | 2 | -150 | AG | 0 | 2.7 | .0 | 9.9 |
| R. SL | 0 | 0 | -2 | 150 | AG | 490 | 2.9 | .0 | 9.9 |
| S. WL | 0 | 0 | 150 | 2 | AG | 0 | 4.2 | .0 | 9.9 |
| T. EL | 0 | 0 | -150 | -2 | AG | 396 | 4.4 | .0 | 9.9 |

III. RECEPTOR LOCATIONS

| RECEPTOR | X | Y | Z |
|---|---|---|---|
| 1. NE3 | 12 | 8 | 1.8 |
| 2. SE3 | 12 | -8 | 1.8 |
| 3. SW3 | -12 | -8 | 1.8 |
| 4. NW3 | -12 | 8 | 1.8 |

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | 264. | .8 | .0 | .0 | .1 | .0 | .0 | .1 | .0 | .0 |
| 2. SE3 | 354. | .9 | .0 | .0 | .3 | .0 | .1 | .1 | .0 | .0 |
| 3. SW3 | 6. | 1.0 | .0 | .0 | .0 | .0 | .0 | .4 | .0 | .0 |
| 4. NW3 | 97. | .7 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 |

CONC/LINK (PPM)

| RECEPTOR | I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .0 | .0 | .0 | .0 | .3 |
| 2. SE3 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .1 | .0 | .0 |
| 3. SW3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 | .0 | .1 |
| 4. NW3 | .0 | .0 | .0 | .0 | .0 | .0 | .4 | .0 | .0 | .0 | .0 | .0 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: WINNETKA AND US101 EB RAMPS PMNP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

| | | |
|---|---|---|
| U= .5 M/S | Z0= 100. CM | ALT= 0. (M) |
| BRG= WORST CASE | VD= .0 CM/S | |
| CLAS= 7 (G) | VS= .0 CM/S | |
| MIXH= 1000. M | AMB= .0 PPM | |
| SIGTH= 5. DEGREES | TEMP= 15.6 DEGREE (C) | |

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| A. NF | 5 | -450 | 5 | -150 | AG | 996 | 2.1 | .0 | 15.0 |
| B. NA | 5 | -150 | 5 | 0 | AG | 996 | 2.9 | .0 | 9.9 |
| C. ND | 5 | 0 | 5 | 150 | AG | 1148 | 2.2 | .0 | 9.9 |
| D. NE | 5 | 150 | 5 | 450 | AG | 1148 | 2.1 | .0 | 15.0 |
| E. SF | -5 | 450 | -5 | 150 | AG | 1070 | 2.1 | .0 | 15.0 |
| F. SA | -5 | 150 | -5 | 0 | AG | 710 | 2.8 | .0 | 9.9 |
| G. SD | -5 | 0 | -5 | -150 | AG | 909 | 2.2 | .0 | 9.9 |
| H. SE | -5 | -150 | -5 | -450 | AG | 909 | 2.1 | .0 | 15.0 |
| I. WF | 450 | 2 | 150 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| J. WA | 150 | 2 | 0 | 2 | AG | 0 | 4.0 | .0 | 9.9 |
| K. WD | 0 | 2 | -150 | 2 | AG | 0 | 2.6 | .0 | 9.9 |
| L. WE | -150 | 2 | -450 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| M. EF | -450 | -2 | -150 | -2 | AG | 630 | 2.1 | .0 | 10.5 |
| N. EA | -150 | -2 | 0 | -2 | AG | 199 | 4.0 | .0 | 9.9 |
| O. ED | 0 | -2 | 150 | -2 | AG | 639 | 4.4 | .0 | 9.9 |
| P. EE | 150 | -2 | 450 | -2 | AG | 639 | 2.1 | .0 | 10.5 |
| Q. NL | 0 | 0 | 2 | -150 | AG | 0 | 2.7 | .0 | 9.9 |
| R. SL | 0 | 0 | -2 | 150 | AG | 360 | 2.8 | .0 | 9.9 |
| S. WL | 0 | 0 | 150 | 2 | AG | 0 | 4.0 | .0 | 9.9 |
| T. EL | 0 | 0 | -150 | -2 | AG | 431 | 4.4 | .0 | 9.9 |

III. RECEPTOR LOCATIONS

| RECEPTOR | X | Y | Z |
|---|---|---|---|
| 1. NE3 | 12 | 8 | 1.8 |
| 2. SE3 | 12 | -8 | 1.8 |
| 3. SW3 | -12 | -8 | 1.8 |
| 4. NW3 | -12 | 8 | 1.8 |

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | 185. | .8 | .0 | .4 | .0 | .0 | .0 | .0 | .0 | .1 |
| 2. SE3 | 354. | .9 | .0 | .0 | .3 | .0 | .1 | .0 | .0 | .0 |
| 3. SW3 | 5. | .8 | .0 | .0 | .0 | .1 | .0 | .3 | .0 | .0 |
| 4. NW3 | 174. | .7 | .0 | .1 | .0 | .0 | .0 | .0 | .3 | .0 |

CONC/LINK (PPM)

| RECEPTOR | I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 2. SE3 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 3. SW3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 |
| 4. NW3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: WINNETKA AND US101 EB RAMPS PMWP
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

| | | |
|---|---|---|
| U= .5 M/S | Z0= 100. CM | ALT= 0. (M) |
| BRG= WORST CASE | VD= .0 CM/S | |
| CLAS= 7 (G) | VS= .0 CM/S | |
| MIXH= 1000. M | AMB= .0 PPM | |
| SIGTH= 5. DEGREES | TEMP= 15.6 DEGREE (C) | |

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| A. NF | 5 | -450 | 5 | -150 | AG | 1005 | 2.1 | .0 | 15.0 |
| B. NA | 5 | -150 | 5 | 0 | AG | 1005 | 2.9 | .0 | 9.9 |
| C. ND | 5 | 0 | 5 | 150 | AG | 1157 | 2.2 | .0 | 9.9 |
| D. NE | 5 | 150 | 5 | 450 | AG | 1157 | 2.1 | .0 | 15.0 |
| E. SF | -5 | 450 | -5 | 150 | AG | 1122 | 2.1 | .0 | 15.0 |
| F. SA | -5 | 150 | -5 | 0 | AG | 723 | 2.8 | .0 | 9.9 |
| G. SD | -5 | 0 | -5 | -150 | AG | 922 | 2.2 | .0 | 9.9 |
| H. SE | -5 | -150 | -5 | -450 | AG | 922 | 2.1 | .0 | 15.0 |
| I. WF | 450 | 2 | 150 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| J. WA | 150 | 2 | 0 | 2 | AG | 0 | 4.0 | .0 | 9.9 |
| K. WD | 0 | 2 | -150 | 2 | AG | 0 | 2.6 | .0 | 9.9 |
| L. WE | -150 | 2 | -450 | 2 | AG | 0 | 2.1 | .0 | 10.5 |
| M. EF | -450 | -2 | -150 | -2 | AG | 630 | 2.1 | .0 | 10.5 |
| N. EA | -150 | -2 | 0 | -2 | AG | 199 | 4.0 | .0 | 9.9 |
| O. ED | 0 | -2 | 150 | -2 | AG | 678 | 4.4 | .0 | 9.9 |
| P. EE | 150 | -2 | 450 | -2 | AG | 678 | 2.1 | .0 | 10.5 |
| Q. NL | 0 | 0 | 2 | -150 | AG | 0 | 2.7 | .0 | 9.9 |
| R. SL | 0 | 0 | -2 | 150 | AG | 399 | 2.8 | .0 | 9.9 |
| S. WL | 0 | 0 | 150 | 2 | AG | 0 | 4.0 | .0 | 9.9 |
| T. EL | 0 | 0 | -150 | -2 | AG | 431 | 4.4 | .0 | 9.9 |

III. RECEPTOR LOCATIONS

| RECEPTOR | X | Y | Z |
|---|---|---|---|
| 1. NE3 | 12 | 8 | 1.8 |
| 2. SE3 | 12 | -8 | 1.8 |
| 3. SW3 | -12 | -8 | 1.8 |
| 4. NW3 | -12 | 8 | 1.8 |

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | 185. | .8 | .0 | .4 | .0 | .0 | .0 | .0 | .0 | .1 |
| 2. SE3 | 354. | .9 | .0 | .0 | .3 | .0 | .1 | .0 | .0 | .0 |
| 3. SW3 | 5. | .8 | .0 | .0 | .0 | .1 | .0 | .3 | .0 | .0 |
| 4. NW3 | 174. | .7 | .0 | .1 | .0 | .0 | .0 | .0 | .3 | .0 |

CONC/LINK (PPM)

| RECEPTOR | I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. NE3 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 2. SE3 | .0 | .0 | .0 | .0 | .0 | .0 | .2 | .0 | .0 | .0 | .0 | .0 |
| 3. SW3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 |
| 4. NW3 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .1 |

# APPENDIX C
TRAFFIC IMPACT STUDY

***DRAFT***

# TRAFFIC AND PARKING STUDY
# FOR THE
# PIERCE COLLEGE FACILITIES MASTER PLAN UPDATE
# ENVIRONMENTAL IMPACT REPORT

JANUARY 2010

PREPARED FOR

ICF/JONES & STOKES

PREPARED BY

FEHR & PEERS
TRANSPORTATION CONSULTANTS

***DRAFT***

**TRAFFIC AND PARKING STUDY**
**FOR THE**
**PIERCE COLLEGE FACILITIES MASTER PLAN UPDATE**
**ENVIRONMENTAL IMPACT REPORT**

January 2010

Prepared for:

**ICF JONES & STOKES**

Prepared by:

**FEHR & PEERS**
201 Santa Monica Boulevard, Suite 500
Santa Monica, California 90401
(310) 458-9916

Ref:  OC09-0135

## TABLE OF CONTENTS

Appendix A: Intersection Configurations
Appendix B: AM and PM Peak Hour Intersection Turning Movements
Appendix C: Intersection Level of Service Worksheets
Appendix D: Pierce College Parking Utilization Survey Data

## LIST OF FIGURES

**NO.**

## LIST OF TABLES

**NO.**

# I. INTRODUCTION

This report documents the results of a study evaluating potential traffic and parking impacts of the proposed Pierce College Facilities Master Plan update. The study was conducted by Fehr & Peers in support of the supplemental environmental impact report (EIR) for the Master Plan update.

## PROJECT DESCRIPTION

The Pierce College campus is located in the western portion of the San Fernando Valley in the City of Los Angeles. The campus encompasses an area generally bounded by Winnetka Avenue on the east, Victory Boulevard on the north, De Soto Avenue on the west, and residential uses on the south. Based on information provided by the University, the existing student full-time equivalent (FTE) was 16,079 for the 2008-2009 academic year. Due to State budget cuts, the existing FTE declined from 16,079 to an estimated 14,763 for the 2009-2010 academic year. Over the buildout period of the Master Plan to Year 2015, enrollment is projected to increase at a modest rate to a projected FTE of about 15,500.

The proposed Facilities Master Plan envisions a series of improvements to the campus academic-related facilities, including new or renovated academic buildings and facilities, campus parking facilities, and support facilities. Previous versions of the Pierce College Master Plan included one or more proposed public/private partnership projects, however; these components have been removed from the project description and are therefore not included in this current traffic analysis.

Existing and future vehicular access to the Pierce College campus is and would be obtained via four access points: Brahma Drive via a signalized intersection with Winnetka Avenue, an unsignalized driveway onto Victory Boulevard from Parking Lot 7, Mason Street via a signalized intersection with Victory Boulevard, and El Rancho Drive via a signalized intersection with De Soto Avenue. There are presently approximately 3,719 parking spaces on campus (including an estimated 85 unmarked spaces in dirt parking areas), provided in a number of both large and small parking lots and as curb parking along internal roadways. An estimated 3,958 parking spaces would be provided on campus at buildout of the Master Plan.

The proposed illustrative master plan is presented in Figure 1. Further project description data is presented as appropriate in the discussions of trip generation and parking impacts later in this report.

**STUDY SCOPE**

The study analyzed the potential project-generated traffic impacts on the street and highway system surrounding and serving the Pierce College campus. The following traffic scenarios were analyzed in the study:

- Existing (Year 2009) Conditions – The analysis of existing traffic conditions provided a basis for the remainder of the study. The existing conditions analysis included an assessment of streets, traffic volumes, operating conditions, transit services, and on-campus parking conditions.

- Year 2015 Cumulative Base (No Project) Conditions – The objective of this scenario was to project future traffic growth and operating conditions that could be expected to result from regional growth and related projects in the vicinity of the project site, without consideration of the proposed project.

- Year 2015 Cumulative plus Project Conditions – The objective of this scenario was to identify potential impacts of the proposed project on projected future traffic operating conditions with traffic expected to be generated by buildout of the proposed Master Plan added to the cumulative base traffic forecasts.

Buildout of the campus Master Plan is projected by 2015. Thus, potential project traffic impacts are evaluated against projected Year 2015 cumulative conditions.

The potential for project impacts is evaluated in the study for weekday AM and PM peak hours of traffic at 32 intersections in the west San Fernando Valley near the Pierce College campus. The analysis locations are illustrated in Figure 2 and are as follows:


FEHR & PEERS
TRANSPORTATION CONSULTANTS

May 24, 2010 TP
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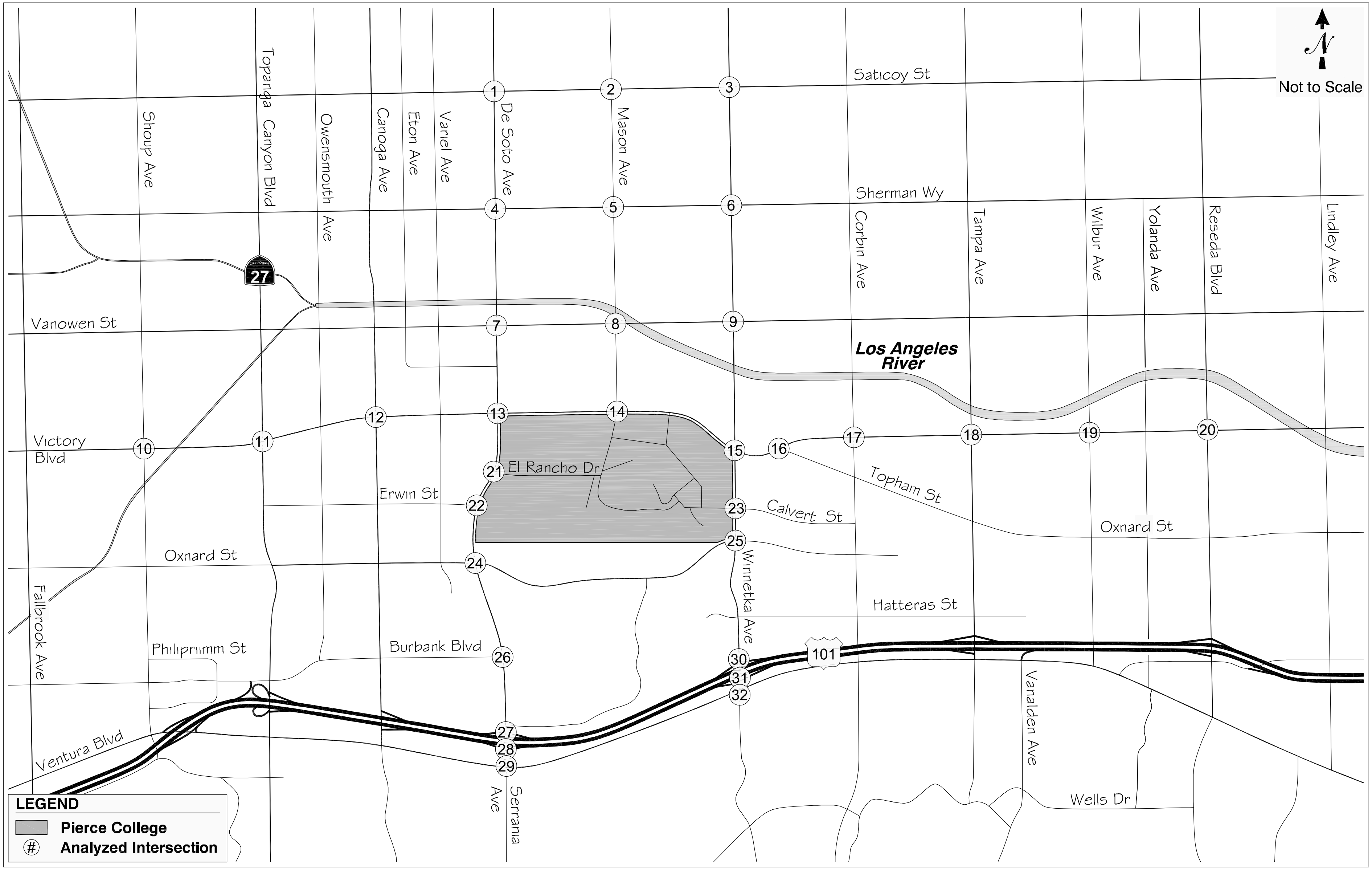
# LOS ANGELES PIERCE COLLEGE - ILLUSTRATIVE MASTER PLAN

FIGURE 1

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**STUDY AREA AND ANALYZED INTERSECTIONS**

**FIGURE 2**

1. De Soto Avenue & Saticoy Street
2. Mason Avenue & Saticoy Street
3. Winnetka Avenue & Saticoy Street
4. De Soto Avenue & Sherman Way
5. Mason Avenue & Sherman Way
6. Winnetka Avenue & Sherman Way
7. De Soto Avenue & Vanowen Street
8. Mason Avenue & Vanowen Street
9. Winnetka Avenue & Vanowen Street
10. Shoup Avenue & Victory Boulevard
11. Topanga Canyon Boulevard & Victory Boulevard
12. Canoga Avenue & Victory Boulevard
13. De Soto Avenue & Victory Boulevard
14. Mason Avenue & Victory Boulevard
15. Winnetka Avenue & Victory Boulevard
16. Topham Street & Victory Boulevard
17. Corbin Avenue & Victory Boulevard
18. Tampa Avenue & Victory Boulevard
19. Wilbur Avenue & Victory Boulevard
20. Reseda Avenue & Victory Boulevard
21. De Soto Avenue & El Rancho Drive
22. De Soto Avenue & Erwin Street
23. Winnetka Avenue & Calvert Street/Brahma Drive
24. De Soto Avenue & Oxnard Street
25. Winnetka Avenue & Oxnard Street
26. De Soto Avenue & Burbank Boulevard (west)
27. De Soto Avenue & US 101 westbound ramps
28. De Soto Avenue & US 101 eastbound ramps
29. De Soto Avenue & Ventura Boulevard
30. Winnetka Avenue & US 101 westbound ramps
31. Winnetka Avenue & US 101 eastbound ramps
32. Winnetka Avenue & Ventura Boulevard

The study also evaluates the adequacy of the proposed future on-campus parking supply to accommodate projected campus parking demands.

Finally, the study includes an analysis of potential project impacts on the regional highway and transit systems in accordance with requirements of the Los Angeles County Congestion Management Program (CMP).

## ORGANIZATION OF REPORT

This report is divided into eight chapters. Chapter II describes the existing circulation system, traffic volumes, and traffic conditions within the study area. Chapter II also describes the existing Pierce College access and circulation system and analyzes existing parking conditions on the campus. The methodologies used to forecast future cumulative and project traffic volumes, and the resultant forecasts, are described in Chapter III. Chapter IV presents an assessment of potential traffic impacts and identifies potential traffic mitigation measures. An analysis of potential impacts on neighborhood streets is presented in Chapter V. Chapter VI presents the results of the Congestion Management Program regional transportation system impact analysis. Chapter VII contains an analysis of potential impacts of the project on campus parking conditions and site access. Finally, conclusions and recommendations of the study are summarized in Chapter VIII.

## II. EXISTING CONDITIONS

A comprehensive data collection effort was undertaken to develop a detailed description of existing transportation and parking conditions within and adjacent to the Pierce College campus. The assessment of existing conditions relevant to this study included street system, traffic volumes and operating conditions, public transit service, campus access system, and existing parking conditions on the Pierce College campus.

### EXISTING STREET SYSTEM

The Pierce College campus is bounded by Victory Boulevard on the north, Winnetka Avenue on the east, and De Soto Avenue on the west. To the north, east, and west of the campus, the street system is a north-south/east-west grid system. To the south of the campus, the street grid is disrupted by the Chalk Hills and, further to the south beyond Ventura Boulevard, the Santa Monica Mountains.

The street system in the study area is illustrated in Figure 2. Primary regional access to the area is provided by the Ventura Freeway (U.S. 101), which runs east-west approximately one mile south of the campus. Winnetka Avenue and De Soto Avenue on either side of the campus are north-south arterial facilities providing access to the Ventura Freeway. Victory Boulevard is an east-west arterial facility. Mason Avenue is a secondary highway providing access to the campus to/from the north.

Additional arterial facilities serving the surrounding study area include Topanga Canyon Boulevard, Canoga Avenue, Tampa Avenue, and Reseda Avenue running north-south and Saticoy Street, Sherman Way, and Ventura Boulevard running east-west.

Descriptions of key roadways serving the study area are provided below:

- Ventura Freeway (U.S. 101) - The Ventura Freeway is a major regional facility that travels in an east-west orientation through the southern portion of the study area. The freeway provides access from the study area to the eastern San Fernando Valley and metropolitan Los Angeles to the east and to the Agoura/Westlake areas and Ventura County to the west. Key interchanges providing access to the Pierce College Campus are full diamond interchanges at Winnetka Avenue and De Soto Avenue. In the study area, the freeway provides 10 lanes (five in each direction) east of Topanga Canyon Boulevard and eight lanes (four in each direction) west of Topanga Canyon Boulevard.

- Shoup Avenue - Shoup Avenue is a north-south street located about 1.5 miles west of Pierce College. It is classified as a secondary highway north of, and a collector street south of, Ventura Boulevard. North of Ventura Boulevard to Roscoe Boulevard, Shoup Avenue provides four through lanes, with on-street parking.

- Topanga Canyon Boulevard (SR 27) - Topanga Canyon Boulevard is a north-south major highway located about one mile west of the Pierce College campus. Topanga Canyon provides access across the Santa Monica Mountains to Pacific Coast Highway (SR 1) to the south, and to the Simi Valley Freeway (SR 118) and the northwestern portion of the San Fernando Valley to the north. Four through lanes are provided north of Vanowen Street, five through lanes (three northbound and two southbound) are provide between Vanowen Street and Burbank Boulevard, and six through lanes are provided south of Burbank Boulevard. A raised median island is present south of Burbank Boulevard. On-street parking is prohibited along the east side of the roadway throughout the Warner Center area, although it is allowed along most of the west side within Warner Center and on both sides north of Vanowen Street. The City of Los Angeles *Draft Bicycle Plan* (Los Angeles Department of City Planning, September 2009) proposes Class II bike lanes along Topanga Canyon Boulevard north of Hart Street in the study area.

- Canoga Avenue - Canoga Avenue is a north-south street located about one-half mile west of the Pierce College campus. It is classified as a major highway between Ventura Boulevard and Victory Boulevard and as a secondary highway both to the north of Victory Boulevard and to the south of Ventura Boulevard. Six through lanes are provided between Victory Boulevard and the Ventura Freeway. Four through lanes are provided to the north of Victory Boulevard and between the Ventura Freeway and Ventura Boulevard, narrowing to two lanes south of Ventura Boulevard. A raised median island is present between Victory Boulevard and Burbank Boulevard. On-street parking is prohibited along much of Canoga Avenue within the study area, although unrestricted parking is allowed south of Ventura Boulevard and along the west side north of Hart Street.

- De Soto Avenue - De Soto Avenue is a north-south street that forms the western boundary of the Pierce College campus. It is classified as a major highway north of Ventura Boulevard and as a collector street south of Ventura Boulevard (where the street changes name to Serrania Avenue). Four through lanes are provided north of Victory Boulevard, six lanes are provided between Victory Boulevard and the Ventura Freeway, five lanes (three northbound and two southbound) are provided between the freeway and Ventura Boulevard, and two lanes are provided south of Ventura Boulevard. On-street parking is prohibited along De Soto Avenue between Victory Boulevard and Ventura Boulevard.

Parking is allowed north of Victory Boulevard, although peak period parking restrictions are used in this section to provide a third southbound travel lane during the morning peak period and a third northbound travel lane during the evening peak period. Unrestricted parking is allowed south of Ventura Boulevard on Serrania Avenue. Bicycle lanes are present on both sides between the Pierce College driveway (El Rancho Drive) and Burbank Boulevard. The City of Los Angeles *Draft Bicycle Plan* identifies De Soto Avenue south of Victory Boulevard as having Class II bike lanes and De Soto Avenue between Victory Boulevard and Sherman Way as having Class III bike routes within the study area.

- Mason Avenue - Mason Avenue is a north-south secondary highway providing access between Pierce College and areas to the north. Mason Avenue terminates as a public street at its intersection with Victory Boulevard on the north side of the campus, and continues within the campus as an internal campus roadway. Mason Avenue provides four through lanes with on-street parking.

- Winnetka Avenue - Winnetka Avenue is a north-south street forming the eastern boundary of the Pierce College campus. It is classified as a major highway north of, and a collector street south of, Ventura Boulevard. Four through lanes and a two-way continuous left-turn lane are provided north of Ventura Boulevard, and two lanes are provided south of Ventura Boulevard. On-street parking is allowed both north of Calvert Street/Pierce College driveway (Brahma Drive) and south of Ventura Boulevard, but is prohibited between Calvert Street and Ventura Boulevard.

- Corbin Avenue - Corbin Avenue is a north-south secondary highway located one-half mile east of Pierce College. In the study area, four through lanes are present north of Topham Street and two through lanes are present south of Topham Street. On-street parking is provided.

- Tampa Avenue - Tampa Avenue is a north-south major highway located one mile east of Pierce College. Tampa Avenue provides four through lanes with on-street parking during off-peak hours. During peak periods, street parking is prohibited to provide additional travel lanes.

- Wilbur Avenue - Wilbur Avenue is a north-south secondary highway located 1.5 miles east of Pierce College. Wilbur Avenue provides four through lanes with on-street parking.

- Reseda Avenue - Reseda Avenue is a north-south major highway located two miles east of Pierce College. In the study area, Reseda Avenue provides four through lanes with on-street parking.

- Saticoy Street - Saticoy Street is a four-lane east-west secondary highway located about 1.5 miles north of Pierce College. A two-way continuous left-turn lane is provided throughout most of the study area, as is on-street parking.

- Sherman Way - Sherman Way is an east-west major highway located about one mile north of Pierce College. It is classified as a divided major highway east of Variel Avenue, where six through lanes and a raised median island are provided. West of Variel Avenue, it is classified as a major highway and provides four through lanes and a two-way continuous left-turn lane. On-street parking is allowed throughout the study area.

- Vanowen Street - Vanowen Street is a four-lane east-west secondary highway located about one-half mile north of the Pierce College campus. On-street parking is permitted on the north side throughout the study area, and on the south side in certain sections.

- Victory Boulevard - Victory Boulevard is an east-west major highway with a two-way continuous left-turn lane throughout the study area. Four through lanes are provided from east of Fallbrook Avenue to Topanga Canyon Boulevard. Six through lanes are provided between Topanga Canyon Boulevard and De Soto Avenue within Warner Center, with some sections of eight lanes. Five through lanes (three eastbound and two westbound) are provided east of De Soto Avenue to Winnetka Avenue adjacent to the Pierce College campus. Four through lanes are provided east of Winnetka Avenue. On-street parking is allowed east of De Soto Avenue. Parking restrictions are used along the north side east of De Soto Avenue to provide a third westbound travel lane during both the morning and evening peak periods.

- Oxnard Street - Oxnard Street is an east-west secondary highway located to the south of the Pierce College campus. Four lanes are provided throughout most of the study area, narrowing to two lanes both west of Shoup Avenue and east of Winnetka Avenue. A raised median island is present between Topanga Canyon Boulevard and Canoga Avenue. On-street parking is prohibited between Topanga Canyon Boulevard and De Soto Avenue in Warner Center, but is allowed to the east of De Soto Avenue. The City of Los Angeles *Draft Bicycle Plan* identifies Oxnard Street as having Class II bike lanes throughout the study area.

- Burbank Boulevard - West of De Soto Avenue, Burbank Boulevard is an east-west secondary highway providing four through lanes between De Soto Avenue and Farralone Avenue. On-street parking is allowed between Canoga Avenue and Topanga Canyon Boulevard. At De Soto Avenue, Burbank Boulevard jogs to the south and continues to the east as a two-lane collector street with on-street parking.

- Ventura Boulevard - Ventura Boulevard is an east-west major highway located about one mile south of the Pierce College campus. Three through lanes are provided in the westbound direction throughout most of the study area, although two lanes are provided east of Winnetka Avenue. In the eastbound direction, two through lanes are provided west of West Hills Drive, three lanes are provided between West Hills Drive and the Chalk Hill summit, two lanes east of the summit, three lanes are provided approaching Winnetka Avenue, and two lanes are provided east of Winnetka Avenue. On-street parking is allowed throughout most of the study area, although parking restrictions are used to provide a third eastbound through lane during both the morning and evening peak periods in the sections between Topanga Canyon Boulevard and West Hills Drive and east of Winnetka Avenue. Parking is also restricted along the south side of Ventura Boulevard immediately adjacent to Taft High School (west of Winnetka Avenue) on school days. A raised median island is present for short sections just east of West Hills Drive (over the Chalk Hill summit).

Diagrams of the existing lane configurations at the 32 study intersections are provided in Appendix A to this report.

## EXISTING TRAFFIC VOLUMES AND OPERATING CONDITIONS

The following sections present the existing peak hour traffic volumes at the study intersections, a description of the methodology used to analyze intersection operating conditions, and the resulting level of service at each location under existing conditions.

### Existing Peak Hour Traffic Volumes

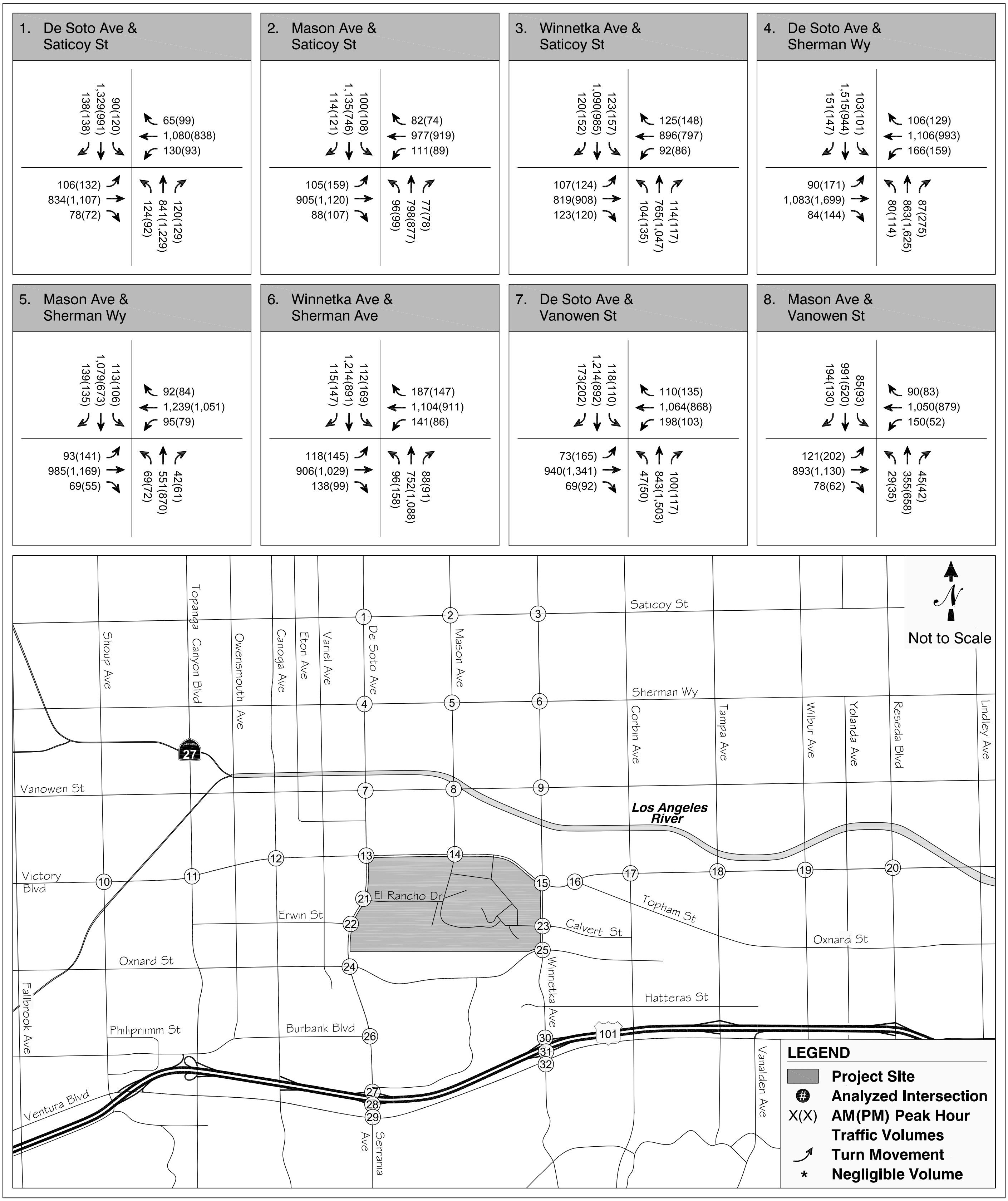
Weekday AM and PM peak period intersection turning movement counts were conducted at the 32 study intersections in 2007 or 2009. To provide a conservative analysis, a growth factor of one percent per year was applied to counts taken in 2007 to reflect 2009 conditions. The existing weekday peak hour turning movement volumes at the analyzed intersections are shown on Figure 3 and the turning movement count sheets are provided in Appendix B.

### Intersection Level of Service Standards and Methodology

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. Level of service definitions for signalized intersections are provided in Table 1.

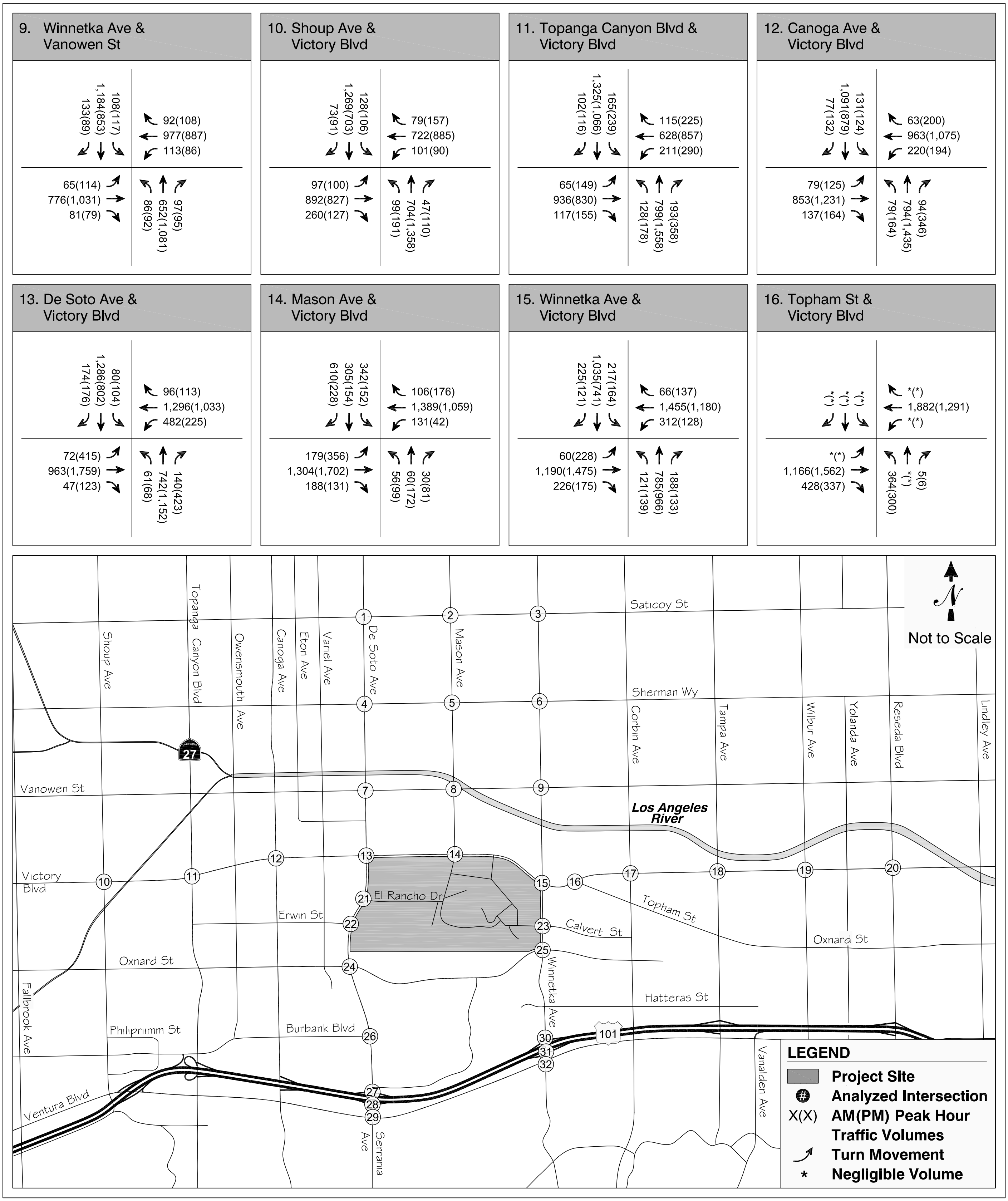
The City of Los Angeles typically uses LOS D as a standard, meaning that LOS D or better is considered to represent satisfactory conditions, while LOS E or F is generally considered to be substandard. The Warner Center Specific Plan establishes LOS E as the minimum acceptable level of service within the Warner Center Specific Plan area (to the west of the Pierce College campus).

All of the study intersections are currently controlled by traffic signals. The City of Los Angeles Department of Transportation (LADOT) requires that the "Critical Movement Analysis" (CMA) method (Transportation Research Board, 1980) of intersection capacity analysis be used to determine the intersection volume to capacity (V/C) ratio and corresponding level of service for the given turning movements and intersection characteristics at signalized intersections. The




**EXISTING (2008-2009)**
**WEEKDAY PEAK HOUR TRAFFIC VOLUMES**

**FIGURE 3**

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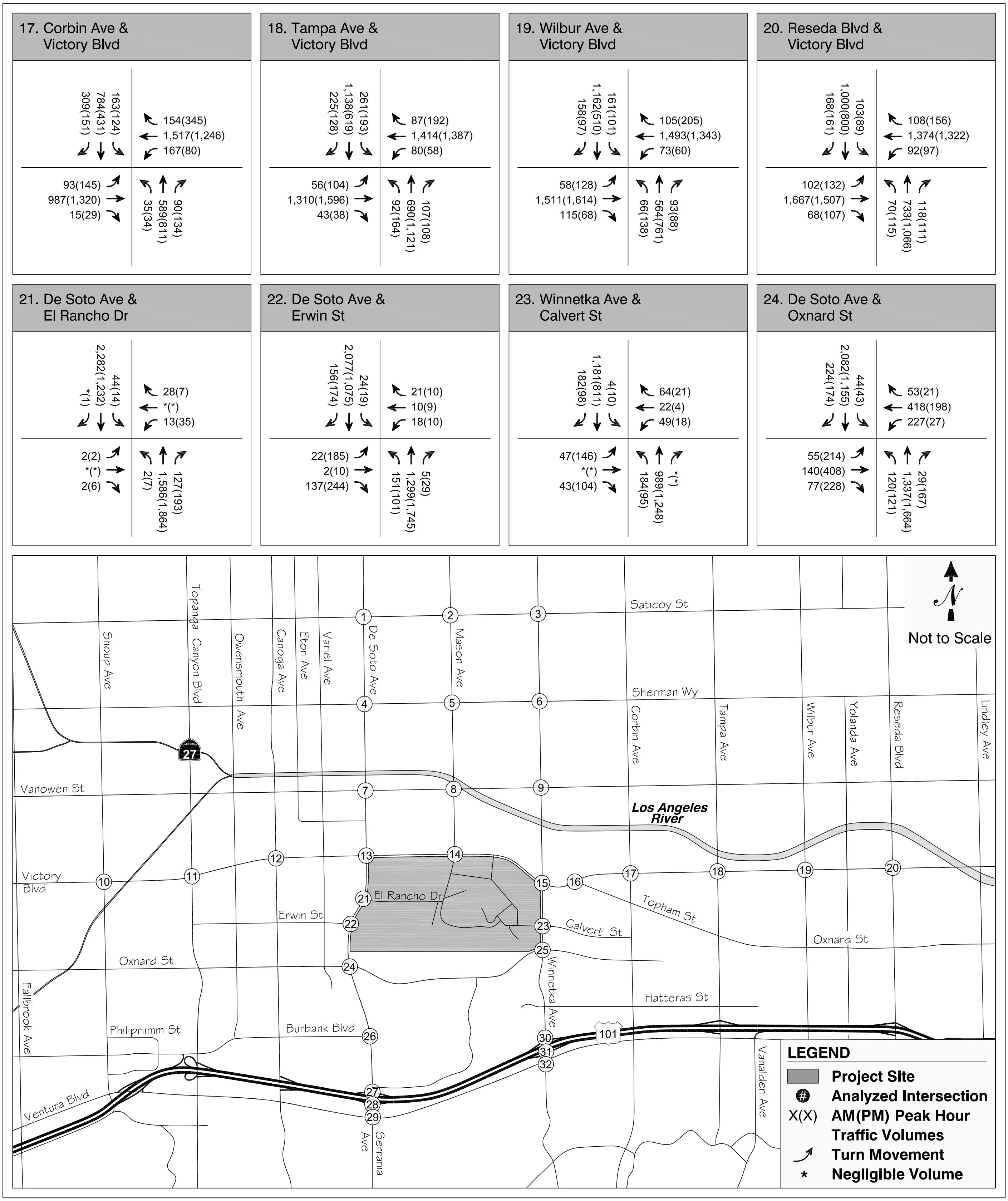
**EXISTING (2008-2009)**
**WEEKDAY PEAK HOUR TRAFFIC VOLUMES**

**FIGURE 3 (CONT.D)**

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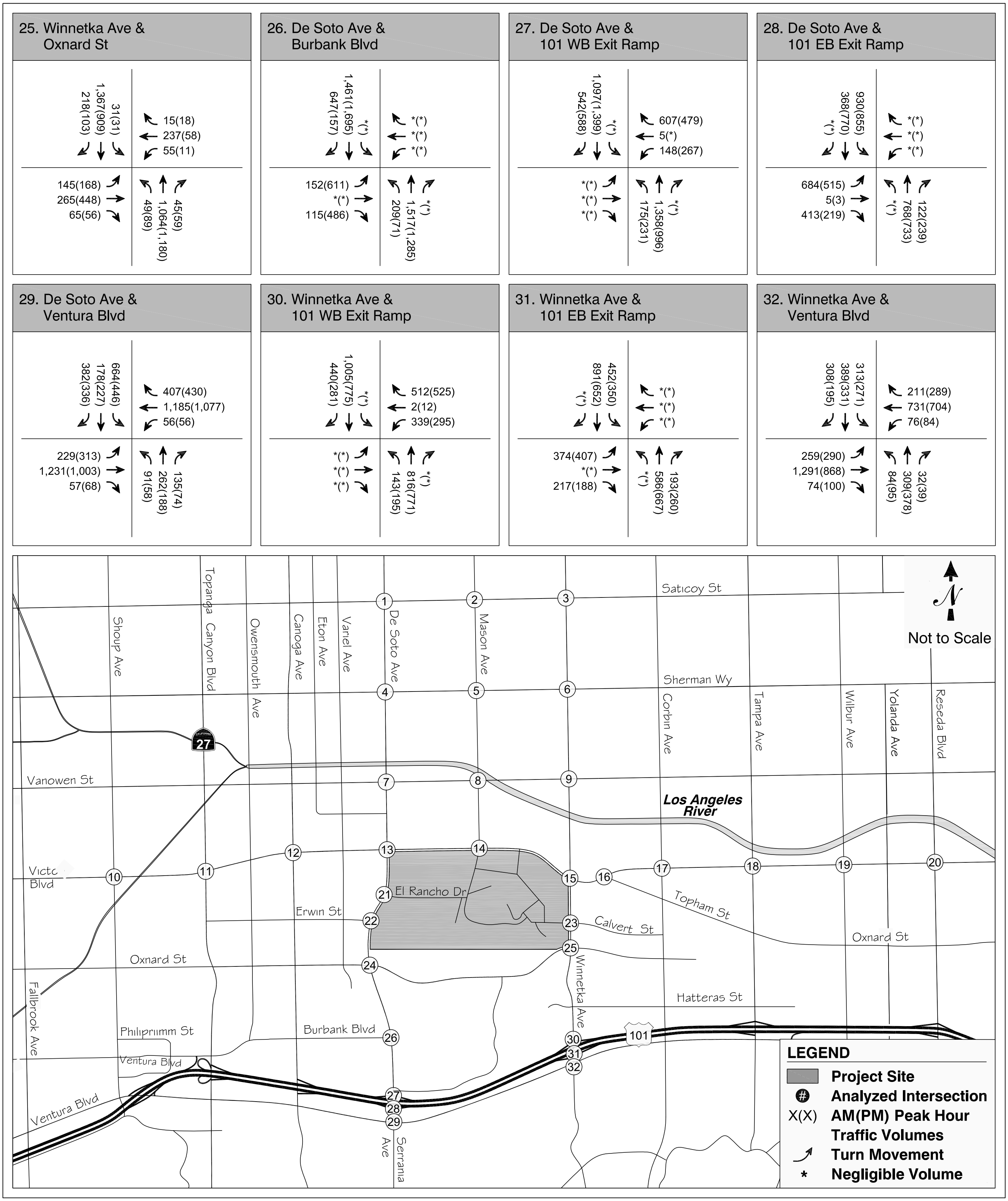
**EXISTING (2008-2009)**
**WEEKDAY PEAK HOUR TRAFFIC VOLUMES**

**FIGURE 3 (CONT.D)**

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**EXISTING (2008-2009)**
**WEEKDAY PEAK HOUR TRAFFIC VOLUMES**

**FIGURE 3 (CONT.D)**

**TABLE 1**
**LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS**

| Level of Service | Intersection Capacity Utilization | Definition |
|---|---|---|
| A | 0.000-0.600 | EXCELLENT. No Vehicle waits longer than one red light and no approach phase is fully used. |
| B | 0.601-0.700 | VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles. |
| C | 0.701-0.800 | GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles. |
| D | 0.801-0.900 | FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups. |
| E | 0.901-1.000 | POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles. |
| F | > 1.000 | FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths. |

Source: *Transportation Research Circular No. 212, Interim Materials on Highway Capacity*, Transportation Research Board, 1980.

CALCADB software package developed by LADOT was used to implement the CMA methodology in this study.

All of the study intersections are currently controlled by the City of Los Angeles' Automated Traffic Surveillance and Control (ATSAC) system. In accordance with LADOT procedures, a capacity increase of 7% (0.07 V/C adjustment) was applied to reflect the benefits of ATSAC control at these intersections. Twenty-seven study intersections (all study intersections except for the three along Saticoy Street and the intersections of Vanowen Street with Mason Avenue and Winnetka Avenue) are currently controlled by the City of Los Angeles' Adaptive Traffic Control System (ATCS) system. In accordance with LADOT procedures, an additional capacity increase of 3% (0.03 V/C adjustment) was applied to reflect the benefits of ATCS control at these 27 intersections. Thus, a capacity increase of 7% was applied to five study intersections and a net capacity increase of 10% was applied at 27 study intersections.

**<u>Existing Peak Hour Intersection Levels of Service</u>**

The existing weekday AM and PM peak hour turning movements shown in Figure 3 were used in conjunction with the level of service methodology described above to determine existing operating conditions at each of the study intersections. Level of service calculation worksheets are included in Appendix C.

Table 2 summarizes the existing AM and PM peak hour V/C ratios and corresponding levels of service at each of the study intersections. As can be seen, 11 of the 32 intersections currently operate at LOS E or F during one or both of the AM and PM peak hours. These intersections are:

- De Soto Avenue & Saticoy Street
- De Soto Avenue & Sherman Way
- De Soto Avenue & Vanowen Street
- Topanga Canyon Boulevard & Victory Boulevard
- De Soto Avenue & Victory Boulevard
- Winnetka Avenue & Victory Boulevard
- Corbin Avenue & Victory Boulevard
- Tampa Avenue & Victory Boulevard
- Wilbur Avenue & Victory Boulevard
- Reseda Avenue & Victory Boulevard
- Winnetka Avenue & Ventura Boulevard

**TABLE 2**
**EXISTING (YEAR 2008-2009) INTERSECTION LEVELS OF SERVICE**

| Intersection | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| | V/C | LOS | V/C | LOS |
| *1. De Soto Av & Saticoy St | 0.870 | D | 0.905 | E |
| *2. Mason Av & Saticoy St | 0.834 | D | 0.789 | C |
| *3. Winnetka Av & Saticoy St | 0.775 | C | 0.823 | D |
| **4. De Soto Av & Sherman Way | 0.735 | C | 0.958 | E |
| **5. Mason Av & Sherman Way | 0.710 | C | 0.627 | B |
| **6. Winnetka Av & Sherman Way | 0.810 | D | 0.814 | D |
| **7. De Soto Av & Vanowen St | 0.815 | D | 0.936 | E |
| *8. Mason Av & Vanowen St | 0.805 | D | 0.681 | B |
| *9. Winnetka Av & Vanowen St | 0.874 | D | 0.875 | D |
| **10. Shoup Av & Victory Blvd | 0.865 | D | 0.874 | D |
| **11. Topanga Canyon Blvd & Victory Blvd | 0.679 | B | 0.910 | E |
| **12. Canoga Av & Victory Blvd | 0.607 | B | 0.861 | D |
| **13. De Soto Av & Victory Blvd | 0.736 | D | 0.904 | F |
| **14. Mason Av & Victory Blvd | 0.652 | C | 0.619 | C |
| **15. Winnetka Av & Victory Blvd | 0.982 | E | 0.912 | E |
| **16. Topham St & Victory Blvd | 0.816 | D | 0.659 | B |
| **17. Corbin Av & Victory Blvd | 0.907 | E | 0.925 | E |
| **18. Tampa Av & Victory Blvd | 0.930 | E | 1.056 | F |
| **19. Wilbur Av & Victory Blvd | 0.975 | E | 0.852 | D |
| **20. Reseda Blvd & Victory Blvd | 0.949 | E | 0.970 | E |
| **21. De Soto Av & El Rancho Dr | 0.429 | A | 0.394 | A |
| **22. De Soto Av & Erwin St | 0.612 | B | 0.451 | A |
| **23. Winnetka Av & Calvert St | 0.545 | A | 0.430 | A |
| **24. De Soto Av & Oxnard St | 0.737 | C | 0.625 | B |
| **25. Winnetka Av & Oxnard St | 0.763 | C | 0.640 | B |
| **26. De Soto Av & Burbank Blvd West | 0.564 | A | 0.583 | A |
| **27. De Soto Av & I-101 WB Ramps | 0.618 | B | 0.649 | B |
| **28. De Soto Av & I-101 EB Ramps | 0.729 | C | 0.583 | A |
| **29. De Soto Av & Ventura Blvd | 0.764 | C | 0.662 | B |
| **30. Winnetka Av & I-101 WB Ramps | 0.553 | A | 0.504 | A |
| **31. Winnetka Av & I-101 EB Ramps | 0.685 | B | 0.666 | B |
| **32. Winnetka Av & Ventura Blvd | 0.885 | D | 0.911 | E |

Notes:
* Intersection is currently operating under ATSAC system.
* *Intersection is currently operating under ATCS system.

The remaining study intersections operate at fair to good levels of service (LOS D or better) during both the AM and PM peak hours.

## EXISTING PUBLIC TRANSIT SERVICE

The Pierce College campus is currently served by bus service provided by the Los Angeles County Metropolitan Transit Authority (Metro) and the Santa Clarita Transit Authority (SCTA). Existing bus routes providing direct service along Victory Boulevard, Winnetka Avenue, and/or De Soto Avenue adjacent to the campus include:

- Metro Orange Line – The Metro Orange Line is a bus rapid transit (BRT) line that operates on a dedicated east-west ROW between the North Hollywood Metro Red Line station and Canoga Park. The line then exits the dedicated ROW and operates on streets, looping through Warner Center to provide service at the Warner Center Transit Hub adjacent to the Promenade, approximately one-half mile from the project site, before re-entering the ROW in the opposite direction. The line operates with average headways[1] of four to five minutes during peak periods.

- Metro Line 164 – Line 164 provides local service along Victory Boulevard between Valley Circle Boulevard, Woodland Hills, Warner Center, Reseda, Van Nuys, North Hollywood and Burbank. Service is provided seven days per week. In the vicinity of the Pierce College campus, Line 164 stops on Victory Boulevard east of Mason Avenue adjacent to Lot 7.

- Metro Line 242/243 – Line 242/243 provides local service between Chatsworth, Canoga Park, Warner Center, Woodland Hills, Winnetka, and Northridge, along a "U" shaped route that includes both Tampa Avenue and Winnetka Avenue. Service is provided six days per week (Monday through Saturday). In the vicinity of Pierce College, Line 242/243 stops on Winnetka Avenue south of Victory Boulevard southbound, on Winnetka Avenue north of Victory Boulevard northbound, north of Brahma Drive/Calvert Street northbound, and south of Brahma Drive/Calvert Street southbound.

- Metro Line 244/245 – Line 244/245 provides local service between Chatsworth, Canoga Park, Warner Center, and Woodland Hills along a "U" shaped route that includes both De Soto Avenue and Topanga Canyon Boulevard. Service is provided seven days per week. In the vicinity of Pierce College, Line 244/245 stops on De Soto Avenue south of Victory Boulevard southbound, north of El Rancho Drive northbound, and south of El Rancho Drive southbound.

- SCTA Commuter Route 796 – This line provides limited stop service between Santa Clarita and Warner Center. Service is provided Monday through Friday only, with five runs traveling inbound from Santa Clarita to Warner Center in the morning peak period and five

[1] Headways are the time between buses arriving at a particular bus stop. In this case, four minute headways means that a bus comes by each stop along this bus route once every four minutes.

runs traveling outbound from Warner Center to Santa Clarita in the evening peak period. Route 791/796 travels along De Soto Avenue in the vicinity of Pierce College.

The paths of the transit routes near Pierce College are shown in Figure 4.

**PIERCE COLLEGE CAMPUS ACCESS AND INTERNAL CIRCULATION SYSTEM**

Vehicular access to the Pierce College campus is provided at four locations:

- <u>Brahma Drive</u> - Brahma Drive is an internal street providing access from Winnetka Avenue on the east side of the campus. Brahma Drive intersects Winnetka Avenue opposite Calvert Street, and its intersection with Winnetka Avenue/Calvert Street is controlled by a traffic signal. On campus, Brahma Drive provides access to Lot 1 and connects to Stadium Way, which in turn ultimately connects to Mason Street.

- <u>Mason Street</u> - Mason Street is an internal street providing access from Victory Boulevard on the north side of the campus. Mason Street intersects Victory Boulevard opposite Mason Avenue, and its intersection with Victory Boulevard is signalized. On campus, Mason Street provides access to Lot 7. It then intersects with Olympic Drive and El Rancho Drive and continues as Stadium Way, ultimately connecting with Brahma Drive.

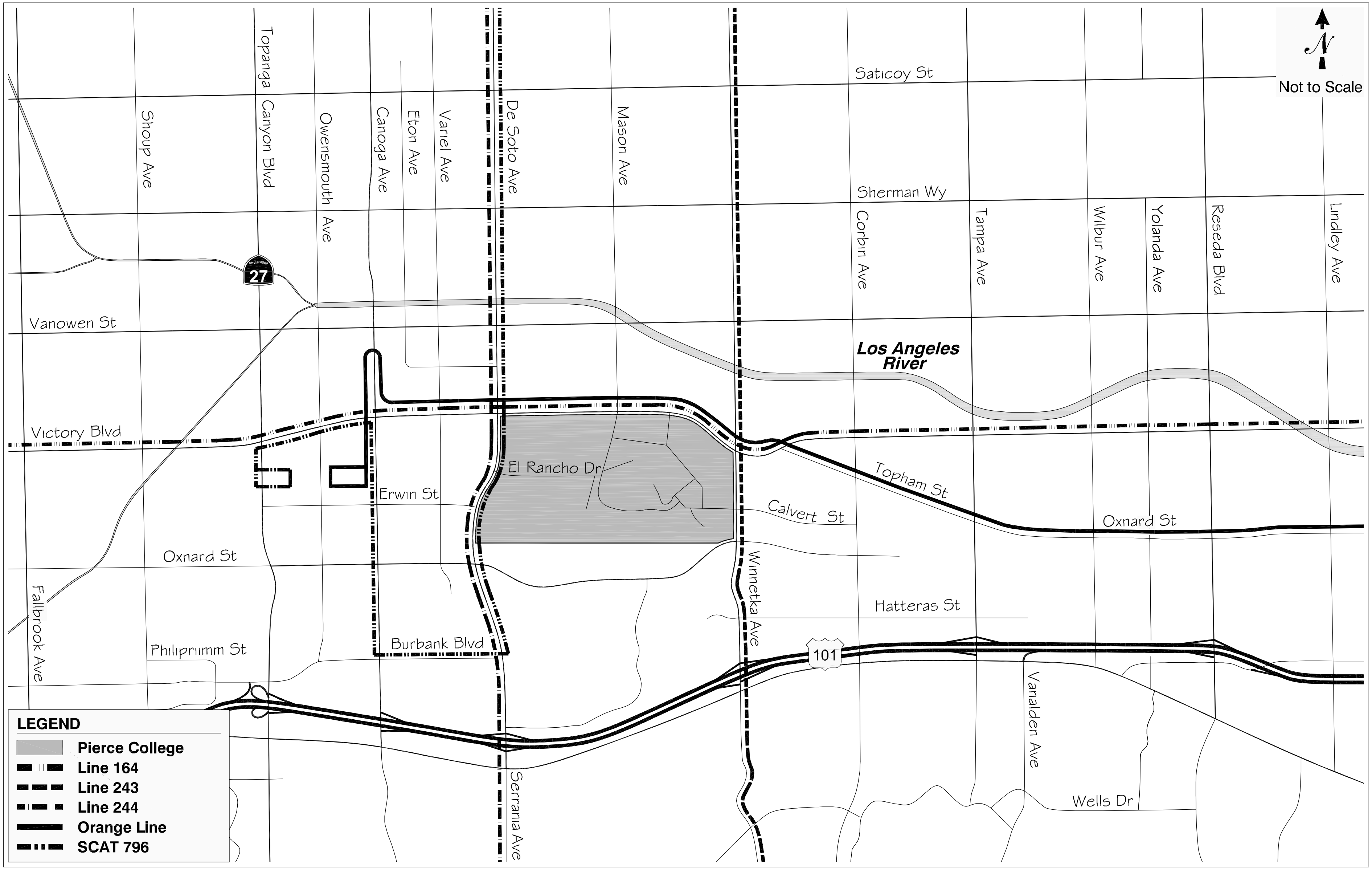
- <u>El Rancho Drive</u> - El Rancho Drive is an internal street providing access from a signalized intersection with De Soto Avenue on the west side of the campus. On campus, El Rancho Drive connects to Mason Street/Stadium Way.

- <u>Lot 7 Driveway</u> - In addition to the three signalized access points described above, there is an unsignalized driveway from parking Lot 7 directly onto Victory Boulevard, east of Mason Avenue.

Additional internal streets providing circulation on the campus include:

- <u>Olympic Drive</u> - Olympic Drive runs along the south side of Lot 7 and has a security gate at the east end of the lot. Beyond the security gate, it continues into the campus core, becoming part of the internal system with a second gate near the sheriff substation.

- <u>Stadium Way</u> - Stadium Way is the primary through route around the south side of the campus core. It connects Brahma Drive with Mason Street and El Rancho Drive, and provides access to Shepard Stadium and several student parking lots.

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**EXISTING TRANSIT SERVICE**

**FIGURE 4**

## EXISTING PIERCE COLLEGE PARKING CONDITIONS

Parking is a critical component of Piece College's transportation system since the majority of students, faculty, staff, and visitors access the campus by vehicle. This section discusses the existing campus parking supply and compares it to the existing demand for parking in order to assess the ability of the current parking supply to serve the campus community.

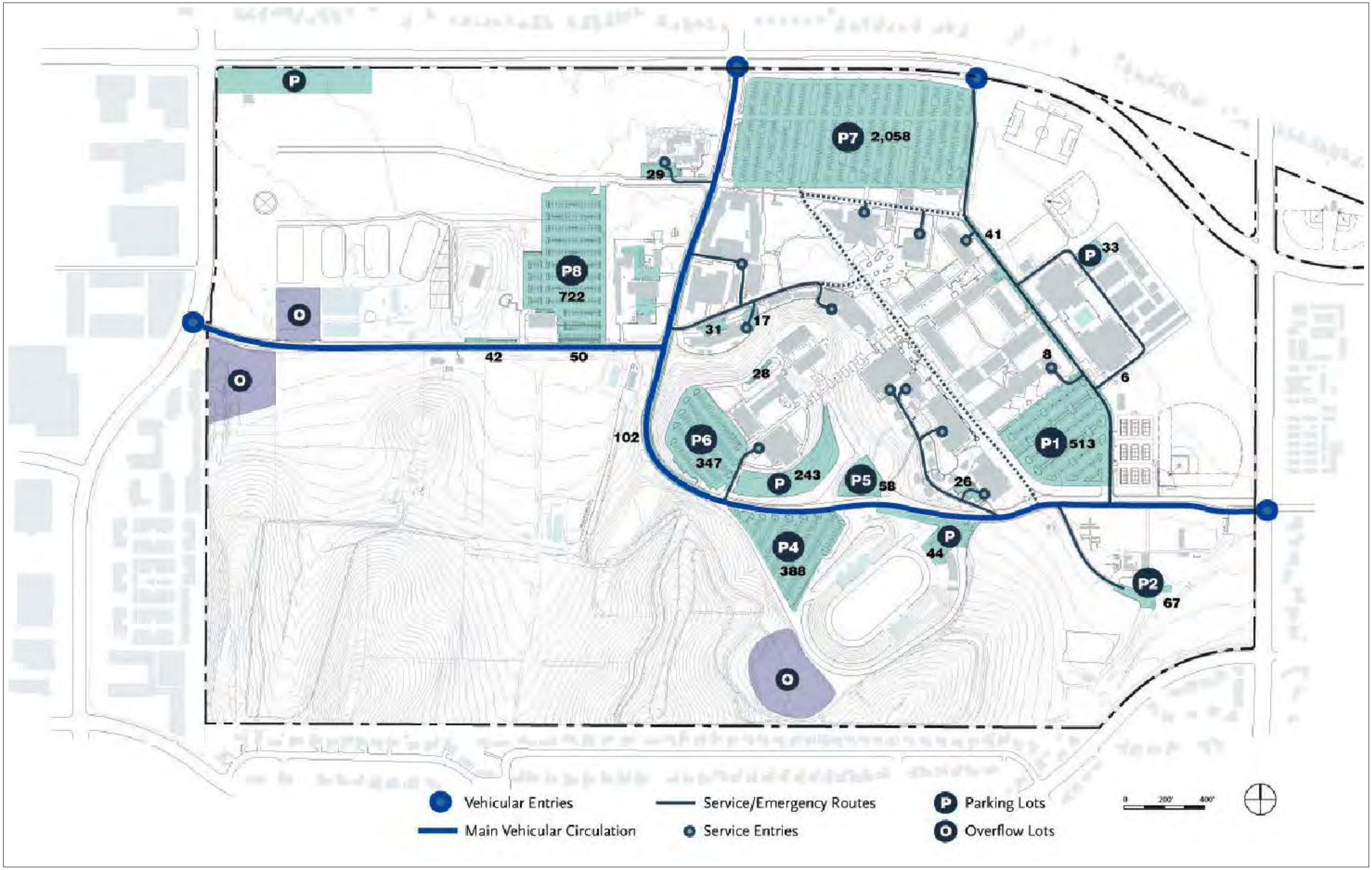
### Existing Campus Parking Supply

This section describes the current inventory of parking on the Pierce College campus, including location, amount, and type of existing parking. This information was either provided by the college, gathered through field investigation, or both. Specifically, the field investigation involved counting the number and type of spaces at each campus lot and adjacent on-street parking locations in spring 2009.

Parking for the Pierce College community is provided in numerous surface parking lots and street parking on adjacent frontages of Victory Boulevard and Winnetka Avenue. The locations of these lots are illustrated in Figure 5. As summarized in Table 3, a total of approximately 3,719 parking spaces are available on the campus in seven major student lots and numerous smaller lots. This includes about 3,138 spaces in student or undesignated lots (including approximately 85 unmarked parking spaces in dirt parking areas) and 581 spaces in designated staff lots. The seven major student lots range in size from about 45 spaces in Lot 3 to 1,127 spaces in Lot 7 (the large lot adjacent to Victory Boulevard).

Access to the student lots is physically unrestricted, although students are required to purchase a pass to use these spaces. Access to the staff lots is typically controlled by security gates and is restricted to faculty, staff, and visitors with passes.

In addition to the on-campus parking supply, it is estimated that there are approximately 271 off-campus curbside unmarked parking spaces along Victory Boulevard and Winnetka Avenue immediately adjacent to the campus. This includes about 45 spaces on the west side of Winnetka Avenue between Victory Boulevard and Brahma Drive/Calvert Street, about 114 spaces on the south side of Victory Boulevard between Mason Avenue and Winnetka Avenue, and about 112 spaces on the south side of Victory Boulevard between De Soto Avenue and Mason Avenue.

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**LOCATIONS OF EXISTING PARKING FACILITIES SERVING PIERCE COLLEGE CAMPUS**

**FIGURE 5**

## TABLE 3
## EXISTING PIERCE COLLEGE PARKING INVENTORY BY LOT

| Map # | Location/ Description | Use | Type | # of Parking Spaces | Inventory Notes |
|---|---|---|---|---|---|
| ***ON-CAMPUS PARKING*** | | | | | |
| 1 | Parking Lot 1 | Staff & Student Parking | Lot | 448 | |
| 2 | Parking Lot 2 & Dirt Parking | Staff & Student Parking | Lot | 58 | 33 student spaces, 5 faculty spaces, and 20 estimated dirt spaces. |
| 3 | Parking Lot 3 | Student Parking | Lot | 45 | |
| 4 | Parking Lot 4 | Student Parking | Lot | 411 | |
| 5 | Parking Lot 5 | Staff Parking | Lot | 68 | |
| 6A | Parking Lot 6 West | Student Parking | Curb/Lot | N/A | This lot was closed at the time parking counts were conducted. |
| 6B | Parking Lot 6 East | Staff & Student Parking | Dirt Lot | 208 | 21 Faculty spaces and 187 student spaces. |
| 7 | Parking Lot 7 | Staff & Student Parking | Lot | 1,286 | |
| 8 | Parking Lot 8 | Staff & Student Parking | Lot | 695 | 14 faculty spaces and 681 student spaces |
| 9 | Parking Lot 9 | Student Parking | Lot | 150 | |
| 10 | Curb Parking NS of El Rancho Drive South of Lot 8 | Student Parking | Curb | 71 | 30 unmarked spaces estimated at time of counts |
| 11 | ES of Mason Street South of Victory Boulevard | Student Parking | Curb | 27 | |
| 12 | Staff Parking WS of Olympic Drive near North Gym | Staff Parking | Curb | 35 | |
| 13 | Staff Parking Lot West of Olympic Drive near Chemistry | Staff Parking | Lot | 2 | |
| 14 | Staff Parking Lot West of Olympic Drive near Computer Science | Staff Parking | Lot | 4 | |
| 15 | Staff Parking East of North Gym | Staff Parking | Lot | 45 | |
| 16 | Staff Parking East of Pool | Staff Parking | Lot | 6 | |
| 17 | Staff Parking East of South Gym | Staff Parking | Lot | 3 | |
| 18 | Staff Parking South of Industrial Technology | Staff Parking | Lot | 33 | |
| 19 | Staff Parking near Anthropology | Staff Parking | Curb | 6 | |
| 20 | Curb Parking Stadium Way South of El Rancho Drive | Student Parking | Curb | 79 | |
| 21 | Curb Parking Stadium Way North of Lot 4 | Student Parking | Curb | 20 | |
| 22 | Student Parking South of South Gym | Student Parking | Lot | 15 | |
| 23 | Curb Parking North of Lot 1 | Staff Parking | Curb | 4 | |
| | **ON-CAMPUS SUBTOTAL** | | | **3,719** | |
| | **Estimated Spaces in Unmarked Dirt Lots** | | | **85** | |
| | **On-Campus Subtotal not including Dirt Spaces** | | | **3,634** | |

## TABLE 3
## EXISTING PIERCE COLLEGE PARKING INVENTORY BY LOT

| Map # | Location/ Description | Use | Type | # of Parking Spaces | Inventory Notes |
|---|---|---|---|---|---|
| ***OFF-CAMPUS (ADJACENT STREET) PARKING*** | | | | | |
| 24 | Parking on South Side of Victory Blvd., De Soto to Mason | General Parking | Curb | 112 | Spaces unmarked, number estimated. |
| 25 | Parking on South Side of Victory Blvd., Mason to Winnetka | General Parking | Curb | 114 | Spaces unmarked, number estimated. |
| 26 | Parking on West Side of Winnetka Ave., Victory to Calvert | General Parking | Curb | 45 | Spaces unmarked, number estimated. |
| | **OFF-CAMPUS SUBTOTAL** | | | **271** | |
| ***GRAND TOTAL ON- AND OFF-CAMPUS PARKING*** | | | | | |
| | **TOTAL SPACES** | | | **3,990** | |

Note: Parking inventory conducted February 2002.

## Existing Campus Parking Demand

A parking utilization survey was conducted as part of this study on Wednesday, April 29, 2009, to assess the utilization of the various parking facilities throughout a typical weekday with school in session. The survey was conducted during the twelfth week of classes in the Spring 2009 semester, after campus activity levels had stabilized. The survey was conducted hourly throughout the day from 8:00 AM to 7:00 PM in each of the on-campus parking facilities as well as the adjacent street parking.

Table 4 summarizes the results of the utilization survey. As can be seen, a maximum of 2,726 parking spaces were observed to be utilized at 12:00 PM, including 2,570 on-campus spaces and 156 off-campus/on-street spaces. Figure 6 illustrates the hourly variation of existing parking demand for the entire campus parking system.

The peak demand-to-supply ratio for the entire system is around 68% at 12:00 PM. The morning hours between 10:00 AM and 12:00 noon experience the highest demand levels, ranging from 64% to 68% of the spaces utilized. The 7:00 PM hour, with 53% of the spaces utilized, is the fifth highest demand hour of the day, due to relatively high attendance at evening classes.

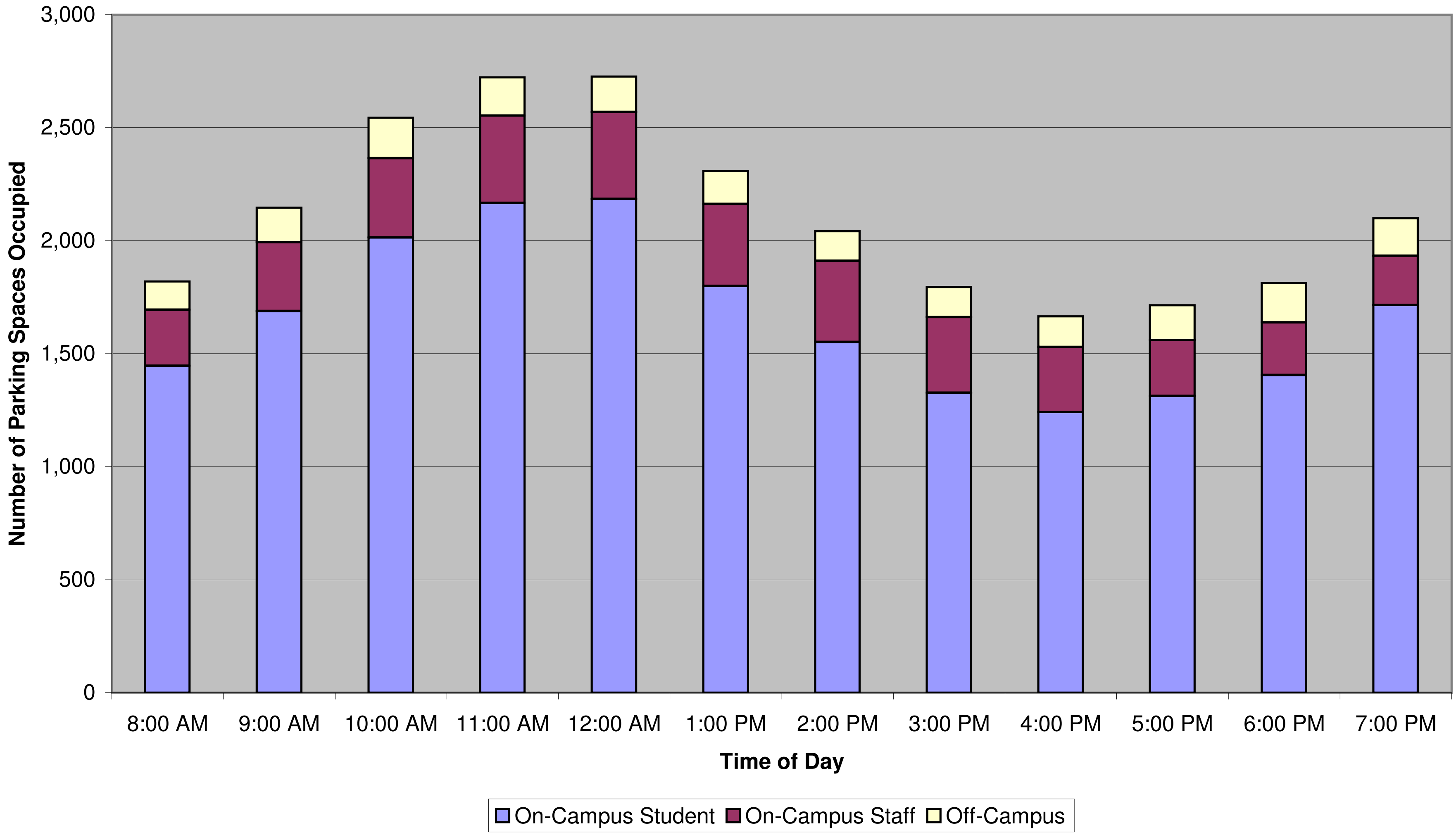
Typically, demand/supply ratios of 85% to 90% are considered to indicate a fully-utilized parking supply. A parking area would be considered effectively full despite the 10% to 15% remaining capacity since the time to find an empty space would be excessive. Since utilization of the existing Pierce College parking system currently peaks at about 68%, there is presently a substantial amount of excess capacity in the system as a whole. Certain individual lots, however, have demand/supply ratios of greater than 90% at certain times of the day, including student Lots 1, 3, and 7 (see Appendix D for details of the utilization survey results by parking lot).

**TABLE 4**
**SUMMARY OF EXISTING PIERCE COLLEGE PARKING INVENTORY AND UTILIZATION**
**Wednesday, April 29, 2009**

| | Inventory (# of Spaces) | Number and Percent of Parking Spaces Occupied by Time of Day | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM |
| ***Number of Spaces Occupied*** | | | | | | | | | | | | | |
| On-Campus: | | | | | | | | | | | | | |
| Student Lots | 3,138 [a] | 1,446 | 1,688 | 2,014 | 2,167 | 2,185 | 1,799 | 1,552 | 1,327 | 1,241 | 1,313 | 1,405 | 1,715 |
| Staff Lots | 581 | 248 | 305 | 351 | 386 | 385 | 363 | 359 | 334 | 288 | 247 | 233 | 218 |
| Subtotal | 3,719 [a] | 1,694 | 1,993 | 2,365 | 2,553 | 2,570 | 2,162 | 1,911 | 1,661 | 1,529 | 1,560 | 1,638 | 1,933 |
| Off-Campus | 271 [b] | 125 | 153 | 179 | 170 | 156 | 145 | 131 | 134 | 136 | 154 | 174 | 166 |
| Total | 3,990 | 1,819 | 2,146 | 2,544 | 2,723 | 2,726 * | 2,307 | 2,042 | 1,795 | 1,665 | 1,714 | 1,812 | 2,099 |
| ***Percent of Spaces Occupied*** | | | | | | | | | | | | | |
| On-Campus: | | | | | | | | | | | | | |
| Student Lots | | 46% | 54% | 64% | 69% | 70% | 57% | 49% | 42% | 40% | 42% | 45% | 55% |
| Staff Lots | | 43% | 52% | 60% | 66% | 66% | 62% | 62% | 57% | 50% | 43% | 40% | 38% |
| Subtotal | | 46% | 54% | 64% | 69% | 69% | 58% | 51% | 45% | 41% | 42% | 44% | 52% |
| Off-Campus | | 46% | 56% | 66% | 63% | 58% | 54% | 48% | 49% | 50% | 57% | 64% | 61% |
| Total | | 46% | 54% | 64% | 68% | 68% * | 58% | 51% | 45% | 42% | 43% | 45% | 53% |

Notes:
- * Denotes peak demand.
- a. On-campus inventory includes approximately 65 unmarked parking spaces in dirt parking lots.
- b. Approximate number of on-street spaces immediately fronting campus along south side of Victory Boulevard and west side of Winnetka Avenue.

**FIGURE 6**
**EXISTING PIERCE COLLEGE PARKING UTILIZATION BY TIME OF DAY**
**Wednesday, April 29, 2009**



## III. FUTURE TRAFFIC PROJECTIONS

In order to properly evaluate potential impacts of the proposed project on the street system, it was necessary to develop estimates of future traffic conditions in the study area both with and without the project. Future traffic volumes were first estimated for the study area without the project. These future forecasts reflect traffic increases due to general regional growth and traffic expected to be generated by other specific developments in the vicinity of the project and represent cumulative base (no project) conditions. Incremental project traffic was then estimated and separately assigned to the surrounding street system. The sum of the cumulative base and project-generated traffic represents the Cumulative plus Project conditions. Development of each of these future traffic scenarios is described in this chapter.

### CUMULATIVE BASE TRAFFIC PROJECTIONS

The cumulative base traffic projections reflect growth in traffic over existing conditions from two primary sources, including growth in the existing traffic volumes to reflect the effects of overall regional growth and development outside of the study area and traffic generated by specific related projects within, or in the vicinity of, the study area. In addition, trips generated by population growth on the Pierce College campus between the 2002 base year and current Year 2009 conditions have been estimated and removed from the 2015 baseline. These factors are described below.

#### **Areawide Traffic Growth**

The background regional growth in traffic was estimated by adjusting the existing traffic volumes upwards using a growth factor. A factor of 1% per year was used in this analysis, based on general traffic volume growth factors suggested in *2004 Congestion Management Program for Los Angeles County* (Los Angeles County Metropolitan Transportation Authority, July 2004) for the San Fernando Valley. Using this growth rate, the existing (year 2009) traffic volumes were adjusted upwards by 6% to reflect six years of regional growth from 2009 to 2015. The existing plus ambient growth weekday peak hour turning movement volumes at the analyzed intersections are shown in Figure 7.

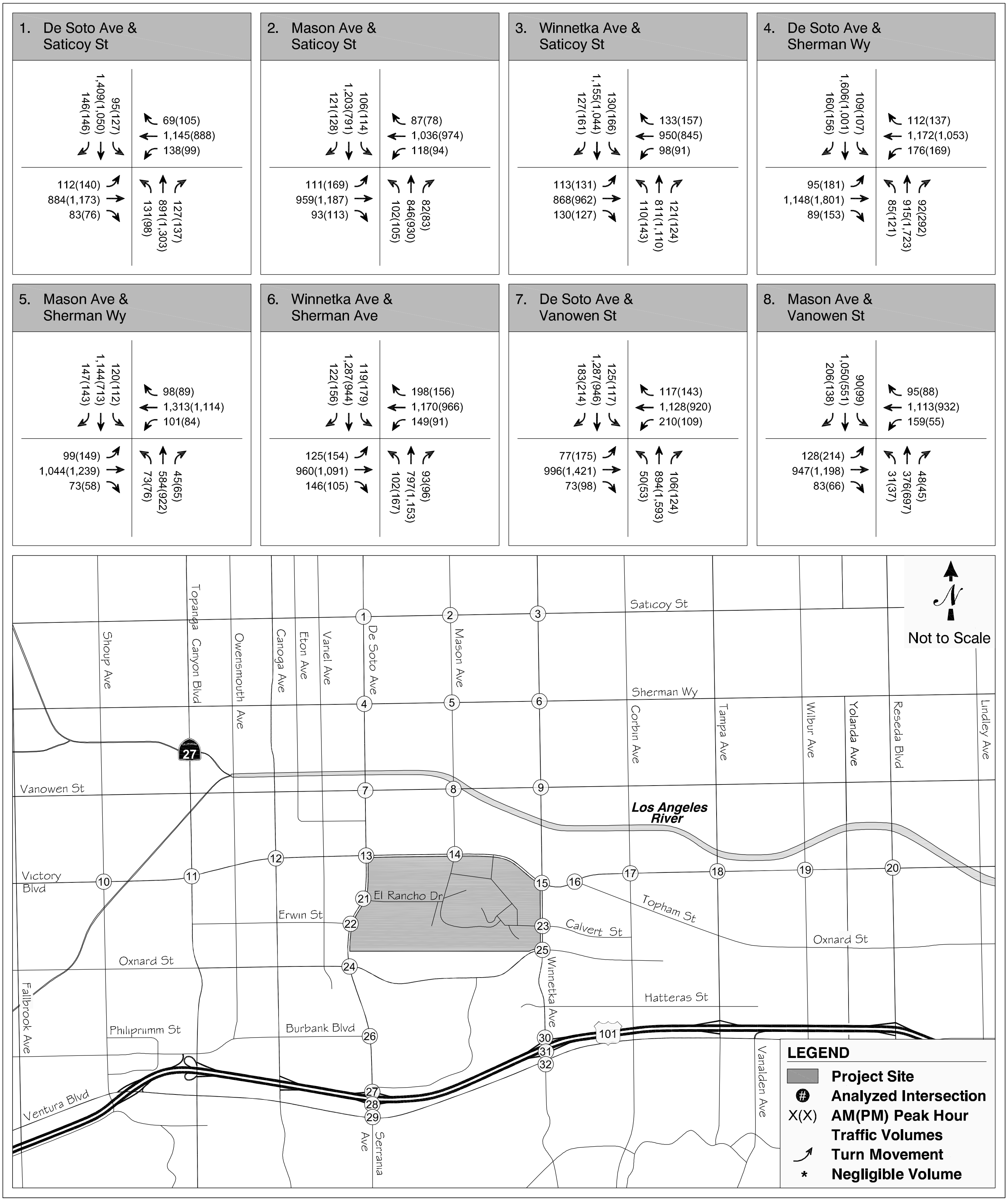
**Cumulative Development Projects**

Traffic expected to be generated by specific development projects within, or with the potential to affect, the study was also considered. Information regarding future projects that are either under construction, planned, or proposed for development was obtained from the City of Los Angeles Department of Transportation (LADOT). A total of 32 related projects were identified for inclusion in the analysis. The locations of these projects are illustrated in Figure 8 and the estimated trip generation for each is listed in Table 5. Trip generation estimates for the related projects were provided by LADOT. The weekday peak hour turning movement volumes representing related project only volumes at the analyzed intersections are shown on Figure 9.

The geographic distribution of traffic generated by developments such as those included in the analysis is dependent on several factors. These factors include the type and density of the proposed land uses, the geographic distribution of the population from which employees and/or patrons of the proposed development are drawn, and the location of the project in relation to the surrounding street system. Trip distribution patterns for each related project were developed based on the above factors.

**Pierce College Baseline Adjustment**

In 2002 an environmental review was conducted to analyze the potential environmental impacts of the proposed Pierce College Facilities Master Plan (*Traffic and Parking Study for the Pierce College Facilities Master Plan Environmental Impact Report*, Kaku Associates, 2002). The scheduled buildout year for that project was 2010. The Pierce College Master Plan evaluated in 2002 is being updated and analyzed in this document. To accurately analyze the entire project, this analysis is analyzing a 2015 cumulative base that replicates conditions based on 2002 FTE. In addition to ambient growth and related projects, the incremental project trips generated by the project based on changes in FTE between 2002 and 2009 have been removed from the street

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# EXISTING PLUS AMBIENT WEEKDAY PEAK HOUR TRAFFIC VOLUMES

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**FIGURE 7**