DRAFT INITIAL STUDY AND
MITIGATED NEGATIVE DECLARATION

GREENFIELD UNION SCHOOL DISTRICT

CRESCENT ELEMENTARY SCHOOL CONSTRUCTION PROJECT

OCTOBER 2019

DRAFT INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION

CRESCENT ELEMENTARY SCHOOL CONSTRUCTION PROJECT

Prepared for:

Greenfield Union School District
1624 Fairview Road
Bakersfield, CA 93309
Contact Person: Jesse Avalos,
Director of Maintenance
Phone: (661) 837-6000

Consultant:

5080 California Avenue, Suite 220
Bakersfield, CA 93309
Contact: Jaymie Brauer, Principal Planner
Phone: (661) 616-2600

Project #190284

GREENFIELD UNION SCHOOL DISTRICT

1624 Fairview Road
Bakersfield, CA 93307
Phone: (661) 837-6000
Fax: (661) 832-2873
www.gfusd.net

Ramon Hendrix, Superintendent

Sarah Dawson
Assistant Superintendent of Curriculum

Lucas Hogue
Assistant Superintendent of Personnel

Vicki Norman
Assistant Superintendent of Business

October 31, 2019

ADDRESSEE LIST (See Distribution List)

Re: **Crescent Elementary School Construction Project**.

Dear Interested Party:

Greenfield Union School District (as lead agency) is proposing to construct and operate a new elementary (Project), within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. The elementary school campus will occupy an approximately 23-acre portion of a 49.5-acre parcel. There will be multiple buildings, with an approximate area totaling almost 74,000 square feet (sq. ft.). The school will be completed in phases, with the first phase constructing: an administrative building, a cafeteria/multipurpose room, and 31 classrooms. The initial enrollment capacity will be 750 students with a potential to expand up to 1,080 students. The Project site would be primarily accessed from E Panama Lane. The school campus site will be annexed into the City of Bakersfield and connect to the City of Bakersfield's water and sewer systems.

The project site is located within Section 29, Township 30 South, Range 28 East, Mount Diablo Base and Meridian (MDB&M), within the Lamont U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle. The site encompasses approximately 23-acre portion of Assessor's Parcel Number (APN) 518-030-22. The Project site is located on the southwest of Cottonwood Road and East Panama Lane.

The enclosed Initial Study/ Mitigated Negative Declaration (IS/MND) is intended to fulfill the requirements under the California Environmental Quality Act (CEQA) and to inform all responsible and trustee agencies, as well as, the public about the Project's nature and scope under CEQA. The lead agency has determined that preparation of an IS/MND would be appropriate for the referenced project.

Please make your comments to the attention of:
Jaymie L. Brauer (jaymie.brauer@qkinc.com)
Quad Knopf, Inc.
5080 California Avenue, Suite 220
Bakersfield, CA 93309

If we have not received a reply from you by **November 29, 2019, at 5:00 P.M.**, we will assume that you have no comments regarding this draft Mitigated Negative Declaration. The Greenfield Union School District Board of Trustees will consider the approval of this project at a board meeting to be held in the Board Room at the Greenfield Union District Administrative Office, 1624 Fairview Road, Bakersfield, CA 93307 on **Wednesday, December 11, 2019, at 5:30 P.M.**

NOTICE OF PUBLIC HEARING AND INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

This is to advise that the Greenfield Union School District (GUSD) has prepared a Mitigated Negative Declaration for the Project identified below that is scheduled to be held at the Greenfield Union School District – Board of Trustees meeting on Wednesday, **December 11, 2019**.

PLEASE BE ADVISED that the Greenfield Union School District – Board of Trustees will consider adopting the Mitigated Negative Declaration at the Board's meeting to be held on December 11, 2019. Presentations will be made at approximately 5:30 p.m. Action on items on the Board agenda will occur after the presentations. The meeting will be held in the District Office Board Room, Greenfield Union School District, 1624 Fairview Road, Bakersfield, CA 93307.

Project Name

Crescent Elementary School Construction Project

Project Location

Southwest corner of East Panama Lane and Cottonwood Road, Bakersfield, CA.

Project Description

The Greenfield Union School District (GUSD or District, as lead agency) has proposed to construct and operate a new elementary school (Project), within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. The school campus site will be annexed into the City of Bakersfield and connect to the City of Bakersfield's water and sewer systems. The elementary school campus will occupy an approximately 23-acre portion of a 49.5-acre parcel. There will be multiple buildings, with an approximate area totaling almost 74,000 square feet (sq. ft.). The school will be completed in phases, with the first phase constructing: an administrative building, a cafeteria/multipurpose room, and 31 classrooms. The initial enrollment capacity will be 750 students with a potential to expand up to 1,080 students.

It is anticipated that new residential development in the metropolitan Bakersfield area would exacerbate the existing overcrowding conditions without the addition of a new school. The construction of the new school would help alleviate the problem of current overcrowding and is designed to provide an elementary school for future students as the population within the District grows. The school campus site will be annexed into the City of Bakersfield and connect to the City of Bakersfield's water and sewer systems.

The document and documents referenced in the Initial Study/Mitigated Negative Declaration are available for review at Greenfield Union School District, 1624 Fairview Road, Bakersfield, CA 93309, and at the Kern County Beale Memorial Library located at 701 Truxtun Avenue Bakersfield, CA 93301.

As mandated by the California Environmental Quality Act (CEQA), the public review period for this document was 30 days (CEQA Section 15073[b]). The public review period began on October 31, 2019 and ended on November 29, 2019. For further information, please contact Jaymie Brauer at 661-616-2600.

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Crescent Elementary School Construction Project

Lead Agency: Greenfield Union School District
Contact Person: Jesse Avalos
Mailing Address: 1624 Fairview Road
Phone: (661) 837-6000
City: Bakersfield
Zip: 93309
County: Kern

Project Location: County: Kern
City/Nearest Community: Bakersfield
Cross Streets: East Panama Lane and Cottonwood Road
Zip Code: 93307
Longitude/Latitude (degrees, minutes and seconds): 35 ° 17 ′ 39.4 ″ N / 116 ° 69 ′ 22.2 ″ W Total Acres: 49.5
Assessor's Parcel No.: 518-030-22
Section: 29 Twp.: 230S Range: 28E Base: MDB&M
Within 2 Miles: State Hwy #: N/A
Waterways: Central Branch Kern Island Canal
Airports: N/A
Railways: N/A
Schools: Multiple

Document Type:

CEQA:
- ☐ NOP
- ☐ Early Cons
- ☐ Neg Dec
- ☒ Mit Neg Dec
- ☐ Draft EIR
- ☐ Supplement/Subsequent EIR
- (Prior SCH No.) ______
- Other: ______

NEPA:
- ☐ NOI
- ☐ EA
- ☐ Draft EIS
- ☐ FONSI

Other:
- ☐ Joint Document
- ☐ Final Document
- ☐ Other: ______

Local Action Type:

- ☐ General Plan Update
- ☐ General Plan Amendment
- ☐ General Plan Element
- ☐ Community Plan
- ☐ Specific Plan
- ☐ Master Plan
- ☐ Planned Unit Development
- ☐ Site Plan
- ☐ Rezone
- ☐ Prezone
- ☐ Use Permit
- ☐ Land Division (Subdivision, etc.)
- ☐ Annexation
- ☐ Redevelopment
- ☐ Coastal Permit
- ☒ Other: School Development

Development Type:

- ☐ Residential: Units ______ Acres ______
- ☐ Office: Sq.ft. ______ Acres ______ Employees ______
- ☐ Commercial: Sq.ft. ______ Acres ______ Employees ______
- ☐ Industrial: Sq.ft. ______ Acres ______ Employees ______
- ☒ Educational: 750 Students, ability to expand to 1,080
- ☐ Recreational: ______
- ☐ Water Facilities: Type ______ MGD ______
- ☐ Transportation: Type ______
- ☐ Mining: Mineral ______
- ☐ Power: Type ______ MW ______
- ☐ Waste Treatment: Type ______ MGD ______
- ☐ Hazardous Waste: Type ______
- ☐ Other: ______

Project Issues Discussed in Document:

- ☒ Aesthetic/Visual
- ☒ Agricultural Land
- ☒ Air Quality
- ☒ Archeological/Historical
- ☒ Biological Resources
- ☐ Coastal Zone
- ☒ Drainage/Absorption
- ☐ Economic/Jobs
- ☐ Fiscal
- ☒ Flood Plain/Flooding
- ☒ Forest Land/Fire Hazard
- ☒ Geologic/Seismic
- ☒ Minerals
- ☒ Noise
- ☒ Population/Housing Balance
- ☒ Public Services/Facilities
- ☒ Recreation/Parks
- ☒ Schools/Universities
- ☒ Septic Systems
- ☒ Sewer Capacity
- ☒ Soil Erosion/Compaction/Grading
- ☒ Solid Waste
- ☒ Toxic/Hazardous
- ☒ Traffic/Circulation
- ☒ Vegetation
- ☒ Water Quality
- ☒ Water Supply/Groundwater
- ☒ Wetland/Riparian
- ☒ Growth Inducement
- ☒ Land Use
- ☐ Cumulative Effects
- ☐ Other: ______

Present Land Use/Zoning/General Plan Designation:
Vacant land in an Exclusive Agriculture (A); Resource- Intensive Agriculture (R-IA) general plan designation

Project Description: *(please use a separate page if necessary)*

See following page.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Crescent Elementary School Construction Project Description

Greenfield Union School District is proposing to construct and operate an elementary school (Project) within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. The elementary school campus will occupy approximately 23 acres of the Project site. There will be multiple buildings, with an approximate area totaling almost 74,000 square feet (sq. ft.). The school will be completed in phases, with the first phase constructing: an administrative building, a cafeteria/multipurpose room, and 31 classrooms. The initial enrollment capacity will be 750 students with a potential to expand up to 1,080 students. Approximately 52 staff parking spaces and 100 visitor parking spaces will be provided. The site would be primarily accessed from Panama Lane on the northern Project boundary.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

X Air Resources Board
___ Boating & Waterways, Department of
___ California Emergency Management Agency
X California Highway Patrol
X Caltrans District # 6
X Caltrans Division of Aeronautics
___ Caltrans Planning
___ Central Valley Flood Protection Board
___ Coachella Valley Mtns. Conservancy
___ Coastal Commission
___ Colorado River Board
X Conservation, Department of
___ Corrections, Department of
___ Delta Protection Commission
X Education, Department of
___ Energy Commission
X Fish & Game Region # 4
___ Food & Agriculture, Department of
___ Forestry and Fire Protection, Department of
___ General Services, Department of
___ Health Services, Department of
___ Housing & Community Development
X Native American Heritage Commission
X Office of Historic Preservation
___ Office of Public School Construction
X Parks & Recreation, Department of
___ Pesticide Regulation, Department of
___ Public Utilities Commission
X Regional WQCB # 5
___ Resources Agency
___ Resources Recycling and Recovery, Department of
___ S.F. Bay Conservation & Development Comm.
___ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
___ San Joaquin River Conservancy
___ Santa Monica Mtns. Conservancy
___ State Lands Commission
___ SWRCB: Clean Water Grants
___ SWRCB: Water Quality
___ SWRCB: Water Rights
___ Tahoe Regional Planning Agency
X Toxic Substances Control, Department of
X Water Resources, Department of

X Other: Division of the State Architect
___ Other: ___

Local Public Review Period (to be filled in by lead agency)

Starting Date October 31, 2019 Ending Date November 29, 2019

Lead Agency (Complete if applicable):

Consulting Firm: ___
Address: ___
City/State/Zip: ___
Contact: ___
Phone: ___

Applicant: ___
Address: ___
City/State/Zip: ___
Phone: ___

Signature of Lead Agency Representative: /S/ **Date:** 10/31/2019

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

DISTRIBUTION LIST

State Clearinghouse (SCH)
Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044
OVERNIGHT COURIER

California Air Resources Board
SCH DISTRIBUTION

California Department of Transportation
SCH DISTRIBUTION

Caltrans Div of Aeronautics
SCH DISTRIBUTION

California Department of Education
SCH DISTRIBUTION

California Department of Fish and Wildlife
SCH DISTRIBUTION

Native American Heritage Commission
SCH DISTRIBUTION

Office of Public School Construction
SCH DISTRIBUTION

Central Valley RWQCB
SCH DISTRIBUTION

State Water Resources Control Board
Water Quality
SCH DISTRIBUTION

California Department of
Toxic Substances Control
SCH DISTRIBUTION

California Department of Water Resources
SCH DISTRIBUTION

Division of the State Architect
SCH DISTRIBUTION

City of Bakersfield
Planning Division
1715 Chester Avenue
Bakersfield, CA 93301

City of Bakersfield
Public Works Department
1501 Truxtun Avenue
Bakersfield, CA 93301

Kern County Planning & Natural
Resources Department
Special Projects Section
2700 M Street, Suite 100
Bakersfield, CA 93301

Kern Council of Governments
1404 19th Street, Ste 300
Bakersfield, CA 93301

City of Bakersfield Police Department
1601 Truxtun Avenue
Bakersfield, CA 93301

Kern County Public Works
Department
2700 M Street, Suite 100
Bakersfield, CA 93301

Kern County Library
Beale Memorial
701 Truxtun Avenue
Bakersfield, CA 93301

San Joaquin Valley
Air Pollution Control District
Central Region
1990 E. Gettysburg Avenue
Fresno, CA 93726

Division of Oil, Gas &
Geothermal Resources
4800 Stockdale Highway, #417
Bakersfield, CA 93309

US Fish and Wildlife Service
2800 Cottage Way, W-2606
Sacramento, CA 95825

Pacific Gas & Electric Co
Land Department
1918 "H" Street
Bakersfield, CA 93301

Southern California Gas Co
1510 North Chester Avenue
Bakersfield, CA 93308

Santa Rosa Rancheria Tachi Yokut Tribe
Rueben Barrios Sr., Chairperson
P.O. Box 8
Lemoore, CA 93245

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589
Porterville, CA 93258

Kitanemuk & Yowlumne Tejon Indians
Delia Dominguez, Chairperson
115 Radio Street
Bakersfield, CA 93305

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838
Newhall, CA 91322

Tejon Indian Tribe
Katherine Montes Morgan, Chairperson
1731 Hasti-acres Drive, Suite 108
Bakersfield, CA 93309

Kern Valley Indian Council
Julie Turner, Secretary
P.O. Box 1010
Lake Isabella, CA 93240

Wuksache Indian Tribe/
Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Ct.
Salinas, CA 93906

Chumash Council of Bakersfield
Arianne Garcia, Chairperson
P.O. Box 902
Bakersfield, CA 93302

Kern Valley Indian Council
Robert Robinson, Co-Chairperson
P.O. Box 401
Weldon, CA 93283

Table of Contents

Appendices

Appendix A – Hazards Studies
Appendix B – Small Project Level Analysis
Appendix C – Cultural Resources
Appendix D – Energy Consumption Technical Memo
Appendix E - Caltrans Aeronautics Letter
Appendix F – Traffic Impact Study

List of Figures

List of Tables

MITIGATED NEGATIVE DECLARATION

As Lead Agency under the California Environmental Quality Act (CEQA), the Greenfield Union School District (District) reviewed the Project described below to determine whether it could have a significant effect on the environment because of its development. In accordance with CEQA Guidelines Section 15382, "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Project Name

Crescent Elementary School Construction Project

Project Location

Southwest corner of Panama Lane and Cottonwood Road, Bakersfield, CA.

Project Description

The District is proposing to construct and operate an elementary school (Project) within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. Figure 1-1 is a map of the regional location and Figure 1-2 shows the aerial view of the Project site. The elementary school campus will occupy an approximately 23-acre portion of a 49.5-acre parcel. The school campus site will be annexed into the City of Bakersfield and connect to the City of Bakersfield's water and sewer systems.

The construction of the Project would be phased. The initial enrollment would be 750 students with a maximum capacity of 1,080 students at full buildout. There will be seven buildings, with an approximate area totaling almost 74,000 square feet (sq. ft.). These buildings will include classrooms, administrative buildings, and multi-purpose rooms.

Student population for the new school would come from students within the District, which is currently experiencing overcrowded facilities. The enrollment in the District during the 2018-2019 school year was 9,562 students (California Department of Education, 2019). It is anticipated that new residential development in the metropolitan Bakersfield area would exacerbate the existing overcrowding conditions without the addition of a new school. The construction of the new school would help alleviate the problem of current overcrowding and is designed to provide an elementary school for future students as the population within the District grows.

California Department of Education, School Siting Requirements

Education Code Section 17251 and the California Code of Regulations (CCR), Title 5, Sections 14001 through 14012, outline the powers and duties of the California Department of Education (CDE) regarding school sites and the construction of school buildings. Districts using local funds are encouraged to seek the Department's approval for the benefits that such outside, objective reviews provide to the school district and the community.

Safety is the first consideration in the selection and/or construction of school sites. Certain health and safety requirements are governed by state regulations and the policies of the Department. When selecting new school sites, the selection team considers the following factors: (1) proximity to airports; (2) proximity to high-voltage power transmission lines; (3) presence of toxic and hazardous substances; (4) hazardous air emissions and facilities within a quarter mile; (5) other health hazards; (6) proximity to railroads; (7) proximity to high-pressure natural gas lines, gasoline lines, pressurized sewer lines, or high pressure water pipelines; (8) proximity to propane tanks; (9) noise; (10) proximity to major roadways; (11) results of geological studies and soils analyses; (12) condition of traffic and school bus safety; (13) safe routes to school; and (14) safety issues for joint-use projects.

In considering the construction of Crescent Elementary School, the Greenfield Union School District considered the factors which apply to new school sites. Figure 1-3 illustrates the location and/or proximity of known hazards using the factors listed above for school site selection and lists the distances to each of the identified hazards from the school.

In general, the school siting criteria provides that hazards should be located greater than 1,500 feet from any new school. Data indicates that the nearest high-pressure gas lines is greater than 1,500 feet from the Project site. Other identified hazards include an inactive 6-inch oil pipeline, and 8-inch active oil pipeline (Soils Engineering, Inc., 2019a). A visual site reconnaissance indicated that overhead power lines at 21 Kilovolt (kV) are present along the south side of Panama Lane (northern Project boundary), on the western Project boundary, and along the east side of Cottonwood Road (See Figure 1-3). No power lines are present within 350 feet of the Project site that carry greater than 50 Kilovolt (kV) power overhead or underground (Soils Engineering, Inc., 2019b)

Mailing Address and Phone Number of Contact Person

Greenfield Union School District
1624 Fairview Road
Bakersfield, CA 93309
Contact Person: Jesse Avalos, Director of Maintenance
Phone: (661) 837-6000

Findings

As Lead Agency, the District finds that the Project will not have a significant effect on the environment. The Environmental Checklist (CEQA Guidelines Appendix G) or Initial Study (IS) *(see Section 3 - Environmental Checklist)* identified one or more potentially significant effects on the environment, but revisions to the Project have been made before the release of this Mitigated Negative Declaration (MND) or mitigation measures would be implemented that reduce all potentially significant impacts less than significant levels. The Lead Agency further finds that there is no substantial evidence that this Project would have a significant effect on the environment.

Mitigation Measures Included in the Project to Avoid Potentially Significant Effects

MM AES-1: Security and nighttime lighting installed at the school site shall incorporate shielding of lighting and orienting lighting downward to prevent direct uplighting. Lighting used for nighttime events shall be turned off by 11:00pm. All lights in excess of 150 watts shall be directed toward the stadium field and away from adjacent properties. All stadium field light fixtures shall be designed with appropriate reflectors, hoods and side shields to direct the angle of incidence to reflect light downward.

MM BIO-1: Prior to ground disturbing activities, a qualified wildlife biologist shall conduct a biological clearance survey no more than 30 calendar days prior to the onset of construction.

The clearance survey shall include walking transects to identify presence of San Joaquin kit fox, American badger, Swainson's hawk, Western burrowing owl, nesting birds_and other special-status species or signs of, and sensitive natural communities. The pre-construction survey shall be walked by no greater than 30-foot transects for 100 percent coverage of the Project site and the 50-foot buffer, where feasible.

Exclusion zones for kit fox shall be placed in accordance with U.S. Fish and Wildlife Service (USFWS) Recommendations using the following:

Potential Den	50-foot radius
Known Den	100-foot radius
Natal/Pupping Den (Occupied and Unoccupied)	Contact U.S. Fish and Wildlife Service for guidance
Atypical Den	50-foot radius

Buffer zones shall be considered Environmentally Sensitive Areas (ESAs) and no ground disturbing activities shall be allowed within a buffer area. The United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) shall be contacted upon the discovery of any SJKF individuals within 500 feet, natal or pupping dens is found during construction activities. CDFW staff shall be contacted at (559) 243-4014 and R4CESA@wildlifeca.gov.

Potential kit fox dens may be excavated provided that the following conditions are satisfied: (1) the den has been monitored for at least five consecutive days and is deemed unoccupied by a qualified biologist; (2) the excavation is conducted by or under the direct supervision of a qualified biologist. Den monitoring and excavation should be conducted in accordance with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (United States Fish and Wildlife Service, 2011).

In addition, impacts to occupied burrowing owl burrows shall be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

MM BIO-2: Prior to ground disturbance activities, or within one week of being deployed at the Project site for newly hired workers, all construction workers at the Project site shall attend a Construction Worker Environmental Awareness Training and Education Program, developed and presented by a qualified biologist.

The Construction Worker Environmental Awareness Training and Education Program shall be presented by the biologist and shall include information on the life history wildlife and plant species that may be encountered during construction activities, their legal protections, the definition of "take" under the Endangered Species Act, measures the Project operator is implementing to protect the species, reporting requirements, specific measures that each worker must employ to avoid take of the species, and penalties for violation of the Act. Identification and information regarding special-status or other sensitive species with the potential to occur on the Project site shall also be provided to construction personnel. The program shall include:

An acknowledgement form signed by each worker indicating that environmental training has been completed.

A copy of the training transcript and/or training video/CD, as well as a list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be maintain on site for the duration of construction activities.

MM BIO-3: If all Project activities are completed outside of the Swainson's hawk nesting season (February 15 through August 31), this mitigation measure shall need not be applied. If construction is planned during the nesting season, a preconstruction survey shall be conducted by a qualified biologist to evaluate the site and a 0.5-mile buffer around the site for active Swainson's hawk nests. If potential Swainson's hawk nests or nesting substrates occur within 0.5 mile of the Project site, then those nests or substrates must be monitored for Swainson's hawk nesting activity on a routine and repeating basis throughout the breeding season, or until Swainson's hawks or other raptor species are verified to be using them. Monitoring shall be conducted according to the protocol outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). The protocol recommends that ten visits be made to each nest or nesting site: one during January 1-March 20 to identify potential nest sites, three during March 20-April 5, three during April 5-April 20, and three during June 10-July 30. To meet the minimum level of protection for the species, surveys shall be completed for at least the two survey periods immediately prior to Project-related ground disturbance activities. During the nesting period, active Swainson's hawk nests shall be avoided by 0.5 mile unless this avoidance buffer is reduced through consultation with the CDFW and/or USFWS. If an active Swainson's hawk nest is located within 500 feet of the Project or within the Project site, including the stick nest located within the Project, the Project proponent shall contact CDFW for guidance.

MM BIO-4: A qualified biologist shall conduct a pre-construction survey on the Project site and within 500 feet of its perimeter, where feasible, to identify the presence of the western burrowing owl. The survey shall be conducted between 14 and 30 days prior to the start of construction activities. If any burrowing owl burrows are observed during the preconstruction survey, avoidance measures shall be consistent with those included in the CDFW staff report on burrowing owl mitigation (CDFG 2012). If occupied burrowing owl burrows are observed outside of the breeding season (September 1 through January 31) and within 250 feet of proposed construction activities, a passive relocation effort may be instituted in accordance with the guidelines established by the California Burrowing Owl Consortium (1993) and the California Department of Fish and Wildlife (2012). During the breeding season (February 1 through August 31), a 500-foot (minimum) buffer zone should be maintained unless a qualified biologist verifies through noninvasive methods that either the birds have not begun egg laying and incubation or that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

MM BIO-5: If construction is planned outside the nesting period for raptors (other than the western burrowing owl) and migratory birds (February 15 to August 31), no mitigation shall be required. If construction is planned during the nesting season for migratory birds and raptors, a preconstruction survey to identify active bird nests shall be conducted by a qualified biologist to evaluate the site and a 250-foot buffer for migratory birds and a 500-foot buffer for raptors. If nesting birds are identified during the survey, active raptor nests shall be avoided by 500 feet and all other migratory bird nests shall be avoided by 250 feet. Avoidance buffers may be reduced if a qualified on-site monitor determines that encroachment into the buffer area is not affecting nest building, the rearing of young, or otherwise affecting the breeding behaviors of the resident birds. Because nesting birds can establish new nests or produce a second or even third clutch at any time during the nesting season, nesting bird surveys shall be repeated every 30 days as construction activities are occurring throughout the nesting season.

No construction or earth-moving activity shall occur within a non-disturbance buffer until it is determined by a qualified biologist that the young have fledged (left the nest) and have attained sufficient flight skills to avoid Project construction areas. Once the migratory birds or raptors have completed nesting and young have fledged, disturbance buffers will no longer be needed and can be removed, and monitoring can cease.

MM BIO-6: During all construction-related activities, the following mitigation shall apply:

a. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from the construction or Project site.
b. Construction-related vehicle traffic shall be restricted to established roads and predetermined ingress and egress corridors, staging, and parking areas. Vehicle speeds should not exceed 20 miles per hour (mph) within the Project site.
c. To prevent inadvertent entrapment of kit fox or other animals during construction, the contractor shall cover all excavated, steep-walled holes or trenches more than two feet deep at the close of each workday with plywood or similar materials. If holes or trenches cannot be covered, one or more escape ramps constructed of earthen fill or wooden planks shall be installed in the trench. Before such holes or trenches are filled, the contractor shall thoroughly inspect them for entrapped animals. All construction-related pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored on the Project site shall be thoroughly inspected for wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in anyway. If at any time an entrapped or injured kit fox is discovered, work in the immediate area shall be temporarily halted and USFWS and CDFW shall be consulted.
d. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
e. No pets, such as dogs or cats, shall be permitted on the Project sites to prevent harassment, mortality of kit foxes, or destruction of dens.
f. Use of anti-coagulant rodenticides and herbicides in Project areas shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional Project-related restrictions deemed necessary by the USFWS and CDFW. If rodent control must be conducted, zinc phosphide shall be used because of the proven lower risk to kit foxes.
g. A representative shall be appointed by the Project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative shall be identified

during the employee education program and their name and telephone number shall be provided to the USFWS.

h. The Sacramento Fish and Wildlife Office of USFWS and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during Project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact can be reached at ~~1701~~ (559) 243-4014 and R4CESA@wildlifeca.gov.
i. All sightings of the San Joaquin kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed shall also be provided to the Service at the address below.
j. Any Project-related information required by the USFWS or questions concerning the above conditions, or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at: Endangered Species Division, 2800 Cottage Way, Suite W 2605, Sacramento, California 95825-1846, phone (916) 414-6620 or (916) 414-6600.
k. If burrowing owl are found to occupy the Project site and avoidance is not possible, burrow exclusion may be conducted by qualified biologists only during the non-breeding season, before breeding behavior is exhibited, and after the burrow is confirmed empty through non-invasive methods (surveillance). Replacement or occupied burrows shall consist of artificial burrows at a ratio of 1 burrow collapsed to 1 artificial burrow constructed (1:1). Ongoing surveillance of the Project site during construction activities shall occur at a rate sufficient to detect Burrowing owl, if they return.

MM CUL-1: If prehistoric or historic-era cultural materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified archaeologist can evaluate the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants. If the qualified archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from Project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation. Implementation of the mitigation measure below would ensure that the proposed Project would not cause a substantial adverse change in the significance of a historical resource. Therefore, the Project would have a less-than-significant impact with incorporation of mitigation measures.

MM CUL-2: If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code. The specific protocol, guidelines, and channels of communication outlined by the Native American Heritage Commission, in accordance with Section 7050.5 of the Health and Safety Code, Section 5097.98 of the Public Resources Code

(Chapter 1492, Statutes of 1982, Senate Bill 297), and Senate Bill 447 (Chapter 44, Statutes of 1987), shall be followed. Section 7050.5(c) shall guide the potential Native American involvement, in the event of discovery of human remains, at the direction of the county coroner.

MM GEO-1: Prior to construction, the District shall submit 1) the approved Storm Water Pollution Prevention Plan (SWPPP) and 2) the Notice of Intent (NOI) to comply with the General National Pollutant Discharge Elimination System (NPDES) from the Central Valley Regional Water Quality Control Board. The requirements of the SWPPP and NPDES shall be incorporated into design specifications and construction contracts. Recommended best management practices for the construction phase may include the following:

- Stockpiling and disposing of demolition debris, concrete, and soil properly;
- Protecting existing storm drain inlets and stabilizing disturbed areas;
- Implementing erosion controls;
- Properly managing construction materials; and
- Managing waste, aggressively controlling litter, and implementing sediment controls.

MM GEO-2: Prior to the commencement of construction, the contractor shall evaluate whether the perched water table has begun to dissipate under the site. Results of the testing and evaluation shall be submitted to the Lead Agency for review and evaluation. If evaluation determines that the perched water is not dissipated, the Lead Agency will consult with the Division of the State Architect to discuss possible changes in project design to provide protection from liquefaction and settlement.

MM GEO-3: During any ground disturbance activities, if paleontological resources are encountered, all work within 25 feet of the find shall halt until a qualified paleontologist as defined by the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (2010), can evaluate the find and make recommendations regarding treatment. Paleontological resource materials may include resources such as fossils, plant impressions, or animal tracks preserved in rock. The qualified paleontologist shall contact the Natural History Museum of Los Angeles County or other appropriate facility regarding any discoveries of paleontological resources.

If the qualified paleontologist determines that the discovery represents a potentially significant paleontological resource, additional investigations and fossil recovery may be required to mitigate adverse impacts from Project implementation. If avoidance is not feasible, the paleontological resources shall be evaluated for their significance. If the resources are not significant, avoidance is not necessary. If the resources are significant, they shall be avoided to ensure no adverse effects, or such effects must be mitigated. Construction in that area shall not resume until the resource appropriate measures are recommended or the materials are determined to be less than significant. If the resource is significant and fossil recovery is the identified form of treatment, then the fossil shall be deposited in an accredited and permanent scientific institution. Copies of all correspondence and reports shall be submitted to the Lead Agency.

MM HAZ-1: Prior to operation of the Project, the Project proponent shall prepare a Hazardous Materials Business Plan that identifies the new location of the new school campus and submit it to the appropriate regulatory agency for review and approval. The Project proponent shall provide the hazardous materials business plan to all contractors working on the Project and shall ensure that one copy is available at the Project site at all times.

MM HAZ-2: In the event that other abandoned or unrecorded wells are uncovered or damaged during excavation or grading activities, all work shall cease, and the California Department of Conservation, Division of Oil, Gas and Geothermal Resources shall be contacted for requirements and approvals. The California Department of Conservation, Division of Oil, Gas and Geothermal Resources may determine that remedial plugging operations may be required.

MM HAZ-3: Prior to commencement of construction, the location of all classroom buildings will be a minimum of 120 feet away from the crude oil pipelines.

MM HAZ-4: Prior to operation of the Project, a high-pressure pipeline release scenario shall be included as part of the school's emergency response program.

MM HYD-1: The District shall limit grading to the minimum area necessary for construction and operation of the Project. Final grading plans shall include best management practices to limit onsite and offsite erosion.

MM HYD-2: Prior to initiation of grading activities, the District shall obtain a water "will serve" letter from California Water Service.

MM NSE-1: During construction, the contractor shall situate implement the following measures:

- All stationary construction equipment on the Project site shall be located so that noise emitting objects or equipment faces away from any potential sensitive receptors.

- The construction contractor shall ensure that all construction equipment is equipped with manufacturer-approved mufflers and baffles During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

- Construction activities shall not take place outside of the allowable hours specified by Section 9.22.050 of the City Noise Ordinance.

MM NSE-2: Project architect/contractor shall incorporate noise attenuation methods into the design and construction of Project. These include but are not limited to the following design features:

- R-30 insulation will be placed in the ceilings, which has a Sound Transmission Class (STC) rating of 37.

- R-19 insulation will be placed in the walls, which has a STC rating of 37.
- All windows will be 1-inch dual paned insulating glass, which has a STC rating of 32.

MM TRA-1: The District shall consult with City of Bakersfield Public Works Department regarding required roadway improvements. The District shall pay fair share costs of 5.45% for a signal at the intersection of Cottonwood Road and Pacheco Road to the City of Bakersfield Public Works Department prior to project commencement. The District shall also pay Regional Transportation Impact Fees. Based on negotiations with the Public Works Department, it may be determined that full improvements to the Cottonwood Road and Pacheco Road intersection, along with local road improvements along the proposed site's frontage may be acceptable in lieu of RTIF payment.

MM TRA-2: Prior to commencement of operations, the District shall prepare and circulate a "Safe Route to School" Plan that has been developed that defines the routes that children should use to travel to and from school.

SECTION 1 - INTRODUCTION

1.1 - Overview

The District is proposing to construct and operate an elementary school (Project) within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. Figure 1-1 is a map of the regional location and Figure 1-2 shows the aerial location of the Project site.

1.2 - California Environmental Quality Act

The District is the Lead Agency for this Project pursuant to the CEQA Guidelines (Public Resources Code Section 15000 et seq.). The Environmental Checklist (CEQA Guidelines Appendix G) or Initial Study (IS) (see *Section 3 – Initial Study*) provides analysis that examines the potential environmental effects of the construction and operation of the Project. Section 15063 of the CEQA Guidelines requires the Lead Agency to prepare an IS to determine whether a discretionary Project will have a significant effect on the environment. A Mitigated Negative Declaration (MND) is appropriate when an IS has been prepared and a determination can be made that no significant environmental effects will occur because revisions to the Project have been made or mitigation measures will be implemented that reduce all potentially significant impacts to less than significant levels. The content of an MND is the same as a Negative Declaration, with the addition of identified mitigation measures and a Mitigation Monitoring and Reporting Program (MMRP) (see *Section 6 – Mitigation Monitoring and Reporting Program*).

Based on the IS, the Lead Agency has determined that the environmental review for the proposed application can be completed with an MND.

1.3 - California Department of Education, School Siting Requirements

Education Code Section 17251 and the California Code of Regulations (CCR), Title 5, Sections 14001 through 14012, outline the powers and duties of the California Department of Education (CDE) regarding school sites and the construction of school buildings. Districts using local funds are encouraged to seek the Department's approval for the benefits that such outside, objective reviews provide to the school district and the community.

Safety is the first consideration in the selection and/or construction of school sites. Certain health and safety requirements are governed by state regulations and the policies of the Department. When selecting new school sites, the selection team considers the following factors: (1) proximity to airports; (2) proximity to high-voltage power transmission lines; (3) presence of toxic and hazardous substances; (4) hazardous air emissions and facilities within a quarter mile; (5) other health hazards; (6) proximity to railroads; (7) proximity to high-pressure natural gas lines, gasoline lines, pressurized sewer lines, or high pressure water pipelines; (8) proximity to propane tanks; (9) noise; (10) proximity to major roadways; (11) results of geological studies and soils analyses; (12) condition of traffic and school bus safety; (13) safe routes to school; and (14) safety issues for joint-use projects.

In considering the construction of the Crescent Elementary School, the Greenfield Union School District considered the factors that apply to new school sites. Figure 1-3 illustrates the location and/or proximity of known hazards using the factors listed above for school site selection and lists the distances to each of the identified hazards from the school. Figure 1-4 illustrates the location of Alquist-Priolo earthquake faults, nearby airports and CalFire Fire Hazard Zone areas in the Project vicinity.

In general, the school siting criteria provides that hazards should be located greater than 1,500 feet from any new school. The geologic hazard study prepared for the Project indicates that no high-pressure natural gas pipelines appear to be present within 1,500 feet of the site, but Kern Oil operates an active 8-inch crude oil pipeline and an idle 6-inch crude oil pipeline on the south side of Panama Lane. (Soils Engineering, Inc., 2019a). There are no overhead high voltage transmission lines within 350 feet of the Project site that carry greater than 50 Kilovolts (kV) power overhead or underground (Soils Engineering, Inc., 2019b). These studies can be found in Appendix A.

1.4 - Impact Terminology

The following terminology is used to describe the level of significance of impacts.

- A finding of "no impact" is appropriate if the analysis concludes that the Project would not affect a topic area in any way.
- An impact is considered "less than significant" if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.
- An impact is considered "less than significant with mitigation incorporated" if the analysis concludes that it would cause no substantial adverse change to the environment with the inclusion of environmental commitments that have been agreed to by the applicant.
- An impact is considered "potentially significant" if the analysis concludes that it could have a substantial adverse effect on the environment.

1.5 - Document Organization and Contents

The content and format of this IS/MND is designed to meet the requirements of CEQA. The report contains the following sections:

- *Section 1 – Introduction:* This section provides an overview of CEQA requirements, intended uses of the IS/MND, document organization, and a list of regulations that have been incorporated by reference.
- *Section 2– Project Description:* This section describes the Project and provides data on the site's location.
- *Section 3 – Initial Study:* This section contains the evaluation of 18 different environmental resource factors contained in Appendix G of the CEQA Guidelines. Each environmental resource factor is analyzed to determine whether the proposed Project would have an impact. One of four findings is made which include: no impact, less than significant impact, less than significant with mitigation, or significant and unavoidable. If

the evaluation results in a finding of significant and unavoidable for any of the 18 environmental resource factors, then an Environmental Impact Report will be required.
- *Section 4 – List of Preparers:* This section identifies the individuals who prepared the IS/MND.
- *Section 5 – Bibliography:* This section contains a full list of references that were used in the preparation of this IS/MND.
- *Section 6 – Mitigation Monitoring and Reporting Program:* This section contains the Mitigation Monitoring and Reporting Program.

1.6 - Incorporated by Reference

The following documents and/or regulations are incorporated into this IS/MND by reference:

- Metropolitan Bakersfield General Plan;
- Kern County General Plan EIR;
- Kern County Zoning Ordinance;
- Kern County Airport Land Use Compatibility Plan
- California Department of Education, Title 5, California Code of Regulation; and
- California Title 24 Code of Regulations (2019)

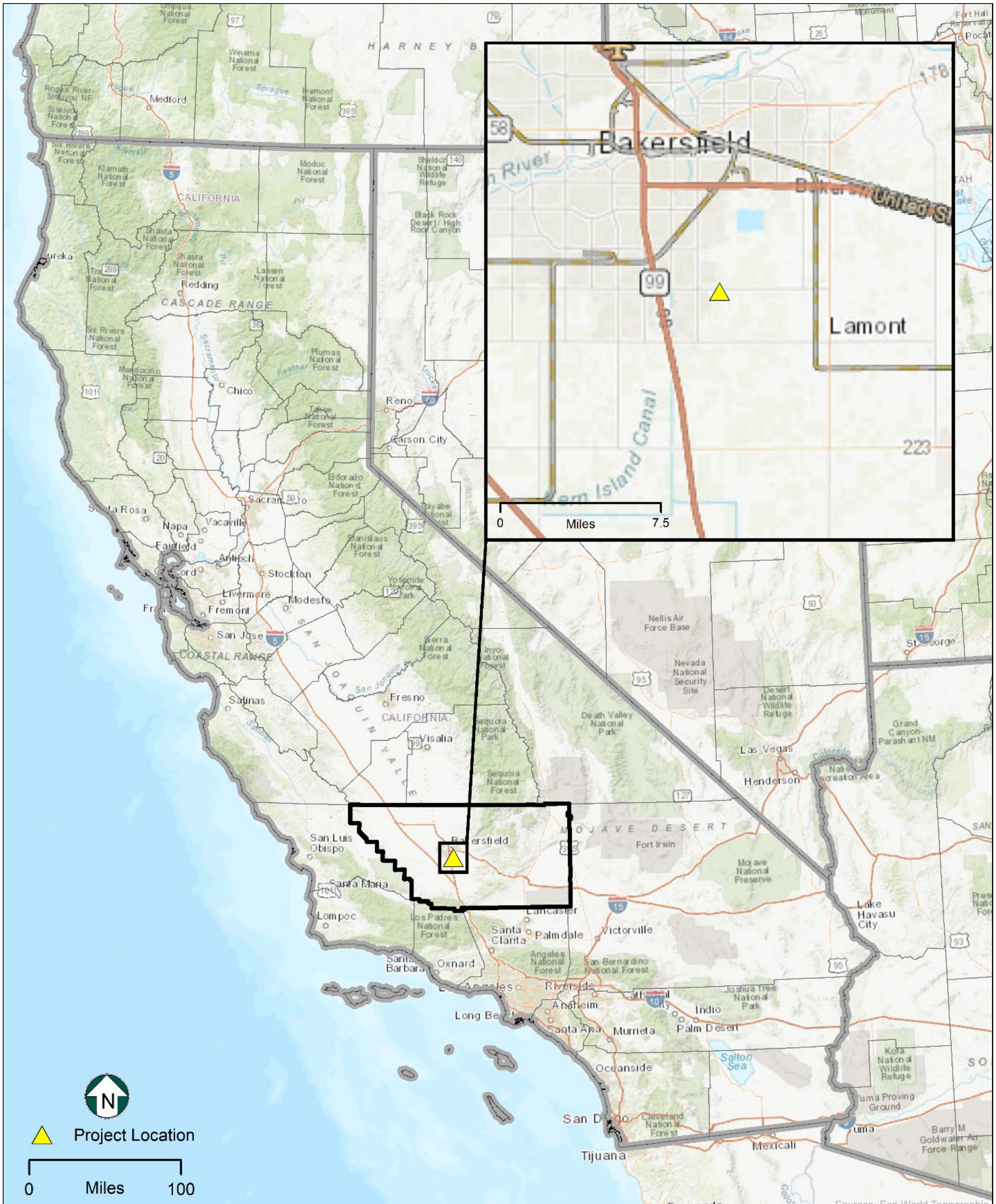


Figure 1-1
Regional Location

Figure 1-2
Aerial Location

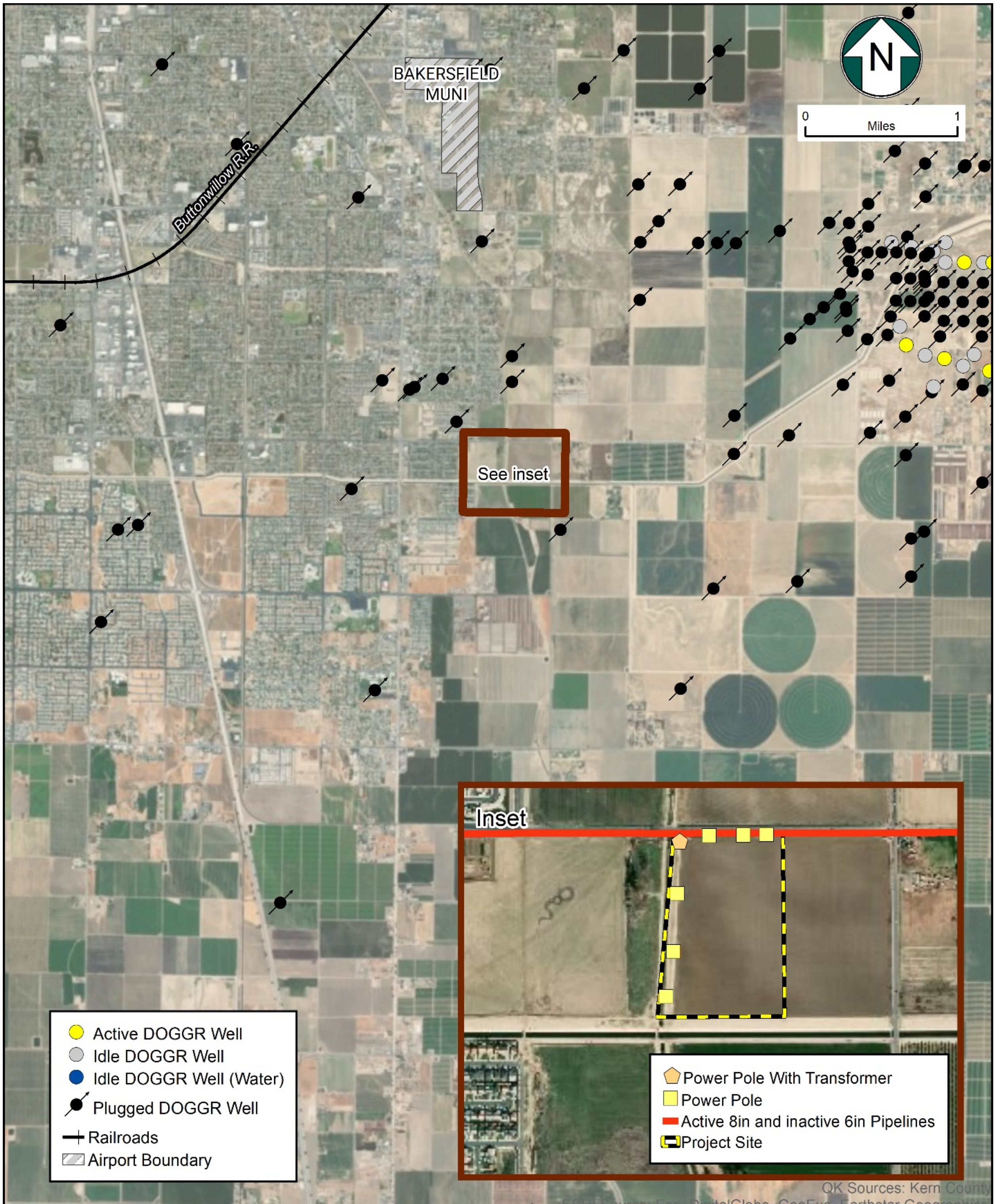


Figure 1-3
DOGGR Wells and Utilities

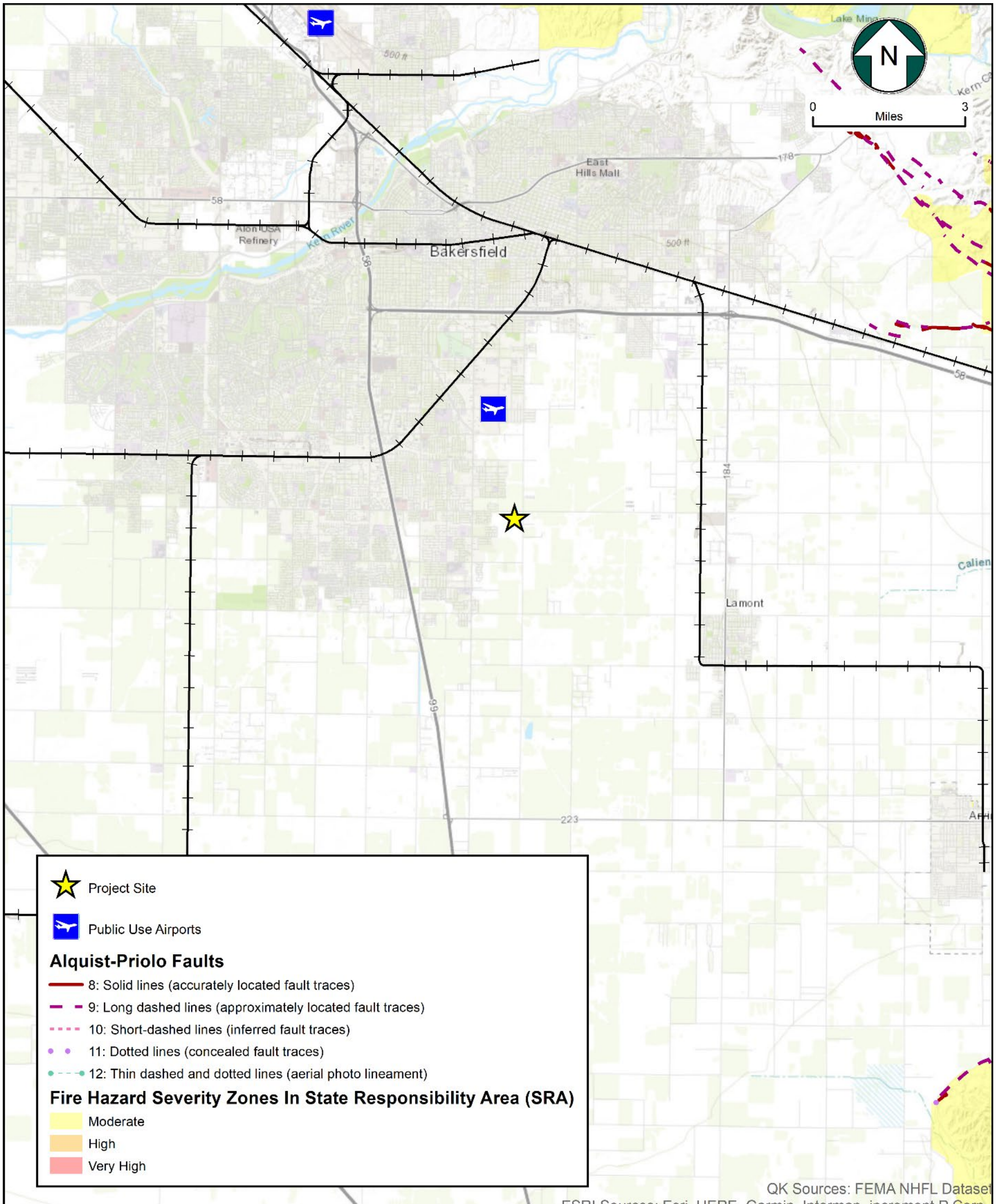


Figure 1-4
Alquist Priolo Faults and Fire Hazard Severity Zones

SECTION 2 - PROJECT DESCRIPTION

2.1 - Introduction

The District is proposing to construct and operate an elementary school (Project) within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. Figure 1-1 is a map of the regional location and Figure 1-2 shows the aerial location of the Project site.

2.2 - Project Location

The project site is located within Section 29, Township 30 South, Range 28 East, Mount Diablo Base and Meridian (MDB&M), within the Lamont U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle. The site encompasses approximately 23-acre portion of Assessor's Parcel Number (APN) 518-030-22. The Project site is located on the southwest of Cottonwood Road and East Panama Lane.

2.3 - Project Environment

The site is not currently under agricultural cultivation. However, the site was historically used for agricultural purposes over the past 50 years, and as recently as 2017. The Project site is within the Metropolitan Bakersfield General Plan (MBGP), a plan that consists of residential, commercial, and industrial uses.

The site is bordered by cultivated farmland property on the north and east, the Arvin-Edison canal and cultivated farmland to the south, and the Kern Island canal and undeveloped farmland to the west.

Police and fire service will be served by the City of Bakersfield and/or the County of Kern. The Project will connect to the existing sewer system, and the nearest sewer line is approximately ¼ mile from the site (City of Bakersfield, 2019). District anticipates annexing into the City of Bakersfield and would tie into the existing Panama and Union Planned Area sewer line system. Water will be provided by California Water Service and sanitation/garbage collection will be provided by Price Disposal, with waste being deposited in the Bena Landfill.

2.4 - Proposed Project

The elementary school campus will occupy approximately 23 acres of the Project site. There will be multiple buildings, with an approximate area totaling almost 74,000 square feet (sq. ft.). The school will be completed in phases, with the first phase constructing: an administrative building, a cafeteria/multipurpose room, and 31 classrooms. The initial enrollment capacity will be 750 students with a potential to expand up to 1,080 students. Approximately 52 staff parking spaces and 100 visitor parking spaces will be provided. The site would be primarily accessed from Panama Lane on the northern Project boundary. The school campus site will be annexed into the City of Bakersfield and connect to the City of Bakersfield's water and sewer systems.

Student population for the new school would come from existing students within the District, which is currently experiencing overcrowded facilities. The enrollment in the District during the 2018-2019 school year was 9,562 students (California Department of Education, 2019). It is anticipated that new residential development in the metropolitan Bakersfield area would exacerbate the existing overcrowding conditions without the addition of a new school. The construction of the new school would help alleviate the problem of current overcrowding and is designed to provide an elementary school for future students as the population within the District grows.

An active 8-inch crude oil pipeline and an idle 6-inch crude oil pipeline operated by Kern Oil are present on the south side of Panama Lane. However, no gas pipelines appear to be present within 1,500 feet of the site (Soils Engineering, Inc., 2019a). No known historic oil activity has occurred on the site. The Project is not located within the boundaries of an oilfield. According to the Division of Oil, Gas and Geothermal Resources (DOGGR) records and maps, no oil or gas wells were shown to be present on the Project site; however, less than a mile to the southeast of the site is a plugged and abandoned-dry hole.

The Project site is located within the "C" zone of the Kern County Airport Land Use Compatibility Plan (Kern County, 2012).

SECTION 3 - INITIAL STUDY

3.1 - Environmental Checklist

1. **Project Title:**

   Crescent Elementary School Construction Project

2. **Lead Agency Name and Address:**

   Greenfield Union School District
   1624 Fairview Road
   Bakersfield, CA 93309

3. **Contact Person and Phone Number:**

   Jesse Avalos, Director of Maintenance
   (661) 837-6000

4. **Project Location:**

   Southwest corner of Cottonwood Road and East Panama Lane, Southeast of Bakersfield, CA.

5. **General Plan Designation:**

   Resource - Intensive Agriculture (R-IA)

6. **Zoning:**

   Exclusive Agriculture (A)

7. **Description of Project:**

   Please See Section 2.

8. **Surrounding Land Uses and Setting:**

   Agricultural cultivation to the east, west and north, and large lot single-family residential to the south.

9. **Other Public Agencies Whose Approval is Required:**

- California Department of Education;
- California Department of Toxic Substances Control;
- California Division of the State Architect;
- Central Valley Regional Water Quality Control Board;
- Kern County Local Agency Formation Commission; and
- San Joaquin Valley Air Pollution Control District;

3.2 - Environmental Factors Potentially Affected

The environmental factors checked below would be potentially 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	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology and Soils	☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☐ Hydrology and Water Quality	☐ Land Use and Planning	☐ Mineral Resources
☐ Noise	☐ Population and Housing	☐ Public Services
☐ Recreation	☐ Transportation and Traffic	☐ Utilities and Service Systems
☐ Wildfire	☐ Mandatory Findings of Significance	

3.3 - Determination

On the basis of this initial evaluation:

☐ I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (a) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (b) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENT IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.

Signature	Date
Printed Name	For

3.4 - Evaluation of Environmental Impacts

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to Projects like the one involved (e.g., the Project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on Project-specific factors as well as general standards (e.g., the Project will not expose sensitive receptors to pollutants, based on a Project-specific screening analysis).

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as Project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a. Earlier Analysis Used. Identify and state where they are available for review.

    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the Project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a Project's environmental effects in whatever format is selected.

9. The explanation of each issue should identify:

   a. the significance criteria or threshold, if any, used to evaluate each question; and

   b. the mitigation measure identified, if any, to reduce the impact to less than significance.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.1 - AESTHETICS				
Except as provided in Public Resources Code Section 21099, would the Project:				
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c. In non-urbanized area, substantially degrade the existing visual character or quality of public views of the site and its surroundings? If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

Discussion

Impact #3.4.1a – Would the Project have a substantial adverse effect on a scenic vista?

The proposed school site is located in an area characterized by flat, undeveloped land that has been historically used for agricultural production. No known aesthetic resources exist on the site. The site is not within or in the vicinity of a city, County, or State identified scenic vista. The Project does not lie near or within a State Designated or Eligible State Scenic Highway (California Department of Transportation, 2011) Furthermore, development of the Project would not block or preclude views to any area containing important or what would be considered visually appealing landforms. Finally, the Project does not include the removal of trees determined to be scenic or of scenic value, the destruction of rock outcroppings or degradation of any historic building. Therefore, no scenic resources will be affected. The Project will not result in development that is substantially different than surrounding land uses.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.1b – Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

See Impact #3.4.1a, above.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.1c – In non-urbanized area, substantially degrade the existing visual character or quality of public views of the site and its surroundings? If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

The Project is in an area that is predominantly rural with residential development to the west. The Project campus and associated structures will be set back from the roadway but will remain visible to traveling motorists. However, changes to the visual quality and character of the Project site will be similar in nature to the nearby residential development. The Project would also include landscaping that would soften the visual impact of the school. The Project's appearance would substantially degrade the visual character of the site. Therefore, the Project would result in a less than significant impact to the visual quality of the area.

See also discussion of Impact #3.4.1a, above.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.1d – Would the Project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Construction of the proposed Project would generally occur during daytime hours, typically from 7:00 a.m. to 6:00 p.m. All lighting would be directed downward and shielded to focus illumination on the desired work areas only and prevent light spillage onto adjacent properties. Because lighting used to illuminate work areas would be shielded, focused downward, and turned off by 6:00 p.m., the potential for lighting to affect any residents adversely is minimal. Increased truck traffic and the transport of construction materials to the Project site would temporarily increase glare conditions during construction. However, this increase in glare would be minimal. Construction activity would focus on specific areas on the sites, and any sources of glare would not be stationary for a prolonged period of time. Therefore, construction of the proposed Project would not create a new source of substantial glare that would affect daytime views in the area.

For operations, exterior lighting would comply with Kern County Dark Skies Ordinance (19.81) standards, which include outdoor lighting design to minimize reflective glare and light scatter. The school facility would include standard lighting for the campus, and field lights for the sports field. State law requires the District to follow the California Code of Regulations Title 24 (Part 3) regarding indoor light design. In addition, Mitigation Measure MM AES-1 would require the school's lighting design to be compliance with "dark skies" standards and event lighting to be shut off by 11:00pm. These requirements would substantially reduce potential nuisances from light or glare. With implementation of Mitigation Measure MM AES-1, the proposed Project would not create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area. Therefore, the Project would have a less than significant impact with mitigation.

MITIGATION MEASURE(S)

MM AES-1: Security and nighttime lighting installed at the school site shall incorporate shielding of lighting and orienting lighting downward to prevent direct uplighting. Lighting used for nighttime events shall be turned off by 11:00pm. All lights in excess of 150 watts shall be directed toward the stadium field and away from adjacent properties. All stadium field light fixtures shall be designed with appropriate reflectors, hoods and side shields to direct the angle of incidence to reflect light downward.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

3.4.2 - Agriculture and Forestry Resources

In determining whether impacts to 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. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the Project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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 nonagricultural use?	☐	☐	☒	☐
b. Conflict with existing zoning for agricultural use or a Williamson Act Contract?	☐	☐	☒	☐
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

Discussion

Impact #3.4.2a – Would the Project 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 nonagricultural use?

The proposed Project would convert approximately 23-acres of agricultural land to accommodate the development of a school facility. In order to determine whether this conversion would result in a significant impact on farmland, several factors must be considered. These factors include the quality of the land being converted, the availability of water to supply farming activities on the land, and the type of use being proposed on the agricultural land. CEQA uses the California Department of Conservation Division of Land Resource Protection's Farmland Mapping Project (FMMP) categories of "Prime Farmland," "Farmland of Statewide Importance," and "Unique Farmland" to define "agricultural land" for the purposes of assessing environmental impacts (PRC Section 21060.1(a)). The project site is designated as Prime Farmland (CA Department of Conservation, 2016). "Prime Farmland" is defined as "Land with the best combination of physical and chemical characteristics able to sustain long term production of agricultural crops. This land must have been used for production of irrigated crops at some time during the four years prior to the mapping date." Although the site has not been used for agriculture since 2017, it is classified as Prime Farmland according to the FMMP (CA Department of Conservation, 2016). Implementation of the Project would convert 23 acres of farmland designated as "Prime" to a non-agricultural use. However, the former property owner considered the land to be less productive than other farmland, and therefore sold the property to District for the construction of the Project. Additionally, Kern County has approximately 579,295 acres of acres of farmland designated as Prime (California Department of Conservation, 2019). The conversion of 23 acres to a non-agricultural use represents 0.0000397% of the overall available prime farmland in the County. Based on this analysis, the impact to the conversion is considered less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.2b – Would the Project conflict with existing zoning for agricultural use or a Williamson Act Contract?

The Project site is zoned for agricultural use; however, is not subject to a Williamson Act land use contract (see Figure 3.4.2-1). The Project is within the MBGP, which designates the project site as R-IA (Intensive Agriculture) and within the A (Exclusive Agriculture) zone district. Additionally, there are no lands adjacent to the that are currently held under Williamson Act Contract.

The Project site has historically been used for agricultural purposes, which is consistent with the existing zoning designation. However, as a special district, the does not fall under the jurisdiction of the Kern County Zoning Ordinance or General Plan, and therefore is not subject to land use regulations.

Therefore, the Project's impacts related to conflicts with existing zoning for agricultural use and/or Williamson Act contracts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.2c – Would the Project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?

The Public Resources Code Section 12220 (g) and Section 4526 defines "Forest land" as land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. There are no forest lands identified on the Project site or within its vicinity; therefore, there would be no conflict with or impacts to zoning for forest land or timber land. The project would not result in the loss or conversion of forest land to a non-forest use.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.2d – Would the Project result in the loss of forest land or conversion of forest land to non-forest use?

See discussion of Impact #3.4.2c, above.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.2e – Would the Project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

See discussion of Impacts #3.4.2a, #3.4.2b, and #3.4.2c, above.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

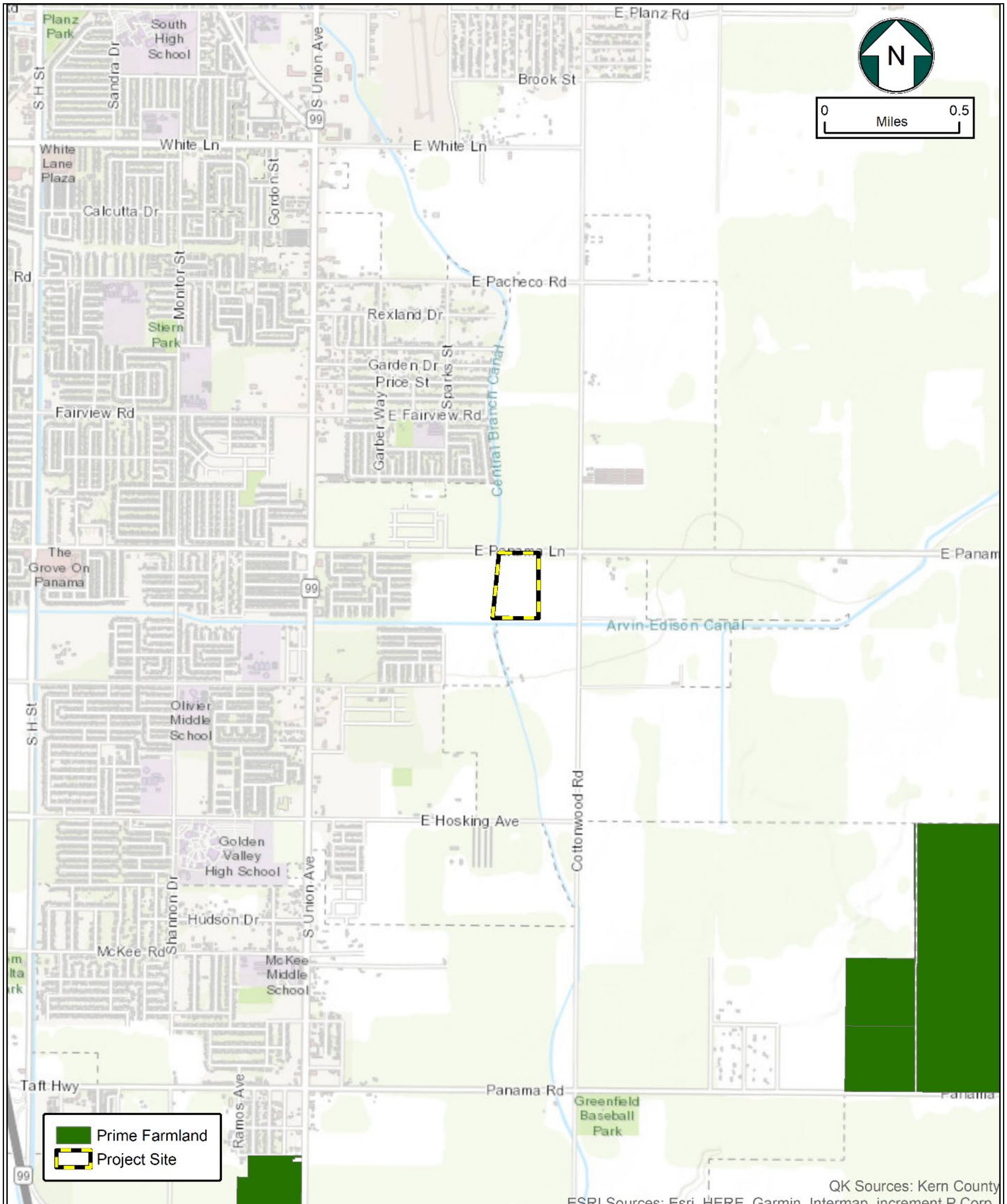


Figure 3.4.2-1
Williamson Act Land Use Contract

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

3.4.3 - 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:

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a.	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b.	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?	☐	☐	☒	☐
c.	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d.	Result in other emissions (such as those leading to odor) adversely affecting a substantial number of people?	☐	☐	☒	☐

Discussion

A SPAL was previously prepared for the Project, and is included as Appendix B.

Impact #3.4.3a – Would the Project Conflict with or obstruct implementation of the applicable air quality plan?

The Project is within the San Joaquin Valley Air Basin (SJVAB) and under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Using project type and size categories, the SJVAPCD has pre-quantified emissions and determined a size below which it is reasonable to conclude that a project would not exceed applicable thresholds of significance for criteria pollutants. This project was determined to qualify as under the Small Project Analysis Level (SPAL).

As noted in the Project Description, the Project proposes an initial enrollment of 750 students with a maximum capacity of 1,080 students at full buildout. Therefore, it will not exceed the 1,875-student established SPAL threshold As indicated in the SJVAPCD *Guide to Mitigating and Assessing Air Quality Impacts* (GAMAQI) projects that fall within the SPAL analysis levels are "deemed to have a less than significant impact on air quality due to criteria pollutant emissions and as such are excluded from quantifying criteria pollutant emissions for CEQA purposes. However, to meet the standards of adequacy for disclosure of potential environmental impacts and mitigation, the SJVAPCD recommends that the Lead Agency's environmental document include a narrative that identifies the sources of emissions and include sufficient discussion of SPAL values to support the conclusion that criteria pollutant emissions from the Project would have a less than significant impact on air quality."

The population of the proposed elementary school upon full build-out would be 1,080 students. Emissions associated with the construction of the Project would be temporary in nature and are not anticipated to result in the generation of a substantial amount of hazardous air pollutants. Recently a comprehensive high school construction project was proposed in the vicinity of the Project, and was the subject of environmental review under CEQA (Kern High School District, 2018). The CEQA document analyze air quality emissions for the construction and operation of a high school campus on approximately 77-acres with 14 buildings totaling between 200,000 and 250,000 square feet, and an enrollment capacity of 2,000 students that will have the ability to expand to 2,500 students. An Air Quality Impact Analysis (AQIA) was prepared for the high school project using CalEEMod modeling (Appendix A of that document). Results of the AQIA showed that both construction and operations-related emissions (unmitigated and mitigated), as calculated by CalEEMod were well under the SJVAPCD significant threshold levels, and impacts were considered less than significant. The subject Project is substantially smaller than what was analyzed for the high school (a 23 acres site with buildings totally approximately 74,000 square feet and enrollment of up to a maximum 1,080 students). Therefore, it can be concluded that the smaller elementary school project would have less emissions associated with its construction and operations and would not exceed established emissions thresholds. As such, impacts of the Project are anticipated to be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.3b – Would the Project 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 which exceed quantitative thresholds for ozone precursors)?

The CEQA Guidelines indicate that a significant impact would occur if the proposed Project would conflict with or obstruct implementation of the applicable air quality plan. The San Joaquin Valley Air Basin (SJVAB) is designated nonattainment of State and federal health-based air quality standards for ozone and particulate matter less than 2.5 microns ($PM_{2.5}$). The SJVAB is designated attainment for federal particulate matter less than 10 microns (PM_{10}) standards and nonattainment of state PM_{10}. To meet federal Clean Air Act (CAA) requirements, the SJVAPCD has multiple air quality attainment plan (AQAP) documents, including:

- 2008 Extreme Ozone Attainment Demonstration Plan (EOADP) for attainment of the 1-hour ozone standard;
- 2007 Ozone Plan for attainment of the 8-hour ozone standard;
- 2007 PM_{10} Maintenance Plan and Request for Redesignation; and
- 2008 $PM_{2.5}$ Plan.

Because of the region's federal nonattainment status for ozone and PM2.5, and State nonattainment status for ozone, $PM_{2.5}$, and PM_{10}, if the project-generated emissions of either the ozone precursor pollutants [reactive organic gases (ROG) or oxides of nitrogen (NO_x)], PM_{10}, or $PM_{2.5}$ were to exceed the SJVAPCD's significance thresholds, then the Project uses would be considered to conflict with the attainment plans. In addition, if the Project uses were to result in a change in land use and corresponding increases in vehicle miles traveled, they may result in an increase in vehicle miles traveled that is unaccounted for in regional emissions inventories contained in regional air quality control plans.

The GAMAQI states that the SJVAPCD's established thresholds of significance for criteria pollutant emissions, which are based on the NSR, require offsets for stationary sources. "Emission reductions achieved through implementation of District offset requirements are a major component of the District's air quality plans. Thus, projects with emissions below the thresholds of significance for criteria pollutants would be determined to 'Not conflict or obstruct implementation of the District's air quality plan'" (SJVAPCD 2015).

Project's Contribution to Air Quality Violations

As discussed in Impact c. below, predicted construction and operational emissions would not exceed the SJVAPCD's significance thresholds for ROG, NO_x, PM10, and $PM_{2.5}$. As a result, the project would not conflict with emissions inventories contained in regional AQAPs and would not result in a significant contribution to the region's air quality non-attainment status.

Consistency with Assumptions in Air Quality Attainment Plans

The primary way of determining consistency with the AQAP's assumptions is determining consistency with the applicable General Plan to ensure that the project's population density and land use are consistent with the growth assumptions used in the AQAPs for the air basin.

As required by California law, city and county General Plans contain a Land Use Element that details the types and quantities of land uses that the city or county estimates will be needed for future growth, and that designates locations for land uses to regulate growth. The Kern County Council of Governments uses the growth projections and land use information in adopted general plans to estimate future average daily trips and then vehicle miles traveled (VMT), which are then provided to SJVAPCD to estimate future emissions in the AQAPs. Existing and future pollutant emissions computed in the AQAP are based on land uses from area general plans. AQAPs detail the control measures and emission reductions required for reaching attainment of the air standards.

The Project is not anticipated to result in substantial direct or indirect population growth that was not previously anticipated because the student population for the proposed elementary school would come from the existing school district population. Accordingly, it can be concluded the proposed Project's uses are consistent with the growth and vehicle miles traveled projections contained in the AQP. The Project impact is less than significant for this criterion.

Control Measures

The AQAPs contain a number of control measures, including the rules outlined by the SJVAPCD. The AQAP control measures are enforceable requirements. The Project would comply with all of the SJVAPCD's applicable rules and regulations. Therefore, the Project would comply with this criterion.

With the incorporation of the enforceable requirements outlined in the AQAP, the Project is not anticipated to result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under any federal or State ambient air quality standards.

The SJVAPCD's Regulation VIII establishes required controls to reduce and minimizing fugitive dust emissions. The following SJVAPCD Rules and Regulations apply to the proposed Project (and all projects):

- Rule 4102 - Nuisance;
- Regulation VIII – Fugitive PM10 Prohibitions;
- Rule 8011 - General Requirements;
- Rule 8021 - Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities;
- Rule 8041 - Carryout and Trackout; and
- Rule 8051 - Open Areas.

SJVAPCD's required measures for all projects would also apply:

- Water exposed areas 3 times per day; and
- Reduce vehicle speed to less than 15 miles per hour.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.3c – Would the Project expose sensitive receptors to substantial pollutant concentrations?

Sensitive receptors are defined as areas where young children, chronically ill individuals, the elderly, or people who are more sensitive than the general population reside. The closest residences are located approximately 0.25 miles to the east of the Project site. The proposed Project, because of its educational nature, is not expected to result in the generation of odors or hazardous air pollutants. However, during construction of the Project, construction activities and equipment may generate emission from construction equipment exhaust. These impacts are localized and temporary in nature and therefore are considered less than significant. The Project would not expose sensitive receptors to substantial concentrations of localized PM_{10}, carbon monoxide, diesel particulate matter, hazardous air pollutants, or naturally occurring asbestos, as discussed below.

Hazardous Pollutants or Odors

The GAMAQI guidelines introduce two types of projects that should be assessed when considering hazardous air pollutants (HAPs) which includes: 1) placing a toxic land use in an area where it may have an adverse health impact on an existing sensitive land use and 2) placing a sensitive land use in an area where an adverse health impact may occur from an existing toxic land use. Some examples of projects that may include HAPs are:

- Agricultural products processing;
- Bulk material handling;
- Chemical blending, mixing, manufacturing, storage, etc.;
- Combustion equipment (boilers, engines, heaters, incinerators, etc.);
- Metals etching, melting, plating, refining, etc.;
- Plastics & fiberglass forming and manufacturing;
- Petroleum production, manufacturing, storage, and distribution; and
- Rock & mineral mining and processing.

The proposed Project is located on a site that is currently undeveloped land that was previously used for agricultural purposes. The proposed Project consists of an elementary school and associated parking lot and playground areas. During the construction period some odors could result from vehicles and equipment using diesel fuels. However, vehicles and equipment using diesel fuels at the proposed project would have to comply with the California Air Resources Board (CARB) guidelines, which limit idling time to five minutes with the Airborne Toxic Control Measure (ATCM). In addition, the construction period would be temporary. In 2009, Senate Bill (SB) 124 (Amended Regulation) acknowledged and codified CARBs ATCM limiting school bus idling. During the operation of the proposed project, school buses may be utilized and would emit diesel, but are also subject to the CARB's ATCM limiting school bus idling and idling at or near schools to only when necessary for safety or operational concerns.

Naturally Occurring Asbestos

The CARB has an ATCM for construction, grading, quarrying, and surface mining operations requiring the implementation of mitigation measures to minimize emissions of asbestosladen dust. This ATCM applies to road construction and maintenance, construction and grading operations, and quarries and surface mines when the activity occurs in an area where naturally occurring asbestos is likely to be found. The studies prepared for the Project did not identify naturally occurring asbestos on or near the Project site (Soils Engineering, Inc., 2019c) and (Soils Engineering, Inc, 2019d).

Valley Fever Exposure

Valley Fever, or coccidioidomycosis, is an infection caused by inhalation of the spores of the fungus, *Coccidioides immitis*. The spores live in soil and can live for an extended time in harsh environmental conditions. Activities or conditions that increase the amount of fugitive dust contribute to greater exposure, and include dust storms, grading, and recreational off-road activities.

There is a potential risk of contracting Valley Fever within the region based on the general similarity between the sediments known to contain the spores and the sediments believed to be present in the area of the proposed project. In addition, it must be noted that: 1) airborne dust containing the spores can be transported to the project area from other areas within the Bakersfield area potentially exposing those present to the disease and 2) persons who have not resided in the Bakersfield area may be more susceptible to contracting the disease than long-time residents due to any environmental, medical, and personal factors. (Note: The conclusions regarding the potential for either exposure to or contraction of Valley Fever through the construction of the proposed Project should not be construed as a professional medical or public health opinion. These conclusions are merely a review of the geologic condition of the project site relative to potential presence of sediments known to contain the Valley Fever spore.)

Although construction activities are anticipated to generate fugitive dust, the Project would minimize the generation of fugitive dust by complying with the SJVAPCD's Regulation VIII. Dust-disturbing activities would be limited in scope and duration.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.3d Would the Project result in emissions (such as those leading to odors) adversely affecting a substantial number of people?

See #3.4.3 Discussion above.

The educational nature of the Project is not expected to result in the generation of odors or hazardous air pollutants. Emissions associated with the construction of the Project would be temporary in nature and are not anticipated to result in the generation of a substantial amount of hazardous air pollutants. Emissions associated with the operation of the Project would result from students arriving to and departing from the school and are not anticipated to be significant.

Mitigation Measure(s)

No mitigation is required.

Level of Significance

Impacts would be ***less than significant***.

3.4.4 - Biological Resources

Would the Project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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 Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
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 Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

Discussion

A biological reconnaissance survey was conducted to determine whether there are sensitive biological resources that might be adversely affected by the proposed Project. The evaluation is based upon existing site conditions, the potential for sensitive biological resources to occur on and in the vicinity of the Project site, and any respective impacts that could potentially occur.

A literature review of the California Department of Fish and Wildlife's California Natural Diversity Database (CNDDB) (CNDDB 2019), California Native Plant Society (CNPS 2019), and United States Fish and Wildlife Service Endangered Species List (USFWS 2019) was conducted to identify special-status plant and wildlife species with the potential to occur within the Project site and vicinity (the surrounding nine quads and a 10-mile radius). Information on the potential presence of wetlands and waters was obtained from the National wetlands Inventory (NWI), National Hydrography database (NHD) and Federal Emergency Management Agency (FEMA). Information regarding the presence of Critical Habitat in the Project vicinity was obtained from the United States Fish and Wildlife Service's Critical Habitat Mapper database. The results of the database inquiries were subsequently reviewed to evaluate the potential for occurrence of special-status species and other sensitive biological resources known to occur on or near the Project site prior to conducting the biological reconnaissance survey.

On August 28, 2019, a QK biologist conducted a biological reconnaissance survey of the entire Project site and a 500-foot buffer area (Survey Area), where feasible. The purpose of the survey was to determine the locations and extent of potential plant communities and sensitive habitats, determine the potential for occurrence of special-status plant and animal species, and identify other sensitive biological resources within the Survey Area. Survey methodologies included walking meandering pedestrian transects through all present habitat types. Protocol surveys for specific special-status wildlife species were not conducted for this report as it was determined by the consulting biologist that such surveys were not warranted due to the condition of the Project site. Photographs were taken to document existing landscape of the Project site and adjacent land uses; detailed notes on observed plant and wildlife species and site conditions were taken while conducting the survey.

General Site Conditions

Most of the Project site has experienced significant historical and ongoing ground disturbance from past agricultural uses surrounding the Project site. The wildlife species inhabiting the Survey Area include those typically found in moderately- to heavily- disturbed habitats associated with agricultural development zones of Kern County and the southern San Joaquin Valley. The Project site had been previously disked, with little vegetation present. There was one irrigation ditch present along the northern boundary of the Project site. The central branch of the Kern Island Canal borders the site to the west and the Arvin-Edison Water Canal is to the south. All three waterways had flowing water present during the time of the reconnaissance survey.

There were nine plant species and ten wildlife species identified during the survey, either through direct observation or by the presence of diagnostic signs (Table 3.4.4-1).

Table 3.4.4-1
List of Plant and Wildlife Species Observed within the Survey Area

Scientific name	Common name
Plants	
	various aquatic species
Amaranthus sp.	pigweed
Asclepias sp.	milkweed
Digitaria	crab grass
Leptochloa sp.	sprangletop
Salsola tragus	Russian thistle
Schsimus arabicus	Mediterranean grass
Solanium elaeagnifolium	night shade
Tribulus terrestris	devil's thorn
Wildlife	
Buteo jamaicensis	red-tailed hawk
Cambarus sp.	crayfish
Canis lupus familiaris	domestic dog*
Capra aegagrus hircus	domestic goat
Equus caballus	horse
Felis catus	domestic cat
Gallus gallus	domestic chicken
Lithobates catesbeianus	bullfrog
Otospermophilus beecheyi	California ground squirrel
Phoxinus phoxinus	minnow

*Indicates that only sign (scat, tracks, prey remains, dens) were observed.

Impact Analysis

This section describes the results of the database searches and, using conditions present on the Project site as determined by the on-site examination, provides an analysis of Project impacts on each of six biological evaluation criteria. Each of the evaluation criteria are discussed below and mitigation measures are provided as warranted to, when implemented, reduce impacts to below significant levels.

Impact #3.4.4a – Would the Project 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 Wildlife or U.S. Fish and Wildlife Service?

The literature search indicated that there is a potential for several sensitive natural communities and special-status species to be present on the Project site. An evaluation of each of the potentially occurring sensitive natural communities and special-status species, which included habitat requirements, likelihood of required habitat to occur within the Project area, and a comparison to the CNDDB records was conducted. The results of this evaluation concluded that no sensitive natural community or special-status plant species are anticipated to occur on or near the Project site, and that four wildlife species have a reasonable potential to occur on or near the Project site.

Sensitive Natural Communities and Special-Status Species

SENSITIVE NATURAL COMMUNITIES AND SPECIAL-STATUS PLANTS

Based on the database query, there were three sensitive natural communities and 37 special-status plant species identified as having potential to occur within the subject quadrangle and eight surrounding quadrangles. According to CNNDB recorded occurrences there are two sensitive natural communities and 17 plant species found within a 10-mile buffer of the Project site. However, the Project site and vicinity has been highly disturbed for years due to ongoing agriculture production and nearby residential development, and it does not provide habitat for any of these sensitive natural communities or special-status plant species. No special-status plant species were identified during the biological reconnaissance survey. Although protocol-level botanical surveys were not conducted and the reconnaissance survey did not coincide with optimum blooming periods for all plant species, it is not anticipated that special-status plant species occur on the Project site.

SPECIAL-STATUS WILDLIFE

Based on the database query, there were 37 special-status wildlife species that were identified as having a potential to occur within subject quadrangle and eight surrounding quadrangles. According to CNDDB recorded occurrences there are 28 special-status wildlife species found within a 10-mile buffer of the Project site. Of the 37 species, 33 were eliminated from consideration due to the lack of suitable habitat within the Project site. The remaining four species have a low, moderate, or high potential to occur within the Project site and vicinity. There was one species with a low potential [American badger (*taxidea taxus*)] to occur on the Project site, two species [western burrowing owl (*Athene cunicularia*) and San Joaquin kit fox (*Vulpes macrotis mutica*)] with a moderate potential to occur, and one species [Swainson's hawk (*Buteo swainsoni*)] with a high potential to occur on or near the Project site. Protocol surveys for specific special-status wildlife species were not conducted for this report because it was determined that such surveys were not warranted due to the conditions present on the Project site.

Swainson's Hawk

The Swainson's hawk has a high potential to occur within the immediate area surrounding the Project site. The most recent CNDDB recorded occurrence (EONDX 115317) of Swainson's hawk was approximately 4.1 miles southwest of the Project site. Swainson's hawks are known to forge in old field and open agricultural fields, such are hay or alfalfa. The area surrounding the Project site has been historically used for such agricultural production, but no Swainson's hawks or sign of the species was observed during the reconnaissance level biological survey.

Potential nesting habitat is present in two locations. One location is in the large trees located outside the Survey Area, on the residential properties to the northeast and east boundaries of the Project site. Another potential location is in trees adjacent to the canal on the western boundary of the Project site. There are also small trees on the northwest corner of the Project site that could provide suitable nesting habitat for migratory nesting birds, but those trees are not suitable for nesting raptors. Although the Project site does not contain nesting habitat it does contain suitable foraging habitat.

Western Burrowing owl

The western burrowing owl has a moderate potential to occur within the Project site and immediate surrounding area. The most recent CNDDB recorded occurrence (EONDX 105727) of a burrowing owl is approximately 7.0 miles south of the Project site. There is a moderate potential for burrowing owl to reside or forage on the Project site and in open fields in the vicinity of the Project site. There were no potential burrows observed within the Project site. No burrowing owl or sign were observed at the time of the survey, but they could become present at any time.

San Joaquin Kit Fox

The San Joaquin kit fox has a moderate potential to occur within the Project site and immediate surrounding area. The most recent CNDDB recorded occurrence (EONDX 115009) of a San Joaquin kit fox observation is approximately 8.0 miles northwest of the Project site. Due to the lack of high-quality habitat and the lack of suitable foraging opportunities, there is a only moderate potential for San Joaquin kit fox to reside or forage on the Project site or in the agricultural fields surrounding the Project site. No San Joaquin kit fox or their sign (e.g., potential dens, tracks, scat) were observed within the Survey Area during the reconnaissance survey. However, the San Joaquin kit fox is known to occur in the vicinity of the Project site and could potentially be present from time to time as a transient forager.

American Badger

The American badger has a low potential to occur within the Project site and immediate surrounding area. The most recent CNDDB record occurrence (EONDX 74778) of an American badger is approximately 8.0 miles northeast of the Project site. There is a low potential for American badger to reside or forage on the Project site. The American badger is known to occur in the vicinity of the Project site and could potentially be present from time to time as a transient forager.

CONCLUSION

The Project site and surrounding area has been disturbed for years by ongoing agriculture crop cultivation and residential development. The Project site and vicinity does not provide suitable habitat for any special-status plant species and no mitigation measures to protect, avoid, or minimize impacts to special-status plant species are warranted.

There is the potential for some special-status or protected wildlife species to be impacted by Project activities. Mitigation Measures MM BIO-1 through MM Bio-6 would protect, avoid, and minimize impacts to special-status wildlife species, as provided below. When implemented, these measures would reduce impacts to these species to below significant levels.

MITIGATION MEASURE(S)

MM BIO-1: Prior to ground disturbing activities, a qualified wildlife biologist shall conduct a biological clearance survey no more than 30 calendar days prior to the onset of construction.

The clearance survey shall include walking transects to identify presence of San Joaquin kit fox, American badger, Swainson's hawk, Western burrowing owl, nesting birds_and other special-status species or signs of, and sensitive natural communities. The pre-construction survey shall be walked by no greater than 30-foot transects for 100 percent coverage of the Project site and the 50-foot buffer, where feasible.

Exclusion zones for kit fox shall be placed in accordance with U.S. Fish and Wildlife Service (USFWS) Recommendations using the following:

Potential Den	50-foot radius
Known Den	100-foot radius
Natal/Pupping Den (Occupied and Unoccupied)	Contact U.S. Fish and Wildlife Service for guidance
Atypical Den	50-foot radius

Buffer zones shall be considered Environmentally Sensitive Areas (ESAs) and no ground disturbing activities shall be allowed within a buffer area. The United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) shall be contacted upon the discovery of any SJKF individuals within 500 feet, natal or pupping dens is found during construction activities. CDFW staff shall be contacted at (559) 243-4014 and R4CESA@wildlifeca.gov.

Potential kit fox dens may be excavated provided that the following conditions are satisfied: (1) the den has been monitored for at least five consecutive days and is deemed unoccupied by a qualified biologist; (2) the excavation is conducted by or under the direct supervision of a qualified biologist. Den monitoring and excavation should be conducted in accordance with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (United States Fish and Wildlife Service, 2011).

In addition, impacts to occupied burrowing owl burrows shall be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 *	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

MM BIO-2: Prior to ground disturbance activities, or within one week of being deployed at the Project site for newly hired workers, all construction workers at the Project site shall attend a Construction Worker Environmental Awareness Training and Education Program, developed and presented by a qualified biologist.

The Construction Worker Environmental Awareness Training and Education Program shall be presented by the biologist and shall include information on the life history wildlife and plant species that may be encountered during construction activities, their legal protections, the definition of "take" under the Endangered Species Act, measures the Project operator is implementing to protect the species, reporting requirements, specific measures that each worker must employ to avoid take of the species, and penalties for violation of the Act. Identification and information regarding special-status or other sensitive species with the potential to occur on the Project site shall also be provided to construction personnel. The program shall include:

- An acknowledgement form signed by each worker indicating that environmental training has been completed.

- A copy of the training transcript and/or training video/CD, as well as a list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be maintain on site for the duration of construction activities.

MM BIO-3: If all Project activities are completed outside of the Swainson's hawk nesting season (February 15 through August 31), this mitigation measure shall need not be applied. If construction is planned during the nesting season, a preconstruction survey shall be conducted by a qualified biologist to evaluate the site and a 0.5-mile buffer around the site for active Swainson's hawk nests. If potential Swainson's hawk nests or nesting substrates occur within 0.5 mile of the Project site, then those nests or substrates must be monitored for Swainson's hawk nesting activity on a routine and repeating basis throughout the breeding season, or until Swainson's hawks or other raptor species are verified to be using them. Monitoring shall be conducted according to the protocol outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). The protocol recommends that ten visits be made to each nest or nesting site: one during January 1-March 20 to identify potential nest sites, three during March 20-April 5, three during April 5-April 20, and three during June 10-July 30. To meet the minimum level of protection for the species, surveys shall be completed for at least the two survey periods immediately prior to Project-related ground disturbance activities. During the nesting period, active Swainson's hawk nests shall be avoided by 0.5 mile unless this avoidance buffer is reduced through consultation with the CDFW and/or USFWS. If an active Swainson's hawk nest is located within 500 feet of the Project or within the Project site, including the stick nest located within the Project, the Project proponent shall contact CDFW for guidance.

MM BIO-4: A qualified biologist shall conduct a pre-construction survey on the Project site and within 500 feet of its perimeter, where feasible, to identify the presence of the western burrowing owl. The survey shall be conducted between 14 and 30 days prior to the start of construction activities. If any burrowing owl burrows are observed during the preconstruction survey, avoidance measures shall be consistent with those included in the CDFW staff report on burrowing owl mitigation (CDFG 2012). If occupied burrowing owl burrows are observed outside of the breeding season (September 1 through January 31) and within 250 feet of proposed construction activities, a passive relocation effort may be instituted in accordance with the guidelines established by the California Burrowing Owl Consortium (1993) and the California Department of Fish and Wildlife (2012). During the breeding season (February 1 through August 31), a 500-foot (minimum) buffer zone should be maintained unless a qualified biologist verifies through noninvasive methods that either the birds have not begun egg laying and incubation or that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

MM BIO-5: If construction is planned outside the nesting period for raptors (other than the western burrowing owl) and migratory birds (February 15 to August 31), no mitigation shall be required. If construction is planned during the nesting season for migratory birds and raptors, a preconstruction survey to identify active bird nests shall be conducted by a qualified biologist to evaluate the site and a 250-foot buffer for migratory birds and a 500-foot buffer for raptors. If nesting birds are identified during the survey, active raptor nests shall be avoided by 500 feet and all other migratory bird nests shall be avoided by 250 feet. Avoidance buffers may be reduced if a qualified on-site monitor determines that encroachment into the buffer area is not affecting nest building, the rearing of young, or otherwise affecting the breeding behaviors of the resident birds. Because nesting birds can establish new nests or produce a second or even third clutch at any time during the nesting season, nesting bird surveys shall be repeated every 30 days as construction activities are occurring throughout the nesting season.

No construction or earth-moving activity shall occur within a non-disturbance buffer until it is determined by a qualified biologist that the young have fledged (left the nest) and have attained sufficient flight skills to avoid Project construction areas. Once the migratory birds or raptors have completed nesting and young have fledged, disturbance buffers will no longer be needed and can be removed, and monitoring can cease.

MM BIO-6: During all construction-related activities, the following mitigation shall apply:

l. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from the construction or Project site.

m. Construction-related vehicle traffic shall be restricted to established roads and predetermined ingress and egress corridors, staging, and parking areas. Vehicle speeds should not exceed 20 miles per hour (mph) within the Project site.
n. To prevent inadvertent entrapment of kit fox or other animals during construction, the contractor shall cover all excavated, steep-walled holes or trenches more than two feet deep at the close of each workday with plywood or similar materials. If holes or trenches cannot be covered, one or more escape ramps constructed of earthen fill or wooden planks shall be installed in the trench. Before such holes or trenches are filled, the contractor shall thoroughly inspect them for entrapped animals. All construction-related pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored on the Project site shall be thoroughly inspected for wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in anyway. If at any time an entrapped or injured kit fox is discovered, work in the immediate area shall be temporarily halted and USFWS and CDFW shall be consulted.
o. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
p. No pets, such as dogs or cats, shall be permitted on the Project sites to prevent harassment, mortality of kit foxes, or destruction of dens.
q. Use of anti-coagulant rodenticides and herbicides in Project areas shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional Project-related restrictions deemed necessary by the USFWS <u>and CDFW</u>. If rodent control must be conducted, zinc phosphide shall be used because of the proven lower risk to kit foxes.
r. A representative shall be appointed by the Project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative shall be identified during the employee education program and their name and telephone number shall be provided to the USFWS.

s. The Sacramento Fish and Wildlife Office of USFWS and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during Project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact can be reached at ~~1701~~ (559) 243-4014 and R4CESA@wildlifeca.gov.
t. All sightings of the San Joaquin kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed shall also be provided to the Service at the address below.
u. Any Project-related information required by the USFWS or questions concerning the above conditions, or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at: Endangered Species Division, 2800 Cottage Way, Suite W 2605, Sacramento, California 95825-1846, phone (916) 414-6620 or (916) 414-6600.
v. If burrowing owl are found to occupy the Project site and avoidance is not possible, burrow exclusion may be conducted by qualified biologists only during the non-breeding season, before breeding behavior is exhibited, and after the burrow is confirmed empty through non-invasive methods (surveillance). Replacement or occupied burrows shall consist of artificial burrows at a ratio of 1 burrow collapsed to 1 artificial burrow constructed (1:1). Ongoing surveillance of the Project site during construction activities shall occur at a rate sufficient to detect Burrowing owl, if they return.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.4b – Would the Project 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 Wildlife or U.S. Fish and Wildlife Service?

According to CNDDB there are two sensitive natural communities, including Great Valley Cottonwood Riparian Forest (EONDX 28905) and Valley Saltbush Scrub (EONDX 16319) with the potential to occur within 10-miles of the Project site (CNDDB 2019). The Project site is highly disturbed and does not provide habitat to maintain these communities. No sensitive natural communities were identified within the Project site or buffer area during the biological reconnaissance survey. There are no anticipated impacts to sensitive natural communities as a result of the proposed Project. The Project site covers an area of approximately 49.5 acres and consists of vacant, previously disturbed land. The Project site is surrounded by disturbed cultivated land.

Riparian habitat is defined as lands that are influenced by a river, specifically the land area that encompasses the river channel and its current or potential floodplain. The Project is not located within a river or an area that encompasses a river or potential floodplain. The proposed Project would not have any adverse effect to a riparian habitat.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.4c – Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

The United States Army Corps of Engineers (USACE) has regulatory authority over the Clean Water Act (CWA), as provided for by the EPA. The USACE has established specific criteria for the determination of wetlands based upon the presence of wetland hydrology, hydric soils, and hydrophilic vegetation. There are no federally protected wetlands or vernal pools that occur within the Project site.

Wetlands, streams, reservoirs, sloughs, and ponds typically meet the criteria for federal jurisdiction under Section 404 of the CWA and State regulatory authority under the Porter-Cologne Water Quality Control Act. Streams and ponds typically meet the criteria for State regulatory authority under Section 1602 of the California Fish and Game Code. There are no features on the Project site that would meet the criteria for either federal jurisdiction or State regulatory authority. The Project site is bounded on the south by the Arvin Edison Canal and the Kern Island Canal to the west, However, construction activities would not be conducted along or in the canals. Once constructed, the Project site would be fenced and therefore would restrict access to either canal. There would be no impact to federally protected wetlands or waterways or State wetlands or waters.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.4d – Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Wildlife migratory corridors are described as a linear stretch of land that connects two open pieces of habitat that would otherwise be unconnected. These routes provide shelter and sufficient food supplies to support wildlife species during migratory movements. Movement corridors generally consist of riparian, woodlands, or forested habitats that span contiguous acres of undisturbed habitat and are important elements of resident species' home ranges.

The proposed Project and surrounding area does not occur within a known terrestrial migration route, significant wildlife corridor, or linkage area as identified in the Recovery Plan for Upland Species in the San Joaquin Valley (US Fish and Wildlife Service, 1998) or in areas identified by the Essential Habitat Connectivity Project (Spencer, W.D., et al, 2010). The survey conducted for the Project did not provide evidence of a wildlife nursery or important migratory habitat being present on the Project site. Migratory birds and raptors could use habitat on or near the Project for foraging and/or as stopover sites during migrations or movement between local areas. The Central Branch Kern Island Canal boarders the site to the west and the Arvin-Edison Water Canal borders the site to the south and both could potentially be used as a wildlife corridor.

The canals bordering the western and southern boundaries of the Project may serve as a local movement corridor for frogs, toads, and fish. However, there is no native habitat for wildlife species to utilize along the canal or in the immediate area of the Project site, and the Project will not eliminate, modify, or otherwise impact these features. The Project would not substantially affect migrating birds or other wildlife. The Project will not restrict, eliminate, or significantly alter a wildlife movement corridor, wildlife core area, or Essential Habitat Connectivity area, either during construction or after the Project has been constructed. Project construction will not substantially interfere with wildlife movements or reduce breeding opportunities.

Additionally, the land surrounding the Project site is developed with residences or is planned for continuation of agricultural development that would sever wildlife movement through the site and eliminate any nursery site. The proposed Project would not interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. Therefore, there would be no impacts to wildlife movements, would not affect movement corridors, or impeded a nursery site.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.4e – Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

There are no adopted local policies or ordinances protecting biological that would apply to this Project site. Therefore, implementation of the proposed Project would have no conflict related to an adopted local policies or ordinances protecting biological.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.4f – Would the Project conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?

The Project site is within the Metropolitan Bakersfield Habitat Conservation Plan (MBHCP) boundaries and the associated Incidental Take Permit (ITP) issued by the California Department of Fish and Wildlife. However, under the MBHCP other agencies that do not obtain permits from the City or County, such as schools and hospitals, are not automatically covered by the MBHCP. The proposed Project would not be covered under the MBHCP ITP.

The Project is subject to biological resources mitigation and this environmental analysis has concluded that the Project would have a less than significant impact with incorporation of mitigation. The Project would follow approved survey protocols and avoidance and minimization measures similar to what is required by the MBHCP.

The Project is not located within any other Natural Community Conservation Plan or any other local, regional, or state conservation plan. With mitigation, the proposed Project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.5 - CULTURAL RESOURCES				
Would the Project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5?	☐	☒	☐	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Discussion

This section is based on a cultural resource record search (RS # 19-341) conducted at the Southern San Joaquin Valley Information Center of the California Historical Resources Information System at the California State University, Bakersfield (Parr, Robert, 2019) , and the technical memo is included in this document as Appendix C. The purpose of the search was to determine whether any known cultural resources or previously conducted cultural resource surveys were located on or near the Project.

The Native American Heritage Commission (NAHC) was also contacted and a Sacred Lands File search was conducted. The results of that search and the list of local tribal groups that was included is also included in Appendix C of this document.

Impact #3.4.5a – Would the Project cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5?

As defined by CEQA Guidelines Section 15064.5, "historical resources" are:

- A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Public Resource Code Section 5024.1, Title 14 California Code of Regulations, Section 4850 et seq.).
- A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Public Resources Code Section 5024.1, Title 14 CCR, Section 4852) including the following:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

The records search covered an area within one-half-mile of the subject property and included a review of the *National Register of Historic Places, California Points of Historical Interest*, *California Registry of Historic Resources*, *Historical Landmarks, California State Historic Resources Inventory*, and a review of cultural resource reports on file.

Nine cultural resource studies have been conducted within a half mile of the property. No cultural resources have been recorded on or within a half mile of the Crescent Elementary School Construction Project property. The records search indicated that the subject property has never been surveyed for cultural resources and it is not known if any exist there.

Although there is no obvious evidence of historical or archaeological resources on the Project site, there is the potential during construction for the discovery of cultural resources. Grading and trenching, as well as other ground-disturbing actions, have the potential to damage or destroy these previously unidentified and potentially significant cultural resources within the Project area, including historical resources. In the unlikely event the disturbance of any deposits that have the potential to provide significant cultural data would be considered a significant impact under CEQA. However, implementation of MM CUL-1 would reduce potential impacts to cultural resources to less than significant levels

MITIGATION MEASURE(S)

MM CUL-1: If prehistoric or historic-era cultural materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified archaeologist can evaluate the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants. If the qualified archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from Project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation.

LEVEL OF SIGNIFICANCE

Impact would be ***less than significant with mitigation incorporated***.

Impact #3.4.5b – Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?

On August 23, 2019, letters were mailed to each of the Native American tribes within the geographic area as identified by the NAHC (see Appendix C). The letters included a Project description and location maps. To date, one response was received from the San Manual Band of Mission Indians that indicated the Project site is located outside of their ancestral territory.

See also discussion of Impact #3.4.5a, above.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM CUL-1

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.5c – Would the Project disturb any human remains, including those interred outside of formal cemeteries?

Although unlikely, subsurface construction activities, such as trenching and grading, associated with the proposed Project could potentially disturb previously undiscovered human burial sites. Accordingly, this is a potentially significant impact. Although considered unlikely subsurface construction activities could cause a potentially significant impact to previously undiscovered human burial sites. The records searches did not indicate the presence of human remains, burials, or cemeteries within the Project site. No human remains have been discovered at the Project site, and no burials or cemeteries are known to occur within the area of the site. However, construction would involve earth-disturbing activities, and it is still possible that human remains may be discovered, possibly in association with archaeological sites. Implementation of the below mitigation measure would ensure that the proposed Project would not directly or indirectly destroy previously unknown human remains. It is unlikely that the proposed Project would disturb any known human remains, including those interred outside of formal cemeteries. However, with implementation of MM CUL-2, the Project would have a less than significant impact.

MITIGATION MEASURE(S)

MM CUL-2: If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code. The specific protocol, guidelines, and channels of communication outlined by the Native American Heritage Commission, in accordance with Section 7050.5 of the Health and Safety Code, Section 5097.98 of the Public Resources Code (Chapter 1492, Statutes of 1982, Senate Bill 297), and Senate Bill 447 (Chapter 44, Statutes of 1987), shall be followed. Section 7050.5(c) shall guide the potential Native American involvement, in the event of discovery of human remains, at the direction of the county coroner.

LEVEL OF SIGNIFICANCE

Impact would be ***less than significant with mitigation incorporated***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.6 - ENERGY				
Would the Project:				
a. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

Discussion

The following analysis is based primarily on the *Energy Consumption Technical Memo* (QK, 2019)prepared for this Project (see Appendix D), and other available data.

Impact #3.4.6a – Would the Project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Energy demand during the construction phase would result from the transportation of materials, construction equipment, and employee vehicle trips. Construction equipment includes excavators, graders, off-highway trucks, rubber-tired dozers, scrapers, tractors, loaders, backhoes, forklifts, cement and mortar mixers and cranes. The Project would comply with the SJVAPCD requirements regarding the use of fuel-efficient vehicles and equipment, to the extent feasible. Using a typical fuel efficiency of 5.85 miles per gallon, the delivery of building materials is expected to require approximately 15,827 gallons of diesel per construction phase (QK, 2019) The Project will not use natural gas during the construction phase. Compliance with standard regional and local regulations, the Project would minimize fuel consumption during construction.

There are no unusual project characteristics that would cause construction equipment to be less energy efficient compared with other similar construction sites in other parts of the State. Thus, construction-related fuel consumption of the Project would not result in inefficient, wasteful, or unnecessary energy use.

Energy demand during the operational phase would result from ongoing school activities the use of typical appliances and school equipment, maintenance equipment and six existing school buses. It is anticipated that approximately 78% of student are bussed and 22% either walk or ride their bicycle to school. According to calculations based on construction equipment data provided by the applicant, the total fuel consumption for the Project would not increase, based on current existing bus routes, parent drop-offs, and pick-ups. The school district will not be expanding their district.

Construction and operationally related fuel consumption at the project would not result in inefficient, wasteful, or unnecessary energy use. The Project would have a less than significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.6b – Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The Project must comply with Title 24, Chapter 4 of the California Building Standards Commission for all school buildings and Part 6, of the California Energy Code (CEC) (California Building Standards Commission, 2019). Additionally, the Project must comply with Section 100 of the CEC for information and applications of CEC adoptions (California Building Standards Commission, 2019). Finally, the Project must comply with the California Code of Regulations (CCR), Title 20 with adoptions of the California Energy Commission (California Building Standards Commission, 2019)

The Crescent Elementary School Project would result in the construction of a new school. Energy saving strategies will be implemented where possible to further reduce the Project's energy consumption, during the construction phase. Strategies being implemented include those recommended by the California Air Resources Board (CARB) that may reduce both the Project's energy consumption, including diesel anti-idling measures, light-duty vehicle technology, usage of alternative fuels such as biodiesel blends and ethanol, and heavy-duty vehicle design measures to reduce energy consumption. Additionally, as outlined in the SJVAPCD's GAMAQI, the Project includes recommendations to reduce energy consumption by shutting down equipment when not in use for extended periods, limiting the usage of construction equipment to eight cumulative hours per day, usage of electric equipment for construction whenever possible in lieu of diesel or gasoline powered equipment, and encouragement of employees to carpool to retail establishments or to remain on-site during lunch breaks.

The Project will also incorporate energy saving design features to offset electrical lighting use in the facility by installing Solatube Brighten Up Series skylights and dual-pane glass windows with window treatments throughout the campus and by the use of renewable energy. The Project proposes to install photovoltaic solar panels shade structures over the 52-space staff parking lot. Energy efficient lighting, motion detector switches, will be installed throughout the interior of the facility. In addition, the Project will use low flow toilets, xeriscaping, drought tolerant plans and drip irrigation to reduce water consumption. Based on this analysis, the Project would be consistent and not conflict with or obstruct a State of local plan related to renewable energy or energy consumption. Impacts would be less than significant.

Mitigation Measure(s)

No mitigation is required.

Level of Significance

Impacts would be ***less than significant.***

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.7 - Geology and Soils				
Would the Project:				
a. Directly or indirectly cause 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.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
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 offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☒	☐	☐
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?	☐	☐	☒	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☒	☐
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

Discussion

The following analysis is based primarily on the *Geologic Hazard Study* (Soils Engineering, Inc., 2019a), prepared for this Project, and other available data.

Impact #3.4.7a(i) – Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving 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?

All of Kern County and the central Valley is considered seismically active. The proposed construction and operation of the Project would increase the potential exposure of persons working on the Project site to seismic events including risk of loss, injury, and death related to earthquakes and related hazards.

Although the Project site is not located within an Alquist-Priolo Earthquake Zone, however, is within the vicinity of several active faults. The nearest active fault is the Kern Front Fault, approximately 10 miles to the northwest. Fault Rupture Hazard Zone is the Edison Fault located approximately 7 miles northeast (Soils Engineering, Inc., 2019a). The nearest Seismic Source Type A fault is the San Andreas Fault, located approximately 30 miles from the site.

In addition, pursuant to the California Educational Code Sections 17212 and 17212.5 construction of school buildings have to comply with safety standards that prohibit schools to be located on an active earthquake fault or fault trace. The proposed project would comply with the most recent California Building Standards Code which is implemented by the Division of the State Architect (DSA) and provides criteria for the seismic design of buildings.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impact would be ***less than significant***.

Impact #3.4.7a(ii) – Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

Given the high seismicity of the southern San Joaquin Valley region, moderate to severe ground shaking associated with earthquakes on the nearby faults can be expected within the project area and throughout Kern County. In the event of an earthquake on one of the nearby faults, it is likely that the Project site would experience ground shaking and expose people and structures associated with the Project. The Lamont Seismic Hazards Atlas Map shows the nearest actives include the Kern Front Fault approximately 16.3 kilometers, the White

Wolf Fault, approximately 17.8 km and the Pleito Fault approximately 32 km from the (Soils Engineering, Inc., 2019a). An estimated ground motion of 0.270g occurred at the site from an aftershock resulting from a 7.7 magnitude earthquake on the White Wolf Fault in July 1952; and, the White Wolf Fault and the San Andreas Fault has produced most of the historical earthquakes in the vicinity of the project site.

While such shaking would be less severe from an earthquake that originates at a greater distance from the Project site, the effects could potentially be damaging to school buildings and supporting infrastructure. The Project is required to design all school development and associated infrastructure to withstand substantial ground shaking in accordance with applicable State law IBC CBC and Title 5 and Title 24 earthquake construction standards, including those relating to soil characteristics. Adherence to all applicable local and State regulations would avoid any potential impacts to structures resulting from liquefaction at the project site. Therefore, there would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.7a(iii) – Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

Liquefaction could result in local areas during a strong earthquake or seismic ground shaking where unconsolidated sediments and a high-water table coincide. The subsurface soils generally consisted of well-graded sand, sandy clay, sandy silt, silty sand, and poorly-graded sand in the top 50 feet below ground surface Shallow groundwater was encountered at a depth of 20-25 feet, and the unconfined aquifer is not less than 50 feet below ground surface. Based on the analysis of multiple borings taken from the site and available data, there is a low potential for liquefaction to occur during a major earthquake. (Soils Engineering, Inc., 2019a).

Therefore, the Project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure including liquefaction. Structures constructed as part of the Project would be required by State law to be constructed in accordance with all applicable IBC CBC, Title 5 and Title 24 construction standards. Adherence to all applicable regulations would reduce or avoid any potential impacts to structures resulting from liquefaction at the Project site and impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be *less than significant*.

Impact #3.4.7a(iv) – Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

The site and surrounding area is flat, with no significant topological features. There is no potential for rock fall and landslides to impact the site in the event of a major earthquake, as the area has no dramatic elevation changes. Based on the predicted maximum horizontal accelerations at the project site and the soil types, minor subsurface settlement may occur on site during a major earthquake, and this is considered less than significant. The property is flat and there is a low potential for landslides. The site would not be subject to liquefaction impacts due to the depth of groundwater below ground surface (Soils Engineering, Inc., 2019a).

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be *less than significant*.

Impact #3.4.7b – Would the Project result in substantial soil erosion or the loss of topsoil?

Construction activities associated with the proposed Project would disrupt surface vegetation and soils and would expose these disturbed areas to erosion by wind and water. National Pollutant Discharge Elimination System (NPDES) stormwater permitting programs regulate stormwater quality from construction sites, which includes erosion and sedimentation. Under the NPDES permitting program, the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) are required for construction activities that would disturb an area of one acre or more. A SWPPP must identify potential sources of erosion or sedimentation that may be reasonably expected to affect the quality of stormwater discharges as well as identify and implement best management practices (BMPs) that ensure the reduction of these pollutants during stormwater discharges. Typical BMPs intended to control erosion include sandbags, retention basins, silt fencing, storm drain inlet protection, street sweeping, and monitoring of water bodies. Mitigation Measure MM GEO-1 requires the approval of a SWPPP to comply with the NPDES General Construction Permit from the Central Valley Regional Water Quality Control Board (RWQCB).

In the long-term and after construction activities have been completed on the Project site, the ground surface will have impermeable surfaces as well as permeable surfaces. The impermeable surfaces would include roadways, driveways, parking lots, and building sites. The permeable surfaces would include the ball fields and landscape areas which would stabilize the permeable areas. Overall, development of the Project would not result in conditions where substantial surface soils would be exposed to wind and water erosion.

The Project would not result in substantial soil erosion or the loss of topsoil. Impacts would be less than significant with incorporation of mitigation measures.

MITIGATION MEASURE(S)

MM GEO-1: Prior to construction, the District shall submit 1) the approved Storm Water Pollution Prevention Plan (SWPPP) and 2) the Notice of Intent (NOI) to comply with the General National Pollutant Discharge Elimination System (NPDES) from the Central Valley Regional Water Quality Control Board. The requirements of the SWPPP and NPDES shall be incorporated into design specifications and construction contracts. Recommended best management practices for the construction phase may include the following:

- Stockpiling and disposing of demolition debris, concrete, and soil properly;
- Protecting existing storm drain inlets and stabilizing disturbed areas;
- Implementing erosion controls;
- Properly managing construction materials; and
- Managing waste, aggressively controlling litter, and implementing sediment controls.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant. with mitigation incorporated***.

Impact #3.4.7c – Would the Project 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 offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

The Project site and surrounding area is flat is not located in an unstable geologic unit or on soil that is considered unstable; there is no evidence of landslides on the Project site. The site has generally flat relief with a slight slope to the south-east. The United States Department of Agriculture Natural Resources Conservation Service indicates that Kimberlina Fine Sandy Loam underlies the project site (see Figure 3.4.7-1). This soil is characterized by the following attributes: 0-2% slopes, well drained, moderate permeability, high water capacity, slow run-off, slight water erosion hazard, low-shrink swell potential, and a storie index rating of 95.

As indicated in the Geological Hazard Study, groundwater levels in the project vicinity range between 160-180 feet below ground surface (bgs) (Soils Engineering, Inc., 2019a). Liquefaction potential appears to be low to moderate. A perched aquifer currently exists due to agricultural production but will likely dissipate upon the cessation of agricultural activities onsite. Therefore, although permeable unconsolidated strata provide the opportunity for liquefaction and lateral spreading to occur, the absence of groundwater near the surface (pending dissipation of the perched aquifer) keeps the potential for liquefaction and lateral spreading to occur to a minimum. This being said, as recommended in the Geologic Hazard Study completed for the project, the potential for liquefaction and settlement to occur on site is predicated on the perched groundwater dissipating at the site. Therefore, the Mitigation Measure MM GEO-2 will be implemented to confirm dissipation of the perched water table.

As indicated in the MBGP EIR, the southern portion of the planning area is susceptible to subsidence; the Project is located in this area (City of Bakersfield, 2002) Implementation of Uniform Building Code Standards as well as DSA requirements will help to reduce impacts associated with subsidence of the Project site. Further, the estimated amount of settlement that would occur at this site during a major earthquake is up to 4.38 inches if water is present and 0.63 inches if water is not present in the top 50 feet (Soils Engineering, Inc., 2019a). Consequently, if the perched water table has not dissipated by the commencement of construction, subsidence could occur. Implementation of MM GEO-2 will reduce potential subsidence impacts to a less than significant level.

As indicated in previous responses, the site is located on 0-2% slopes, which do not provide the conditions required for significant on-site land sliding. Additionally, the site is not located near any areas with sufficient slope which could result in off-site landslides. Moreover, the Project will be designed by an engineer to resist spreading, subsidence, liquefaction or collapse.

MITIGATION MEASURE(S)

MM GEO-2: Prior to the commencement of construction, the contractor shall evaluate whether the perched water table has begun to dissipate under the site. Results of the testing and evaluation shall be submitted to the Lead Agency for review and evaluation. If evaluation determines that the perched water is not dissipated, the Lead Agency will consult with the Division of the State Architect to discuss possible changes in project design to provide protection from liquefaction and settlement.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.7d – Would the Project 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?

Based on the lithology encountered in the top 10 feet of soil in the Project area, it was determined that it is unlikely expansive soils would be encountered. The Project is located within an area where the lowest amount of subsidence and hydrocompaction has occurred (Soils Engineering, Inc., 2019a)

The Project would comply with all applicable requirements of the California Department of Education Title 5, California Code of Regulations, and the most recent California Building Standards Code that provides criteria for the appropriate design of buildings. The proposed

Project would not be located on any identified expansive soils, as defined in the California Building Code. Therefore, the Project would have a less than significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.7e – Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?

The proposed Project will not use a septic system. Once annexed into the City of Bakersfield, the Project will connect to the existing sewer line/system located about ¼ mile to the west. That system is the "Panama and Union Planned Sewer Area." Therefore, the Project would have a less than significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.7f – Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Geological records of the region indicate that the Project area is underlain by recent alluvial deposits (2,000 – 150 BP) to all depths likely to be reached by excavations associated with development (Meyer, Jack et al, 2010). These alluvial deposits appear to be too young geologically to contain significant fossil remains based on the age of Buena Vista Lake deposits, which represent the distal end of the Kern River deposits. Therefore, the Project area is considered to have a very "low potential." (City of Bakersfield, 2002). However, there remains the possibility for previously unknown, buried paleontological resources or unique geological sites to be uncovered during subsurface construction activities. Therefore, this would be a potentially significant impact. Mitigation is proposed requiring standard inadvertent discovery procedures to be implemented to reduce this impact to a level of less than significant.

MITIGATION MEASURE(S)

MM GEO-3: During any ground disturbance activities, if paleontological resources are encountered, all work within 25 feet of the find shall halt until a qualified paleontologist as defined by the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (2010), can evaluate the find and make recommendations regarding treatment. Paleontological resource materials may include resources such as fossils, plant impressions, or animal tracks preserved in rock. The qualified paleontologist shall contact the Natural History Museum of Los Angeles County or other appropriate facility regarding any discoveries of paleontological resources.

If the qualified paleontologist determines that the discovery represents a potentially significant paleontological resource, additional investigations and fossil recovery may be required to mitigate adverse impacts from Project implementation. If avoidance is not feasible, the paleontological resources shall be evaluated for their significance. If the resources are not significant, avoidance is not necessary. If the resources are significant, they shall be avoided to ensure no adverse effects, or such effects must be mitigated. Construction in that area shall not resume until the resource appropriate measures are recommended or the materials are determined to be less than significant. If the resource is significant and fossil recovery is the identified form of treatment, then the fossil shall be deposited in an accredited and permanent scientific institution. Copies of all correspondence and reports shall be submitted to the Lead Agency.

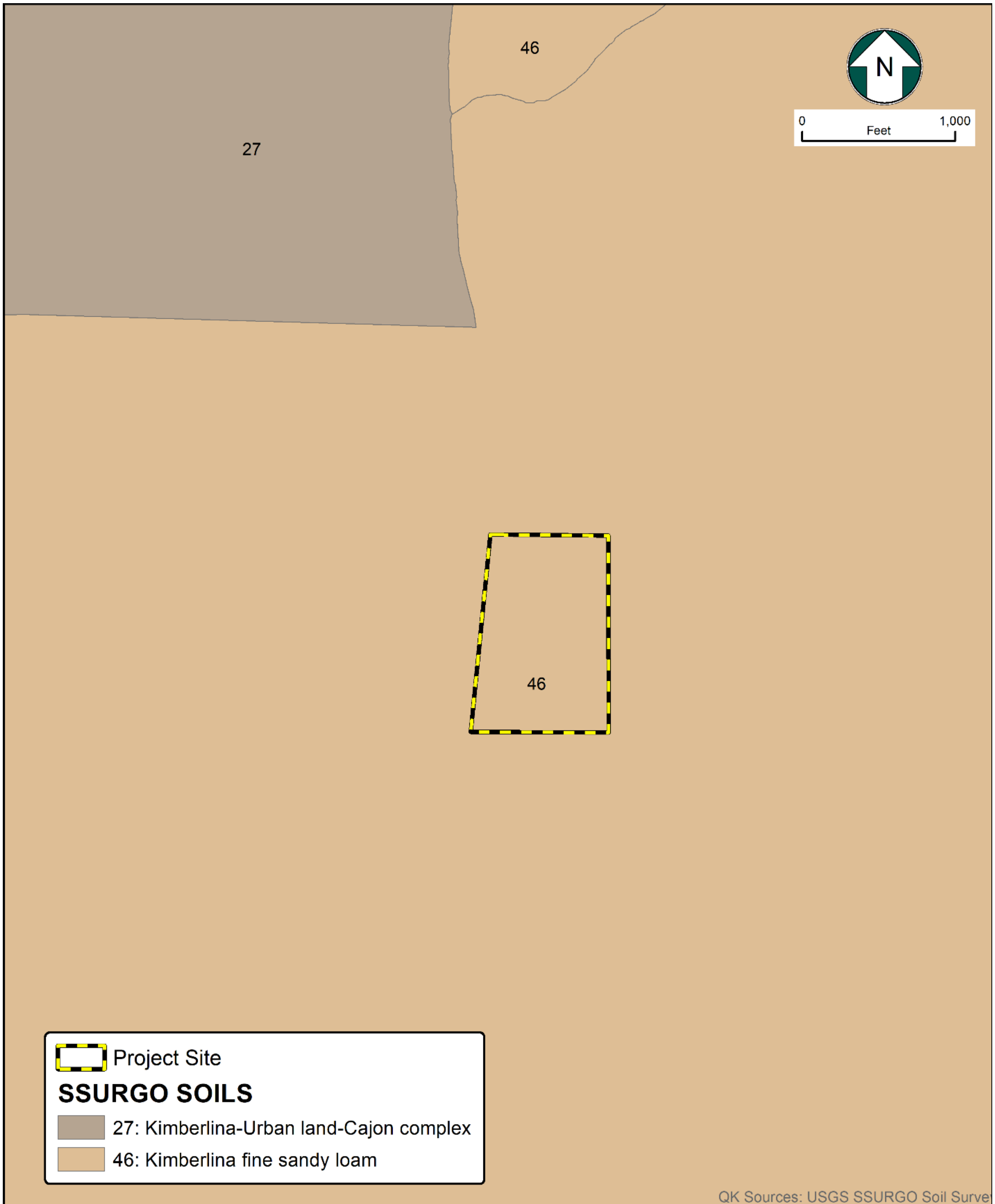


Figure 3.4.7-1
Soil Types

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.8 - GREENHOUSE GAS EMISSIONS				
Would the Project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b. Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Impact #3.4.8a – Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Although construction and operation of the proposed Project would result in emissions of GHGs, the Project does not exceed the SPAL established by the SJVAPCD. Therefore, the Project is anticipated to have a less than significant impact on the environment.

As noted in 3.4.3- *Air Quality* an AQIA was prepared for a comprehensive high school construction project, which included greenhouse gases (GHG) emissions modeling (Kern High School District, 2018). GHG emissions were determined to be minimal. Since this Project is significantly smaller in size and scope, it can be extrapolated that emissions of GHG would also be minimal.

See also Impact 3.4.3a.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.8b – Would the Project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

See Impact 3.4.8 Discussion above. The Project will not exceed the 1,875-student SPAL established by the SJVAPCD. Therefore, the Project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs and impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.9 - 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?	☐	☒	☐	☐
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?	☐	☒	☐	☐
c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐
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 it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e. For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area?	☐	☒	☐	☐
f. Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☐
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☒	☐

Discussion

This section is based on the *Geologic Hazard Study* (Soils Engineering, Inc., 2019a)*,* the *Power Line Information Letter* report (Soils Engineering, Inc., 2019b) *Preliminary*

Environmental Assessment (PEA) (Soils Engineering, Inc., 2019c) and a *Hazardous Waste Landfills, Potentially Hazardous Sites and Naturally Occurring Asbestos* letter report (Soils Engineering, Inc, 2019d) prepared for the Project. These studies are included in Appendix C of this document.

Impact #3.4.9a – Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Kern County Environmental Health Services Division is the Certified Unified Program Agency (CUPA) for the County. The CUPA unifies and consolidates the various requirements for businesses handling hazardous materials, generating or treating hazardous wastes, The Business Plan consists of the following items: Hazardous Materials Business Plan Certification Form, Business Activities Page, Business Owner/Operator Identification Page, Hazardous Materials Inventory Pages(s), Site Map Form, Emergency Response Plans and Procedures, and Employee Training Program.

Construction of the Project would involve the transport and use of minor quantities of hazardous materials such as fuels, oils, lubricants, hydraulic fluids, paints and solvents. The types and quantities of hazardous materials to be used and stored onsite would not be of a significant amount to create a reasonably foreseeable upset or accident condition. The handling and transport of all hazardous materials onsite would be performed in accordance with all applicable federal, State, and local laws and regulations.

During Project operation, minor amounts of custodial chemicals would be used for cleaning purposes. The presence of such materials could present risk if not managed properly. The presence and use of these materials, which can be classified as hazardous materials, create the potential for accidental spillage and exposure of workers to these substances. The District has procedures in place for the transport, use, and storage of hazardous materials which comply with the CDE Title 5. Hazardous and non-hazardous wastes would likely be transported to and from the Project site during the construction phase of the proposed Project. Construction would involve the use of some hazardous materials, such as diesel fuel, hydraulic oil, grease, solvents, adhesives, paints, and other petroleum-based products, although these materials are commonly used during construction activities and would not be disposed of on the Project site. Any hazardous waste or debris that is generated during construction of the proposed Project would be collected and transported away from the site and disposed of at an approved off-site landfill or other such facility. In addition, sanitary waste generated during construction would be managed through the use of portable toilets, which would be located at reasonably accessible on-site locations. Hazardous materials such as paint, bleach, water treatment chemicals, gasoline, oil, etc., may be used at the proposed school. These materials are stored in appropriate storage locations and containers in the manner specified by the manufacturer and disposed of in accordance with local, federal, and State regulations. Additionally, and in accordance with applicable federal and State Health and Safety Codes, and Kern County regulations, the Project proponent would be required to prepare and submit a hazardous materials business plan to include the new school site to the appropriate regulatory agency. Therefore, with implementation of Mitigation Measure MM HAZ-1, no significant hazard to the public or to the environment through the routine transport, use, or disposal of hazardous waste during construction or operation of the new school campus would occur.

SEI collected shallow (0 to 6 inches) discrete soil samples at 36 locations evenly spread across the site, along with soil samples beneath a pole-mounted electrical transformer and adjacent to a water transfer pump. The 36 discrete soil samples from the field areas were combined by the analytical laboratory into 12 composite soil samples and were analyzed for organochlorine pesticides (OCPs). Twelve (12) discrete soil samples (-B sample from each composite) were analyzed for CAM 17 metals. The discrete soil samples collected beneath the electrical transformer and adjacent to the water transfer pump were analyzed for PCBs and petroleum hydrocarbons and metals, respectively (Soils Engineering, Inc., 2019c). DTSC accepted the results of this sampling event but required additional soil sampling be conducted in the irrigation ditches and low-lying areas along the northern and eastern property boundaries.

Discrete soil samples were collected at depths of 0 to 6inches and 2 feet to 2.5 feet at nine locations within the irrigation ditches located along the northern and eastern property boundaries and were analyzed for OCPs. The shallow (0 to 6 inches) soil samples collected at the end of the irrigation ditches were also analyzed for CAM 17 metals, with the other shallow soil samples analyzed for arsenic. Oil-stained soil was encountered in the central area of the northern irrigation ditch at sample location D3, so additional soil samples (3 locations) were collected in this area and analyzed for Total Petroleum Hydrocarbons (TPH). Selected soil samples in this area of concern were also analyzed for polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and CAM 17 metals. s (Soils Engineering, Inc., 2019c) The site is absent of significant concentrations of pesticides and metals in the soil.

An active 8-inch crude oil pipeline and an idle 6-inch crude oil pipeline operated by Kern Oil on located the south side of Panama Lane. No high-pressure natural gas pipelines appear within 1,500 feet of the site (Soils Engineering, Inc., 2019c). A pipeline risk assessment (PRA) of the pipelines was conducted per CDE protocols. Based on that analysis, the probabilities for individual risk were calculated to be insignificant at a value of 2.3 x 10^{-7} for the combined pipelines and 2.2 x 10^{-7} for the 6 inch or the 8inch pipeline. Analysis indicates that a 120-foot setback from the 8-inch crude oil pipeline is appropriate for this Project. To reduce impacts from the pipelines, Mitigation Measure MM HAZ-3 requires and setback of 120 feet from the pipeline, and the inclusion of a high-pressure pipeline release scenario in the emergency response program for the school.

A visual site reconnaissance indicated that no power lines are present within 350 feet of the site boundaries carry greater than 50 kilovolt (kV) power overhead or underground. Overhead power lines at 21 kV are present along the south side of Panama Lane, on the west side of the site and along the east side of Cottonwood Road. No underground power lines are present within or along the borders of the site. No setbacks from these power lines are required since they carry power <50 kV (Soils Engineering, Inc., 2019b).

With mitigation, the proposed Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste. Based on analysis above, Mitigation Measures MM HAZ-1 through MM HAZ-4 have been proposed to mitigate potential impacts. With this mitigation, the proposed Project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials nor 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. Therefore, impacts would be less than significant with mitigation incorporated.

MITIGATION MEASURE(S)

MM HAZ-1: Prior to operation of the Project, the Project proponent shall prepare a Hazardous Materials Business Plan that identifies the new location of the new school campus and submit it to the appropriate regulatory agency for review and approval. The Project proponent shall provide the hazardous materials business plan to all contractors working on the Project and shall ensure that one copy is available at the Project site at all times.

MM HAZ-2: In the event that other abandoned or unrecorded wells are uncovered or damaged during excavation or grading activities, all work shall cease and the California Department of Conservation, Division of Oil, Gas and Geothermal Resources shall be contacted for requirements and approvals. The California Department of Conservation, Division of Oil, Gas and Geothermal Resources may determine that remedial plugging operations may be required.

MM HAZ-3: Prior to commencement of construction, the location of all classroom buildings will be a minimum of 120 feet away of the crude oil pipelines.

MM HAZ-4: Prior to operation of the Project, a high-pressure pipeline release scenario shall be included as part of the school's emergency response program.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.9b – Would the Project 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?

See Impact #3.4.8a, above.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM HAZ-1 through MM HAZ-4.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.9c – Would the Project emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

See Impact #3.4.8a, above.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM HAZ-1 through MM HAZ-4.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.9d – Would the Project 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 it create a significant hazard to the public or the environment?

An online search was conducted of Cortese List to identify locations on or near the Project site. The Department of Toxic Substances Control (DTSC) website, indicated that there are no hazardous or toxic sites in the vicinity (within one mile) of the Project site (Cal EPA, n.d.). The State Water Resources Control Board website indicated that there are no Permitted Underground Storage Tanks, Leaking Underground Storage Tanks, or any other cleanup sites on or in the vicinity (within one mile) of the project site (California Water Resources Board, n.d.).

The Project is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and would not create a significant hazard to the public or the environment. The Project site is not within the immediate vicinity of a hazardous materials site and would not impact a listed site. Literature review of available federal, State, and local database information systems was performed for the purpose of identifying known recognized environmental conditions present on the site and the nearby properties that have the potential to adversely impact the site. There is no data identifying any facilities within ¼ mile of the site that might reasonably be anticipated to emit hazardous air emissions or handle hazardous materials, substances, or wastes that might affect the proposed school site. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be *less than significant.*

Impact #3.4.9e – For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area?

The nearest public or private airport is Bakersfield Municipal Airport, located on East Planz Road, approximately 6,500 feet northwest of the project site. The proposed Project is located within the "C" Compatibility Zone of the Kern County Airport Land Use Compatibility Plan. Two existing schools are located within close proximity to this Airport, Leo G. Pauly Elementary School is located 2,500 feet west and Casa Loma Elementary School is located 2,600 feet north.

A letter has been received from the California Department of Transportation – Division of Aeronautics (included as Appendix E of this document). The letter states that Caltrans has reviewed the proposed site in relation to the Kern County Airport Land Use Compatibility Plan (ALUCP), California Airport Land Use Planning Handbook, and other relevant documentation. Although the Project appears to be in conflict with the adopted Kern County ALUCP; however, in an inspection of the site, the proposed Project provides an "appropriate level of safety suitable for a school." Caltrans encouraged the incorporation of noise attenuation methods to Project design and construction. With the addition of noise attenuations design features such as dual pane glass, the Project would have a less than significant impact.

LEVEL OF SIGNIFICANCE

Impacts would be *less than significant.*

Impact #3.4.9f – Would the Project Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?

The proposed Project is required to adhere to the standards set forth in the Uniform Fire Code, which identifies the design standards for emergency access during both the Project's construction and operational phases. The Project would also comply with the appropriate local and State requirements regarding emergency response plans and access. Mitigation Measure MM HAZ-4 recommends that a high-pressure pipeline release scenario be included in the emergency response program for the school. The proposed Project would not inhibit the ability of local roadways to continue to accommodate emergency response and evacuation activities.

With implementation of Mitigation Measure MM HAZ-4, the proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, the Project would have a less than significant impact with the incorporation of mitigation.

MITIGATION MEASURE(S)

Implementation of Mitigation Measure MM HAZ-4.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.9g – Would the Project Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The proposed Project is surrounded by a mix of agricultural and residential land uses and would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, as there are no wildlands in the vicinity. According to available data, (see Figure 1-3), the Project site is not located within a hazard zone classified as Very High, High or Moderate for wildland fires (Cal Fire, 2006). Construction and operation of the Project is not expected to increase the risk of wildfires on and adjacent to the Project site. The Project will also be required to comply with all applicable standards as required by the State Fire Marshall, CDE Title 5 and Title 24 regulations, as well as local fire codes.

The proposed Project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Therefore, the impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***

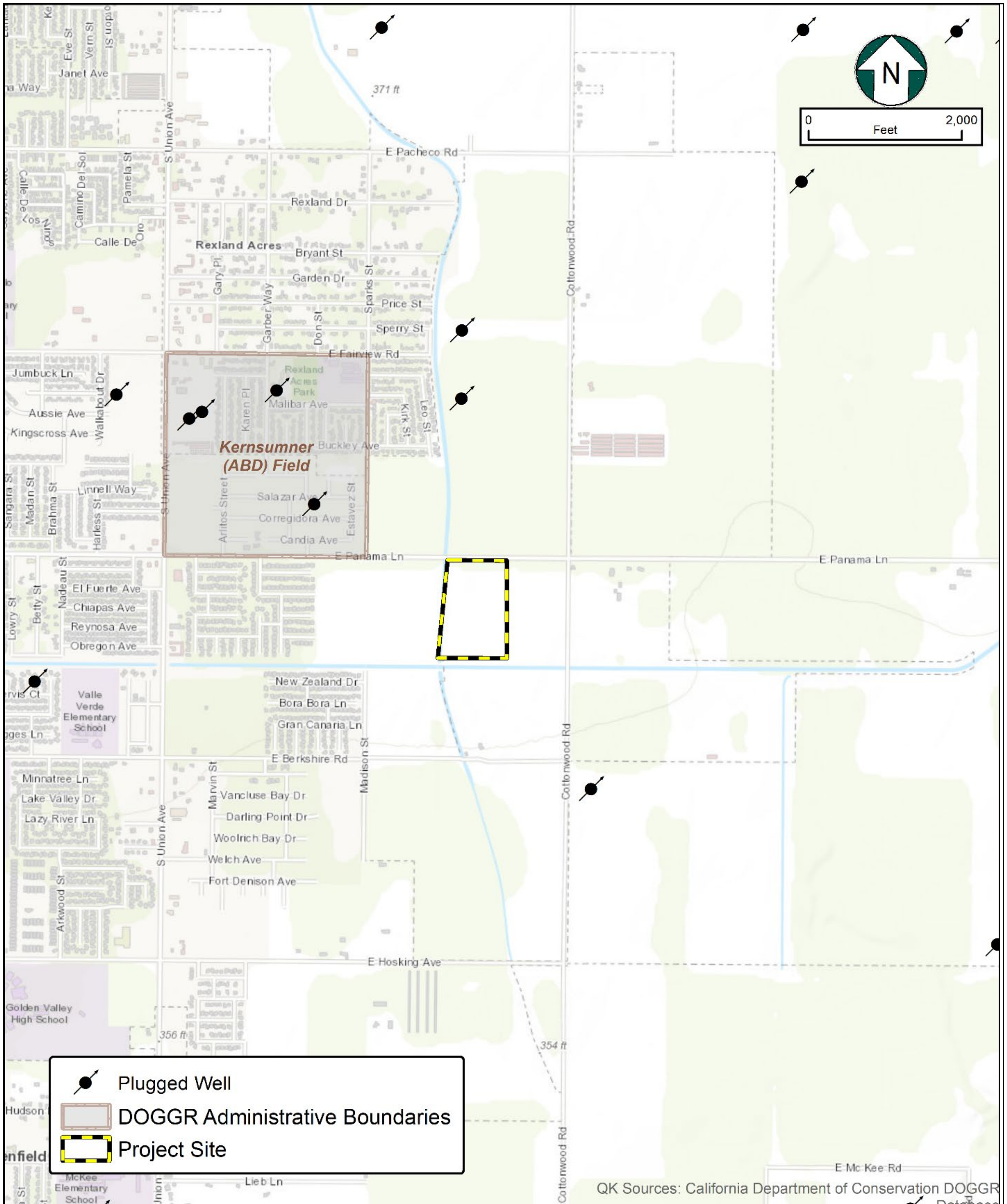


Figure 3.4.9-1
Oil / Gas Wells and Field Boundaries

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.10 - HYDROLOGY AND WATER QUALITY				
Would the Project:				
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality?	☐	☒	☐	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☒	☐	☐
i. Result in substantial erosion or siltation on- or off-site?	☐	☒	☐	☐
ii. Substantially increase the rate of amount of surface runoff in a manner which would result flooding on- or offsite?	☐	☒	☐	☐
iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☒	☐	☐
iv. Impede or redirect flood flows?	☐	☒	☐	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☐
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☒	☐	☐

Discussion

Impact #3.4.10a – Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality?

Construction of the Project would involve excavation, soil stockpiling, mass and fine grading, the installation of supporting drainage facilities, and associated infrastructure. During site grading and construction activities, large areas of bare soil could be exposed to erosive forces for long periods of time. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading activities could result in increased erosion and sedimentation to surface waters.

Additionally, accidental spills or disposal of potentially harmful materials used during construction could possibly wash into and pollute surface water runoff. Materials that could potentially contaminate the construction area, or spill or leak, include lead-based paint flakes, diesel fuel, gasoline, lubrication oil, hydraulic fluid, antifreeze, transmission fluid, lubricating grease, and other fluids. A SWPPP for construction-related activities would include, but not be limited to, the following types of BMPs to minimize the potential for pollution related to material spills:

- Vehicles and equipment will be cleaned.
- Vehicle and equipment fueling, and maintenance requirements will be established.
- A spill containment and clean-up plan will be in place prior to and during construction activities.

In order to reduce potential impacts to water quality during construction activities, Mitigation Measure MM GEO-1 requires the Project proponent to file a Notice of Intent (NOI) to comply with the NPDES General Construction Permit and prepare a SWPPP. The Project SWPPP would include BMPs targeted at minimizing and controlling construction and post-construction runoff and erosion to the maximum extent practicable. Mitigation Measure MM HYD-1 requires the District to limit grading to the minimum area necessary for construction and operation of the Project. Additionally, as noted in Section 3.4.9, *Hazards and Hazardous Materials*, Mitigation Measure MM HAZ-1 requires that all hazardous wastes be stored and properly managed in accordance with the approved Hazardous Waste Exclusion Plan and hazardous materials business plan.

In order to reduce potential impacts to water quality during construction and operation activities, Mitigation Measures MM GEO-1, MM HAZ-1 through MM HAZ-4 as well as MM HYD-1 would be required. With mitigation, the proposed Project would not violate any water quality standards or waste discharge requirements. Therefore, the Project would have a less than significant impact with incorporation of mitigation.

Mitigation Measure(s)

MM HYD-1: The District shall limit grading to the minimum area necessary for construction and operation of the Project. Final grading plans shall include best management practices to limit onsite and offsite erosion.

Implementation of Mitigation Measures MM GEO-1, MM HAZ-1 through MM HAZ-4.

Level of Significance

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10b – Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The Project site is located within the Kern County Subbasin within the San Joaquin Vlley Groundwater Basin (Basin Number 5-22.14, DWR Bulletin 118), which is identified as being critically overdrafted (California Department of Water Resources, 2003), The City of Bakersfield is a member of the Kern River Groundwater Sustainability Agency (KRGSA, Groundwater Management Act (SGMA) requirements and the newly formed Groundwater Sustainability Agencies. SGMA consists of three legislative bills and the legislation provides a framework for a long-term sustainable groundwater management across California. Local stakeholders have until 2020 to develop, prepare, and begin to implement the plan. GSAs will then have the responsibility to achieve groundwater sustainability. However, at this time, no additional requirements or implementation measures are applicable since a GSP has not been adopted within the subbasin.

The water purveyor for the Project area will be California Water Service, supplied by combination of groundwater wells, treated and untreated surface water, and imported water. The 2015 Urban Water Management Plan (UWMP) Bakersfield District prepared by California Water Service (City of Bakersfield, 2016) concludes that sufficient water supplies will exist to satisfy all current and projected future customers of the water district, during normal, single-dry, and multiple-dry years. The proposed project would not 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. Mitigation measure HYD-3 requires the District to obtain a water "will serve" letter from California Water Service. Therefore, the project would have a less than significant impact.

See also Impact #3.4.1-19b.

Mitigation Measure(s)

MM HYD-2: Prior to initiation of grading activities, the District shall obtain a water "will serve" letter from California Water Service.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10c(i) – Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site?

The rate and amount of surface runoff is determined by multiple factors, including the following: topography, the amount and intensity of precipitation, the amount of evaporation that occurs in the watershed and the amount of precipitation and water that infiltrates to the groundwater. The proposed Project would alter the existing drainage pattern of the site, which would have the potential to result in erosion, siltation, or flooding on- or off-site. The disturbance of soils on-site during construction could cause erosion, resulting in temporary construction impacts. In addition, the placement of permanent structures on-site could affect drainage in the long-term. Impacts from construction and operation are discussed below.

As discussed in Impact #3.4.10a. above, potential impacts on water quality arising from erosion and sedimentation are expected to be localized and temporary during construction. Construction-related erosion and sedimentation impacts as a result of soil disturbance would be less than significant after implementation of an SWPPP (see Mitigation Measure MM GEO-1) and BMPs required by the NPDES. No drainages or other water bodies are present on the Project site, and therefore, the proposed Project would not change the course of any such drainages; however, erosion may occur on-site during rain events or high winds. Mitigation Measure MM HYD-1 requires the District to limit grading to the minimum area necessary for construction and operation of the Project. Additionally, as noted in Section 3.4.9, *Hazards and Hazardous Materials*, Mitigation Measure MM HAZ-1 requires that all hazardous wastes be stored and properly managed in accordance with the approved Hazardous Waste Exclusion Plan and hazardous materials business plan.

With mitigation, the Project would not 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. Therefore, the Project would have a less than significant impact with incorporation of mitigation.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM HAZ-1, MM GEO-1, and MM HYD-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10c(ii) – Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through

the addition of impervious surfaces, in a manner which would substantially increase the rate of amount of surface runoff in a manner which would result flooding on- or offsite?

See also Impact #3.4.9c, above.

The Project site is relatively flat, and grading would be minimal. The topography of the site would not appreciably change because of grading activities. The site does not contain any blue-line water features, including streams or rivers. The Arvin Edison and Kern Island canals runs along the southerly and westerly border of the site, respectively. However, the Project would not impact the canals, as they are off site. The Project would develop significant areas of impervious surfaces that could significantly reduce the rate of percolation at the site or concentrate and accelerate surface runoff in comparison to the baseline condition. However, a water retention basin on the south portion of the Project site would be sufficient to retain stormwater on the Project site. In addition, there are areas of the Project that would be undeveloped (i.e, kindergarten yard, portions of the recreational field) and stormwater would generally allow water to percolate to ground.

Mitigation Measures MM HAZ-1 would require the Project proponent to prepare and implement a Hazardous Materials Business Plan, which would minimize this impact by ensuring safe handling of hazardous materials on site and providing for cleanup in the event of an accidental release. MM GEO-1 and MM HYD-1 requires the development of a SWPPP and the use of BMPs, and limit the amount of grading where feasible to reduce impacts to water quality during construction and operation activities, respectively. The Project would not 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 drainage patterns or cause substantial surface runoff that would result in flooding on- or off-site, therefore, the Project would have a less than significant impact with the incorporation of mitigation.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM HAZ-1, MM GEO-1 and MM HYD-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10c(iii) – Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Please see response #3.4.10(a through c (ii)), above. The Project would comply with all applicable State and City codes and regulations. Additionally, there is a proposed stormwater retention basin on the site. Therefore, the Project would not 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. Impacts would be less than significant.

No streams or rivers exist within the Project's vicinity that would result in substantial erosion or siltation on- or off-site. With implementation of MM HAZ-1, MM GEO-1 and MM HYD-1 as noted above, the Project would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site, contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, nor provide additional sources of polluted runoff.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM HAZ-1, MM GEO-1 and MM HYD-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10c(iv) – Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows?

As discussed above Impact #3.4.10 a through c (iii), construction and operations activities could potentially degrade water quality through the occurrence of erosion or siltation at the Project site. Additionally, accidental release of potentially harmful materials, such as engine oil, diesel fuel, or other substances used in operation of the facilities, could potentially degrade water quality onsite.

Construction of the Project would include soil-disturbing activities that could result in erosion and siltation, as well as the use of harmful and potentially hazardous materials required to operate vehicles and equipment. The transport of disturbed soils or the accidental release of potentially hazardous materials could result in water quality degradation. The District would be required to request coverage under the NPDES Construction General Permit. A SWPPP would be prepared to specify BMPs to prevent construction pollutants as required by MM GEO-1. Mitigation Measure MM HYD-1 requires the District to limit grading to the minimum area necessary for construction and operation of the Project. Additionally, as noted in Section 3.4.8, *Hazards and Hazardous Materials*, Mitigation Measure MM HAZ-1 requires that all hazardous wastes be stored and properly managed in accordance with the approved Hazardous Waste Exclusion Plan and hazardous materials business plan. The proposed Project would not otherwise substantially degrade water quality. Therefore, the Project will have a less than significant impact.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM HAZ-1, MM GEO-1, and MM HYD-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10d – Would the Project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?

The Project site is not located near the ocean or a steep topographic feature (i.e., mountain, hill, bluff, etc.). Therefore, there is no potential for the site to be inundated by tsunami or mudflow. Additionally, there is no body of water within the vicinity of the Project site. There is no potential for inundation of the Project site by seiche.

As shown by Federal Emergency Management Agency (FEMA), the school property is not located within a 100-year flood zone (see Figure 3.4.10-1). The potential for flooding at the site appears to be very low. The proposed Project site is located within a FEMA Flood Hazard Zone X: Area of Minimal Flood Hazard.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.10e – Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Please see response #3.4.10b above. At this time, a GSP has not been prepared for the Kern County Subbasin, which is within the San Joaquin Valley Groundwater Basin. Therefore, no additional requirements or implementation measures are applicable. The Project. Mitigation measure HYD-2 requires the District to obtain a water "will serve" letter from California Water Service. It is not anticipated that the Project would substantially deplete groundwater supplies or conflict with any future adopted groundwater management plan.

MITIGATION MEASURE(S)

Implementation of Mitigation Measure MM HYD-2

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

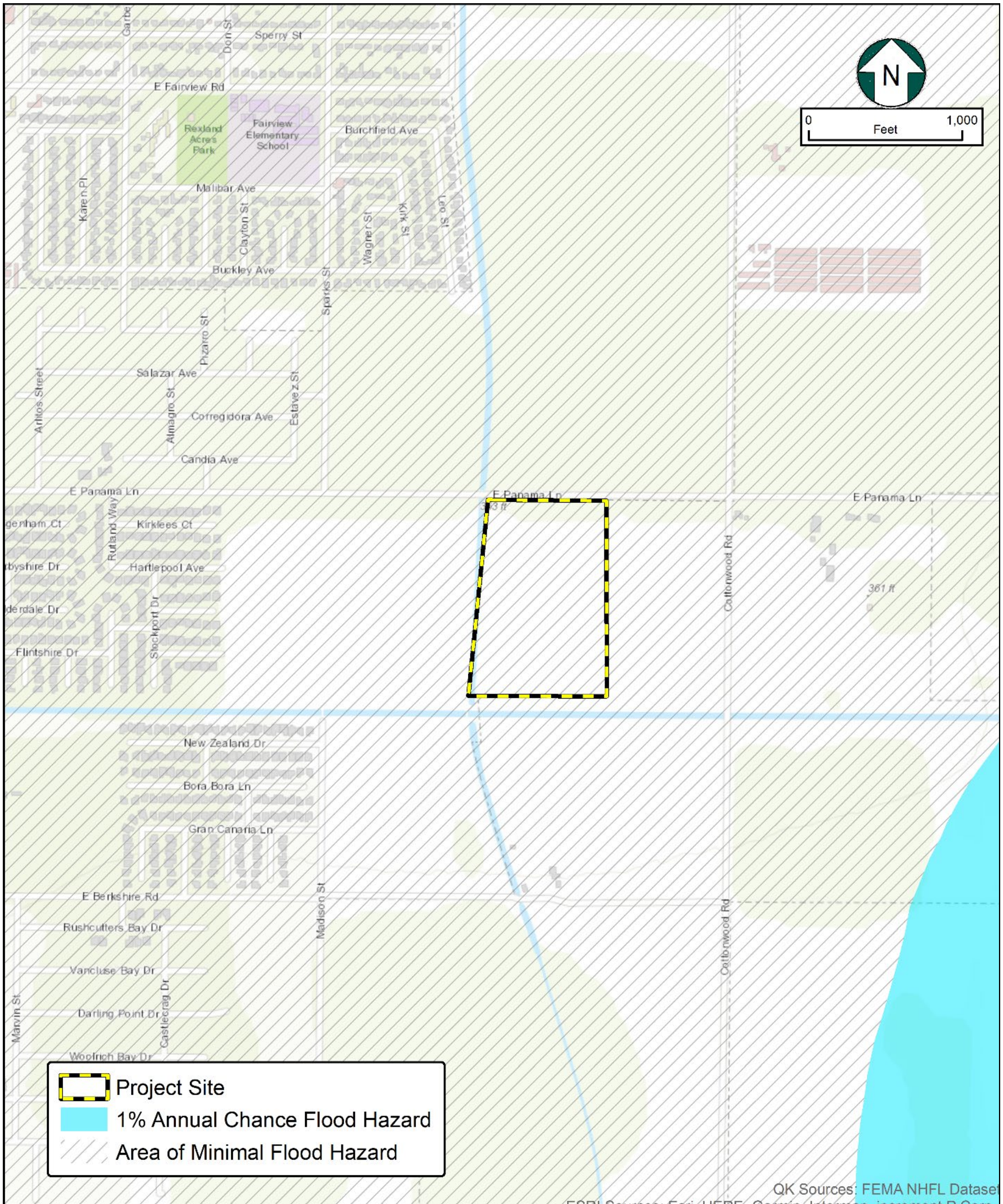


Figure 3.4.10-1
FEMA Flood Hazards

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.11 - Land Use and Planning				
Would the Project:				
a. Physically divide an established community?	☐	☐	☐	☒
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Discussion

Impact #3.4.11a – Would the Project physically divide an established community?

The proposed Project site is presently undeveloped land and is surrounded by agricultural land to the east, west, north and rural residential to the south. The boundary of incorporated City of Bakersfield is approximately ½ mile west of the Project site and surrounding agricultural lands in the area are in the process of being converted to urban uses as envisioned by the MBGP. The Project also intends to be annexed into the City in the near future. The proposed Project would not physically divide an established community. Therefore, the project will have a no impact.

Mitigation Measure(s)

No mitigation is required.

Level of Significance

There would be ***no impact***.

Impact #3.4.11b – Would the Project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

The Project is within the MBGP, which designates the project site as R-IA (Resource-Intensive Agriculture) (Figure 3.4.11-1) and is within an A (Exclusive Agriculture) zone district (Figure 3.4.11-2). While schools are not expressly allowed in this designation, they are conditionally permitted by the County. However, Government Code Section 53091 does not require a school district to comply with County land use designations and therefore, the

District is not seeking a General Plan amendment or zone change for the subject site. The Project is not anticipated to result in substantial direct or indirect population growth that was not previously anticipated by the MBGP. The proposed Project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, the Project would have no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

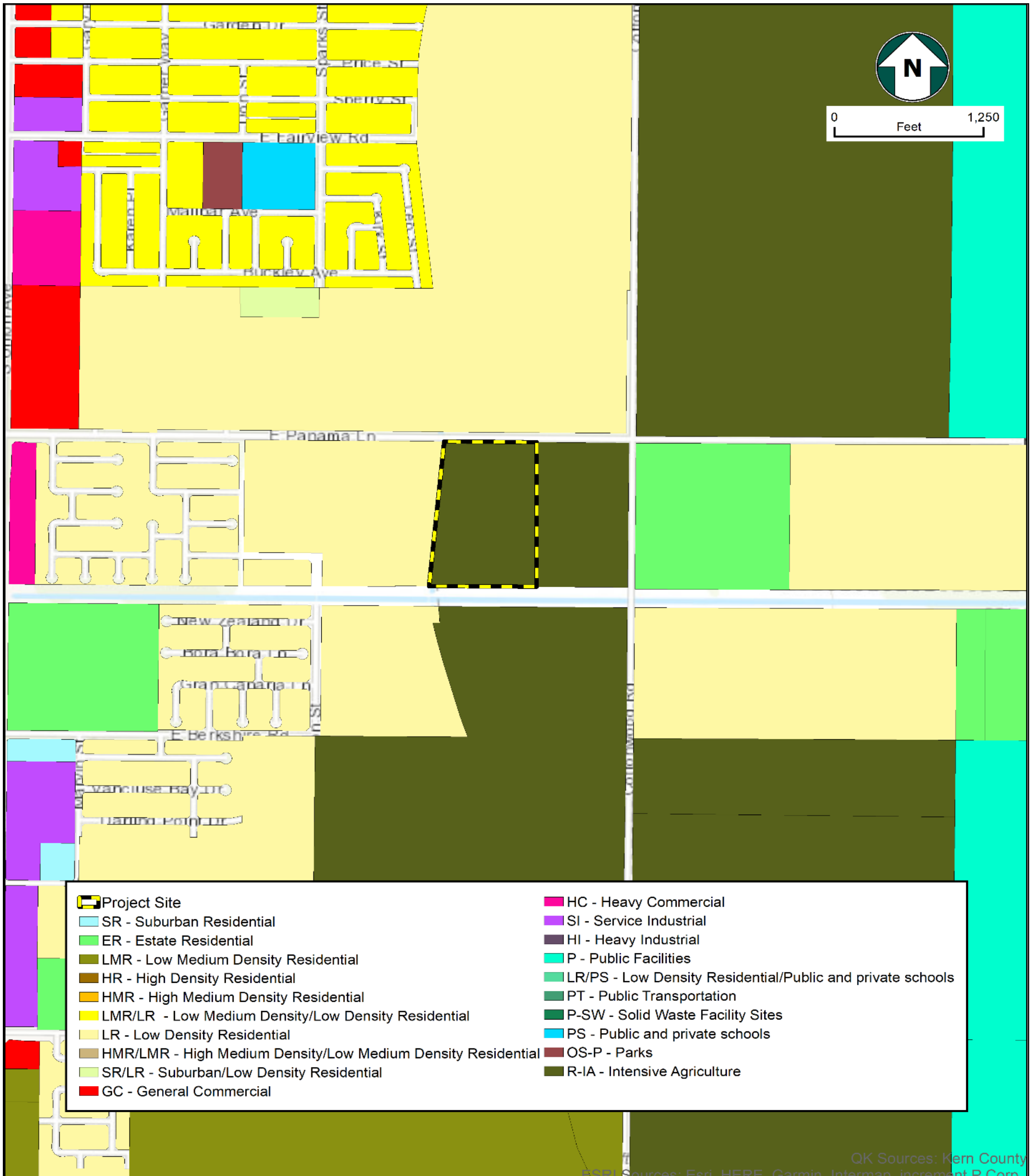


Figure 3.4.11-1
Land Use Designations

Figure 3.4.11-2
Zone Districts

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less–than-Significant Impact	No Impact
3.4.12 - 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?	☐	☐	☒	☐
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?	☐	☐	☒	☐

Discussion

Impact #3.4.12a – Would the Project 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 current mineral extraction activities exist on the project site nor are any mineral extraction activities included in the project design. As illustrated in Figure 3.4.9-1, the Project site is not located in an oilfield and there are no known wells located on the site. The closest oil well is located approximately 1,500 feet to the west of the project site. The proposed project would not result in the loss of availability of mineral resources as the project does not propose the extraction of mineral resources. Additionally, the proposed project would not restrict the ability of mineral rights' holders, in the area, to exercise their legal rights to access surrounding sites for the exploration and/or extraction of underlying oil research or other natural resources.

The proposed project would not 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. Therefore, there would be no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.12b – Would the Project 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?

As seen in Figures 3.4.11-1 and 3.4.11-2 in Section 3.4.11, *Land Use and Planning*, the proposed Project is not designated as a mineral recovery area by the MBGP. The Project would not alter any existing plans that protect mineral resources. As a result, the proposed Project would not interfere with mining operations and would not result in the loss of land designated for mineral and petroleum.

The proposed Project would not 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. Therefore, the project would have no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

3.4.13 - NOISE

Would the Project result in:

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a.	Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	☐	☒	☐	☐
b.	Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c.	For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two 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?	☐	☒	☐	☐

Analysis is based on available information and a determination from the California Department of Transportation (Caltrans) Division of Aeronautics (California Department of Transportation Division of Aeronautics, 2005), included in Appendix E of this document.

Discussion

Impact #3.4.13a – Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?

The MBGP has noise policies within the Noise Element of the plan (City of Bakersfield, 2007). It discusses the noise environment in the metro planning area and establishes policies regarding land uses that may generate noise, and sensitive land uses that may be affected by noise generated elsewhere. Schools are identified as a sensitive land use. The primary function of the Noise Element is to incorporate noise considerations into the land use decision-making process.

The Noise Element identifies the existing and projected major sources of noise in the County. These include roadways, railways, airports, industry, and facilities used for special events. The project site is not located in the immediate vicinity of any of these identified sources, with the exception of its location on the corner of Panama Lane and Cottonwood Road within two miles of the Bakersfield Municipal Airport.

The roadway sections identified as a major noise source in the Noise section of the Metropolitan Bakersfield General Plan EIR (City of Bakersfield, 2002) that are closest to the project site are 1) adjacent to the north of the project site on Panama Lane between Union Avenue & Cottonwood Road; and 2) adjacent to the east of the project site on Cottonwood Road between Panama Lane and Panama Rd. Table 4.5-7 of the Metropolitan Bakersfield General Plan Update EIR projects that the 65 dBA contour will be located approximately 48 feet and 21 feet from the roadway centerline, respectively.

For site buildings along Panama Lane, the 65-dBA contour line lies 48 feet from road centerline. Since the average right-of-way for arterial streets is 110 feet, the southern half of Panama Lane from centerline to the property boundary would be a distance of 55 feet. Therefore, the 65 dBA lies within the designated road right of way (ROW). Additionally, for site buildings along Cottonwood Road the 65-dBA contour line lies 21 feet from the road centerline. Since the average right-of-way for an arterial road is 110 feet, the western half of Cottonwood Road from centerline to the property boundary would be 55 feet. Therefore, the 65dBA contour lies within the designated ROW.

Consequently, all exterior noise levels at the property boundaries will be less than City of Bakersfield standards for acceptable outdoor noise levels. Consequently, sensitive receptors located at the school site will not be exposed to noise levels that violate applicable noise standards. Impacts to sensitive receptors onsite are considered less than significant.

The Noise Element establishes a land use compatibility criterion of 65 dB CNEL for exterior noise levels generated by stationary sources and 45 dB CNEL for interior living spaces. Outdoor activity areas generally include backyards of single-family residences, individual patios or decks of multi-family developments, and common outdoor recreation areas of transient lodging developments. The intent of the exterior noise level requirement is to provide an acceptable noise environment for outdoor activities and recreation.

When the school is constructed, traffic on local roadways would be expected to increase. School-related activities could also result in an increase in ambient noise levels in the immediate project vicinity. Activities that could be expected to generate noise include voices from students and staff, bell or alarm systems, and mechanical systems related to heating, ventilation, and air conditioning (HVAC) systems on school buildings. Additionally, nearby existing sensitive uses could be affected by noise and vibration during the construction of the project.

Noise levels from school activities would be intermittent and mostly occur during periods when students are arriving at school in the morning or leaving school in the afternoon, and during periods of recess or physical education classes on the play fields. The noise levels generated by such activities would occasionally be audible in the existing residential areas to the west of the new school but would not exceed the County's 65 dB CNEL standard. It is noted that student gathering and play areas are located near the center of the campus at a distance of more than 1,450 feet from the closest home. School bells or alarms would also be audible by the closest residence but would not generate noise levels in excess of applicable noise standards.

The closest school buildings would be at least 1,200 feet from the nearest homes located to the east of the school site. School buildings would have ground- or roof-mounted HVAC equipment that would generate noise. Details on the number, size and placement of such units were not available for analysis. However, based upon data from similar projects, it is estimated that hourly values from the continuous operation of HVAC systems could be less than 40 dB at the closest noise-sensitive receivers. Even if it is assumed that HVAC systems could operate continuously, 24 hours per day, HVAC system noise would not approach or exceed the County's 65 dB CNEL standard at the closest residential uses. As indicated in the foregoing discussion of the project's noise impacts, because the Project would generate noise levels below standards established in the MBGP or noise ordinance, and applicable standards of other agencies, its permanent increase in ambient noise levels in the project vicinity and temporary or periodic increases in ambient noise levels in the project vicinity would not be considered substantial.

Construction of the proposed project would include grading, truck traffic and the various noises generally associated with construction activities. There are a few residences to the east of the project site across Cottonwood Road which could be affected by noise from construction of the project. All other residences or sensitive receptors are located at distances sufficient to attenuate noise to acceptable levels. Implementation of the following mitigation measures will reduce temporary noise impacts from construction of the project to levels considered less than significant.

MITIGATION MEASURE(S)

MM NSE-1: During construction, the contractor shall situate implement the following measures:

- All stationary construction equipment on the Project site shall be located so that noise emitting objects or equipment faces away from any potential sensitive receptors.
- The construction contractor shall ensure that all construction equipment is equipped with manufacturer-approved mufflers and baffles During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.
- Construction activities shall not take place outside of the allowable hours specified by Section 9.22.050 of the City Noise Ordinance.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.13b – Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Construction

Construction activities in general can have the potential to create groundborne vibrations. However, based on the soil types found in the general project vicinity, it is unlikely that any blasting or pile-driving would be required in connection with construction of the school. Therefore, the potential for groundborne vibrations to occur as part of the construction of the Project is considered minimal.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative even for sustained pile driving. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. The typical vibration produced by construction equipment is illustrated in Table 3.4.13-1.

Table 3.4.13-1. Typical Vibration Levels for Construction Equipment

Equipment	Reference peak particle velocity at 25 feet (inches/second)[1]	Approximate peak particle velocity at 100 feet (inches/second)[2]
Large bulldozer	0.089	0.011
Loaded trucks	0.076	0.010
Small bulldozer	0.003	0.0004
Jackhammer	0.035	0.004
Vibratory compactor/roller	0.210	0.026

Source: Kern County Planning Department, 2013.

Notes:

1 – Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006. Table 12-2.

2 – Calculated using the following formula:

PPV_{equip} = PPVref x (25/D)1.5
where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA Transit Noise and Vibration Impact Assessment Guidelines

D = the distance from the equipment to the receiver

As indicated in Table 3.4.13-1, based on the FTA data, vibration velocities from typical heavy construction equipment that would be used during Project construction range from 0.003 to 0.644 inch-per-second peak particle velocity (PPV) at 25 feet from the source of activity. With regard to the proposed project, ground-borne vibration would be generated during site clearing and grading activities on-site facilitated by implementation of the proposed project. As demonstrated in Table 3.4-13-1, vibration levels at 100 feet would range from 0.0004 to 0.026 PPV. Therefore, the anticipated vibration levels would not exceed the 0.2 inch-per-second PPV significance threshold during construction operations at the nearest receptors, which are 1,400 feet to the east. It should be noted that 0.2 inch-per-second PPV is a conservative threshold, as that is the construction vibration damage criteria for non-engineered timber and masonry buildings (Kern County Planning Department, 2013). Buildings within the Project area would be better represented by the 0.5 inch-per-second PPV significance threshold (construction vibration damage criteria for a reinforced concrete, steel or timber buildings) (Kern County Planning Department, 2013). Therefore, vibration impacts associated with construction are anticipated to be less than significant.

Operations

Further, operation of the school would not contain any activities that would create groundborne vibrations. The proposed Project would not result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. Therefore, the Project would have a less than significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.13c – For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two 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?

As noted in response #3.4.9(e), the Bakersfield Municipal Airport is located 6,500 feet northwest of the Project site and is located within the "C" Compatibility Zone of the Kern County ALUCP. Caltrans Division of Aeronautics was notified of the potential purchase of the project site and its intended use as a school site. and a response was provided to the Lead Agency (California Department of Transportation Division of Aeronautics, 2005). As such, the District has incorporated the following design features into the project to sufficiently address noise issues associated with the airport. Implementation of mitigation measure MM NSE-2 would require the integration of design features to reduce noise coupled with regulatory requirements. These would sufficiently address noise impacts from potential aircraft flyover of the project site. Therefore, noise impacts are considered less than significant.

Mitigation Measure(s)

MM NSE-2: Project architect/contractor shall incorporate noise attenuation methods into the design and construction of Project. These include but are not limited to the following design features:

- R-30 insulation will be placed in the ceilings, which has a Sound Transmission Class (STC) rating of 37.
- R-19 insulation will be placed in the walls, which has a STC rating of 37.
- All windows will be 1-inch dual paned insulating glass, which has a STC rating of 32

Level of Significance

Impacts would be ***less than significant. with mitigation incorporated***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.14 - Population and Housing				
the Project:				
a. Induce substantial unplanned 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)?	☐	☐	☒	☐
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

Impact #3.4.14a – Would the Project induce substantial unplanned 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)?

Development of the new elementary school is in response to the overcrowded conditions in the existing surrounding schools within the District. The MBGP (City of Bakersfield, 2002) recognized growth throughout the metropolitan area, and instituted policies and implementation measures to assure orderly growth as the metropolitan area expands.

The proposed Project would not 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). Therefore, impacts of the Project would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.14b – Would the Project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

The proposed Project site is undeveloped, therefore, would not displace any existing housing or people nor would implementation of the Project require construction or replacement of housing.

In addition, it is anticipated that construction workers would come from the surrounding area and would not require new housing. The proposed Project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere. Therefore, the Project would have no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.15 - PUBLIC SERVICES				
Would the Project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or to other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☒	☐

Discussion

Impact #3.4.15a(i) – Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or to other performance objectives for any of the public services - Fire Protection?

The proposed Project would have to comply with the California Department of Education Title 5, California Code of Regulations Section 14001, which requires that "all schools are designed to meet federal, State, and local statutory requirements for structure, fire, and public safety, and shall be conveniently located for public services including but not limited to fire protection, police protection, public transit and trash disposal whenever feasible."

There are 13 fire stations located within the City of Bakersfield. However, in combination, the City and County maintain a total of 26 stations in the metropolitan area. Currently each station is responsible for a first-in response area of approximately 9 square miles. Fire suppression support for this campus would come from Kern County Fire Station #52 located on Taft Highway near South Union Avenue.

Various agreements have been adopted between the Kern County Fire Department and the City of Bakersfield Fire Department. They generally facilitate the following:

- Closest station response concept
- Dual agency training facility
- Emergency radio communication between both agencies

The existing Kern County Fire Department Station 52 or the City or Bakersfield Fire Station 5 would provide fire suppression and emergency medical services at the Project site. Station 52 is located a little over 3 miles to the southwest of the Project site along Taft Highway and Station 5 is located a little over two miles to the northwest along White Lane.

An approved water supply system capable of supplying required fire flow for fire protection purposes is to be provided to all portions of the school campus where buildings are to be located. The establishment of gallons-per-minute requirements for fire flow shall be based on the Guide for Determination of Required Fire Flow, published by the State Insurance Service Office and Kern County's adopted Fire Code.

Fire hydrants would also be located and installed per the County of Kern standards. The District would install the required infrastructure to meet water supply demands for municipal fire protection services. These design standards coupled with existing fire protection infrastructure would provide for proper fire suppression services on site. By meeting these standards and incorporating needed design features in the project design, no additional fire protection services would be required. Therefore, the project would not increase the need for such services beyond the baseline condition.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.15a(ii) – Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or to other performance objectives for any of the public services – Police Protection?

The Kern County Sheriff's Office (KCSO) provides law enforcement services to the unincorporated areas of the County. KCSO would provide primary public protection to the

Project site and surrounding areas. In addition, the Project site is located in the California Highway Patrol's Central Division.

Although the school will not directly cause an increase in population that would require more police protection services, development of a new elementary school campus could result in additional police service calls. This being said the Greenfield Union School District provides its own on-campus security service, which will relieve the need for most service calls by the Bakersfield Police Department. Therefore, impacts to police protection services are considered less than significant

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.15a(iii) – Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or to other performance objectives for any of the public services – Schools?

As stated previously, the new school site (Project) would serve students in the vicinity and alleviate possible overcrowding and high teacher-student ratios. The new school would also provide safe and modern educational and recreational opportunities for the existing and future student, faculty and staff population. The construction of an elementary school has been anticipated by the MBGP. Therefore, the proposed project has no impacts on school services.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.15a(iv) – Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or to other performance objectives for any of the public services – Parks?

The nearest park facilities are Stiern Park located approximately 1.5 miles northwest of the proposed school site; Kern Delta Park located approximately 2.3 miles southwest of the proposed school site; and Greenfield Park located approximately 1.75 miles south-southwest of the proposed school site.

As the population served by the school will most likely come from existing student populations and future student populations will be served by parks set aside by developers per City of Bakersfield development standards, development of a new elementary school would not be the cause of new demand for park services in the community, and, therefore, would not have any adverse impacts on existing parks or recreation areas. Moreover, it is likely that the school will have beneficial effects in the area because the school site and associated outdoor recreational areas could be used to host some of the activities currently held at nearby parks. Therefore, no impacts to parks and recreational facilities are expected.

The new school would provide recreational space for the students during the school day. Existing parks would not be affected by the Project because the MBGP has anticipated the growth that is driving the need for the school as well as the need for future parks to serve the anticipated population. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.15a(v) – Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or to other performance objectives for any of the public services – Other Public Facilities?

The Project is proposed as a part of the MBGP and the predicted residential development in the area in order to reduce classroom overcrowding and teacher/student ratios. The project would not induce the appreciable use of other public facilities such as libraries, courts, and other Kern County services.

The proposed Project would indirectly affect the demand for public services through the addition of school/educational capacity to serve increased population growth. However, this growth is in accordance with the MBGP.

The school would provide an additional resource in the community and could be used for many other public facility purposes, off-setting some of the need for additional public facilities, therefore, having an overall net benefit to the community. The proposed Project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause a significant environmental impact. Therefore, no impacts are expected.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less–than-Significant Impact	No Impact
3.4.16 - RECREATION				
Would the Project:				
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐

Discussion

Impact #3.4.16a – Would the Project Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

As described in Impact 3.4.15 a(iv), there are three parks located within 2.5 miles of the proposed project. Further, as a matter of policy, the Greenfield School District has made its school campuses available to the community for recreational use outside of school hours. Development of a new school is expected to have an overall beneficial effect by increasing the amount of land available for recreational needs in the southeast Bakersfield area. Therefore, no impacts to recreational resources are expected to occur.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.16b – Would the Project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

The proposed project includes facilities that are integral to a school facility, including buildings and outdoor areas that provide recreational opportunities for students. Impacts from construction of such facilities are included as part of the evaluation of the impacts as identified in the various sections of this Initial Study. Therefore, environmental impacts associated with provision of these facilities are already being assessed and addressed. The development and operation of the recreational areas will have a less than significant impact...

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.17 - TRANSPORTATION				
Would the Project:				
a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☒	☐	☐
b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☒	☐	☐
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐
d. Result in inadequate emergency access?	☐	☐	☒	☐

Discussion

The analysis below is based on a Traffic Impact Study (TIS) prepared for this Project (Ruettgers & Schuler, 2019), which is found in Appendix F of this document. The TIS was prepared using trip generation and design hour volumes calculated using the Institute of Transportation Engineers (ITE) Trip Generation, 9th Edition as well as data provided in the project description.

The following traffic scenarios were analyzed in the Traffic Study:

- Existing (2019)
- Existing + Project (2019)
- Future Cumulative (2022)
- Future Cumulative + Project (2022)
- Future Cumulative (2040)
- Future Cumulative + Project (2040)

Impact #3.4.17a – Would the Project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

The construction of the proposed elementary school is intended to relieve current overcrowding in the other District schools. It is anticipated that students living in the vicinity of the Project would attend this school, possibly reducing the distance from their homes to school, and reducing the number of vehicle miles traveled on a daily basis.

The existing roadways, providing the main circulation in the vicinity of the Project, include the following:

Cottonwood Road is designated as an arterial. It currently exists within the study area as a two-lane, north-south roadway, with graded shoulders and provides access to agricultural and low density residential land uses throughout eastern Metropolitan Bakersfield.

Fairview Road is an east-west roadway located east of SR 99 midway between Panama Lane and Pacheco Road. It is designated as a collector and provides access to residential land uses within the study area. Fairview Road currently exists as a two-lane roadway with graded shoulders adjacent to residential development.

Pacheco Road is an east-west roadway that is designated as an arterial west of Old River Road and as a collector east of Old River Road. In the vicinity of the project, East Pacheco Road exists as a two-lane roadway with graded shoulders and provides access to residential, commercial, and agricultural areas, as well as a crossing over the Kern Island Canal.

Monitor Street is a two-lane, north-south midway located midway between South H Street and South Union Avenue. Is it designated as a collector and provides access to residential areas.

Panama Lane is designated as an arterial. It extends east from SR 43 near Interstate 5 through the southern Metropolitan Bakersfield area and provides access from agricultural, residential and commercial areas to north-south arterials and collectors and SR 43 and SR 99. In the vicinity of the project, Panama Lane exists as a two-lane facility at various stages of widening adjacent to development.

South H Street is a north-south arterial which extends from Taft Highway (SR 119) to Brundage Lane and continues northward through downtown Bakersfield as H Street. It exists as a two-lane roadway in the vicinity of the Project.

Union Avenue is designated as an arterial and was formerly a segment of SR 99. South Union Avenue extends from SR 99 to Brundage Lane and continues north to Columbus Street. In the Project vicinity, South Union Avenue operates as a 4-lane divided roadway and provides access to residential and commercial land uses.

Existing and Future Traffic

Existing peak hour turn movement volumes were field measured in May and October of 2018 at the study intersections for the hours of 7:30-8:30 AM and 3:00-4:00 PM in order to coincide with the school's peak hours of operation.

Annual growth rates of up to 3.0% were applied to existing traffic volumes to estimate future traffic volumes for the opening year and 2040 scenarios. These growth rates were estimated based on KernCOG 2040 traffic model data. Table 3.4.17-1 shows the Project's trip generation assumptions used for the traffic modeling.

An investigation was also conducted for general plan amendments and zone changes for projects that would not yet be accounted for in the KernCOG traffic model. The only project that was found to interact with the roadway system in the study area was the Kern High School District's proposed high school on the northeast corner of Panama Lane and Cottonwood Road. Cumulative trip generation and distribution for the proposed high school was added to the future traffic volume estimates at the study intersections.

Table 3.4.17-1
Project Trip Generation

	General Information		Daily Trips		AM Peak Hour Trips			PM Peak Hour Trips		
ITE CODE	Dev Type	Variable	ADT RATE	ADT	Rate	In % Split/ Trips	Out % Split/ Trips	Rate	In % Split/ Trips	Out % Split/ Trips
520	Elem. School	1080 Students	eq	2116	0.67	54% 391	46% 333	0.34	45% 165	55% 202

Source: Appendix F.

Levels of Service

Criteria for intersection level of service (LOS) are shown in the Tables 3.4.16-2 and 3.4.16-3 below.

Table 3.4.17-2
Level of Service Criteria – Unsignalized Intersections

Average Control Delay (sec/veh)	Level of Service	Expected Delay to Minor Street Traffic
≤10	A	Little or no delay
10 and ≤15	B	Short traffic delays
15 and ≤25	C	Average traffic delays
25 and ≤35	D	Long traffic delays
35 and ≤50	E	Very long traffic delays
>50	F	Extreme delays

Table 3.4.17-3
Level of Service Criteria Signalized Intersections

Volume/Capacity Control Delay (sec/veh) Level of Service	Volume/Capacity Control Delay (sec/veh) Level of Service	Volume/Capacity Control Delay (sec/veh) Level of Service
<0.60	≤10	A
0.61-0.70	>10 and ≤20	B
0.71-0.80	>20 and ≤35	C

0.81-0.90	>35 and ≤55	D
0.91-1.00	>55 and ≤80	E
>1.00	>80	F

Level of service for the study intersections is presented in Tables 3.4.16-4 through 3.4.16-7. According to the MBGP the level of service goal for the roadways within the scope of this study is "C".

Table 3.4.17-4
AM Intersection Level of Service

#	Intersection	Existing Control Type	2019	2019+ Project	2022[1]	2022[1]+ Project	2040[1]	2040[1] + Project	2040+ Project w/Mitigation[1]
1	Cottonwood Rd & Pacheco Rd	Stop- EB	C	C	C	E (39.5)	F (267.6)	F (>300)	B
2	Monitor St & Fairview Rd	Signal	C	C	C	C	D (35.9)	D (40.6)	C
3	Union Ave & Fairview Rd	Signal	C	C	C	C	C	C	-
4	S H St & Panama Ln	Signal	C	C	C	C	C	C	-
5	Monitor St & Panama Ln	Signal	C	C	C	C	D (35.4)	D (36.2)	C
6	Union Ave & Panama Ln	Signal	C	D (37.9)	D (53.6)	E (62.8)	E (61.3)	F (85.7)	C
7	Project Entrance[4] & Panama Ln	Signal	-[3]	C	-[3]	C	-[3]	C[4]	-
8	Cottonwood Rd & Panama Ln	AWSC	A	B	F (57.2)	F (63.3)	F (65.8)	F (68.4)	C

NOTE: (#) = Delay in Seconds; AWSC = All Way Stop Control
[1]Includes cumulative traffic volumes from other projects
[2]See Table 7 for mitigation details
[3]Only studied with project
[4]Analyzed with Panama Lane RTIF Phase IV improvements (addition of 1 EBT, 1 WBT)

Table 3.4.17-5
PM Intersection Level of Service

#	Intersection	Existing Control Type	2019	2019+ Project	2022[1]	2022[1]+ Project	2040[1]	2040[1] + Project	2040+ Project w/Mitigation[1]
1	Cottonwood Rd & Pacheco Rd	Stop- EB	D (26.3)	D (31.8)	F (57.7)	F (83.1)	F (>300)	F (>300)	B
2	Monitor St & Fairview Rd	Signal	C	C	C	C	C	C	-
3	Union Ave & Fairview Rd	Signal	C	C	C	C	C	C	-
4	S H St & Panama Ln	Signal	C	C	C	C	D (35.8)	D (44.0)	C
5	Monitor St & Panama Ln	Signal	C	C	C	C	D (40.3)	D (46.1)	C
6	Union Ave & Panama Ln	Signal	D (39.6)	D (44.5)	D (49.0)	E (55.2)	F (93.1)	F (100.1)	C
7	Project Entrance[4] & Panama Ln	Signal	-[3]	B	-[3]	C	-[3]	C[4]	-
8	Cottonwood Rd & Panama Ln	AWSC	C	E (41.9)	F (68.7)	F (72.3)	F (78.1)	F (78.1)	C

NOTE: (#) = Delay in seconds; AWSC = All Way Stop Control
[1]Includes cumulative traffic volumes from other projects.
[2]See Table 7 for mitigation details.
[3]Only studied with project.
[4]Analyzed with Panama Lane RTIF Phase IV improvements (addition of 1 EBT, 1 WBT).

Traffic Signal Warrant Analysis

Peak hour signal warrants were evaluated for each of the unsignalized intersections within the study based on the California Manual on Uniform Traffic Control Devices (MUTCD). Peak hour signal warrants assess delay to traffic on the minor street approaches when entering or crossing a major street. Signal warrant analysis results for existing and future AM and PM peak hours are shown in Tables 3.4.17-6 (a-b) and 3.4.17-7 (a-b).

It is important to note that a signal warrant defines the minimum condition under which signalization of an intersection might be warranted. Meeting this threshold does not suggest traffic signals are required, but rather, that other traffic factors and conditions be considered in order to determine whether signals are justified.

It is also noted that signal warrants do not necessarily correlate with level of service. An intersection may satisfy a signal warrant condition and operate at or above an acceptable level of service or operate below an acceptable level of service and not meet signal warrant criteria.

Table 3.4.17-6a
AM Traffic Signal Warrants – Existing

		2019 Cumulative			2019+Project		
#	Intersection	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
1	Cottonwood Rd at Pacheco Rd	539	148	NO	613	183	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1084	333	YES
8	Cottonwood Rd at Panama Ln	507	109	NO	624	191	YES

Table 3.4.17-6b
AM Traffic Signal Warrants – Future

#	Intersection	2022 Cumulative			2022 Cumulative+ Project			2040 Cumulative			2040 Cumulative+Project		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met

1	Cottonwood Rd at Pacheco Rd	760	233	YES	834	258	YES	1198	282	YES	1272	317	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1870	333	YES	-[1]	-[1]	-[1]	2401	333	YES
8	Cottonwood Rd at Panama Ln	1405	304	YES	1522	386	YES	1637	389	YES	1754	471	YES

Table 3.4.17-7a
PM Traffic Signal Warrants – Existing

		2019 Cumulative			2019+Project		
#	Intersection	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
1	Cottonwood Rd at Pacheco Rd	758	186	YES	798	201	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1032	201	YES
8	Cottonwood Rd at Panama Ln	670	287	YES	736	292	YES

[1]Studied with Project Only

Table 3.4.17-7b
PM Traffic Signal Warrants - Future

#	Intersection	2022 Cumulative: Major Street Total Approach Vol	2022 Cumulative: Minor Street High Approach Vol	2022 Cumulative: Warrant Met	2022 Cumulative+Project: Major Street Total Approach Vol	2022 Cumulative+Project: Minor Street High Approach Vol	2022 Cumulative+Project: Warrant Met	2040: Major Street Total Approach Vol	2040: Minor Street High Approach Vol	2040: Warrant Met	2040 Cumulative+Project: Major Street Total Approach Vol	2040 Cumulative+Project: Minor Street High Approach Vol	2040 Cumulative+Project: Warrant Met
1	Cottonwood Rd at Pacheco Rd	926	211	YES	966	226	YES	1579	302	YES	1579	302	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1429	201	YES	-[1]	-[1]	-[1]	1669	201	YES
8	Cottonwood Rd at Panama Ln	1206	331	YES	1272	349	YES	1576	556	YES	1576	556	YES

[1]Studied with Project Only

Roadway Analysis

The volume-to-capacity ratios shown in Table 3.4.16-8b were calculated for roadways with published ADT information and future projected traffic as shown in Table 3.4.16-8a.

A volume-to-capacity ratio (v/c) of greater than 0.80 corresponds to a LOS of less than C, as defined in the Highway Capacity Manual. Mitigation is required where project traffic reduces the LOS to below an acceptable level, or where the pre-existing condition of the roadway is below an acceptable level of service and degrades below the pre-existing LOS with the addition of the project.

Table 3.4.17-8a
Roadway ADT & Capacity

Street	2019[1]	Project ADT	Cum. ADT	2022 ADT[2]	2022 Project[2]	2040 ADT[2]	2040+ Project[2]	Existing Capacity	Mitigated Capacity
Fairview Rd: Monitor St to Union Ave	7435[2]	75	257	8078	8153	10850	10925	20000	-
Panama Ln: S H St. to S Union Ave	22985[2]	802	1348	24820	25622	27966	28768	40000	-
Panama Ln: S Union Ave to Cottonwood Rd	8664[2]	1499	2557	11670	13169	14901	16400	15000	40000

Monitor St: Panama Ln to Fairview Rd	7392[2]	213	452	8007	8220	9066	9279	30000	-
S Union Ave: Panama Ln to Fairview Rd	16002[2]	352	688	17669	18021	24942	25294	20000	40000
Cottonwood Rd: Panama Ln to Pacheco Rd	7898[2]	444	945	9655	10099	16607	17051	15000	30000

[1]2019 data not available, traffic estimated from most recent year available.
2Cumulative traffic from other Project included in all future volumes

Table 3.4.17-8b
Roadway Level of Service

Street	v/c (EX) 2019	v/c 2019+Proj	v/c 2022	v/c 2022+Proj	v/c 2040	v/c 2040+Proj
Fairview Rd: Monitor St to Union Ave	0.37	0.38	0.40	0.41	0.54	-
Panama Ln: S H St. to S Union Ave	0.57	0.59	0.62	0.64	0.70	-
Panama Ln: S Union Ave to Cottonwood Rd	0.58	0.68	0.78	0.88	0.99	0.41
Monitor St: Panama Ln to Fairview Rd	0.25	0.25	0.27	0.27	0.30	-
S Union Ave: Panama Ln to Fairview Rd	0.80	0.82	0.88	0.90	1.25	0.63
Cottonwood Rd: Panama Ln to Pacheco Rd	0.53	0.56	0.64	0.67	1.11	0.57

Intersection and roadway improvements needed by the year 2040 to maintain or improve the operational level of service of the street system in the vicinity of the project is shown in Tables 3.4.16-9 and 3.4.16-10. The Regional Transportation Impact Fee (RTIF) Program is a fee imposed on new development and contains a Regional Transportation Facilities List and a Transportation Impact Fee Schedule. The Facilities List includes many of the facilities needed to maintain a Level of Service (LOS) C or better for new growth or to prevent the degradation of facilities which are currently operating below LOS C. The Fee Schedule sets forth the fees to be collected from new development to mitigate the need for the facilities.

Table 3.4.17-9
Future Intersection Improvements and Local Mitigation

#	Intersection	Total Improvements Required by 2040	Local Mitigation (Improvements not covered by RTIF or adjacent development)	Percent Share
1	Cottonwood Rd & Pacheco Rd	Signal; NBT, SBT	Signal	5.45%
2	Monitor St & Fairview Rd	Change NBT/R to 1 NBT, Add 1 NBR (Striping Only)	-	-
4	S H St & Panama Ln	Add 1 EBT	-	-
5	Monitor St & Panama Ln	Add 1 EBT, 1 WBT NOTE: Roadway has been widened to 6-lane arterial width but is currently striped for 4 lanes only. No widening is necessary, only striping for the addition of one lane in each direction.	-	-
6	Union Ave & Panama Ln	Add 1 EBL, 1 WBL, 1 NBL, 1 SBL Change WBT/R to 2 WBT, Add 1 WBR Change SBT/R to 2 SBT, Add 1 SBR	-	-
7	Project Entrance & Panama Ln	Add 1 EBT, 1 WBT	-	-
8	Cottonwood Rd & Panama Ln	Signal Change EBL/T/R to 2-EBL, 2-EBT, EBR Change WBL/T/R to 2-WBL, 2-WBT, WBR; Change NBL/T/R to 2-NBL, 2 NBT, NBR; Change SBL/T/R to 2-SBL, 2-SBT, SBR	-	-

Northbound, SB = Southbound, L = Left-Turn Lane, WB = Westbound, T = Through Lane, EB = Eastbound, R = Right-Turn Lan

Table 3.4.17-10
Future Roadway Improvements and Local Mitigation

Roadway Segment	Total Improvements Required by 2040	Local Mitigation (Improvements not covered by RTIF or adjacent development)
Panama Ln: S. Union Ave to Cottonwood Rd	Add 2 Lanes	-
S Union Ave: Panama Ln to Fairview Rd	Add 2 Lanes	-
Cottonwood Rd: Panama Ln to Pacheco Rd	Add 2 Lanes	-

Level of Service Analysis

With the exception of Cottonwood Road & Pacheco Road and Union Avenue & Panama Lane all other intersections operate with an acceptable level of service during peak hours in the existing year prior to the addition of project traffic.

With the addition of Project traffic to the existing year, the intersection of Cottonwood Road & Panama Lane is anticipated to operate below an acceptable level of service. All other intersections continue to operate at an acceptable level of service through the future year 2022 and are anticipated to do so with the addition of project traffic.

By the future year 2040, it is anticipated that the intersections of Monitor Street & Fairview Road and S H Street & Panama Lane will operate below an acceptable level of service. All other intersections continue to operate at an acceptable level of service in the future year 2040 and are anticipated to do so with the addition of project traffic.

The remaining intersections are anticipated to operate at an acceptable level of service during the peak hour and are expected to continue to do so with the addition of project traffic in the future year.

Roadway Capacity

All roadway segments in the project scope currently operate at an acceptable level of service in the existing year. With the addition of project traffic, all roadway segments continue to operate at an acceptable level of service with the exception of South Union Avenue from Panama Lane to Fairview Road.

All roadway segments operating at an acceptable level of service in the future year 2022 continue to do so. With the addition of project traffic in the future year 2022, it is anticipated that the roadway segment of Panama Lane from S Union Avenue to Cottonwood Road will operate below an acceptable level of service.

In the future year 2040, it is anticipated that the roadway segment of Cottonwood Road from Panama Lane to Pacheco Road will operate below an acceptable level of service. All other roadway segments operating at an acceptable level of service in the future year 2040 will continue to do so with the addition of the Project.

CONCLUSION

Based on the County of Kern's standards for determining whether Project traffic has a significant impact on intersections and roadways, the mitigation measures identified in Tables 3.4.16-9 and 3.4.16-10 are anticipated to be needed in order to reduce the impacts for the listed facilities to less than significant levels in the year 2040.

MITIGATION MEASURE(S)

MM TRA-1: Prior to commencement of construction, the District shall pay fair share costs of 5.45% for a signal at the intersection of Cottonwood Road and Pacheco Road to the City of Bakersfield Public Works Department prior to Project commencement. The District shall also pay Regional Transportation Impact Fees. Based on negotiations with the Public Works Department, it may be determined that full improvements to the Cottonwood Road and Pacheco Road intersection, along with local road improvements along the proposed Site's frontage may be acceptable in lieu of RTIF payment.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.17b – Would the Project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

See Impact #3.4.17a, above.

MITIGATION MEASURE(S)

Implementation of Mitigation Measure MM TRA-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.17c – Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The entry and exit of school buses and private automobiles could create conditions that would create unsafe roadway conditions. Vehicles exiting the campus should be provided with a clear view of the roadway without obstruction. Landscaping associated with the entry driveway could, if improperly installed, impede such views.

Specific circulation patterns and roadways for the proposed project would incorporate all applicable safety measures in the project design, which would ensure that hazardous design features or inadequate emergency access to the site or other areas surrounding the project area would not occur.

The District's conservative assumption is 22% of the students would walk or bicycle and approximately 78% of students would come by car or bus. The school site is located on the corner of Panama Lane and Cottonwood, a busy arterials intersection. Students using these transportation methods could be exposed to hazards from automobiles if safe routes are not identified. Therefore, with incorporation of design features and the mitigation measure below, impacts are expected to be less than significant.

MITIGATION MEASURE(S)

MM TRA-2: Prior to commencement of operations, the District shall prepare and circulate a "Safe Route to School" Plan that has been developed that defines the routes that children should use to travel to and from school.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.17d – Would the Project result in inadequate emergency access?

The proposed Project would be required to comply with all emergency access requirements adopted by City, County, regional, and State agencies. Site access requirements are set forth in the City of Bakersfield Municipal Code as well as dictated by the DSA. These requirements and all others required to be included in the project design will be verified by the appropriate agency prior to project approval. Therefore, emergency access impacts are considered less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less–than-Significant Impact	No Impact
3.4.18 - TRIBAL CULTURAL RESOURCES				
Would the Project:				
a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	☐	☒	☐	☐
Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or	☐	☒	☐	☐
A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Discussion

Impact #3.4.18a(i) – Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?

See the discussion presented in Section 3.4.5 - *Cultural Resources,* Impacts #3.4.5a through 3.4.5c.

On September 23, 2019, letters were mailed to each of the Native American tribes within the geographic area (see Appendix C). The letters included a brief Project description and location maps. To date, one response was received from the San Manual Band of Mission

Indians that indicated the Project site is located outside of their ancestral territory. No other letters from tribal groups were received.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM CUL-1 and MM CUL-2.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.18a(ii) – Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

See discussion for Impacts #3.4.5a through#3.4.5c.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM CUL-1 and MM CUL-2.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.19 - Utilities and Service Systems				
Would the Project:				
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b. Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☒	☐	☐
c. 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?	☐	☐	☒	☐
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

Discussion

This analysis relied upon review of applicable requirements of the RWQCB- Central Valley as provided on their web site, the Kern County Waste Management Department online resources, and analysis provided by the Metropolitan Bakersfield General Plan EIR (City of Bakersfield, 2007).

Impact #3.4.19a – Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The infrastructure necessary to serve the Project would be made available through construction of the new school. The school campus site will be annexed into the City of Bakersfield and connect to the City of Bakersfield's sanitary sewer system. The school site is located within the planned future service area for the City of Bakersfield Wastewater Treatment Plant No. 3 located west of highway 99, at the Corner of McCutchen and Ashe Roads. The wastewater plant upgraded to 32 MGD, which will adequately service the proposed Project. Therefore, no additional sewer service would be required for the proposed project. Impacts are considered less than significant.

Construction of the Project would necessitate the construction of an on-site stormwater retention basin to retain water displaced by impermeable surfaces created by the new school. Stormwater would be retained on site, and therefore not impact existing treatment facilities.

The school will connect to existing PG&E transmission for electrical power, however, the installation of solar panels also used as shade structures on the parking lot would offset the consumption of electricity needed from the regional grid. Telecommunication requirements for the new school are typical of this type of land use and would not require any expansion or construction of new telecommunication facilities.

The proposed Project would not require or result in the construction or expansion of existing of new water, wastewater treatment, electrical or telecommunications facilities. Therefore, the project would have a less than significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

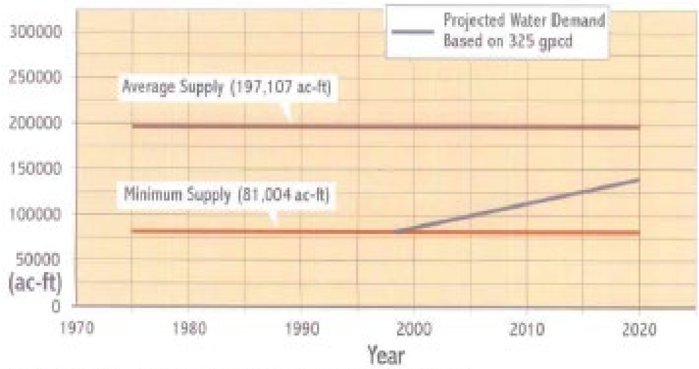
LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.19b – Would the Project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?

The City of Bakersfield lies above a series of water aquifers, which are part of a larger groundwater basin called the Southern San Joaquin Groundwater Basin. Sources of recharge for these aquifers include the Kern River Channel, runoff, canal seepage, spreading/banking, and wastewater reclamation, all of which are surface waters, and recharge the aquifers for use at a later date (City of Bakersfield, 2000). As can be seen in the chart below water balance in the City of Bakersfield will be sufficient to service projected populations in the year 2020.

Table 3.4.19-1
Projected Water Demand and Resources



Source: City of Bakersfield Water Balance Report, 2000

The Project would be served by water provided by California Water Service (CalWater) and water lines would be constructed to supply water to the school. As discussed in response to Impact #3.4.19a, above, there is adequate water supply for the Project and MM HYD-2 requires the District to obtain a will-serve letter from CalWater signifying its ability and capacity to provide an adequate water supply to the Project.

MITIGATION MEASURE(S)

Implementation of Mitigation Measure MM HYD-2.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

Impact #3.4.19c – Would the Project 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?

See #3.4.19a and b.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant impact***.

Impact #3.4.19d – Would the Project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Implementation of the proposed project would result in the generation of solid waste on the project site, which would increase the demand for solid waste disposal. Solid waste removed from the site would be transported to the Bena Landfill located approximately 13 miles northeast of the proposed project site. According to the CalRecycle, Bena Landfill has a maximum disposal capacity of 4,500 tons/day. A generation of solid waste resulting in a significant impact is not anticipated, as Bena Landfill has a remaining capacity of 32,808,260 cubic yards (CalRecycle, 2013). The Bena Landfill has sufficient capacity to accommodate the proposed Project.

The Project, in compliance with federal, State, and local statutes and regulations related to solid waste, would dispose of all waste generated on-site at an approved solid waste facility (Bena Landfill). The Project does not, and would not conflict with federal, State, or local regulations related to solid waste. The proposed Project would be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs in compliance with federal, state, and local statutes and regulations related to solid waste. Therefore, the Project would have a less than significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant impact***

Impact #3.4.19e – Would the Project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

See discussion for Impact #3.4.19d.

The 1989 California Integrated Waste Management Act (AB 939) requires Kern County to attain specific waste diversion goals. In addition, the California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires expanded or new development projects to incorporate storage areas for recycling bins into the proposed project design. Reuse and recycling of construction debris would reduce operating expenses and save valuable landfill space.

As stated above, the Bena Sanitary Landfill has available capacity to accommodate solid waste generated by the proposed project. Therefore, the proposed project would not be expected to significantly impact Kern County landfills. The proposed project would be required to comply with all federal, State, and local statues and regulations related to solid waste. Therefore, implementation of the proposed project would result in less than significant impacts in this regard.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.20 - WILDFIRE				
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:				
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentration from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☒	☐	☐
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

Discussion

Impact #3.4.20a – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project substantially impair an adopted emergency response plan or emergency evacuation plan?

As previously noted in Impact #3.4.9g, the proposed Project site is not located in or near SRA or lands classified as being a very high hazard severity zones. The construction of an elementary school would not impair implementation of the Kern County Emergency Operations Plan or other applicable emergency response plan or evacuation plan. The Project will also be required to comply with all applicable standards as required by the State Fire Marshall, CDE Title 5 and Title 24 regulations, as well as local fire codes. Once operational, the school would also develop and implement an emergency response plan in case of fire or other emergency situation. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation needed.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***. **Impact #3.4.20b – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentration from a wildfire or the uncontrolled spread of a wildfire?**

As discussed in Impact #3.4.20a, above, the proposed Project site is not located in or near SRA or lands classified as very high hazard severity zones. Additionally, the proposed Project site is flat and does not exacerbate the risk of exposure of Project occupants to wildfire. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation needed.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.20c – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

See Impacts # 3.4.9a and g, #3.4.20a and b. As discussed, the proposed Project site is not located in or near State Responsibility Areas or lands classified as very high hazard severity zones. Additionally, the Project is not located within 350 feet of high voltage transmission lines. The Project would not require the installation or maintenance of infrastructure that would exacerbate fire risk or result in environmental impacts. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation needed.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.20d – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

See Impacts See Impacts # 3.4.9a and g, #3.4.20a, b and c, above. The topography of the site is relatively flat, and the Project is not within a FEMA-designated floodplain. Additionally, MM GEO-1 requires the preparation of a SWPPP to mitigate the site drainage changes during the construction of the proposed Project. Therefore, no flooding is anticipated as a result of runoff, post-fire slope instability, or drainage changes, and impacts would be less than significant.

MITIGATION MEASURE(S)

Implementation of MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
3.4.21 - 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, substantially 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?	☐	☒	☐	☐
b. Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are significant when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects.)	☐	☒	☐	☐
c. Does the Project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Discussion

Impact #3.4.21a – 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, substantially 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?

As evaluated in this IS/MND, the proposed Project would not substantially 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 an endangered, rare, or threatened species; or eliminate important examples of the major periods of California history or prehistory. With implementation of the mitigation measures recommended in this document, the proposed Project would not have the potential to degrade the quality of the environment, significantly impact biological resources, or eliminate important examples of the major periods of California history or prehistory. Therefore, the Project would have a less than significant impact with mitigation incorporated.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM BIO-1 through MM BIO-6; MM CUL-1 and MM CUL-2.

LEVEL OF SIGNIFICANCE

The Project would have a ***less than significant impact with mitigation incorporated***.

Impact #3.4.21b - Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are significant when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects.)?

As described in the impact analyses in Sections 3.4.1 through 3.4.20 of this IS/MND, any potentially significant impacts of the proposed Project would be reduced to a less than significant level following incorporation of the mitigation measures listed in Section 6, *Mitigation Monitoring and Reporting Plan*. Projects completed in the past have also implemented mitigation as necessary. Accordingly, the proposed Project would not otherwise combine with impacts of related development to add considerably to any cumulative impacts in the region. With mitigation, the proposed project would not have impacts that are individually limited, but cumulatively considerable. Therefore, the Project would have a less than cumulatively considerable impact with mitigation incorporated.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM AES-1, MM BIO-1 through MM BIO-6, MM CUL-1 and MM CUL-2, MM GEO-1 through MM GEO-3, MM HAZ-1 through MM HAZ-4, MM HYD-1 through MM HYD-4, MM NSE-1 and MM NSE 2, and MM TRA-1 and MM TRA 2.

LEVEL OF SIGNIFICANCE

The Project would have a ***less than significant impact with mitigation incorporated***.

Impact #3.4.21c - Does the Project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?

All of the Project's impacts, both direct and indirect, that are attributable to the Project were identified and mitigated. As shown in Section 6, *Mitigation Monitoring and Reporting Plan*, the District has agreed to implement mitigation measures that will substantially reduce or eliminate impacts of the Project. Therefore, the proposed Project would not either directly or indirectly cause substantial adverse effects on human beings because all potentially adverse direct impacts of the proposed Project are identified as having no impact, less than significant impact, or less than significant impact with mitigation.

Mitigation Measure(s)

Implementation of Mitigation Measures MM AES-1, MM BIO-1 through MM BIO-6, MM CUL-1 and MM CUL-2, MM GEO-1 through MM GEO-3, MM HAZ-1 through MM HAZ-4, MM HYD-1 through MM HYD-4, MM NSE-1 and MM NSE 2, and MM TRA-1 and MM TRA 2.

Level of Significance

The Project would have a ***less than significant impact with mitigation incorporated***.

SECTION 4 - LIST OF PREPARERS

Lead Agency- Greenfield Union School District

- Ramon Hendrix- Superintendent
- Jesse Alvos - Director of Maintenance

Consultant - QK

Jaymie Brauer – Project Manager, QA/QC

Amber Williams – Lead Author

Conor McKay - Author

Robert Parr – Technical Author (Cultural)

Karissa Denney – Technical Author (Biological)

SECTION 5 - BIBLIOGRAPHY

(n.d.).

California Department of Transportation Division of Aeronautics. (2005). *Caltrans Airport Clearance.*

CA Department of Conservation. (2016). *FMMP.* Retrieved from http://www.conservation.ca.gov/dlrp/Pages/qh_maps.aspx

Cal EPA. (n.d.). *Cortese List (SuperFund Cleanup Site List)*. Retrieved March 9, 2016, from http://www.envirostor.dtsc.ca.gov/public/search.asp?cmd=search&reporttype=CORTESE&site_type=CSITES,OPEN,FUDS,CLOSE&status=ACT,BKLG,COM&reporttitle=HAZARDOUS+WASTE+AND+SUBSTANCES+SITE+LIST.

Cal Fire. (2006). *California Wildland Hazard Severity Zone Map Update.* Retrieved from Local Responsibility Area (LRA) Map: http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_statewide

California Building Standards Commission. (2019). *California Code of Regulations.*

California Building Standards Commission. (2019). *Guide to Title 24.*

California Department of Conservation. (2016, May). Retrieved from Important Farmland Finder: http://maps.conservation.ca.gov/ciff/ciff.html

California Department of Conservation. (2019, October 3). *Important Farmland Availability*. Retrieved from Kern County: https://www.conservation.ca.gov/dlrp/fmmp/Pages/Kern.aspx

California Department of Education. (2019). *2018-19 Enrollment by Grade.*

California Department of Transportation. (2011). *California Scenic Highway Mapping System.*

California Department of Water Resources. (2003). *California's Groundwater – Bulletin 118 – Update 2003.* http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_ground.

California Water Resources Board. (n.d.). *GeoTracker*. Retrieved March 9, 2016, from https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=desert+hot+springs%2C+ca

CalRecycle. (2013). *SWIS Facility Detail - Bena.*

City of Bakersfield. (2000). *Water Balance Report .*

City of Bakersfield. (2002). *Metropolitan Bakersfield General Plan Update- EIR Section 4.10 Cultural Resources.*

City of Bakersfield. (2002). *Metropolitian Bakersfield General Plan Environmental Impact Report Update.*

City of Bakersfield. (2002a). *Metropolitan Bakersfield General Plan .*

City of Bakersfield. (2007). *Metropolitan Bakersfield General Plan Update.*

City of Bakersfield. (2016). *2015 Urban Water Management Plan.* Water Resources Department.

City of Bakersfield. (2019). *Map Gallery and Spatial Data Library.*

County of Kern. (2019). *Public Works - Trash Collection.*

Department of Conservation. (2016). *California Important Farmland Finder*. Retrieved from California Department of Conservation: http://maps.conservation.ca.gov/ciff/ciff.html

Department of Conservation Division of Oil, Gas & Geothermal Resources. (n.d.). *Division of Oil, Gas & Geothermal Resources (DOGGR).* Retrieved March 11, 2016, from Well Finder: http://maps.conservation.ca.gov/doggr/index.html#close

Department of Toxic Substances Control . (2015). EnviroStor. California, United States of America .

Geotab. (2017). *The State of Fuel Economy in Trucking*. Retrieved from Geotab: https://www.geotab.com/truck-mpg-benchmark/

Greenfield Union School District. (2016). *Vision and Goals*.

Insight Environmental/Trinity Consultants. (2018). *Air Quality Impact Analysis.*

Kern County. (2012). *Aiport Land Use Compatability Plan.* Kern County.

Kern County. (2016). *Zoning Ordinance.*

Kern County Planning Department. (2013). *Lerdo Jail- Justice Facility Project Enviromental Impact Report- Noise Section 4.11.*

Kern High School District. (2018). *Intial Study/Mitigated Negative Declaration for the SE Comprehensive High School Construction Project.*

Meyer, Jack et al. (2010). *Cultural Resources Inventory of Caltrans District 6/9: Volume 1- A Geoarchaeological Overview and Assessment of Caltrans Districts 6 and 9.* Caltrans.

Meyer, Jack et al. (2010). *Volume 1: A Geoarchaeolgoical Overview and Assessment of Caltrans District 6 and 9.* California Department of Transportation.

Parr, Robert. (2019). *Cultural Resources Technical Memo.*

QK. (2019). *Energy Consumption Technical Memo.*

Ruettgers & Schuler. (2019). *Traffic Study.*

Soils Engineering, Inc. (2019). *GUSD Powerline Info Letter.*

Soils Engineering, Inc. (2019a). *Geologic Hazard Study.*

Soils Engineering, Inc. (2019b). *Power Line Information.*

Soils Engineering, Inc. (2019c). *Update of Preliminary Environmental Assessment Report.* Bakersfield.

Soils Engineering, Inc. (2019d). *Hazardous Waste Landfills, Potentially Hazardous Sites and Naturally Occurring Asbestos.*

Spencer, W.D., et al. (2010). *California Essential Habitat Connectivity Project - A Strategy for Conserving a Connected California.* Caltrans.

United States Fish and Wildlife Service. (2011). *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance.*

US Fish and Wildlife Service. (1998). *Recovery Plan for Upland Species of the San Joaquin Valley, CA.*

SECTION 6 - MITIGATION MONITORING AND REPORTING PROGRAM

Impact No.	Mitigation Measure	Implementation	Monitoring
Aesthetics			
3.4.1-d	**MM AES-1:** Security and nighttime lighting installed at the school site shall incorporate shielding of lighting and orienting lighting downward to prevent direct uplighting. Lighting used for nighttime events shall be turned off by 11:00pm. All lights in excess of 150 watts shall be directed toward the stadium field and away from adjacent properties. All stadium field light fixtures shall be designed with appropriate reflectors, hoods and side shields to direct the angle of incidence to reflect light downward.	GUSD/Project Architect/ Project Contractor	GUSD Project Inspector
Biological Resources			
3.4.4-a	**MM BIO-1:** Prior to ground disturbing activities, a qualified wildlife biologist shall conduct a biological clearance survey no more than 30 calendar days prior to the onset of construction. The clearance survey shall include walking transects to identify presence of San Joaquin kit fox, American badger, Swainson's hawk, Western burrowing owl, nesting birds_and other special-status species or signs of, and sensitive natural communities. The pre-construction survey shall be walked by no greater than 30-foot transects for 100 percent coverage of the Project site and the 50-foot buffer, where feasible. Exclusion zones for kit fox shall be placed in accordance with U.S. Fish and Wildlife Service (USFWS) Recommendations using the following:	GUSD/Project Contractor	GUSD Project Inspector

Potential Den	50-foot radius
Known Den	100-foot radius
Natal/Pupping Den (Occupied and Unoccupied)	Contact U.S. Fish and Wildlife Service for guidance
Atypical Den	50-foot radius

Buffer zones shall be considered Environmentally Sensitive Areas (ESAs) and no ground disturbing activities shall be allowed within a buffer area. The United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) shall be contacted upon the discovery of any SJKF individuals within 500 feet, natal or pupping dens is found during construction activities. CDFW staff shall be contacted at (559) 243-4014 and R4CESA@wildlifeca.gov.

Potential kit fox dens may be excavated provided that the following conditions are satisfied: (1) the den has been monitored for at least five consecutive days and is deemed unoccupied by a qualified biologist; (2) the excavation is conducted by or under the direct supervision of a qualified biologist. Den monitoring and excavation should be conducted in accordance with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (United States Fish and Wildlife Service, 2011).

In addition, impacts to occupied burrowing owl burrows shall be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

3.4.4-a **MM BIO-2:** Prior to ground disturbance activities, or within one week of being deployed at the Project site for newly hired workers, all construction workers at the Project site shall attend a Construction Worker Environmental Awareness Training and Education Program, developed and presented by a qualified biologist. — GUSD/Project Contractor — GUSD Project Inspector

The Construction Worker Environmental Awareness Training and Education Program shall be presented by the biologist and shall include information on the life history wildlife and plant species that may be encountered during construction activities, their legal protections, the definition of "take" under the Endangered Species Act, measures the Project operator is implementing to protect the species, reporting requirements, specific measures that each worker must employ to avoid take of the species, and penalties for violation of the Act. Identification and information regarding special-status or other sensitive species with the potential to occur on the Project site shall also be provided to construction personnel. The program shall include:

An acknowledgement form signed by each worker indicating

	that environmental training has been completed. A copy of the training transcript and/or training video/CD, as well as a list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be maintain on site for the duration of construction activities.		
3.4.4-a	**MM BIO-3:** If all Project activities are completed outside of the Swainson's hawk nesting season (February 15 through August 31), this mitigation measure shall need not be applied. If construction is planned during the nesting season, a preconstruction survey shall be conducted by a qualified biologist to evaluate the site and a 0.5-mile buffer around the site for active Swainson's hawk nests. If potential Swainson's hawk nests or nesting substrates occur within 0.5 mile of the Project site, then those nests or substrates must be monitored for Swainson's hawk nesting activity on a routine and repeating basis throughout the breeding season, or until Swainson's hawks or other raptor species are verified to be using them. Monitoring shall be conducted according to the protocol outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). The protocol recommends that ten visits be made to each nest or nesting site: one during January 1-March 20 to identify potential nest sites, three during March 20-April 5, three during April 5-April 20, and three during June 10-July 30. To meet the minimum level of protection for the species, surveys shall be completed for at least the two survey periods immediately prior to Project-related ground disturbance activities. During the nesting period, active Swainson's hawk nests shall be avoided by 0.5 mile unless this avoidance buffer is reduced through consultation with the CDFW and/or USFWS. If an active Swainson's hawk nest is located within 500 feet of the Project or	GUSD/Project Contractor	GUSD Project Inspector

	within the Project site, including the stick nest located within the Project, the Project proponent shall contact CDFW for guidance.		
3.4.4-a	**MM BIO-4:** A qualified biologist shall conduct a pre-construction survey on the Project site and within 500 feet of its perimeter, where feasible, to identify the presence of the western burrowing owl. The survey shall be conducted between 14 and 30 days prior to the start of construction activities. If any burrowing owl burrows are observed during the preconstruction survey, avoidance measures shall be consistent with those included in the CDFW staff report on burrowing owl mitigation (CDFG 2012). If occupied burrowing owl burrows are observed outside of the breeding season (September 1 through January 31) and within 250 feet of proposed construction activities, a passive relocation effort may be instituted in accordance with the guidelines established by the California Burrowing Owl Consortium (1993) and the California Department of Fish and Wildlife (2012). During the breeding season (February 1 through August 31), a 500-foot (minimum) buffer zone should be maintained unless a qualified biologist verifies through noninvasive methods that either the birds have not begun egg laying and incubation or that juveniles from the occupied burrows are foraging independently and are capable of independent survival.	GUSD/Project Contractor	GUSD Project Inspector
3.4.4-a	**MM BIO-5:** If construction is planned outside the nesting period for raptors (other than the western burrowing owl) and migratory birds (February 15 to August 31), no mitigation shall be required. If construction is planned during the nesting season for migratory birds and raptors, a preconstruction survey to identify active bird nests shall be conducted by a qualified biologist to evaluate the site and a 250-foot buffer for migratory birds and a 500-foot buffer for raptors. If nesting birds are identified during the survey, active raptor nests shall be avoided by 500 feet and all other migratory bird nests shall be avoided by 250 feet. Avoidance buffers may be	GUSD/Project Contractor	GUSD Project Inspector

reduced if a qualified on-site monitor determines that encroachment into the buffer area is not affecting nest building, the rearing of young, or otherwise affecting the breeding behaviors of the resident birds. Because nesting birds can establish new nests or produce a second or even third clutch at any time during the nesting season, nesting bird surveys shall be repeated every 30 days as construction activities are occurring throughout the nesting season.

No construction or earth-moving activity shall occur within a non-disturbance buffer until it is determined by a qualified biologist that the young have fledged (left the nest) and have attained sufficient flight skills to avoid Project construction areas. Once the migratory birds or raptors have completed nesting and young have fledged, disturbance buffers will no longer be needed and can be removed, and monitoring can cease.

3.4.4-a **MM BIO-6:** During all construction-related activities, the following mitigation shall apply:

a. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from the construction or Project site.
b. Construction-related vehicle traffic shall be restricted to established roads and predetermined ingress and egress corridors, staging, and parking areas. Vehicle speeds should not exceed 20 miles per hour (mph) within the Project site.
c. To prevent inadvertent entrapment of kit fox or other animals during construction, the contractor shall cover all excavated, steep-walled holes or trenches more than two feet deep at the close of each workday with plywood or similar materials. If

holes or trenches cannot be covered, one or more escape ramps constructed of earthen fill or wooden planks shall be installed in the trench. Before such holes or trenches are filled, the contractor shall thoroughly inspect them for entrapped animals. All construction-related pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored on the Project site shall be thoroughly inspected for wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in anyway. If at any time an entrapped or injured kit fox is discovered, work in the immediate area shall be temporarily halted and USFWS and CDFW shall be consulted.

d. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
e. No pets, such as dogs or cats, shall be permitted on the Project sites to prevent harassment, mortality of kit foxes, or destruction of dens.
f. Use of anti-coagulant rodenticides and herbicides in Project areas shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S.

Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional Project-related restrictions deemed necessary by the USFWS <u>and CDFW</u>. If rodent control must be conducted, zinc phosphide shall be used because of the proven lower risk to kit foxes.

g. A representative shall be appointed by the Project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative shall be identified during the employee education program and their name and telephone number shall be provided to the USFWS.

h. The Sacramento Fish and Wildlife Office of USFWS and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during Project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact can be reached at ~~1701~~ (559) 243-4014 and R4CESA@wildlifeca.gov.

i. All sightings of the San Joaquin kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed shall also be provided to the Service at the address below.

j. Any Project-related information required by the USFWS or questions concerning the above conditions, or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at: Endangered Species Division, 2800 Cottage

	Way, Suite W 2605, Sacramento, California 95825-1846, phone (916) 414-6620 or (916) 414-6600. k. If burrowing owl are found to occupy the Project site and avoidance is not possible, burrow exclusion may be conducted by qualified biologists only during the non-breeding season, before breeding behavior is exhibited, and after the burrow is confirmed empty through non-invasive methods (surveillance). Replacement or occupied burrows shall consist of artificial burrows at a ratio of 1 burrow collapsed to 1 artificial burrow constructed (1:1). Ongoing surveillance of the Project site during construction activities shall occur at a rate sufficient to detect Burrowing owl, if they return.		
Cultural Resources			
3.4.5-a	**MM CUL-1:** If prehistoric or historic-era cultural materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified archaeologist can evaluate the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants. If the qualified archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from Project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation. Implementation of the mitigation measure below would ensure that the proposed Project would not cause a substantial adverse change in the significance of a historical resource. Therefore, the Project	GUSD/Project Contractor	GUSD Project Inspector

	would have a less-than-significant impact with incorporation of mitigation measures.		
3.4.5-d	**MM CUL-2:** If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code. The specific protocol, guidelines, and channels of communication outlined by the Native American Heritage Commission, in accordance with Section 7050.5 of the Health and Safety Code, Section 5097.98 of the Public Resources Code (Chapter 1492, Statutes of 1982, Senate Bill 297), and Senate Bill 447 (Chapter 44, Statutes of 1987), shall be followed. Section 7050.5(c) shall guide the potential Native American involvement, in the event of discovery of human remains, at the direction of the county coroner.	GUSD/Project Contractor	GUSD Project Inspector

Geology and Soils			
3.4.7-b	**MM GEO-1:** Prior to construction, the District shall submit 1) the approved Storm Water Pollution Prevention Plan (SWPPP) and 2) the Notice of Intent (NOI) to comply with the General National Pollutant Discharge Elimination System (NPDES) from the Central Valley Regional Water Quality Control Board. The requirements of the SWPPP and NPDES shall be incorporated into design specifications and construction contracts. Recommended best management practices for the construction phase may include the following: • Stockpiling and disposing of demolition debris, concrete, and soil properly; • Protecting existing storm drain inlets and stabilizing disturbed areas; • Implementing erosion controls; • Properly managing construction materials; and • Managing waste, aggressively controlling litter, and implementing sediment controls.	GUSD/Project Contractor	GUSD Project Inspector
3.4.7-c	**MM GEO-2:** Prior to the commencement of construction, the contractor shall evaluate whether the perched water table has begun to dissipate under the site. Results of the testing and evaluation shall be submitted to the Lead Agency for review and evaluation. If evaluation determines that the perched water is not dissipated, the Lead Agency will consult with the Division of the State Architect to discuss possible changes in project design to provide protection from liquefaction and settlement.	GUSD/Project Contractor	GUSD Project Inspector
3.4.7-f	**MM GEO-3:** During any ground disturbance activities, if paleontological resources are encountered, all work within 25 feet of the find shall halt until a qualified paleontologist as defined by the Society of Vertebrate Paleontology Standard Procedures for the	GUSD/Project Contractor	GUSD Project Inspector

	Assessment and Mitigation of Adverse Impacts to Paleontological Resources (2010), can evaluate the find and make recommendations regarding treatment. Paleontological resource materials may include resources such as fossils, plant impressions, or animal tracks preserved in rock. The qualified paleontologist shall contact the Natural History Museum of Los Angeles County or other appropriate facility regarding any discoveries of paleontological resources. If the qualified paleontologist determines that the discovery represents a potentially significant paleontological resource, additional investigations and fossil recovery may be required to mitigate adverse impacts from Project implementation. If avoidance is not feasible, the paleontological resources shall be evaluated for their significance. If the resources are not significant, avoidance is not necessary. If the resources are significant, they shall be avoided to ensure no adverse effects, or such effects must be mitigated. Construction in that area shall not resume until the resource appropriate measures are recommended or the materials are determined to be less than significant. If the resource is significant and fossil recovery is the identified form of treatment, then the fossil shall be deposited in an accredited and permanent scientific institution. Copies of all correspondence and reports shall be submitted to the Lead Agency.		
Hazards and Hazardous Materials			
3.4.9-a	**MM HAZ-1:** Prior to operation of the Project, the Project proponent shall prepare a Hazardous Materials Business Plan that identifies the new location of the new school campus and submit it to the appropriate regulatory agency for review and approval. The Project proponent shall provide the hazardous materials business plan to	GUSD/Project Contractor	GUSD Project Inspector

	all contractors working on the Project and shall ensure that one copy is available at the Project site at all times.		
3.4.9-a	**MM HAZ-2:** In the event that other abandoned or unrecorded wells are uncovered or damaged during excavation or grading activities, all work shall cease and the California Department of Conservation, Division of Oil, Gas and Geothermal Resources shall be contacted for requirements and approvals. The California Department of Conservation, Division of Oil, Gas and Geothermal Resources may determine that remedial plugging operations may be required.	GUSD/Project Contractor	GUSD Project Inspector
3.4.9-a	**MM HAZ-3:** Prior to commencement of construction, the location of all classroom buildings will be a minimum of 120 feet away of the crude oil pipelines.	GUSD/Project Contractor	GUSD Project Inspector
3.4.9-a	**MM HAZ-4**: Prior to operation of the Project, a high-pressure pipeline release scenario shall be included as part of the school's emergency response program.	GUSD/Project Contractor	GUSD Project Inspector
Hydrology and Water Quality			
3.4.10-a	**MM HYD-1:** The District shall limit grading to the minimum area necessary for construction and operation of the Project. Final grading plans shall include best management practices to limit onsite and offsite erosion.	GUSD/Project Contractor	GUSD Project Inspector
3.4.10-a	**MM HYD-2:** Prior to initiation of grading activities, the District shall obtain a water "will serve" letter from California Water Service.	GUSD/Project Contractor	GUSD Project Inspector

Noise			
3.4.13-a	**MM NSE-1:** During construction, the contractor shall situate implement the following measures: • All stationary construction equipment on the Project site shall be located so that noise emitting objects or equipment faces away from any potential sensitive receptors. • The construction contractor shall ensure that all construction equipment is equipped with manufacturer-approved mufflers and baffles During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers. • Construction activities shall not take place outside of the allowable hours specified by Section 9.22.050 of the City Noise Ordinance.	GUSD/Project Contractor	GUSD Project Inspector
3.4.13-c	**MM NSE-2:** Project architect/contractor shall incorporate noise attenuation methods into the design and construction of Project. These include but are not limited to the following design features: • R-30 insulation will be placed in the ceilings, which has a Sound Transmission Class (STC) rating of 37. • R-19 insulation will be placed in the walls, which has a STC rating of 37. • All windows will be 1-inch dual paned insulating glass, which has a STC rating of 32.	GUSD/Project Contractor	GUSD Project Inspector

Transportation and Traffic			
3.4.17-a	**MM TRA-1:** Prior to commencement of construction, the District shall pay fair share costs of 5.45% for a signal at the intersection of Cottonwood Road and Pacheco Road to the City of Bakersfield Public Works Department prior to Project commencement. The District shall also pay Regional Transportation Impact Fees. Based on negotiations with the Public Works Department, it may be determined that full improvements to the Cottonwood Road and Pacheco Road intersection, along with local road improvements along the proposed Site's frontage may be acceptable in lieu of RTIF payment.	GUSD/Project Contractor	GUSD Project Inspector
3.4.17-c	**MM TRA-2:** Prior to commencement of operations, the District shall prepare and circulate a "Safe Route to School" Plan that has been developed that defines the routes that children should use to travel to and from school.	GUSD/Project Contractor	GUSD Project Inspector

APPENDIX A
HAZARDS STUDIES

SOILS ENGINEERING, INC.

GEOLOGIC HAZARD STUDY

PROPOSED CRESCENT ELEMENTARY SCHOOL
SOUTH OF PANAMA LN. & WEST OF COTTONWOOD RD.
BAKERSFIELD, CALIFORNIA

Prepared For:

Greenfield Union School District
1624 Fairview Road
Bakersfield, CA 93307
Attn: Ms. Lucy Williams

File No. 19-17151

Prepared By:

Soils Engineering, Inc.
4400 Yeager Way
Bakersfield, CA 93313

June 2019

SOILS ENGINEERING, INC.

June 27, 2019

File No. 19-17151

Ms. Lucy Williams
Greenfield Union School District
1624 Fairview Rd.
Bakersfield, CA 93307

Subject: Geological Hazard Study
for Proposed 20.2 Acre Crescent Elementary School Site,
South of Panama Lane & West of Cottonwood Road
in Bakersfield, CA.
Western Portion of APN# 518-030-06

Dear Ms. Williams:

In accordance with your request and authorization, Soils Engineering, Inc. (SEI) has performed a Geological Hazards Study for the above described subject property in Bakersfield, California (site). This study was conducted in compliance with the California Code of Regulations, Title 24, Chapters 16, 18 and 33 of the 2016 California Building Code.

Our Geological Hazards Assessment indicates that there is a low to moderate probability for liquefaction to occur during a major earthquake at the site and that the maximum peak ground acceleration at the site would be 0.343g as a result of a maximum earthquake of magnitude 7.3 on the White Wolf Fault, approximately 17.8 kilometers away. The areas of moderate liquefaction potential appear to be along the southern and northwestern borders of the site area with the interior and eastern areas having a low potential for liquefaction to occur. The potential for liquefaction to occur should decrease overtime if the perched water under the site dissipates after agricultural irrigation ceases.

The computer-modeling program Eqsearchwin estimated that a ground motion of 0.270 g from a 7.7 magnitude earthquake on the White Wolf Fault on July 21, 1952. The proposed structures should be built to withstand this magnitude of an earthquake and ground motions.

The site-specific design acceleration values to be utilized for the proposed development should be 0.808g for short periods (S_{DS}) and 0.454g for the 1 second period (S_{D1}). The seismic design category is a D for both short and 1-second periods per the 2016 CBC.

In the event of a major earthquake, there is a very low potential for rock falls or landslides to impact the site. The site is located within the potential flood zone of an upstream disaster (dam failure) with an estimated 8 to 10 hours of warning prior to the flood waters arrival.

In the event of a major earthquake, there is a very low potential for rock falls or landslides to impact the site. Minor flooding is possible following an upstream disaster but is not likely, due to upstream levees and canals. Settlement up to 1.36" may occur at this site during a major earthquake if saturated zones are present at 15' below the site. This settlement reduces to <0.6" if no water is present in the top 50' below the site.

No high-pressure natural gas pipelines are known within 1500' of the site. An active 8" and an idle 6" crude oil pipeline is present just north of the northern border of the Site. A Pipeline Risk Analysis of these pipelines indicates an acceptable individual risk and recommends a 120' setback from this crude oil pipeline. A few oil wells (dry holes) have been drilled less than one mile away from the site, but it is not likely that any significant subsurface oilfield related gases (hydrogen sulfide, methane, etc.) are present beneath the site.

A re-evaluation of the liquefaction potential and potential settlement may be required once the proposed building locations are finalized at the site. If the perched water does not dissipate over-time, some mitigation measures (stone columns, piers etc.) may be recommended in the building areas along the southern and northwestern borders of the Site.

The accompanying report is an instrument of service of ***Soils Engineering, Inc.*** The report summarizes our findings and relates our opinions with respect to the potential for geological hazards to affect the site. Note that our findings and opinions are based on information that we obtained on given dates, through records review, site review, and related activities. It is possible that other information exists or subsequently has become known, just as it is possible for conditions we observed to have changed after our observation.

Soils Engineering, Inc. will be pleased to provide more information in this regard. Please call us for assistance at (661) 831-5100.

Sincerely,
SOILS ENGINEERING, INC.

Robert J. Becker, P.G. 5076, C.E.G. 2238
Environmental & Geologic Manager

L. Thomas Bayne, GE, PE
President

Distribution: Addressee (3)

CERTIFIED ENGINEERING GEOLOGIST
ROBERT J. BECKER
No. 2238
Exp. Date 2/28/21
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
LOUIS THOMAS BAYNE
No. 000125
GEOTECHNICAL
STATE OF CALIFORNIA

Table of Contents

Geologic Hazard Study

APPENDICES

I. LIST OF ILLUSTRATIONS

APPENDICES

I. LIST OF ILLUSTRATIONS

SOILS ENGINEERING, INC.

GEOLOGICAL HAZARDS STUDY

For

Proposed 20.2-Acre Crescent Elementary School Site
South of Panama Lane and West of Cottonwood Drive
in
Bakersfield, California

June 2019

1.0 Introduction

Soils Engineering, Inc. (SEI) has conducted a Geological Hazards Study for the proposed 20.2 acre Crescent Elementary school located south of Panama Lane and west of Cottonwood Road (site) in Bakersfield, California (see Location Map, Plate 1). The site location coordinates are approximately 35.294073° north, latitude, and -118.989461° west, longitude. The following is an Executive Summary of the investigation originally conducted in 2006, updated in February 2017 and now updated in June 2019 after a reconfiguration of the elementary school site location. The Crescent Elementary School is now going to be located where the Middle School #4 was proposed to be located in the far western portion of the Greenfield Union School District site. The potential site layout is shown on Plate 2C.

A site reconnaissance, which consisted of walking the property and evaluating the surrounding geological features, was conducted by SEI personnel in July and August, 2006, in December 2016 and again in June 2019. The project site covers approximately 20.2 acres, as shown on Plate 2, and is agricultural land. Near the northwestern corner of the site is a power pole with a transformer and a transfer pump. Also, the site is bounded by 21 kV power lines on the western and northern border of the site and on the adjacent property to the east. Adjacent off-site properties include the proposed Middle School #4 to the east, agricultural land on the west and north and south.

2.0 Geology and Hydrology

2.1 Geologic Setting

The site has generally flat relief with a slight slope to the south-southeast. The project site rests on Quaternary Fan deposits (Qf) within the southern portion of the San Joaquin Valley. See the attached Geologic Map (Plate 2A), as interpreted from on-site soil borings and the Bakersfield Sheet of the Geologic Map of California (Smith, Department of Conservation Division of Mines and Geology (CDMG), 1964). Active faults within 50 miles include the Kern Front Fault, approximately 16.3 kilometers to the northwest; the White Wolf Fault, approximately 17.8 kilometers to the southeast; the Pleito Thrust Fault, approximately 32.3 kilometers to the south, southwest; the Garlock (west) Fault, approximately 49.6 kilometers to the south, southeast; the San Andreas Fault—1857 Rupture and Carrizo, approximately 51 kilometers to the west; the Big Pine Fault,

4400 YEAGER WAY • BAKERSFIELD, CALIFORNIA 93313 • PHONE (661) 831-5100 • FAX: (661) 831-2111

approximately 52.6 kilometers to the southwest; the San Gabriel, approximately 65.3 kilometers to the southeast; Santa Ynez (East) Fault approximately 79 kilometers to the south; San Andreas—Mojave 79.3 kilometers to the south; San Andreas—Cholame, approximately 79.6 kilometers to the south. The site is not located within an Alquist-Priolo Special Study Zone (Earthquake Fault Zone), and the Seismic Hazard Atlas map of the Lamont Quadrangle shows no active faults near the site (Plate 3). Nearby active faults are shown on the Fault Activity Map of California and Adjacent Areas (Jennings, CDMG, 1994) within the general area of the site (Plate 5A) and on the EQFault California Fault Map (Plate 5).

Near surface soils within the zone of influence of future developments consist of interbedded sandy clay, silty sand, clayey sand, and poorly-graded sand layers overlying bedrock, which is located several thousand feet below the surface. These sediments were derived in the Sierra Nevada Mountains to the east of the site and deposited by local drainage and the meandering Kern River.

2.2 Surface Lithology

Earth materials identified in the two (2) onsite soil borings (B-2 and B-3) conducted on August 24, 2006 and four (4) borings (B-6 to B-9) conducted in December 2016 consisted generally of intervals of Well-Graded Sand (SW), Sandy Clay (CL), Sandy Silt (ML), Silty Sand (SM) and Poorly-Graded Sand (SP) in the top 50 feet below ground surface (bgs). These soils are classified as SW, CL, ML, SM and SP respectively, in the Unified Soils Classification System. Shallow groundwater was encountered at depths of 20'and 24' in the two (2) soil borings (B-2 and B-3, respectively) conducted in 2006 and at depths of 24' to 27' in December 2016. See attached boring logs included in Appendix B and Plate 2B which presents a cross-section of the subsurface lithology beneath the site for more detail.

2.3 Hydrology

Unconfined Aquifer - The depth to the unconfined aquifer as shown on maps prepared by the Kern County Water Agency (KCWA), and dated April 2004, is approximately 160-180 feet below the ground surface (bgs). Depth to water in the Summer of 2015 was approximately 140' to 160'. Historical depth to water data (Department of Water Resources (DWR) database and KCWA maps) indicates that the depth to groundwater has been >50' since at least the 1980's within 1/2-mile of the site. See Appendix B for table.

Perched Water, Ground Water or Seepage - Shallow ground water on the site is shown on Kern Water Agency groundwater maps, dated Summer 1999, Summer 2001 and Summer 2011. The depth of this shallow groundwater appears to range from 10' to 15' from the surface. The Seismic Hazard Atlas map of the Lamont Quadrangle also shows the area to the east of the site as one in which shallow ground water exists. In the borings conducted on-site and on the adjacent property to the east water was encountered at 20' to 25' bgs in 2006 and 2016. See Appendix B for boring logs.

3.0 Seismic and Fault Hazards

3.1 Seismic History

There have been a number of historic earthquakes that may have affected the Bakersfield area. The following is a short summary of the major known events:

- 1/9/1857 - Fort Tejon Earthquake - San Andreas Fault, Estimated Magnitude 8.2+, 30 feet of slippage over a 200 mile area, widespread damage.

- 7/21/1952 - Arvin/Tehachapi - White Wolf Fault, Magnitude 7.7, extensive damage to buildings and highways.

- 8/22/1952 - Bakersfield Quake (Aftershock of Arvin/Tehachapi) - 6 miles ESE of Bakersfield, Magnitude 5.8. Closest aftershock to Bakersfield causing extensive damage to already weakened buildings. Multiple surface fissures were created from the 1952 earthquakes.

SEI utilized the software program EQSEARCHWIN version 3.0 (Thomas F. Blake) to evaluate historical earthquakes in the area of the site over the last 200 years. The Earthquake Epicenter Map (Plate 3A) shows earthquake magnitudes and the epicentral distance from the site. The majority of the seismic activity in the area of the site has been along the White Wolf Fault and the San Andreas Fault. The closest earthquake of at least 5.0 magnitude to the site was 7.9 kilometers away, at a magnitude of 5.8 in August 1952. The largest magnitude earthquake within 100 miles was 7.9 on the San Andreas Fault in 1857. The largest estimated site acceleration is 0.270 g from a 7.7 magnitude earthquake on the White Wolf Fault on July 21, 1952. The EQSEARCHWIN estimation of Peak Acceleration from California Earthquake Catalogs Table, Earthquake Recurrence Curve, Earthquake Epicenter Map and a graph of the Number of Earthquakes (N) above Magnitude (M) are presented in Appendix A.

3.2 Seismic Evaluation

The site is located within the Lamont Quadrangle in the north ½ of the northeast ¼ of Section 29, Township 30 South, Range 28 East and is not located in an Alquist-Priolo special studies zone (California Fault Zone). Local faults and general geology are also shown on the Lamont Quadrangle, Seismic Hazard Atlas Maps prepared for the Kern County Council of Governments (Plate 3).

The Lamont Seismic Hazard Atlas Map shows a <3.9 magnitude earthquake epicenter approximately 1.5 miles north, northwest of the site. The nearest active fault, as indicated by the computer-modeling program EQFault version 3.0, is the Kern Front Fault, which is approximately 16.3 kilometers to the northwest of the site. The White Wolf Fault is approximately 17.8 km to the southeast. The Pleito Fault is located approximately 32.3

kilometers south, southwest of the site. The Garlock Fault (west) is approximately 49.6 kilometers south, southeast of the site, and the San Andreas Fault zone (Carrizo and 1857 rupture) is approximately 51 kilometers west of the site. The Big Pine Fault is approximately 52.6 kilometers to the southwest and the San Gabriel is approximately 65.3 kilometers to the southeast. The Santa Ynez (East) Fault approximately 79 kilometers to the south, and the San Andreas— Mojave is approximately 79.3 kilometers to the south. The San Andreas— Cholame is 79.6 kilometers to the south of the site. Regional faults in relation to the site location are presented on Plate 5A and are from the Fault Activity Map of California and Adjacent Areas (Jennings, CDMG, 1994).

3.3 Seismic Design

The seismic design values are presented in the table below based on the 2016 California Building Code (CBC). The Site Class for the proposed improvements located at the Southwest corner of Panama Lane and Cottonwood Road in Bakersfield, Kern County, California, were determined using standard penetration test data obtained at the site and are provided in the attached Boring Logs.

SEISMIC DESIGN CRITERIA	VALUE	SOURCE
Risk Category	**III**	2016 CBC Table 1604.5
Site Class	**D**	Site Specific Soils Report 2016 CBC Section 1613.3.2, ASCE 7-10 Table 20.3-1
Mapped MCE_R Spectral Response Acceleration, short period, S_s	**1.177**	USGS maps/Software - 2016 CBC Figure 1613.3.1 (1)
Mapped MCE_R Spectral Response Acceleration, at 1-sec. Period, S_1	**0.435**	USGS Maps/Software - 2016 CBC Figure 1613.3.1 (2)
Site Coefficient, F_a	**1.029**	USGS Software - 2016 CBC Table 1613.3.3 (1)
Site Coefficient, F_v	**1.565**	USGS Software - 2016 CBC Table 1613.3.3 (2)
Adjusted MCE_R Spectral Response Acceleration, Short periods, $S_{MS} = F_a S_s$	**1.211**	USGS Software - 2016 CBC Section 1613.3.3
Adjusted MCE_R Spectral Response Acceleration, 1-sec. Period, $S_{M1} = F_v S_1$	**0.681**	USGS Software - 2016 CBC Section 1613.3.3
Design Spectral Response Acceleration, short periods, $S_{DS} = 2/3\ S_{MS}$	**0.808**	USGS Software - 2016 CBC Section 1613.3.4
Design Spectral Response Acceleration, 1-sec period, $S_{D1} = 2/3\ S_{MI}$	**0.454**	USGS Software - 2016 CBC Section 1613.3.4
Peak Ground Acceleration (PGA) for Max. Considered Earthquake (MCE_G)	***0.442g***	*USGS Software – ASCE 7-10 Fig 22-7*

SEISMIC DESIGN CRITERIA	VALUE	SOURCE
Site Coefficient, F_{PGA} = 1.057, $PGA_M = F_{PGA} * PGA$ =	***0.468g***	*USGS Software – ASCE 7-10 Table 11.8-1*
Site-Specific Ground Motion Procedures for Seismic Design, C_{RS}	***1.026***	*USGS Software - ASCE 7-10 Fig 22-17*
Site-Specific Ground Motion Procedures for Seismic Design, C_{R1}	***1.045***	*USGS Software - ASCE 7-10 Fig 22-18*
Seismic Design Category short periods (S_{DS})	**D**	2016 CBC Table 1613.3.5 (1)
Seismic Design Category, 1-sec period (S_{D1})	**D**	2016 CBC Table 1613.3.5 (2)

MCE_R = Maximum Considered Earthquake (risk targeted),
MCE_G = Maximum Considered Earthquake (geometric mean)

See attached USGS Design Maps Summary and Detail Report in Attachment A.

3.4 Seismology & Calculation of Earthquake Ground Motion

Because the site is not located within or directly adjacent to a mapped Alquist-Priolo (AP) Earthquake Zone, is not a Seismic Design Category E or F and is not required by ASCE 7 §11.4.7, a site-specific ground motion analysis was not conducted for this site. The above seismic design information will be utilized for this project.

3.5 Possible Earthquake Effects

A number of active faults are located within a 50-mile radius of the subject site. To evaluate the affect a major earthquake might have on the site, the computer modeling program EQFaultwin vers. 3.0 (Thomas Blake) was utilized. Site-specific parameters were inputted and the programs computed the maximum peak site ground accelerations resulting from an earthquake. Because ground accelerations are based largely on fault distance and magnitude, we have focused our analysis on those faults which are close to the site, or that have large maximum credible magnitudes, or a combination of the two. The result of this analysis is presented below in Table A.

TABLE A

FAULT	Approximate Distance (Km)	Maximum Earthquake Magnitude (Mw)	Maximum Peak Ground Acceleration (g)	Estimated Site Intensity (MM)
Kern Front	**16.3**	6.3	0.215	VIII
White Wolf	17.8	7.3	**0.343**	**IX**
Pleito Thrust	32.3	7.0	0.189	VIII
Garlock (West)	49.6	7.3	0.131	VII
San Andreas (Carrizo & 1857 Rupture)	51	7.4 to **8.0**	0.135 to 0.186	VIII
Big Pine	52.6	6.9	0.101	VII
San Gabriel	65.3	7.2	0.101	VII

This analysis estimates that a maximum peak ground acceleration of 0.343g would be felt at the site as a result of a maximum earthquake of magnitude 7.3 on the White Wolf Fault, approximately 17.8 kilometers away. See attached Deterministic Site Parameters for a full listing of computed values for faults within a 100-mile radius of the site in Appendix A. Also attached is a California Fault Map showing nearby faults in relationship to the site (Plate 5).

Utilizing the USGS Deaggregation program the Probabilistic Seismic Hazard Deaggregation for the Site was calculated to be 0.5195g for a 2% chance every 50 years of exceedance based on a 6.36 magnitude earthquake occurring 19.3 kilometers away. See Attachment A for this calculation results page.

3.6 Potential for Ground Rupture, Ground Shaking, Ground Failure

Ground rupture may occur along a fault trace in a major earthquake. Since this site is not located within 500 feet of a suspected active fault, it is unlikely that ground rupture would occur here. Moderate to strong ground shaking is likely at this site, in the event of a major earthquake on one of the nearby faults. Based on the predicted maximum horizontal accelerations at the site and the soil types identified in this investigation, ground failure is highly unlikely at this site.

3.7 Potential for Earthquake-Induced Flooding and Flood Zone

The potential for earthquake-induced flooding at the site appears to be low. The site is located within flood Zone C with minimal potential flooding, according to the Flood Insurance Rate Map covering the site area (see Appendix B for map). The site is less than a mile away from a location that may be flooded during a 100 year flood and covered by 1-3 feet of water.

The Lake Isabella Dam Flood Plain & Dam Inundation Area Map for the Bakersfield Area indicates it would take approximately 8 to 10 hours for the flood waters to reach the Site area (see Appendix B for map). During this 8 to 10 hour period the site could be evacuated and preventive measures (sand bagging, etc.) could be conducted to limit the damage to the school grounds.

According to the City of Bakersfield and Kern County Emergency Services there is a system of emergency sirens that are supposed to go off as an early warning system if the dam breaks. They are in the process of updating and testing this emergency warning system. In addition, an emergency broadcast over the radio networks would occur and a phone chain from the City or County to the Greenfield Union School District and then to the schools that might be impacted would be conducted.

Repair and improvement to the Lake Isabella Dam by the Army Corps of Engineers has begun to further lessen the potential for a major dam release. The amount of water that is stored in the lake is also restricted until these repairs are complete.

The proposed school will have a detailed Emergency Response Plan prepared which will include protocols for responses to earthquakes, flooding, fire and other hazards. This emergency response plan will include a response to the Lake Isabella dam collapsing.

3.8 Liquefaction Potential

Shallow groundwater was encountered at a depth of 20' to 25' bgs in on-site and adjacent site soil borings conducted in 2006 and 2016. Perched water is shown on Kern Water Agency maps from 1999, 2001 and 2011 in the range of 15'. The unconfined aquifer is not shown to be less than 50 feet below ground surface at the site based on current and historical information from the Kern County Water Agency. SPT or SPT equivalent blowcounts in the soil borings ranged from 5 to 45 blowcounts per foot to a depth of 51'. The lithology encountered in the subsurface includes multiple clay, silt and sand layers of material. Based on this information a liquefaction analysis was performed on the borings B-2, B-3, B-6, B-7 and B-8 utilizing the program LiquefyPro (version 5.9b). Site-specific information was used in this analysis including; SPT or SPT equivalent blowcounts per foot, grain-size analysis, dry weight densities, historical depth to water (15') and the PGA for the MCEg earthquake motion (0.468g). The liquefaction potential at this site appears to be low to moderate along the northwestern and southern borders and low within the interior and eastern portions of the Site area. A few zones of sand and sandy silt intervals below 15' in depth at boring locations B-2 and B-3 have a safety factor less than 1, which indicates a potential for liquefaction to occur during a major earthquake. Borings B-6, B-7 and B-8 just east of the Site have a low potential for liquefaction to occur during a major earthquake. If the perched water dissipates over time as agricultural irrigation ceases at and near the site the potential for liquefaction to occur should decrease. See attached LiquefyPro data and boring logs in Appendix B for more detail.

3.9 Slope Stability

The site is located in an area with minimal slope to the southeast. No evidence of historic landslides or creep was observed in this area. There is a very low potential for rockfalls or landslides to impact the site in the event of a major earthquake. Overall, the site appears to be very stable.

3.10 Settlement

The estimated amount of dynamic settlement that would occur at this site during a major earthquake ranges from 0.05" (B-7) to 1.36" (B-3) if shallow water is present and up to 0.56" (B-2) if water is not present in the top 50'. The estimated amount of differential settlement ranges from 0.027" (B-7) to 0.68" (B-3) with shallow water present. This is based on the lithology encountered, the blowcounts recorded during sampling and the settlement analysis that was conducted utilizing the program LiquefyPro version 5.9b. See attached Liquefaction Analysis Calculation Sheet and graphic representation in Appendix B for more detail.

3.11 Expansive Soil and Hydrocollapse Potential

Based on the lithology encountered in the top 10 feet in the soil borings it appears unlikely that highly expansive surface soils are present at this site.

The City of Bakersfield Safety Element includes a discussion on land subsidence potential in the Bakersfield area. The main causes of land subsidence are Tectonic Subsidence, Oil & Gas Fluid Extraction, Groundwater Withdrawal and Hydrocompaction of Moisture Deficient Alluvial Deposits. Figure 15 in the Safety Element shows the areas of significant subsidence within the Bakersfield area. The proposed school site is located within the area where the lowest amount of historic land subsidence has occurred and outside of the area of hydrocompaction as shown on attached Plate 7. In addition, the school site is in an area where oil & gas activity is minor, agricultural use is decreasing and no public water wells are present nearby, so groundwater withdrawal appears to be limited. Based on this information it appears that regional subsidence should not be an issue at this site requiring any special mitigation or requirements.

4.0 High-Pressure Pipelines & Hazardous Materials

4.1 High-Pressure Pipelines

Based on the Lamont Quadrangle topographic map, a visual survey of the surrounding area and interviews with local utility companies, an active 8" crude oil pipeline and an idle 6" crude oil pipeline operated by Kern Oil are present on the south side of Panama Lane. No high-pressure natural gas pipelines appear to be present within 1500' of the site. SEI conducted a pipeline risk assessment of 6" and 8" crude oil pipelines per CDE Protocols. This analysis indicated that a full rupture pool-fire in the 6" and 8" pipelines at the same time would have a radiation impact of 5000 btu/ft2 hr at a distance of approximately 166 feet. A full rupture pool fire of the 8" crude oil pipeline would have a radiation impact of 5000 btu/ft2 hr at a distance of approximately 117 feet. Applying these radiation impact distances, the probabilities for individual risk were calculated to be insignificant at a value of 2.3×10^{-7} for the combined pipelines and 2.2×10^{-7} for the 6" or 8" pipeline. Even if the individual risk was doubled for both pipelines rupturing during the same year, the value would be insignificant at 4.4×10^{-7}. The population risk indicator is 100 for both scenarios of a full rupture pool fire. The Stage 3 analysis indicates that a setback of approximately 120 feet from the 8" crude oil pipeline is appropriate for this site, since the Protocol indicates the likelihood of two (2) pipelines rupturing at the same time is so low that it is excluded from further consideration in a risk analysis required by the Protocol. See attached Pipeline Risk Analysis in Appendix B.

4.2 Hazardous Materials

No on-site oil or gas wells were indicated on the California Division of Oil and Gas & Geothermal Resources (DOGGR) maps. However, less than a mile to the southeast of the site is a plugged and abandoned-dry hole. See Plate 6 for the site location in reference to the nearest oil and gas wells. A Preliminary Environmental Assessment was conducted on this site with Department of Toxic Substances Control oversight. The PEA indicated some minor petroleum hydrocarbons in the soil within the drainage ditch just south of Panama Lane, but no impact from pesticides or metals in the agricultural field areas. After additional sampling it was determined that this material could remain in place and not be a risk to the future school occupants. A letter dated October 26, 2010 from the DTSC for No Further Action was received. An Update to the PEA was prepared by SEI in July 2016 and submitted to the DTSC which responded in a letter dated January 23, 2017 which recommended no additional work was required at this time.

5.0 Conclusions & Recommendations

Our Geological Hazards Assessment indicates that there is a low to moderate probability for liquefaction to occur during a major earthquake at the site and that the maximum peak ground acceleration at the site would be 0.343g as a result of a maximum earthquake of magnitude 7.3 on the White Wolf Fault, approximately 17.8 kilometers away. The areas of moderate liquefaction potential appear to be along the southern and northwestern borders of the site area with the interior and eastern areas having a low potential for liquefaction to occur. The potential for liquefaction to occur should decrease overtime if the perched water under the site dissipates after agricultural irrigation ceases.

The computer-modeling program Eqsearchwin estimated that a ground motion of 0.270 g from a 7.7 magnitude earthquake on the White Wolf Fault on July 21, 1952. The proposed structures should be built to withstand this magnitude of an earthquake and ground motions.

The site-specific design acceleration values to be utilized for the proposed development should be 0.808g for short periods (S_{Ds}) and 0.454g for the 1 second period (S_{D1}). The seismic design category is a D for both short and 1-second periods per the 2016 CBC.

In the event of a major earthquake, there is a very low potential for rock falls or landslides to impact the site. The site is located within the potential flood zone of an upstream disaster (dam failure) with an estimated 8 to 10 hours of warning prior to the flood waters arrival.

In the event of a major earthquake, there is a very low potential for rock falls or landslides to impact the site. Minor flooding is possible following an upstream disaster but is not likely, due to upstream levees and canals. Settlement up to 1.36" may occur at this site during a major earthquake if saturated zones are present at 15' below the site. This settlement reduces to <0.6" if no water is present in the top 50' below the site.

No high-pressure natural gas pipelines are known within 1500' of the site. An active 8" and an idle 6" crude oil pipeline is present just north of the northern border of the Site. A Pipeline Risk Analysis of these pipelines indicates an acceptable individual risk and recommends a 120' setback from this crude oil pipeline. A few oil wells (dry holes) have been drilled less than one mile away from the site, but it is not likely that any significant subsurface oilfield related gases (hydrogen sulfide, methane, etc.) are present beneath the site.

A re-evaluation of the liquefaction potential and potential settlement may be required once the proposed building locations are finalized at the site. If the perched water does not dissipate over-time, some mitigation measures (stone columns, piers etc.) may be recommended in the building areas along the southern and northwestern borders of the Site.

6.0 Attachments

6.1 Location Map- Plate 1, "Location Map" shows the location of the site with relationship to roads and land features.

6.2 Plot Plan - Plate 2, "PLOT PLAN" shows the location and lot configuration of the property.

6.2.1 Plate 2A, Geologic Map shows the site geology related to local topography, streets and nearby surficial features.

6.2.2 Plate 2B, Cross-Section A to A' shows the subsurface lithology beneath the site.

6.2.3 Plate 2C, Potential Site Layout shows the proposed buildings, field areas, etc. for the proposed school campus.

6.3 Seismic Hazard Atlas Map- Plate 3, shows local geology and faults within the Lamont Quadrangle near the site.

6.3.1 Earthquake Epicenter Map - Plate 3A, shows the site location on an earthquake epicenter map of historical earthquakes with magnitudes >5.0, from the Eqsearchwin computer modeling program.

6.4 Depth to Groundwater Map - Plate 4, shows the site location in relation to a Depth to Water Map of the regional area prepared by the Kern County Water Agency.

6.5 Fault Location Map- Plate 5, shows the site in relation to the nearest active faults within 100 miles based on the EQFault program.

6.5.1 Plate 5A shows the Regional Faults based on the Fault Activity Map of California and Adjacent Areas, Jennings, 1994.

6.6 DOGGR Oil Well Map - Plate 6, shows the site in relation to the nearest oil wells drilled near the site.

6.7 Regional Land Subsidence Map - Plate 7, shows the site on the City of Bakersfield Land Subsidence Map.

6.8 Appendix A - Deterministic Site Parameters - EQFAULTWIN data determined for the site for faults within 100 miles. EQSEARCHWIN data concerning the distance and magnitude of earthquakes within 100 miles of the site is attached. USGS Design Maps results, USGS Deaggregation plot.

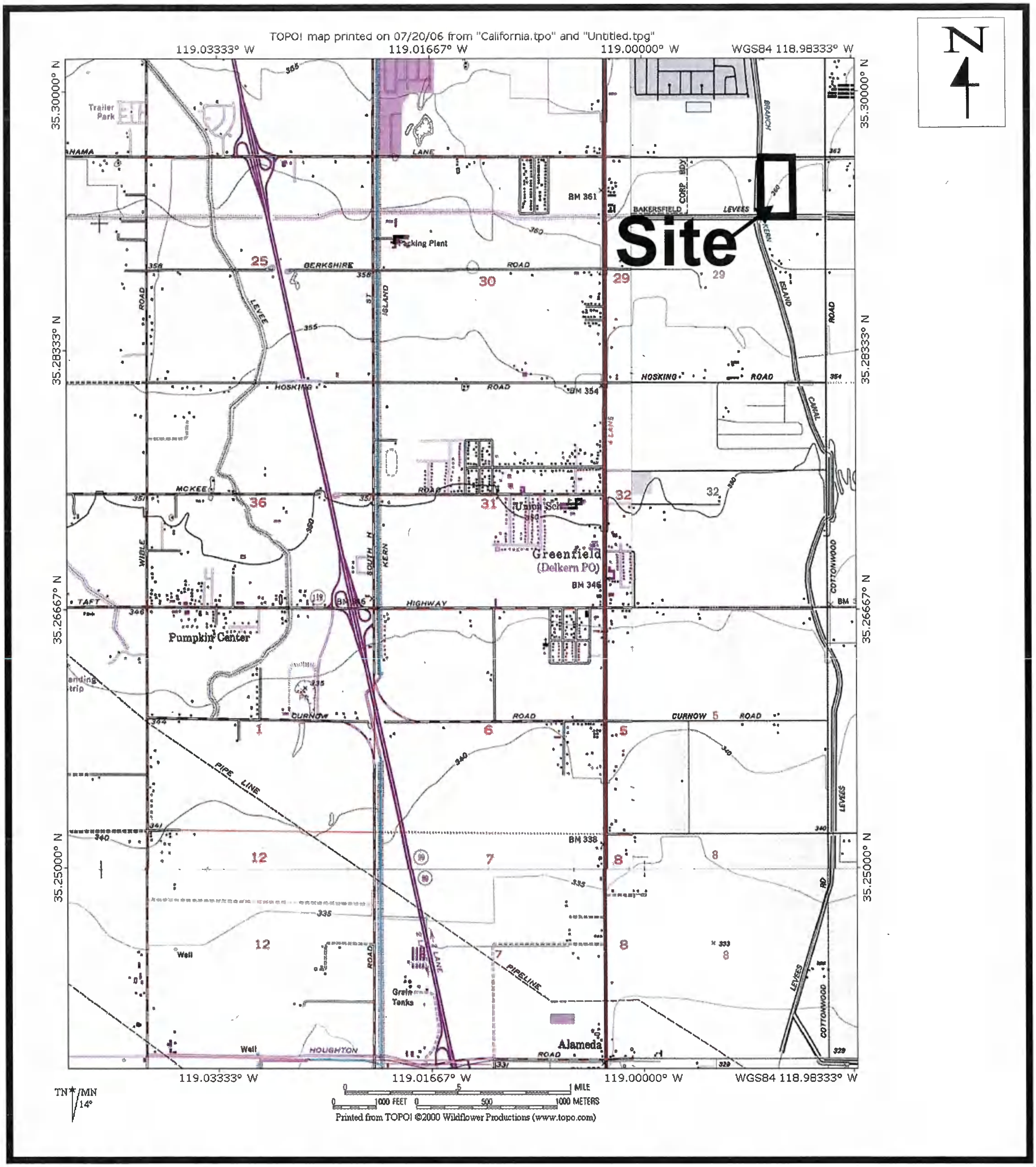
6.9 Appendix B - Presents the Boring Logs, Depth to Water Data, Lake Isabella Dam Inundation Map Flood Insurance Rate Map, Lab Test Result Table, Liquefaction Analysis Calculation Sheet and Graphic Representation (LiquefyPro) and Pipeline Risk Report.

7.0 References

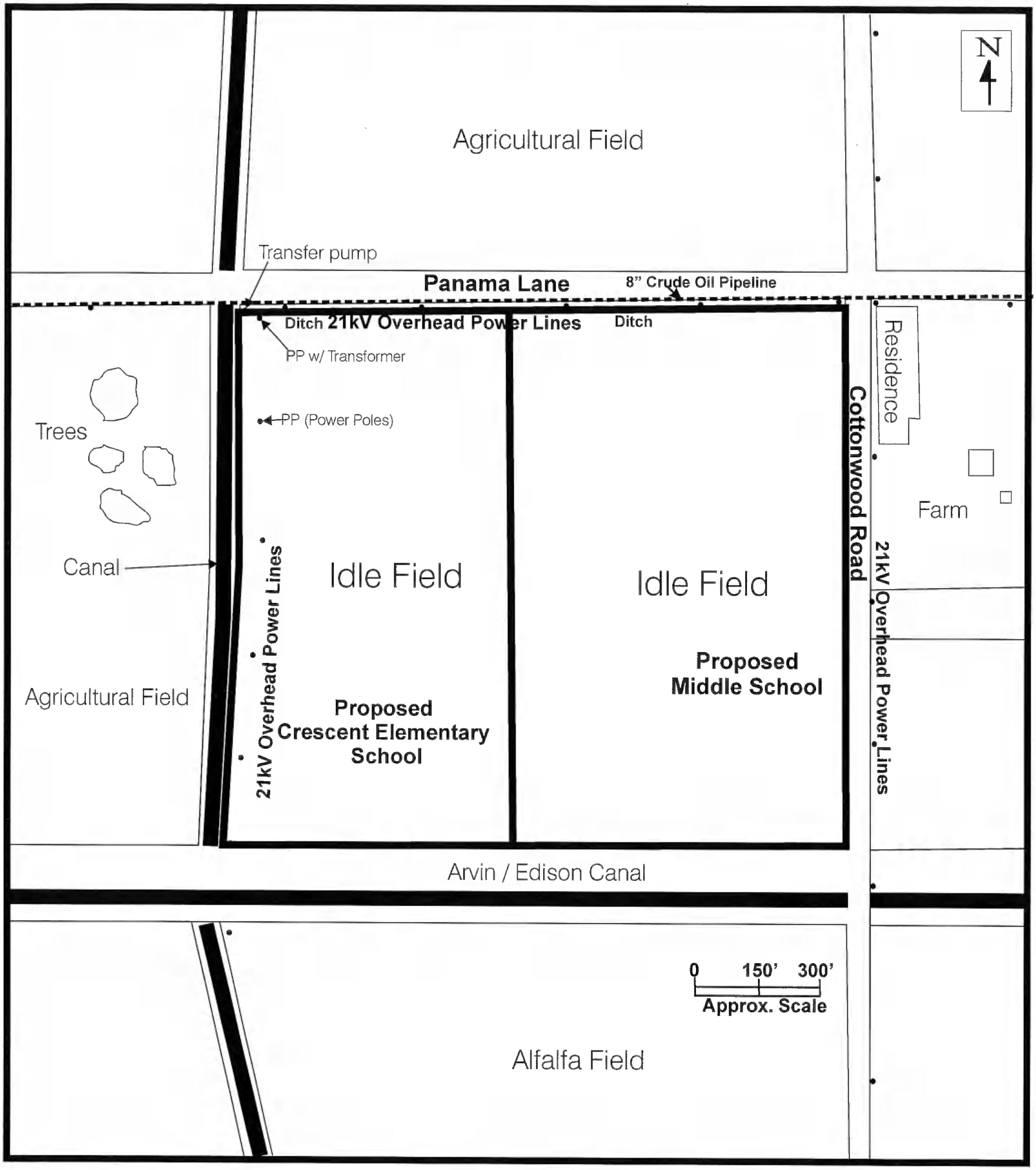
- Water Supply Report 2011, Report on Water Conditions, Kern County Water Agency, Bakersfield, California.
- USGS Quadrangle Map, Lamont Quadrangle, Sheet, 1968.
- Smith, Arthur, California Division of Mines and Geology - Geologic Map of California-Bakersfield Sheet, 1964, Olaf P. Jennings Edition.
- Jennings, Charles, Fault Activity Map of California and Adjacent Areas, with

Locations and Ages of Recent Volcanic Eruptions, CDMG, 1994.

- U.S. Dept. of Agricultural Soil Surveys, 1942, 1945, 1946.
- EQFaultwin, ver. 3.0, Thomas F. Blake; FRISKSPWIN, ver. 4.0, Thomas F. Blake;
- EQSEARCHWIN, ver. 3.0, Thomas F. Blake
- Blake, Thomas, Empirical Prediction of Earthquake Induced Liquefaction Potential.
- Seismic Hazard Atlas Map, Lamont Quadrangle, Kern County.
- California Fault Parameters, 1996 Draft, California Department of Conservation, Division of Mines and Geology.
- N. Bolton Seed, Kotiji Tokimatsu, A.M., A.S.C.E, Evaluation of Settlement in Sands Due to Earthquake Shaking; Journal of Geotechnical Engineering A.S.C.E. Vol. 113, No. 8, August, 1987.
- Pradel, Daniel, Procedure To Evaluate Earthquake-Induced Settlements in Dry Sandy Soils, Journal of Geotechnical and Geoenvironmental Engineering, volume 124, No. 4, pg. 364 – 368, April 1998.
- Youd, T.L and others, Liquefaction Resistance of Soils: Summary Report from 1996 and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Geoenvironmental Engineering, volume 127, No. 10, pg. 817 – 833, October 2001.
- Cetin, Onder, K., Seed, Raymond B. and Others, Standard Penetration Test-Based Probabilistic and Deterministic Assessment of Seismic Liquefaction Potential, Journal of Geotechnical and Geoenvironmental Engineering, volume 130, No. 12, pg. 1314 – 1340, December 2004.
- Seed, R.B, Cetin, O.K., and others, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework, 26th Annual Los Angeles Geotechnical Spring Seminar, Keynote Presentation, H.M.S. Queen Mary, Long Beach, CA., April 30, 2003.
- ASCE, Settlement Analysis, Technical Engineering and Design Guides as Adapted from the US Army Corps of Engineers, No. 9, 1994.
- CA Office of Emergency Services, Flood Plain & Dam Inundation Areas, Kern Regional Atlas, Kern Council of Governments, 2004.
- Department of Water Resources, Groundwater Data Module, web page: http://wdl.water.ca.gov/gw/admin/main_menu_gw.asp
- Improvement District #4 2015 Report on Water Conditions, Kern County Water Agency, Bakersfield, California.
- LiquefyPro version 5.9b, CivilTech Software.



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 6/19 PROJECT: 17151	Greenfield USD-Crescent Elementary School S. of Panama Lane and W. of Cottonwood Road Bakersfield, CA **Location Map**	PLATE 1



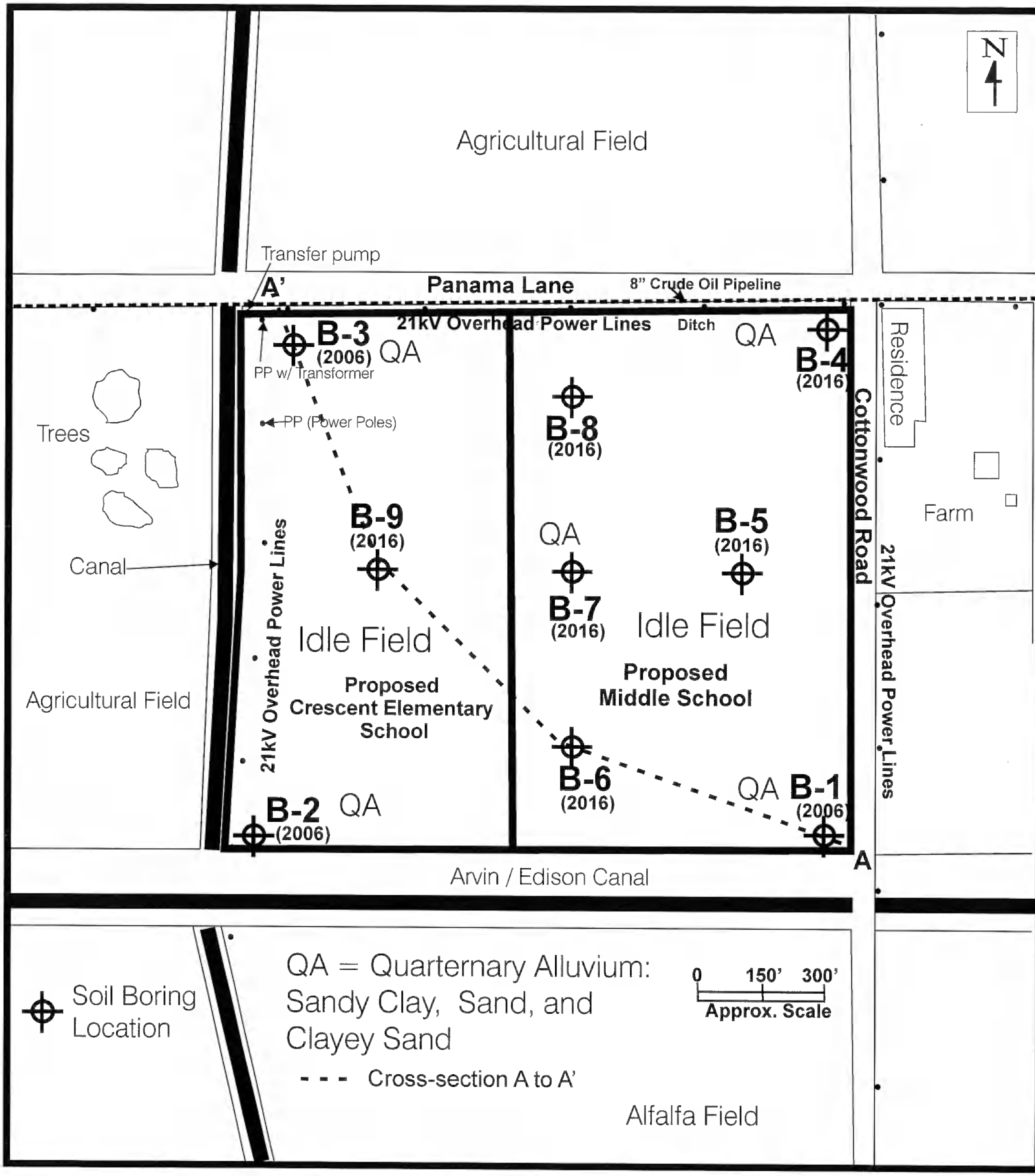
SOILS ENGINEERING, INC.
4400 Yeager Way
BAKERSFIELD, CA 93313

DATE: 6/19
PROJECT: 17151

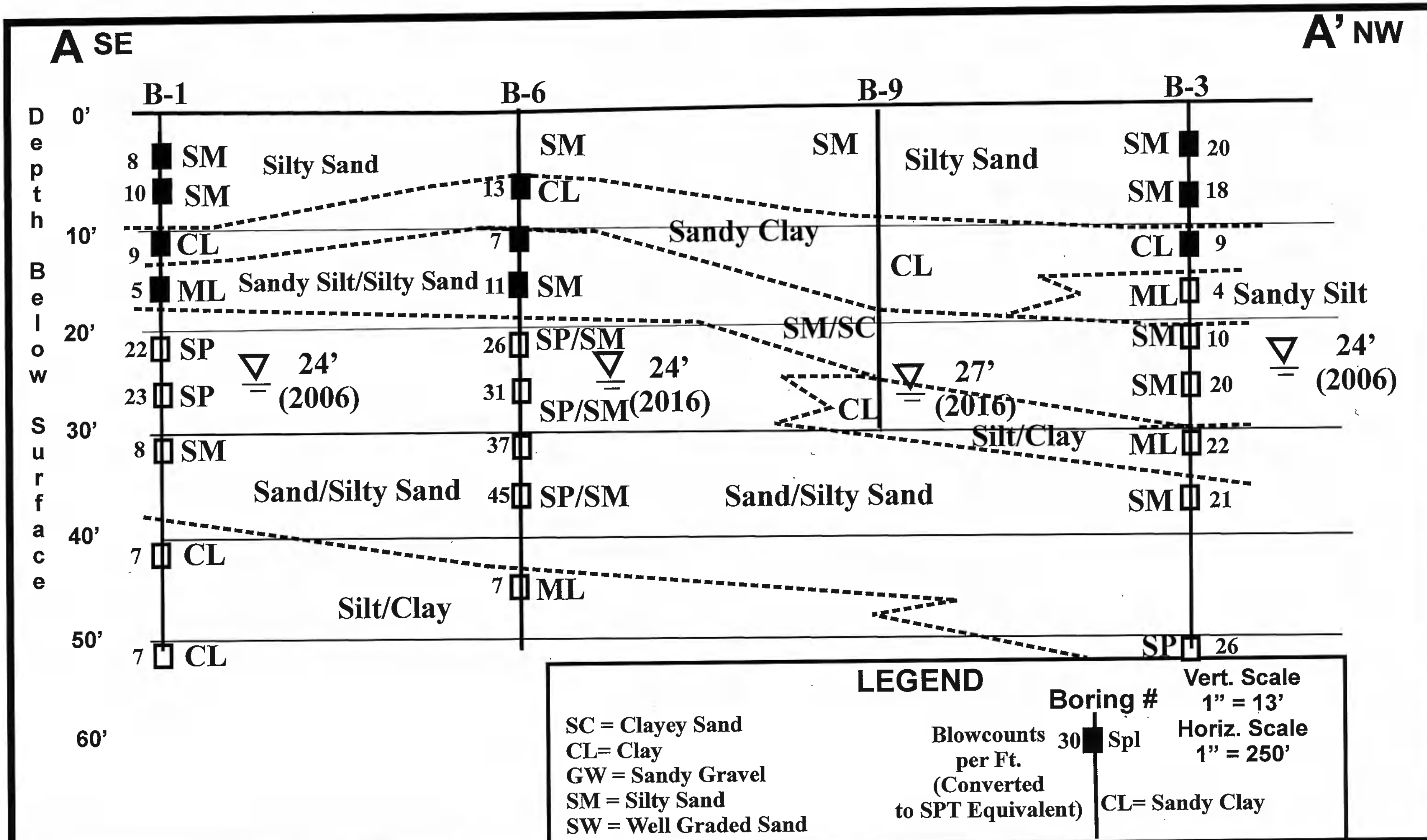
Greenfield USD-Crescent Elementary School
S. of Panama Lane and W. of Cottonwood Road
Bakersfield, CA

Plot Plan

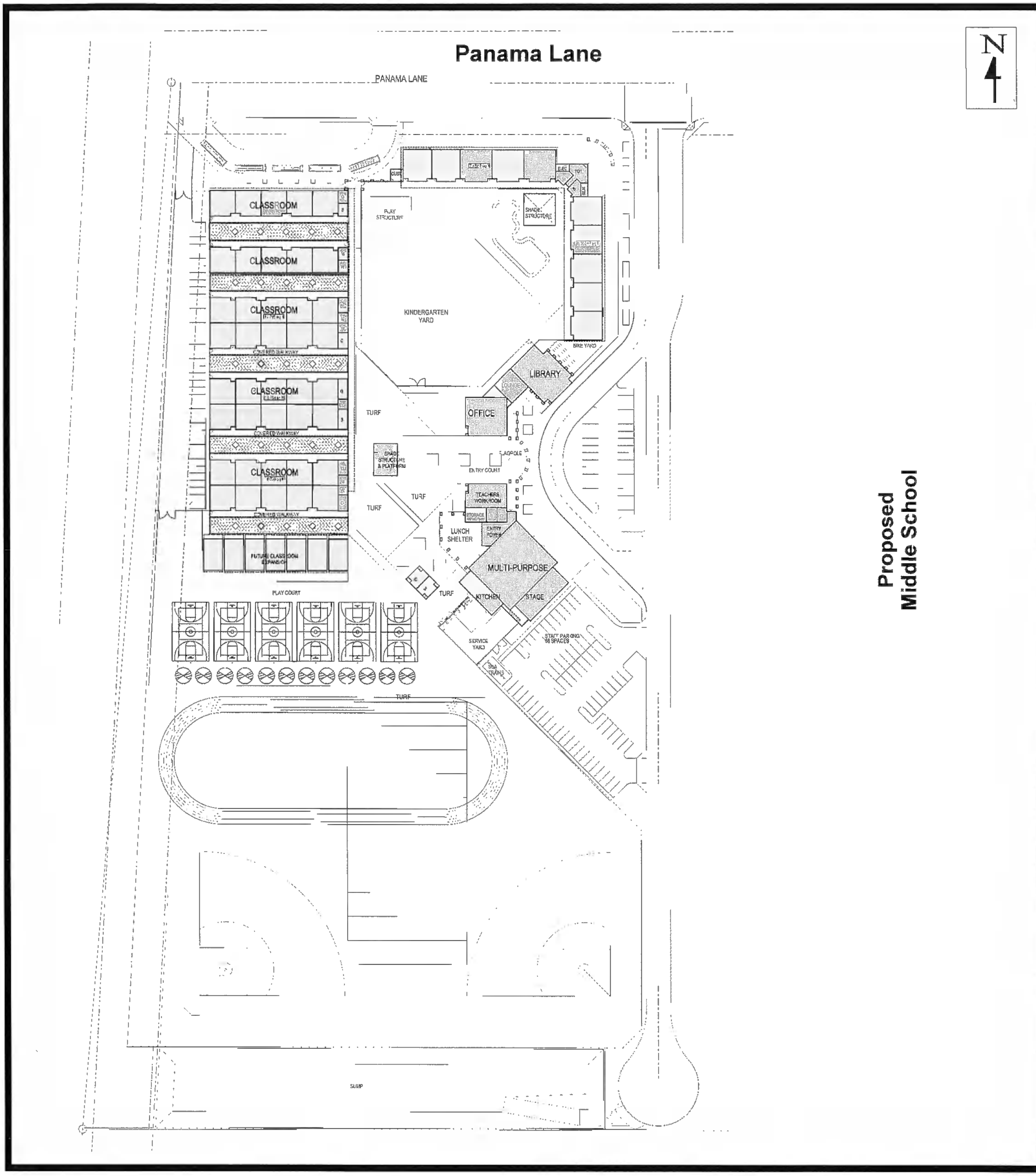
PLATE
2



SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 **DATE: 6/19** **PROJECT: 17151**	**Greenfield USD-Crescent Elementary School** **S. of Panama Lane and W. of Cottonwood Road** **Bakersfield, CA** **BORING LOCATION/GEOLOGIC MAP**	PLATE 2A



SOILS ENGINEERING 4400 Yeager Way Bakersfield, CA 93313 File No. 16-15820 Date: 2/17	**Crescent Elementary & Middle School #4** **SW of Cottonwood Road & Panama Lane** **Bakersfield, CA** Geologic Cross-section A to A'	PLATE **2B**



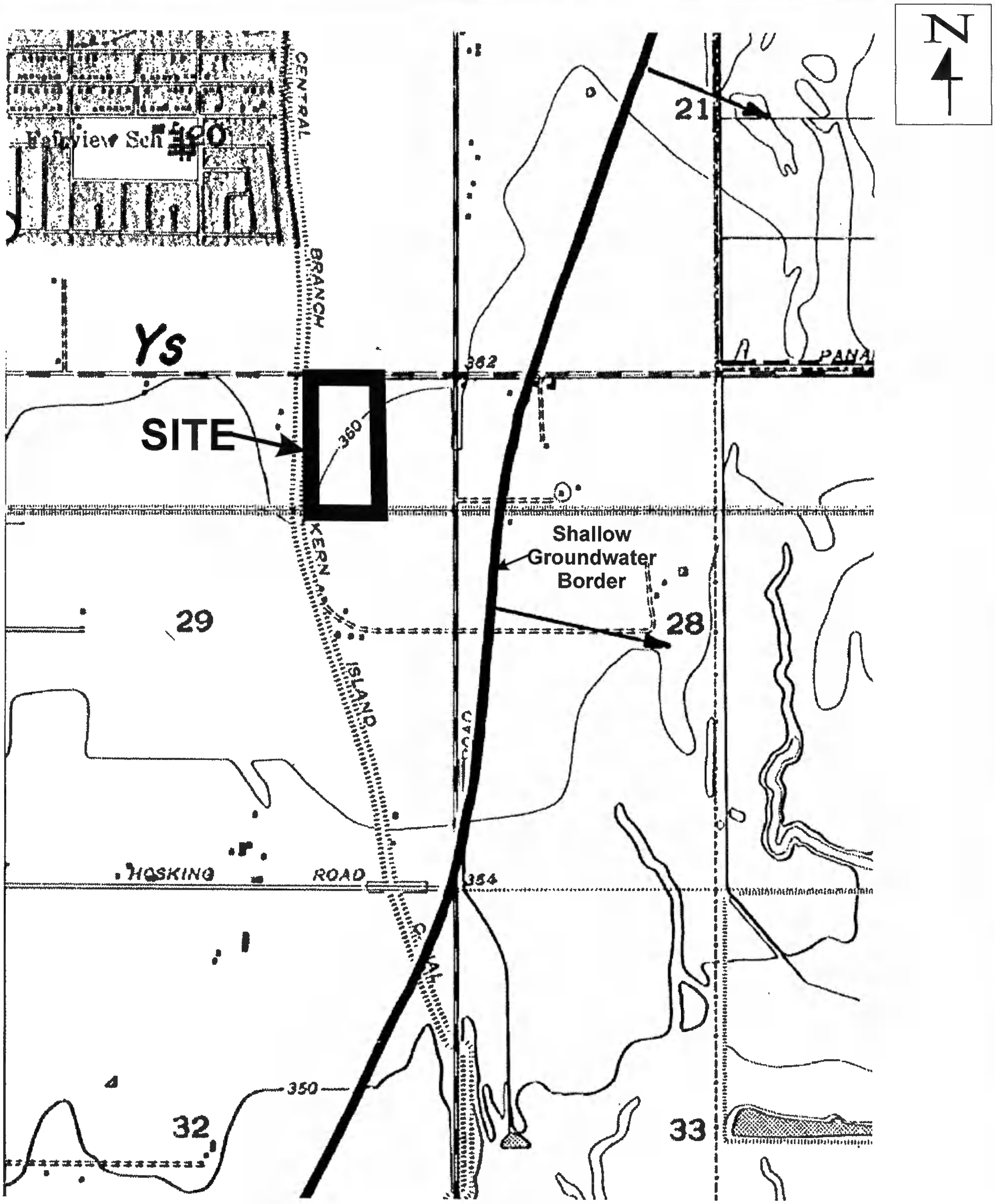
SOILS ENGINEERING, INC.
4400 Yeager Way
BAKERSFIELD, CA 93313

DATE: 6/19
PROJECT: 17151

Greenfield USD-Crescent Elementary School
S. of Panama Lane and W. of Cottonwood Road
Bakersfield, CA

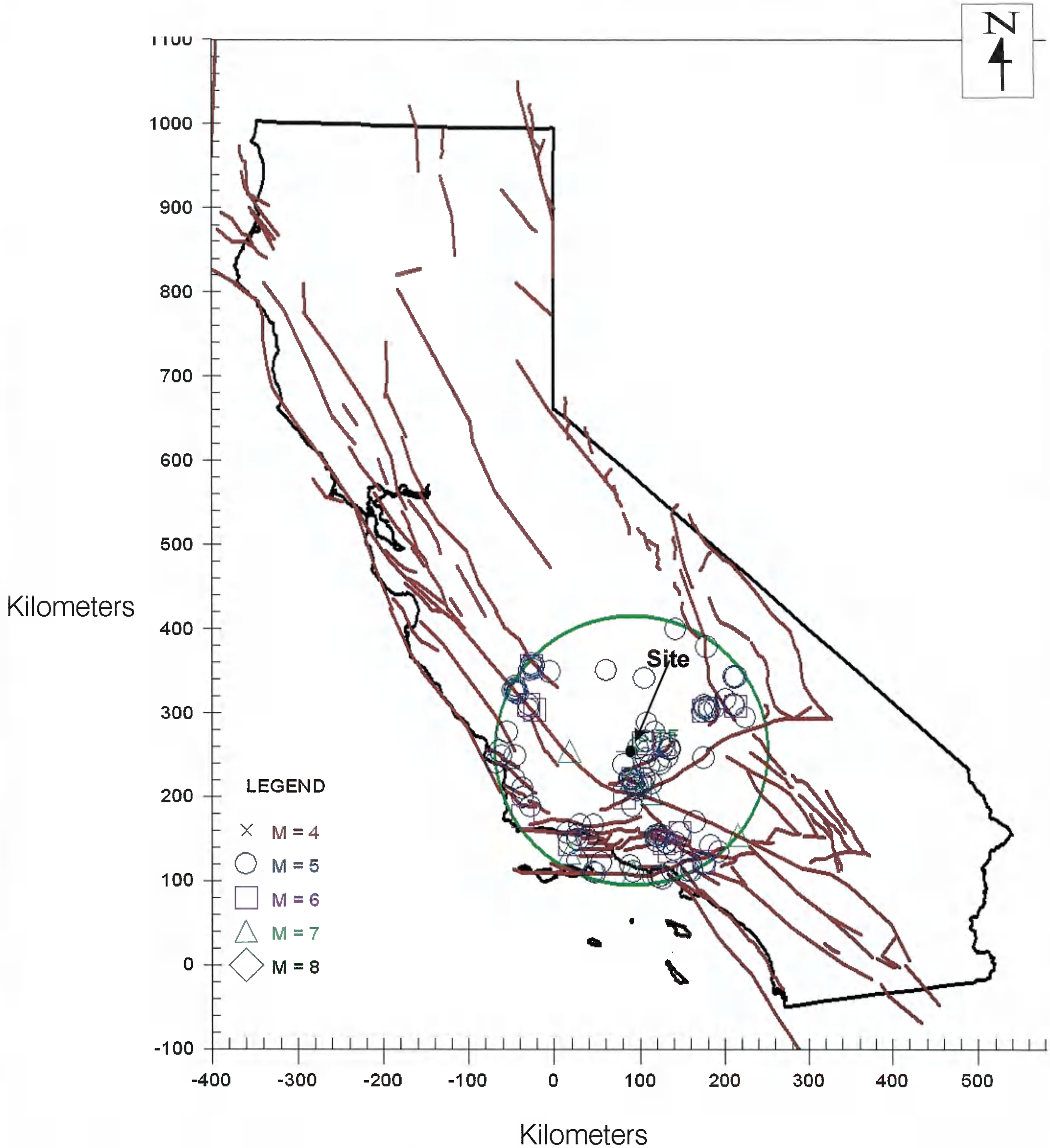
Potential Site Layout Map

PLATE
2C

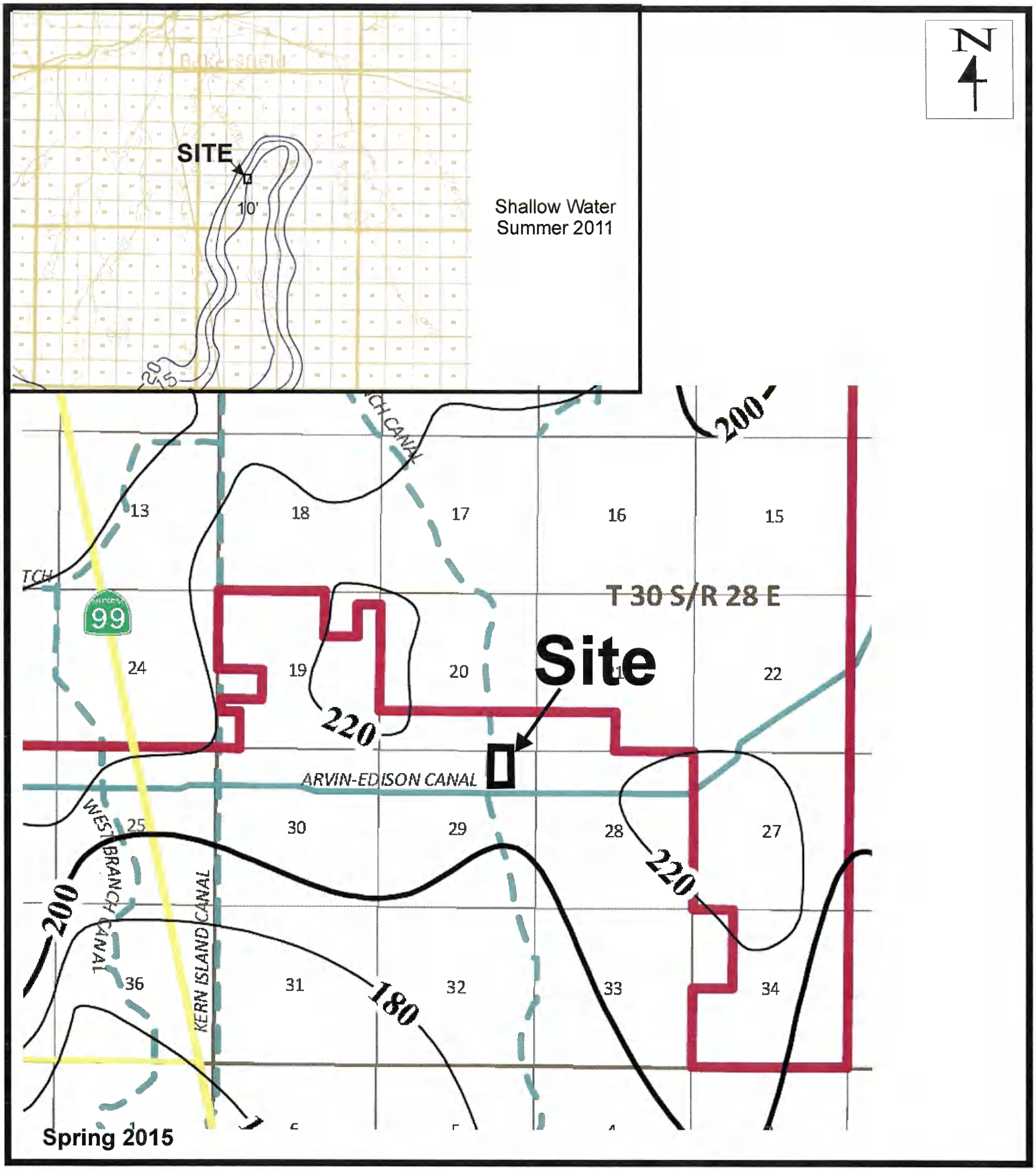


SOURCE: Lamont Quadrangle, Seismic Hazard Atlas Map, Kern County Council of Govt.

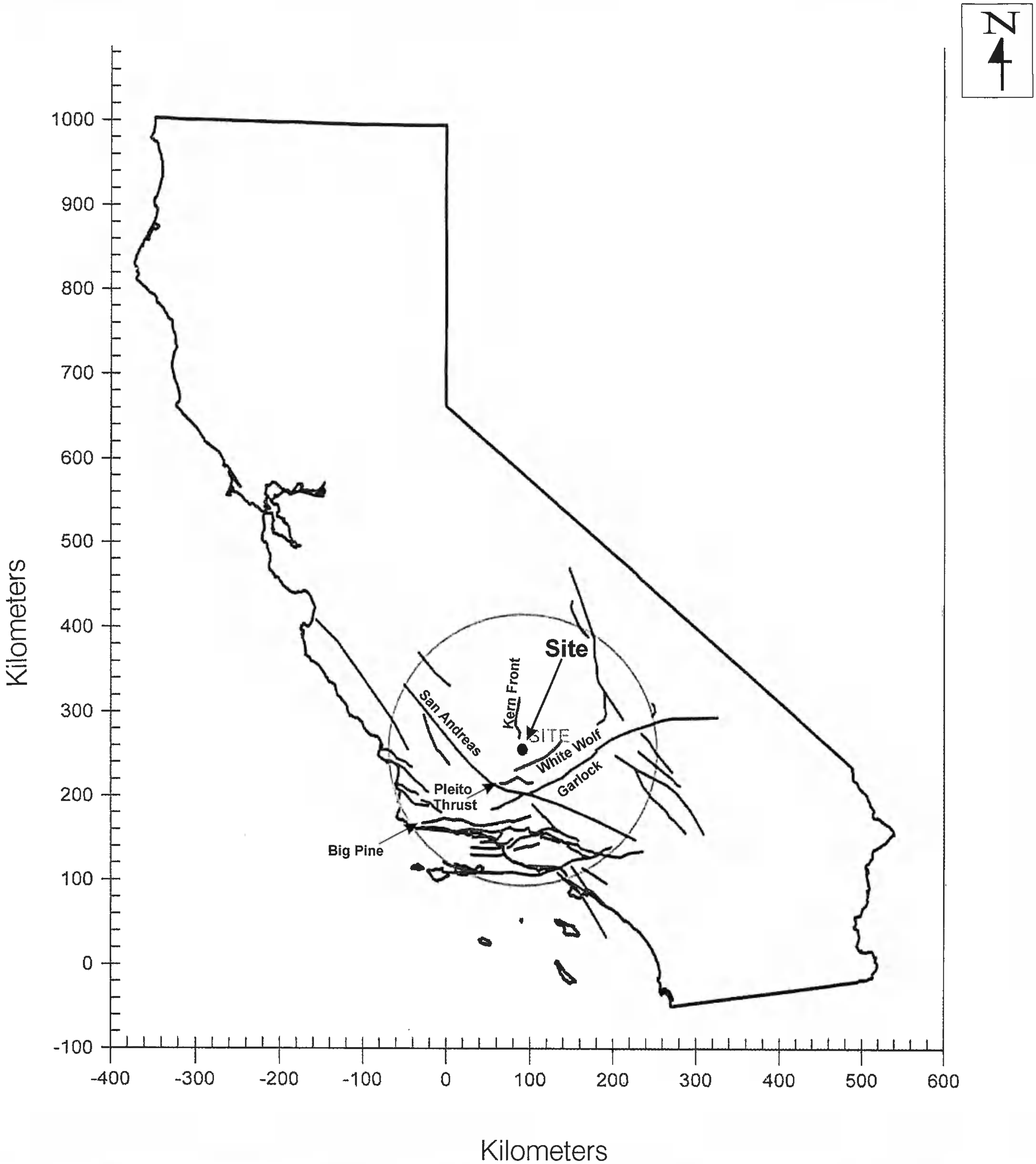
SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 **DATE: 6/19** **PROJECT: 17151**	**Greenfield USD-Crescent Elementary School** **S. of Panama Lane and W. of Cottonwood Road** **Bakersfield, CA** Seismic Hazard Zone Atlas Map	PLATE 3



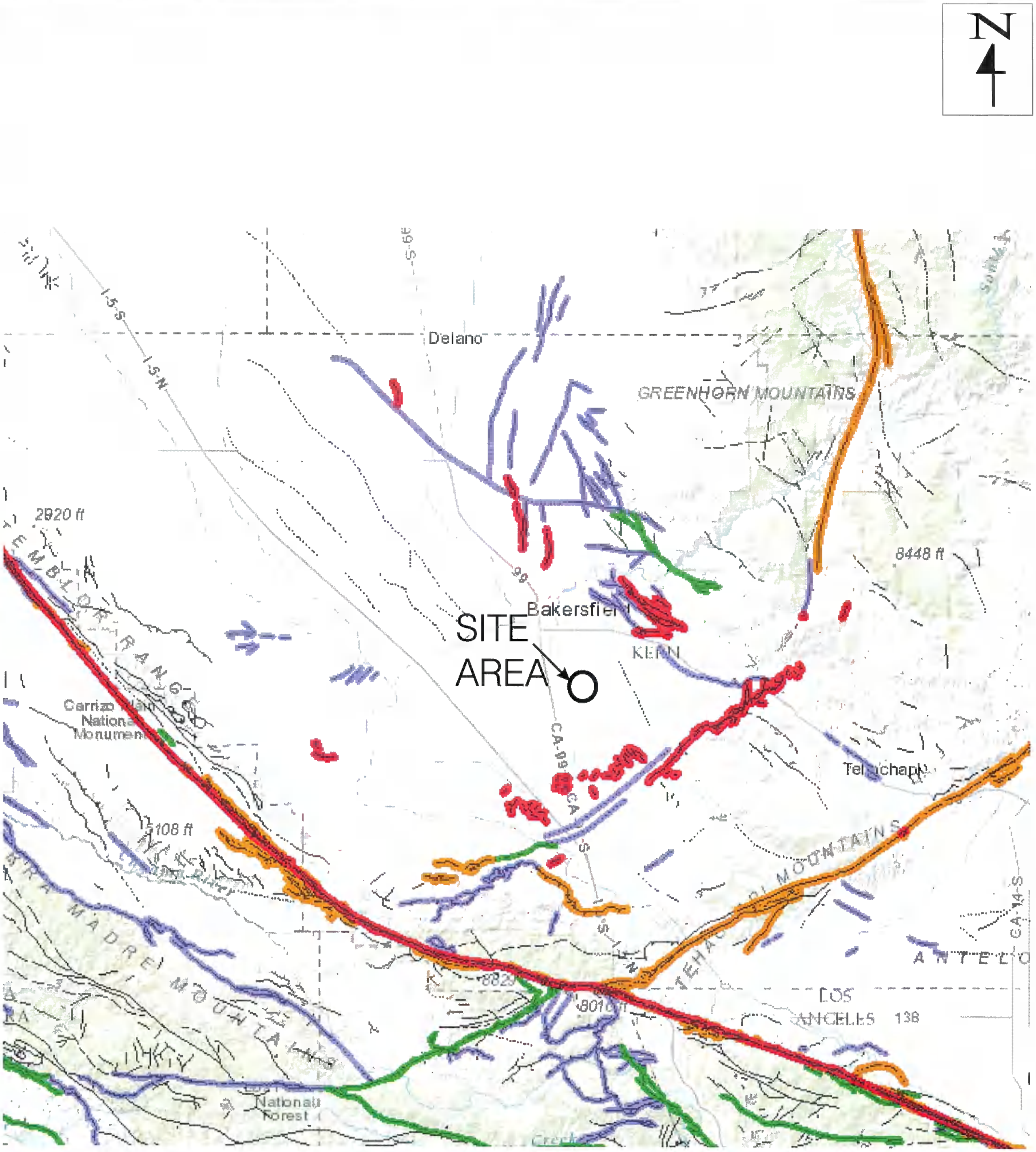
SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 **DATE: 6/19** **PROJECT: 17151**	**Greenfield USD-Crescent Elementary School** **S. of Panama Lane and W. of Cottonwood Road** **Bakersfield, CA** Earthquake Epicenter Map	PLATE 3A



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831-5100	Greenfield USD-Crescent Elementary School S. of Panama Lane and W. of Cottonwood Road Bakersfield, CA	PLATE
DATE: 6/19 PROJECT: 17151	Depth To Water Map	4

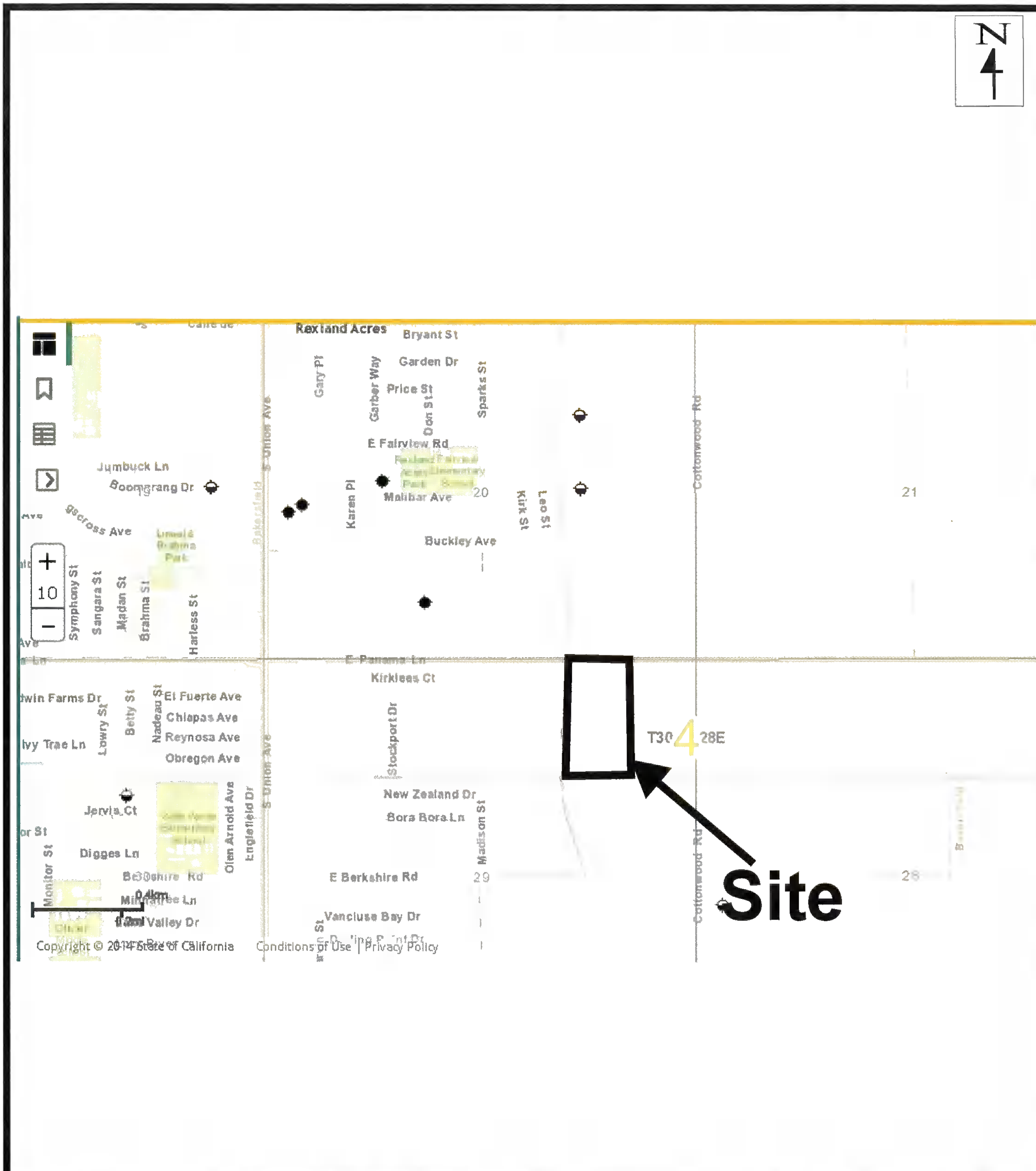


SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 **DATE: 6/19** **PROJECT: 17151**	**Greenfield USD-Crescent Elementary School** **S. of Panama Lane and W. of Cottonwood Road** **Bakersfield, CA** Fault Location Map	PLATE 5



SOURCE: Fault Activity Map of California 2010, CDMG

SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 **DATE: 6/19** **PROJECT: 17151**	**Greenfield USD-Crescent Elementary School** **S. of Panama Lane and W. of Cottonwood Road** **Bakersfield, CA** **REGIONAL FAULT MAP**	PLATE 5A

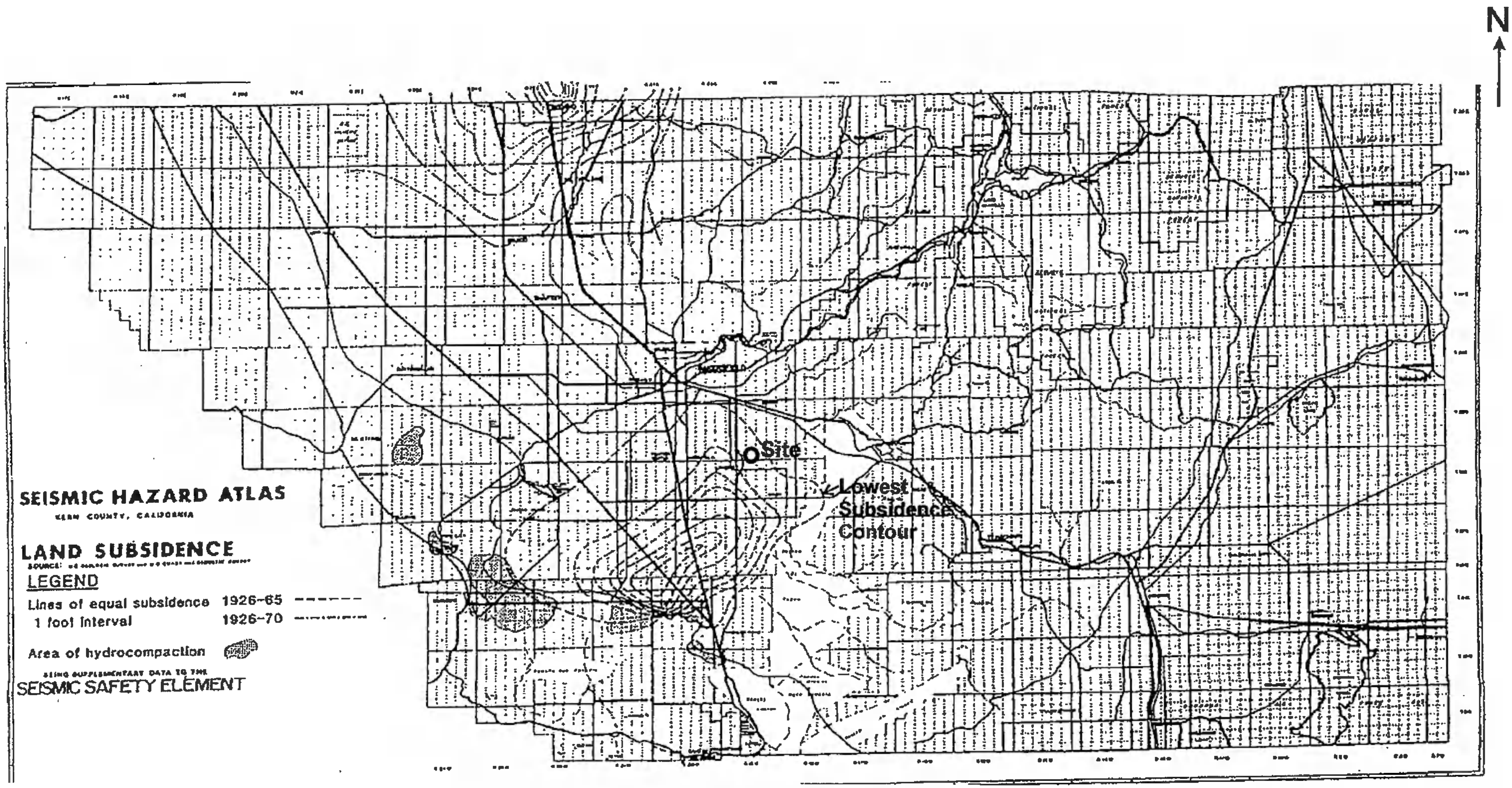


SOILS ENGINEERING, INC.
4400 Yeager Way
Bakersfield, CA 93313
(661) 831 - 5100
DATE: 6/19
PROJECT: 17151

Greenfield USD-Crescent Elementary School
S. of Panama Lane and W. of Cottonwood Road
Bakersfield, CA

DOGGR Oil Well Map

PLATE
6



Regional Land Subsidence Map

From City of Bakersfield Safety Element (Figure 15)

Plate 7

Appendix A

Deterministic Site Parameters - EQFAULTWIN data, EQSEARCHWIN data, USGS Design Maps Summary Report and Detail Report. USGS Interactive Deaggregation.

```
**********************
*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
**********************
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 17151

DATE: 06-27-2019

JOB NAME: GUSD Crescent Elem

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: CGSFLTE.DAT

SITE COORDINATES:
   SITE LATITUDE: 35.2941
   SITE LONGITUDE: 118.9895

SEARCH RADIUS: 100 mi

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
   DISTANCE MEASURE: cd_2drp
   SCOND: 0
   Basement Depth: 5.00 km   Campbell SSR: Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
Kern Front	10.1(16.3)	6.3	0.215	VIII
WHITE WOLF	11.1(17.8)	7.3	0.343	IX
PLEITO THRUST	20.1(32.3)	7.0	0.189	VIII
GARLOCK (West)	30.8(49.6)	7.3	0.131	VIII
SAN ANDREAS - Whole M-1a	31.7(51.0)	8.0	0.186	VIII
SAN ANDREAS - Carrizo M-1c-2	31.7(51.0)	7.4	0.135	VIII
SAN ANDREAS - 1857 Rupture M-2a	31.7(51.0)	7.8	0.167	VIII
SAN ANDREAS - Cho-Moj M-1b-1	31.7(51.0)	7.8	0.167	VIII
BIG PINE	32.7(52.6)	6.9	0.101	VII
SAN GABRIEL	40.6(65.3)	7.2	0.101	VII
SANTA YNEZ (East)	49.1(79.0)	7.1	0.082	VII
SAN ANDREAS - Mojave M-1c-3	49.3(79.3)	7.4	0.096	VII
SAN ANDREAS - Cholame M-1c-1	49.5(79.6)	7.3	0.091	VII
SAN CAYETANO	53.7(86.5)	7.0	0.089	VII
GARLOCK (East)	54.4(87.6)	7.5	0.094	VII

M.RIDGE-ARROYO PARIDA-SANTA ANA	54.6(87.8)	7.2	0.097	VII
SAN JUAN	55.7(89.6)	7.1	0.075	VII
So. SIERRA NEVADA	59.3(95.4)	7.3	0.096	VII
SANTA SUSANA	60.6(97.5)	6.7	0.069	VI
HOLSER	60.6(97.5)	6.5	0.062	VI
NORTH CHANNEL SLOPE	61.3(98.6)	7.4	0.099	VII
RED MOUNTAIN	62.3(100.2)	7.0	0.079	VII
OAK RIDGE (Onshore)	62.9(101.2)	7.0	0.078	VII
NORTHRIDGE (E. Oak Ridge)	63.5(102.2)	7.0	0.078	VII
SANTA YNEZ (West)	64.6(104.0)	7.1	0.067	VI
VENTURA - PITAS POINT	64.7(104.1)	6.9	0.073	VII
SIMI-SANTA ROSA	65.6(105.5)	7.0	0.076	VII
SIERRA MADRE (San Fernando)	66.9(107.6)	6.7	0.064	VI
OAK RIDGE MID-CHANNEL STRUCTURE	68.6(110.4)	6.6	0.059	VI
LENWOOD-LOCKHART-OLD WOMAN SPRGS	69.4(111.7)	7.5	0.078	VII
SAN LUIS RANGE (S. Margin)	71.9(115.7)	7.2	0.079	VII
CHANNEL IS. THRUST (Eastern)	72.5(116.6)	7.5	0.091	VII
GREAT VALLEY 14	72.8(117.2)	6.4	0.051	VI
VERDUGO	74.5(119.9)	6.9	0.065	VI
LITTLE LAKE	75.7(121.8)	6.9	0.053	VI
LOS ALAMOS-W. BASELINE	76.0(122.3)	6.9	0.064	VI
SIERRA MADRE	77.9(125.3)	7.2	0.074	VII
ANACAPA-DUME	78.4(126.2)	7.5	0.086	VII
OAK RIDGE(Blind Thrust Offshore)	78.9(127.0)	7.1	0.069	VI
LIONS HEAD	80.3(129.3)	6.6	0.053	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
SAN ANDREAS - Parkfield	80.4(129.4)	6.5	0.041	V
LOS OSOS	83.6(134.5)	7.0	0.063	VI
MALIBU COAST	83.8(134.8)	6.7	0.054	VI
OWENS VALLEY	84.0(135.2)	7.6	0.071	VI
CASMALIA (Orcutt Frontal Fault)	84.4(135.9)	6.5	0.048	VI
HELENDALE - S. LOCKHARDT	85.4(137.5)	7.3	0.060	VI
RINCONADA	85.7(138.0)	7.5	0.066	VI
HOLLYWOOD	86.6(139.4)	6.4	0.045	VI
GRAVEL HILLS - HARPER LAKE	86.6(139.4)	7.1	0.053	VI
CLAMSHELL-SAWPIT	87.2(140.3)	6.5	0.047	VI
GREAT VALLEY 13	87.7(141.2)	6.5	0.047	VI

17151 EQF

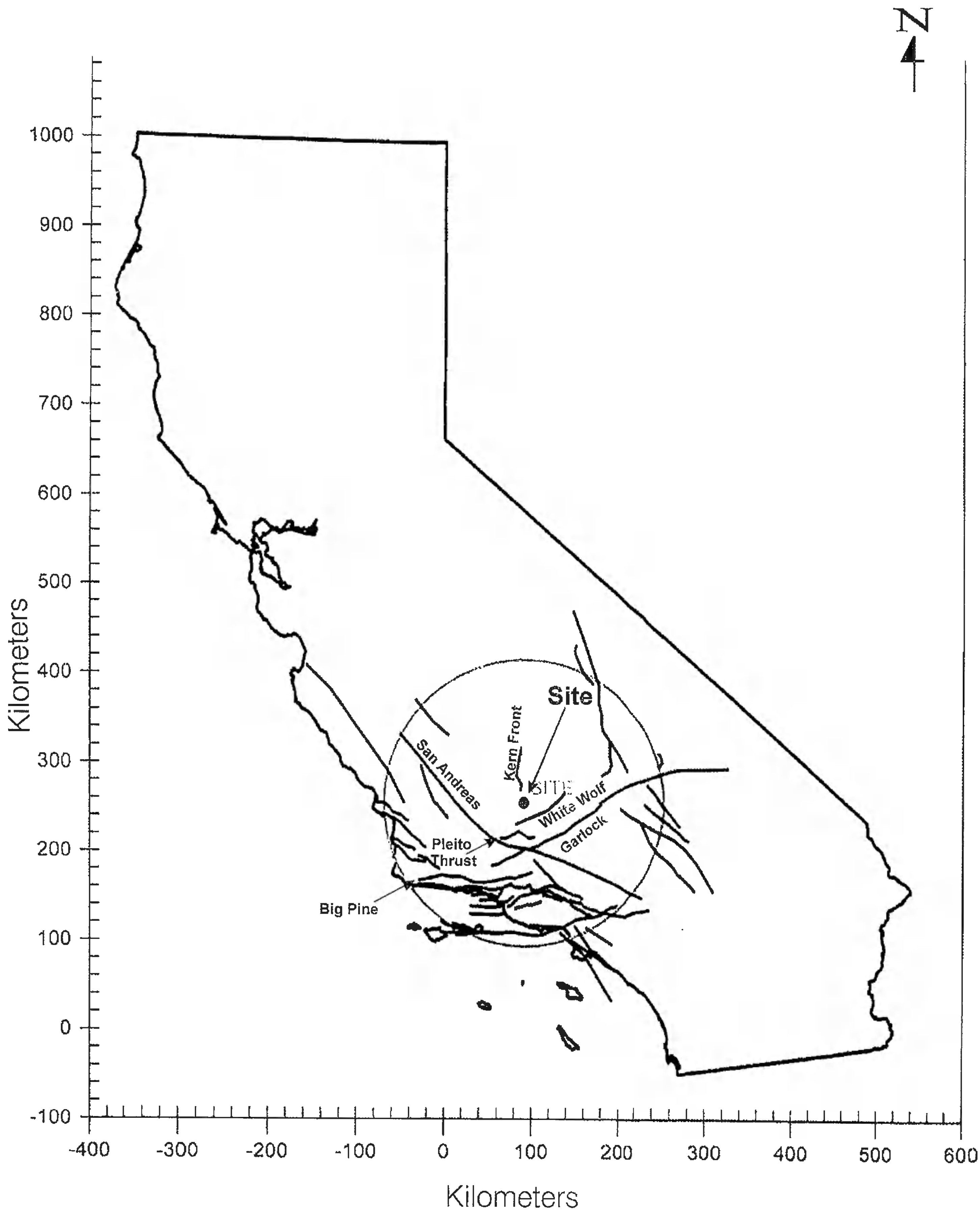
SANTA MONICA	87.9(141.5)	6.6	0.049	VI
UPPER ELYSIAN PARK BLIND THRUST	88.6(142.6)	6.4	0.044	VI
BLACKWATER	89.6(144.2)	7.1	0.052	VI
PUENTE HILLS BLIND THRUST	89.7(144.4)	7.1	0.063	VI
RAYMOND	90.0(144.8)	6.5	0.046	VI
NEWPORT-INGLEWOOD (L.A.Basin)	92.8(149.4)	7.1	0.050	VI
SANTA CRUZ ISLAND	94.9(152.7)	7.0	0.057	VI
PALOS VERDES	95.9(154.3)	7.3	0.054	VI
INDEPENDENCE	97.6(157.0)	7.1	0.059	VI
TANK CANYON	97.9(157.6)	6.4	0.041	V
CUCAMONGA	100.0(160.9)	6.9	0.052	VI

****

-END OF SEARCH- 62 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

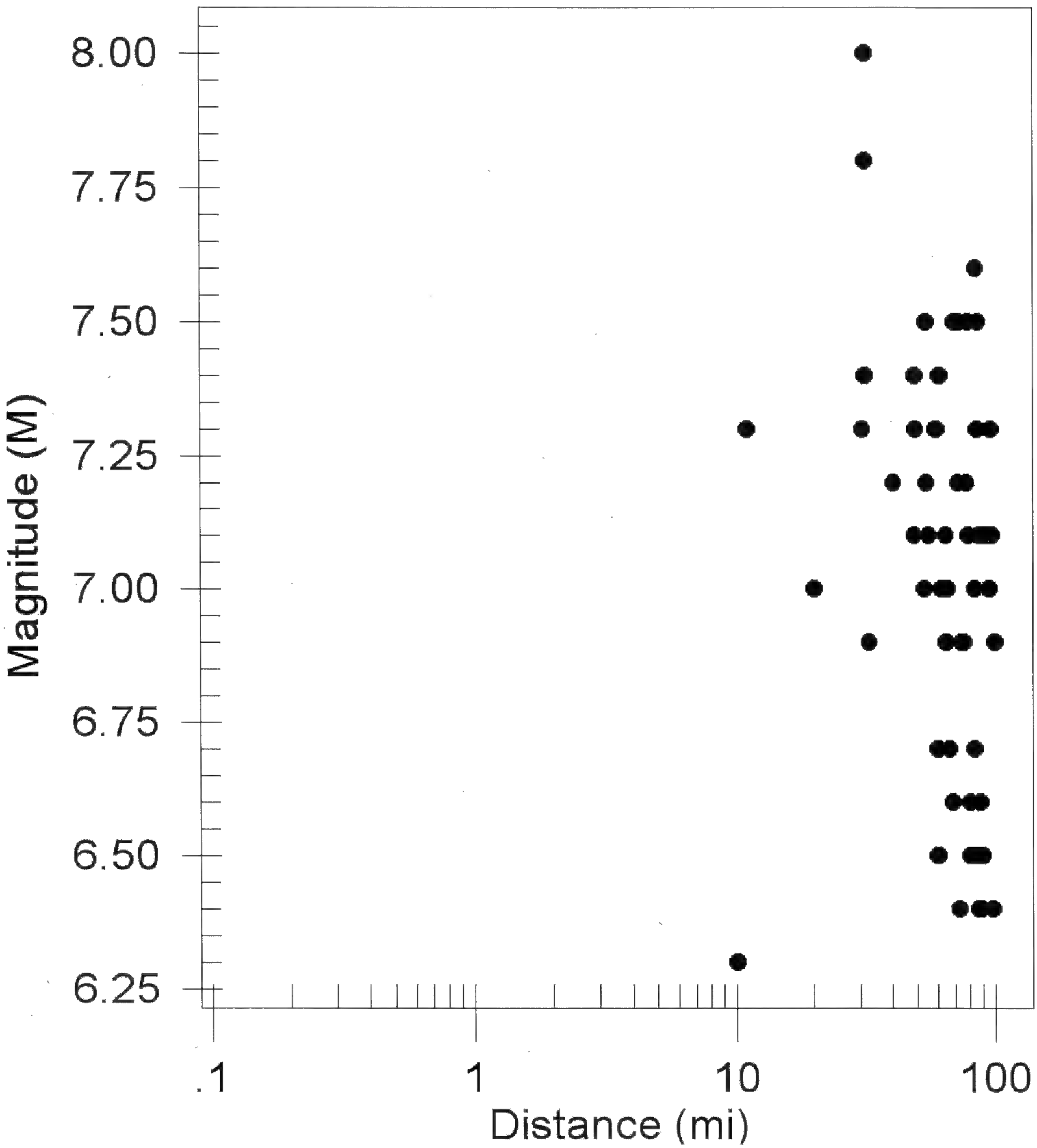
THE Kern Front FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 10.1 MILES (16.3 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.3429 g


N
Kilometers
1000
900
800
700
600
500
400
300
200
100
0
-100
-400
-300
-200
-100
0
100
200
300
400
500
600
Kilometers
Site
Kern Front
San Andreas
SITE
White Wolf
Garlock
Pleito Thrust
Big Pine

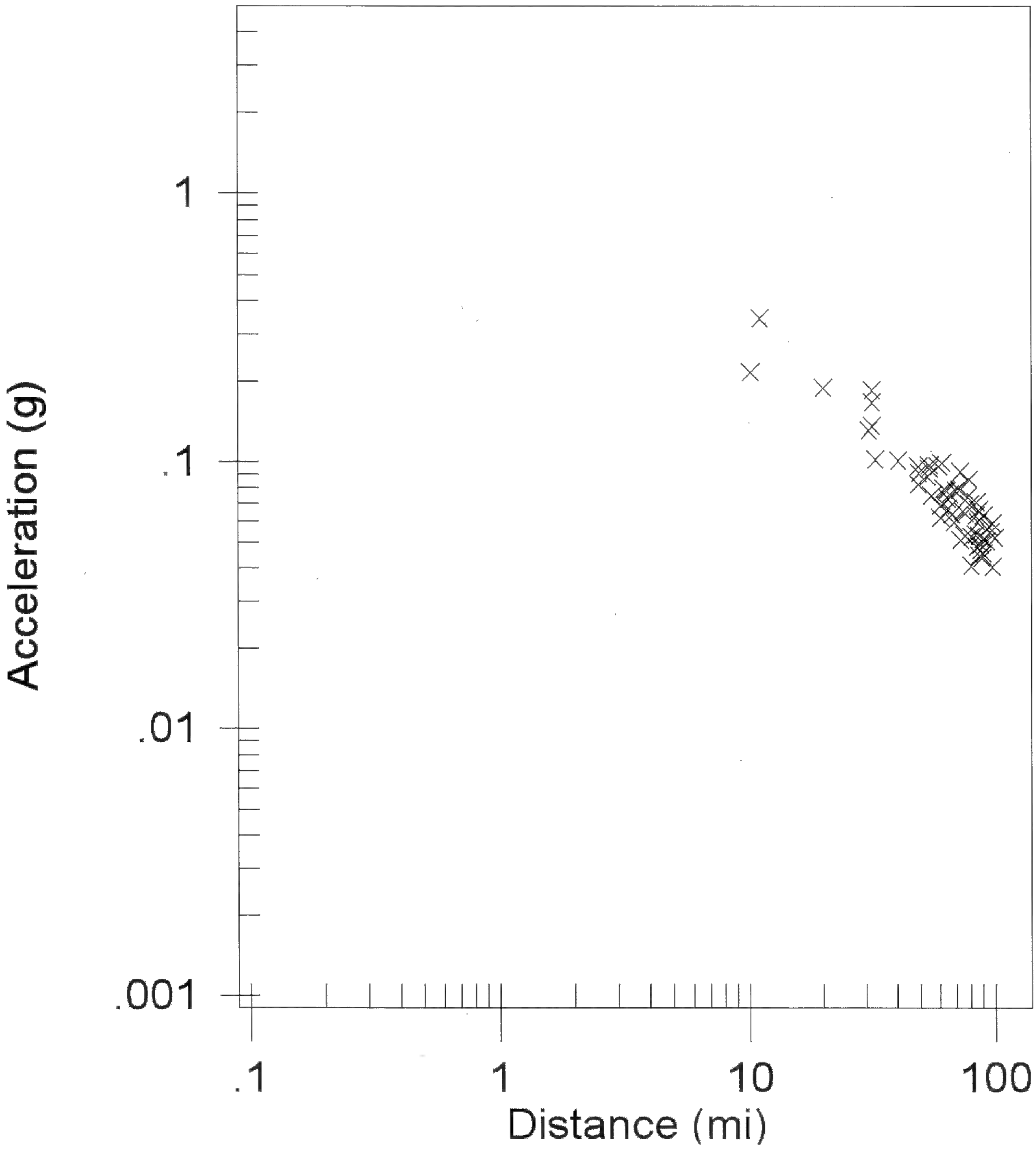
EARTHQUAKE MAGNITUDES & DISTANCES

GUSD Crescent Elem



MAXIMUM EARTHQUAKES

GUSD Crescent Elem



```
*************************
*                       *
*   E Q S E A R C H     *
*                       *
*     Version 3.00      *
*                       *
*************************
```

ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 17151

DATE: 06-27-2019

JOB NAME: GUSD Crescent

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

SITE COORDINATES:
SITE LATITUDE: 35.2941
SITE LONGITUDE: 118.9895

SEARCH DATES:
START DATE: 1800
END DATE: 2010

SEARCH RADIUS:
100.0 mi
160.9 km

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
SCOND: 0 Depth Source: A
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 0.0

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.3330	118.9170	08/22/1952	224124.0	0.0	5.80	0.260	IX	4.9(7.9)
DMG	35.3830	118.8500	07/29/1952	7 347.0	0.0	6.10	0.196	VIII	10.0(16.0)
DMG	35.3000	118.8000	12/23/1905	2223 0.0	0.0	5.00	0.105	VII	10.7(17.2)
DMG	35.2170	118.8170	07/23/1952	1317 5.0	0.0	5.70	0.147	VIII	11.1(17.8)
GSP	35.1490	119.1040	05/28/1993	044740.6	21.0	5.20	0.108	VII	11.9(19.2)
DMG	35.4000	118.8170	07/29/1952	8 146.0	0.0	5.10	0.101	VII	12.2(19.6)
DMG	35.1330	118.7670	07/21/1952	194122.0	0.0	5.50	0.098	VII	16.8(27.0)
DMG	35.0000	119.0000	07/21/1952	12 531.0	0.0	6.40	0.136	VIII	20.3(32.7)
DMG	35.0000	119.0000	02/16/1919	1557 0.0	0.0	5.00	0.065	VI	20.3(32.7)
DMG	35.0000	119.0170	07/21/1952	115214.0	0.0	7.70	0.270	IX	20.4(32.8)
DMG	35.0000	119.0170	01/12/1954	233349.0	0.0	5.90	0.105	VII	20.4(32.8)
DMG	35.0000	119.0330	07/21/1952	12 2 0.0	0.0	5.60	0.089	VII	20.4(32.9)
DMG	35.1830	118.6500	07/21/1952	151358.0	0.0	5.10	0.068	VI	20.6(33.2)
DMG	34.9830	118.9830	05/23/1954	235243.0	0.0	5.10	0.066	VI	21.5(34.6)
DMG	35.5000	118.7000	01/06/1905	1430 0.0	0.0	5.00	0.062	VI	21.6(34.8)
DMG	35.3330	118.6000	07/31/1952	12 9 9.0	0.0	5.80	0.093	VII	22.1(35.6)
DMG	35.0000	118.8330	07/23/1952	75319.0	0.0	5.40	0.075	VII	22.1(35.6)
DMG	35.0000	118.8330	07/23/1952	181351.0	0.0	5.20	0.068	VI	22.1(35.6)
DMG	35.1500	118.6330	01/27/1954	141948.0	0.0	5.00	0.061	VI	22.4(36.1)
DMG	35.3670	118.5830	07/23/1952	31923.0	0.0	5.00	0.059	VI	23.4(37.7)
DMG	35.3670	118.5830	07/23/1952	03832.0	0.0	6.10	0.104	VII	23.4(37.7)
DMG	35.6000	118.8000	06/30/1926	1331 0.0	0.0	5.00	0.058	VI	23.7(38.1)
DMG	34.9410	118.9870	11/15/1961	53855.5	10.7	5.00	0.057	VI	24.4(39.2)
DMG	34.9500	118.8670	07/21/1952	121936.0	0.0	5.30	0.066	VI	24.7(39.8)
DMG	34.9320	118.9760	03/01/1963	02557.9	13.9	5.00	0.056	VI	25.0(40.2)
DMG	35.2330	118.5330	07/21/1952	174244.0	0.0	5.10	0.057	VI	26.1(42.0)
T-A	34.9200	118.9200	05/23/1857	0 0 0.0	0.0	5.00	0.054	VI	26.1(42.0)
T-A	34.9200	118.9200	01/20/1857	0 0 0.0	0.0	5.00	0.054	VI	26.1(42.0)
DMG	35.3150	118.5160	07/25/1952	194323.7	11.2	5.70	0.077	VII	26.7(43.0)
DMG	34.9000	118.9500	08/01/1952	13 430.0	0.0	5.10	0.055	VI	27.3(43.9)
DMG	35.3110	118.4990	07/25/1952	1313 8.2	2.8	5.00	0.052	VI	27.7(44.5)
DMG	34.9000	118.9000	10/23/1916	244 0.0	0.0	6.00	0.087	VII	27.7(44.5)
PAS	34.9430	118.7430	06/10/1988	23 643.0	6.8	5.40	0.063	VI	28.0(45.0)
DMG	35.3170	118.4940	07/25/1952	19 944.6	5.5	5.70	0.074	VII	28.0(45.0)
DMG	34.8670	118.9330	09/21/1941	1953 7.2	0.0	5.20	0.054	VI	29.7(47.7)
DMG	34.8000	119.1000	09/05/1883	1230 0.0	0.0	6.00	0.073	VII	34.7(55.8)
T-A	34.8300	118.7500	11/27/1852	0 0 0.0	0.0	7.00	0.124	VII	34.8(56.0)
DMG	34.7000	119.0000	10/23/1916	254 0.0	0.0	5.50	0.050	VI	41.0(66.0)
DMG	35.3000	119.8000	01/09/1857	16 0 0.0	0.0	7.90	0.162	VIII	45.7(73.5)
GSP	35.2100	118.0660	07/11/1992	181416.2	10.0	5.70	0.046	VI	52.4(84.3)
DMG	36.0800	118.8200	05/29/1915	646 0.0	0.0	5.00	0.030	V	55.1(88.6)
DMG	35.7150	118.0740	03/15/1946	14 035.4	0.0	5.30	0.034	V	59.1(95.1)
DMG	35.7250	118.0550	03/15/1946	134935.9	22.0	6.30	0.056	VI	60.4(97.1)
DMG	35.7450	118.0390	03/16/1946	94617.9	0.0	5.10	0.029	V	61.8(99.5)
DMG	34.5000	119.5000	06/29/1926	2321 0.0	0.0	5.50	0.036	V	62.0(99.7)
DMG	34.5000	119.5000	08/05/1930	1125 0.0	0.0	5.00	0.028	V	62.0(99.7)
DMG	35.7510	118.0290	03/15/1946	215433.4	0.0	5.20	0.031	V	62.5(100.6)
DMG	35.7780	118.0490	01/28/1961	81246.2	5.5	5.30	0.032	V	62.5(100.6)
T-A	36.1700	119.3200	07/25/1868	230 0.0	0.0	5.00	0.027	V	63.2(101.8)
DMG	35.7140	117.9770	03/15/1946	191853.6	0.0	5.40	0.033	V	63.9(102.8)
DMG	35.7530	117.9860	03/15/1946	1321 0.9	0.0	5.20	0.030	V	64.7(104.1)
GSP	34.3940	118.6690	06/26/1995	084028.9	13.0	5.00	0.027	V	64.7(104.2)
GSB	34.3790	118.7110	01/19/1994	210928.6	14.0	5.50	0.035	V	65.1(104.8)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	34.3770	118.6980	01/18/1994	004308.9	11.0	5.20	0.029	V	65.4(105.3)
GSP	34.3690	118.6720	04/26/1997	103730.7	16.0	5.10	0.028	V	66.4(106.8)
GSP	34.3780	118.6180	01/19/1994	211144.9	11.0	5.10	0.028	V	66.7(107.3)
T-A	34.5000	119.6700	06/01/1893	12 0 0.0	0.0	5.00	0.026	V	67.0(107.8)
DMG	35.7470	117.9080	03/18/1946	155042.6	4.4	5.30	0.030	V	68.3(110.0)
GSP	34.3260	118.6980	01/17/1994	233330.7	9.0	5.60	0.035	V	68.9(110.8)
DMG	34.4110	118.4010	02/09/1971	14 244.0	8.0	5.80	0.039	V	69.5(111.8)
DMG	34.4110	118.4010	02/09/1971	14 041.8	8.4	6.40	0.053	VI	69.5(111.8)
DMG	34.4110	118.4010	02/09/1971	14 1 8.0	8.0	5.80	0.039	V	69.5(111.8)
DMG	34.4110	118.4010	02/09/1971	141028.0	8.0	5.30	0.030	V	69.5(111.8)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.025	V	69.8(112.3)
DMG	34.3000	118.6000	04/04/1893	1940 0.0	0.0	6.00	0.042	VI	72.1(116.0)
GSP	34.3050	118.5790	01/29/1994	112036.0	1.0	5.10	0.026	V	72.1(116.1)
DMG	34.3670	119.5830	07/01/1941	75054.8	0.0	5.90	0.039	V	72.3(116.4)
GSB	34.3010	118.5650	01/17/1994	204602.4	9.0	5.20	0.027	V	72.7(116.9)
MGI	34.4000	119.7000	03/25/1806	8 0 0.0	0.0	5.00	0.024	V	73.7(118.6)
DMG	34.3080	118.4540	02/09/1971	144346.7	6.2	5.20	0.027	V	74.5(120.0)
T-A	34.4200	119.8200	00/00/1862	0 0 0.0	0.0	5.70	0.034	V	76.5(123.1)
PAS	34.3470	119.6960	08/13/1978	225453.4	12.8	5.10	0.025	V	76.7(123.4)
DMG	35.7500	120.2500	03/10/1922	112120.0	0.0	6.50	0.051	VI	77.5(124.7)
DMG	35.8310	117.7610	10/19/1961	5 943.9	-2.0	5.20	0.026	V	78.3(126.0)
GSP	34.2130	118.5370	01/17/1994	123055.4	18.0	6.70	0.056	VI	78.9(127.0)
GSP	34.2310	118.4750	03/20/1994	212012.3	13.0	5.30	0.027	V	79.0(127.1)
DMG	35.7500	120.3300	08/18/1922	512 0.0	0.0	5.00	0.022	IV	81.6(131.4)
GSP	35.7760	117.6620	08/17/1995	223959.0	5.0	5.40	0.028	V	81.7(131.4)
GSP	35.7660	117.6490	01/07/1996	143253.1	5.0	5.20	0.025	V	82.1(132.1)
GSB	35.7610	117.6390	09/20/1995	232736.3	5.0	6.10	0.040	V	82.4(132.7)
DMG	34.3000	119.8000	06/29/1925	144216.0	0.0	6.25	0.043	VI	82.6(132.9)
MGI	34.3000	119.8000	07/03/1925	1821 0.0	0.0	5.30	0.026	V	82.6(132.9)
MGI	34.3000	119.8000	07/03/1925	1638 0.0	0.0	5.30	0.026	V	82.6(132.9)
DMG	35.8000	120.3300	06/08/1934	447 0.0	0.0	6.00	0.037	V	83.0(133.6)
DMG	35.8000	120.3300	06/05/1934	2148 0.0	0.0	5.00	0.022	IV	83.0(133.6)
DMG	35.8000	120.3300	12/28/1939	121538.0	0.0	5.00	0.022	IV	83.0(133.6)
DMG	35.8000	120.3300	06/08/1934	430 0.0	0.0	5.00	0.022	IV	83.0(133.6)
PAS	36.1510	120.0490	08/04/1985	12 156.0	6.0	5.80	0.033	V	83.8(134.9)
MGI	34.9000	120.4000	03/29/1928	625 0.0	0.0	5.30	0.026	V	84.2(135.5)
DMG	34.7000	120.3000	01/12/1915	431 0.0	0.0	5.50	0.028	V	84.7(136.3)
DMG	34.7000	120.3000	07/31/1902	920 0.0	0.0	5.50	0.028	V	84.7(136.3)
DMG	34.0650	119.0350	02/21/1973	144557.3	8.0	5.90	0.035	V	84.9(136.6)
MGI	35.2500	120.5000	07/10/1917	043 0.0	0.0	5.30	0.025	V	85.2(137.1)
MGI	35.2500	120.5000	07/09/1917	2222 0.0	0.0	5.00	0.022	IV	85.2(137.1)
MGI	35.2500	120.5000	07/09/1917	2238 0.0	0.0	5.30	0.025	V	85.2(137.1)
MGI	35.2500	120.5000	07/10/1917	045 0.0	0.0	5.30	0.025	V	85.2(137.1)
DMG	34.1000	119.4000	05/19/1893	035 0.0	0.0	5.50	0.028	V	85.7(137.9)
DMG	35.6310	117.5130	09/17/1938	1423 4.1	-2.0	5.00	0.021	IV	86.2(138.8)
MGI	34.8000	120.4000	12/12/1902	0 0 0.0	0.0	5.70	0.031	V	86.7(139.6)
MGI	35.0000	120.5000	11/19/1927	332 0.0	0.0	5.00	0.021	IV	87.7(141.1)
DMG	34.2000	119.8000	12/21/1812	19 0 0.0	0.0	7.00	0.060	VI	88.4(142.3)
MGI	34.0000	119.0000	12/14/1912	0 0 0.0	0.0	5.70	0.030	V	89.4(143.8)
DMG	34.0000	119.0000	09/24/1827	4 0 0.0	0.0	7.00	0.060	VI	89.4(143.8)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.025	V	90.6(145.8)
DMG	34.1180	119.7020	07/05/1968	04517.2	5.9	5.20	0.023	IV	90.7(146.0)
MGI	35.5000	120.6000	01/01/1830	0 0 0.0	0.0	5.00	0.020	IV	91.7(147.6)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	36.0750	117.6500	11/27/1996	201724.1	1.0	5.30	0.024	IV	92.5(148.8)
GSP	36.0670	117.6380	03/06/1998	054740.3	1.0	5.20	0.022	IV	92.7(149.2)
MGI	34.6000	120.4000	07/28/1902	657 0.0	0.0	6.30	0.040	V	93.1(149.8)
MGI	34.6000	120.4000	08/01/1902	330 0.0	0.0	6.30	0.040	V	93.1(149.8)
GSB	35.9170	120.4650	12/20/1994	102747.2	8.0	5.00	0.020	IV	93.3(150.2)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.020	IV	93.5(150.5)
DMG	34.0000	118.5000	08/04/1927	1224 0.0	0.0	5.00	0.020	IV	93.6(150.6)
MGI	34.0000	118.5000	11/19/1918	2018 0.0	0.0	5.00	0.020	IV	93.6(150.6)
DMG	34.0000	119.5000	02/18/1926	1818 0.0	0.0	5.00	0.020	IV	93.9(151.2)
GSP	36.0760	117.6180	03/07/1998	003646.8	1.0	5.00	0.020	IV	94.0(151.2)
PAS	36.1820	120.2680	02/14/1987	72650.8	6.0	5.10	0.021	IV	94.3(151.7)
DMG	36.4000	118.0000	07/05/1871	21 6 0.0	0.0	5.20	0.022	IV	94.3(151.8)
DMG	33.9860	119.4750	08/06/1973	232917.0	16.9	5.00	0.020	IV	94.4(152.0)
DMG	35.9300	120.4800	12/24/1934	1626 0.0	0.0	5.00	0.020	IV	94.5(152.0)
DMG	35.9500	120.4700	11/16/1956	323 9.0	0.0	5.00	0.020	IV	94.6(152.3)
T-A	35.2500	120.6700	00/00/1830	0 0 0.0	0.0	5.70	0.029	V	94.8(152.5)
T-A	35.2500	120.6700	12/17/1852	0 0 0.0	0.0	5.70	0.029	V	94.8(152.5)
PAS	33.9440	118.6810	01/01/1979	231438.9	11.3	5.00	0.020	IV	94.8(152.6)
DMG	33.9500	118.6320	08/31/1930	04036.0	0.0	5.20	0.022	IV	95.0(152.9)
BRK	36.2200	120.2600	09/09/1983	91614.0	0.0	5.40	0.024	V	95.7(154.0)
MGI	36.6000	118.4000	09/04/1868	0 0 0.0	0.0	5.00	0.020	IV	96.0(154.5)
DMG	36.1700	120.3200	12/27/1926	919 0.0	0.0	5.00	0.020	IV	96.0(154.5)
DMG	35.9500	120.5000	06/28/1966	42613.4	0.0	5.50	0.026	V	96.1(154.7)
MGI	35.3000	120.7000	12/07/1906	640 0.0	0.0	5.90	0.032	V	96.4(155.1)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.039	V	96.7(155.6)
DMG	35.9700	120.5000	06/28/1966	4 856.2	0.0	5.10	0.021	IV	96.8(155.7)
BRK	36.2200	120.2900	05/02/1983	2346 6.0	0.0	5.60	0.027	V	96.9(156.0)
BRK	36.2200	120.2900	05/02/1983	234239.0	0.0	6.70	0.048	VI	96.9(156.0)
PAS	33.9190	118.6270	01/19/1989	65328.8	11.9	5.00	0.020	IV	97.1(156.3)
MGI	34.0000	118.3000	09/03/1905	540 0.0	0.0	5.30	0.023	IV	97.6(157.0)
DMG	35.9500	120.5300	06/29/1966	195325.9	0.0	5.00	0.019	IV	97.6(157.1)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.025	V	97.6(157.1)
DMG	36.0000	120.5000	02/02/1881	011 0.0	0.0	5.60	0.027	V	97.8(157.3)
DMG	36.0000	120.5000	03/03/1901	745 0.0	0.0	5.50	0.025	V	97.8(157.3)
BRK	36.2400	120.2900	05/09/1983	24912.0	0.0	5.20	0.022	IV	97.8(157.5)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.023	IV	98.3(158.2)
T-A	34.0000	118.2500	01/10/1856	0 0 0.0	0.0	5.00	0.019	IV	98.7(158.9)
T-A	34.0000	118.2500	03/26/1860	0 0 0.0	0.0	5.00	0.019	IV	98.7(158.9)
T-A	34.0000	118.2500	09/23/1827	0 0 0.0	0.0	5.00	0.019	IV	98.7(158.9)
DMG	34.3700	117.6500	12/08/1812	15 0 0.0	0.0	7.00	0.055	VI	99.2(159.6)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.031	V	99.6(160.3)
MGI	35.1700	120.7500	12/01/1916	2253 0.0	0.0	5.70	0.028	V	99.7(160.4)

****

-END OF SEARCH- 148 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2010

LENGTH OF SEARCH TIME: 211 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 4.9 MILES (7.9 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.9

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.270 g

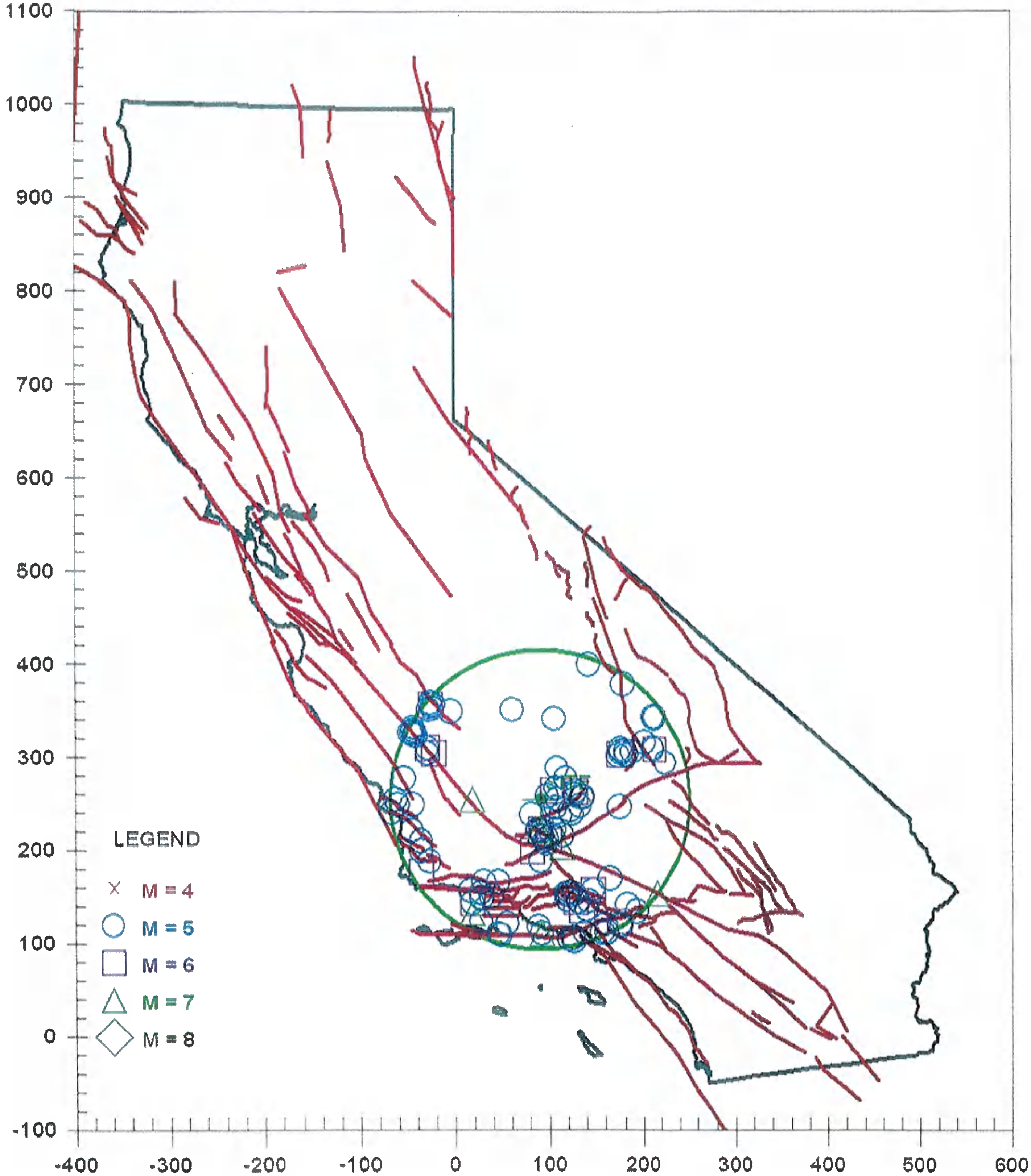
COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.633
b-value= 0.406
beta-value= 0.936

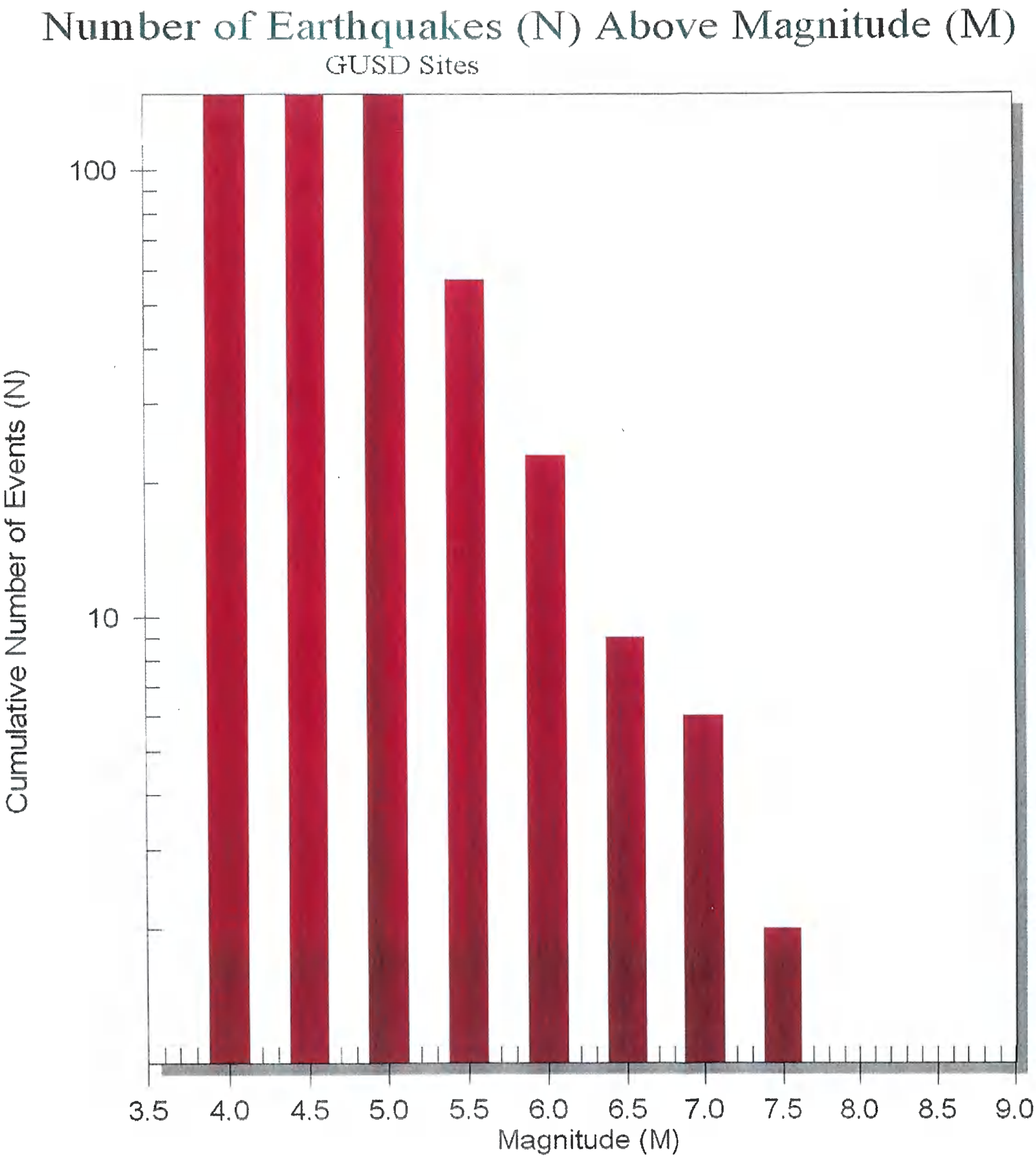
TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	148	0.70476
4.5	148	0.70476
5.0	148	0.70476
5.5	57	0.27143
6.0	23	0.10952
6.5	9	0.04286
7.0	6	0.02857
7.5	2	0.00952

EARTHQUAKE EPICENTER MAP

GUSD Sites

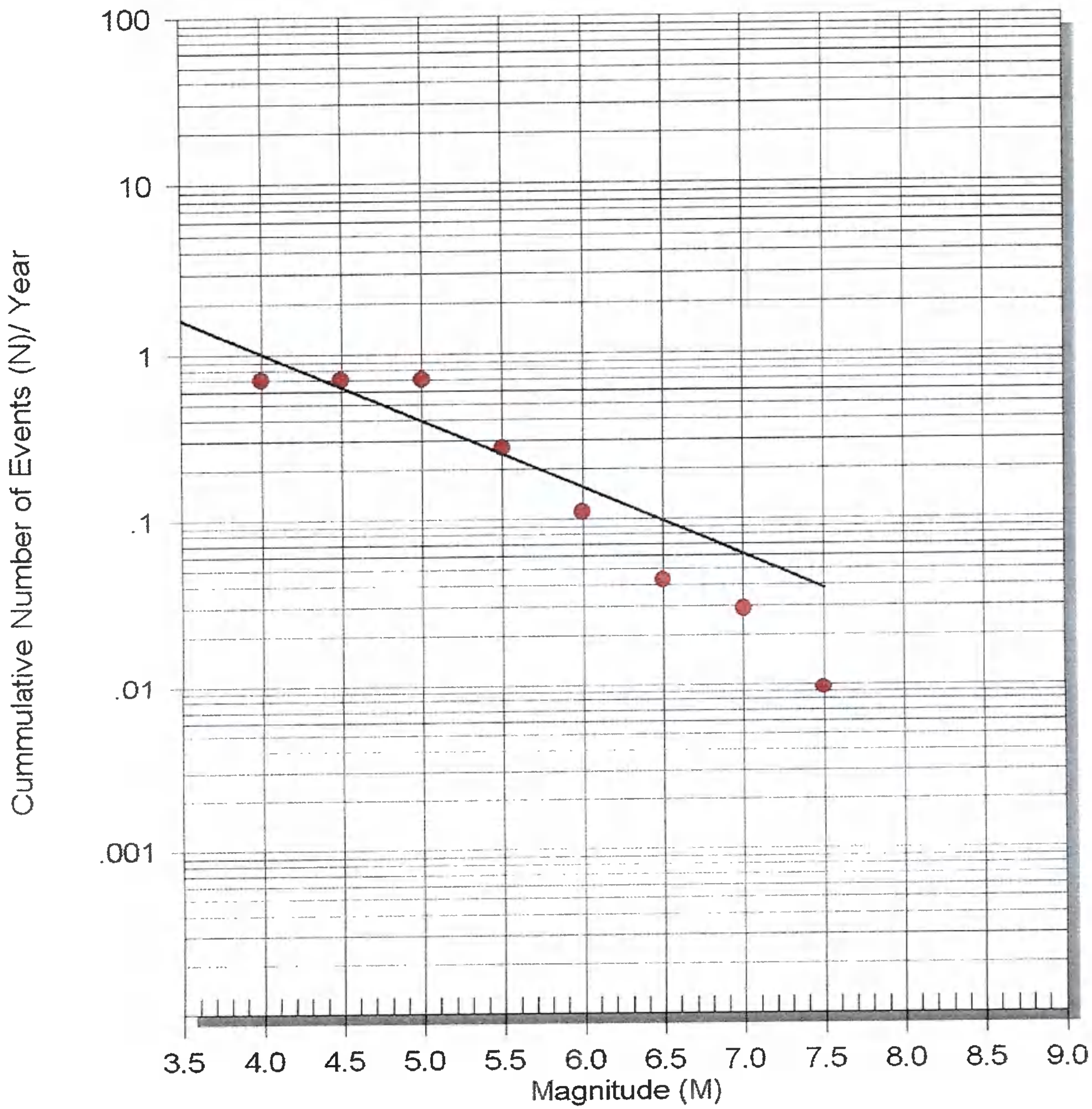




Number of Earthquakes (N) Above Magnitude (M)
GUSD Sites
100
10
Cumulative Number of Events (N)
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Magnitude (M)

EARTHQUAKE RECURRENCE CURVE

GUSD Sites



USGS Design Maps Summary Report

User–Specified Input

Report Title 15820 GUSD Middle School #4
Thu July 14, 2016 22:57:12 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 35.29408°N, 118.98952°W

Site Soil Classification Site Class D – "Stiff Soil"

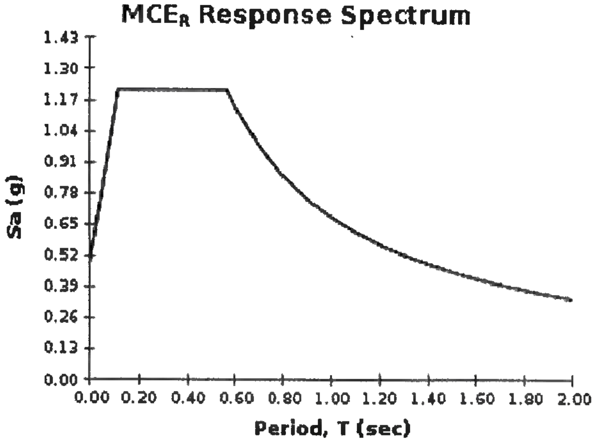
Risk Category I/II/III

USGS–Provided Output

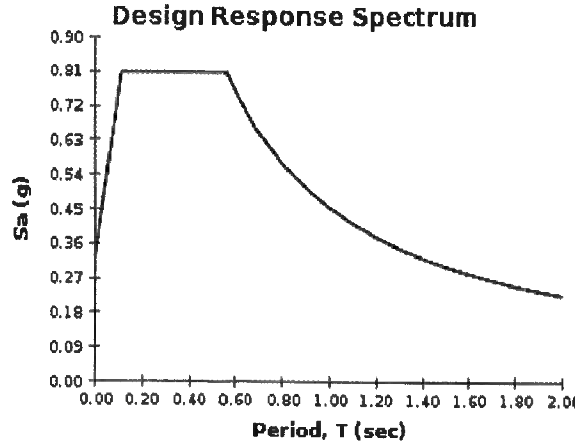
S_S =	1.177 g	S_{MS} =	1.211 g	S_{DS} =	0.808 g
S_1 =	0.435 g	S_{M1} =	0.681 g	S_{D1} =	0.454 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

MCE_R Response Spectrum



Design Response Spectrum



For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (35.29408°N, 118.98952°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 1.177$ g

From Figure 22-2 [2] $S_1 = 0.435$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Equation (11.4-1): $S_{MS} = F_aS_S = 1.029 \times 1.177 = 1.211$ g

Equation (11.4-2): $S_{M1} = F_vS_1 = 1.565 \times 0.435 = 0.681$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

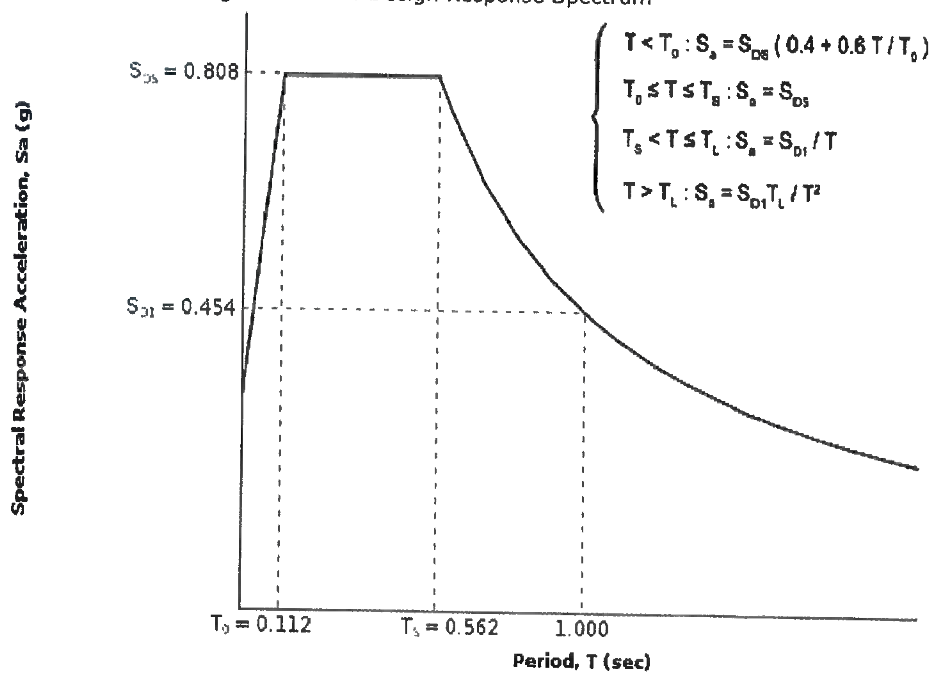
Equation (11.4-3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 1.211 = 0.808$ g

Equation (11.4-4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 0.681 = 0.454$ g

Section 11.4.5 — Design Response Spectrum

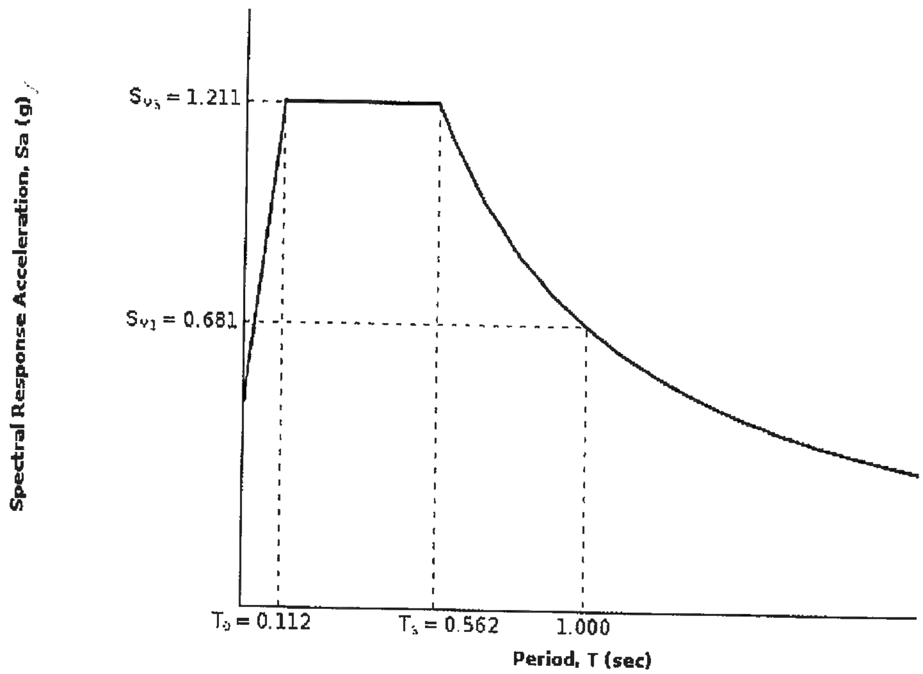
From Figure 22-12 [3] $T_L = 12$ seconds

Figure 11.4-1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.442

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.058 \times 0.442 = 0.468$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.442 g, F_{PGA} = 1.058

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 1.026

From Figure 22-18 [6] C_{R1} = 1.045

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.808 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.454 g, Seismic Design Category = D

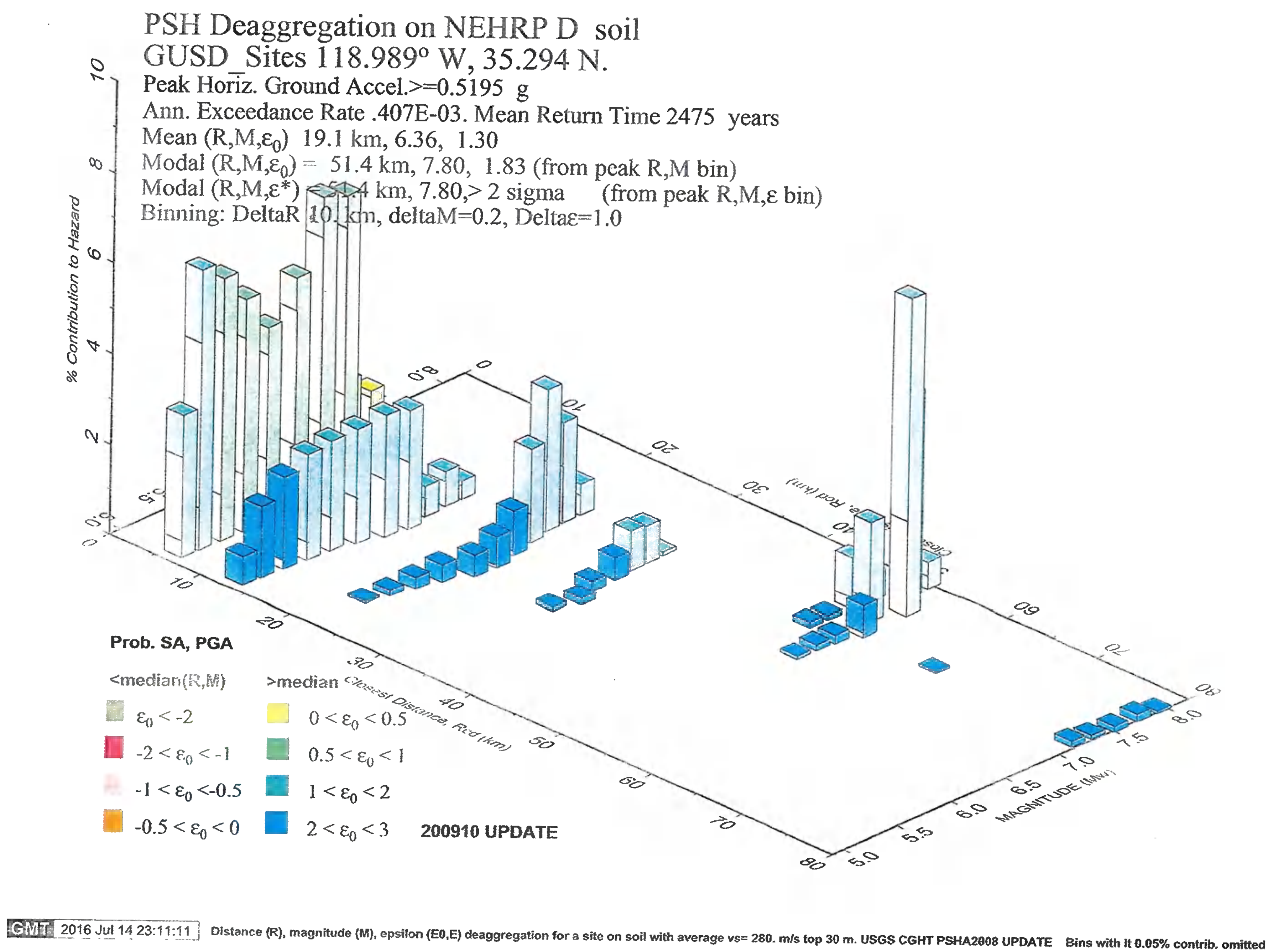
Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf


PSH Deaggregation on NEHRP D soil
GUSD_Sites 118.989° W, 35.294 N.
Peak Horiz. Ground Accel.>=0.5195 g
Ann. Exceedance Rate .407E-03. Mean Return Time 2475 years
Mean (R,M,ε0) 19.1 km, 6.36, 1.30
Modal (R,M,ε0) = 51.4 km, 7.80, 1.83 (from peak R,M bin)
Modal (R,M,ε*) = 51.4 km, 7.80,> 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0
% Contribution to Hazard
Closest Distance, Rcd (km)
MAGNITUDE (Mw)
Prob. SA, PGA
<median(R,M)
>median
ε0 < -2
-2 < ε0 < -1
-1 < ε0 <-0.5
-0.5 < ε0 < 0
0 < ε0 < 0.5
0.5 < ε0 < 1
1 < ε0 < 2
2 < ε0 < 3
200910 UPDATE
GMT 2016 Jul 14 23:11:11
Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on soil with average vs= 280. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

Appendix B

Boring Logs, Lake Isabella Flood Inundation Map, Flood Insurance Rate Map, LiquefyPro Plots and Calculation Sheets for Liquefaction and Settlement, Pipeline Risk Analysis Report and Lab Results Table.

LOG OF TEST BORING
BORING B-2E

PROJECT: 49-ACRE SANDRINI SITE
BORING DATE: 08/24/06
BORING LOCATION: SEE BORING LOCATION MAP, PLATE 2A
DRILL METHOD: 4-1/4 INCH I.D. HOLLOW-STEM AUGER
DESCRIPTION: GEOLOGICAL HAZARD STUDY
DEPTH TO WATER - ▼ : 20'
CAVING - ➧ : N/A

FILE NO: 06-11833
ELEV.: 100' ASSUMED
START: 08/24/06
FINISH: 08/24/06
LOGGER: Bobby Carolina

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
0 30		SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to medium; clean; medium dense.			
	6/6 7/6 8/6				106.4	3.5
29 5	5/6 6/6 7/6				103.9	4.2
28 10			fine to coarse; clean; slight gravel			
27	4/6 6/6 8/6				101.5	4.6
26 15		SM	SILTY SAND: yellowish brown; slightly moist; fines; cohesive; medium dense.			
	4/6 5/6 6/6				106.0	15.7
25 20	▼					
24	7/6 9/6 9/6	SP	POORLY-GRADED SAND: light orangish brown; wet; fines; clean; medium dense.		121.2	23.4
23 25	5/6 7/6 12/6		light orangish brown; saturated; medium dense		114.3	24.1
22 30		ML	SANDY SILT: light gray; saturated; cohesive fines; firm.			
21	2/6 4/6 5/6				112.4	25.0
20 35		SP	POORLY-GRADED SAND: light gray; saturated; fines; loose.			

Figure Number 2

LOG OF TEST BORING
BORING B-2E

PROJECT: *49-ACRE SANDRINI SITE*
BORING DATE: *08/24/06*
BORING LOCATION: *SEE BORING LOCATION MAP, PLATE 2A*
DRILL METHOD: *4-1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *GEOLOGICAL HAZARD STUDY*
DEPTH TO WATER - : *20'* CAVING - : *N/A*

FILE NO: *06-11833*
ELEV.: *100' ASSUMED*
START: *08/24/06*
FINISH: *08/24/06*
LOGGER: *Bobby Carolina*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
	9/6 10/6 13/6		medium dense		119.1	19.5
19						
40						
18	3/6 5/6 9/6				116.9	27.8
17						
45						
16	8/6 9/6 10/6	SM	SILTY SAND		104.4	24.9
50						
15			BOTTOM			
14						
55						
13						
60						
12						
11						
65						
10						
70						
9						

LOG OF TEST BORING
BORING B-3E

PROJECT: *49-ACRE SANDRINI SITE*
BORING DATE: *08/24/06*
BORING LOCATION: *SEE BORING LOCATION MAP, PLATE 2A*
DRILL METHOD: *4-1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *GEOLOGICAL HAZARD STUDY*
DEPTH TO WATER - ▽ : *24'*
CAVING - : *N/A*

FILE NO: *06-11833*
ELEV.: *100' ASSUMED*
START: *08/24/06*
FINISH: *08/24/06*
LOGGER: *Bobby Carolina*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
0		SM	SILTY SAND: dark yellowish brown; slightly moist; fines; cohesive fines; medium dense.			
30	10/6 15/6 18/6				99.7	7.1
29 / 5	8/6 13/6 16/6				104.1	7.8
28 / 10		CL	SANDY CLAY: dark grayish brown; moist; plastic fines; firm.			
27	4/6 7/6 8/6				116.9	14.6
26 / 15		ML	SANDY SILT: yellowish brown; moist; fine; slightly cohesive fines; very loose.			
25	5/6 2/6 2/6				100.5	22.5
20		SM	SILTY SAND: light orangish brown; moist; fines; clean; medium dense.			
24	5/6 6/6 4/6				90.2	22.7
23 / 25	▽		WATER			
22	5/6 9/6 11/6				107.7	23.7
30 / 21	9/6 10/6 12/6	ML	SANDY SILT: yellowish brown; saturated; fines; cohesive; medium dense.		108.0	27.8
20 / 35						

Figure Number 3

LOG OF TEST BORING
BORING B-3E

PROJECT: *49-ACRE SANDRINI SITE*
BORING DATE: *08/24/06*
BORING LOCATION: *SEE BORING LOCATION MAP, PLATE 2A*
DRILL METHOD: *4-1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *GEOLOGICAL HAZARD STUDY*
DEPTH TO WATER - : *24'*
CAVING - : *N/A*

FILE NO: *06-11833*
ELEV.: *100' ASSUMED*
START: *08/24/06*
FINISH: *08/24/06*
LOGGER: *Bobby Carolina*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
19 / 40 / 18	7/6 10/6 11/6	SM	SILTY SAND: light gray; saturated; fines; clean; medium dense.		110.0	23.7
17 / 45			grayish brown; slightly cohesive			
16 / 50 / 15	9/6 11/6 15/6	SP	POORLY-GRADED SAND: light gray; saturated; fines; clean; medium dense.		110.3	25.9
14 / 55 / 13 / 60 / 12 / 11 / 65 / 10 / 70 / 9			BOTTOM			

Figure Number 3

KEY TO SYMBOLS

Symbol Description

Strata symbols

Poorly graded sand

Silty sand

Clayey sand

Silt

Well graded sand

Low plasticity clay

Misc. Symbols

Water table at boring completion

Boring continues

Soil Samplers

California sampler

Standard penetration test

Notes:

1. Three (3) Exploratory borings were drilled on 08/24/06 using a 4 1/4 inch I.D. hollow-stem auger.
2. Water was encountered in each of the borings between 20' and 24' with the maximum depth drilled being 51 feet.
3. Boring locations are shown on the Boring Location Map, Plate 2A.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests for moisture & density conducted on samples recovered are reported on the logs.

LOG OF TEST BORING
BORING B-6

PROJECT: *GUSD Update of PEA & Geohazard*
BORING DATE: *12/21/16*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4 1/4" I.D. Hollow-Stem Auger*
DESCRIPTION: *PEA Update & Geohazard Update*
DEPTH TO WATER - ▼ : *24*
CAVING - ➤ : *N/A*

FILE NO: *15820*
ELEV.:
START: *12/21/16*
FINISH: *12/27/16*
LOGGER: *M. WATTS*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
0		SM	SILTY SAND: yellowish brown; damp; fine grained.			
5	4/6 6/6 7/6	CL	SANDY CLAY: olive brown; damp; stiff; low plasticity.			10.1
10	2/6 2/6 5/6	SM	SILTY SAND: olive brown; loose.			16.6
15	2/6 4/6 7/6		light olive brown; damp to wet; medium dense; traces of clay			18.3
		SP-SM	POORLY-GRADED SAND with low fine content: light olive brown; wet; fine grained.			
20	6/6 12/6 14/6		medium dense water came up to 21'			11.1
	▼		WATER			
25	5/6 13/6 18/6		light grayish brown; dense; saturated			17.6
30	6/6 14/6 23/6		lighy gray; dense			20.6
35						

Figure Number 7

LOG OF TEST BORING
BORING B-6

PROJECT: *GUSD Update of PEA & Geohazard*
BORING DATE: *12/21/16*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4 1/4" I.D. Hollow-Stem Auger*
DESCRIPTION: *PEA Update & Geohazard Update*
DEPTH TO WATER - : *24*
CAVING - : *N/A*

FILE NO: *15820*
ELEV.:
START: *12/21/16*
FINISH: *12/27/16*
LOGGER: *M. WATTS*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
	6/6 21/6 24/6		gray; dense			18.8
40						
45	6/6 8/6 20/6	ML	SANDY SILT: blue green; saturated; low plasticity; traces of clay.			19.6
50			NO SAMPLE TAKEN DUE TO REFUSAL-FLOWING SANDS.			
55						
60						
65						
70						

LOG OF TEST BORING
BORING B-7

PROJECT: *GUSD Update of PEA & Geohazard*
BORING DATE: *12/21/16*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4 1/4" I.D. Hollow-Stem Auger*
DESCRIPTION: *PEA Update & Geohazard Update*
DEPTH TO WATER - : *24*
CAVING - : *N/A*

FILE NO: *15820*
ELEV.:
START: *12/21/16*
FINISH: *12/27/16*
LOGGER: *M. WATTS*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
0		SM	SILTY SAND: light brown; dry to damp; fine grained.			
6	5/6 7/6 9/6	ML	SANDY SILT: olive brown; dry to damp; very stiff; low plasticity; traces of clay.			6.8
11	3/6 4/6 5/6	SC	CLAYEY SAND: dark olive brown; damp; low plasticity; fine grained.			9.2
16	3/6 5/6 9/6	SC	CLAYEY SAND: light olive brown; damp; medium dense; low plasticity; fine grained.			15.9
21	6/6 10/6 13/6	SP-SM	POORLY-GRADED SAND with low fine content: light olive brown; damp; medium dense; fine to medium grained.			5.0
24			WATER			
26	3/6 11/6 19/6		saturated; medium dense			18.3
30			REFUSAL DUE TO FLOWING SANDS			

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35

LOG OF TEST BORING
BORING B-8

PROJECT: *GUSD Update of PEA & Geohazard*
BORING DATE: *12/21/16*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4 1/4" I.D. Hollow-Stem Auger*
DESCRIPTION: *PEA Update & Geohazard Update*
DEPTH TO WATER - ▽ : *25*
CAVING - ➤ : *N/A*

FILE NO: *15820*
ELEV.:
START: *12/21/16*
FINISH: *12/27/16*
LOGGER: *M. WATTS*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
0		SC	CLAYEY SAND: olive brown; dry to damp; low plasticity; fine grained.			
5	4/6 7/6 10/6		medium dense			8.6
10	3/6 5/6 7/6	CL SM	SANDY CLAY: brown; damp; low plasticity. SILTY SAND: olive brown; dry to damp; medium dense; fine grained.			9.8
15	3/6 5/6 6/6		light olive brown; damp; medium dense; low cohesion			16.6
20	4/6 8/6 10/6		yellowish brown; medium dense; very fine grained			19.8
25 ▽	6/6 13/6 17/6	SP	WATER POORLY-GRADED SAND: light brownish gray; saturated; dense; fine to medium grained.			17.1
30	5/6 9/6 7/6	ML	SANDY SILT; gray; saturated; stiff; low plasticity			22.8
35						

LOG OF TEST BORING
BORING B-8

PROJECT: *GUSD Update of PEA & Geohazard*
BORING DATE: *12/21/16*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4 1/4" I.D. Hollow-Stem Auger*
DESCRIPTION: *PEA Update & Geohazard Update*
DEPTH TO WATER - ≡ **:** *25*
CAVING - **:** *N/A*

FILE NO: *15820*
ELEV.:
START: *12/21/16*
FINISH: *12/27/16*
LOGGER: *M. WATTS*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
	9/6 17/6 20/6		blue gray; saturated; hard; low plasticity.			22.6
40						
45						
	7/6 13/6 25/6	SM	SILTY SAND: light olive brown; saturated; dense; fine to medium grained.			2.3
50			REFUSAL DUE TO FLOWING SANDS			
55						
60						
65						
70						

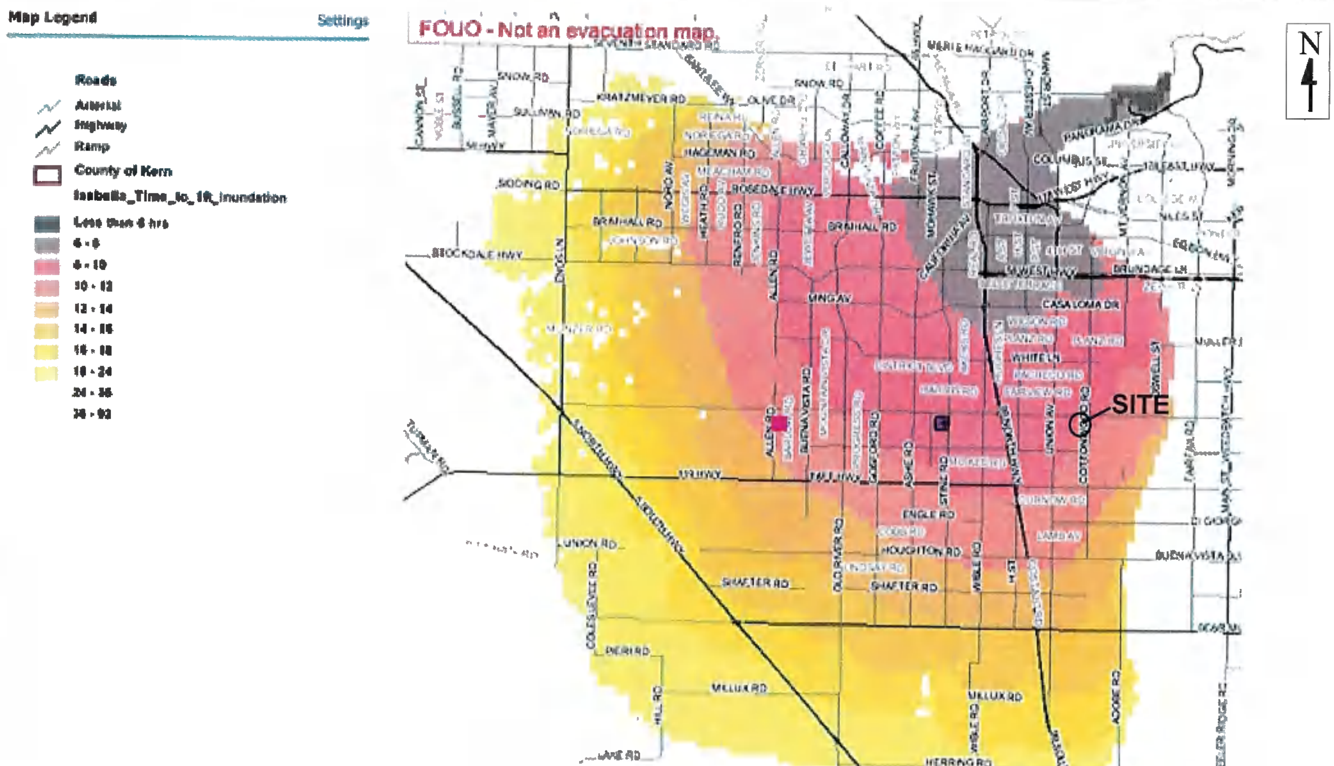
Figure Number 9

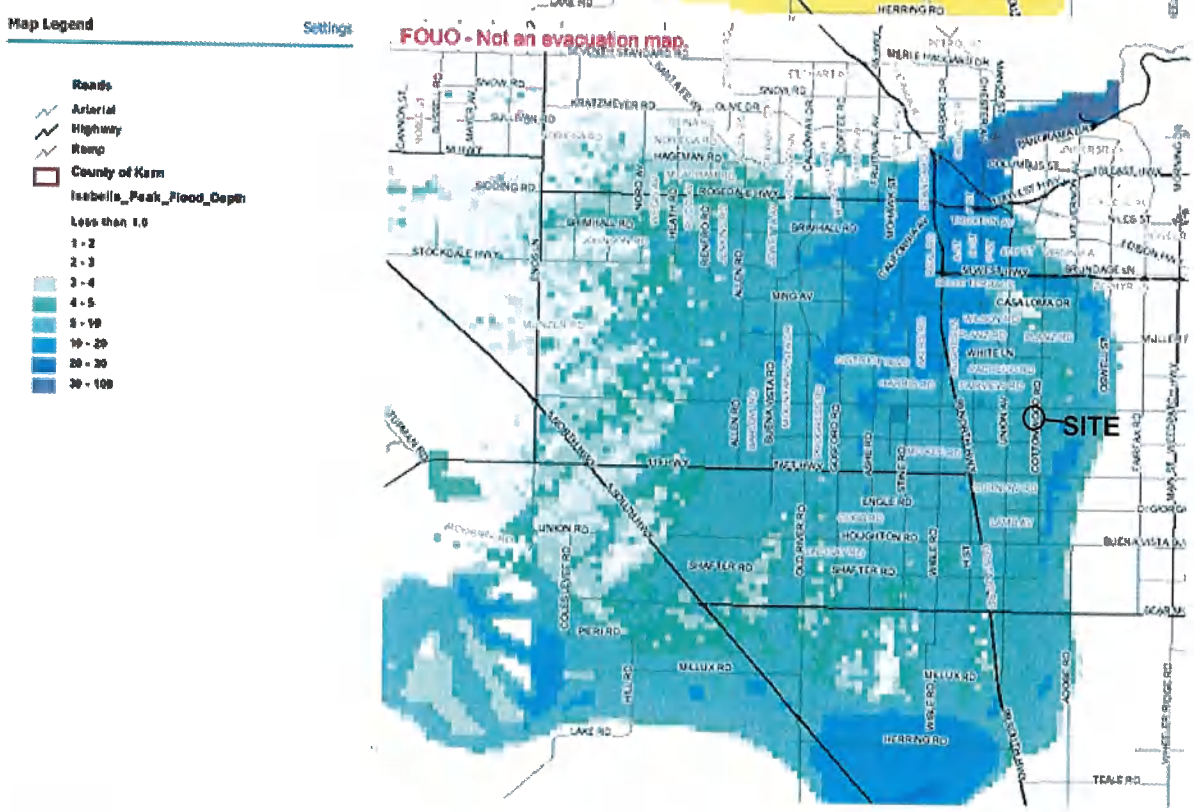
LOG OF TEST BORING
BORING B-9

PROJECT: *GUSD Update of PEA & Geohazard*
BORING DATE: *12/21/16*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4 1/4" I.D. Hollow-Stem Auger*
DESCRIPTION: *PEA Update & Geohazard Update*
DEPTH TO WATER - ▽ : *27*
CAVING - ► : *N/A*

FILE NO: *15820*
ELEV.:
START: *12/21/16*
FINISH: *12/27/16*
LOGGER: *M. WATTS*

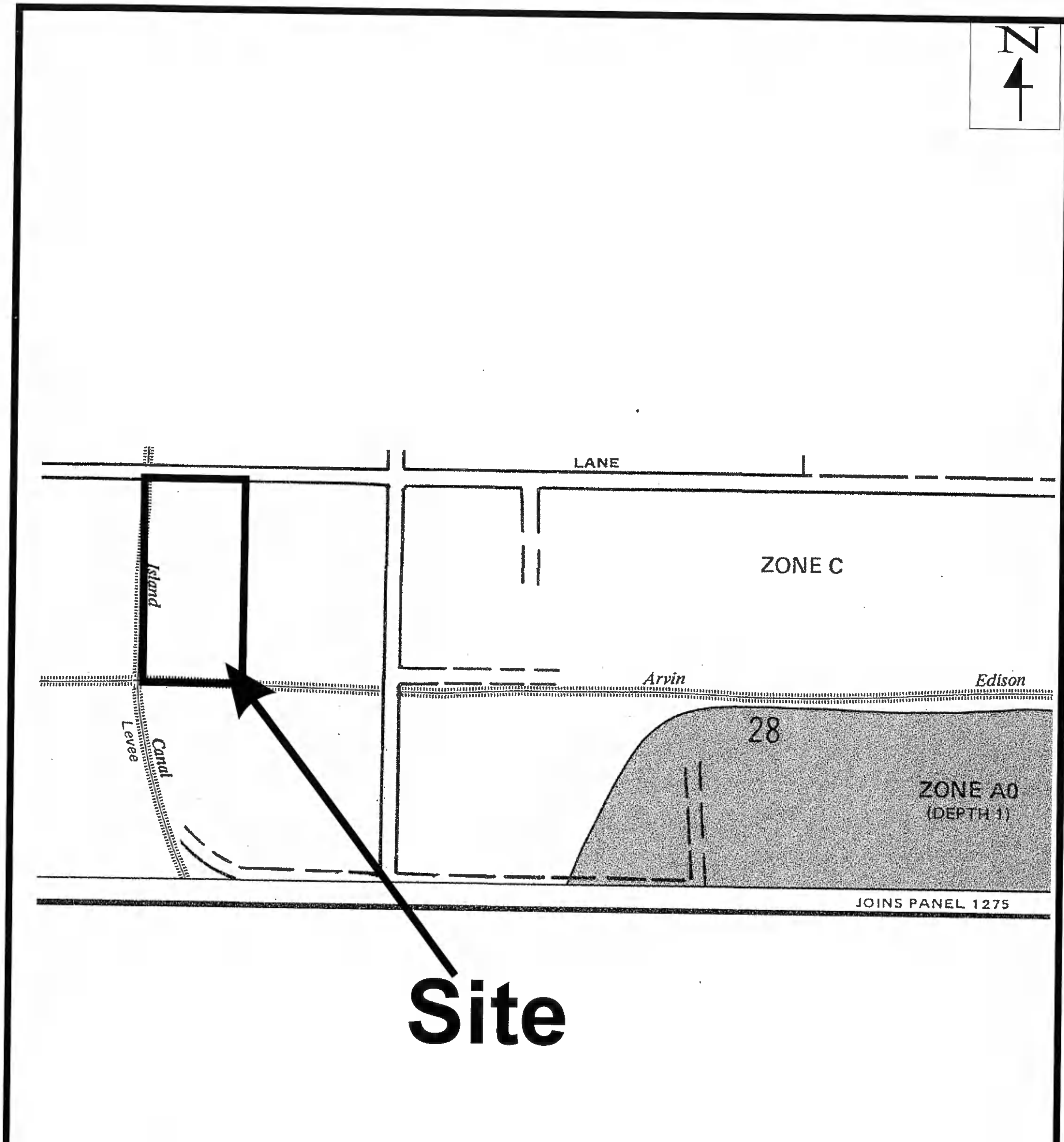
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
0		SM	SILTY SAND: light yellowish brown; dry to damp; fine grained.			
5						
10		CL	CLAY: brown; damp; low plasticity.			
15						
20						
		SC	CLAYEY SAND: yellowish brown; damp to wet; fine grained.			
25		CL	CLAY: light brown; damp; to wet; low to medium plasticity. Water raised to 24' in 5 minutes			
	▽					
30			WATER			
			STOPPED DUE TO WATER			
35						





Source: Kern County Map Info System, US Army Corps of Engineers Preliminary Flood Results

SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 6/19 PROJECT: 17151	Greenfield USD-Crescent Elementary School S. of Panama Lane and W. of Cottonwood Road Bakersfield, CA **Lake Isabella Dam Inundation Maps**



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 6/19 PROJECT: 17151	Greenfield USD-Crescent Elementary School S. of Panama Lane and W. of Cottonwood Road Bakersfield, CA **FEMA Flood Insurance Rate Map**	PLATE

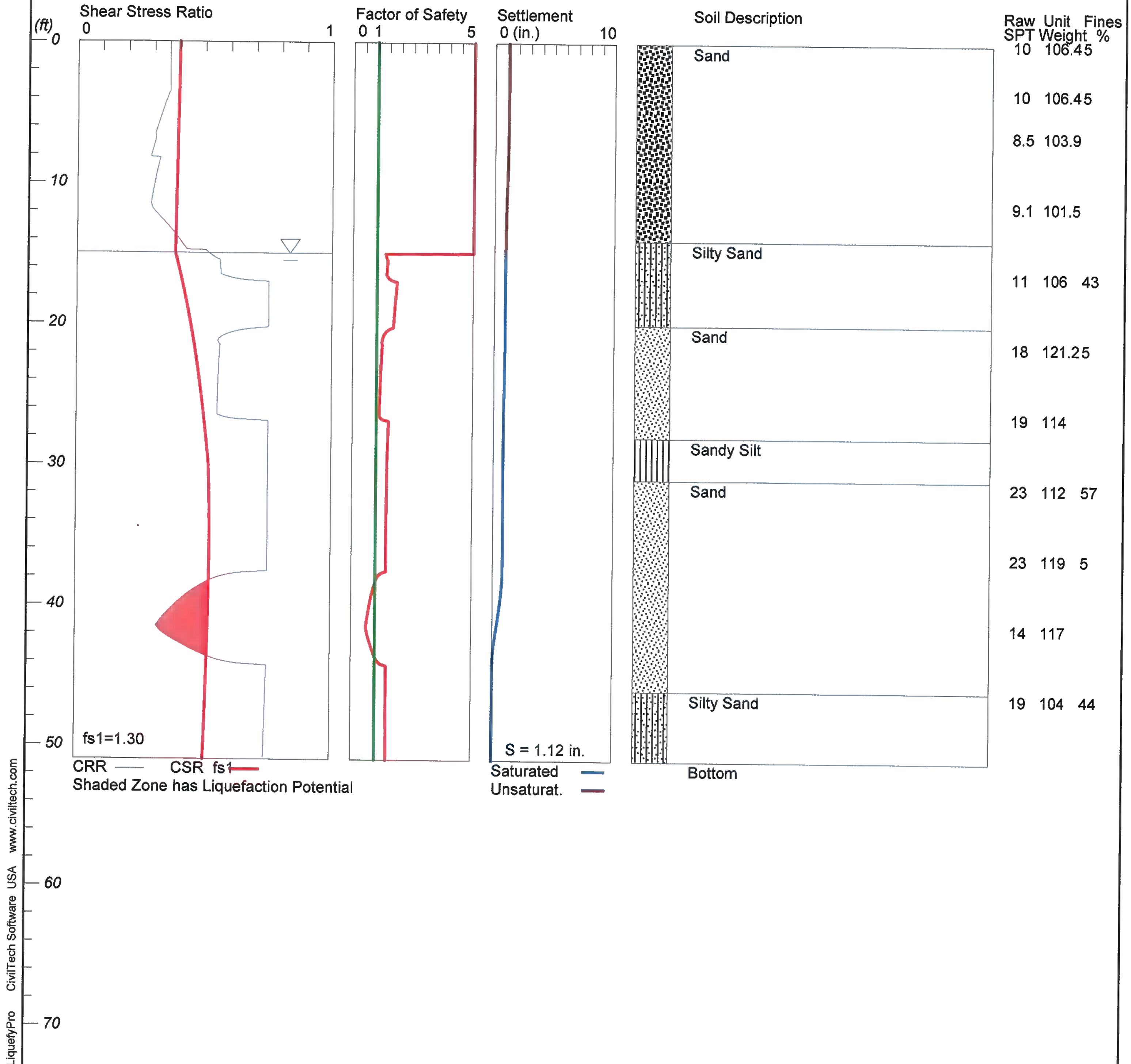
Depth to Water on Kern County Water Agency Maps in Site Area		
Year	**Season/Month**	**Water Depth Range (in ft)**
1983	Spring	50-100
1984	Spring	100-150
1985	Spring	100-150
1986	Spring	50-100
1987	Spring	50-100
1989	Spring	50-100
1991	January	300
1992	January	100-150
1993	January	100-150
1994	January	100-150
1995	Spring	150-200
1995	September	190-200
1996	Spring	100-150
1997	Spring	100-150
1997	September	140-160
1998	Spring	150
2000	Spring	150
2000	Fall	140-160
2002	Fall	160-180
2003	Fall	160-180
2004	Fall	160-180
2005	Fall	160-180
2006	Fall	100-150
2007	Fall	190
2008	Fall	150
2009	Fall	120-150
2010	Fall	150
2012	Spring	180
2013	Spring	160
2014	Spring	210
2015	Spring	210

LIQUEFACTION ANALYSIS

17151 GUSD Crescent Elem

Hole No.=B-2 (2006) ***Water Depth=15 ft***

Magnitude=6.4
Acceleration=0.47g



```
*************************************************************************
                    *****************************
                    LIQUEFACTION ANALYSIS SUMMARY
                   Copyright by CivilTech Software
                          www.civiltech.com
*************************************************************************
                    *****************************
      Font: Courier New, Regular, Size 8 is recommended for this report.
      Licensed to SEI, 6/26/2019  3:55:00 PM

      Input File Name: O:\b. PROJECT FILES (ACTIVE)\17100-17199\17151
Greenfield USD Updates to Crescent Elem\Updated Geohaz Report for Cres
Elem West\17151 B2 crescent.liq
      Title:  17151 GUSD Crescent Elem
      Subtitle:  B2

      Surface Elev.=
      Hole No.=B-2 (2006)
      Depth of Hole= 51.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 20.00 ft
      Max. Acceleration= 0.47 g
      Earthquake Magnitude= 6.40

 Input Data:
      Surface Elev.=
      Hole No.=B-2 (2006)
      Depth of Hole=51.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 20.00 ft
      Max. Acceleration=0.47 g
      Earthquake Magnitude=6.40
      No-Liquefiable Soils:   CL, OL are Non-Liq. Soil

      1. SPT or BPT Calculation.
      2. Settlement Analysis Method: Tokimatsu, M-correction
      3. Fines Correction for Liquefaction: Idriss/Seed
      4. Fine Correction for Settlement: During Liquefaction*
      5. Settlement Calculation in: All zones*
      6. Hammer Energy Ratio,                                  Ce = 1.25
      7. Borehole Diameter,                                    Cb= 1.15
      8. Sampling Method,                                      Cs= 1.2
      9. User request factor of safety (apply to CSR) ,   User= 1.3
         Plot one CSR curve (fs1=User)
      10. Use Curve Smoothing: Yes*
      * Recommended Options
```

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	10.00	106.40	5.00
3.50	10.00	106.40	5.00
6.50	8.50	103.90	5.00
11.50	9.10	101.50	5.00
16.50	11.00	106.00	43.00
21.50	18.00	121.20	5.00
26.50	19.00	114.00	5.00
31.50	23.00	112.00	57.00
36.50	23.00	119.00	5.00
41.50	14.00	117.00	5.00
46.50	19.00	104.00	44.00

Output Results:

Settlement of Saturated Sands=0.91 in.
Settlement of Unsaturated Sands=0.21 in.
Total Settlement of Saturated and Unsaturated Sands=1.12 in.
Differential Settlement=0.561 to 0.740 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.36	0.40	5.00	0.91	0.21	1.12
0.05	0.36	0.40	5.00	0.91	0.21	1.12
0.10	0.36	0.40	5.00	0.91	0.21	1.12
0.15	0.36	0.40	5.00	0.91	0.21	1.12
0.20	0.36	0.40	5.00	0.91	0.21	1.12
0.25	0.36	0.40	5.00	0.91	0.21	1.12
0.30	0.36	0.40	5.00	0.91	0.21	1.12
0.35	0.36	0.40	5.00	0.91	0.21	1.12
0.40	0.36	0.40	5.00	0.91	0.21	1.12
0.45	0.36	0.40	5.00	0.91	0.21	1.12
0.50	0.36	0.40	5.00	0.91	0.21	1.12
0.55	0.36	0.40	5.00	0.91	0.21	1.12
0.60	0.36	0.40	5.00	0.91	0.21	1.12
0.65	0.36	0.40	5.00	0.91	0.21	1.12
0.70	0.36	0.40	5.00	0.91	0.21	1.12
0.75	0.36	0.40	5.00	0.91	0.21	1.12
0.80	0.36	0.40	5.00	0.91	0.21	1.12
0.85	0.36	0.40	5.00	0.91	0.21	1.12
0.90	0.36	0.40	5.00	0.91	0.21	1.12
0.95	0.36	0.40	5.00	0.91	0.21	1.12
1.00	0.36	0.40	5.00	0.91	0.21	1.12
1.05	0.36	0.40	5.00	0.91	0.21	1.12
1.10	0.36	0.40	5.00	0.91	0.21	1.12
1.15	0.36	0.40	5.00	0.91	0.21	1.12
1.20	0.36	0.40	5.00	0.91	0.21	1.12
1.25	0.36	0.40	5.00	0.91	0.21	1.12
1.30	0.36	0.40	5.00	0.91	0.21	1.12
1.35	0.36	0.40	5.00	0.91	0.21	1.12
1.40	0.36	0.40	5.00	0.91	0.21	1.12
1.45	0.36	0.40	5.00	0.91	0.21	1.12
1.50	0.36	0.40	5.00	0.91	0.21	1.12
1.55	0.36	0.40	5.00	0.91	0.21	1.12
1.60	0.36	0.40	5.00	0.91	0.21	1.12

1.65	0.36	0.40	5.00	0.91	0.21	1.12
1.70	0.36	0.40	5.00	0.91	0.21	1.12
1.75	0.36	0.40	5.00	0.91	0.21	1.12
1.80	0.36	0.40	5.00	0.91	0.21	1.12
1.85	0.36	0.40	5.00	0.91	0.21	1.12
1.90	0.36	0.40	5.00	0.91	0.21	1.12
1.95	0.36	0.40	5.00	0.91	0.21	1.12
2.00	0.36	0.40	5.00	0.91	0.21	1.12
2.05	0.36	0.40	5.00	0.91	0.21	1.12
2.10	0.36	0.40	5.00	0.91	0.21	1.12
2.15	0.36	0.40	5.00	0.91	0.21	1.12
2.20	0.36	0.40	5.00	0.91	0.21	1.12
2.25	0.36	0.40	5.00	0.91	0.21	1.12
2.30	0.36	0.40	5.00	0.91	0.21	1.12
2.35	0.36	0.39	5.00	0.91	0.21	1.12
2.40	0.36	0.39	5.00	0.91	0.21	1.12
2.45	0.36	0.39	5.00	0.91	0.21	1.12
2.50	0.36	0.39	5.00	0.91	0.21	1.12
2.55	0.36	0.39	5.00	0.91	0.21	1.11
2.60	0.36	0.39	5.00	0.91	0.21	1.11
2.65	0.36	0.39	5.00	0.91	0.21	1.11
2.70	0.36	0.39	5.00	0.91	0.21	1.11
2.75	0.36	0.39	5.00	0.91	0.21	1.11
2.80	0.36	0.39	5.00	0.91	0.21	1.11
2.85	0.36	0.39	5.00	0.91	0.21	1.11
2.90	0.36	0.39	5.00	0.91	0.21	1.11
2.95	0.36	0.39	5.00	0.91	0.21	1.11
3.00	0.36	0.39	5.00	0.91	0.21	1.11
3.05	0.36	0.39	5.00	0.91	0.21	1.11
3.10	0.36	0.39	5.00	0.91	0.21	1.11
3.15	0.36	0.39	5.00	0.91	0.21	1.11
3.20	0.36	0.39	5.00	0.91	0.21	1.11
3.25	0.36	0.39	5.00	0.91	0.20	1.11
3.30	0.36	0.39	5.00	0.91	0.20	1.11
3.35	0.36	0.39	5.00	0.91	0.20	1.11
3.40	0.36	0.39	5.00	0.91	0.20	1.11
3.45	0.36	0.39	5.00	0.91	0.20	1.11
3.50	0.36	0.39	5.00	0.91	0.20	1.11
3.55	0.36	0.39	5.00	0.91	0.20	1.11
3.60	0.36	0.39	5.00	0.91	0.20	1.11
3.65	0.36	0.39	5.00	0.91	0.20	1.11
3.70	0.36	0.39	5.00	0.91	0.20	1.11
3.75	0.35	0.39	5.00	0.91	0.20	1.11
3.80	0.35	0.39	5.00	0.91	0.20	1.11
3.85	0.35	0.39	5.00	0.91	0.20	1.11
3.90	0.35	0.39	5.00	0.91	0.20	1.11
3.95	0.35	0.39	5.00	0.91	0.20	1.11
4.00	0.35	0.39	5.00	0.91	0.20	1.11
4.05	0.35	0.39	5.00	0.91	0.20	1.11
4.10	0.35	0.39	5.00	0.91	0.20	1.11
4.15	0.35	0.39	5.00	0.91	0.20	1.11
4.20	0.35	0.39	5.00	0.91	0.20	1.11
4.25	0.34	0.39	5.00	0.91	0.20	1.11
4.30	0.34	0.39	5.00	0.91	0.20	1.11
4.35	0.34	0.39	5.00	0.91	0.20	1.11
4.40	0.34	0.39	5.00	0.91	0.20	1.10
4.45	0.34	0.39	5.00	0.91	0.20	1.10
4.50	0.34	0.39	5.00	0.91	0.20	1.10
4.55	0.34	0.39	5.00	0.91	0.20	1.10

4.60	0.34	0.39	5.00	0.91	0.20	1.10
4.65	0.34	0.39	5.00	0.91	0.20	1.10
4.70	0.34	0.39	5.00	0.91	0.20	1.10
4.75	0.34	0.39	5.00	0.91	0.20	1.10
4.80	0.33	0.39	5.00	0.91	0.20	1.10
4.85	0.33	0.39	5.00	0.91	0.19	1.10
4.90	0.33	0.39	5.00	0.91	0.19	1.10
4.95	0.33	0.39	5.00	0.91	0.19	1.10
5.00	0.33	0.39	5.00	0.91	0.19	1.10
5.05	0.33	0.39	5.00	0.91	0.19	1.10
5.10	0.33	0.39	5.00	0.91	0.19	1.10
5.15	0.33	0.39	5.00	0.91	0.19	1.10
5.20	0.33	0.39	5.00	0.91	0.19	1.10
5.25	0.33	0.39	5.00	0.91	0.19	1.10
5.30	0.32	0.39	5.00	0.91	0.19	1.10
5.35	0.32	0.39	5.00	0.91	0.19	1.10
5.40	0.32	0.39	5.00	0.91	0.19	1.10
5.45	0.32	0.39	5.00	0.91	0.19	1.10
5.50	0.32	0.39	5.00	0.91	0.19	1.10
5.55	0.32	0.39	5.00	0.91	0.19	1.10
5.60	0.32	0.39	5.00	0.91	0.19	1.10
5.65	0.32	0.39	5.00	0.91	0.19	1.10
5.70	0.32	0.39	5.00	0.91	0.19	1.10
5.75	0.32	0.39	5.00	0.91	0.19	1.10
5.80	0.32	0.39	5.00	0.91	0.19	1.09
5.85	0.31	0.39	5.00	0.91	0.19	1.09
5.90	0.31	0.39	5.00	0.91	0.19	1.09
5.95	0.31	0.39	5.00	0.91	0.19	1.09
6.00	0.31	0.39	5.00	0.91	0.19	1.09
6.05	0.31	0.39	5.00	0.91	0.19	1.09
6.10	0.31	0.39	5.00	0.91	0.19	1.09
6.15	0.31	0.39	5.00	0.91	0.19	1.09
6.20	0.31	0.39	5.00	0.91	0.18	1.09
6.25	0.31	0.39	5.00	0.91	0.18	1.09
6.30	0.31	0.39	5.00	0.91	0.18	1.09
6.35	0.31	0.39	5.00	0.91	0.18	1.09
6.40	0.30	0.39	5.00	0.91	0.18	1.09
6.45	0.30	0.39	5.00	0.91	0.18	1.09
6.50	0.30	0.39	5.00	0.91	0.18	1.09
6.55	0.30	0.39	5.00	0.91	0.18	1.09
6.60	0.30	0.39	5.00	0.91	0.18	1.09
6.65	0.30	0.39	5.00	0.91	0.18	1.09
6.70	0.30	0.39	5.00	0.91	0.18	1.09
6.75	0.30	0.39	5.00	0.91	0.18	1.09
6.80	0.30	0.39	5.00	0.91	0.18	1.09
6.85	0.30	0.39	5.00	0.91	0.18	1.08
6.90	0.30	0.39	5.00	0.91	0.18	1.08
6.95	0.30	0.39	5.00	0.91	0.18	1.08
7.00	0.30	0.39	5.00	0.91	0.18	1.08
7.05	0.30	0.39	5.00	0.91	0.18	1.08
7.10	0.30	0.39	5.00	0.91	0.17	1.08
7.15	0.30	0.39	5.00	0.91	0.17	1.08
7.20	0.30	0.39	5.00	0.91	0.17	1.08
7.25	0.30	0.39	5.00	0.91	0.17	1.08
7.30	0.30	0.39	5.00	0.91	0.17	1.08
7.35	0.30	0.39	5.00	0.91	0.17	1.08
7.40	0.30	0.39	5.00	0.91	0.17	1.08
7.45	0.30	0.39	5.00	0.91	0.17	1.08
7.50	0.30	0.39	5.00	0.91	0.17	1.08

7.55	0.29	0.39	5.00	0.91	0.17	1.08
7.60	0.29	0.39	5.00	0.91	0.17	1.07
7.65	0.29	0.39	5.00	0.91	0.17	1.07
7.70	0.29	0.39	5.00	0.91	0.17	1.07
7.75	0.29	0.39	5.00	0.91	0.17	1.07
7.80	0.29	0.39	5.00	0.91	0.16	1.07
7.85	0.29	0.39	5.00	0.91	0.16	1.07
7.90	0.29	0.39	5.00	0.91	0.16	1.07
7.95	0.29	0.39	5.00	0.91	0.16	1.07
8.00	0.29	0.39	5.00	0.91	0.16	1.07
8.05	0.29	0.39	5.00	0.91	0.16	1.07
8.10	0.29	0.39	5.00	0.91	0.16	1.07
8.15	0.29	0.39	5.00	0.91	0.16	1.06
8.20	0.29	0.39	5.00	0.91	0.16	1.06
8.25	0.32	0.39	5.00	0.91	0.16	1.06
8.30	0.32	0.39	5.00	0.91	0.15	1.06
8.35	0.32	0.39	5.00	0.91	0.15	1.06
8.40	0.32	0.39	5.00	0.91	0.15	1.06
8.45	0.32	0.39	5.00	0.91	0.15	1.06
8.50	0.32	0.39	5.00	0.91	0.15	1.06
8.55	0.32	0.39	5.00	0.91	0.15	1.06
8.60	0.32	0.39	5.00	0.91	0.15	1.06
8.65	0.32	0.39	5.00	0.91	0.15	1.06
8.70	0.32	0.39	5.00	0.91	0.15	1.05
8.75	0.32	0.39	5.00	0.91	0.15	1.05
8.80	0.32	0.39	5.00	0.91	0.15	1.05
8.85	0.31	0.39	5.00	0.91	0.15	1.05
8.90	0.31	0.39	5.00	0.91	0.14	1.05
8.95	0.31	0.39	5.00	0.91	0.14	1.05
9.00	0.31	0.39	5.00	0.91	0.14	1.05
9.05	0.31	0.39	5.00	0.91	0.14	1.05
9.10	0.31	0.39	5.00	0.91	0.14	1.05
9.15	0.31	0.39	5.00	0.91	0.14	1.05
9.20	0.31	0.39	5.00	0.91	0.14	1.04
9.25	0.31	0.39	5.00	0.91	0.14	1.04
9.30	0.31	0.39	5.00	0.91	0.13	1.04
9.35	0.31	0.39	5.00	0.91	0.13	1.04
9.40	0.31	0.39	5.00	0.91	0.13	1.04
9.45	0.31	0.39	5.00	0.91	0.13	1.04
9.50	0.31	0.39	5.00	0.91	0.13	1.04
9.55	0.31	0.39	5.00	0.91	0.13	1.03
9.60	0.31	0.39	5.00	0.91	0.13	1.03
9.65	0.30	0.39	5.00	0.91	0.12	1.03
9.70	0.30	0.39	5.00	0.91	0.12	1.03
9.75	0.30	0.39	5.00	0.91	0.12	1.03
9.80	0.30	0.39	5.00	0.91	0.12	1.03
9.85	0.30	0.39	5.00	0.91	0.12	1.03
9.90	0.30	0.39	5.00	0.91	0.12	1.02
9.95	0.30	0.39	5.00	0.91	0.11	1.02
10.00	0.30	0.39	5.00	0.91	0.11	1.02
10.05	0.30	0.39	5.00	0.91	0.11	1.02
10.10	0.30	0.39	5.00	0.91	0.11	1.02
10.15	0.30	0.39	5.00	0.91	0.11	1.01
10.20	0.30	0.39	5.00	0.91	0.10	1.01
10.25	0.30	0.39	5.00	0.91	0.10	1.01
10.30	0.30	0.39	5.00	0.91	0.10	1.01
10.35	0.30	0.39	5.00	0.91	0.10	1.00
10.40	0.30	0.39	5.00	0.91	0.09	1.00
10.45	0.30	0.39	5.00	0.91	0.09	1.00

10.50	0.30	0.39	5.00	0.91	0.09	1.00
10.55	0.30	0.39	5.00	0.91	0.09	0.99
10.60	0.29	0.39	5.00	0.91	0.08	0.99
10.65	0.29	0.39	5.00	0.91	0.08	0.99
10.70	0.29	0.39	5.00	0.91	0.08	0.98
10.75	0.29	0.39	5.00	0.91	0.07	0.98
10.80	0.29	0.39	5.00	0.91	0.07	0.98
10.85	0.29	0.39	5.00	0.91	0.07	0.97
10.90	0.29	0.39	5.00	0.91	0.06	0.97
10.95	0.29	0.39	5.00	0.91	0.06	0.97
11.00	0.29	0.39	5.00	0.91	0.06	0.97
11.05	0.29	0.39	5.00	0.91	0.06	0.97
11.10	0.29	0.39	5.00	0.91	0.06	0.97
11.15	0.29	0.39	5.00	0.91	0.06	0.97
11.20	0.29	0.39	5.00	0.91	0.06	0.97
11.25	0.29	0.39	5.00	0.91	0.06	0.96
11.30	0.29	0.39	5.00	0.91	0.06	0.96
11.35	0.29	0.39	5.00	0.91	0.06	0.96
11.40	0.29	0.39	5.00	0.91	0.06	0.96
11.45	0.29	0.39	5.00	0.91	0.05	0.96
11.50	0.29	0.39	5.00	0.91	0.05	0.96
11.55	0.29	0.39	5.00	0.91	0.05	0.96
11.60	0.29	0.39	5.00	0.91	0.05	0.96
11.65	0.29	0.39	5.00	0.91	0.05	0.96
11.70	0.29	0.39	5.00	0.91	0.05	0.96
11.75	0.29	0.39	5.00	0.91	0.05	0.96
11.80	0.29	0.39	5.00	0.91	0.05	0.95
11.85	0.29	0.39	5.00	0.91	0.05	0.95
11.90	0.30	0.39	5.00	0.91	0.05	0.95
11.95	0.30	0.39	5.00	0.91	0.04	0.95
12.00	0.30	0.39	5.00	0.91	0.04	0.95
12.05	0.30	0.39	5.00	0.91	0.04	0.95
12.10	0.30	0.39	5.00	0.91	0.04	0.95
12.15	0.31	0.39	5.00	0.91	0.04	0.95
12.20	0.31	0.39	5.00	0.91	0.04	0.95
12.25	0.31	0.39	5.00	0.91	0.04	0.95
12.30	0.31	0.39	5.00	0.91	0.04	0.94
12.35	0.32	0.39	5.00	0.91	0.04	0.94
12.40	0.32	0.39	5.00	0.91	0.04	0.94
12.45	0.32	0.39	5.00	0.91	0.04	0.94
12.50	0.33	0.39	5.00	0.91	0.03	0.94
12.55	0.33	0.39	5.00	0.91	0.03	0.94
12.60	0.33	0.39	5.00	0.91	0.03	0.94
12.65	0.33	0.39	5.00	0.91	0.03	0.94
12.70	0.34	0.39	5.00	0.91	0.03	0.94
12.75	0.34	0.39	5.00	0.91	0.03	0.94
12.80	0.34	0.39	5.00	0.91	0.03	0.94
12.85	0.34	0.39	5.00	0.91	0.03	0.94
12.90	0.35	0.39	5.00	0.91	0.03	0.93
12.95	0.35	0.39	5.00	0.91	0.03	0.93
13.00	0.35	0.39	5.00	0.91	0.03	0.93
13.05	0.36	0.39	5.00	0.91	0.03	0.93
13.10	0.36	0.39	5.00	0.91	0.02	0.93
13.15	0.36	0.38	5.00	0.91	0.02	0.93
13.20	0.36	0.38	5.00	0.91	0.02	0.93
13.25	0.36	0.38	5.00	0.91	0.02	0.93
13.30	0.37	0.38	5.00	0.91	0.02	0.93
13.35	0.37	0.38	5.00	0.91	0.02	0.93
13.40	0.37	0.38	5.00	0.91	0.02	0.93

13.45	0.37	0.38	5.00	0.91	0.02	0.93
13.50	0.38	0.38	5.00	0.91	0.02	0.93
13.55	0.38	0.38	5.00	0.91	0.02	0.93
13.60	0.38	0.38	5.00	0.91	0.02	0.92
13.65	0.38	0.38	5.00	0.91	0.02	0.92
13.70	0.38	0.38	5.00	0.91	0.02	0.92
13.75	0.39	0.38	5.00	0.91	0.02	0.92
13.80	0.39	0.38	5.00	0.91	0.01	0.92
13.85	0.39	0.38	5.00	0.91	0.01	0.92
13.90	0.39	0.38	5.00	0.91	0.01	0.92
13.95	0.40	0.38	5.00	0.91	0.01	0.92
14.00	0.40	0.38	5.00	0.91	0.01	0.92
14.05	0.40	0.38	5.00	0.91	0.01	0.92
14.10	0.40	0.38	5.00	0.91	0.01	0.92
14.15	0.40	0.38	5.00	0.91	0.01	0.92
14.20	0.41	0.38	5.00	0.91	0.01	0.92
14.25	0.41	0.38	5.00	0.91	0.01	0.92
14.30	0.41	0.38	5.00	0.91	0.01	0.92
14.35	0.41	0.38	5.00	0.91	0.01	0.91
14.40	0.41	0.38	5.00	0.91	0.01	0.91
14.45	0.42	0.38	5.00	0.91	0.01	0.91
14.50	0.42	0.38	5.00	0.91	0.01	0.91
14.55	0.42	0.38	5.00	0.91	0.01	0.91
14.60	0.42	0.38	5.00	0.91	0.00	0.91
14.65	0.42	0.38	5.00	0.91	0.00	0.91
14.70	0.43	0.38	5.00	0.91	0.00	0.91
14.75	0.43	0.38	5.00	0.91	0.00	0.91
14.80	0.50	0.38	5.00	0.91	0.00	0.91
14.85	0.51	0.38	5.00	0.91	0.00	0.91
14.90	0.51	0.38	5.00	0.91	0.00	0.91
14.95	0.51	0.38	5.00	0.91	0.00	0.91
15.00	0.52	0.38	1.35	0.91	0.00	0.91
15.05	0.52	0.38	1.35	0.91	0.00	0.91
15.10	0.52	0.38	1.36	0.91	0.00	0.91
15.15	0.53	0.39	1.37	0.91	0.00	0.91
15.20	0.53	0.39	1.37	0.91	0.00	0.91
15.25	0.53	0.39	1.38	0.91	0.00	0.91
15.30	0.54	0.39	1.39	0.91	0.00	0.91
15.35	0.54	0.39	1.40	0.91	0.00	0.91
15.40	0.55	0.39	1.41	0.91	0.00	0.91
15.45	0.56	0.39	1.43	0.91	0.00	0.91
15.50	0.56	0.39	1.43	0.91	0.00	0.91
15.55	0.56	0.39	1.43	0.91	0.00	0.91
15.60	0.56	0.39	1.42	0.91	0.00	0.91
15.65	0.56	0.39	1.42	0.91	0.00	0.91
15.70	0.56	0.39	1.42	0.91	0.00	0.91
15.75	0.56	0.39	1.42	0.91	0.00	0.91
15.80	0.56	0.39	1.42	0.91	0.00	0.91
15.85	0.56	0.40	1.41	0.91	0.00	0.91
15.90	0.56	0.40	1.41	0.91	0.00	0.91
15.95	0.56	0.40	1.41	0.91	0.00	0.91
16.00	0.56	0.40	1.41	0.91	0.00	0.91
16.05	0.56	0.40	1.41	0.91	0.00	0.91
16.10	0.56	0.40	1.40	0.91	0.00	0.91
16.15	0.56	0.40	1.40	0.91	0.00	0.91
16.20	0.56	0.40	1.40	0.91	0.00	0.91
16.25	0.56	0.40	1.40	0.91	0.00	0.91
16.30	0.56	0.40	1.40	0.91	0.00	0.91
16.35	0.56	0.40	1.40	0.91	0.00	0.91

16.40	0.56	0.40	1.39	0.91	0.00	0.91
16.45	0.56	0.40	1.39	0.91	0.00	0.91
16.50	0.56	0.40	1.39	0.91	0.00	0.91
16.55	0.57	0.40	1.41	0.91	0.00	0.91
16.60	0.58	0.41	1.42	0.91	0.00	0.91
16.65	0.59	0.41	1.44	0.91	0.00	0.91
16.70	0.60	0.41	1.47	0.91	0.00	0.91
16.75	0.61	0.41	1.49	0.91	0.00	0.91
16.80	0.62	0.41	1.52	0.91	0.00	0.91
16.85	0.64	0.41	1.56	0.91	0.00	0.91
16.90	0.66	0.41	1.62	0.91	0.00	0.91
16.95	0.70	0.41	1.70	0.91	0.00	0.91
17.00	0.75	0.41	1.83	0.91	0.00	0.91
17.05	0.75	0.41	1.83	0.91	0.00	0.91
17.10	0.75	0.41	1.82	0.91	0.00	0.91
17.15	0.75	0.41	1.82	0.91	0.00	0.91
17.20	0.75	0.41	1.82	0.91	0.00	0.91
17.25	0.75	0.41	1.81	0.91	0.00	0.91
17.30	0.75	0.41	1.81	0.91	0.00	0.91
17.35	0.75	0.41	1.81	0.91	0.00	0.91
17.40	0.75	0.42	1.81	0.91	0.00	0.91
17.45	0.75	0.42	1.80	0.91	0.00	0.91
17.50	0.75	0.42	1.80	0.91	0.00	0.91
17.55	0.75	0.42	1.80	0.91	0.00	0.91
17.60	0.75	0.42	1.80	0.91	0.00	0.91
17.65	0.75	0.42	1.79	0.91	0.00	0.91
17.70	0.75	0.42	1.79	0.91	0.00	0.91
17.75	0.75	0.42	1.79	0.91	0.00	0.91
17.80	0.75	0.42	1.79	0.91	0.00	0.91
17.85	0.75	0.42	1.78	0.91	0.00	0.91
17.90	0.75	0.42	1.78	0.91	0.00	0.91
17.95	0.75	0.42	1.78	0.91	0.00	0.91
18.00	0.75	0.42	1.78	0.91	0.00	0.91
18.05	0.75	0.42	1.77	0.91	0.00	0.91
18.10	0.75	0.42	1.77	0.91	0.00	0.91
18.15	0.75	0.42	1.77	0.91	0.00	0.91
18.20	0.75	0.42	1.77	0.91	0.00	0.91
18.25	0.75	0.43	1.76	0.91	0.00	0.91
18.30	0.75	0.43	1.76	0.91	0.00	0.91
18.35	0.75	0.43	1.76	0.91	0.00	0.91
18.40	0.75	0.43	1.76	0.91	0.00	0.91
18.45	0.75	0.43	1.75	0.91	0.00	0.91
18.50	0.75	0.43	1.75	0.91	0.00	0.91
18.55	0.75	0.43	1.75	0.91	0.00	0.91
18.60	0.75	0.43	1.75	0.91	0.00	0.91
18.65	0.75	0.43	1.74	0.91	0.00	0.91
18.70	0.75	0.43	1.74	0.91	0.00	0.91
18.75	0.75	0.43	1.74	0.91	0.00	0.91
18.80	0.75	0.43	1.74	0.91	0.00	0.91
18.85	0.75	0.43	1.74	0.91	0.00	0.91
18.90	0.75	0.43	1.73	0.91	0.00	0.91
18.95	0.75	0.43	1.73	0.91	0.00	0.91
19.00	0.75	0.43	1.73	0.91	0.00	0.91
19.05	0.75	0.43	1.73	0.91	0.00	0.91
19.10	0.75	0.43	1.72	0.91	0.00	0.91
19.15	0.75	0.44	1.72	0.91	0.00	0.91
19.20	0.75	0.44	1.72	0.91	0.00	0.91
19.25	0.75	0.44	1.72	0.91	0.00	0.91
19.30	0.75	0.44	1.72	0.91	0.00	0.91

19.35	0.75	0.44	1.71	0.91	0.00	0.91
19.40	0.75	0.44	1.71	0.91	0.00	0.91
19.45	0.75	0.44	1.71	0.91	0.00	0.91
19.50	0.75	0.44	1.71	0.91	0.00	0.91
19.55	0.75	0.44	1.71	0.91	0.00	0.91
19.60	0.75	0.44	1.70	0.91	0.00	0.91
19.65	0.75	0.44	1.70	0.91	0.00	0.91
19.70	0.75	0.44	1.70	0.91	0.00	0.91
19.75	0.75	0.44	1.70	0.91	0.00	0.91
19.80	0.75	0.44	1.70	0.91	0.00	0.91
19.85	0.75	0.44	1.69	0.91	0.00	0.91
19.90	0.75	0.44	1.69	0.91	0.00	0.91
19.95	0.75	0.44	1.69	0.91	0.00	0.91
20.00	0.75	0.44	1.69	0.91	0.00	0.91
20.05	0.75	0.44	1.69	0.91	0.00	0.91
20.10	0.75	0.45	1.68	0.91	0.00	0.91
20.15	0.75	0.45	1.68	0.91	0.00	0.91
20.20	0.75	0.45	1.68	0.91	0.00	0.91
20.25	0.75	0.45	1.67	0.91	0.00	0.91
20.30	0.71	0.45	1.58	0.91	0.00	0.91
20.35	0.68	0.45	1.52	0.91	0.00	0.91
20.40	0.66	0.45	1.48	0.91	0.00	0.91
20.45	0.64	0.45	1.44	0.91	0.00	0.91
20.50	0.63	0.45	1.40	0.91	0.00	0.91
20.55	0.62	0.45	1.38	0.91	0.00	0.91
20.60	0.61	0.45	1.35	0.91	0.00	0.91
20.65	0.60	0.45	1.33	0.91	0.00	0.91
20.70	0.59	0.45	1.31	0.91	0.00	0.91
20.75	0.58	0.45	1.30	0.91	0.00	0.91
20.80	0.58	0.45	1.28	0.91	0.00	0.91
20.85	0.57	0.45	1.27	0.91	0.00	0.91
20.90	0.57	0.45	1.25	0.91	0.00	0.91
20.95	0.56	0.45	1.24	0.91	0.00	0.91
21.00	0.56	0.45	1.23	0.90	0.00	0.90
21.05	0.56	0.45	1.23	0.90	0.00	0.90
21.10	0.55	0.45	1.22	0.90	0.00	0.90
21.15	0.55	0.46	1.21	0.90	0.00	0.90
21.20	0.55	0.46	1.21	0.90	0.00	0.90
21.25	0.55	0.46	1.21	0.90	0.00	0.90
21.30	0.55	0.46	1.21	0.90	0.00	0.90
21.35	0.55	0.46	1.21	0.90	0.00	0.90
21.40	0.56	0.46	1.21	0.90	0.00	0.90
21.45	0.56	0.46	1.22	0.90	0.00	0.90
21.50	0.56	0.46	1.22	0.90	0.00	0.90
21.55	0.56	0.46	1.22	0.90	0.00	0.90
21.60	0.56	0.46	1.22	0.90	0.00	0.90
21.65	0.56	0.46	1.22	0.90	0.00	0.90
21.70	0.56	0.46	1.21	0.90	0.00	0.90
21.75	0.56	0.46	1.21	0.89	0.00	0.89
21.80	0.56	0.46	1.21	0.89	0.00	0.89
21.85	0.56	0.46	1.21	0.89	0.00	0.89
21.90	0.56	0.46	1.21	0.89	0.00	0.89
21.95	0.56	0.46	1.21	0.89	0.00	0.89
22.00	0.56	0.46	1.20	0.89	0.00	0.89
22.05	0.56	0.46	1.20	0.89	0.00	0.89
22.10	0.56	0.46	1.20	0.89	0.00	0.89
22.15	0.56	0.46	1.20	0.89	0.00	0.89
22.20	0.56	0.46	1.20	0.89	0.00	0.89
22.25	0.56	0.46	1.20	0.89	0.00	0.89

22.30	0.56	0.47	1.20	0.89	0.00	0.89
22.35	0.56	0.47	1.19	0.89	0.00	0.89
22.40	0.56	0.47	1.19	0.88	0.00	0.88
22.45	0.56	0.47	1.19	0.88	0.00	0.88
22.50	0.56	0.47	1.19	0.88	0.00	0.88
22.55	0.56	0.47	1.19	0.88	0.00	0.88
22.60	0.56	0.47	1.19	0.88	0.00	0.88
22.65	0.56	0.47	1.19	0.88	0.00	0.88
22.70	0.56	0.47	1.18	0.88	0.00	0.88
22.75	0.56	0.47	1.18	0.88	0.00	0.88
22.80	0.56	0.47	1.18	0.88	0.00	0.88
22.85	0.56	0.47	1.18	0.88	0.00	0.88
22.90	0.55	0.47	1.18	0.88	0.00	0.88
22.95	0.55	0.47	1.18	0.88	0.00	0.88
23.00	0.55	0.47	1.18	0.87	0.00	0.87
23.05	0.55	0.47	1.18	0.87	0.00	0.87
23.10	0.55	0.47	1.17	0.87	0.00	0.87
23.15	0.55	0.47	1.17	0.87	0.00	0.87
23.20	0.55	0.47	1.17	0.87	0.00	0.87
23.25	0.55	0.47	1.17	0.87	0.00	0.87
23.30	0.55	0.47	1.17	0.87	0.00	0.87
23.35	0.55	0.47	1.17	0.87	0.00	0.87
23.40	0.55	0.47	1.17	0.87	0.00	0.87
23.45	0.55	0.47	1.17	0.87	0.00	0.87
23.50	0.55	0.48	1.17	0.87	0.00	0.87
23.55	0.55	0.48	1.16	0.86	0.00	0.86
23.60	0.55	0.48	1.16	0.86	0.00	0.86
23.65	0.55	0.48	1.16	0.86	0.00	0.86
23.70	0.55	0.48	1.16	0.86	0.00	0.86
23.75	0.55	0.48	1.16	0.86	0.00	0.86
23.80	0.55	0.48	1.16	0.86	0.00	0.86
23.85	0.55	0.48	1.16	0.86	0.00	0.86
23.90	0.55	0.48	1.16	0.86	0.00	0.86
23.95	0.55	0.48	1.16	0.86	0.00	0.86
24.00	0.55	0.48	1.15	0.86	0.00	0.86
24.05	0.55	0.48	1.15	0.86	0.00	0.86
24.10	0.55	0.48	1.15	0.85	0.00	0.85
24.15	0.55	0.48	1.15	0.85	0.00	0.85
24.20	0.55	0.48	1.15	0.85	0.00	0.85
24.25	0.55	0.48	1.15	0.85	0.00	0.85
24.30	0.55	0.48	1.15	0.85	0.00	0.85
24.35	0.55	0.48	1.15	0.85	0.00	0.85
24.40	0.55	0.48	1.15	0.85	0.00	0.85
24.45	0.55	0.48	1.14	0.85	0.00	0.85
24.50	0.55	0.48	1.14	0.85	0.00	0.85
24.55	0.55	0.48	1.14	0.85	0.00	0.85
24.60	0.55	0.48	1.14	0.84	0.00	0.84
24.65	0.55	0.48	1.14	0.84	0.00	0.84
24.70	0.55	0.48	1.14	0.84	0.00	0.84
24.75	0.55	0.48	1.14	0.84	0.00	0.84
24.80	0.55	0.48	1.14	0.84	0.00	0.84
24.85	0.55	0.49	1.14	0.84	0.00	0.84
24.90	0.55	0.49	1.14	0.84	0.00	0.84
24.95	0.55	0.49	1.14	0.84	0.00	0.84
25.00	0.55	0.49	1.13	0.84	0.00	0.84
25.05	0.55	0.49	1.13	0.84	0.00	0.84
25.10	0.55	0.49	1.13	0.83	0.00	0.83
25.15	0.55	0.49	1.13	0.83	0.00	0.83
25.20	0.55	0.49	1.13	0.83	0.00	0.83

25.25	0.55	0.49	1.13	0.83	0.00	0.83
25.30	0.55	0.49	1.13	0.83	0.00	0.83
25.35	0.55	0.49	1.13	0.83	0.00	0.83
25.40	0.55	0.49	1.13	0.83	0.00	0.83
25.45	0.55	0.49	1.13	0.83	0.00	0.83
25.50	0.55	0.49	1.13	0.83	0.00	0.83
25.55	0.55	0.49	1.12	0.83	0.00	0.83
25.60	0.55	0.49	1.12	0.82	0.00	0.82
25.65	0.55	0.49	1.12	0.82	0.00	0.82
25.70	0.55	0.49	1.12	0.82	0.00	0.82
25.75	0.55	0.49	1.12	0.82	0.00	0.82
25.80	0.55	0.49	1.12	0.82	0.00	0.82
25.85	0.55	0.49	1.12	0.82	0.00	0.82
25.90	0.55	0.49	1.12	0.82	0.00	0.82
25.95	0.55	0.49	1.12	0.82	0.00	0.82
26.00	0.55	0.49	1.12	0.82	0.00	0.82
26.05	0.55	0.49	1.12	0.82	0.00	0.82
26.10	0.55	0.49	1.12	0.81	0.00	0.81
26.15	0.55	0.49	1.11	0.81	0.00	0.81
26.20	0.55	0.49	1.11	0.81	0.00	0.81
26.25	0.55	0.49	1.11	0.81	0.00	0.81
26.30	0.55	0.50	1.11	0.81	0.00	0.81
26.35	0.55	0.50	1.11	0.81	0.00	0.81
26.40	0.55	0.50	1.11	0.81	0.00	0.81
26.45	0.55	0.50	1.11	0.81	0.00	0.81
26.50	0.55	0.50	1.11	0.81	0.00	0.81
26.55	0.56	0.50	1.13	0.80	0.00	0.80
26.60	0.57	0.50	1.14	0.80	0.00	0.80
26.65	0.58	0.50	1.16	0.80	0.00	0.80
26.70	0.59	0.50	1.18	0.80	0.00	0.80
26.75	0.61	0.50	1.22	0.80	0.00	0.80
26.80	0.64	0.50	1.28	0.80	0.00	0.80
26.85	0.70	0.50	1.40	0.80	0.00	0.80
26.90	0.75	0.50	1.50	0.80	0.00	0.80
26.95	0.75	0.50	1.50	0.80	0.00	0.80
27.00	0.75	0.50	1.50	0.80	0.00	0.80
27.05	0.75	0.50	1.50	0.80	0.00	0.80
27.10	0.75	0.50	1.50	0.80	0.00	0.80
27.15	0.75	0.50	1.50	0.80	0.00	0.80
27.20	0.75	0.50	1.50	0.80	0.00	0.80
27.25	0.75	0.50	1.50	0.80	0.00	0.80
27.30	0.75	0.50	1.50	0.80	0.00	0.80
27.35	0.75	0.50	1.49	0.80	0.00	0.80
27.40	0.75	0.50	1.49	0.80	0.00	0.80
27.45	0.75	0.50	1.49	0.80	0.00	0.80
27.50	0.75	0.50	1.49	0.80	0.00	0.80
27.55	0.75	0.50	1.49	0.80	0.00	0.80
27.60	0.75	0.50	1.49	0.80	0.00	0.80
27.65	0.75	0.50	1.49	0.80	0.00	0.80
27.70	0.75	0.50	1.49	0.80	0.00	0.80
27.75	0.75	0.50	1.49	0.80	0.00	0.80
27.80	0.75	0.50	1.49	0.80	0.00	0.80
27.85	0.75	0.51	1.49	0.80	0.00	0.80
27.90	0.75	0.51	1.48	0.80	0.00	0.80
27.95	0.75	0.51	1.48	0.80	0.00	0.80
28.00	0.75	0.51	1.48	0.80	0.00	0.80
28.05	0.75	0.51	1.48	0.80	0.00	0.80
28.10	0.75	0.51	1.48	0.80	0.00	0.80
28.15	0.75	0.51	1.48	0.80	0.00	0.80

28.20	0.75	0.51	1.48	0.80	0.00	0.80
28.25	0.75	0.51	1.48	0.80	0.00	0.80
28.30	0.75	0.51	1.48	0.80	0.00	0.80
28.35	0.75	0.51	1.48	0.80	0.00	0.80
28.40	0.75	0.51	1.48	0.80	0.00	0.80
28.45	0.75	0.51	1.47	0.80	0.00	0.80
28.50	0.75	0.51	1.47	0.80	0.00	0.80
28.55	0.75	0.51	1.47	0.80	0.00	0.80
28.60	0.75	0.51	1.47	0.80	0.00	0.80
28.65	0.75	0.51	1.47	0.80	0.00	0.80
28.70	0.75	0.51	1.47	0.80	0.00	0.80
28.75	0.75	0.51	1.47	0.80	0.00	0.80
28.80	0.75	0.51	1.47	0.80	0.00	0.80
28.85	0.75	0.51	1.47	0.80	0.00	0.80
28.90	0.75	0.51	1.47	0.80	0.00	0.80
28.95	0.75	0.51	1.47	0.80	0.00	0.80
29.00	0.75	0.51	1.47	0.80	0.00	0.80
29.05	0.75	0.51	1.46	0.80	0.00	0.80
29.10	0.75	0.51	1.46	0.80	0.00	0.80
29.15	0.75	0.51	1.46	0.80	0.00	0.80
29.20	0.75	0.51	1.46	0.80	0.00	0.80
29.25	0.75	0.51	1.46	0.80	0.00	0.80
29.30	0.75	0.51	1.46	0.80	0.00	0.80
29.35	0.75	0.51	1.46	0.80	0.00	0.80
29.40	0.75	0.51	1.46	0.80	0.00	0.80
29.45	0.75	0.51	1.46	0.80	0.00	0.80
29.50	0.75	0.51	1.46	0.80	0.00	0.80
29.55	0.75	0.51	1.46	0.80	0.00	0.80
29.60	0.75	0.52	1.46	0.80	0.00	0.80
29.65	0.75	0.52	1.46	0.80	0.00	0.80
29.70	0.75	0.52	1.45	0.80	0.00	0.80
29.75	0.75	0.52	1.45	0.80	0.00	0.80
29.80	0.75	0.52	1.45	0.80	0.00	0.80
29.85	0.75	0.52	1.45	0.80	0.00	0.80
29.90	0.75	0.52	1.45	0.80	0.00	0.80
29.95	0.75	0.52	1.45	0.80	0.00	0.80
30.00	0.75	0.52	1.45	0.80	0.00	0.80
30.05	0.75	0.52	1.45	0.80	0.00	0.80
30.10	0.75	0.52	1.45	0.80	0.00	0.80
30.15	0.75	0.52	1.45	0.80	0.00	0.80
30.20	0.75	0.52	1.45	0.80	0.00	0.80
30.25	0.75	0.52	1.45	0.80	0.00	0.80
30.30	0.75	0.52	1.45	0.80	0.00	0.80
30.35	0.75	0.52	1.45	0.80	0.00	0.80
30.40	0.75	0.52	1.45	0.80	0.00	0.80
30.45	0.75	0.52	1.45	0.80	0.00	0.80
30.50	0.75	0.52	1.45	0.80	0.00	0.80
30.55	0.75	0.52	1.45	0.80	0.00	0.80
30.60	0.75	0.52	1.45	0.80	0.00	0.80
30.65	0.75	0.52	1.45	0.80	0.00	0.80
30.70	0.75	0.52	1.45	0.80	0.00	0.80
30.75	0.75	0.52	1.45	0.80	0.00	0.80
30.80	0.75	0.52	1.45	0.80	0.00	0.80
30.85	0.75	0.52	1.45	0.80	0.00	0.80
30.90	0.75	0.52	1.45	0.80	0.00	0.80
30.95	0.75	0.52	1.45	0.80	0.00	0.80
31.00	0.75	0.52	1.44	0.80	0.00	0.80
31.05	0.75	0.52	1.44	0.80	0.00	0.80
31.10	0.75	0.52	1.44	0.80	0.00	0.80

31.15	0.75	0.52	1.44	0.80	0.00	0.80
31.20	0.75	0.52	1.44	0.80	0.00	0.80
31.25	0.75	0.52	1.44	0.80	0.00	0.80
31.30	0.75	0.52	1.44	0.80	0.00	0.80
31.35	0.75	0.52	1.44	0.80	0.00	0.80
31.40	0.75	0.52	1.44	0.80	0.00	0.80
31.45	0.75	0.52	1.44	0.80	0.00	0.80
31.50	0.75	0.52	1.44	0.80	0.00	0.80
31.55	0.75	0.52	1.44	0.80	0.00	0.80
31.60	0.75	0.52	1.44	0.80	0.00	0.80
31.65	0.75	0.52	1.44	0.80	0.00	0.80
31.70	0.75	0.52	1.44	0.80	0.00	0.80
31.75	0.75	0.52	1.44	0.80	0.00	0.80
31.80	0.75	0.52	1.44	0.80	0.00	0.80
31.85	0.75	0.52	1.44	0.80	0.00	0.80
31.90	0.75	0.52	1.44	0.80	0.00	0.80
31.95	0.75	0.52	1.44	0.80	0.00	0.80
32.00	0.75	0.52	1.44	0.80	0.00	0.80
32.05	0.75	0.52	1.44	0.80	0.00	0.80
32.10	0.75	0.52	1.44	0.80	0.00	0.80
32.15	0.75	0.52	1.44	0.80	0.00	0.80
32.20	0.75	0.52	1.44	0.80	0.00	0.80
32.25	0.75	0.52	1.44	0.80	0.00	0.80
32.30	0.75	0.52	1.44	0.80	0.00	0.80
32.35	0.75	0.52	1.44	0.80	0.00	0.80
32.40	0.75	0.52	1.44	0.80	0.00	0.80
32.45	0.75	0.52	1.44	0.80	0.00	0.80
32.50	0.75	0.52	1.44	0.80	0.00	0.80
32.55	0.75	0.52	1.44	0.80	0.00	0.80
32.60	0.75	0.52	1.44	0.80	0.00	0.80
32.65	0.75	0.52	1.44	0.80	0.00	0.80
32.70	0.75	0.52	1.44	0.80	0.00	0.80
32.75	0.75	0.52	1.44	0.80	0.00	0.80
32.80	0.75	0.52	1.44	0.80	0.00	0.80
32.85	0.75	0.52	1.44	0.80	0.00	0.80
32.90	0.75	0.52	1.44	0.80	0.00	0.80
32.95	0.75	0.52	1.44	0.80	0.00	0.80
33.00	0.75	0.52	1.44	0.80	0.00	0.80
33.05	0.75	0.52	1.44	0.80	0.00	0.80
33.10	0.75	0.52	1.44	0.80	0.00	0.80
33.15	0.75	0.52	1.44	0.80	0.00	0.80
33.20	0.75	0.52	1.44	0.80	0.00	0.80
33.25	0.75	0.52	1.44	0.80	0.00	0.80
33.30	0.75	0.52	1.44	0.80	0.00	0.80
33.35	0.75	0.52	1.44	0.80	0.00	0.80
33.40	0.75	0.52	1.44	0.80	0.00	0.80
33.45	0.75	0.52	1.44	0.80	0.00	0.80
33.50	0.75	0.52	1.44	0.80	0.00	0.80
33.55	0.75	0.52	1.44	0.80	0.00	0.80
33.60	0.75	0.52	1.44	0.80	0.00	0.80
33.65	0.75	0.52	1.44	0.80	0.00	0.80
33.70	0.75	0.52	1.44	0.80	0.00	0.80
33.75	0.75	0.52	1.44	0.80	0.00	0.80
33.80	0.75	0.52	1.44	0.80	0.00	0.80
33.85	0.75	0.52	1.44	0.80	0.00	0.80
33.90	0.75	0.52	1.44	0.80	0.00	0.80
33.95	0.75	0.52	1.44	0.80	0.00	0.80
34.00	0.75	0.52	1.44	0.80	0.00	0.80
34.05	0.75	0.52	1.43	0.80	0.00	0.80

34.10	0.75	0.52	1.43	0.80	0.00	0.80
34.15	0.75	0.52	1.43	0.80	0.00	0.80
34.20	0.75	0.52	1.43	0.80	0.00	0.80
34.25	0.75	0.52	1.43	0.80	0.00	0.80
34.30	0.75	0.52	1.43	0.80	0.00	0.80
34.35	0.75	0.52	1.43	0.80	0.00	0.80
34.40	0.75	0.52	1.43	0.80	0.00	0.80
34.45	0.75	0.52	1.43	0.80	0.00	0.80
34.50	0.75	0.52	1.43	0.80	0.00	0.80
34.55	0.75	0.52	1.43	0.80	0.00	0.80
34.60	0.75	0.52	1.43	0.80	0.00	0.80
34.65	0.75	0.52	1.43	0.80	0.00	0.80
34.70	0.75	0.52	1.43	0.80	0.00	0.80
34.75	0.75	0.52	1.43	0.80	0.00	0.80
34.80	0.75	0.52	1.43	0.80	0.00	0.80
34.85	0.75	0.52	1.43	0.80	0.00	0.80
34.90	0.75	0.52	1.43	0.80	0.00	0.80
34.95	0.75	0.52	1.43	0.80	0.00	0.80
35.00	0.75	0.52	1.43	0.80	0.00	0.80
35.05	0.75	0.52	1.43	0.80	0.00	0.80
35.10	0.75	0.52	1.43	0.80	0.00	0.80
35.15	0.75	0.52	1.43	0.80	0.00	0.80
35.20	0.75	0.52	1.43	0.80	0.00	0.80
35.25	0.75	0.52	1.43	0.80	0.00	0.80
35.30	0.75	0.52	1.43	0.80	0.00	0.80
35.35	0.75	0.52	1.43	0.80	0.00	0.80
35.40	0.75	0.52	1.43	0.80	0.00	0.80
35.45	0.75	0.52	1.43	0.80	0.00	0.80
35.50	0.75	0.52	1.43	0.80	0.00	0.80
35.55	0.75	0.52	1.43	0.80	0.00	0.80
35.60	0.75	0.52	1.43	0.80	0.00	0.80
35.65	0.75	0.52	1.43	0.80	0.00	0.80
35.70	0.75	0.52	1.43	0.80	0.00	0.80
35.75	0.75	0.52	1.43	0.80	0.00	0.80
35.80	0.75	0.52	1.43	0.80	0.00	0.80
35.85	0.75	0.52	1.43	0.80	0.00	0.80
35.90	0.75	0.52	1.43	0.80	0.00	0.80
35.95	0.75	0.52	1.43	0.80	0.00	0.80
36.00	0.75	0.52	1.43	0.80	0.00	0.80
36.05	0.75	0.52	1.43	0.80	0.00	0.80
36.10	0.75	0.52	1.43	0.80	0.00	0.80
36.15	0.75	0.52	1.43	0.80	0.00	0.80
36.20	0.75	0.52	1.43	0.80	0.00	0.80
36.25	0.75	0.52	1.43	0.80	0.00	0.80
36.30	0.75	0.52	1.43	0.80	0.00	0.80
36.35	0.75	0.52	1.43	0.80	0.00	0.80
36.40	0.75	0.52	1.43	0.80	0.00	0.80
36.45	0.75	0.52	1.43	0.80	0.00	0.80
36.50	0.75	0.52	1.43	0.80	0.00	0.80
36.55	0.75	0.52	1.43	0.80	0.00	0.80
36.60	0.75	0.52	1.43	0.80	0.00	0.80
36.65	0.75	0.52	1.43	0.80	0.00	0.80
36.70	0.75	0.52	1.43	0.80	0.00	0.80
36.75	0.75	0.52	1.44	0.80	0.00	0.80
36.80	0.75	0.52	1.44	0.80	0.00	0.80
36.85	0.75	0.52	1.44	0.80	0.00	0.80
36.90	0.75	0.52	1.44	0.80	0.00	0.80
36.95	0.75	0.52	1.44	0.80	0.00	0.80
37.00	0.75	0.52	1.44	0.80	0.00	0.80

37.05	0.75	0.52	1.44	0.80	0.00	0.80
37.10	0.75	0.52	1.44	0.80	0.00	0.80
37.15	0.75	0.52	1.44	0.79	0.00	0.79
37.20	0.75	0.52	1.44	0.79	0.00	0.79
37.25	0.75	0.52	1.44	0.79	0.00	0.79
37.30	0.75	0.52	1.44	0.79	0.00	0.79
37.35	0.75	0.52	1.44	0.79	0.00	0.79
37.40	0.75	0.52	1.44	0.79	0.00	0.79
37.45	0.75	0.52	1.44	0.79	0.00	0.79
37.50	0.75	0.52	1.44	0.79	0.00	0.79
37.55	0.75	0.52	1.44	0.79	0.00	0.79
37.60	0.75	0.52	1.44	0.79	0.00	0.79
37.65	0.70	0.52	1.35	0.79	0.00	0.79
37.70	0.66	0.52	1.26	0.79	0.00	0.79
37.75	0.63	0.52	1.21	0.78	0.00	0.78
37.80	0.61	0.52	1.17	0.78	0.00	0.78
37.85	0.60	0.52	1.14	0.78	0.00	0.78
37.90	0.59	0.52	1.12	0.78	0.00	0.78
37.95	0.57	0.52	1.10	0.78	0.00	0.78
38.00	0.57	0.52	1.08	0.78	0.00	0.78
38.05	0.56	0.52	1.07	0.78	0.00	0.78
38.10	0.55	0.52	1.05	0.77	0.00	0.77
38.15	0.54	0.52	1.04	0.77	0.00	0.77
38.20	0.53	0.52	1.03	0.77	0.00	0.77
38.25	0.53	0.52	1.01	0.77	0.00	0.77
38.30	0.52	0.52	1.00	0.76	0.00	0.76
38.35	0.52	0.52	0.99*	0.76	0.00	0.76
38.40	0.51	0.52	0.98*	0.76	0.00	0.76
38.45	0.51	0.52	0.97*	0.75	0.00	0.75
38.50	0.50	0.52	0.96*	0.75	0.00	0.75
38.55	0.50	0.52	0.95*	0.75	0.00	0.75
38.60	0.49	0.52	0.94*	0.74	0.00	0.74
38.65	0.49	0.52	0.93*	0.74	0.00	0.74
38.70	0.48	0.52	0.92*	0.73	0.00	0.73
38.75	0.48	0.52	0.92*	0.73	0.00	0.73
38.80	0.47	0.52	0.91*	0.72	0.00	0.72
38.85	0.47	0.52	0.90*	0.72	0.00	0.72
38.90	0.46	0.52	0.89*	0.71	0.00	0.71
38.95	0.46	0.52	0.88*	0.71	0.00	0.71
39.00	0.46	0.52	0.88*	0.70	0.00	0.70
39.05	0.45	0.52	0.87*	0.70	0.00	0.70
39.10	0.45	0.52	0.86*	0.69	0.00	0.69
39.15	0.44	0.52	0.85*	0.68	0.00	0.68
39.20	0.44	0.52	0.85*	0.68	0.00	0.68
39.25	0.44	0.52	0.84*	0.67	0.00	0.67
39.30	0.43	0.52	0.83*	0.66	0.00	0.66
39.35	0.43	0.52	0.83*	0.66	0.00	0.66
39.40	0.43	0.52	0.82*	0.65	0.00	0.65
39.45	0.42	0.52	0.81*	0.65	0.00	0.65
39.50	0.42	0.52	0.81*	0.64	0.00	0.64
39.55	0.42	0.52	0.80*	0.63	0.00	0.63
39.60	0.41	0.52	0.80*	0.63	0.00	0.63
39.65	0.41	0.52	0.79*	0.62	0.00	0.62
39.70	0.41	0.52	0.78*	0.61	0.00	0.61
39.75	0.40	0.52	0.78*	0.61	0.00	0.61
39.80	0.40	0.52	0.77*	0.60	0.00	0.60
39.85	0.40	0.52	0.77*	0.59	0.00	0.59
39.90	0.40	0.52	0.76*	0.58	0.00	0.58
39.95	0.39	0.52	0.75*	0.58	0.00	0.58

40.00	0.39	0.52	0.75*	0.57	0.00	0.57
40.05	0.39	0.52	0.74*	0.56	0.00	0.56
40.10	0.38	0.52	0.74*	0.56	0.00	0.56
40.15	0.38	0.52	0.73*	0.55	0.00	0.55
40.20	0.38	0.52	0.73*	0.54	0.00	0.54
40.25	0.38	0.52	0.72*	0.53	0.00	0.53
40.30	0.37	0.52	0.72*	0.53	0.00	0.53
40.35	0.37	0.52	0.71*	0.52	0.00	0.52
40.40	0.37	0.52	0.71*	0.51	0.00	0.51
40.45	0.36	0.52	0.70*	0.50	0.00	0.50
40.50	0.36	0.52	0.70*	0.50	0.00	0.50
40.55	0.36	0.52	0.69*	0.49	0.00	0.49
40.60	0.36	0.52	0.69*	0.48	0.00	0.48
40.65	0.35	0.52	0.68*	0.47	0.00	0.47
40.70	0.35	0.52	0.68*	0.46	0.00	0.46
40.75	0.35	0.52	0.67*	0.46	0.00	0.46
40.80	0.35	0.52	0.67*	0.45	0.00	0.45
40.85	0.34	0.52	0.66*	0.44	0.00	0.44
40.90	0.34	0.52	0.66*	0.43	0.00	0.43
40.95	0.34	0.52	0.66*	0.42	0.00	0.42
41.00	0.34	0.52	0.65*	0.42	0.00	0.42
41.05	0.34	0.52	0.65*	0.41	0.00	0.41
41.10	0.33	0.52	0.64*	0.40	0.00	0.40
41.15	0.33	0.52	0.64*	0.39	0.00	0.39
41.20	0.33	0.52	0.63*	0.38	0.00	0.38
41.25	0.33	0.52	0.63*	0.37	0.00	0.37
41.30	0.33	0.52	0.63*	0.36	0.00	0.36
41.35	0.32	0.52	0.62*	0.36	0.00	0.36
41.40	0.32	0.52	0.62*	0.35	0.00	0.35
41.45	0.32	0.52	0.62*	0.34	0.00	0.34
41.50	0.32	0.52	0.61*	0.33	0.00	0.33
41.55	0.32	0.52	0.61*	0.32	0.00	0.32
41.60	0.32	0.52	0.62*	0.31	0.00	0.31
41.65	0.32	0.52	0.62*	0.30	0.00	0.30
41.70	0.32	0.52	0.63*	0.29	0.00	0.29
41.75	0.33	0.52	0.63*	0.28	0.00	0.28
41.80	0.33	0.52	0.64*	0.28	0.00	0.28
41.85	0.33	0.52	0.64*	0.27	0.00	0.27
41.90	0.33	0.52	0.65*	0.26	0.00	0.26
41.95	0.34	0.52	0.65*	0.25	0.00	0.25
42.00	0.34	0.52	0.66*	0.24	0.00	0.24
42.05	0.35	0.52	0.67*	0.23	0.00	0.23
42.10	0.35	0.52	0.68*	0.22	0.00	0.22
42.15	0.35	0.52	0.68*	0.22	0.00	0.22
42.20	0.36	0.52	0.69*	0.21	0.00	0.21
42.25	0.36	0.52	0.70*	0.20	0.00	0.20
42.30	0.37	0.52	0.71*	0.19	0.00	0.19
42.35	0.37	0.52	0.72*	0.18	0.00	0.18
42.40	0.38	0.52	0.73*	0.18	0.00	0.18
42.45	0.38	0.52	0.74*	0.17	0.00	0.17
42.50	0.39	0.52	0.75*	0.16	0.00	0.16
42.55	0.39	0.52	0.76*	0.15	0.00	0.15
42.60	0.39	0.52	0.76*	0.15	0.00	0.15
42.65	0.40	0.52	0.77*	0.14	0.00	0.14
42.70	0.40	0.52	0.78*	0.13	0.00	0.13
42.75	0.41	0.52	0.79*	0.13	0.00	0.13
42.80	0.41	0.52	0.80*	0.12	0.00	0.12
42.85	0.42	0.52	0.81*	0.11	0.00	0.11
42.90	0.43	0.52	0.82*	0.11	0.00	0.11

42.95	0.43	0.52	0.83*	0.10	0.00	0.10
43.00	0.44	0.52	0.84*	0.09	0.00	0.09
43.05	0.44	0.52	0.85*	0.09	0.00	0.09
43.10	0.45	0.52	0.87*	0.08	0.00	0.08
43.15	0.45	0.52	0.88*	0.08	0.00	0.08
43.20	0.46	0.52	0.89*	0.07	0.00	0.07
43.25	0.46	0.52	0.90*	0.06	0.00	0.06
43.30	0.47	0.52	0.91*	0.06	0.00	0.06
43.35	0.47	0.52	0.92*	0.05	0.00	0.05
43.40	0.48	0.52	0.93*	0.05	0.00	0.05
43.45	0.49	0.52	0.94*	0.04	0.00	0.04
43.50	0.49	0.52	0.96*	0.04	0.00	0.04
43.55	0.50	0.51	0.97*	0.04	0.00	0.04
43.60	0.51	0.51	0.98*	0.03	0.00	0.03
43.65	0.51	0.51	1.00*	0.03	0.00	0.03
43.70	0.52	0.51	1.01	0.02	0.00	0.02
43.75	0.53	0.51	1.02	0.02	0.00	0.02
43.80	0.54	0.51	1.04	0.02	0.00	0.02
43.85	0.54	0.51	1.06	0.02	0.00	0.02
43.90	0.55	0.51	1.08	0.01	0.00	0.01
43.95	0.56	0.51	1.10	0.01	0.00	0.01
44.00	0.57	0.51	1.12	0.01	0.00	0.01
44.05	0.59	0.51	1.14	0.01	0.00	0.01
44.10	0.60	0.51	1.18	0.01	0.00	0.01
44.15	0.63	0.51	1.22	0.01	0.00	0.01
44.20	0.66	0.51	1.28	0.01	0.00	0.01
44.25	0.71	0.51	1.38	0.01	0.00	0.01
44.30	0.75	0.51	1.46	0.01	0.00	0.01
44.35	0.75	0.51	1.46	0.00	0.00	0.00
44.40	0.75	0.51	1.46	0.00	0.00	0.00
44.45	0.75	0.51	1.46	0.00	0.00	0.00
44.50	0.75	0.51	1.46	0.00	0.00	0.00
44.55	0.75	0.51	1.46	0.00	0.00	0.00
44.60	0.75	0.51	1.46	0.00	0.00	0.00
44.65	0.75	0.51	1.46	0.00	0.00	0.00
44.70	0.75	0.51	1.46	0.00	0.00	0.00
44.75	0.75	0.51	1.46	0.00	0.00	0.00
44.80	0.75	0.51	1.46	0.00	0.00	0.00
44.85	0.75	0.51	1.46	0.00	0.00	0.00
44.90	0.75	0.51	1.46	0.00	0.00	0.00
44.95	0.75	0.51	1.46	0.00	0.00	0.00
45.00	0.75	0.51	1.46	0.00	0.00	0.00
45.05	0.75	0.51	1.46	0.00	0.00	0.00
45.10	0.75	0.51	1.46	0.00	0.00	0.00
45.15	0.75	0.51	1.46	0.00	0.00	0.00
45.20	0.75	0.51	1.46	0.00	0.00	0.00
45.25	0.75	0.51	1.46	0.00	0.00	0.00
45.30	0.75	0.51	1.46	0.00	0.00	0.00
45.35	0.75	0.51	1.46	0.00	0.00	0.00
45.40	0.75	0.51	1.46	0.00	0.00	0.00
45.45	0.75	0.51	1.46	0.00	0.00	0.00
45.50	0.75	0.51	1.46	0.00	0.00	0.00
45.55	0.75	0.51	1.46	0.00	0.00	0.00
45.60	0.75	0.51	1.46	0.00	0.00	0.00
45.65	0.75	0.51	1.46	0.00	0.00	0.00
45.70	0.75	0.51	1.46	0.00	0.00	0.00
45.75	0.75	0.51	1.46	0.00	0.00	0.00
45.80	0.75	0.51	1.46	0.00	0.00	0.00
45.85	0.75	0.51	1.46	0.00	0.00	0.00

45.90	0.75	0.51	1.46	0.00	0.00	0.00
45.95	0.75	0.51	1.46	0.00	0.00	0.00
46.00	0.75	0.51	1.46	0.00	0.00	0.00
46.05	0.75	0.51	1.46	0.00	0.00	0.00
46.10	0.75	0.51	1.46	0.00	0.00	0.00
46.15	0.75	0.51	1.46	0.00	0.00	0.00
46.20	0.75	0.51	1.46	0.00	0.00	0.00
46.25	0.75	0.51	1.46	0.00	0.00	0.00
46.30	0.75	0.51	1.46	0.00	0.00	0.00
46.35	0.75	0.51	1.46	0.00	0.00	0.00
46.40	0.75	0.51	1.46	0.00	0.00	0.00
46.45	0.75	0.51	1.46	0.00	0.00	0.00
46.50	0.75	0.51	1.46	0.00	0.00	0.00
46.55	0.75	0.51	1.46	0.00	0.00	0.00
46.60	0.75	0.51	1.46	0.00	0.00	0.00
46.65	0.75	0.51	1.46	0.00	0.00	0.00
46.70	0.75	0.51	1.46	0.00	0.00	0.00
46.75	0.75	0.51	1.46	0.00	0.00	0.00
46.80	0.75	0.51	1.46	0.00	0.00	0.00
46.85	0.75	0.51	1.46	0.00	0.00	0.00
46.90	0.74	0.51	1.46	0.00	0.00	0.00
46.95	0.74	0.51	1.46	0.00	0.00	0.00
47.00	0.74	0.51	1.46	0.00	0.00	0.00
47.05	0.74	0.51	1.46	0.00	0.00	0.00
47.10	0.74	0.51	1.46	0.00	0.00	0.00
47.15	0.74	0.51	1.46	0.00	0.00	0.00
47.20	0.74	0.51	1.46	0.00	0.00	0.00
47.25	0.74	0.51	1.46	0.00	0.00	0.00
47.30	0.74	0.51	1.46	0.00	0.00	0.00
47.35	0.74	0.51	1.46	0.00	0.00	0.00
47.40	0.74	0.51	1.46	0.00	0.00	0.00
47.45	0.74	0.51	1.46	0.00	0.00	0.00
47.50	0.74	0.51	1.46	0.00	0.00	0.00
47.55	0.74	0.51	1.46	0.00	0.00	0.00
47.60	0.74	0.51	1.46	0.00	0.00	0.00
47.65	0.74	0.51	1.46	0.00	0.00	0.00
47.70	0.74	0.51	1.46	0.00	0.00	0.00
47.75	0.74	0.51	1.46	0.00	0.00	0.00
47.80	0.74	0.51	1.46	0.00	0.00	0.00
47.85	0.74	0.51	1.46	0.00	0.00	0.00
47.90	0.74	0.51	1.46	0.00	0.00	0.00
47.95	0.74	0.51	1.46	0.00	0.00	0.00
48.00	0.74	0.51	1.46	0.00	0.00	0.00
48.05	0.74	0.51	1.46	0.00	0.00	0.00
48.10	0.74	0.51	1.46	0.00	0.00	0.00
48.15	0.74	0.51	1.46	0.00	0.00	0.00
48.20	0.74	0.51	1.46	0.00	0.00	0.00
48.25	0.74	0.51	1.46	0.00	0.00	0.00
48.30	0.74	0.51	1.46	0.00	0.00	0.00
48.35	0.74	0.51	1.46	0.00	0.00	0.00
48.40	0.74	0.51	1.46	0.00	0.00	0.00
48.45	0.74	0.51	1.46	0.00	0.00	0.00
48.50	0.74	0.51	1.47	0.00	0.00	0.00
48.55	0.74	0.51	1.47	0.00	0.00	0.00
48.60	0.74	0.51	1.47	0.00	0.00	0.00
48.65	0.74	0.51	1.47	0.00	0.00	0.00
48.70	0.74	0.51	1.47	0.00	0.00	0.00
48.75	0.74	0.51	1.47	0.00	0.00	0.00
48.80	0.74	0.51	1.47	0.00	0.00	0.00

48.85	0.74	0.51	1.47	0.00	0.00	0.00
48.90	0.74	0.51	1.47	0.00	0.00	0.00
48.95	0.74	0.51	1.47	0.00	0.00	0.00
49.00	0.74	0.51	1.47	0.00	0.00	0.00
49.05	0.74	0.51	1.47	0.00	0.00	0.00
49.10	0.74	0.51	1.47	0.00	0.00	0.00
49.15	0.74	0.51	1.47	0.00	0.00	0.00
49.20	0.74	0.51	1.47	0.00	0.00	0.00
49.25	0.74	0.51	1.47	0.00	0.00	0.00
49.30	0.74	0.51	1.47	0.00	0.00	0.00
49.35	0.74	0.51	1.47	0.00	0.00	0.00
49.40	0.74	0.51	1.47	0.00	0.00	0.00
49.45	0.74	0.50	1.47	0.00	0.00	0.00
49.50	0.74	0.50	1.47	0.00	0.00	0.00
49.55	0.74	0.50	1.47	0.00	0.00	0.00
49.60	0.74	0.50	1.47	0.00	0.00	0.00
49.65	0.74	0.50	1.47	0.00	0.00	0.00
49.70	0.74	0.50	1.47	0.00	0.00	0.00
49.75	0.74	0.50	1.47	0.00	0.00	0.00
49.80	0.74	0.50	1.47	0.00	0.00	0.00
49.85	0.74	0.50	1.47	0.00	0.00	0.00
49.90	0.74	0.50	1.47	0.00	0.00	0.00
49.95	0.74	0.50	1.47	0.00	0.00	0.00
50.00	0.74	0.50	1.47	0.00	0.00	0.00
50.05	0.74	0.50	1.47	0.00	0.00	0.00
50.10	0.74	0.50	1.47	0.00	0.00	0.00
50.15	0.74	0.50	1.47	0.00	0.00	0.00
50.20	0.74	0.50	1.47	0.00	0.00	0.00
50.25	0.74	0.50	1.47	0.00	0.00	0.00
50.30	0.74	0.50	1.47	0.00	0.00	0.00
50.35	0.74	0.50	1.47	0.00	0.00	0.00
50.40	0.74	0.50	1.47	0.00	0.00	0.00
50.45	0.74	0.50	1.47	0.00	0.00	0.00
50.50	0.74	0.50	1.47	0.00	0.00	0.00
50.55	0.74	0.50	1.47	0.00	0.00	0.00
50.60	0.74	0.50	1.47	0.00	0.00	0.00
50.65	0.74	0.50	1.47	0.00	0.00	0.00
50.70	0.74	0.50	1.47	0.00	0.00	0.00
50.75	0.74	0.50	1.47	0.00	0.00	0.00
50.80	0.74	0.50	1.47	0.00	0.00	0.00
50.85	0.74	0.50	1.47	0.00	0.00	0.00
50.90	0.74	0.50	1.47	0.00	0.00	0.00
50.95	0.74	0.50	1.47	0.00	0.00	0.00
51.00	0.74	0.50	1.47	0.00	0.00	0.00

---

* F.S.<1, Liquefaction Potential Zone

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units:Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

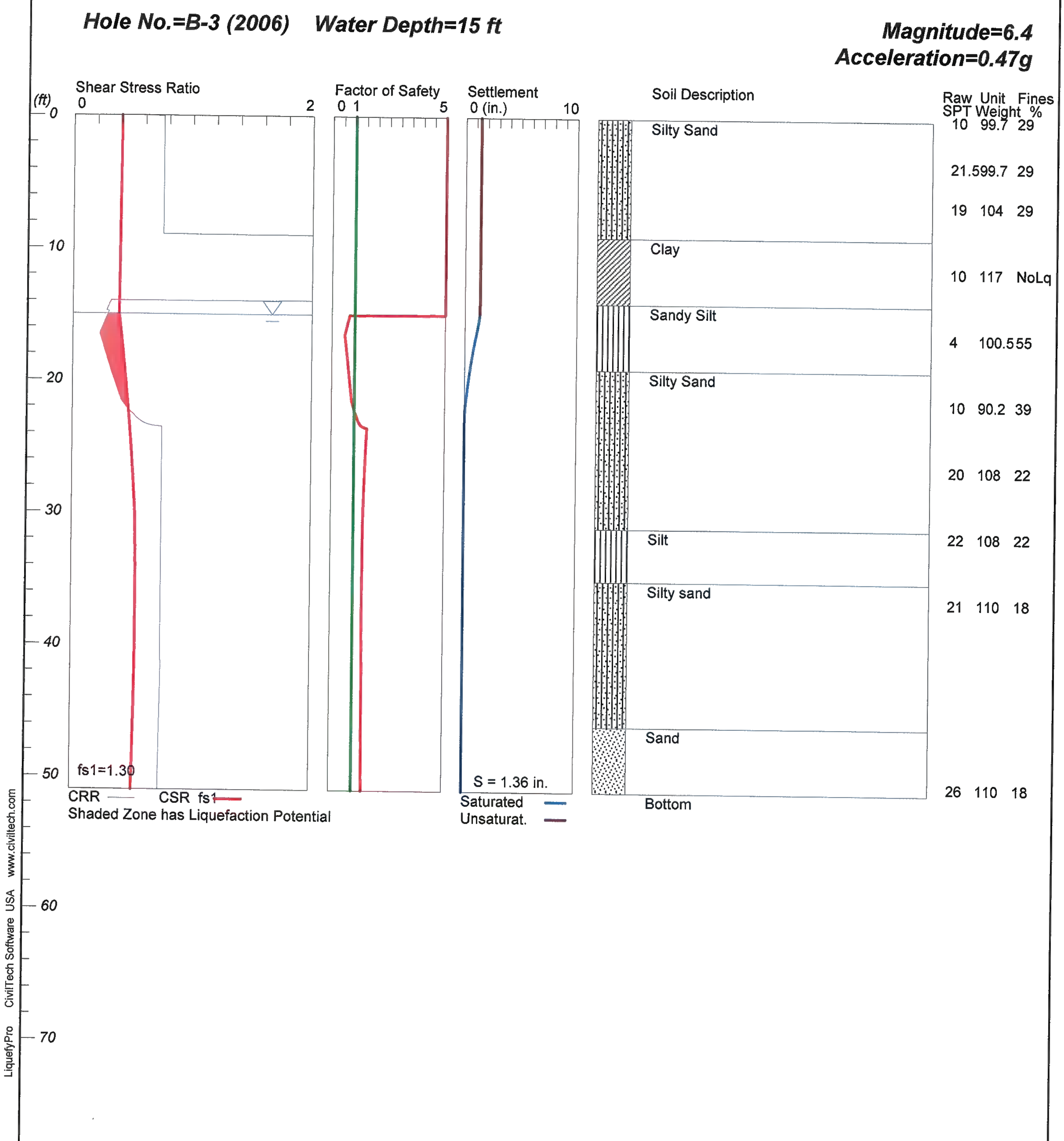
---

1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS

17151 GUSD Crescent Elem



```
*************************************************************************
*****************************
LIQUEFACTION ANALYSIS SUMMARY
Copyright by CivilTech Software
www.civiltech.com
*************************************************************************
*****************************
```

Font: Courier New, Regular, Size 8 is recommended for this report.
Licensed to SEI, 6/26/2019 4:04:20 PM

Input File Name: O:\b. PROJECT FILES (ACTIVE)\17100-17199\17151 Greenfield USD Updates to Crescent Elem\Updated Geohaz Report for Cres Elem West\17151 B3 crescent.liq
Title: 17151 GUSD Crescent Elem
Subtitle: B3

Surface Elev.=
Hole No.=B-3 (2006)
Depth of Hole= 51.00 ft
Water Table during Earthquake= 15.00 ft
Water Table during In-Situ Testing= 24.00 ft
Max. Acceleration= 0.47 g
Earthquake Magnitude= 6.40

Input Data:
Surface Elev.=
Hole No.=B-3 (2006)
Depth of Hole=51.00 ft
Water Table during Earthquake= 15.00 ft
Water Table during In-Situ Testing= 24.00 ft
Max. Acceleration=0.47 g
Earthquake Magnitude=6.40
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	10.00	99.70	29.00
3.50	21.50	99.70	29.00
6.50	19.00	104.00	29.00
11.50	10.00	117.00	NoLiq
16.50	4.00	100.50	55.00
21.50	10.00	90.20	39.00
26.50	20.00	108.00	22.00
31.50	22.00	108.00	22.00
36.50	21.00	110.00	18.00
50.50	26.00	110.00	18.00

Output Results:

Settlement of Saturated Sands=1.32 in.
Settlement of Unsaturated Sands=0.04 in.
Total Settlement of Saturated and Unsaturated Sands=1.36 in.
Differential Settlement=0.680 to 0.897 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.65	0.40	5.00	1.32	0.04	1.36
0.05	0.75	0.40	5.00	1.32	0.04	1.36
0.10	0.75	0.40	5.00	1.32	0.04	1.36
0.15	0.75	0.40	5.00	1.32	0.04	1.36
0.20	0.75	0.40	5.00	1.32	0.04	1.36
0.25	0.75	0.40	5.00	1.32	0.04	1.36
0.30	0.75	0.40	5.00	1.32	0.04	1.36
0.35	0.75	0.40	5.00	1.32	0.04	1.36
0.40	0.75	0.40	5.00	1.32	0.04	1.36
0.45	0.75	0.40	5.00	1.32	0.04	1.36
0.50	0.75	0.40	5.00	1.32	0.04	1.36
0.55	0.75	0.40	5.00	1.32	0.04	1.36
0.60	0.75	0.40	5.00	1.32	0.04	1.36
0.65	0.75	0.40	5.00	1.32	0.04	1.36
0.70	0.75	0.40	5.00	1.32	0.04	1.36
0.75	0.75	0.40	5.00	1.32	0.04	1.36
0.80	0.75	0.40	5.00	1.32	0.04	1.36
0.85	0.75	0.40	5.00	1.32	0.04	1.36
0.90	0.75	0.40	5.00	1.32	0.04	1.36
0.95	0.75	0.40	5.00	1.32	0.04	1.36
1.00	0.75	0.40	5.00	1.32	0.04	1.36
1.05	0.75	0.40	5.00	1.32	0.04	1.36
1.10	0.75	0.40	5.00	1.32	0.04	1.36
1.15	0.75	0.40	5.00	1.32	0.04	1.36
1.20	0.75	0.40	5.00	1.32	0.04	1.36
1.25	0.75	0.40	5.00	1.32	0.04	1.36
1.30	0.75	0.40	5.00	1.32	0.04	1.36
1.35	0.75	0.40	5.00	1.32	0.04	1.36
1.40	0.75	0.40	5.00	1.32	0.04	1.36
1.45	0.75	0.40	5.00	1.32	0.04	1.36
1.50	0.75	0.40	5.00	1.32	0.04	1.36
1.55	0.75	0.40	5.00	1.32	0.04	1.36
1.60	0.75	0.40	5.00	1.32	0.04	1.36
1.65	0.75	0.40	5.00	1.32	0.04	1.36

1.70	0.75	0.40	5.00	1.32	0.04	1.36
1.75	0.75	0.40	5.00	1.32	0.04	1.36
1.80	0.75	0.40	5.00	1.32	0.04	1.36
1.85	0.75	0.40	5.00	1.32	0.04	1.36
1.90	0.75	0.40	5.00	1.32	0.04	1.36
1.95	0.75	0.40	5.00	1.32	0.04	1.36
2.00	0.75	0.40	5.00	1.32	0.04	1.36
2.05	0.75	0.40	5.00	1.32	0.04	1.36
2.10	0.75	0.40	5.00	1.32	0.04	1.36
2.15	0.75	0.40	5.00	1.32	0.04	1.36
2.20	0.75	0.40	5.00	1.32	0.04	1.36
2.25	0.75	0.40	5.00	1.32	0.04	1.36
2.30	0.75	0.40	5.00	1.32	0.04	1.36
2.35	0.75	0.39	5.00	1.32	0.04	1.36
2.40	0.75	0.39	5.00	1.32	0.04	1.36
2.45	0.75	0.39	5.00	1.32	0.04	1.36
2.50	0.75	0.39	5.00	1.32	0.04	1.36
2.55	0.75	0.39	5.00	1.32	0.04	1.36
2.60	0.75	0.39	5.00	1.32	0.04	1.36
2.65	0.75	0.39	5.00	1.32	0.04	1.36
2.70	0.75	0.39	5.00	1.32	0.04	1.36
2.75	0.75	0.39	5.00	1.32	0.04	1.36
2.80	0.75	0.39	5.00	1.32	0.04	1.36
2.85	0.75	0.39	5.00	1.32	0.04	1.36
2.90	0.75	0.39	5.00	1.32	0.04	1.36
2.95	0.75	0.39	5.00	1.32	0.04	1.36
3.00	0.75	0.39	5.00	1.32	0.04	1.36
3.05	0.75	0.39	5.00	1.32	0.04	1.36
3.10	0.75	0.39	5.00	1.32	0.04	1.36
3.15	0.75	0.39	5.00	1.32	0.04	1.36
3.20	0.75	0.39	5.00	1.32	0.04	1.36
3.25	0.75	0.39	5.00	1.32	0.04	1.36
3.30	0.75	0.39	5.00	1.32	0.04	1.36
3.35	0.75	0.39	5.00	1.32	0.04	1.36
3.40	0.75	0.39	5.00	1.32	0.04	1.36
3.45	0.75	0.39	5.00	1.32	0.04	1.36
3.50	0.75	0.39	5.00	1.32	0.04	1.36
3.55	0.75	0.39	5.00	1.32	0.04	1.36
3.60	0.75	0.39	5.00	1.32	0.04	1.36
3.65	0.75	0.39	5.00	1.32	0.04	1.36
3.70	0.75	0.39	5.00	1.32	0.04	1.36
3.75	0.75	0.39	5.00	1.32	0.04	1.36
3.80	0.75	0.39	5.00	1.32	0.04	1.36
3.85	0.75	0.39	5.00	1.32	0.04	1.36
3.90	0.75	0.39	5.00	1.32	0.04	1.36
3.95	0.75	0.39	5.00	1.32	0.04	1.36
4.00	0.75	0.39	5.00	1.32	0.04	1.36
4.05	0.75	0.39	5.00	1.32	0.04	1.36
4.10	0.75	0.39	5.00	1.32	0.04	1.36
4.15	0.75	0.39	5.00	1.32	0.04	1.36
4.20	0.75	0.39	5.00	1.32	0.04	1.36
4.25	0.75	0.39	5.00	1.32	0.04	1.36
4.30	0.75	0.39	5.00	1.32	0.04	1.35
4.35	0.75	0.39	5.00	1.32	0.04	1.35
4.40	0.75	0.39	5.00	1.32	0.04	1.35
4.45	0.75	0.39	5.00	1.32	0.04	1.35
4.50	0.75	0.39	5.00	1.32	0.04	1.35
4.55	0.75	0.39	5.00	1.32	0.04	1.35
4.60	0.75	0.39	5.00	1.32	0.04	1.35

4.65	0.75	0.39	5.00	1.32	0.04	1.35
4.70	0.75	0.39	5.00	1.32	0.04	1.35
4.75	0.75	0.39	5.00	1.32	0.03	1.35
4.80	0.75	0.39	5.00	1.32	0.03	1.35
4.85	0.75	0.39	5.00	1.32	0.03	1.35
4.90	0.75	0.39	5.00	1.32	0.03	1.35
4.95	0.75	0.39	5.00	1.32	0.03	1.35
5.00	0.75	0.39	5.00	1.32	0.03	1.35
5.05	0.75	0.39	5.00	1.32	0.03	1.35
5.10	0.75	0.39	5.00	1.32	0.03	1.35
5.15	0.75	0.39	5.00	1.32	0.03	1.35
5.20	0.75	0.39	5.00	1.32	0.03	1.35
5.25	0.75	0.39	5.00	1.32	0.03	1.35
5.30	0.75	0.39	5.00	1.32	0.03	1.35
5.35	0.75	0.39	5.00	1.32	0.03	1.35
5.40	0.75	0.39	5.00	1.32	0.03	1.35
5.45	0.75	0.39	5.00	1.32	0.03	1.35
5.50	0.75	0.39	5.00	1.32	0.03	1.35
5.55	0.75	0.39	5.00	1.32	0.03	1.35
5.60	0.75	0.39	5.00	1.32	0.03	1.35
5.65	0.75	0.39	5.00	1.32	0.03	1.35
5.70	0.75	0.39	5.00	1.32	0.03	1.35
5.75	0.75	0.39	5.00	1.32	0.03	1.35
5.80	0.75	0.39	5.00	1.32	0.03	1.35
5.85	0.75	0.39	5.00	1.32	0.03	1.35
5.90	0.75	0.39	5.00	1.32	0.03	1.35
5.95	0.75	0.39	5.00	1.32	0.03	1.35
6.00	0.75	0.39	5.00	1.32	0.03	1.35
6.05	0.75	0.39	5.00	1.32	0.03	1.35
6.10	0.75	0.39	5.00	1.32	0.03	1.35
6.15	0.75	0.39	5.00	1.32	0.03	1.35
6.20	0.75	0.39	5.00	1.32	0.03	1.35
6.25	0.75	0.39	5.00	1.32	0.03	1.35
6.30	0.75	0.39	5.00	1.32	0.03	1.35
6.35	0.75	0.39	5.00	1.32	0.03	1.35
6.40	0.75	0.39	5.00	1.32	0.03	1.35
6.45	0.75	0.39	5.00	1.32	0.03	1.35
6.50	0.75	0.39	5.00	1.32	0.03	1.35
6.55	0.75	0.39	5.00	1.32	0.03	1.35
6.60	0.75	0.39	5.00	1.32	0.03	1.35
6.65	0.75	0.39	5.00	1.32	0.03	1.35
6.70	0.75	0.39	5.00	1.32	0.03	1.35
6.75	0.75	0.39	5.00	1.32	0.03	1.35
6.80	0.75	0.39	5.00	1.32	0.03	1.35
6.85	0.75	0.39	5.00	1.32	0.03	1.35
6.90	0.75	0.39	5.00	1.32	0.03	1.35
6.95	0.75	0.39	5.00	1.32	0.03	1.35
7.00	0.75	0.39	5.00	1.32	0.03	1.35
7.05	0.75	0.39	5.00	1.32	0.03	1.35
7.10	0.75	0.39	5.00	1.32	0.03	1.35
7.15	0.75	0.39	5.00	1.32	0.03	1.35
7.20	0.75	0.39	5.00	1.32	0.03	1.35
7.25	0.75	0.39	5.00	1.32	0.03	1.35
7.30	0.75	0.39	5.00	1.32	0.03	1.35
7.35	0.75	0.39	5.00	1.32	0.03	1.35
7.40	0.75	0.39	5.00	1.32	0.03	1.35
7.45	0.75	0.39	5.00	1.32	0.03	1.35
7.50	0.75	0.39	5.00	1.32	0.03	1.35
7.55	0.75	0.39	5.00	1.32	0.03	1.35

7.60	0.75	0.39	5.00	1.32	0.03	1.35
7.65	0.75	0.39	5.00	1.32	0.03	1.35
7.70	0.75	0.39	5.00	1.32	0.03	1.35
7.75	0.75	0.39	5.00	1.32	0.03	1.35
7.80	0.75	0.39	5.00	1.32	0.03	1.35
7.85	0.75	0.39	5.00	1.32	0.03	1.35
7.90	0.75	0.39	5.00	1.32	0.03	1.35
7.95	0.75	0.39	5.00	1.32	0.03	1.35
8.00	0.75	0.39	5.00	1.32	0.03	1.35
8.05	0.75	0.39	5.00	1.32	0.03	1.35
8.10	0.75	0.39	5.00	1.32	0.03	1.35
8.15	0.75	0.39	5.00	1.32	0.03	1.35
8.20	0.75	0.39	5.00	1.32	0.03	1.35
8.25	0.75	0.39	5.00	1.32	0.03	1.35
8.30	0.75	0.39	5.00	1.32	0.03	1.35
8.35	0.75	0.39	5.00	1.32	0.03	1.35
8.40	0.75	0.39	5.00	1.32	0.03	1.35
8.45	0.75	0.39	5.00	1.32	0.03	1.35
8.50	0.75	0.39	5.00	1.32	0.03	1.35
8.55	0.75	0.39	5.00	1.32	0.03	1.35
8.60	0.75	0.39	5.00	1.32	0.03	1.35
8.65	0.75	0.39	5.00	1.32	0.03	1.35
8.70	0.75	0.39	5.00	1.32	0.03	1.35
8.75	0.75	0.39	5.00	1.32	0.03	1.35
8.80	0.75	0.39	5.00	1.32	0.03	1.35
8.85	0.75	0.39	5.00	1.32	0.03	1.35
8.90	0.75	0.39	5.00	1.32	0.03	1.35
8.95	0.75	0.39	5.00	1.32	0.03	1.35
9.00	2.00	0.39	5.00	1.32	0.03	1.35
9.05	2.00	0.39	5.00	1.32	0.03	1.35
9.10	2.00	0.39	5.00	1.32	0.03	1.35
9.15	2.00	0.39	5.00	1.32	0.03	1.35
9.20	2.00	0.39	5.00	1.32	0.03	1.35
9.25	2.00	0.39	5.00	1.32	0.03	1.35
9.30	2.00	0.39	5.00	1.32	0.03	1.35
9.35	2.00	0.39	5.00	1.32	0.03	1.35
9.40	2.00	0.39	5.00	1.32	0.03	1.35
9.45	2.00	0.39	5.00	1.32	0.03	1.35
9.50	2.00	0.39	5.00	1.32	0.03	1.35
9.55	2.00	0.39	5.00	1.32	0.03	1.35
9.60	2.00	0.39	5.00	1.32	0.03	1.35
9.65	2.00	0.39	5.00	1.32	0.03	1.35
9.70	2.00	0.39	5.00	1.32	0.03	1.35
9.75	2.00	0.39	5.00	1.32	0.03	1.35
9.80	2.00	0.39	5.00	1.32	0.03	1.35
9.85	2.00	0.39	5.00	1.32	0.03	1.35
9.90	2.00	0.39	5.00	1.32	0.03	1.35
9.95	2.00	0.39	5.00	1.32	0.03	1.35
10.00	2.00	0.39	5.00	1.32	0.03	1.35
10.05	2.00	0.39	5.00	1.32	0.03	1.35
10.10	2.00	0.39	5.00	1.32	0.03	1.35
10.15	2.00	0.39	5.00	1.32	0.03	1.35
10.20	2.00	0.39	5.00	1.32	0.03	1.35
10.25	2.00	0.39	5.00	1.32	0.03	1.35
10.30	2.00	0.39	5.00	1.32	0.03	1.35
10.35	2.00	0.39	5.00	1.32	0.03	1.35
10.40	2.00	0.39	5.00	1.32	0.03	1.35
10.45	2.00	0.39	5.00	1.32	0.03	1.35
10.50	2.00	0.39	5.00	1.32	0.03	1.35

10.55	2.00	0.39	5.00	1.32	0.03	1.35
10.60	2.00	0.39	5.00	1.32	0.03	1.35
10.65	2.00	0.39	5.00	1.32	0.03	1.35
10.70	2.00	0.39	5.00	1.32	0.03	1.35
10.75	2.00	0.39	5.00	1.32	0.03	1.35
10.80	2.00	0.39	5.00	1.32	0.03	1.35
10.85	2.00	0.39	5.00	1.32	0.03	1.35
10.90	2.00	0.39	5.00	1.32	0.03	1.35
10.95	2.00	0.39	5.00	1.32	0.03	1.35
11.00	2.00	0.39	5.00	1.32	0.03	1.35
11.05	2.00	0.39	5.00	1.32	0.03	1.35
11.10	2.00	0.39	5.00	1.32	0.03	1.35
11.15	2.00	0.39	5.00	1.32	0.03	1.35
11.20	2.00	0.39	5.00	1.32	0.03	1.35
11.25	2.00	0.39	5.00	1.32	0.03	1.35
11.30	2.00	0.39	5.00	1.32	0.03	1.35
11.35	2.00	0.39	5.00	1.32	0.03	1.35
11.40	2.00	0.39	5.00	1.32	0.03	1.35
11.45	2.00	0.39	5.00	1.32	0.03	1.35
11.50	2.00	0.39	5.00	1.32	0.03	1.35
11.55	2.00	0.39	5.00	1.32	0.03	1.35
11.60	2.00	0.39	5.00	1.32	0.03	1.35
11.65	2.00	0.39	5.00	1.32	0.03	1.35
11.70	2.00	0.39	5.00	1.32	0.03	1.35
11.75	2.00	0.39	5.00	1.32	0.03	1.35
11.80	2.00	0.39	5.00	1.32	0.03	1.35
11.85	2.00	0.39	5.00	1.32	0.03	1.35
11.90	2.00	0.39	5.00	1.32	0.03	1.35
11.95	2.00	0.39	5.00	1.32	0.03	1.35
12.00	2.00	0.39	5.00	1.32	0.03	1.35
12.05	2.00	0.39	5.00	1.32	0.03	1.35
12.10	2.00	0.39	5.00	1.32	0.03	1.35
12.15	2.00	0.39	5.00	1.32	0.03	1.35
12.20	2.00	0.39	5.00	1.32	0.03	1.35
12.25	2.00	0.39	5.00	1.32	0.03	1.35
12.30	2.00	0.39	5.00	1.32	0.03	1.35
12.35	2.00	0.39	5.00	1.32	0.03	1.35
12.40	2.00	0.39	5.00	1.32	0.03	1.35
12.45	2.00	0.39	5.00	1.32	0.03	1.35
12.50	2.00	0.39	5.00	1.32	0.03	1.35
12.55	2.00	0.39	5.00	1.32	0.03	1.35
12.60	2.00	0.39	5.00	1.32	0.03	1.35
12.65	2.00	0.39	5.00	1.32	0.03	1.35
12.70	2.00	0.39	5.00	1.32	0.03	1.35
12.75	2.00	0.39	5.00	1.32	0.03	1.35
12.80	2.00	0.39	5.00	1.32	0.03	1.35
12.85	2.00	0.39	5.00	1.32	0.03	1.35
12.90	2.00	0.39	5.00	1.32	0.03	1.35
12.95	2.00	0.39	5.00	1.32	0.03	1.35
13.00	2.00	0.39	5.00	1.32	0.03	1.35
13.05	2.00	0.39	5.00	1.32	0.03	1.35
13.10	2.00	0.39	5.00	1.32	0.03	1.35
13.15	2.00	0.38	5.00	1.32	0.03	1.35
13.20	2.00	0.38	5.00	1.32	0.03	1.35
13.25	2.00	0.38	5.00	1.32	0.03	1.35
13.30	2.00	0.38	5.00	1.32	0.03	1.35
13.35	2.00	0.38	5.00	1.32	0.03	1.35
13.40	2.00	0.38	5.00	1.32	0.03	1.35
13.45	2.00	0.38	5.00	1.32	0.03	1.35

13.50	2.00	0.38	5.00	1.32	0.03	1.35
13.55	2.00	0.38	5.00	1.32	0.03	1.35
13.60	2.00	0.38	5.00	1.32	0.03	1.35
13.65	2.00	0.38	5.00	1.32	0.03	1.35
13.70	2.00	0.38	5.00	1.32	0.03	1.35
13.75	2.00	0.38	5.00	1.32	0.03	1.35
13.80	2.00	0.38	5.00	1.32	0.03	1.35
13.85	2.00	0.38	5.00	1.32	0.03	1.35
13.90	2.00	0.38	5.00	1.32	0.03	1.35
13.95	2.00	0.38	5.00	1.32	0.03	1.35
14.00	0.32	0.38	5.00	1.32	0.03	1.35
14.05	0.32	0.38	5.00	1.32	0.03	1.35
14.10	0.31	0.38	5.00	1.32	0.03	1.34
14.15	0.31	0.38	5.00	1.32	0.02	1.34
14.20	0.31	0.38	5.00	1.32	0.02	1.34
14.25	0.31	0.38	5.00	1.32	0.02	1.34
14.30	0.30	0.38	5.00	1.32	0.02	1.34
14.35	0.30	0.38	5.00	1.32	0.02	1.34
14.40	0.30	0.38	5.00	1.32	0.02	1.34
14.45	0.30	0.38	5.00	1.32	0.02	1.34
14.50	0.29	0.38	5.00	1.32	0.02	1.33
14.55	0.29	0.38	5.00	1.32	0.01	1.33
14.60	0.29	0.38	5.00	1.32	0.01	1.33
14.65	0.29	0.38	5.00	1.32	0.01	1.33
14.70	0.28	0.38	5.00	1.32	0.01	1.33
14.75	0.28	0.38	5.00	1.32	0.01	1.33
14.80	0.30	0.38	5.00	1.32	0.01	1.33
14.85	0.30	0.38	5.00	1.32	0.00	1.32
14.90	0.30	0.38	5.00	1.32	0.00	1.32
14.95	0.30	0.38	5.00	1.32	0.00	1.32
15.00	0.29	0.38	0.77*	1.32	0.00	1.32
15.05	0.29	0.38	0.76*	1.31	0.00	1.31
15.10	0.29	0.38	0.75*	1.30	0.00	1.30
15.15	0.29	0.39	0.74*	1.29	0.00	1.29
15.20	0.28	0.39	0.73*	1.28	0.00	1.28
15.25	0.28	0.39	0.73*	1.27	0.00	1.27
15.30	0.28	0.39	0.72*	1.27	0.00	1.27
15.35	0.28	0.39	0.71*	1.26	0.00	1.26
15.40	0.27	0.39	0.70*	1.25	0.00	1.25
15.45	0.27	0.39	0.70*	1.24	0.00	1.24
15.50	0.27	0.39	0.69*	1.23	0.00	1.23
15.55	0.27	0.39	0.68*	1.22	0.00	1.22
15.60	0.26	0.39	0.67*	1.21	0.00	1.21
15.65	0.26	0.39	0.67*	1.20	0.00	1.20
15.70	0.26	0.39	0.66*	1.19	0.00	1.19
15.75	0.26	0.39	0.65*	1.18	0.00	1.18
15.80	0.25	0.39	0.64*	1.16	0.00	1.16
15.85	0.25	0.39	0.64*	1.15	0.00	1.15
15.90	0.25	0.40	0.63*	1.14	0.00	1.14
15.95	0.25	0.40	0.62*	1.13	0.00	1.13
16.00	0.24	0.40	0.62*	1.12	0.00	1.12
16.05	0.24	0.40	0.61*	1.11	0.00	1.11
16.10	0.24	0.40	0.60*	1.10	0.00	1.10
16.15	0.24	0.40	0.60*	1.09	0.00	1.09
16.20	0.24	0.40	0.59*	1.07	0.00	1.07
16.25	0.23	0.40	0.58*	1.06	0.00	1.06
16.30	0.23	0.40	0.58*	1.05	0.00	1.05
16.35	0.23	0.40	0.57*	1.04	0.00	1.04
16.40	0.23	0.40	0.56*	1.03	0.00	1.03

16.45	0.22	0.40	0.56*	1.01	0.00	1.01
16.50	0.22	0.40	0.55*	1.00	0.00	1.00
16.55	0.22	0.40	0.55*	0.99	0.00	0.99
16.60	0.23	0.40	0.56*	0.98	0.00	0.98
16.65	0.23	0.41	0.56*	0.96	0.00	0.96
16.70	0.23	0.41	0.56*	0.95	0.00	0.95
16.75	0.23	0.41	0.57*	0.94	0.00	0.94
16.80	0.23	0.41	0.57*	0.93	0.00	0.93
16.85	0.23	0.41	0.58*	0.91	0.00	0.91
16.90	0.24	0.41	0.58*	0.90	0.00	0.90
16.95	0.24	0.41	0.58*	0.89	0.00	0.89
17.00	0.24	0.41	0.59*	0.88	0.00	0.88
17.05	0.24	0.41	0.59*	0.87	0.00	0.87
17.10	0.24	0.41	0.59*	0.86	0.00	0.86
17.15	0.25	0.41	0.60*	0.84	0.00	0.84
17.20	0.25	0.41	0.60*	0.83	0.00	0.83
17.25	0.25	0.41	0.60*	0.82	0.00	0.82
17.30	0.25	0.41	0.61*	0.81	0.00	0.81
17.35	0.25	0.41	0.61*	0.80	0.00	0.80
17.40	0.25	0.41	0.61*	0.79	0.00	0.79
17.45	0.26	0.42	0.62*	0.78	0.00	0.78
17.50	0.26	0.42	0.62*	0.77	0.00	0.77
17.55	0.26	0.42	0.62*	0.75	0.00	0.75
17.60	0.26	0.42	0.63*	0.74	0.00	0.74
17.65	0.26	0.42	0.63*	0.73	0.00	0.73
17.70	0.27	0.42	0.63*	0.72	0.00	0.72
17.75	0.27	0.42	0.64*	0.71	0.00	0.71
17.80	0.27	0.42	0.64*	0.70	0.00	0.70
17.85	0.27	0.42	0.64*	0.69	0.00	0.69
17.90	0.27	0.42	0.65*	0.68	0.00	0.68
17.95	0.27	0.42	0.65*	0.67	0.00	0.67
18.00	0.28	0.42	0.65*	0.66	0.00	0.66
18.05	0.28	0.42	0.66*	0.65	0.00	0.65
18.10	0.28	0.42	0.66*	0.64	0.00	0.64
18.15	0.28	0.42	0.66*	0.63	0.00	0.63
18.20	0.28	0.42	0.67*	0.62	0.00	0.62
18.25	0.28	0.43	0.67*	0.61	0.00	0.61
18.30	0.29	0.43	0.67*	0.60	0.00	0.60
18.35	0.29	0.43	0.68*	0.59	0.00	0.59
18.40	0.29	0.43	0.68*	0.58	0.00	0.58
18.45	0.29	0.43	0.68*	0.57	0.00	0.57
18.50	0.29	0.43	0.69*	0.56	0.00	0.56
18.55	0.29	0.43	0.69*	0.56	0.00	0.56
18.60	0.30	0.43	0.69*	0.55	0.00	0.55
18.65	0.30	0.43	0.69*	0.54	0.00	0.54
18.70	0.30	0.43	0.70*	0.53	0.00	0.53
18.75	0.30	0.43	0.70*	0.52	0.00	0.52
18.80	0.30	0.43	0.70*	0.51	0.00	0.51
18.85	0.31	0.43	0.71*	0.50	0.00	0.50
18.90	0.31	0.43	0.71*	0.49	0.00	0.49
18.95	0.31	0.43	0.71*	0.48	0.00	0.48
19.00	0.31	0.43	0.72*	0.48	0.00	0.48
19.05	0.31	0.43	0.72*	0.47	0.00	0.47
19.10	0.31	0.43	0.72*	0.46	0.00	0.46
19.15	0.32	0.44	0.72*	0.45	0.00	0.45
19.20	0.32	0.44	0.73*	0.44	0.00	0.44
19.25	0.32	0.44	0.73*	0.43	0.00	0.43
19.30	0.32	0.44	0.73*	0.42	0.00	0.42
19.35	0.32	0.44	0.74*	0.42	0.00	0.42

19.40	0.32	0.44	0.74*	0.41	0.00	0.41
19.45	0.33	0.44	0.74*	0.40	0.00	0.40
19.50	0.33	0.44	0.75*	0.39	0.00	0.39
19.55	0.33	0.44	0.75*	0.38	0.00	0.38
19.60	0.33	0.44	0.75*	0.37	0.00	0.37
19.65	0.33	0.44	0.76*	0.37	0.00	0.37
19.70	0.34	0.44	0.76*	0.36	0.00	0.36
19.75	0.34	0.44	0.76*	0.35	0.00	0.35
19.80	0.34	0.44	0.76*	0.34	0.00	0.34
19.85	0.34	0.44	0.77*	0.34	0.00	0.34
19.90	0.34	0.44	0.77*	0.33	0.00	0.33
19.95	0.34	0.44	0.77*	0.32	0.00	0.32
20.00	0.35	0.45	0.78*	0.31	0.00	0.31
20.05	0.35	0.45	0.78*	0.30	0.00	0.30
20.10	0.35	0.45	0.78*	0.30	0.00	0.30
20.15	0.35	0.45	0.79*	0.29	0.00	0.29
20.20	0.35	0.45	0.79*	0.28	0.00	0.28
20.25	0.36	0.45	0.79*	0.27	0.00	0.27
20.30	0.36	0.45	0.80*	0.27	0.00	0.27
20.35	0.36	0.45	0.80*	0.26	0.00	0.26
20.40	0.36	0.45	0.80*	0.25	0.00	0.25
20.45	0.36	0.45	0.81*	0.25	0.00	0.25
20.50	0.36	0.45	0.81*	0.24	0.00	0.24
20.55	0.37	0.45	0.81*	0.23	0.00	0.23
20.60	0.37	0.45	0.82*	0.22	0.00	0.22
20.65	0.37	0.45	0.82*	0.22	0.00	0.22
20.70	0.37	0.45	0.82*	0.21	0.00	0.21
20.75	0.37	0.45	0.83*	0.20	0.00	0.20
20.80	0.38	0.45	0.83*	0.20	0.00	0.20
20.85	0.38	0.45	0.83*	0.19	0.00	0.19
20.90	0.38	0.45	0.84*	0.18	0.00	0.18
20.95	0.38	0.46	0.84*	0.17	0.00	0.17
21.00	0.38	0.46	0.84*	0.17	0.00	0.17
21.05	0.39	0.46	0.85*	0.16	0.00	0.16
21.10	0.39	0.46	0.85*	0.15	0.00	0.15
21.15	0.39	0.46	0.85*	0.15	0.00	0.15
21.20	0.39	0.46	0.86*	0.14	0.00	0.14
21.25	0.39	0.46	0.86*	0.14	0.00	0.14
21.30	0.40	0.46	0.86*	0.13	0.00	0.13
21.35	0.40	0.46	0.87*	0.12	0.00	0.12
21.40	0.40	0.46	0.87*	0.12	0.00	0.12
21.45	0.40	0.46	0.87*	0.11	0.00	0.11
21.50	0.40	0.46	0.88*	0.10	0.00	0.10
21.55	0.41	0.46	0.88*	0.10	0.00	0.10
21.60	0.41	0.46	0.89*	0.09	0.00	0.09
21.65	0.42	0.46	0.90*	0.08	0.00	0.08
21.70	0.42	0.46	0.91*	0.08	0.00	0.08
21.75	0.42	0.46	0.92*	0.07	0.00	0.07
21.80	0.43	0.46	0.92*	0.07	0.00	0.07
21.85	0.43	0.46	0.93*	0.06	0.00	0.06
21.90	0.44	0.47	0.94*	0.06	0.00	0.06
21.95	0.44	0.47	0.95*	0.05	0.00	0.05
22.00	0.45	0.47	0.96*	0.05	0.00	0.05
22.05	0.45	0.47	0.97*	0.04	0.00	0.04
22.10	0.46	0.47	0.97*	0.04	0.00	0.04
22.15	0.46	0.47	0.98*	0.04	0.00	0.04
22.20	0.47	0.47	0.99*	0.03	0.00	0.03
22.25	0.47	0.47	1.00	0.03	0.00	0.03
22.30	0.48	0.47	1.01	0.03	0.00	0.03

22.35	0.48	0.47	1.02	0.03	0.00	0.03
22.40	0.49	0.47	1.03	0.02	0.00	0.02
22.45	0.49	0.47	1.04	0.02	0.00	0.02
22.50	0.50	0.47	1.06	0.02	0.00	0.02
22.55	0.50	0.47	1.07	0.02	0.00	0.02
22.60	0.51	0.47	1.08	0.02	0.00	0.02
22.65	0.52	0.47	1.09	0.02	0.00	0.02
22.70	0.52	0.47	1.10	0.02	0.00	0.02
22.75	0.52	0.47	1.11	0.01	0.00	0.01
22.80	0.53	0.47	1.12	0.01	0.00	0.01
22.85	0.53	0.47	1.13	0.01	0.00	0.01
22.90	0.54	0.48	1.14	0.01	0.00	0.01
22.95	0.55	0.48	1.15	0.01	0.00	0.01
23.00	0.55	0.48	1.16	0.01	0.00	0.01
23.05	0.56	0.48	1.18	0.01	0.00	0.01
23.10	0.57	0.48	1.19	0.01	0.00	0.01
23.15	0.58	0.48	1.21	0.01	0.00	0.01
23.20	0.58	0.48	1.22	0.01	0.00	0.01
23.25	0.60	0.48	1.24	0.01	0.00	0.01
23.30	0.61	0.48	1.27	0.00	0.00	0.00
23.35	0.62	0.48	1.29	0.00	0.00	0.00
23.40	0.64	0.48	1.33	0.00	0.00	0.00
23.45	0.66	0.48	1.38	0.00	0.00	0.00
23.50	0.70	0.48	1.45	0.00	0.00	0.00
23.55	0.75	0.48	1.56	0.00	0.00	0.00
23.60	0.75	0.48	1.56	0.00	0.00	0.00
23.65	0.75	0.48	1.55	0.00	0.00	0.00
23.70	0.75	0.48	1.55	0.00	0.00	0.00
23.75	0.75	0.48	1.55	0.00	0.00	0.00
23.80	0.75	0.48	1.55	0.00	0.00	0.00
23.85	0.75	0.48	1.55	0.00	0.00	0.00
23.90	0.75	0.48	1.55	0.00	0.00	0.00
23.95	0.75	0.49	1.55	0.00	0.00	0.00
24.00	0.75	0.49	1.54	0.00	0.00	0.00
24.05	0.75	0.49	1.54	0.00	0.00	0.00
24.10	0.75	0.49	1.54	0.00	0.00	0.00
24.15	0.75	0.49	1.54	0.00	0.00	0.00
24.20	0.75	0.49	1.54	0.00	0.00	0.00
24.25	0.75	0.49	1.54	0.00	0.00	0.00
24.30	0.75	0.49	1.54	0.00	0.00	0.00
24.35	0.75	0.49	1.54	0.00	0.00	0.00
24.40	0.75	0.49	1.53	0.00	0.00	0.00
24.45	0.75	0.49	1.53	0.00	0.00	0.00
24.50	0.75	0.49	1.53	0.00	0.00	0.00
24.55	0.75	0.49	1.53	0.00	0.00	0.00
24.60	0.75	0.49	1.53	0.00	0.00	0.00
24.65	0.75	0.49	1.53	0.00	0.00	0.00
24.70	0.75	0.49	1.53	0.00	0.00	0.00
24.75	0.75	0.49	1.52	0.00	0.00	0.00
24.80	0.75	0.49	1.52	0.00	0.00	0.00
24.85	0.75	0.49	1.52	0.00	0.00	0.00
24.90	0.75	0.49	1.52	0.00	0.00	0.00
24.95	0.75	0.49	1.52	0.00	0.00	0.00
25.00	0.75	0.49	1.52	0.00	0.00	0.00
25.05	0.75	0.49	1.52	0.00	0.00	0.00
25.10	0.75	0.50	1.52	0.00	0.00	0.00
25.15	0.75	0.50	1.51	0.00	0.00	0.00
25.20	0.75	0.50	1.51	0.00	0.00	0.00
25.25	0.75	0.50	1.51	0.00	0.00	0.00

25.30	0.75	0.50	1.51	0.00	0.00	0.00
25.35	0.75	0.50	1.51	0.00	0.00	0.00
25.40	0.75	0.50	1.51	0.00	0.00	0.00
25.45	0.75	0.50	1.51	0.00	0.00	0.00
25.50	0.75	0.50	1.51	0.00	0.00	0.00
25.55	0.75	0.50	1.50	0.00	0.00	0.00
25.60	0.75	0.50	1.50	0.00	0.00	0.00
25.65	0.75	0.50	1.50	0.00	0.00	0.00
25.70	0.75	0.50	1.50	0.00	0.00	0.00
25.75	0.75	0.50	1.50	0.00	0.00	0.00
25.80	0.75	0.50	1.50	0.00	0.00	0.00
25.85	0.75	0.50	1.50	0.00	0.00	0.00
25.90	0.75	0.50	1.50	0.00	0.00	0.00
25.95	0.75	0.50	1.49	0.00	0.00	0.00
26.00	0.75	0.50	1.49	0.00	0.00	0.00
26.05	0.75	0.50	1.49	0.00	0.00	0.00
26.10	0.75	0.50	1.49	0.00	0.00	0.00
26.15	0.75	0.50	1.49	0.00	0.00	0.00
26.20	0.75	0.50	1.49	0.00	0.00	0.00
26.25	0.75	0.50	1.49	0.00	0.00	0.00
26.30	0.75	0.50	1.49	0.00	0.00	0.00
26.35	0.75	0.50	1.49	0.00	0.00	0.00
26.40	0.75	0.51	1.48	0.00	0.00	0.00
26.45	0.75	0.51	1.48	0.00	0.00	0.00
26.50	0.75	0.51	1.48	0.00	0.00	0.00
26.55	0.75	0.51	1.48	0.00	0.00	0.00
26.60	0.75	0.51	1.48	0.00	0.00	0.00
26.65	0.75	0.51	1.48	0.00	0.00	0.00
26.70	0.75	0.51	1.48	0.00	0.00	0.00
26.75	0.75	0.51	1.48	0.00	0.00	0.00
26.80	0.75	0.51	1.48	0.00	0.00	0.00
26.85	0.75	0.51	1.48	0.00	0.00	0.00
26.90	0.75	0.51	1.47	0.00	0.00	0.00
26.95	0.75	0.51	1.47	0.00	0.00	0.00
27.00	0.75	0.51	1.47	0.00	0.00	0.00
27.05	0.75	0.51	1.47	0.00	0.00	0.00
27.10	0.75	0.51	1.47	0.00	0.00	0.00
27.15	0.75	0.51	1.47	0.00	0.00	0.00
27.20	0.75	0.51	1.47	0.00	0.00	0.00
27.25	0.75	0.51	1.47	0.00	0.00	0.00
27.30	0.75	0.51	1.47	0.00	0.00	0.00
27.35	0.75	0.51	1.47	0.00	0.00	0.00
27.40	0.75	0.51	1.46	0.00	0.00	0.00
27.45	0.75	0.51	1.46	0.00	0.00	0.00
27.50	0.75	0.51	1.46	0.00	0.00	0.00
27.55	0.75	0.51	1.46	0.00	0.00	0.00
27.60	0.75	0.51	1.46	0.00	0.00	0.00
27.65	0.75	0.51	1.46	0.00	0.00	0.00
27.70	0.75	0.51	1.46	0.00	0.00	0.00
27.75	0.75	0.51	1.46	0.00	0.00	0.00
27.80	0.75	0.52	1.46	0.00	0.00	0.00
27.85	0.75	0.52	1.46	0.00	0.00	0.00
27.90	0.75	0.52	1.45	0.00	0.00	0.00
27.95	0.75	0.52	1.45	0.00	0.00	0.00
28.00	0.75	0.52	1.45	0.00	0.00	0.00
28.05	0.75	0.52	1.45	0.00	0.00	0.00
28.10	0.75	0.52	1.45	0.00	0.00	0.00
28.15	0.75	0.52	1.45	0.00	0.00	0.00
28.20	0.75	0.52	1.45	0.00	0.00	0.00

28.25	0.75	0.52	1.45	0.00	0.00	0.00
28.30	0.75	0.52	1.45	0.00	0.00	0.00
28.35	0.75	0.52	1.45	0.00	0.00	0.00
28.40	0.75	0.52	1.45	0.00	0.00	0.00
28.45	0.75	0.52	1.44	0.00	0.00	0.00
28.50	0.75	0.52	1.44	0.00	0.00	0.00
28.55	0.75	0.52	1.44	0.00	0.00	0.00
28.60	0.75	0.52	1.44	0.00	0.00	0.00
28.65	0.75	0.52	1.44	0.00	0.00	0.00
28.70	0.75	0.52	1.44	0.00	0.00	0.00
28.75	0.75	0.52	1.44	0.00	0.00	0.00
28.80	0.75	0.52	1.44	0.00	0.00	0.00
28.85	0.75	0.52	1.44	0.00	0.00	0.00
28.90	0.75	0.52	1.44	0.00	0.00	0.00
28.95	0.75	0.52	1.44	0.00	0.00	0.00
29.00	0.75	0.52	1.43	0.00	0.00	0.00
29.05	0.75	0.52	1.43	0.00	0.00	0.00
29.10	0.75	0.52	1.43	0.00	0.00	0.00
29.15	0.75	0.52	1.43	0.00	0.00	0.00
29.20	0.75	0.52	1.43	0.00	0.00	0.00
29.25	0.75	0.52	1.43	0.00	0.00	0.00
29.30	0.75	0.52	1.43	0.00	0.00	0.00
29.35	0.75	0.53	1.43	0.00	0.00	0.00
29.40	0.75	0.53	1.43	0.00	0.00	0.00
29.45	0.75	0.53	1.43	0.00	0.00	0.00
29.50	0.75	0.53	1.43	0.00	0.00	0.00
29.55	0.75	0.53	1.43	0.00	0.00	0.00
29.60	0.75	0.53	1.42	0.00	0.00	0.00
29.65	0.75	0.53	1.42	0.00	0.00	0.00
29.70	0.75	0.53	1.42	0.00	0.00	0.00
29.75	0.75	0.53	1.42	0.00	0.00	0.00
29.80	0.75	0.53	1.42	0.00	0.00	0.00
29.85	0.75	0.53	1.42	0.00	0.00	0.00
29.90	0.75	0.53	1.42	0.00	0.00	0.00
29.95	0.75	0.53	1.42	0.00	0.00	0.00
30.00	0.75	0.53	1.42	0.00	0.00	0.00
30.05	0.75	0.53	1.42	0.00	0.00	0.00
30.10	0.75	0.53	1.42	0.00	0.00	0.00
30.15	0.75	0.53	1.42	0.00	0.00	0.00
30.20	0.75	0.53	1.42	0.00	0.00	0.00
30.25	0.75	0.53	1.42	0.00	0.00	0.00
30.30	0.75	0.53	1.42	0.00	0.00	0.00
30.35	0.75	0.53	1.42	0.00	0.00	0.00
30.40	0.75	0.53	1.42	0.00	0.00	0.00
30.45	0.75	0.53	1.42	0.00	0.00	0.00
30.50	0.75	0.53	1.41	0.00	0.00	0.00
30.55	0.75	0.53	1.41	0.00	0.00	0.00
30.60	0.75	0.53	1.41	0.00	0.00	0.00
30.65	0.75	0.53	1.41	0.00	0.00	0.00
30.70	0.75	0.53	1.41	0.00	0.00	0.00
30.75	0.75	0.53	1.41	0.00	0.00	0.00
30.80	0.75	0.53	1.41	0.00	0.00	0.00
30.85	0.75	0.53	1.41	0.00	0.00	0.00
30.90	0.75	0.53	1.41	0.00	0.00	0.00
30.95	0.75	0.53	1.41	0.00	0.00	0.00
31.00	0.75	0.53	1.41	0.00	0.00	0.00
31.05	0.75	0.53	1.41	0.00	0.00	0.00
31.10	0.75	0.53	1.41	0.00	0.00	0.00
31.15	0.75	0.53	1.41	0.00	0.00	0.00

31.20	0.75	0.53	1.41	0.00	0.00	0.00
31.25	0.75	0.53	1.41	0.00	0.00	0.00
31.30	0.75	0.53	1.41	0.00	0.00	0.00
31.35	0.75	0.53	1.41	0.00	0.00	0.00
31.40	0.75	0.53	1.41	0.00	0.00	0.00
31.45	0.75	0.53	1.41	0.00	0.00	0.00
31.50	0.75	0.53	1.41	0.00	0.00	0.00
31.55	0.75	0.53	1.41	0.00	0.00	0.00
31.60	0.75	0.53	1.41	0.00	0.00	0.00
31.65	0.75	0.53	1.41	0.00	0.00	0.00
31.70	0.75	0.53	1.41	0.00	0.00	0.00
31.75	0.75	0.53	1.41	0.00	0.00	0.00
31.80	0.75	0.53	1.41	0.00	0.00	0.00
31.85	0.75	0.53	1.41	0.00	0.00	0.00
31.90	0.75	0.53	1.41	0.00	0.00	0.00
31.95	0.75	0.53	1.41	0.00	0.00	0.00
32.00	0.75	0.53	1.41	0.00	0.00	0.00
32.05	0.75	0.53	1.41	0.00	0.00	0.00
32.10	0.75	0.53	1.41	0.00	0.00	0.00
32.15	0.75	0.53	1.41	0.00	0.00	0.00
32.20	0.75	0.53	1.41	0.00	0.00	0.00
32.25	0.75	0.53	1.41	0.00	0.00	0.00
32.30	0.75	0.53	1.40	0.00	0.00	0.00
32.35	0.75	0.53	1.40	0.00	0.00	0.00
32.40	0.75	0.53	1.40	0.00	0.00	0.00
32.45	0.75	0.53	1.40	0.00	0.00	0.00
32.50	0.75	0.53	1.40	0.00	0.00	0.00
32.55	0.75	0.53	1.40	0.00	0.00	0.00
32.60	0.75	0.53	1.40	0.00	0.00	0.00
32.65	0.75	0.53	1.40	0.00	0.00	0.00
32.70	0.75	0.53	1.40	0.00	0.00	0.00
32.75	0.75	0.53	1.40	0.00	0.00	0.00
32.80	0.75	0.53	1.40	0.00	0.00	0.00
32.85	0.75	0.53	1.40	0.00	0.00	0.00
32.90	0.75	0.53	1.40	0.00	0.00	0.00
32.95	0.75	0.53	1.40	0.00	0.00	0.00
33.00	0.75	0.54	1.40	0.00	0.00	0.00
33.05	0.75	0.54	1.40	0.00	0.00	0.00
33.10	0.75	0.54	1.40	0.00	0.00	0.00
33.15	0.75	0.54	1.40	0.00	0.00	0.00
33.20	0.75	0.54	1.40	0.00	0.00	0.00
33.25	0.75	0.54	1.40	0.00	0.00	0.00
33.30	0.75	0.54	1.40	0.00	0.00	0.00
33.35	0.75	0.54	1.40	0.00	0.00	0.00
33.40	0.75	0.54	1.40	0.00	0.00	0.00
33.45	0.75	0.54	1.40	0.00	0.00	0.00
33.50	0.75	0.54	1.40	0.00	0.00	0.00
33.55	0.75	0.54	1.40	0.00	0.00	0.00
33.60	0.75	0.54	1.40	0.00	0.00	0.00
33.65	0.75	0.54	1.40	0.00	0.00	0.00
33.70	0.75	0.54	1.40	0.00	0.00	0.00
33.75	0.75	0.54	1.40	0.00	0.00	0.00
33.80	0.75	0.54	1.40	0.00	0.00	0.00
33.85	0.75	0.54	1.40	0.00	0.00	0.00
33.90	0.75	0.54	1.40	0.00	0.00	0.00
33.95	0.75	0.54	1.40	0.00	0.00	0.00
34.00	0.75	0.54	1.40	0.00	0.00	0.00
34.05	0.75	0.54	1.40	0.00	0.00	0.00
34.10	0.75	0.54	1.40	0.00	0.00	0.00

34.15	0.75	0.54	1.40	0.00	0.00	0.00
34.20	0.75	0.54	1.40	0.00	0.00	0.00
34.25	0.75	0.54	1.40	0.00	0.00	0.00
34.30	0.75	0.54	1.40	0.00	0.00	0.00
34.35	0.75	0.54	1.40	0.00	0.00	0.00
34.40	0.75	0.54	1.40	0.00	0.00	0.00
34.45	0.75	0.54	1.40	0.00	0.00	0.00
34.50	0.75	0.54	1.40	0.00	0.00	0.00
34.55	0.75	0.54	1.40	0.00	0.00	0.00
34.60	0.75	0.54	1.40	0.00	0.00	0.00
34.65	0.75	0.54	1.40	0.00	0.00	0.00
34.70	0.75	0.54	1.40	0.00	0.00	0.00
34.75	0.75	0.54	1.40	0.00	0.00	0.00
34.80	0.75	0.54	1.40	0.00	0.00	0.00
34.85	0.75	0.54	1.40	0.00	0.00	0.00
34.90	0.75	0.54	1.40	0.00	0.00	0.00
34.95	0.75	0.54	1.40	0.00	0.00	0.00
35.00	0.75	0.54	1.40	0.00	0.00	0.00
35.05	0.75	0.54	1.40	0.00	0.00	0.00
35.10	0.75	0.54	1.40	0.00	0.00	0.00
35.15	0.75	0.54	1.40	0.00	0.00	0.00
35.20	0.75	0.54	1.40	0.00	0.00	0.00
35.25	0.75	0.54	1.40	0.00	0.00	0.00
35.30	0.75	0.54	1.40	0.00	0.00	0.00
35.35	0.75	0.54	1.40	0.00	0.00	0.00
35.40	0.75	0.54	1.40	0.00	0.00	0.00
35.45	0.75	0.54	1.40	0.00	0.00	0.00
35.50	0.75	0.54	1.40	0.00	0.00	0.00
35.55	0.75	0.54	1.40	0.00	0.00	0.00
35.60	0.75	0.54	1.40	0.00	0.00	0.00
35.65	0.75	0.54	1.40	0.00	0.00	0.00
35.70	0.75	0.54	1.40	0.00	0.00	0.00
35.75	0.75	0.54	1.40	0.00	0.00	0.00
35.80	0.75	0.54	1.40	0.00	0.00	0.00
35.85	0.75	0.54	1.40	0.00	0.00	0.00
35.90	0.75	0.54	1.40	0.00	0.00	0.00
35.95	0.75	0.54	1.40	0.00	0.00	0.00
36.00	0.75	0.54	1.40	0.00	0.00	0.00
36.05	0.75	0.54	1.40	0.00	0.00	0.00
36.10	0.75	0.54	1.40	0.00	0.00	0.00
36.15	0.75	0.54	1.40	0.00	0.00	0.00
36.20	0.75	0.54	1.40	0.00	0.00	0.00
36.25	0.75	0.54	1.40	0.00	0.00	0.00
36.30	0.75	0.54	1.40	0.00	0.00	0.00
36.35	0.75	0.54	1.40	0.00	0.00	0.00
36.40	0.75	0.54	1.39	0.00	0.00	0.00
36.45	0.75	0.54	1.39	0.00	0.00	0.00
36.50	0.75	0.54	1.39	0.00	0.00	0.00
36.55	0.75	0.54	1.39	0.00	0.00	0.00
36.60	0.75	0.54	1.39	0.00	0.00	0.00
36.65	0.75	0.54	1.39	0.00	0.00	0.00
36.70	0.75	0.54	1.39	0.00	0.00	0.00
36.75	0.75	0.54	1.39	0.00	0.00	0.00
36.80	0.75	0.54	1.39	0.00	0.00	0.00
36.85	0.75	0.54	1.39	0.00	0.00	0.00
36.90	0.75	0.54	1.39	0.00	0.00	0.00
36.95	0.75	0.54	1.39	0.00	0.00	0.00
37.00	0.75	0.54	1.39	0.00	0.00	0.00
37.05	0.75	0.54	1.39	0.00	0.00	0.00

37.10	0.75	0.54	1.39	0.00	0.00	0.00
37.15	0.75	0.54	1.39	0.00	0.00	0.00
37.20	0.75	0.54	1.39	0.00	0.00	0.00
37.25	0.75	0.54	1.39	0.00	0.00	0.00
37.30	0.75	0.54	1.39	0.00	0.00	0.00
37.35	0.75	0.54	1.39	0.00	0.00	0.00
37.40	0.75	0.54	1.39	0.00	0.00	0.00
37.45	0.75	0.54	1.39	0.00	0.00	0.00
37.50	0.75	0.54	1.39	0.00	0.00	0.00
37.55	0.75	0.54	1.39	0.00	0.00	0.00
37.60	0.75	0.54	1.39	0.00	0.00	0.00
37.65	0.75	0.54	1.39	0.00	0.00	0.00
37.70	0.75	0.54	1.39	0.00	0.00	0.00
37.75	0.75	0.54	1.39	0.00	0.00	0.00
37.80	0.75	0.54	1.40	0.00	0.00	0.00
37.85	0.75	0.54	1.40	0.00	0.00	0.00
37.90	0.75	0.54	1.40	0.00	0.00	0.00
37.95	0.75	0.54	1.40	0.00	0.00	0.00
38.00	0.75	0.54	1.40	0.00	0.00	0.00
38.05	0.75	0.54	1.40	0.00	0.00	0.00
38.10	0.75	0.54	1.40	0.00	0.00	0.00
38.15	0.75	0.54	1.40	0.00	0.00	0.00
38.20	0.75	0.54	1.40	0.00	0.00	0.00
38.25	0.75	0.54	1.40	0.00	0.00	0.00
38.30	0.75	0.54	1.40	0.00	0.00	0.00
38.35	0.75	0.54	1.40	0.00	0.00	0.00
38.40	0.75	0.54	1.40	0.00	0.00	0.00
38.45	0.75	0.54	1.40	0.00	0.00	0.00
38.50	0.75	0.54	1.40	0.00	0.00	0.00
38.55	0.75	0.54	1.40	0.00	0.00	0.00
38.60	0.75	0.54	1.40	0.00	0.00	0.00
38.65	0.75	0.54	1.40	0.00	0.00	0.00
38.70	0.75	0.54	1.40	0.00	0.00	0.00
38.75	0.75	0.54	1.40	0.00	0.00	0.00
38.80	0.75	0.54	1.40	0.00	0.00	0.00
38.85	0.75	0.54	1.40	0.00	0.00	0.00
38.90	0.75	0.54	1.40	0.00	0.00	0.00
38.95	0.75	0.54	1.40	0.00	0.00	0.00
39.00	0.75	0.54	1.40	0.00	0.00	0.00
39.05	0.75	0.54	1.40	0.00	0.00	0.00
39.10	0.75	0.54	1.40	0.00	0.00	0.00
39.15	0.75	0.54	1.40	0.00	0.00	0.00
39.20	0.75	0.54	1.40	0.00	0.00	0.00
39.25	0.75	0.54	1.40	0.00	0.00	0.00
39.30	0.75	0.54	1.40	0.00	0.00	0.00
39.35	0.75	0.54	1.40	0.00	0.00	0.00
39.40	0.75	0.54	1.40	0.00	0.00	0.00
39.45	0.75	0.54	1.40	0.00	0.00	0.00
39.50	0.75	0.54	1.40	0.00	0.00	0.00
39.55	0.75	0.54	1.40	0.00	0.00	0.00
39.60	0.75	0.54	1.40	0.00	0.00	0.00
39.65	0.75	0.54	1.40	0.00	0.00	0.00
39.70	0.75	0.54	1.40	0.00	0.00	0.00
39.75	0.75	0.54	1.40	0.00	0.00	0.00
39.80	0.75	0.54	1.40	0.00	0.00	0.00
39.85	0.75	0.54	1.40	0.00	0.00	0.00
39.90	0.75	0.54	1.40	0.00	0.00	0.00
39.95	0.75	0.54	1.40	0.00	0.00	0.00
40.00	0.75	0.54	1.40	0.00	0.00	0.00

40.05	0.75	0.54	1.40	0.00	0.00	0.00
40.10	0.75	0.54	1.40	0.00	0.00	0.00
40.15	0.75	0.54	1.40	0.00	0.00	0.00
40.20	0.75	0.54	1.40	0.00	0.00	0.00
40.25	0.75	0.54	1.40	0.00	0.00	0.00
40.30	0.75	0.54	1.40	0.00	0.00	0.00
40.35	0.75	0.54	1.40	0.00	0.00	0.00
40.40	0.75	0.54	1.40	0.00	0.00	0.00
40.45	0.75	0.54	1.40	0.00	0.00	0.00
40.50	0.75	0.54	1.40	0.00	0.00	0.00
40.55	0.75	0.54	1.40	0.00	0.00	0.00
40.60	0.75	0.54	1.40	0.00	0.00	0.00
40.65	0.75	0.54	1.40	0.00	0.00	0.00
40.70	0.75	0.54	1.40	0.00	0.00	0.00
40.75	0.75	0.54	1.40	0.00	0.00	0.00
40.80	0.75	0.54	1.40	0.00	0.00	0.00
40.85	0.75	0.54	1.40	0.00	0.00	0.00
40.90	0.75	0.54	1.40	0.00	0.00	0.00
40.95	0.75	0.54	1.40	0.00	0.00	0.00
41.00	0.75	0.54	1.40	0.00	0.00	0.00
41.05	0.75	0.54	1.40	0.00	0.00	0.00
41.10	0.75	0.54	1.40	0.00	0.00	0.00
41.15	0.75	0.54	1.40	0.00	0.00	0.00
41.20	0.75	0.54	1.40	0.00	0.00	0.00
41.25	0.75	0.54	1.41	0.00	0.00	0.00
41.30	0.75	0.54	1.41	0.00	0.00	0.00
41.35	0.75	0.54	1.41	0.00	0.00	0.00
41.40	0.75	0.54	1.41	0.00	0.00	0.00
41.45	0.75	0.54	1.41	0.00	0.00	0.00
41.50	0.75	0.54	1.41	0.00	0.00	0.00
41.55	0.75	0.54	1.41	0.00	0.00	0.00
41.60	0.75	0.54	1.41	0.00	0.00	0.00
41.65	0.75	0.54	1.41	0.00	0.00	0.00
41.70	0.75	0.54	1.41	0.00	0.00	0.00
41.75	0.75	0.53	1.41	0.00	0.00	0.00
41.80	0.75	0.53	1.41	0.00	0.00	0.00
41.85	0.75	0.53	1.41	0.00	0.00	0.00
41.90	0.75	0.53	1.41	0.00	0.00	0.00
41.95	0.75	0.53	1.41	0.00	0.00	0.00
42.00	0.75	0.53	1.41	0.00	0.00	0.00
42.05	0.75	0.53	1.41	0.00	0.00	0.00
42.10	0.75	0.53	1.41	0.00	0.00	0.00
42.15	0.75	0.53	1.41	0.00	0.00	0.00
42.20	0.75	0.53	1.41	0.00	0.00	0.00
42.25	0.75	0.53	1.41	0.00	0.00	0.00
42.30	0.75	0.53	1.41	0.00	0.00	0.00
42.35	0.75	0.53	1.41	0.00	0.00	0.00
42.40	0.75	0.53	1.41	0.00	0.00	0.00
42.45	0.75	0.53	1.41	0.00	0.00	0.00
42.50	0.75	0.53	1.41	0.00	0.00	0.00
42.55	0.75	0.53	1.41	0.00	0.00	0.00
42.60	0.75	0.53	1.41	0.00	0.00	0.00
42.65	0.75	0.53	1.41	0.00	0.00	0.00
42.70	0.75	0.53	1.41	0.00	0.00	0.00
42.75	0.75	0.53	1.41	0.00	0.00	0.00
42.80	0.75	0.53	1.41	0.00	0.00	0.00
42.85	0.75	0.53	1.41	0.00	0.00	0.00
42.90	0.75	0.53	1.41	0.00	0.00	0.00
42.95	0.75	0.53	1.41	0.00	0.00	0.00

43.00	0.75	0.53	1.41	0.00	0.00	0.00
43.05	0.75	0.53	1.41	0.00	0.00	0.00
43.10	0.75	0.53	1.41	0.00	0.00	0.00
43.15	0.75	0.53	1.41	0.00	0.00	0.00
43.20	0.75	0.53	1.41	0.00	0.00	0.00
43.25	0.75	0.53	1.41	0.00	0.00	0.00
43.30	0.75	0.53	1.41	0.00	0.00	0.00
43.35	0.75	0.53	1.41	0.00	0.00	0.00
43.40	0.75	0.53	1.41	0.00	0.00	0.00
43.45	0.75	0.53	1.41	0.00	0.00	0.00
43.50	0.75	0.53	1.41	0.00	0.00	0.00
43.55	0.75	0.53	1.41	0.00	0.00	0.00
43.60	0.75	0.53	1.41	0.00	0.00	0.00
43.65	0.75	0.53	1.41	0.00	0.00	0.00
43.70	0.75	0.53	1.41	0.00	0.00	0.00
43.75	0.75	0.53	1.41	0.00	0.00	0.00
43.80	0.75	0.53	1.41	0.00	0.00	0.00
43.85	0.75	0.53	1.41	0.00	0.00	0.00
43.90	0.75	0.53	1.41	0.00	0.00	0.00
43.95	0.75	0.53	1.41	0.00	0.00	0.00
44.00	0.75	0.53	1.41	0.00	0.00	0.00
44.05	0.75	0.53	1.41	0.00	0.00	0.00
44.10	0.75	0.53	1.41	0.00	0.00	0.00
44.15	0.75	0.53	1.41	0.00	0.00	0.00
44.20	0.75	0.53	1.41	0.00	0.00	0.00
44.25	0.75	0.53	1.41	0.00	0.00	0.00
44.30	0.75	0.53	1.41	0.00	0.00	0.00
44.35	0.75	0.53	1.41	0.00	0.00	0.00
44.40	0.75	0.53	1.41	0.00	0.00	0.00
44.45	0.75	0.53	1.41	0.00	0.00	0.00
44.50	0.75	0.53	1.41	0.00	0.00	0.00
44.55	0.75	0.53	1.41	0.00	0.00	0.00
44.60	0.75	0.53	1.41	0.00	0.00	0.00
44.65	0.75	0.53	1.41	0.00	0.00	0.00
44.70	0.75	0.53	1.41	0.00	0.00	0.00
44.75	0.75	0.53	1.41	0.00	0.00	0.00
44.80	0.75	0.53	1.41	0.00	0.00	0.00
44.85	0.75	0.53	1.41	0.00	0.00	0.00
44.90	0.75	0.53	1.41	0.00	0.00	0.00
44.95	0.75	0.53	1.41	0.00	0.00	0.00
45.00	0.75	0.53	1.41	0.00	0.00	0.00
45.05	0.75	0.53	1.41	0.00	0.00	0.00
45.10	0.75	0.53	1.41	0.00	0.00	0.00
45.15	0.75	0.53	1.41	0.00	0.00	0.00
45.20	0.75	0.53	1.41	0.00	0.00	0.00
45.25	0.75	0.53	1.41	0.00	0.00	0.00
45.30	0.75	0.53	1.41	0.00	0.00	0.00
45.35	0.75	0.53	1.41	0.00	0.00	0.00
45.40	0.75	0.53	1.41	0.00	0.00	0.00
45.45	0.75	0.53	1.41	0.00	0.00	0.00
45.50	0.75	0.53	1.41	0.00	0.00	0.00
45.55	0.75	0.53	1.41	0.00	0.00	0.00
45.60	0.75	0.53	1.41	0.00	0.00	0.00
45.65	0.75	0.53	1.41	0.00	0.00	0.00
45.70	0.75	0.53	1.41	0.00	0.00	0.00
45.75	0.75	0.53	1.41	0.00	0.00	0.00
45.80	0.75	0.53	1.41	0.00	0.00	0.00
45.85	0.75	0.53	1.41	0.00	0.00	0.00
45.90	0.75	0.53	1.41	0.00	0.00	0.00

45.95	0.75	0.53	1.41	0.00	0.00	0.00
46.00	0.75	0.53	1.41	0.00	0.00	0.00
46.05	0.75	0.53	1.41	0.00	0.00	0.00
46.10	0.75	0.53	1.41	0.00	0.00	0.00
46.15	0.75	0.53	1.41	0.00	0.00	0.00
46.20	0.75	0.53	1.41	0.00	0.00	0.00
46.25	0.75	0.53	1.41	0.00	0.00	0.00
46.30	0.75	0.53	1.41	0.00	0.00	0.00
46.35	0.75	0.53	1.41	0.00	0.00	0.00
46.40	0.75	0.53	1.41	0.00	0.00	0.00
46.45	0.75	0.53	1.41	0.00	0.00	0.00
46.50	0.75	0.53	1.41	0.00	0.00	0.00
46.55	0.75	0.53	1.41	0.00	0.00	0.00
46.60	0.75	0.53	1.41	0.00	0.00	0.00
46.65	0.75	0.53	1.42	0.00	0.00	0.00
46.70	0.75	0.53	1.42	0.00	0.00	0.00
46.75	0.75	0.53	1.42	0.00	0.00	0.00
46.80	0.75	0.53	1.42	0.00	0.00	0.00
46.85	0.75	0.53	1.42	0.00	0.00	0.00
46.90	0.74	0.53	1.42	0.00	0.00	0.00
46.95	0.74	0.53	1.42	0.00	0.00	0.00
47.00	0.74	0.53	1.42	0.00	0.00	0.00
47.05	0.74	0.53	1.42	0.00	0.00	0.00
47.10	0.74	0.53	1.42	0.00	0.00	0.00
47.15	0.74	0.53	1.42	0.00	0.00	0.00
47.20	0.74	0.53	1.42	0.00	0.00	0.00
47.25	0.74	0.53	1.42	0.00	0.00	0.00
47.30	0.74	0.53	1.42	0.00	0.00	0.00
47.35	0.74	0.53	1.42	0.00	0.00	0.00
47.40	0.74	0.53	1.42	0.00	0.00	0.00
47.45	0.74	0.52	1.42	0.00	0.00	0.00
47.50	0.74	0.52	1.42	0.00	0.00	0.00
47.55	0.74	0.52	1.42	0.00	0.00	0.00
47.60	0.74	0.52	1.42	0.00	0.00	0.00
47.65	0.74	0.52	1.42	0.00	0.00	0.00
47.70	0.74	0.52	1.42	0.00	0.00	0.00
47.75	0.74	0.52	1.42	0.00	0.00	0.00
47.80	0.74	0.52	1.42	0.00	0.00	0.00
47.85	0.74	0.52	1.42	0.00	0.00	0.00
47.90	0.74	0.52	1.42	0.00	0.00	0.00
47.95	0.74	0.52	1.42	0.00	0.00	0.00
48.00	0.74	0.52	1.42	0.00	0.00	0.00
48.05	0.74	0.52	1.42	0.00	0.00	0.00
48.10	0.74	0.52	1.42	0.00	0.00	0.00
48.15	0.74	0.52	1.42	0.00	0.00	0.00
48.20	0.74	0.52	1.42	0.00	0.00	0.00
48.25	0.74	0.52	1.42	0.00	0.00	0.00
48.30	0.74	0.52	1.42	0.00	0.00	0.00
48.35	0.74	0.52	1.42	0.00	0.00	0.00
48.40	0.74	0.52	1.42	0.00	0.00	0.00
48.45	0.74	0.52	1.42	0.00	0.00	0.00
48.50	0.74	0.52	1.42	0.00	0.00	0.00
48.55	0.74	0.52	1.42	0.00	0.00	0.00
48.60	0.74	0.52	1.42	0.00	0.00	0.00
48.65	0.74	0.52	1.42	0.00	0.00	0.00
48.70	0.74	0.52	1.42	0.00	0.00	0.00
48.75	0.74	0.52	1.42	0.00	0.00	0.00
48.80	0.74	0.52	1.42	0.00	0.00	0.00
48.85	0.74	0.52	1.42	0.00	0.00	0.00

48.90	0.74	0.52	1.42	0.00	0.00	0.00
48.95	0.74	0.52	1.42	0.00	0.00	0.00
49.00	0.74	0.52	1.42	0.00	0.00	0.00
49.05	0.74	0.52	1.42	0.00	0.00	0.00
49.10	0.74	0.52	1.42	0.00	0.00	0.00
49.15	0.74	0.52	1.42	0.00	0.00	0.00
49.20	0.74	0.52	1.42	0.00	0.00	0.00
49.25	0.74	0.52	1.42	0.00	0.00	0.00
49.30	0.74	0.52	1.42	0.00	0.00	0.00
49.35	0.74	0.52	1.42	0.00	0.00	0.00
49.40	0.74	0.52	1.42	0.00	0.00	0.00
49.45	0.74	0.52	1.42	0.00	0.00	0.00
49.50	0.74	0.52	1.42	0.00	0.00	0.00
49.55	0.74	0.52	1.42	0.00	0.00	0.00
49.60	0.74	0.52	1.42	0.00	0.00	0.00
49.65	0.74	0.52	1.42	0.00	0.00	0.00
49.70	0.74	0.52	1.42	0.00	0.00	0.00
49.75	0.74	0.52	1.43	0.00	0.00	0.00
49.80	0.74	0.52	1.43	0.00	0.00	0.00
49.85	0.74	0.52	1.43	0.00	0.00	0.00
49.90	0.74	0.52	1.43	0.00	0.00	0.00
49.95	0.74	0.52	1.43	0.00	0.00	0.00
50.00	0.74	0.52	1.43	0.00	0.00	0.00
50.05	0.74	0.52	1.43	0.00	0.00	0.00
50.10	0.74	0.52	1.43	0.00	0.00	0.00
50.15	0.74	0.52	1.43	0.00	0.00	0.00
50.20	0.74	0.52	1.43	0.00	0.00	0.00
50.25	0.74	0.52	1.43	0.00	0.00	0.00
50.30	0.74	0.52	1.43	0.00	0.00	0.00
50.35	0.74	0.52	1.43	0.00	0.00	0.00
50.40	0.74	0.52	1.43	0.00	0.00	0.00
50.45	0.74	0.52	1.43	0.00	0.00	0.00
50.50	0.74	0.52	1.43	0.00	0.00	0.00
50.55	0.74	0.52	1.43	0.00	0.00	0.00
50.60	0.74	0.52	1.43	0.00	0.00	0.00
50.65	0.74	0.52	1.43	0.00	0.00	0.00
50.70	0.74	0.52	1.43	0.00	0.00	0.00
50.75	0.74	0.52	1.43	0.00	0.00	0.00
50.80	0.74	0.52	1.43	0.00	0.00	0.00
50.85	0.74	0.52	1.43	0.00	0.00	0.00
50.90	0.74	0.52	1.43	0.00	0.00	0.00
50.95	0.74	0.52	1.43	0.00	0.00	0.00
51.00	0.74	0.52	1.43	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units:Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1 tsf (ton/ft2)

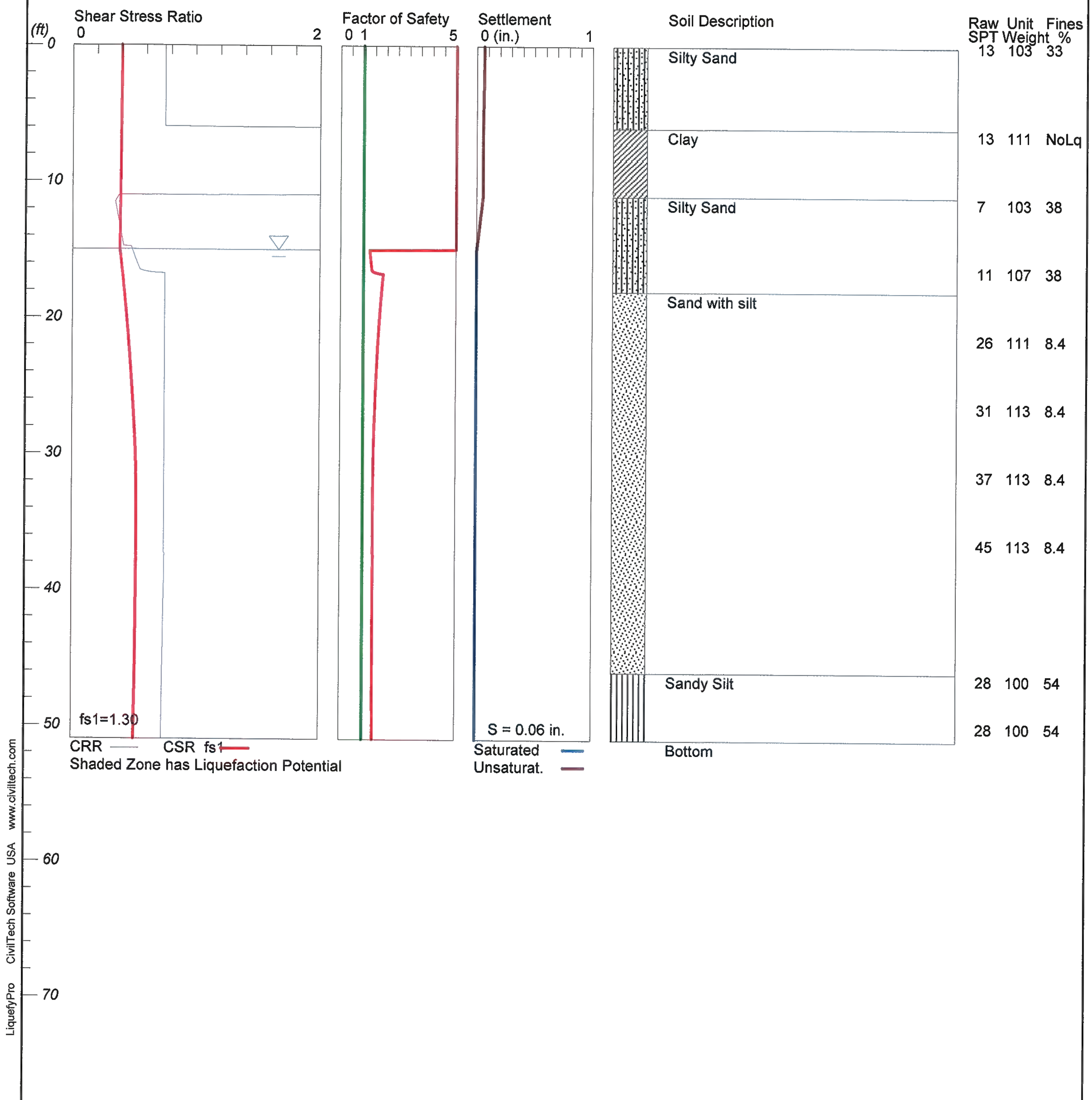
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS

17151 GUSD Crescent Elem

Hole No.=B-6 (2016)   Water Depth=15 ft

Magnitude=6.4
Acceleration=0.47g



```
*************************************************************************
                  ****************************
                  LIQUEFACTION ANALYSIS SUMMARY
                 Copyright by CivilTech Software
                        www.civiltech.com
*************************************************************************
                  ****************************
      Font: Courier New, Regular, Size 8 is recommended for this report.
      Licensed to SEI, 6/26/2019  4:16:46 PM

      Input File Name: O:\b. PROJECT FILES (ACTIVE)\17100-17199\17151
Greenfield USD Updates to Crescent Elem\Updated Geohaz Report for Cres
Elem West\17151 B6 crescent.liq
      Title:  17151 GUSD Crescent Elem
      Subtitle:  B6

      Surface Elev.=
      Hole No.=B-6 (2016)
      Depth of Hole= 51.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 24.00 ft
      Max. Acceleration= 0.47 g
      Earthquake Magnitude= 6.40

 Input Data:
      Surface Elev.=
      Hole No.=B-6 (2016)
      Depth of Hole=51.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 24.00 ft
      Max. Acceleration=0.47 g
      Earthquake Magnitude=6.40
      No-Liquefiable Soils:   CL, OL are Non-Liq. Soil

      1. SPT or BPT Calculation.
      2. Settlement Analysis Method: Tokimatsu, M-correction
      3. Fines Correction for Liquefaction: Idriss/Seed
      4. Fine Correction for Settlement: During Liquefaction*
      5. Settlement Calculation in: All zones*
      6. Hammer Energy Ratio,                                 Ce = 1.25
      7. Borehole Diameter,                                   Cb= 1.15
      8. Sampling Method,                                     Cs= 1.2
      9. User request factor of safety (apply to CSR) ,   User= 1.3
         Plot one CSR curve (fs1=User)
      10. Use Curve Smoothing: Yes*
      * Recommended Options
```

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	13.00	103.00	33.00
6.50	13.00	111.00	NoLiq
11.50	7.00	103.00	38.00
16.50	11.00	107.00	38.00
21.50	26.00	111.00	8.40
26.50	31.00	113.00	8.40
31.50	37.00	113.00	8.40
36.50	45.00	113.00	8.40
46.50	28.00	100.00	54.00
50.00	28.00	100.00	54.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.06 in.
Total Settlement of Saturated and Unsaturated Sands=0.06 in.
Differential Settlement=0.030 to 0.040 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.75	0.40	5.00	0.00	0.06	0.06
0.05	0.75	0.40	5.00	0.00	0.06	0.06
0.10	0.75	0.40	5.00	0.00	0.06	0.06
0.15	0.75	0.40	5.00	0.00	0.06	0.06
0.20	0.75	0.40	5.00	0.00	0.06	0.06
0.25	0.75	0.40	5.00	0.00	0.06	0.06
0.30	0.75	0.40	5.00	0.00	0.06	0.06
0.35	0.75	0.40	5.00	0.00	0.06	0.06
0.40	0.75	0.40	5.00	0.00	0.06	0.06
0.45	0.75	0.40	5.00	0.00	0.06	0.06
0.50	0.75	0.40	5.00	0.00	0.06	0.06
0.55	0.75	0.40	5.00	0.00	0.06	0.06
0.60	0.75	0.40	5.00	0.00	0.06	0.06
0.65	0.75	0.40	5.00	0.00	0.06	0.06
0.70	0.75	0.40	5.00	0.00	0.06	0.06
0.75	0.75	0.40	5.00	0.00	0.06	0.06
0.80	0.75	0.40	5.00	0.00	0.06	0.06
0.85	0.75	0.40	5.00	0.00	0.06	0.06
0.90	0.75	0.40	5.00	0.00	0.06	0.06
0.95	0.75	0.40	5.00	0.00	0.06	0.06
1.00	0.75	0.40	5.00	0.00	0.06	0.06
1.05	0.75	0.40	5.00	0.00	0.06	0.06
1.10	0.75	0.40	5.00	0.00	0.06	0.06
1.15	0.75	0.40	5.00	0.00	0.06	0.06
1.20	0.75	0.40	5.00	0.00	0.06	0.06
1.25	0.75	0.40	5.00	0.00	0.06	0.06
1.30	0.75	0.40	5.00	0.00	0.06	0.06
1.35	0.75	0.40	5.00	0.00	0.06	0.06
1.40	0.75	0.40	5.00	0.00	0.06	0.06
1.45	0.75	0.40	5.00	0.00	0.06	0.06
1.50	0.75	0.40	5.00	0.00	0.06	0.06
1.55	0.75	0.40	5.00	0.00	0.06	0.06
1.60	0.75	0.40	5.00	0.00	0.06	0.06
1.65	0.75	0.40	5.00	0.00	0.06	0.06

1.70	0.75	0.40	5.00	0.00	0.06	0.06
1.75	0.75	0.40	5.00	0.00	0.06	0.06
1.80	0.75	0.40	5.00	0.00	0.06	0.06
1.85	0.75	0.40	5.00	0.00	0.06	0.06
1.90	0.75	0.40	5.00	0.00	0.06	0.06
1.95	0.75	0.40	5.00	0.00	0.06	0.06
2.00	0.75	0.40	5.00	0.00	0.06	0.06
2.05	0.75	0.40	5.00	0.00	0.06	0.06
2.10	0.75	0.40	5.00	0.00	0.06	0.06
2.15	0.75	0.40	5.00	0.00	0.06	0.06
2.20	0.75	0.40	5.00	0.00	0.06	0.06
2.25	0.75	0.40	5.00	0.00	0.06	0.06
2.30	0.75	0.40	5.00	0.00	0.06	0.06
2.35	0.75	0.39	5.00	0.00	0.06	0.06
2.40	0.75	0.39	5.00	0.00	0.06	0.06
2.45	0.75	0.39	5.00	0.00	0.06	0.06
2.50	0.75	0.39	5.00	0.00	0.06	0.06
2.55	0.75	0.39	5.00	0.00	0.06	0.06
2.60	0.75	0.39	5.00	0.00	0.06	0.06
2.65	0.75	0.39	5.00	0.00	0.06	0.06
2.70	0.75	0.39	5.00	0.00	0.06	0.06
2.75	0.75	0.39	5.00	0.00	0.06	0.06
2.80	0.75	0.39	5.00	0.00	0.06	0.06
2.85	0.75	0.39	5.00	0.00	0.06	0.06
2.90	0.75	0.39	5.00	0.00	0.06	0.06
2.95	0.75	0.39	5.00	0.00	0.06	0.06
3.00	0.75	0.39	5.00	0.00	0.06	0.06
3.05	0.75	0.39	5.00	0.00	0.06	0.06
3.10	0.75	0.39	5.00	0.00	0.06	0.06
3.15	0.75	0.39	5.00	0.00	0.06	0.06
3.20	0.75	0.39	5.00	0.00	0.06	0.06
3.25	0.75	0.39	5.00	0.00	0.06	0.06
3.30	0.75	0.39	5.00	0.00	0.06	0.06
3.35	0.75	0.39	5.00	0.00	0.06	0.06
3.40	0.75	0.39	5.00	0.00	0.06	0.06
3.45	0.75	0.39	5.00	0.00	0.06	0.06
3.50	0.75	0.39	5.00	0.00	0.06	0.06
3.55	0.75	0.39	5.00	0.00	0.06	0.06
3.60	0.75	0.39	5.00	0.00	0.06	0.06
3.65	0.75	0.39	5.00	0.00	0.06	0.06
3.70	0.75	0.39	5.00	0.00	0.06	0.06
3.75	0.75	0.39	5.00	0.00	0.06	0.06
3.80	0.75	0.39	5.00	0.00	0.06	0.06
3.85	0.75	0.39	5.00	0.00	0.06	0.06
3.90	0.75	0.39	5.00	0.00	0.06	0.06
3.95	0.75	0.39	5.00	0.00	0.06	0.06
4.00	0.75	0.39	5.00	0.00	0.06	0.06
4.05	0.75	0.39	5.00	0.00	0.06	0.06
4.10	0.75	0.39	5.00	0.00	0.06	0.06
4.15	0.75	0.39	5.00	0.00	0.06	0.06
4.20	0.75	0.39	5.00	0.00	0.06	0.06
4.25	0.75	0.39	5.00	0.00	0.06	0.06
4.30	0.75	0.39	5.00	0.00	0.06	0.06
4.35	0.75	0.39	5.00	0.00	0.06	0.06
4.40	0.75	0.39	5.00	0.00	0.06	0.06
4.45	0.75	0.39	5.00	0.00	0.06	0.06
4.50	0.75	0.39	5.00	0.00	0.06	0.06
4.55	0.75	0.39	5.00	0.00	0.06	0.06
4.60	0.75	0.39	5.00	0.00	0.06	0.06

4.65	0.75	0.39	5.00	0.00	0.06	0.06
4.70	0.75	0.39	5.00	0.00	0.06	0.06
4.75	0.75	0.39	5.00	0.00	0.06	0.06
4.80	0.75	0.39	5.00	0.00	0.06	0.06
4.85	0.75	0.39	5.00	0.00	0.06	0.06
4.90	0.75	0.39	5.00	0.00	0.06	0.06
4.95	0.75	0.39	5.00	0.00	0.06	0.06
5.00	0.75	0.39	5.00	0.00	0.05	0.05
5.05	0.75	0.39	5.00	0.00	0.05	0.05
5.10	0.75	0.39	5.00	0.00	0.05	0.05
5.15	0.75	0.39	5.00	0.00	0.05	0.05
5.20	0.75	0.39	5.00	0.00	0.05	0.05
5.25	0.75	0.39	5.00	0.00	0.05	0.05
5.30	0.75	0.39	5.00	0.00	0.05	0.05
5.35	0.75	0.39	5.00	0.00	0.05	0.05
5.40	0.75	0.39	5.00	0.00	0.05	0.05
5.45	0.75	0.39	5.00	0.00	0.05	0.05
5.50	0.75	0.39	5.00	0.00	0.05	0.05
5.55	0.75	0.39	5.00	0.00	0.05	0.05
5.60	0.75	0.39	5.00	0.00	0.05	0.05
5.65	0.75	0.39	5.00	0.00	0.05	0.05
5.70	0.75	0.39	5.00	0.00	0.05	0.05
5.75	0.75	0.39	5.00	0.00	0.05	0.05
5.80	0.75	0.39	5.00	0.00	0.05	0.05
5.85	0.75	0.39	5.00	0.00	0.05	0.05
5.90	0.75	0.39	5.00	0.00	0.05	0.05
5.95	0.75	0.39	5.00	0.00	0.05	0.05
6.00	2.00	0.39	5.00	0.00	0.05	0.05
6.05	2.00	0.39	5.00	0.00	0.05	0.05
6.10	2.00	0.39	5.00	0.00	0.05	0.05
6.15	2.00	0.39	5.00	0.00	0.05	0.05
6.20	2.00	0.39	5.00	0.00	0.05	0.05
6.25	2.00	0.39	5.00	0.00	0.05	0.05
6.30	2.00	0.39	5.00	0.00	0.05	0.05
6.35	2.00	0.39	5.00	0.00	0.05	0.05
6.40	2.00	0.39	5.00	0.00	0.05	0.05
6.45	2.00	0.39	5.00	0.00	0.05	0.05
6.50	2.00	0.39	5.00	0.00	0.05	0.05
6.55	2.00	0.39	5.00	0.00	0.05	0.05
6.60	2.00	0.39	5.00	0.00	0.05	0.05
6.65	2.00	0.39	5.00	0.00	0.05	0.05
6.70	2.00	0.39	5.00	0.00	0.05	0.05
6.75	2.00	0.39	5.00	0.00	0.05	0.05
6.80	2.00	0.39	5.00	0.00	0.05	0.05
6.85	2.00	0.39	5.00	0.00	0.05	0.05
6.90	2.00	0.39	5.00	0.00	0.05	0.05
6.95	2.00	0.39	5.00	0.00	0.05	0.05
7.00	2.00	0.39	5.00	0.00	0.05	0.05
7.05	2.00	0.39	5.00	0.00	0.05	0.05
7.10	2.00	0.39	5.00	0.00	0.05	0.05
7.15	2.00	0.39	5.00	0.00	0.05	0.05
7.20	2.00	0.39	5.00	0.00	0.05	0.05
7.25	2.00	0.39	5.00	0.00	0.05	0.05
7.30	2.00	0.39	5.00	0.00	0.05	0.05
7.35	2.00	0.39	5.00	0.00	0.05	0.05
7.40	2.00	0.39	5.00	0.00	0.05	0.05
7.45	2.00	0.39	5.00	0.00	0.05	0.05
7.50	2.00	0.39	5.00	0.00	0.05	0.05
7.55	2.00	0.39	5.00	0.00	0.05	0.05

7.60	2.00	0.39	5.00	0.00	0.05	0.05
7.65	2.00	0.39	5.00	0.00	0.05	0.05
7.70	2.00	0.39	5.00	0.00	0.05	0.05
7.75	2.00	0.39	5.00	0.00	0.05	0.05
7.80	2.00	0.39	5.00	0.00	0.05	0.05
7.85	2.00	0.39	5.00	0.00	0.05	0.05
7.90	2.00	0.39	5.00	0.00	0.05	0.05
7.95	2.00	0.39	5.00	0.00	0.05	0.05
8.00	2.00	0.39	5.00	0.00	0.05	0.05
8.05	2.00	0.39	5.00	0.00	0.05	0.05
8.10	2.00	0.39	5.00	0.00	0.05	0.05
8.15	2.00	0.39	5.00	0.00	0.05	0.05
8.20	2.00	0.39	5.00	0.00	0.05	0.05
8.25	2.00	0.39	5.00	0.00	0.05	0.05
8.30	2.00	0.39	5.00	0.00	0.05	0.05
8.35	2.00	0.39	5.00	0.00	0.05	0.05
8.40	2.00	0.39	5.00	0.00	0.05	0.05
8.45	2.00	0.39	5.00	0.00	0.05	0.05
8.50	2.00	0.39	5.00	0.00	0.05	0.05
8.55	2.00	0.39	5.00	0.00	0.05	0.05
8.60	2.00	0.39	5.00	0.00	0.05	0.05
8.65	2.00	0.39	5.00	0.00	0.05	0.05
8.70	2.00	0.39	5.00	0.00	0.05	0.05
8.75	2.00	0.39	5.00	0.00	0.05	0.05
8.80	2.00	0.39	5.00	0.00	0.05	0.05
8.85	2.00	0.39	5.00	0.00	0.05	0.05
8.90	2.00	0.39	5.00	0.00	0.05	0.05
8.95	2.00	0.39	5.00	0.00	0.05	0.05
9.00	2.00	0.39	5.00	0.00	0.05	0.05
9.05	2.00	0.39	5.00	0.00	0.05	0.05
9.10	2.00	0.39	5.00	0.00	0.05	0.05
9.15	2.00	0.39	5.00	0.00	0.05	0.05
9.20	2.00	0.39	5.00	0.00	0.05	0.05
9.25	2.00	0.39	5.00	0.00	0.05	0.05
9.30	2.00	0.39	5.00	0.00	0.05	0.05
9.35	2.00	0.39	5.00	0.00	0.05	0.05
9.40	2.00	0.39	5.00	0.00	0.05	0.05
9.45	2.00	0.39	5.00	0.00	0.05	0.05
9.50	2.00	0.39	5.00	0.00	0.05	0.05
9.55	2.00	0.39	5.00	0.00	0.05	0.05
9.60	2.00	0.39	5.00	0.00	0.05	0.05
9.65	2.00	0.39	5.00	0.00	0.05	0.05
9.70	2.00	0.39	5.00	0.00	0.05	0.05
9.75	2.00	0.39	5.00	0.00	0.05	0.05
9.80	2.00	0.39	5.00	0.00	0.05	0.05
9.85	2.00	0.39	5.00	0.00	0.05	0.05
9.90	2.00	0.39	5.00	0.00	0.05	0.05
9.95	2.00	0.39	5.00	0.00	0.05	0.05
10.00	2.00	0.39	5.00	0.00	0.05	0.05
10.05	2.00	0.39	5.00	0.00	0.05	0.05
10.10	2.00	0.39	5.00	0.00	0.05	0.05
10.15	2.00	0.39	5.00	0.00	0.05	0.05
10.20	2.00	0.39	5.00	0.00	0.05	0.05
10.25	2.00	0.39	5.00	0.00	0.05	0.05
10.30	2.00	0.39	5.00	0.00	0.05	0.05
10.35	2.00	0.39	5.00	0.00	0.05	0.05
10.40	2.00	0.39	5.00	0.00	0.05	0.05
10.45	2.00	0.39	5.00	0.00	0.05	0.05
10.50	2.00	0.39	5.00	0.00	0.05	0.05

10.55	2.00	0.39	5.00	0.00	0.05	0.05
10.60	2.00	0.39	5.00	0.00	0.05	0.05
10.65	2.00	0.39	5.00	0.00	0.05	0.05
10.70	2.00	0.39	5.00	0.00	0.05	0.05
10.75	2.00	0.39	5.00	0.00	0.05	0.05
10.80	2.00	0.39	5.00	0.00	0.05	0.05
10.85	2.00	0.39	5.00	0.00	0.05	0.05
10.90	2.00	0.39	5.00	0.00	0.05	0.05
10.95	2.00	0.39	5.00	0.00	0.05	0.05
11.00	0.38	0.39	5.00	0.00	0.05	0.05
11.05	0.37	0.39	5.00	0.00	0.05	0.05
11.10	0.37	0.39	5.00	0.00	0.05	0.05
11.15	0.37	0.39	5.00	0.00	0.05	0.05
11.20	0.36	0.39	5.00	0.00	0.05	0.05
11.25	0.36	0.39	5.00	0.00	0.05	0.05
11.30	0.36	0.39	5.00	0.00	0.05	0.05
11.35	0.35	0.39	5.00	0.00	0.05	0.05
11.40	0.35	0.39	5.00	0.00	0.05	0.05
11.45	0.35	0.39	5.00	0.00	0.05	0.05
11.50	0.34	0.39	5.00	0.00	0.05	0.05
11.55	0.35	0.39	5.00	0.00	0.05	0.05
11.60	0.35	0.39	5.00	0.00	0.05	0.05
11.65	0.35	0.39	5.00	0.00	0.05	0.05
11.70	0.35	0.39	5.00	0.00	0.04	0.04
11.75	0.35	0.39	5.00	0.00	0.04	0.04
11.80	0.35	0.39	5.00	0.00	0.04	0.04
11.85	0.35	0.39	5.00	0.00	0.04	0.04
11.90	0.35	0.39	5.00	0.00	0.04	0.04
11.95	0.35	0.39	5.00	0.00	0.04	0.04
12.00	0.36	0.39	5.00	0.00	0.04	0.04
12.05	0.36	0.39	5.00	0.00	0.04	0.04
12.10	0.36	0.39	5.00	0.00	0.04	0.04
12.15	0.36	0.39	5.00	0.00	0.04	0.04
12.20	0.36	0.39	5.00	0.00	0.04	0.04
12.25	0.36	0.39	5.00	0.00	0.04	0.04
12.30	0.36	0.39	5.00	0.00	0.04	0.04
12.35	0.36	0.39	5.00	0.00	0.04	0.04
12.40	0.36	0.39	5.00	0.00	0.03	0.03
12.45	0.36	0.39	5.00	0.00	0.03	0.03
12.50	0.37	0.39	5.00	0.00	0.03	0.03
12.55	0.37	0.39	5.00	0.00	0.03	0.03
12.60	0.37	0.39	5.00	0.00	0.03	0.03
12.65	0.37	0.39	5.00	0.00	0.03	0.03
12.70	0.37	0.39	5.00	0.00	0.03	0.03
12.75	0.37	0.39	5.00	0.00	0.03	0.03
12.80	0.37	0.39	5.00	0.00	0.03	0.03
12.85	0.37	0.39	5.00	0.00	0.03	0.03
12.90	0.37	0.39	5.00	0.00	0.03	0.03
12.95	0.38	0.39	5.00	0.00	0.03	0.03
13.00	0.38	0.39	5.00	0.00	0.03	0.03
13.05	0.38	0.39	5.00	0.00	0.03	0.03
13.10	0.38	0.39	5.00	0.00	0.03	0.03
13.15	0.38	0.38	5.00	0.00	0.02	0.02
13.20	0.38	0.38	5.00	0.00	0.02	0.02
13.25	0.38	0.38	5.00	0.00	0.02	0.02
13.30	0.38	0.38	5.00	0.00	0.02	0.02
13.35	0.38	0.38	5.00	0.00	0.02	0.02
13.40	0.38	0.38	5.00	0.00	0.02	0.02
13.45	0.39	0.38	5.00	0.00	0.02	0.02

13.50	0.39	0.38	5.00	0.00	0.02	0.02
13.55	0.39	0.38	5.00	0.00	0.02	0.02
13.60	0.39	0.38	5.00	0.00	0.02	0.02
13.65	0.39	0.38	5.00	0.00	0.02	0.02
13.70	0.39	0.38	5.00	0.00	0.02	0.02
13.75	0.39	0.38	5.00	0.00	0.02	0.02
13.80	0.39	0.38	5.00	0.00	0.02	0.02
13.85	0.39	0.38	5.00	0.00	0.02	0.02
13.90	0.40	0.38	5.00	0.00	0.01	0.01
13.95	0.40	0.38	5.00	0.00	0.01	0.01
14.00	0.40	0.38	5.00	0.00	0.01	0.01
14.05	0.40	0.38	5.00	0.00	0.01	0.01
14.10	0.40	0.38	5.00	0.00	0.01	0.01
14.15	0.40	0.38	5.00	0.00	0.01	0.01
14.20	0.40	0.38	5.00	0.00	0.01	0.01
14.25	0.40	0.38	5.00	0.00	0.01	0.01
14.30	0.40	0.38	5.00	0.00	0.01	0.01
14.35	0.41	0.38	5.00	0.00	0.01	0.01
14.40	0.41	0.38	5.00	0.00	0.01	0.01
14.45	0.41	0.38	5.00	0.00	0.01	0.01
14.50	0.41	0.38	5.00	0.00	0.01	0.01
14.55	0.41	0.38	5.00	0.00	0.01	0.01
14.60	0.41	0.38	5.00	0.00	0.00	0.00
14.65	0.41	0.38	5.00	0.00	0.00	0.00
14.70	0.41	0.38	5.00	0.00	0.00	0.00
14.75	0.41	0.38	5.00	0.00	0.00	0.00
14.80	0.48	0.38	5.00	0.00	0.00	0.00
14.85	0.48	0.38	5.00	0.00	0.00	0.00
14.90	0.48	0.38	5.00	0.00	0.00	0.00
14.95	0.48	0.38	5.00	0.00	0.00	0.00
15.00	0.49	0.38	1.27	0.00	0.00	0.00
15.05	0.49	0.38	1.27	0.00	0.00	0.00
15.10	0.49	0.38	1.27	0.00	0.00	0.00
15.15	0.49	0.39	1.27	0.00	0.00	0.00
15.20	0.49	0.39	1.28	0.00	0.00	0.00
15.25	0.49	0.39	1.28	0.00	0.00	0.00
15.30	0.50	0.39	1.28	0.00	0.00	0.00
15.35	0.50	0.39	1.28	0.00	0.00	0.00
15.40	0.50	0.39	1.29	0.00	0.00	0.00
15.45	0.50	0.39	1.29	0.00	0.00	0.00
15.50	0.50	0.39	1.29	0.00	0.00	0.00
15.55	0.51	0.39	1.29	0.00	0.00	0.00
15.60	0.51	0.39	1.30	0.00	0.00	0.00
15.65	0.51	0.39	1.30	0.00	0.00	0.00
15.70	0.51	0.39	1.30	0.00	0.00	0.00
15.75	0.51	0.39	1.31	0.00	0.00	0.00
15.80	0.52	0.39	1.31	0.00	0.00	0.00
15.85	0.52	0.39	1.31	0.00	0.00	0.00
15.90	0.52	0.40	1.32	0.00	0.00	0.00
15.95	0.52	0.40	1.32	0.00	0.00	0.00
16.00	0.52	0.40	1.32	0.00	0.00	0.00
16.05	0.53	0.40	1.33	0.00	0.00	0.00
16.10	0.53	0.40	1.33	0.00	0.00	0.00
16.15	0.53	0.40	1.33	0.00	0.00	0.00
16.20	0.53	0.40	1.34	0.00	0.00	0.00
16.25	0.54	0.40	1.34	0.00	0.00	0.00
16.30	0.54	0.40	1.34	0.00	0.00	0.00
16.35	0.54	0.40	1.35	0.00	0.00	0.00
16.40	0.54	0.40	1.35	0.00	0.00	0.00

16.45	0.55	0.40	1.36	0.00	0.00	0.00
16.50	0.55	0.40	1.36	0.00	0.00	0.00
16.55	0.56	0.40	1.40	0.00	0.00	0.00
16.60	0.58	0.40	1.45	0.00	0.00	0.00
16.65	0.61	0.41	1.51	0.00	0.00	0.00
16.70	0.66	0.41	1.62	0.00	0.00	0.00
16.75	0.75	0.41	1.85	0.00	0.00	0.00
16.80	0.75	0.41	1.84	0.00	0.00	0.00
16.85	0.75	0.41	1.84	0.00	0.00	0.00
16.90	0.75	0.41	1.84	0.00	0.00	0.00
16.95	0.75	0.41	1.83	0.00	0.00	0.00
17.00	0.75	0.41	1.83	0.00	0.00	0.00
17.05	0.75	0.41	1.83	0.00	0.00	0.00
17.10	0.75	0.41	1.83	0.00	0.00	0.00
17.15	0.75	0.41	1.82	0.00	0.00	0.00
17.20	0.75	0.41	1.82	0.00	0.00	0.00
17.25	0.75	0.41	1.82	0.00	0.00	0.00
17.30	0.75	0.41	1.81	0.00	0.00	0.00
17.35	0.75	0.41	1.81	0.00	0.00	0.00
17.40	0.75	0.41	1.81	0.00	0.00	0.00
17.45	0.75	0.42	1.81	0.00	0.00	0.00
17.50	0.75	0.42	1.80	0.00	0.00	0.00
17.55	0.75	0.42	1.80	0.00	0.00	0.00
17.60	0.75	0.42	1.80	0.00	0.00	0.00
17.65	0.75	0.42	1.80	0.00	0.00	0.00
17.70	0.75	0.42	1.79	0.00	0.00	0.00
17.75	0.75	0.42	1.79	0.00	0.00	0.00
17.80	0.75	0.42	1.79	0.00	0.00	0.00
17.85	0.75	0.42	1.79	0.00	0.00	0.00
17.90	0.75	0.42	1.78	0.00	0.00	0.00
17.95	0.75	0.42	1.78	0.00	0.00	0.00
18.00	0.75	0.42	1.78	0.00	0.00	0.00
18.05	0.75	0.42	1.78	0.00	0.00	0.00
18.10	0.75	0.42	1.77	0.00	0.00	0.00
18.15	0.75	0.42	1.77	0.00	0.00	0.00
18.20	0.75	0.42	1.77	0.00	0.00	0.00
18.25	0.75	0.42	1.77	0.00	0.00	0.00
18.30	0.75	0.43	1.76	0.00	0.00	0.00
18.35	0.75	0.43	1.76	0.00	0.00	0.00
18.40	0.75	0.43	1.76	0.00	0.00	0.00
18.45	0.75	0.43	1.76	0.00	0.00	0.00
18.50	0.75	0.43	1.76	0.00	0.00	0.00
18.55	0.75	0.43	1.75	0.00	0.00	0.00
18.60	0.75	0.43	1.75	0.00	0.00	0.00
18.65	0.75	0.43	1.75	0.00	0.00	0.00
18.70	0.75	0.43	1.75	0.00	0.00	0.00
18.75	0.75	0.43	1.74	0.00	0.00	0.00
18.80	0.75	0.43	1.74	0.00	0.00	0.00
18.85	0.75	0.43	1.74	0.00	0.00	0.00
18.90	0.75	0.43	1.74	0.00	0.00	0.00
18.95	0.75	0.43	1.74	0.00	0.00	0.00
19.00	0.75	0.43	1.73	0.00	0.00	0.00
19.05	0.75	0.43	1.73	0.00	0.00	0.00
19.10	0.75	0.43	1.73	0.00	0.00	0.00
19.15	0.75	0.43	1.73	0.00	0.00	0.00
19.20	0.75	0.44	1.72	0.00	0.00	0.00
19.25	0.75	0.44	1.72	0.00	0.00	0.00
19.30	0.75	0.44	1.72	0.00	0.00	0.00
19.35	0.75	0.44	1.72	0.00	0.00	0.00

19.40	0.75	0.44	1.72	0.00	0.00	0.00
19.45	0.75	0.44	1.71	0.00	0.00	0.00
19.50	0.75	0.44	1.71	0.00	0.00	0.00
19.55	0.75	0.44	1.71	0.00	0.00	0.00
19.60	0.75	0.44	1.71	0.00	0.00	0.00
19.65	0.75	0.44	1.71	0.00	0.00	0.00
19.70	0.75	0.44	1.70	0.00	0.00	0.00
19.75	0.75	0.44	1.70	0.00	0.00	0.00
19.80	0.75	0.44	1.70	0.00	0.00	0.00
19.85	0.75	0.44	1.70	0.00	0.00	0.00
19.90	0.75	0.44	1.70	0.00	0.00	0.00
19.95	0.75	0.44	1.69	0.00	0.00	0.00
20.00	0.75	0.44	1.69	0.00	0.00	0.00
20.05	0.75	0.44	1.69	0.00	0.00	0.00
20.10	0.75	0.44	1.69	0.00	0.00	0.00
20.15	0.75	0.44	1.69	0.00	0.00	0.00
20.20	0.75	0.45	1.68	0.00	0.00	0.00
20.25	0.75	0.45	1.68	0.00	0.00	0.00
20.30	0.75	0.45	1.68	0.00	0.00	0.00
20.35	0.75	0.45	1.68	0.00	0.00	0.00
20.40	0.75	0.45	1.68	0.00	0.00	0.00
20.45	0.75	0.45	1.67	0.00	0.00	0.00
20.50	0.75	0.45	1.67	0.00	0.00	0.00
20.55	0.75	0.45	1.67	0.00	0.00	0.00
20.60	0.75	0.45	1.67	0.00	0.00	0.00
20.65	0.75	0.45	1.67	0.00	0.00	0.00
20.70	0.75	0.45	1.67	0.00	0.00	0.00
20.75	0.75	0.45	1.66	0.00	0.00	0.00
20.80	0.75	0.45	1.66	0.00	0.00	0.00
20.85	0.75	0.45	1.66	0.00	0.00	0.00
20.90	0.75	0.45	1.66	0.00	0.00	0.00
20.95	0.75	0.45	1.66	0.00	0.00	0.00
21.00	0.75	0.45	1.65	0.00	0.00	0.00
21.05	0.75	0.45	1.65	0.00	0.00	0.00
21.10	0.75	0.45	1.65	0.00	0.00	0.00
21.15	0.75	0.45	1.65	0.00	0.00	0.00
21.20	0.75	0.46	1.65	0.00	0.00	0.00
21.25	0.75	0.46	1.65	0.00	0.00	0.00
21.30	0.75	0.46	1.64	0.00	0.00	0.00
21.35	0.75	0.46	1.64	0.00	0.00	0.00
21.40	0.75	0.46	1.64	0.00	0.00	0.00
21.45	0.75	0.46	1.64	0.00	0.00	0.00
21.50	0.75	0.46	1.64	0.00	0.00	0.00
21.55	0.75	0.46	1.64	0.00	0.00	0.00
21.60	0.75	0.46	1.63	0.00	0.00	0.00
21.65	0.75	0.46	1.63	0.00	0.00	0.00
21.70	0.75	0.46	1.63	0.00	0.00	0.00
21.75	0.75	0.46	1.63	0.00	0.00	0.00
21.80	0.75	0.46	1.63	0.00	0.00	0.00
21.85	0.75	0.46	1.63	0.00	0.00	0.00
21.90	0.75	0.46	1.62	0.00	0.00	0.00
21.95	0.75	0.46	1.62	0.00	0.00	0.00
22.00	0.75	0.46	1.62	0.00	0.00	0.00
22.05	0.75	0.46	1.62	0.00	0.00	0.00
22.10	0.75	0.46	1.62	0.00	0.00	0.00
22.15	0.75	0.46	1.62	0.00	0.00	0.00
22.20	0.75	0.46	1.62	0.00	0.00	0.00
22.25	0.75	0.46	1.61	0.00	0.00	0.00
22.30	0.75	0.47	1.61	0.00	0.00	0.00

22.35	0.75	0.47	1.61	0.00	0.00	0.00
22.40	0.75	0.47	1.61	0.00	0.00	0.00
22.45	0.75	0.47	1.61	0.00	0.00	0.00
22.50	0.75	0.47	1.61	0.00	0.00	0.00
22.55	0.75	0.47	1.61	0.00	0.00	0.00
22.60	0.75	0.47	1.60	0.00	0.00	0.00
22.65	0.75	0.47	1.60	0.00	0.00	0.00
22.70	0.75	0.47	1.60	0.00	0.00	0.00
22.75	0.75	0.47	1.60	0.00	0.00	0.00
22.80	0.75	0.47	1.60	0.00	0.00	0.00
22.85	0.75	0.47	1.60	0.00	0.00	0.00
22.90	0.75	0.47	1.59	0.00	0.00	0.00
22.95	0.75	0.47	1.59	0.00	0.00	0.00
23.00	0.75	0.47	1.59	0.00	0.00	0.00
23.05	0.75	0.47	1.59	0.00	0.00	0.00
23.10	0.75	0.47	1.59	0.00	0.00	0.00
23.15	0.75	0.47	1.59	0.00	0.00	0.00
23.20	0.75	0.47	1.59	0.00	0.00	0.00
23.25	0.75	0.47	1.59	0.00	0.00	0.00
23.30	0.75	0.47	1.58	0.00	0.00	0.00
23.35	0.75	0.47	1.58	0.00	0.00	0.00
23.40	0.75	0.47	1.58	0.00	0.00	0.00
23.45	0.75	0.47	1.58	0.00	0.00	0.00
23.50	0.75	0.48	1.58	0.00	0.00	0.00
23.55	0.75	0.48	1.58	0.00	0.00	0.00
23.60	0.75	0.48	1.58	0.00	0.00	0.00
23.65	0.75	0.48	1.57	0.00	0.00	0.00
23.70	0.75	0.48	1.57	0.00	0.00	0.00
23.75	0.75	0.48	1.57	0.00	0.00	0.00
23.80	0.75	0.48	1.57	0.00	0.00	0.00
23.85	0.75	0.48	1.57	0.00	0.00	0.00
23.90	0.75	0.48	1.57	0.00	0.00	0.00
23.95	0.75	0.48	1.57	0.00	0.00	0.00
24.00	0.75	0.48	1.57	0.00	0.00	0.00
24.05	0.75	0.48	1.56	0.00	0.00	0.00
24.10	0.75	0.48	1.56	0.00	0.00	0.00
24.15	0.75	0.48	1.56	0.00	0.00	0.00
24.20	0.75	0.48	1.56	0.00	0.00	0.00
24.25	0.75	0.48	1.56	0.00	0.00	0.00
24.30	0.75	0.48	1.56	0.00	0.00	0.00
24.35	0.75	0.48	1.56	0.00	0.00	0.00
24.40	0.75	0.48	1.56	0.00	0.00	0.00
24.45	0.75	0.48	1.55	0.00	0.00	0.00
24.50	0.75	0.48	1.55	0.00	0.00	0.00
24.55	0.75	0.48	1.55	0.00	0.00	0.00
24.60	0.75	0.48	1.55	0.00	0.00	0.00
24.65	0.75	0.48	1.55	0.00	0.00	0.00
24.70	0.75	0.48	1.55	0.00	0.00	0.00
24.75	0.75	0.49	1.55	0.00	0.00	0.00
24.80	0.75	0.49	1.55	0.00	0.00	0.00
24.85	0.75	0.49	1.54	0.00	0.00	0.00
24.90	0.75	0.49	1.54	0.00	0.00	0.00
24.95	0.75	0.49	1.54	0.00	0.00	0.00
25.00	0.75	0.49	1.54	0.00	0.00	0.00
25.05	0.75	0.49	1.54	0.00	0.00	0.00
25.10	0.75	0.49	1.54	0.00	0.00	0.00
25.15	0.75	0.49	1.54	0.00	0.00	0.00
25.20	0.75	0.49	1.54	0.00	0.00	0.00
25.25	0.75	0.49	1.53	0.00	0.00	0.00

25.30	0.75	0.49	1.53	0.00	0.00	0.00
25.35	0.75	0.49	1.53	0.00	0.00	0.00
25.40	0.75	0.49	1.53	0.00	0.00	0.00
25.45	0.75	0.49	1.53	0.00	0.00	0.00
25.50	0.75	0.49	1.53	0.00	0.00	0.00
25.55	0.75	0.49	1.53	0.00	0.00	0.00
25.60	0.75	0.49	1.53	0.00	0.00	0.00
25.65	0.75	0.49	1.53	0.00	0.00	0.00
25.70	0.75	0.49	1.52	0.00	0.00	0.00
25.75	0.75	0.49	1.52	0.00	0.00	0.00
25.80	0.75	0.49	1.52	0.00	0.00	0.00
25.85	0.75	0.49	1.52	0.00	0.00	0.00
25.90	0.75	0.49	1.52	0.00	0.00	0.00
25.95	0.75	0.49	1.52	0.00	0.00	0.00
26.00	0.75	0.49	1.52	0.00	0.00	0.00
26.05	0.75	0.49	1.52	0.00	0.00	0.00
26.10	0.75	0.49	1.52	0.00	0.00	0.00
26.15	0.75	0.50	1.52	0.00	0.00	0.00
26.20	0.75	0.50	1.51	0.00	0.00	0.00
26.25	0.75	0.50	1.51	0.00	0.00	0.00
26.30	0.75	0.50	1.51	0.00	0.00	0.00
26.35	0.75	0.50	1.51	0.00	0.00	0.00
26.40	0.75	0.50	1.51	0.00	0.00	0.00
26.45	0.75	0.50	1.51	0.00	0.00	0.00
26.50	0.75	0.50	1.51	0.00	0.00	0.00
26.55	0.75	0.50	1.51	0.00	0.00	0.00
26.60	0.75	0.50	1.51	0.00	0.00	0.00
26.65	0.75	0.50	1.51	0.00	0.00	0.00
26.70	0.75	0.50	1.50	0.00	0.00	0.00
26.75	0.75	0.50	1.50	0.00	0.00	0.00
26.80	0.75	0.50	1.50	0.00	0.00	0.00
26.85	0.75	0.50	1.50	0.00	0.00	0.00
26.90	0.75	0.50	1.50	0.00	0.00	0.00
26.95	0.75	0.50	1.50	0.00	0.00	0.00
27.00	0.75	0.50	1.50	0.00	0.00	0.00
27.05	0.75	0.50	1.50	0.00	0.00	0.00
27.10	0.75	0.50	1.50	0.00	0.00	0.00
27.15	0.75	0.50	1.50	0.00	0.00	0.00
27.20	0.75	0.50	1.49	0.00	0.00	0.00
27.25	0.75	0.50	1.49	0.00	0.00	0.00
27.30	0.75	0.50	1.49	0.00	0.00	0.00
27.35	0.75	0.50	1.49	0.00	0.00	0.00
27.40	0.75	0.50	1.49	0.00	0.00	0.00
27.45	0.75	0.50	1.49	0.00	0.00	0.00
27.50	0.75	0.50	1.49	0.00	0.00	0.00
27.55	0.75	0.50	1.49	0.00	0.00	0.00
27.60	0.75	0.50	1.49	0.00	0.00	0.00
27.65	0.75	0.50	1.49	0.00	0.00	0.00
27.70	0.75	0.51	1.49	0.00	0.00	0.00
27.75	0.75	0.51	1.48	0.00	0.00	0.00
27.80	0.75	0.51	1.48	0.00	0.00	0.00
27.85	0.75	0.51	1.48	0.00	0.00	0.00
27.90	0.75	0.51	1.48	0.00	0.00	0.00
27.95	0.75	0.51	1.48	0.00	0.00	0.00
28.00	0.75	0.51	1.48	0.00	0.00	0.00
28.05	0.75	0.51	1.48	0.00	0.00	0.00
28.10	0.75	0.51	1.48	0.00	0.00	0.00
28.15	0.75	0.51	1.48	0.00	0.00	0.00
28.20	0.75	0.51	1.48	0.00	0.00	0.00

28.25	0.75	0.51	1.48	0.00	0.00	0.00
28.30	0.75	0.51	1.47	0.00	0.00	0.00
28.35	0.75	0.51	1.47	0.00	0.00	0.00
28.40	0.75	0.51	1.47	0.00	0.00	0.00
28.45	0.75	0.51	1.47	0.00	0.00	0.00
28.50	0.75	0.51	1.47	0.00	0.00	0.00
28.55	0.75	0.51	1.47	0.00	0.00	0.00
28.60	0.75	0.51	1.47	0.00	0.00	0.00
28.65	0.75	0.51	1.47	0.00	0.00	0.00
28.70	0.75	0.51	1.47	0.00	0.00	0.00
28.75	0.75	0.51	1.47	0.00	0.00	0.00
28.80	0.75	0.51	1.47	0.00	0.00	0.00
28.85	0.75	0.51	1.47	0.00	0.00	0.00
28.90	0.75	0.51	1.46	0.00	0.00	0.00
28.95	0.75	0.51	1.46	0.00	0.00	0.00
29.00	0.75	0.51	1.46	0.00	0.00	0.00
29.05	0.75	0.51	1.46	0.00	0.00	0.00
29.10	0.75	0.51	1.46	0.00	0.00	0.00
29.15	0.75	0.51	1.46	0.00	0.00	0.00
29.20	0.75	0.51	1.46	0.00	0.00	0.00
29.25	0.75	0.51	1.46	0.00	0.00	0.00
29.30	0.75	0.51	1.46	0.00	0.00	0.00
29.35	0.75	0.51	1.46	0.00	0.00	0.00
29.40	0.75	0.52	1.46	0.00	0.00	0.00
29.45	0.75	0.52	1.46	0.00	0.00	0.00
29.50	0.75	0.52	1.45	0.00	0.00	0.00
29.55	0.75	0.52	1.45	0.00	0.00	0.00
29.60	0.75	0.52	1.45	0.00	0.00	0.00
29.65	0.75	0.52	1.45	0.00	0.00	0.00
29.70	0.75	0.52	1.45	0.00	0.00	0.00
29.75	0.75	0.52	1.45	0.00	0.00	0.00
29.80	0.75	0.52	1.45	0.00	0.00	0.00
29.85	0.75	0.52	1.45	0.00	0.00	0.00
29.90	0.75	0.52	1.45	0.00	0.00	0.00
29.95	0.75	0.52	1.45	0.00	0.00	0.00
30.00	0.75	0.52	1.45	0.00	0.00	0.00
30.05	0.75	0.52	1.45	0.00	0.00	0.00
30.10	0.75	0.52	1.45	0.00	0.00	0.00
30.15	0.75	0.52	1.45	0.00	0.00	0.00
30.20	0.75	0.52	1.45	0.00	0.00	0.00
30.25	0.75	0.52	1.45	0.00	0.00	0.00
30.30	0.75	0.52	1.45	0.00	0.00	0.00
30.35	0.75	0.52	1.45	0.00	0.00	0.00
30.40	0.75	0.52	1.45	0.00	0.00	0.00
30.45	0.75	0.52	1.44	0.00	0.00	0.00
30.50	0.75	0.52	1.44	0.00	0.00	0.00
30.55	0.75	0.52	1.44	0.00	0.00	0.00
30.60	0.75	0.52	1.44	0.00	0.00	0.00
30.65	0.75	0.52	1.44	0.00	0.00	0.00
30.70	0.75	0.52	1.44	0.00	0.00	0.00
30.75	0.75	0.52	1.44	0.00	0.00	0.00
30.80	0.75	0.52	1.44	0.00	0.00	0.00
30.85	0.75	0.52	1.44	0.00	0.00	0.00
30.90	0.75	0.52	1.44	0.00	0.00	0.00
30.95	0.75	0.52	1.44	0.00	0.00	0.00
31.00	0.75	0.52	1.44	0.00	0.00	0.00
31.05	0.75	0.52	1.44	0.00	0.00	0.00
31.10	0.75	0.52	1.44	0.00	0.00	0.00
31.15	0.75	0.52	1.44	0.00	0.00	0.00

31.20	0.75	0.52	1.44	0.00	0.00	0.00
31.25	0.75	0.52	1.44	0.00	0.00	0.00
31.30	0.75	0.52	1.44	0.00	0.00	0.00
31.35	0.75	0.52	1.44	0.00	0.00	0.00
31.40	0.75	0.52	1.44	0.00	0.00	0.00
31.45	0.75	0.52	1.44	0.00	0.00	0.00
31.50	0.75	0.52	1.44	0.00	0.00	0.00
31.55	0.75	0.52	1.44	0.00	0.00	0.00
31.60	0.75	0.52	1.44	0.00	0.00	0.00
31.65	0.75	0.52	1.44	0.00	0.00	0.00
31.70	0.75	0.52	1.44	0.00	0.00	0.00
31.75	0.75	0.52	1.44	0.00	0.00	0.00
31.80	0.75	0.52	1.44	0.00	0.00	0.00
31.85	0.75	0.52	1.44	0.00	0.00	0.00
31.90	0.75	0.52	1.44	0.00	0.00	0.00
31.95	0.75	0.52	1.44	0.00	0.00	0.00
32.00	0.75	0.52	1.44	0.00	0.00	0.00
32.05	0.75	0.52	1.44	0.00	0.00	0.00
32.10	0.75	0.52	1.44	0.00	0.00	0.00
32.15	0.75	0.52	1.44	0.00	0.00	0.00
32.20	0.75	0.52	1.44	0.00	0.00	0.00
32.25	0.75	0.52	1.44	0.00	0.00	0.00
32.30	0.75	0.52	1.44	0.00	0.00	0.00
32.35	0.75	0.52	1.44	0.00	0.00	0.00
32.40	0.75	0.52	1.44	0.00	0.00	0.00
32.45	0.75	0.52	1.44	0.00	0.00	0.00
32.50	0.75	0.52	1.44	0.00	0.00	0.00
32.55	0.75	0.52	1.44	0.00	0.00	0.00
32.60	0.75	0.52	1.44	0.00	0.00	0.00
32.65	0.75	0.52	1.44	0.00	0.00	0.00
32.70	0.75	0.52	1.44	0.00	0.00	0.00
32.75	0.75	0.52	1.43	0.00	0.00	0.00
32.80	0.75	0.52	1.43	0.00	0.00	0.00
32.85	0.75	0.52	1.43	0.00	0.00	0.00
32.90	0.75	0.52	1.43	0.00	0.00	0.00
32.95	0.75	0.52	1.43	0.00	0.00	0.00
33.00	0.75	0.52	1.43	0.00	0.00	0.00
33.05	0.75	0.52	1.43	0.00	0.00	0.00
33.10	0.75	0.52	1.43	0.00	0.00	0.00
33.15	0.75	0.52	1.43	0.00	0.00	0.00
33.20	0.75	0.52	1.43	0.00	0.00	0.00
33.25	0.75	0.52	1.43	0.00	0.00	0.00
33.30	0.75	0.52	1.43	0.00	0.00	0.00
33.35	0.75	0.52	1.43	0.00	0.00	0.00
33.40	0.75	0.52	1.43	0.00	0.00	0.00
33.45	0.75	0.52	1.43	0.00	0.00	0.00
33.50	0.75	0.52	1.43	0.00	0.00	0.00
33.55	0.75	0.52	1.43	0.00	0.00	0.00
33.60	0.75	0.52	1.43	0.00	0.00	0.00
33.65	0.75	0.52	1.43	0.00	0.00	0.00
33.70	0.75	0.52	1.43	0.00	0.00	0.00
33.75	0.75	0.52	1.43	0.00	0.00	0.00
33.80	0.75	0.52	1.43	0.00	0.00	0.00
33.85	0.75	0.52	1.43	0.00	0.00	0.00
33.90	0.75	0.52	1.43	0.00	0.00	0.00
33.95	0.75	0.52	1.43	0.00	0.00	0.00
34.00	0.75	0.52	1.43	0.00	0.00	0.00
34.05	0.75	0.52	1.43	0.00	0.00	0.00
34.10	0.75	0.52	1.43	0.00	0.00	0.00

34.15	0.75	0.52	1.43	0.00	0.00	0.00
34.20	0.75	0.52	1.43	0.00	0.00	0.00
34.25	0.75	0.52	1.43	0.00	0.00	0.00
34.30	0.75	0.52	1.43	0.00	0.00	0.00
34.35	0.75	0.52	1.43	0.00	0.00	0.00
34.40	0.75	0.52	1.43	0.00	0.00	0.00
34.45	0.75	0.52	1.43	0.00	0.00	0.00
34.50	0.75	0.52	1.43	0.00	0.00	0.00
34.55	0.75	0.52	1.43	0.00	0.00	0.00
34.60	0.75	0.52	1.43	0.00	0.00	0.00
34.65	0.75	0.52	1.43	0.00	0.00	0.00
34.70	0.75	0.52	1.43	0.00	0.00	0.00
34.75	0.75	0.52	1.43	0.00	0.00	0.00
34.80	0.75	0.52	1.43	0.00	0.00	0.00
34.85	0.75	0.52	1.43	0.00	0.00	0.00
34.90	0.75	0.52	1.43	0.00	0.00	0.00
34.95	0.75	0.52	1.43	0.00	0.00	0.00
35.00	0.75	0.52	1.43	0.00	0.00	0.00
35.05	0.75	0.52	1.43	0.00	0.00	0.00
35.10	0.75	0.52	1.43	0.00	0.00	0.00
35.15	0.75	0.52	1.43	0.00	0.00	0.00
35.20	0.75	0.52	1.43	0.00	0.00	0.00
35.25	0.75	0.52	1.43	0.00	0.00	0.00
35.30	0.75	0.52	1.43	0.00	0.00	0.00
35.35	0.75	0.52	1.43	0.00	0.00	0.00
35.40	0.75	0.52	1.43	0.00	0.00	0.00
35.45	0.75	0.52	1.43	0.00	0.00	0.00
35.50	0.75	0.52	1.43	0.00	0.00	0.00
35.55	0.75	0.52	1.43	0.00	0.00	0.00
35.60	0.75	0.52	1.43	0.00	0.00	0.00
35.65	0.75	0.52	1.43	0.00	0.00	0.00
35.70	0.75	0.52	1.43	0.00	0.00	0.00
35.75	0.75	0.52	1.43	0.00	0.00	0.00
35.80	0.75	0.52	1.43	0.00	0.00	0.00
35.85	0.75	0.52	1.43	0.00	0.00	0.00
35.90	0.75	0.52	1.43	0.00	0.00	0.00
35.95	0.75	0.52	1.43	0.00	0.00	0.00
36.00	0.75	0.52	1.43	0.00	0.00	0.00
36.05	0.75	0.52	1.43	0.00	0.00	0.00
36.10	0.75	0.52	1.43	0.00	0.00	0.00
36.15	0.75	0.52	1.43	0.00	0.00	0.00
36.20	0.75	0.52	1.43	0.00	0.00	0.00
36.25	0.75	0.52	1.43	0.00	0.00	0.00
36.30	0.75	0.52	1.43	0.00	0.00	0.00
36.35	0.75	0.52	1.43	0.00	0.00	0.00
36.40	0.75	0.52	1.43	0.00	0.00	0.00
36.45	0.75	0.52	1.43	0.00	0.00	0.00
36.50	0.75	0.52	1.43	0.00	0.00	0.00
36.55	0.75	0.52	1.43	0.00	0.00	0.00
36.60	0.75	0.52	1.43	0.00	0.00	0.00
36.65	0.75	0.52	1.43	0.00	0.00	0.00
36.70	0.75	0.52	1.43	0.00	0.00	0.00
36.75	0.75	0.52	1.43	0.00	0.00	0.00
36.80	0.75	0.52	1.43	0.00	0.00	0.00
36.85	0.75	0.52	1.43	0.00	0.00	0.00
36.90	0.75	0.52	1.43	0.00	0.00	0.00
36.95	0.75	0.52	1.43	0.00	0.00	0.00
37.00	0.75	0.52	1.43	0.00	0.00	0.00
37.05	0.75	0.52	1.43	0.00	0.00	0.00

37.10	0.75	0.52	1.43	0.00	0.00	0.00
37.15	0.75	0.52	1.43	0.00	0.00	0.00
37.20	0.75	0.52	1.43	0.00	0.00	0.00
37.25	0.75	0.52	1.43	0.00	0.00	0.00
37.30	0.75	0.52	1.43	0.00	0.00	0.00
37.35	0.75	0.52	1.44	0.00	0.00	0.00
37.40	0.75	0.52	1.44	0.00	0.00	0.00
37.45	0.75	0.52	1.44	0.00	0.00	0.00
37.50	0.75	0.52	1.44	0.00	0.00	0.00
37.55	0.75	0.52	1.44	0.00	0.00	0.00
37.60	0.75	0.52	1.44	0.00	0.00	0.00
37.65	0.75	0.52	1.44	0.00	0.00	0.00
37.70	0.75	0.52	1.44	0.00	0.00	0.00
37.75	0.75	0.52	1.44	0.00	0.00	0.00
37.80	0.75	0.52	1.44	0.00	0.00	0.00
37.85	0.75	0.52	1.44	0.00	0.00	0.00
37.90	0.75	0.52	1.44	0.00	0.00	0.00
37.95	0.75	0.52	1.44	0.00	0.00	0.00
38.00	0.75	0.52	1.44	0.00	0.00	0.00
38.05	0.75	0.52	1.44	0.00	0.00	0.00
38.10	0.75	0.52	1.44	0.00	0.00	0.00
38.15	0.75	0.52	1.44	0.00	0.00	0.00
38.20	0.75	0.52	1.44	0.00	0.00	0.00
38.25	0.75	0.52	1.44	0.00	0.00	0.00
38.30	0.75	0.52	1.44	0.00	0.00	0.00
38.35	0.75	0.52	1.44	0.00	0.00	0.00
38.40	0.75	0.52	1.44	0.00	0.00	0.00
38.45	0.75	0.52	1.44	0.00	0.00	0.00
38.50	0.75	0.52	1.44	0.00	0.00	0.00
38.55	0.75	0.52	1.44	0.00	0.00	0.00
38.60	0.75	0.52	1.44	0.00	0.00	0.00
38.65	0.75	0.52	1.44	0.00	0.00	0.00
38.70	0.75	0.52	1.44	0.00	0.00	0.00
38.75	0.75	0.52	1.44	0.00	0.00	0.00
38.80	0.75	0.52	1.44	0.00	0.00	0.00
38.85	0.75	0.52	1.44	0.00	0.00	0.00
38.90	0.75	0.52	1.43	0.00	0.00	0.00
38.95	0.75	0.52	1.43	0.00	0.00	0.00
39.00	0.75	0.52	1.43	0.00	0.00	0.00
39.05	0.75	0.52	1.43	0.00	0.00	0.00
39.10	0.75	0.52	1.43	0.00	0.00	0.00
39.15	0.75	0.52	1.43	0.00	0.00	0.00
39.20	0.75	0.52	1.43	0.00	0.00	0.00
39.25	0.75	0.52	1.43	0.00	0.00	0.00
39.30	0.75	0.52	1.43	0.00	0.00	0.00
39.35	0.75	0.52	1.43	0.00	0.00	0.00
39.40	0.75	0.52	1.43	0.00	0.00	0.00
39.45	0.75	0.52	1.43	0.00	0.00	0.00
39.50	0.75	0.52	1.43	0.00	0.00	0.00
39.55	0.75	0.52	1.43	0.00	0.00	0.00
39.60	0.75	0.52	1.43	0.00	0.00	0.00
39.65	0.75	0.52	1.43	0.00	0.00	0.00
39.70	0.75	0.52	1.43	0.00	0.00	0.00
39.75	0.75	0.52	1.43	0.00	0.00	0.00
39.80	0.75	0.52	1.43	0.00	0.00	0.00
39.85	0.75	0.52	1.43	0.00	0.00	0.00
39.90	0.75	0.52	1.43	0.00	0.00	0.00
39.95	0.75	0.52	1.43	0.00	0.00	0.00
40.00	0.75	0.52	1.43	0.00	0.00	0.00

40.05	0.75	0.52	1.43	0.00	0.00	0.00
40.10	0.75	0.52	1.43	0.00	0.00	0.00
40.15	0.75	0.52	1.43	0.00	0.00	0.00
40.20	0.75	0.52	1.43	0.00	0.00	0.00
40.25	0.75	0.52	1.43	0.00	0.00	0.00
40.30	0.75	0.52	1.43	0.00	0.00	0.00
40.35	0.75	0.52	1.43	0.00	0.00	0.00
40.40	0.75	0.52	1.43	0.00	0.00	0.00
40.45	0.75	0.52	1.43	0.00	0.00	0.00
40.50	0.75	0.52	1.43	0.00	0.00	0.00
40.55	0.75	0.52	1.43	0.00	0.00	0.00
40.60	0.75	0.52	1.43	0.00	0.00	0.00
40.65	0.75	0.52	1.43	0.00	0.00	0.00
40.70	0.75	0.52	1.43	0.00	0.00	0.00
40.75	0.75	0.52	1.43	0.00	0.00	0.00
40.80	0.75	0.52	1.43	0.00	0.00	0.00
40.85	0.75	0.52	1.43	0.00	0.00	0.00
40.90	0.75	0.52	1.43	0.00	0.00	0.00
40.95	0.75	0.52	1.43	0.00	0.00	0.00
41.00	0.75	0.52	1.43	0.00	0.00	0.00
41.05	0.75	0.52	1.43	0.00	0.00	0.00
41.10	0.75	0.52	1.43	0.00	0.00	0.00
41.15	0.75	0.52	1.43	0.00	0.00	0.00
41.20	0.75	0.52	1.43	0.00	0.00	0.00
41.25	0.75	0.52	1.43	0.00	0.00	0.00
41.30	0.75	0.52	1.43	0.00	0.00	0.00
41.35	0.75	0.52	1.43	0.00	0.00	0.00
41.40	0.75	0.52	1.43	0.00	0.00	0.00
41.45	0.75	0.52	1.43	0.00	0.00	0.00
41.50	0.75	0.52	1.43	0.00	0.00	0.00
41.55	0.75	0.52	1.43	0.00	0.00	0.00
41.60	0.75	0.52	1.43	0.00	0.00	0.00
41.65	0.75	0.52	1.43	0.00	0.00	0.00
41.70	0.75	0.52	1.43	0.00	0.00	0.00
41.75	0.75	0.52	1.43	0.00	0.00	0.00
41.80	0.75	0.52	1.43	0.00	0.00	0.00
41.85	0.75	0.52	1.43	0.00	0.00	0.00
41.90	0.75	0.52	1.43	0.00	0.00	0.00
41.95	0.75	0.52	1.43	0.00	0.00	0.00
42.00	0.75	0.52	1.43	0.00	0.00	0.00
42.05	0.75	0.52	1.43	0.00	0.00	0.00
42.10	0.75	0.52	1.43	0.00	0.00	0.00
42.15	0.75	0.52	1.43	0.00	0.00	0.00
42.20	0.75	0.52	1.43	0.00	0.00	0.00
42.25	0.75	0.52	1.43	0.00	0.00	0.00
42.30	0.75	0.52	1.43	0.00	0.00	0.00
42.35	0.75	0.52	1.43	0.00	0.00	0.00
42.40	0.75	0.52	1.43	0.00	0.00	0.00
42.45	0.75	0.52	1.43	0.00	0.00	0.00
42.50	0.75	0.52	1.43	0.00	0.00	0.00
42.55	0.75	0.52	1.43	0.00	0.00	0.00
42.60	0.75	0.52	1.43	0.00	0.00	0.00
42.65	0.75	0.52	1.43	0.00	0.00	0.00
42.70	0.75	0.52	1.43	0.00	0.00	0.00
42.75	0.75	0.52	1.43	0.00	0.00	0.00
42.80	0.75	0.52	1.43	0.00	0.00	0.00
42.85	0.75	0.52	1.43	0.00	0.00	0.00
42.90	0.75	0.52	1.43	0.00	0.00	0.00
42.95	0.75	0.52	1.43	0.00	0.00	0.00

43.00	0.75	0.52	1.43	0.00	0.00	0.00
43.05	0.75	0.52	1.43	0.00	0.00	0.00
43.10	0.75	0.52	1.43	0.00	0.00	0.00
43.15	0.75	0.52	1.43	0.00	0.00	0.00
43.20	0.75	0.52	1.43	0.00	0.00	0.00
43.25	0.74	0.52	1.43	0.00	0.00	0.00
43.30	0.74	0.52	1.43	0.00	0.00	0.00
43.35	0.74	0.52	1.43	0.00	0.00	0.00
43.40	0.74	0.52	1.43	0.00	0.00	0.00
43.45	0.74	0.52	1.43	0.00	0.00	0.00
43.50	0.74	0.52	1.43	0.00	0.00	0.00
43.55	0.74	0.52	1.43	0.00	0.00	0.00
43.60	0.74	0.52	1.43	0.00	0.00	0.00
43.65	0.74	0.52	1.43	0.00	0.00	0.00
43.70	0.74	0.52	1.43	0.00	0.00	0.00
43.75	0.74	0.52	1.43	0.00	0.00	0.00
43.80	0.74	0.52	1.43	0.00	0.00	0.00
43.85	0.74	0.52	1.43	0.00	0.00	0.00
43.90	0.74	0.52	1.43	0.00	0.00	0.00
43.95	0.74	0.52	1.43	0.00	0.00	0.00
44.00	0.74	0.52	1.43	0.00	0.00	0.00
44.05	0.74	0.52	1.43	0.00	0.00	0.00
44.10	0.74	0.52	1.43	0.00	0.00	0.00
44.15	0.74	0.52	1.43	0.00	0.00	0.00
44.20	0.74	0.52	1.43	0.00	0.00	0.00
44.25	0.74	0.52	1.43	0.00	0.00	0.00
44.30	0.74	0.52	1.43	0.00	0.00	0.00
44.35	0.74	0.52	1.43	0.00	0.00	0.00
44.40	0.74	0.52	1.43	0.00	0.00	0.00
44.45	0.74	0.52	1.43	0.00	0.00	0.00
44.50	0.74	0.52	1.43	0.00	0.00	0.00
44.55	0.74	0.52	1.43	0.00	0.00	0.00
44.60	0.74	0.52	1.43	0.00	0.00	0.00
44.65	0.74	0.52	1.43	0.00	0.00	0.00
44.70	0.74	0.52	1.43	0.00	0.00	0.00
44.75	0.74	0.52	1.43	0.00	0.00	0.00
44.80	0.74	0.52	1.43	0.00	0.00	0.00
44.85	0.74	0.52	1.43	0.00	0.00	0.00
44.90	0.74	0.52	1.43	0.00	0.00	0.00
44.95	0.74	0.52	1.43	0.00	0.00	0.00
45.00	0.74	0.52	1.43	0.00	0.00	0.00
45.05	0.74	0.52	1.43	0.00	0.00	0.00
45.10	0.74	0.52	1.43	0.00	0.00	0.00
45.15	0.74	0.52	1.43	0.00	0.00	0.00
45.20	0.74	0.52	1.43	0.00	0.00	0.00
45.25	0.74	0.52	1.43	0.00	0.00	0.00
45.30	0.74	0.52	1.43	0.00	0.00	0.00
45.35	0.74	0.52	1.43	0.00	0.00	0.00
45.40	0.74	0.52	1.43	0.00	0.00	0.00
45.45	0.74	0.52	1.43	0.00	0.00	0.00
45.50	0.74	0.52	1.43	0.00	0.00	0.00
45.55	0.74	0.52	1.43	0.00	0.00	0.00
45.60	0.74	0.52	1.43	0.00	0.00	0.00
45.65	0.74	0.52	1.43	0.00	0.00	0.00
45.70	0.74	0.52	1.43	0.00	0.00	0.00
45.75	0.74	0.52	1.43	0.00	0.00	0.00
45.80	0.74	0.52	1.43	0.00	0.00	0.00
45.85	0.74	0.52	1.43	0.00	0.00	0.00
45.90	0.74	0.52	1.43	0.00	0.00	0.00

45.95	0.74	0.52	1.43	0.00	0.00	0.00
46.00	0.74	0.52	1.43	0.00	0.00	0.00
46.05	0.74	0.52	1.43	0.00	0.00	0.00
46.10	0.74	0.52	1.43	0.00	0.00	0.00
46.15	0.74	0.52	1.43	0.00	0.00	0.00
46.20	0.74	0.52	1.43	0.00	0.00	0.00
46.25	0.74	0.52	1.43	0.00	0.00	0.00
46.30	0.74	0.52	1.43	0.00	0.00	0.00
46.35	0.74	0.52	1.43	0.00	0.00	0.00
46.40	0.74	0.52	1.43	0.00	0.00	0.00
46.45	0.74	0.52	1.43	0.00	0.00	0.00
46.50	0.74	0.52	1.43	0.00	0.00	0.00
46.55	0.74	0.52	1.43	0.00	0.00	0.00
46.60	0.74	0.52	1.43	0.00	0.00	0.00
46.65	0.74	0.52	1.43	0.00	0.00	0.00
46.70	0.74	0.52	1.43	0.00	0.00	0.00
46.75	0.74	0.52	1.43	0.00	0.00	0.00
46.80	0.74	0.52	1.43	0.00	0.00	0.00
46.85	0.74	0.52	1.43	0.00	0.00	0.00
46.90	0.74	0.52	1.43	0.00	0.00	0.00
46.95	0.74	0.52	1.43	0.00	0.00	0.00
47.00	0.74	0.52	1.43	0.00	0.00	0.00
47.05	0.74	0.52	1.43	0.00	0.00	0.00
47.10	0.74	0.52	1.43	0.00	0.00	0.00
47.15	0.74	0.52	1.43	0.00	0.00	0.00
47.20	0.74	0.52	1.43	0.00	0.00	0.00
47.25	0.74	0.52	1.43	0.00	0.00	0.00
47.30	0.74	0.52	1.43	0.00	0.00	0.00
47.35	0.74	0.52	1.43	0.00	0.00	0.00
47.40	0.74	0.52	1.43	0.00	0.00	0.00
47.45	0.74	0.52	1.43	0.00	0.00	0.00
47.50	0.74	0.52	1.43	0.00	0.00	0.00
47.55	0.74	0.52	1.43	0.00	0.00	0.00
47.60	0.74	0.52	1.43	0.00	0.00	0.00
47.65	0.74	0.52	1.43	0.00	0.00	0.00
47.70	0.74	0.52	1.43	0.00	0.00	0.00
47.75	0.74	0.52	1.43	0.00	0.00	0.00
47.80	0.74	0.52	1.43	0.00	0.00	0.00
47.85	0.74	0.51	1.43	0.00	0.00	0.00
47.90	0.74	0.51	1.43	0.00	0.00	0.00
47.95	0.74	0.51	1.43	0.00	0.00	0.00
48.00	0.74	0.51	1.43	0.00	0.00	0.00
48.05	0.74	0.51	1.43	0.00	0.00	0.00
48.10	0.74	0.51	1.43	0.00	0.00	0.00
48.15	0.74	0.51	1.43	0.00	0.00	0.00
48.20	0.74	0.51	1.43	0.00	0.00	0.00
48.25	0.74	0.51	1.44	0.00	0.00	0.00
48.30	0.74	0.51	1.44	0.00	0.00	0.00
48.35	0.74	0.51	1.44	0.00	0.00	0.00
48.40	0.74	0.51	1.44	0.00	0.00	0.00
48.45	0.74	0.51	1.44	0.00	0.00	0.00
48.50	0.74	0.51	1.44	0.00	0.00	0.00
48.55	0.74	0.51	1.44	0.00	0.00	0.00
48.60	0.74	0.51	1.44	0.00	0.00	0.00
48.65	0.74	0.51	1.44	0.00	0.00	0.00
48.70	0.74	0.51	1.44	0.00	0.00	0.00
48.75	0.74	0.51	1.44	0.00	0.00	0.00
48.80	0.74	0.51	1.44	0.00	0.00	0.00
48.85	0.74	0.51	1.44	0.00	0.00	0.00

48.90	0.74	0.51	1.44	0.00	0.00	0.00
48.95	0.74	0.51	1.44	0.00	0.00	0.00
49.00	0.74	0.51	1.44	0.00	0.00	0.00
49.05	0.74	0.51	1.44	0.00	0.00	0.00
49.10	0.74	0.51	1.44	0.00	0.00	0.00
49.15	0.74	0.51	1.44	0.00	0.00	0.00
49.20	0.74	0.51	1.44	0.00	0.00	0.00
49.25	0.74	0.51	1.44	0.00	0.00	0.00
49.30	0.74	0.51	1.44	0.00	0.00	0.00
49.35	0.74	0.51	1.44	0.00	0.00	0.00
49.40	0.74	0.51	1.44	0.00	0.00	0.00
49.45	0.74	0.51	1.44	0.00	0.00	0.00
49.50	0.74	0.51	1.44	0.00	0.00	0.00
49.55	0.74	0.51	1.44	0.00	0.00	0.00
49.60	0.74	0.51	1.44	0.00	0.00	0.00
49.65	0.74	0.51	1.44	0.00	0.00	0.00
49.70	0.74	0.51	1.44	0.00	0.00	0.00
49.75	0.74	0.51	1.44	0.00	0.00	0.00
49.80	0.74	0.51	1.44	0.00	0.00	0.00
49.85	0.74	0.51	1.44	0.00	0.00	0.00
49.90	0.74	0.51	1.44	0.00	0.00	0.00
49.95	0.74	0.51	1.44	0.00	0.00	0.00
50.00	0.74	0.51	1.44	0.00	0.00	0.00
50.05	0.74	0.51	1.44	0.00	0.00	0.00
50.10	0.74	0.51	1.44	0.00	0.00	0.00
50.15	0.74	0.51	1.44	0.00	0.00	0.00
50.20	0.74	0.51	1.44	0.00	0.00	0.00
50.25	0.74	0.51	1.44	0.00	0.00	0.00
50.30	0.74	0.51	1.44	0.00	0.00	0.00
50.35	0.74	0.51	1.44	0.00	0.00	0.00
50.40	0.74	0.51	1.44	0.00	0.00	0.00
50.45	0.74	0.51	1.44	0.00	0.00	0.00
50.50	0.74	0.51	1.44	0.00	0.00	0.00
50.55	0.74	0.51	1.44	0.00	0.00	0.00
50.60	0.73	0.51	1.44	0.00	0.00	0.00
50.65	0.73	0.51	1.44	0.00	0.00	0.00
50.70	0.73	0.51	1.44	0.00	0.00	0.00
50.75	0.73	0.51	1.44	0.00	0.00	0.00
50.80	0.73	0.51	1.44	0.00	0.00	0.00
50.85	0.73	0.51	1.44	0.00	0.00	0.00
50.90	0.73	0.51	1.44	0.00	0.00	0.00
50.95	0.73	0.51	1.44	0.00	0.00	0.00
51.00	0.73	0.51	1.44	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

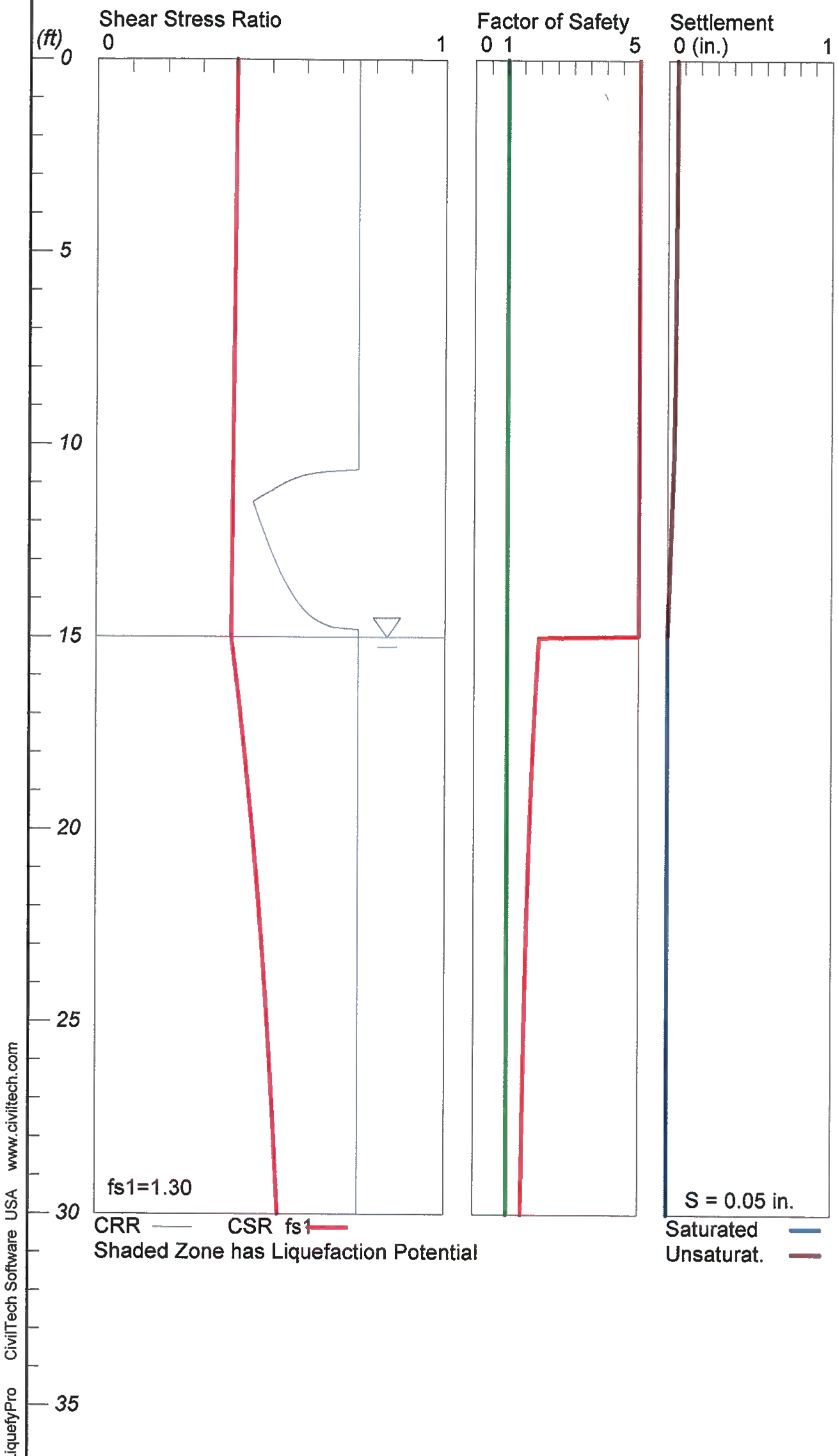
1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS

17151 GUSD Crescent Elem

Hole No.=B-7 (2016) ***Water Depth=15 ft*** ***Magnitude=6.4*** ***Acceleration=0.47g***



Soil Description	Raw SPT	Unit Weight	Fines %
Silty Sand	16	100	33
Silt	16	100	70
Clayey Sand	9	106	33
	14	106	33
Sand with silt	23	115	6.7
	30	115	6.7
Bottom	30	115	6.7

```
*************************************************************************
                    *****************************
                    LIQUEFACTION ANALYSIS SUMMARY
                  Copyright by CivilTech Software
                         www.civiltech.com
*************************************************************************
                    *****************************
      Font: Courier New, Regular, Size 8 is recommended for this report.
      Licensed to SEI, 6/26/2019  4:22:20 PM

      Input File Name: O:\b. PROJECT FILES (ACTIVE)\17100-17199\17151
Greenfield USD Updates to Crescent Elem\Updated Geohaz Report for Cres
Elem West\17151 B7 crescent.liq
      Title:  17151 GUSD Crescent Elem
      Subtitle:  B7

      Surface Elev.=
      Hole No.=B-7 (2016)
      Depth of Hole= 30.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 24.00 ft
      Max. Acceleration= 0.47 g
      Earthquake Magnitude= 6.40

 Input Data:
      Surface Elev.=
      Hole No.=B-7 (2016)
      Depth of Hole=30.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 24.00 ft
      Max. Acceleration=0.47 g
      Earthquake Magnitude=6.40
      No-Liquefiable Soils:   CL, OL are Non-Liq. Soil

      1. SPT or BPT Calculation.
      2. Settlement Analysis Method: Tokimatsu, M-correction
      3. Fines Correction for Liquefaction: Idriss/Seed
      4. Fine Correction for Settlement: During Liquefaction*
      5. Settlement Calculation in: All zones*
      6. Hammer Energy Ratio,                                  Ce = 1.25
      7. Borehole Diameter,                                    Cb= 1.15
      8. Sampling Method,                                      Cs= 1.2
      9. User request factor of safety (apply to CSR) ,   User= 1.3
         Plot one CSR curve (fs1=User)
      10. Use Curve Smoothing: Yes*
      * Recommended Options

      In-Situ Test Data:
      Depth SPT   gamma       Fines
      ft          pcf         %
      ____________________________________
      0.00  16.00 100.00      33.00
      6.50  16.00 100.00      70.00
      11.50 9.00  106.00      33.00
      16.50 14.00 106.00      33.00
      21.50 23.00 115.00      6.70
      26.50 30.00 115.00      6.70
      30.00 30.00 115.00      6.70
      ____________________________________
```

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.05 in.
Total Settlement of Saturated and Unsaturated Sands=0.05 in.
Differential Settlement=0.027 to 0.036 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.75	0.40	5.00	0.00	0.05	0.05
0.05	0.75	0.40	5.00	0.00	0.05	0.05
0.10	0.75	0.40	5.00	0.00	0.05	0.05
0.15	0.75	0.40	5.00	0.00	0.05	0.05
0.20	0.75	0.40	5.00	0.00	0.05	0.05
0.25	0.75	0.40	5.00	0.00	0.05	0.05
0.30	0.75	0.40	5.00	0.00	0.05	0.05
0.35	0.75	0.40	5.00	0.00	0.05	0.05
0.40	0.75	0.40	5.00	0.00	0.05	0.05
0.45	0.75	0.40	5.00	0.00	0.05	0.05
0.50	0.75	0.40	5.00	0.00	0.05	0.05
0.55	0.75	0.40	5.00	0.00	0.05	0.05
0.60	0.75	0.40	5.00	0.00	0.05	0.05
0.65	0.75	0.40	5.00	0.00	0.05	0.05
0.70	0.75	0.40	5.00	0.00	0.05	0.05
0.75	0.75	0.40	5.00	0.00	0.05	0.05
0.80	0.75	0.40	5.00	0.00	0.05	0.05
0.85	0.75	0.40	5.00	0.00	0.05	0.05
0.90	0.75	0.40	5.00	0.00	0.05	0.05
0.95	0.75	0.40	5.00	0.00	0.05	0.05
1.00	0.75	0.40	5.00	0.00	0.05	0.05
1.05	0.75	0.40	5.00	0.00	0.05	0.05
1.10	0.75	0.40	5.00	0.00	0.05	0.05
1.15	0.75	0.40	5.00	0.00	0.05	0.05
1.20	0.75	0.40	5.00	0.00	0.05	0.05
1.25	0.75	0.40	5.00	0.00	0.05	0.05
1.30	0.75	0.40	5.00	0.00	0.05	0.05
1.35	0.75	0.40	5.00	0.00	0.05	0.05
1.40	0.75	0.40	5.00	0.00	0.05	0.05
1.45	0.75	0.40	5.00	0.00	0.05	0.05
1.50	0.75	0.40	5.00	0.00	0.05	0.05
1.55	0.75	0.40	5.00	0.00	0.05	0.05
1.60	0.75	0.40	5.00	0.00	0.05	0.05
1.65	0.75	0.40	5.00	0.00	0.05	0.05
1.70	0.75	0.40	5.00	0.00	0.05	0.05
1.75	0.75	0.40	5.00	0.00	0.05	0.05
1.80	0.75	0.40	5.00	0.00	0.05	0.05
1.85	0.75	0.40	5.00	0.00	0.05	0.05
1.90	0.75	0.40	5.00	0.00	0.05	0.05
1.95	0.75	0.40	5.00	0.00	0.05	0.05
2.00	0.75	0.40	5.00	0.00	0.05	0.05
2.05	0.75	0.40	5.00	0.00	0.05	0.05
2.10	0.75	0.40	5.00	0.00	0.05	0.05
2.15	0.75	0.40	5.00	0.00	0.05	0.05
2.20	0.75	0.40	5.00	0.00	0.05	0.05
2.25	0.75	0.40	5.00	0.00	0.05	0.05
2.30	0.75	0.40	5.00	0.00	0.05	0.05
2.35	0.75	0.39	5.00	0.00	0.05	0.05
2.40	0.75	0.39	5.00	0.00	0.05	0.05

2.45	0.75	0.39	5.00	0.00	0.05	0.05
2.50	0.75	0.39	5.00	0.00	0.05	0.05
2.55	0.75	0.39	5.00	0.00	0.05	0.05
2.60	0.75	0.39	5.00	0.00	0.05	0.05
2.65	0.75	0.39	5.00	0.00	0.05	0.05
2.70	0.75	0.39	5.00	0.00	0.05	0.05
2.75	0.75	0.39	5.00	0.00	0.05	0.05
2.80	0.75	0.39	5.00	0.00	0.05	0.05
2.85	0.75	0.39	5.00	0.00	0.05	0.05
2.90	0.75	0.39	5.00	0.00	0.05	0.05
2.95	0.75	0.39	5.00	0.00	0.05	0.05
3.00	0.75	0.39	5.00	0.00	0.05	0.05
3.05	0.75	0.39	5.00	0.00	0.05	0.05
3.10	0.75	0.39	5.00	0.00	0.05	0.05
3.15	0.75	0.39	5.00	0.00	0.05	0.05
3.20	0.75	0.39	5.00	0.00	0.05	0.05
3.25	0.75	0.39	5.00	0.00	0.05	0.05
3.30	0.75	0.39	5.00	0.00	0.05	0.05
3.35	0.75	0.39	5.00	0.00	0.05	0.05
3.40	0.75	0.39	5.00	0.00	0.05	0.05
3.45	0.75	0.39	5.00	0.00	0.05	0.05
3.50	0.75	0.39	5.00	0.00	0.05	0.05
3.55	0.75	0.39	5.00	0.00	0.05	0.05
3.60	0.75	0.39	5.00	0.00	0.05	0.05
3.65	0.75	0.39	5.00	0.00	0.05	0.05
3.70	0.75	0.39	5.00	0.00	0.05	0.05
3.75	0.75	0.39	5.00	0.00	0.05	0.05
3.80	0.75	0.39	5.00	0.00	0.05	0.05
3.85	0.75	0.39	5.00	0.00	0.05	0.05
3.90	0.75	0.39	5.00	0.00	0.05	0.05
3.95	0.75	0.39	5.00	0.00	0.05	0.05
4.00	0.75	0.39	5.00	0.00	0.05	0.05
4.05	0.75	0.39	5.00	0.00	0.05	0.05
4.10	0.75	0.39	5.00	0.00	0.05	0.05
4.15	0.75	0.39	5.00	0.00	0.05	0.05
4.20	0.75	0.39	5.00	0.00	0.05	0.05
4.25	0.75	0.39	5.00	0.00	0.05	0.05
4.30	0.75	0.39	5.00	0.00	0.05	0.05
4.35	0.75	0.39	5.00	0.00	0.05	0.05
4.40	0.75	0.39	5.00	0.00	0.05	0.05
4.45	0.75	0.39	5.00	0.00	0.05	0.05
4.50	0.75	0.39	5.00	0.00	0.05	0.05
4.55	0.75	0.39	5.00	0.00	0.05	0.05
4.60	0.75	0.39	5.00	0.00	0.05	0.05
4.65	0.75	0.39	5.00	0.00	0.05	0.05
4.70	0.75	0.39	5.00	0.00	0.05	0.05
4.75	0.75	0.39	5.00	0.00	0.05	0.05
4.80	0.75	0.39	5.00	0.00	0.05	0.05
4.85	0.75	0.39	5.00	0.00	0.05	0.05
4.90	0.75	0.39	5.00	0.00	0.05	0.05
4.95	0.75	0.39	5.00	0.00	0.05	0.05
5.00	0.75	0.39	5.00	0.00	0.05	0.05
5.05	0.75	0.39	5.00	0.00	0.05	0.05
5.10	0.75	0.39	5.00	0.00	0.05	0.05
5.15	0.75	0.39	5.00	0.00	0.05	0.05
5.20	0.75	0.39	5.00	0.00	0.05	0.05
5.25	0.75	0.39	5.00	0.00	0.05	0.05
5.30	0.75	0.39	5.00	0.00	0.05	0.05
5.35	0.75	0.39	5.00	0.00	0.05	0.05

5.40	0.75	0.39	5.00	0.00	0.05	0.05
5.45	0.75	0.39	5.00	0.00	0.05	0.05
5.50	0.75	0.39	5.00	0.00	0.05	0.05
5.55	0.75	0.39	5.00	0.00	0.05	0.05
5.60	0.75	0.39	5.00	0.00	0.05	0.05
5.65	0.75	0.39	5.00	0.00	0.05	0.05
5.70	0.75	0.39	5.00	0.00	0.05	0.05
5.75	0.75	0.39	5.00	0.00	0.05	0.05
5.80	0.75	0.39	5.00	0.00	0.05	0.05
5.85	0.75	0.39	5.00	0.00	0.05	0.05
5.90	0.75	0.39	5.00	0.00	0.05	0.05
5.95	0.75	0.39	5.00	0.00	0.05	0.05
6.00	0.75	0.39	5.00	0.00	0.05	0.05
6.05	0.75	0.39	5.00	0.00	0.05	0.05
6.10	0.75	0.39	5.00	0.00	0.05	0.05
6.15	0.75	0.39	5.00	0.00	0.05	0.05
6.20	0.75	0.39	5.00	0.00	0.05	0.05
6.25	0.75	0.39	5.00	0.00	0.05	0.05
6.30	0.75	0.39	5.00	0.00	0.05	0.05
6.35	0.75	0.39	5.00	0.00	0.05	0.05
6.40	0.75	0.39	5.00	0.00	0.05	0.05
6.45	0.75	0.39	5.00	0.00	0.05	0.05
6.50	0.75	0.39	5.00	0.00	0.05	0.05
6.55	0.75	0.39	5.00	0.00	0.05	0.05
6.60	0.75	0.39	5.00	0.00	0.05	0.05
6.65	0.75	0.39	5.00	0.00	0.05	0.05
6.70	0.75	0.39	5.00	0.00	0.05	0.05
6.75	0.75	0.39	5.00	0.00	0.05	0.05
6.80	0.75	0.39	5.00	0.00	0.05	0.05
6.85	0.75	0.39	5.00	0.00	0.05	0.05
6.90	0.75	0.39	5.00	0.00	0.05	0.05
6.95	0.75	0.39	5.00	0.00	0.05	0.05
7.00	0.75	0.39	5.00	0.00	0.05	0.05
7.05	0.75	0.39	5.00	0.00	0.05	0.05
7.10	0.75	0.39	5.00	0.00	0.05	0.05
7.15	0.75	0.39	5.00	0.00	0.05	0.05
7.20	0.75	0.39	5.00	0.00	0.05	0.05
7.25	0.75	0.39	5.00	0.00	0.05	0.05
7.30	0.75	0.39	5.00	0.00	0.05	0.05
7.35	0.75	0.39	5.00	0.00	0.05	0.05
7.40	0.75	0.39	5.00	0.00	0.04	0.04
7.45	0.75	0.39	5.00	0.00	0.04	0.04
7.50	0.75	0.39	5.00	0.00	0.04	0.04
7.55	0.75	0.39	5.00	0.00	0.04	0.04
7.60	0.75	0.39	5.00	0.00	0.04	0.04
7.65	0.75	0.39	5.00	0.00	0.04	0.04
7.70	0.75	0.39	5.00	0.00	0.04	0.04
7.75	0.75	0.39	5.00	0.00	0.04	0.04
7.80	0.75	0.39	5.00	0.00	0.04	0.04
7.85	0.75	0.39	5.00	0.00	0.04	0.04
7.90	0.75	0.39	5.00	0.00	0.04	0.04
7.95	0.75	0.39	5.00	0.00	0.04	0.04
8.00	0.75	0.39	5.00	0.00	0.04	0.04
8.05	0.75	0.39	5.00	0.00	0.04	0.04
8.10	0.75	0.39	5.00	0.00	0.04	0.04
8.15	0.75	0.39	5.00	0.00	0.04	0.04
8.20	0.75	0.39	5.00	0.00	0.04	0.04
8.25	0.75	0.39	5.00	0.00	0.04	0.04
8.30	0.75	0.39	5.00	0.00	0.04	0.04

8.35	0.75	0.39	5.00	0.00	0.04	0.04
8.40	0.75	0.39	5.00	0.00	0.04	0.04
8.45	0.75	0.39	5.00	0.00	0.04	0.04
8.50	0.75	0.39	5.00	0.00	0.04	0.04
8.55	0.75	0.39	5.00	0.00	0.04	0.04
8.60	0.75	0.39	5.00	0.00	0.04	0.04
8.65	0.75	0.39	5.00	0.00	0.04	0.04
8.70	0.75	0.39	5.00	0.00	0.04	0.04
8.75	0.75	0.39	5.00	0.00	0.04	0.04
8.80	0.75	0.39	5.00	0.00	0.04	0.04
8.85	0.75	0.39	5.00	0.00	0.04	0.04
8.90	0.75	0.39	5.00	0.00	0.04	0.04
8.95	0.75	0.39	5.00	0.00	0.04	0.04
9.00	0.75	0.39	5.00	0.00	0.04	0.04
9.05	0.75	0.39	5.00	0.00	0.04	0.04
9.10	0.75	0.39	5.00	0.00	0.04	0.04
9.15	0.75	0.39	5.00	0.00	0.04	0.04
9.20	0.75	0.39	5.00	0.00	0.04	0.04
9.25	0.75	0.39	5.00	0.00	0.04	0.04
9.30	0.75	0.39	5.00	0.00	0.04	0.04
9.35	0.75	0.39	5.00	0.00	0.04	0.04
9.40	0.75	0.39	5.00	0.00	0.04	0.04
9.45	0.75	0.39	5.00	0.00	0.04	0.04
9.50	0.75	0.39	5.00	0.00	0.04	0.04
9.55	0.75	0.39	5.00	0.00	0.04	0.04
9.60	0.75	0.39	5.00	0.00	0.04	0.04
9.65	0.75	0.39	5.00	0.00	0.04	0.04
9.70	0.75	0.39	5.00	0.00	0.04	0.04
9.75	0.75	0.39	5.00	0.00	0.04	0.04
9.80	0.75	0.39	5.00	0.00	0.04	0.04
9.85	0.75	0.39	5.00	0.00	0.04	0.04
9.90	0.75	0.39	5.00	0.00	0.04	0.04
9.95	0.75	0.39	5.00	0.00	0.04	0.04
10.00	0.75	0.39	5.00	0.00	0.04	0.04
10.05	0.75	0.39	5.00	0.00	0.04	0.04
10.10	0.75	0.39	5.00	0.00	0.04	0.04
10.15	0.75	0.39	5.00	0.00	0.04	0.04
10.20	0.75	0.39	5.00	0.00	0.04	0.04
10.25	0.75	0.39	5.00	0.00	0.04	0.04
10.30	0.75	0.39	5.00	0.00	0.04	0.04
10.35	0.75	0.39	5.00	0.00	0.04	0.04
10.40	0.75	0.39	5.00	0.00	0.04	0.04
10.45	0.75	0.39	5.00	0.00	0.04	0.04
10.50	0.75	0.39	5.00	0.00	0.04	0.04
10.55	0.75	0.39	5.00	0.00	0.04	0.04
10.60	0.75	0.39	5.00	0.00	0.03	0.03
10.65	0.75	0.39	5.00	0.00	0.03	0.03
10.70	0.66	0.39	5.00	0.00	0.03	0.03
10.75	0.62	0.39	5.00	0.00	0.03	0.03
10.80	0.60	0.39	5.00	0.00	0.03	0.03
10.85	0.58	0.39	5.00	0.00	0.03	0.03
10.90	0.56	0.39	5.00	0.00	0.03	0.03
10.95	0.55	0.39	5.00	0.00	0.03	0.03
11.00	0.54	0.39	5.00	0.00	0.03	0.03
11.05	0.53	0.39	5.00	0.00	0.03	0.03
11.10	0.52	0.39	5.00	0.00	0.03	0.03
11.15	0.51	0.39	5.00	0.00	0.03	0.03
11.20	0.50	0.39	5.00	0.00	0.03	0.03
11.25	0.49	0.39	5.00	0.00	0.03	0.03

11.30	0.48	0.39	5.00	0.00	0.03	0.03
11.35	0.47	0.39	5.00	0.00	0.03	0.03
11.40	0.46	0.39	5.00	0.00	0.03	0.03
11.45	0.45	0.39	5.00	0.00	0.03	0.03
11.50	0.45	0.39	5.00	0.00	0.03	0.03
11.55	0.45	0.39	5.00	0.00	0.03	0.03
11.60	0.45	0.39	5.00	0.00	0.03	0.03
11.65	0.45	0.39	5.00	0.00	0.03	0.03
11.70	0.45	0.39	5.00	0.00	0.03	0.03
11.75	0.46	0.39	5.00	0.00	0.03	0.03
11.80	0.46	0.39	5.00	0.00	0.02	0.02
11.85	0.46	0.39	5.00	0.00	0.02	0.02
11.90	0.46	0.39	5.00	0.00	0.02	0.02
11.95	0.46	0.39	5.00	0.00	0.02	0.02
12.00	0.47	0.39	5.00	0.00	0.02	0.02
12.05	0.47	0.39	5.00	0.00	0.02	0.02
12.10	0.47	0.39	5.00	0.00	0.02	0.02
12.15	0.47	0.39	5.00	0.00	0.02	0.02
12.20	0.47	0.39	5.00	0.00	0.02	0.02
12.25	0.48	0.39	5.00	0.00	0.02	0.02
12.30	0.48	0.39	5.00	0.00	0.02	0.02
12.35	0.48	0.39	5.00	0.00	0.02	0.02
12.40	0.48	0.39	5.00	0.00	0.02	0.02
12.45	0.48	0.39	5.00	0.00	0.02	0.02
12.50	0.49	0.39	5.00	0.00	0.02	0.02
12.55	0.49	0.39	5.00	0.00	0.02	0.02
12.60	0.49	0.39	5.00	0.00	0.02	0.02
12.65	0.49	0.39	5.00	0.00	0.02	0.02
12.70	0.49	0.39	5.00	0.00	0.02	0.02
12.75	0.50	0.39	5.00	0.00	0.02	0.02
12.80	0.50	0.39	5.00	0.00	0.02	0.02
12.85	0.50	0.39	5.00	0.00	0.02	0.02
12.90	0.50	0.39	5.00	0.00	0.02	0.02
12.95	0.51	0.39	5.00	0.00	0.02	0.02
13.00	0.51	0.39	5.00	0.00	0.02	0.02
13.05	0.51	0.39	5.00	0.00	0.02	0.02
13.10	0.51	0.39	5.00	0.00	0.01	0.01
13.15	0.52	0.38	5.00	0.00	0.01	0.01
13.20	0.52	0.38	5.00	0.00	0.01	0.01
13.25	0.52	0.38	5.00	0.00	0.01	0.01
13.30	0.52	0.38	5.00	0.00	0.01	0.01
13.35	0.53	0.38	5.00	0.00	0.01	0.01
13.40	0.53	0.38	5.00	0.00	0.01	0.01
13.45	0.53	0.38	5.00	0.00	0.01	0.01
13.50	0.53	0.38	5.00	0.00	0.01	0.01
13.55	0.54	0.38	5.00	0.00	0.01	0.01
13.60	0.54	0.38	5.00	0.00	0.01	0.01
13.65	0.54	0.38	5.00	0.00	0.01	0.01
13.70	0.55	0.38	5.00	0.00	0.01	0.01
13.75	0.55	0.38	5.00	0.00	0.01	0.01
13.80	0.55	0.38	5.00	0.00	0.01	0.01
13.85	0.56	0.38	5.00	0.00	0.01	0.01
13.90	0.56	0.38	5.00	0.00	0.01	0.01
13.95	0.56	0.38	5.00	0.00	0.01	0.01
14.00	0.57	0.38	5.00	0.00	0.01	0.01
14.05	0.57	0.38	5.00	0.00	0.01	0.01
14.10	0.58	0.38	5.00	0.00	0.01	0.01
14.15	0.58	0.38	5.00	0.00	0.01	0.01
14.20	0.58	0.38	5.00	0.00	0.01	0.01

14.25	0.59	0.38	5.00	0.00	0.01	0.01
14.30	0.59	0.38	5.00	0.00	0.01	0.01
14.35	0.60	0.38	5.00	0.00	0.00	0.00
14.40	0.61	0.38	5.00	0.00	0.00	0.00
14.45	0.61	0.38	5.00	0.00	0.00	0.00
14.50	0.62	0.38	5.00	0.00	0.00	0.00
14.55	0.63	0.38	5.00	0.00	0.00	0.00
14.60	0.64	0.38	5.00	0.00	0.00	0.00
14.65	0.65	0.38	5.00	0.00	0.00	0.00
14.70	0.66	0.38	5.00	0.00	0.00	0.00
14.75	0.68	0.38	5.00	0.00	0.00	0.00
14.80	0.75	0.38	5.00	0.00	0.00	0.00
14.85	0.75	0.38	5.00	0.00	0.00	0.00
14.90	0.75	0.38	5.00	0.00	0.00	0.00
14.95	0.75	0.38	5.00	0.00	0.00	0.00
15.00	0.75	0.38	1.96	0.00	0.00	0.00
15.05	0.75	0.38	1.95	0.00	0.00	0.00
15.10	0.75	0.38	1.95	0.00	0.00	0.00
15.15	0.75	0.39	1.95	0.00	0.00	0.00
15.20	0.75	0.39	1.94	0.00	0.00	0.00
15.25	0.75	0.39	1.94	0.00	0.00	0.00
15.30	0.75	0.39	1.94	0.00	0.00	0.00
15.35	0.75	0.39	1.93	0.00	0.00	0.00
15.40	0.75	0.39	1.93	0.00	0.00	0.00
15.45	0.75	0.39	1.92	0.00	0.00	0.00
15.50	0.75	0.39	1.92	0.00	0.00	0.00
15.55	0.75	0.39	1.92	0.00	0.00	0.00
15.60	0.75	0.39	1.91	0.00	0.00	0.00
15.65	0.75	0.39	1.91	0.00	0.00	0.00
15.70	0.75	0.39	1.91	0.00	0.00	0.00
15.75	0.75	0.39	1.90	0.00	0.00	0.00
15.80	0.75	0.39	1.90	0.00	0.00	0.00
15.85	0.75	0.40	1.90	0.00	0.00	0.00
15.90	0.75	0.40	1.89	0.00	0.00	0.00
15.95	0.75	0.40	1.89	0.00	0.00	0.00
16.00	0.75	0.40	1.89	0.00	0.00	0.00
16.05	0.75	0.40	1.88	0.00	0.00	0.00
16.10	0.75	0.40	1.88	0.00	0.00	0.00
16.15	0.75	0.40	1.88	0.00	0.00	0.00
16.20	0.75	0.40	1.87	0.00	0.00	0.00
16.25	0.75	0.40	1.87	0.00	0.00	0.00
16.30	0.75	0.40	1.87	0.00	0.00	0.00
16.35	0.75	0.40	1.87	0.00	0.00	0.00
16.40	0.75	0.40	1.86	0.00	0.00	0.00
16.45	0.75	0.40	1.86	0.00	0.00	0.00
16.50	0.75	0.40	1.86	0.00	0.00	0.00
16.55	0.75	0.40	1.85	0.00	0.00	0.00
16.60	0.75	0.41	1.85	0.00	0.00	0.00
16.65	0.75	0.41	1.85	0.00	0.00	0.00
16.70	0.75	0.41	1.84	0.00	0.00	0.00
16.75	0.75	0.41	1.84	0.00	0.00	0.00
16.80	0.75	0.41	1.84	0.00	0.00	0.00
16.85	0.75	0.41	1.84	0.00	0.00	0.00
16.90	0.75	0.41	1.83	0.00	0.00	0.00
16.95	0.75	0.41	1.83	0.00	0.00	0.00
17.00	0.75	0.41	1.83	0.00	0.00	0.00
17.05	0.75	0.41	1.82	0.00	0.00	0.00
17.10	0.75	0.41	1.82	0.00	0.00	0.00
17.15	0.75	0.41	1.82	0.00	0.00	0.00

17.20	0.75	0.41	1.82	0.00	0.00	0.00
17.25	0.75	0.41	1.81	0.00	0.00	0.00
17.30	0.75	0.41	1.81	0.00	0.00	0.00
17.35	0.75	0.42	1.81	0.00	0.00	0.00
17.40	0.75	0.42	1.80	0.00	0.00	0.00
17.45	0.75	0.42	1.80	0.00	0.00	0.00
17.50	0.75	0.42	1.80	0.00	0.00	0.00
17.55	0.75	0.42	1.80	0.00	0.00	0.00
17.60	0.75	0.42	1.79	0.00	0.00	0.00
17.65	0.75	0.42	1.79	0.00	0.00	0.00
17.70	0.75	0.42	1.79	0.00	0.00	0.00
17.75	0.75	0.42	1.79	0.00	0.00	0.00
17.80	0.75	0.42	1.78	0.00	0.00	0.00
17.85	0.75	0.42	1.78	0.00	0.00	0.00
17.90	0.75	0.42	1.78	0.00	0.00	0.00
17.95	0.75	0.42	1.78	0.00	0.00	0.00
18.00	0.75	0.42	1.77	0.00	0.00	0.00
18.05	0.75	0.42	1.77	0.00	0.00	0.00
18.10	0.75	0.42	1.77	0.00	0.00	0.00
18.15	0.75	0.42	1.77	0.00	0.00	0.00
18.20	0.75	0.43	1.76	0.00	0.00	0.00
18.25	0.75	0.43	1.76	0.00	0.00	0.00
18.30	0.75	0.43	1.76	0.00	0.00	0.00
18.35	0.75	0.43	1.76	0.00	0.00	0.00
18.40	0.75	0.43	1.75	0.00	0.00	0.00
18.45	0.75	0.43	1.75	0.00	0.00	0.00
18.50	0.75	0.43	1.75	0.00	0.00	0.00
18.55	0.75	0.43	1.75	0.00	0.00	0.00
18.60	0.75	0.43	1.74	0.00	0.00	0.00
18.65	0.75	0.43	1.74	0.00	0.00	0.00
18.70	0.75	0.43	1.74	0.00	0.00	0.00
18.75	0.75	0.43	1.74	0.00	0.00	0.00
18.80	0.75	0.43	1.73	0.00	0.00	0.00
18.85	0.75	0.43	1.73	0.00	0.00	0.00
18.90	0.75	0.43	1.73	0.00	0.00	0.00
18.95	0.75	0.43	1.73	0.00	0.00	0.00
19.00	0.75	0.43	1.73	0.00	0.00	0.00
19.05	0.75	0.44	1.72	0.00	0.00	0.00
19.10	0.75	0.44	1.72	0.00	0.00	0.00
19.15	0.75	0.44	1.72	0.00	0.00	0.00
19.20	0.75	0.44	1.72	0.00	0.00	0.00
19.25	0.75	0.44	1.71	0.00	0.00	0.00
19.30	0.75	0.44	1.71	0.00	0.00	0.00
19.35	0.75	0.44	1.71	0.00	0.00	0.00
19.40	0.75	0.44	1.71	0.00	0.00	0.00
19.45	0.75	0.44	1.71	0.00	0.00	0.00
19.50	0.75	0.44	1.70	0.00	0.00	0.00
19.55	0.75	0.44	1.70	0.00	0.00	0.00
19.60	0.75	0.44	1.70	0.00	0.00	0.00
19.65	0.75	0.44	1.70	0.00	0.00	0.00
19.70	0.75	0.44	1.70	0.00	0.00	0.00
19.75	0.75	0.44	1.69	0.00	0.00	0.00
19.80	0.75	0.44	1.69	0.00	0.00	0.00
19.85	0.75	0.44	1.69	0.00	0.00	0.00
19.90	0.75	0.44	1.69	0.00	0.00	0.00
19.95	0.75	0.45	1.69	0.00	0.00	0.00
20.00	0.75	0.45	1.68	0.00	0.00	0.00
20.05	0.75	0.45	1.68	0.00	0.00	0.00
20.10	0.75	0.45	1.68	0.00	0.00	0.00

20.15	0.75	0.45	1.68	0.00	0.00	0.00
20.20	0.75	0.45	1.68	0.00	0.00	0.00
20.25	0.75	0.45	1.67	0.00	0.00	0.00
20.30	0.75	0.45	1.67	0.00	0.00	0.00
20.35	0.75	0.45	1.67	0.00	0.00	0.00
20.40	0.75	0.45	1.67	0.00	0.00	0.00
20.45	0.75	0.45	1.67	0.00	0.00	0.00
20.50	0.75	0.45	1.66	0.00	0.00	0.00
20.55	0.75	0.45	1.66	0.00	0.00	0.00
20.60	0.75	0.45	1.66	0.00	0.00	0.00
20.65	0.75	0.45	1.66	0.00	0.00	0.00
20.70	0.75	0.45	1.66	0.00	0.00	0.00
20.75	0.75	0.45	1.66	0.00	0.00	0.00
20.80	0.75	0.45	1.65	0.00	0.00	0.00
20.85	0.75	0.45	1.65	0.00	0.00	0.00
20.90	0.75	0.45	1.65	0.00	0.00	0.00
20.95	0.75	0.46	1.65	0.00	0.00	0.00
21.00	0.75	0.46	1.65	0.00	0.00	0.00
21.05	0.75	0.46	1.64	0.00	0.00	0.00
21.10	0.75	0.46	1.64	0.00	0.00	0.00
21.15	0.75	0.46	1.64	0.00	0.00	0.00
21.20	0.75	0.46	1.64	0.00	0.00	0.00
21.25	0.75	0.46	1.64	0.00	0.00	0.00
21.30	0.75	0.46	1.64	0.00	0.00	0.00
21.35	0.75	0.46	1.63	0.00	0.00	0.00
21.40	0.75	0.46	1.63	0.00	0.00	0.00
21.45	0.75	0.46	1.63	0.00	0.00	0.00
21.50	0.75	0.46	1.63	0.00	0.00	0.00
21.55	0.75	0.46	1.63	0.00	0.00	0.00
21.60	0.75	0.46	1.63	0.00	0.00	0.00
21.65	0.75	0.46	1.62	0.00	0.00	0.00
21.70	0.75	0.46	1.62	0.00	0.00	0.00
21.75	0.75	0.46	1.62	0.00	0.00	0.00
21.80	0.75	0.46	1.62	0.00	0.00	0.00
21.85	0.75	0.46	1.62	0.00	0.00	0.00
21.90	0.75	0.46	1.62	0.00	0.00	0.00
21.95	0.75	0.46	1.62	0.00	0.00	0.00
22.00	0.75	0.46	1.61	0.00	0.00	0.00
22.05	0.75	0.47	1.61	0.00	0.00	0.00
22.10	0.75	0.47	1.61	0.00	0.00	0.00
22.15	0.75	0.47	1.61	0.00	0.00	0.00
22.20	0.75	0.47	1.61	0.00	0.00	0.00
22.25	0.75	0.47	1.61	0.00	0.00	0.00
22.30	0.75	0.47	1.60	0.00	0.00	0.00
22.35	0.75	0.47	1.60	0.00	0.00	0.00
22.40	0.75	0.47	1.60	0.00	0.00	0.00
22.45	0.75	0.47	1.60	0.00	0.00	0.00
22.50	0.75	0.47	1.60	0.00	0.00	0.00
22.55	0.75	0.47	1.60	0.00	0.00	0.00
22.60	0.75	0.47	1.60	0.00	0.00	0.00
22.65	0.75	0.47	1.59	0.00	0.00	0.00
22.70	0.75	0.47	1.59	0.00	0.00	0.00
22.75	0.75	0.47	1.59	0.00	0.00	0.00
22.80	0.75	0.47	1.59	0.00	0.00	0.00
22.85	0.75	0.47	1.59	0.00	0.00	0.00
22.90	0.75	0.47	1.59	0.00	0.00	0.00
22.95	0.75	0.47	1.59	0.00	0.00	0.00
23.00	0.75	0.47	1.58	0.00	0.00	0.00
23.05	0.75	0.47	1.58	0.00	0.00	0.00

23.10	0.75	0.47	1.58	0.00	0.00	0.00
23.15	0.75	0.47	1.58	0.00	0.00	0.00
23.20	0.75	0.48	1.58	0.00	0.00	0.00
23.25	0.75	0.48	1.58	0.00	0.00	0.00
23.30	0.75	0.48	1.58	0.00	0.00	0.00
23.35	0.75	0.48	1.57	0.00	0.00	0.00
23.40	0.75	0.48	1.57	0.00	0.00	0.00
23.45	0.75	0.48	1.57	0.00	0.00	0.00
23.50	0.75	0.48	1.57	0.00	0.00	0.00
23.55	0.75	0.48	1.57	0.00	0.00	0.00
23.60	0.75	0.48	1.57	0.00	0.00	0.00
23.65	0.75	0.48	1.57	0.00	0.00	0.00
23.70	0.75	0.48	1.57	0.00	0.00	0.00
23.75	0.75	0.48	1.56	0.00	0.00	0.00
23.80	0.75	0.48	1.56	0.00	0.00	0.00
23.85	0.75	0.48	1.56	0.00	0.00	0.00
23.90	0.75	0.48	1.56	0.00	0.00	0.00
23.95	0.75	0.48	1.56	0.00	0.00	0.00
24.00	0.75	0.48	1.56	0.00	0.00	0.00
24.05	0.75	0.48	1.56	0.00	0.00	0.00
24.10	0.75	0.48	1.55	0.00	0.00	0.00
24.15	0.75	0.48	1.55	0.00	0.00	0.00
24.20	0.75	0.48	1.55	0.00	0.00	0.00
24.25	0.75	0.48	1.55	0.00	0.00	0.00
24.30	0.75	0.48	1.55	0.00	0.00	0.00
24.35	0.75	0.48	1.55	0.00	0.00	0.00
24.40	0.75	0.48	1.55	0.00	0.00	0.00
24.45	0.75	0.49	1.55	0.00	0.00	0.00
24.50	0.75	0.49	1.55	0.00	0.00	0.00
24.55	0.75	0.49	1.54	0.00	0.00	0.00
24.60	0.75	0.49	1.54	0.00	0.00	0.00
24.65	0.75	0.49	1.54	0.00	0.00	0.00
24.70	0.75	0.49	1.54	0.00	0.00	0.00
24.75	0.75	0.49	1.54	0.00	0.00	0.00
24.80	0.75	0.49	1.54	0.00	0.00	0.00
24.85	0.75	0.49	1.54	0.00	0.00	0.00
24.90	0.75	0.49	1.54	0.00	0.00	0.00
24.95	0.75	0.49	1.53	0.00	0.00	0.00
25.00	0.75	0.49	1.53	0.00	0.00	0.00
25.05	0.75	0.49	1.53	0.00	0.00	0.00
25.10	0.75	0.49	1.53	0.00	0.00	0.00
25.15	0.75	0.49	1.53	0.00	0.00	0.00
25.20	0.75	0.49	1.53	0.00	0.00	0.00
25.25	0.75	0.49	1.53	0.00	0.00	0.00
25.30	0.75	0.49	1.53	0.00	0.00	0.00
25.35	0.75	0.49	1.53	0.00	0.00	0.00
25.40	0.75	0.49	1.52	0.00	0.00	0.00
25.45	0.75	0.49	1.52	0.00	0.00	0.00
25.50	0.75	0.49	1.52	0.00	0.00	0.00
25.55	0.75	0.49	1.52	0.00	0.00	0.00
25.60	0.75	0.49	1.52	0.00	0.00	0.00
25.65	0.75	0.49	1.52	0.00	0.00	0.00
25.70	0.75	0.49	1.52	0.00	0.00	0.00
25.75	0.75	0.49	1.52	0.00	0.00	0.00
25.80	0.75	0.49	1.52	0.00	0.00	0.00
25.85	0.75	0.50	1.51	0.00	0.00	0.00
25.90	0.75	0.50	1.51	0.00	0.00	0.00
25.95	0.75	0.50	1.51	0.00	0.00	0.00
26.00	0.75	0.50	1.51	0.00	0.00	0.00

26.05	0.75	0.50	1.51	0.00	0.00	0.00
26.10	0.75	0.50	1.51	0.00	0.00	0.00
26.15	0.75	0.50	1.51	0.00	0.00	0.00
26.20	0.75	0.50	1.51	0.00	0.00	0.00
26.25	0.75	0.50	1.51	0.00	0.00	0.00
26.30	0.75	0.50	1.51	0.00	0.00	0.00
26.35	0.75	0.50	1.50	0.00	0.00	0.00
26.40	0.75	0.50	1.50	0.00	0.00	0.00
26.45	0.75	0.50	1.50	0.00	0.00	0.00
26.50	0.75	0.50	1.50	0.00	0.00	0.00
26.55	0.75	0.50	1.50	0.00	0.00	0.00
26.60	0.75	0.50	1.50	0.00	0.00	0.00
26.65	0.75	0.50	1.50	0.00	0.00	0.00
26.70	0.75	0.50	1.50	0.00	0.00	0.00
26.75	0.75	0.50	1.50	0.00	0.00	0.00
26.80	0.75	0.50	1.50	0.00	0.00	0.00
26.85	0.75	0.50	1.49	0.00	0.00	0.00
26.90	0.75	0.50	1.49	0.00	0.00	0.00
26.95	0.75	0.50	1.49	0.00	0.00	0.00
27.00	0.75	0.50	1.49	0.00	0.00	0.00
27.05	0.75	0.50	1.49	0.00	0.00	0.00
27.10	0.75	0.50	1.49	0.00	0.00	0.00
27.15	0.75	0.50	1.49	0.00	0.00	0.00
27.20	0.75	0.50	1.49	0.00	0.00	0.00
27.25	0.75	0.50	1.49	0.00	0.00	0.00
27.30	0.75	0.50	1.49	0.00	0.00	0.00
27.35	0.75	0.51	1.49	0.00	0.00	0.00
27.40	0.75	0.51	1.48	0.00	0.00	0.00
27.45	0.75	0.51	1.48	0.00	0.00	0.00
27.50	0.75	0.51	1.48	0.00	0.00	0.00
27.55	0.75	0.51	1.48	0.00	0.00	0.00
27.60	0.75	0.51	1.48	0.00	0.00	0.00
27.65	0.75	0.51	1.48	0.00	0.00	0.00
27.70	0.75	0.51	1.48	0.00	0.00	0.00
27.75	0.75	0.51	1.48	0.00	0.00	0.00
27.80	0.75	0.51	1.48	0.00	0.00	0.00
27.85	0.75	0.51	1.48	0.00	0.00	0.00
27.90	0.75	0.51	1.48	0.00	0.00	0.00
27.95	0.75	0.51	1.47	0.00	0.00	0.00
28.00	0.75	0.51	1.47	0.00	0.00	0.00
28.05	0.75	0.51	1.47	0.00	0.00	0.00
28.10	0.75	0.51	1.47	0.00	0.00	0.00
28.15	0.75	0.51	1.47	0.00	0.00	0.00
28.20	0.75	0.51	1.47	0.00	0.00	0.00
28.25	0.75	0.51	1.47	0.00	0.00	0.00
28.30	0.75	0.51	1.47	0.00	0.00	0.00
28.35	0.75	0.51	1.47	0.00	0.00	0.00
28.40	0.75	0.51	1.47	0.00	0.00	0.00
28.45	0.75	0.51	1.47	0.00	0.00	0.00
28.50	0.75	0.51	1.46	0.00	0.00	0.00
28.55	0.75	0.51	1.46	0.00	0.00	0.00
28.60	0.75	0.51	1.46	0.00	0.00	0.00
28.65	0.75	0.51	1.46	0.00	0.00	0.00
28.70	0.75	0.51	1.46	0.00	0.00	0.00
28.75	0.75	0.51	1.46	0.00	0.00	0.00
28.80	0.75	0.51	1.46	0.00	0.00	0.00
28.85	0.75	0.51	1.46	0.00	0.00	0.00
28.90	0.75	0.51	1.46	0.00	0.00	0.00
28.95	0.75	0.51	1.46	0.00	0.00	0.00

29.00	0.75	0.51	1.46	0.00	0.00	0.00
29.05	0.75	0.52	1.46	0.00	0.00	0.00
29.10	0.75	0.52	1.46	0.00	0.00	0.00
29.15	0.75	0.52	1.45	0.00	0.00	0.00
29.20	0.75	0.52	1.45	0.00	0.00	0.00
29.25	0.75	0.52	1.45	0.00	0.00	0.00
29.30	0.75	0.52	1.45	0.00	0.00	0.00
29.35	0.75	0.52	1.45	0.00	0.00	0.00
29.40	0.75	0.52	1.45	0.00	0.00	0.00
29.45	0.75	0.52	1.45	0.00	0.00	0.00
29.50	0.75	0.52	1.45	0.00	0.00	0.00
29.55	0.75	0.52	1.45	0.00	0.00	0.00
29.60	0.75	0.52	1.45	0.00	0.00	0.00
29.65	0.75	0.52	1.45	0.00	0.00	0.00
29.70	0.75	0.52	1.45	0.00	0.00	0.00
29.75	0.75	0.52	1.45	0.00	0.00	0.00
29.80	0.75	0.52	1.44	0.00	0.00	0.00
29.85	0.75	0.52	1.44	0.00	0.00	0.00
29.90	0.75	0.52	1.44	0.00	0.00	0.00
29.95	0.75	0.52	1.44	0.00	0.00	0.00
30.00	0.75	0.52	1.44	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1 tsf (ton/ft2)

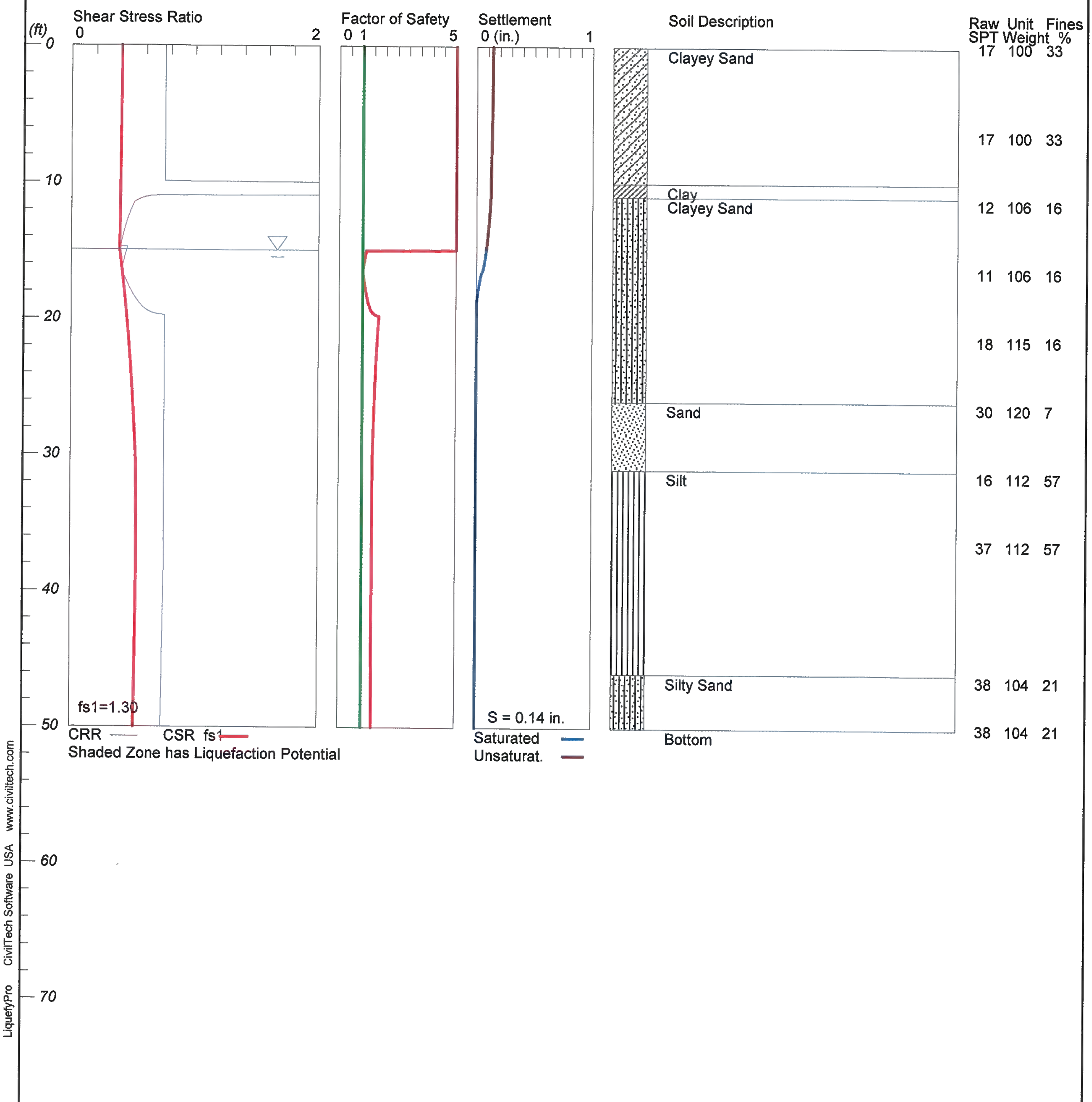
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS

17151 GUSD Crescent Elem

Hole No.=B-8 (2016) ***Water Depth=15 ft***

Magnitude=6.4
Acceleration=0.47g



```
*************************************************************************
                    *****************************
                    LIQUEFACTION ANALYSIS SUMMARY
                   Copyright by CivilTech Software
                          www.civiltech.com
*************************************************************************
                    *****************************
      Font: Courier New, Regular, Size 8 is recommended for this report.
      Licensed to SEI ,      6/26/2019  4:42:05 PM

      Input File Name: O:\b. PROJECT FILES (ACTIVE)\17100-17199\17151
Greenfield USD Updates to Crescent Elem\Updated Geohaz Report for Cres
Elem West\17151 B8 crescent.liq
      Title:  17151 GUSD Crescent Elem
      Subtitle:  B8

      Surface Elev.=
      Hole No.=B-8 (2016)
      Depth of Hole= 50.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 25.00 ft
      Max. Acceleration= 0.47 g
      Earthquake Magnitude= 6.40

 Input Data:
      Surface Elev.=
      Hole No.=B-8 (2016)
      Depth of Hole=50.00 ft
      Water Table during Earthquake= 15.00 ft
      Water Table during In-Situ Testing= 25.00 ft
      Max. Acceleration=0.47 g
      Earthquake Magnitude=6.40
      No-Liquefiable Soils:   CL, OL are Non-Liq. Soil

      1. SPT or BPT Calculation.
      2. Settlement Analysis Method: Tokimatsu, M-correction
      3. Fines Correction for Liquefaction: Idriss/Seed
      4. Fine Correction for Settlement: During Liquefaction*
      5. Settlement Calculation in: All zones*
      6. Hammer Energy Ratio,                                  Ce = 1.25
      7. Borehole Diameter,                                    Cb= 1.15
      8. Sampling Method,                                      Cs= 1.2
      9. User request factor of safety (apply to CSR) ,   User= 1.3
         Plot one CSR curve (fs1=User)
      10. Use Curve Smoothing: Yes*
      * Recommended Options
```

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	17.00	100.00	33.00
6.50	17.00	100.00	33.00
11.50	12.00	106.00	16.00
16.50	11.00	106.00	16.00
21.50	18.00	115.00	16.00
26.50	30.00	120.00	7.00
31.50	16.00	112.00	57.00
36.50	37.00	112.00	57.00
46.50	38.00	104.00	21.00
50.00	38.00	104.00	21.00

Output Results:

Settlement of Saturated Sands=0.08 in.
Settlement of Unsaturated Sands=0.05 in.
Total Settlement of Saturated and Unsaturated Sands=0.14 in.
Differential Settlement=0.068 to 0.090 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.75	0.40	5.00	0.08	0.05	0.14
0.05	0.75	0.40	5.00	0.08	0.05	0.14
0.10	0.75	0.40	5.00	0.08	0.05	0.14
0.15	0.75	0.40	5.00	0.08	0.05	0.14
0.20	0.75	0.40	5.00	0.08	0.05	0.14
0.25	0.75	0.40	5.00	0.08	0.05	0.14
0.30	0.75	0.40	5.00	0.08	0.05	0.14
0.35	0.75	0.40	5.00	0.08	0.05	0.14
0.40	0.75	0.40	5.00	0.08	0.05	0.14
0.45	0.75	0.40	5.00	0.08	0.05	0.14
0.50	0.75	0.40	5.00	0.08	0.05	0.14
0.55	0.75	0.40	5.00	0.08	0.05	0.14
0.60	0.75	0.40	5.00	0.08	0.05	0.14
0.65	0.75	0.40	5.00	0.08	0.05	0.14
0.70	0.75	0.40	5.00	0.08	0.05	0.14
0.75	0.75	0.40	5.00	0.08	0.05	0.14
0.80	0.75	0.40	5.00	0.08	0.05	0.14
0.85	0.75	0.40	5.00	0.08	0.05	0.14
0.90	0.75	0.40	5.00	0.08	0.05	0.14
0.95	0.75	0.40	5.00	0.08	0.05	0.14
1.00	0.75	0.40	5.00	0.08	0.05	0.14
1.05	0.75	0.40	5.00	0.08	0.05	0.14
1.10	0.75	0.40	5.00	0.08	0.05	0.14
1.15	0.75	0.40	5.00	0.08	0.05	0.14
1.20	0.75	0.40	5.00	0.08	0.05	0.14
1.25	0.75	0.40	5.00	0.08	0.05	0.14
1.30	0.75	0.40	5.00	0.08	0.05	0.14
1.35	0.75	0.40	5.00	0.08	0.05	0.14
1.40	0.75	0.40	5.00	0.08	0.05	0.14
1.45	0.75	0.40	5.00	0.08	0.05	0.14
1.50	0.75	0.40	5.00	0.08	0.05	0.14
1.55	0.75	0.40	5.00	0.08	0.05	0.14
1.60	0.75	0.40	5.00	0.08	0.05	0.14
1.65	0.75	0.40	5.00	0.08	0.05	0.14

1.70	0.75	0.40	5.00	0.08	0.05	0.14
1.75	0.75	0.40	5.00	0.08	0.05	0.14
1.80	0.75	0.40	5.00	0.08	0.05	0.14
1.85	0.75	0.40	5.00	0.08	0.05	0.14
1.90	0.75	0.40	5.00	0.08	0.05	0.14
1.95	0.75	0.40	5.00	0.08	0.05	0.14
2.00	0.75	0.40	5.00	0.08	0.05	0.14
2.05	0.75	0.40	5.00	0.08	0.05	0.14
2.10	0.75	0.40	5.00	0.08	0.05	0.14
2.15	0.75	0.40	5.00	0.08	0.05	0.14
2.20	0.75	0.40	5.00	0.08	0.05	0.13
2.25	0.75	0.40	5.00	0.08	0.05	0.13
2.30	0.75	0.40	5.00	0.08	0.05	0.13
2.35	0.75	0.39	5.00	0.08	0.05	0.13
2.40	0.75	0.39	5.00	0.08	0.05	0.13
2.45	0.75	0.39	5.00	0.08	0.05	0.13
2.50	0.75	0.39	5.00	0.08	0.05	0.13
2.55	0.75	0.39	5.00	0.08	0.05	0.13
2.60	0.75	0.39	5.00	0.08	0.05	0.13
2.65	0.75	0.39	5.00	0.08	0.05	0.13
2.70	0.75	0.39	5.00	0.08	0.05	0.13
2.75	0.75	0.39	5.00	0.08	0.05	0.13
2.80	0.75	0.39	5.00	0.08	0.05	0.13
2.85	0.75	0.39	5.00	0.08	0.05	0.13
2.90	0.75	0.39	5.00	0.08	0.05	0.13
2.95	0.75	0.39	5.00	0.08	0.05	0.13
3.00	0.75	0.39	5.00	0.08	0.05	0.13
3.05	0.75	0.39	5.00	0.08	0.05	0.13
3.10	0.75	0.39	5.00	0.08	0.05	0.13
3.15	0.75	0.39	5.00	0.08	0.05	0.13
3.20	0.75	0.39	5.00	0.08	0.05	0.13
3.25	0.75	0.39	5.00	0.08	0.05	0.13
3.30	0.75	0.39	5.00	0.08	0.05	0.13
3.35	0.75	0.39	5.00	0.08	0.05	0.13
3.40	0.75	0.39	5.00	0.08	0.05	0.13
3.45	0.75	0.39	5.00	0.08	0.05	0.13
3.50	0.75	0.39	5.00	0.08	0.05	0.13
3.55	0.75	0.39	5.00	0.08	0.05	0.13
3.60	0.75	0.39	5.00	0.08	0.05	0.13
3.65	0.75	0.39	5.00	0.08	0.05	0.13
3.70	0.75	0.39	5.00	0.08	0.05	0.13
3.75	0.75	0.39	5.00	0.08	0.05	0.13
3.80	0.75	0.39	5.00	0.08	0.05	0.13
3.85	0.75	0.39	5.00	0.08	0.05	0.13
3.90	0.75	0.39	5.00	0.08	0.05	0.13
3.95	0.75	0.39	5.00	0.08	0.05	0.13
4.00	0.75	0.39	5.00	0.08	0.05	0.13
4.05	0.75	0.39	5.00	0.08	0.05	0.13
4.10	0.75	0.39	5.00	0.08	0.05	0.13
4.15	0.75	0.39	5.00	0.08	0.05	0.13
4.20	0.75	0.39	5.00	0.08	0.05	0.13
4.25	0.75	0.39	5.00	0.08	0.05	0.13
4.30	0.75	0.39	5.00	0.08	0.05	0.13
4.35	0.75	0.39	5.00	0.08	0.05	0.13
4.40	0.75	0.39	5.00	0.08	0.05	0.13
4.45	0.75	0.39	5.00	0.08	0.05	0.13
4.50	0.75	0.39	5.00	0.08	0.05	0.13
4.55	0.75	0.39	5.00	0.08	0.05	0.13
4.60	0.75	0.39	5.00	0.08	0.05	0.13

4.65	0.75	0.39	5.00	0.08	0.05	0.13
4.70	0.75	0.39	5.00	0.08	0.05	0.13
4.75	0.75	0.39	5.00	0.08	0.05	0.13
4.80	0.75	0.39	5.00	0.08	0.05	0.13
4.85	0.75	0.39	5.00	0.08	0.05	0.13
4.90	0.75	0.39	5.00	0.08	0.05	0.13
4.95	0.75	0.39	5.00	0.08	0.05	0.13
5.00	0.75	0.39	5.00	0.08	0.05	0.13
5.05	0.75	0.39	5.00	0.08	0.05	0.13
5.10	0.75	0.39	5.00	0.08	0.05	0.13
5.15	0.75	0.39	5.00	0.08	0.05	0.13
5.20	0.75	0.39	5.00	0.08	0.05	0.13
5.25	0.75	0.39	5.00	0.08	0.05	0.13
5.30	0.75	0.39	5.00	0.08	0.05	0.13
5.35	0.75	0.39	5.00	0.08	0.05	0.13
5.40	0.75	0.39	5.00	0.08	0.05	0.13
5.45	0.75	0.39	5.00	0.08	0.05	0.13
5.50	0.75	0.39	5.00	0.08	0.05	0.13
5.55	0.75	0.39	5.00	0.08	0.05	0.13
5.60	0.75	0.39	5.00	0.08	0.05	0.13
5.65	0.75	0.39	5.00	0.08	0.05	0.13
5.70	0.75	0.39	5.00	0.08	0.05	0.13
5.75	0.75	0.39	5.00	0.08	0.05	0.13
5.80	0.75	0.39	5.00	0.08	0.05	0.13
5.85	0.75	0.39	5.00	0.08	0.05	0.13
5.90	0.75	0.39	5.00	0.08	0.05	0.13
5.95	0.75	0.39	5.00	0.08	0.05	0.13
6.00	0.75	0.39	5.00	0.08	0.05	0.13
6.05	0.75	0.39	5.00	0.08	0.05	0.13
6.10	0.75	0.39	5.00	0.08	0.05	0.13
6.15	0.75	0.39	5.00	0.08	0.05	0.13
6.20	0.75	0.39	5.00	0.08	0.05	0.13
6.25	0.75	0.39	5.00	0.08	0.05	0.13
6.30	0.75	0.39	5.00	0.08	0.05	0.13
6.35	0.75	0.39	5.00	0.08	0.05	0.13
6.40	0.75	0.39	5.00	0.08	0.05	0.13
6.45	0.75	0.39	5.00	0.08	0.05	0.13
6.50	0.75	0.39	5.00	0.08	0.05	0.13
6.55	0.75	0.39	5.00	0.08	0.05	0.13
6.60	0.75	0.39	5.00	0.08	0.05	0.13
6.65	0.75	0.39	5.00	0.08	0.05	0.13
6.70	0.75	0.39	5.00	0.08	0.05	0.13
6.75	0.75	0.39	5.00	0.08	0.05	0.13
6.80	0.75	0.39	5.00	0.08	0.05	0.13
6.85	0.75	0.39	5.00	0.08	0.05	0.13
6.90	0.75	0.39	5.00	0.08	0.05	0.13
6.95	0.75	0.39	5.00	0.08	0.05	0.13
7.00	0.75	0.39	5.00	0.08	0.05	0.13
7.05	0.75	0.39	5.00	0.08	0.05	0.13
7.10	0.75	0.39	5.00	0.08	0.05	0.13
7.15	0.75	0.39	5.00	0.08	0.05	0.13
7.20	0.75	0.39	5.00	0.08	0.05	0.13
7.25	0.75	0.39	5.00	0.08	0.05	0.13
7.30	0.75	0.39	5.00	0.08	0.05	0.13
7.35	0.75	0.39	5.00	0.08	0.05	0.13
7.40	0.75	0.39	5.00	0.08	0.05	0.13
7.45	0.75	0.39	5.00	0.08	0.05	0.13
7.50	0.75	0.39	5.00	0.08	0.05	0.13
7.55	0.75	0.39	5.00	0.08	0.05	0.13

7.60	0.75	0.39	5.00	0.08	0.05	0.13
7.65	0.75	0.39	5.00	0.08	0.05	0.13
7.70	0.75	0.39	5.00	0.08	0.05	0.13
7.75	0.75	0.39	5.00	0.08	0.05	0.13
7.80	0.75	0.39	5.00	0.08	0.05	0.13
7.85	0.75	0.39	5.00	0.08	0.04	0.13
7.90	0.75	0.39	5.00	0.08	0.04	0.13
7.95	0.75	0.39	5.00	0.08	0.04	0.13
8.00	0.75	0.39	5.00	0.08	0.04	0.13
8.05	0.75	0.39	5.00	0.08	0.04	0.13
8.10	0.75	0.39	5.00	0.08	0.04	0.13
8.15	0.75	0.39	5.00	0.08	0.04	0.13
8.20	0.75	0.39	5.00	0.08	0.04	0.13
8.25	0.75	0.39	5.00	0.08	0.04	0.13
8.30	0.75	0.39	5.00	0.08	0.04	0.13
8.35	0.75	0.39	5.00	0.08	0.04	0.13
8.40	0.75	0.39	5.00	0.08	0.04	0.13
8.45	0.75	0.39	5.00	0.08	0.04	0.13
8.50	0.75	0.39	5.00	0.08	0.04	0.13
8.55	0.75	0.39	5.00	0.08	0.04	0.12
8.60	0.75	0.39	5.00	0.08	0.04	0.12
8.65	0.75	0.39	5.00	0.08	0.04	0.12
8.70	0.75	0.39	5.00	0.08	0.04	0.12
8.75	0.75	0.39	5.00	0.08	0.04	0.12
8.80	0.75	0.39	5.00	0.08	0.04	0.12
8.85	0.75	0.39	5.00	0.08	0.04	0.12
8.90	0.75	0.39	5.00	0.08	0.04	0.12
8.95	0.75	0.39	5.00	0.08	0.04	0.12
9.00	0.75	0.39	5.00	0.08	0.04	0.12
9.05	0.75	0.39	5.00	0.08	0.04	0.12
9.10	0.75	0.39	5.00	0.08	0.04	0.12
9.15	0.75	0.39	5.00	0.08	0.04	0.12
9.20	0.75	0.39	5.00	0.08	0.04	0.12
9.25	0.75	0.39	5.00	0.08	0.04	0.12
9.30	0.75	0.39	5.00	0.08	0.04	0.12
9.35	0.75	0.39	5.00	0.08	0.04	0.12
9.40	0.75	0.39	5.00	0.08	0.04	0.12
9.45	0.75	0.39	5.00	0.08	0.04	0.12
9.50	0.75	0.39	5.00	0.08	0.04	0.12
9.55	0.75	0.39	5.00	0.08	0.04	0.12
9.60	0.75	0.39	5.00	0.08	0.04	0.12
9.65	0.75	0.39	5.00	0.08	0.04	0.12
9.70	0.75	0.39	5.00	0.08	0.04	0.12
9.75	0.75	0.39	5.00	0.08	0.04	0.12
9.80	0.75	0.39	5.00	0.08	0.04	0.12
9.85	0.75	0.39	5.00	0.08	0.04	0.12
9.90	0.75	0.39	5.00	0.08	0.04	0.12
9.95	0.75	0.39	5.00	0.08	0.04	0.12
10.00	2.00	0.39	5.00	0.08	0.04	0.12
10.05	2.00	0.39	5.00	0.08	0.04	0.12
10.10	2.00	0.39	5.00	0.08	0.04	0.12
10.15	2.00	0.39	5.00	0.08	0.04	0.12
10.20	2.00	0.39	5.00	0.08	0.04	0.12
10.25	2.00	0.39	5.00	0.08	0.04	0.12
10.30	2.00	0.39	5.00	0.08	0.04	0.12
10.35	2.00	0.39	5.00	0.08	0.04	0.12
10.40	2.00	0.39	5.00	0.08	0.04	0.12
10.45	2.00	0.39	5.00	0.08	0.04	0.12
10.50	2.00	0.39	5.00	0.08	0.04	0.12

10.55	2.00	0.39	5.00	0.08	0.04	0.12
10.60	2.00	0.39	5.00	0.08	0.04	0.12
10.65	2.00	0.39	5.00	0.08	0.04	0.12
10.70	2.00	0.39	5.00	0.08	0.04	0.12
10.75	2.00	0.39	5.00	0.08	0.04	0.12
10.80	2.00	0.39	5.00	0.08	0.04	0.12
10.85	2.00	0.39	5.00	0.08	0.04	0.12
10.90	2.00	0.39	5.00	0.08	0.04	0.12
10.95	2.00	0.39	5.00	0.08	0.04	0.12
11.00	0.72	0.39	5.00	0.08	0.04	0.12
11.05	0.65	0.39	5.00	0.08	0.04	0.12
11.10	0.61	0.39	5.00	0.08	0.04	0.12
11.15	0.59	0.39	5.00	0.08	0.04	0.12
11.20	0.57	0.39	5.00	0.08	0.04	0.12
11.25	0.56	0.39	5.00	0.08	0.04	0.12
11.30	0.54	0.39	5.00	0.08	0.04	0.12
11.35	0.53	0.39	5.00	0.08	0.04	0.12
11.40	0.52	0.39	5.00	0.08	0.04	0.12
11.45	0.51	0.39	5.00	0.08	0.04	0.12
11.50	0.51	0.39	5.00	0.08	0.04	0.12
11.55	0.50	0.39	5.00	0.08	0.04	0.12
11.60	0.50	0.39	5.00	0.08	0.04	0.12
11.65	0.50	0.39	5.00	0.08	0.03	0.12
11.70	0.49	0.39	5.00	0.08	0.03	0.12
11.75	0.49	0.39	5.00	0.08	0.03	0.12
11.80	0.49	0.39	5.00	0.08	0.03	0.12
11.85	0.49	0.39	5.00	0.08	0.03	0.11
11.90	0.48	0.39	5.00	0.08	0.03	0.11
11.95	0.48	0.39	5.00	0.08	0.03	0.11
12.00	0.48	0.39	5.00	0.08	0.03	0.11
12.05	0.48	0.39	5.00	0.08	0.03	0.11
12.10	0.48	0.39	5.00	0.08	0.03	0.11
12.15	0.47	0.39	5.00	0.08	0.03	0.11
12.20	0.47	0.39	5.00	0.08	0.03	0.11
12.25	0.47	0.39	5.00	0.08	0.03	0.11
12.30	0.47	0.39	5.00	0.08	0.03	0.11
12.35	0.46	0.39	5.00	0.08	0.03	0.11
12.40	0.46	0.39	5.00	0.08	0.03	0.11
12.45	0.46	0.39	5.00	0.08	0.03	0.11
12.50	0.46	0.39	5.00	0.08	0.03	0.11
12.55	0.46	0.39	5.00	0.08	0.03	0.11
12.60	0.45	0.39	5.00	0.08	0.03	0.11
12.65	0.45	0.39	5.00	0.08	0.03	0.11
12.70	0.45	0.39	5.00	0.08	0.03	0.11
12.75	0.45	0.39	5.00	0.08	0.03	0.11
12.80	0.45	0.39	5.00	0.08	0.03	0.11
12.85	0.45	0.39	5.00	0.08	0.03	0.11
12.90	0.44	0.39	5.00	0.08	0.02	0.11
12.95	0.44	0.39	5.00	0.08	0.02	0.11
13.00	0.44	0.39	5.00	0.08	0.02	0.11
13.05	0.44	0.39	5.00	0.08	0.02	0.10
13.10	0.44	0.39	5.00	0.08	0.02	0.10
13.15	0.43	0.38	5.00	0.08	0.02	0.10
13.20	0.43	0.38	5.00	0.08	0.02	0.10
13.25	0.43	0.38	5.00	0.08	0.02	0.10
13.30	0.43	0.38	5.00	0.08	0.02	0.10
13.35	0.43	0.38	5.00	0.08	0.02	0.10
13.40	0.43	0.38	5.00	0.08	0.02	0.10
13.45	0.43	0.38	5.00	0.08	0.02	0.10

13.50	0.42	0.38	5.00	0.08	0.02	0.10
13.55	0.42	0.38	5.00	0.08	0.02	0.10
13.60	0.42	0.38	5.00	0.08	0.02	0.10
13.65	0.42	0.38	5.00	0.08	0.02	0.10
13.70	0.42	0.38	5.00	0.08	0.02	0.10
13.75	0.42	0.38	5.00	0.08	0.02	0.10
13.80	0.42	0.38	5.00	0.08	0.02	0.10
13.85	0.41	0.38	5.00	0.08	0.01	0.10
13.90	0.41	0.38	5.00	0.08	0.01	0.10
13.95	0.41	0.38	5.00	0.08	0.01	0.10
14.00	0.41	0.38	5.00	0.08	0.01	0.09
14.05	0.41	0.38	5.00	0.08	0.01	0.09
14.10	0.41	0.38	5.00	0.08	0.01	0.09
14.15	0.41	0.38	5.00	0.08	0.01	0.09
14.20	0.40	0.38	5.00	0.08	0.01	0.09
14.25	0.40	0.38	5.00	0.08	0.01	0.09
14.30	0.40	0.38	5.00	0.08	0.01	0.09
14.35	0.40	0.38	5.00	0.08	0.01	0.09
14.40	0.40	0.38	5.00	0.08	0.01	0.09
14.45	0.40	0.38	5.00	0.08	0.01	0.09
14.50	0.40	0.38	5.00	0.08	0.01	0.09
14.55	0.40	0.38	5.00	0.08	0.01	0.09
14.60	0.39	0.38	5.00	0.08	0.01	0.09
14.65	0.39	0.38	5.00	0.08	0.00	0.09
14.70	0.39	0.38	5.00	0.08	0.00	0.09
14.75	0.39	0.38	5.00	0.08	0.00	0.08
14.80	0.45	0.38	5.00	0.08	0.00	0.08
14.85	0.45	0.38	5.00	0.08	0.00	0.08
14.90	0.44	0.38	5.00	0.08	0.00	0.08
14.95	0.44	0.38	5.00	0.08	0.00	0.08
15.00	0.44	0.38	1.15	0.08	0.00	0.08
15.05	0.44	0.38	1.14	0.08	0.00	0.08
15.10	0.44	0.38	1.14	0.08	0.00	0.08
15.15	0.44	0.39	1.13	0.08	0.00	0.08
15.20	0.44	0.39	1.13	0.08	0.00	0.08
15.25	0.43	0.39	1.12	0.08	0.00	0.08
15.30	0.43	0.39	1.11	0.08	0.00	0.08
15.35	0.43	0.39	1.11	0.08	0.00	0.08
15.40	0.43	0.39	1.10	0.08	0.00	0.08
15.45	0.43	0.39	1.10	0.07	0.00	0.07
15.50	0.43	0.39	1.09	0.07	0.00	0.07
15.55	0.42	0.39	1.09	0.07	0.00	0.07
15.60	0.42	0.39	1.08	0.07	0.00	0.07
15.65	0.42	0.39	1.08	0.07	0.00	0.07
15.70	0.42	0.39	1.07	0.07	0.00	0.07
15.75	0.42	0.39	1.06	0.07	0.00	0.07
15.80	0.42	0.39	1.06	0.07	0.00	0.07
15.85	0.42	0.40	1.05	0.07	0.00	0.07
15.90	0.42	0.40	1.05	0.07	0.00	0.07
15.95	0.41	0.40	1.04	0.06	0.00	0.06
16.00	0.41	0.40	1.04	0.06	0.00	0.06
16.05	0.41	0.40	1.03	0.06	0.00	0.06
16.10	0.41	0.40	1.03	0.06	0.00	0.06
16.15	0.41	0.40	1.02	0.06	0.00	0.06
16.20	0.41	0.40	1.02	0.06	0.00	0.06
16.25	0.41	0.40	1.01	0.06	0.00	0.06
16.30	0.41	0.40	1.01	0.06	0.00	0.06
16.35	0.40	0.40	1.01	0.05	0.00	0.05
16.40	0.40	0.40	1.00	0.05	0.00	0.05

16.45	0.40	0.40	1.00*	0.05	0.00	0.05
16.50	0.40	0.40	0.99*	0.05	0.00	0.05
16.55	0.40	0.40	1.00*	0.05	0.00	0.05
16.60	0.41	0.41	1.00*	0.04	0.00	0.04
16.65	0.41	0.41	1.00	0.04	0.00	0.04
16.70	0.41	0.41	1.01	0.04	0.00	0.04
16.75	0.41	0.41	1.01	0.04	0.00	0.04
16.80	0.41	0.41	1.02	0.04	0.00	0.04
16.85	0.42	0.41	1.02	0.03	0.00	0.03
16.90	0.42	0.41	1.02	0.03	0.00	0.03
16.95	0.42	0.41	1.03	0.03	0.00	0.03
17.00	0.42	0.41	1.03	0.03	0.00	0.03
17.05	0.43	0.41	1.04	0.03	0.00	0.03
17.10	0.43	0.41	1.04	0.03	0.00	0.03
17.15	0.43	0.41	1.05	0.03	0.00	0.03
17.20	0.43	0.41	1.05	0.03	0.00	0.03
17.25	0.44	0.41	1.05	0.03	0.00	0.03
17.30	0.44	0.41	1.06	0.02	0.00	0.02
17.35	0.44	0.42	1.06	0.02	0.00	0.02
17.40	0.44	0.42	1.07	0.02	0.00	0.02
17.45	0.45	0.42	1.07	0.02	0.00	0.02
17.50	0.45	0.42	1.08	0.02	0.00	0.02
17.55	0.45	0.42	1.08	0.02	0.00	0.02
17.60	0.45	0.42	1.09	0.02	0.00	0.02
17.65	0.46	0.42	1.09	0.02	0.00	0.02
17.70	0.46	0.42	1.10	0.02	0.00	0.02
17.75	0.46	0.42	1.10	0.02	0.00	0.02
17.80	0.47	0.42	1.11	0.01	0.00	0.01
17.85	0.47	0.42	1.11	0.01	0.00	0.01
17.90	0.47	0.42	1.12	0.01	0.00	0.01
17.95	0.47	0.42	1.12	0.01	0.00	0.01
18.00	0.48	0.42	1.13	0.01	0.00	0.01
18.05	0.48	0.42	1.13	0.01	0.00	0.01
18.10	0.48	0.42	1.14	0.01	0.00	0.01
18.15	0.49	0.42	1.14	0.01	0.00	0.01
18.20	0.49	0.43	1.15	0.01	0.00	0.01
18.25	0.49	0.43	1.16	0.01	0.00	0.01
18.30	0.50	0.43	1.16	0.01	0.00	0.01
18.35	0.50	0.43	1.17	0.01	0.00	0.01
18.40	0.50	0.43	1.17	0.00	0.00	0.00
18.45	0.51	0.43	1.18	0.00	0.00	0.00
18.50	0.51	0.43	1.19	0.00	0.00	0.00
18.55	0.51	0.43	1.19	0.00	0.00	0.00
18.60	0.52	0.43	1.20	0.00	0.00	0.00
18.65	0.52	0.43	1.21	0.00	0.00	0.00
18.70	0.52	0.43	1.21	0.00	0.00	0.00
18.75	0.53	0.43	1.22	0.00	0.00	0.00
18.80	0.53	0.43	1.23	0.00	0.00	0.00
18.85	0.54	0.43	1.24	0.00	0.00	0.00
18.90	0.54	0.43	1.24	0.00	0.00	0.00
18.95	0.54	0.43	1.25	0.00	0.00	0.00
19.00	0.55	0.43	1.26	0.00	0.00	0.00
19.05	0.55	0.44	1.27	0.00	0.00	0.00
19.10	0.56	0.44	1.28	0.00	0.00	0.00
19.15	0.56	0.44	1.29	0.00	0.00	0.00
19.20	0.57	0.44	1.30	0.00	0.00	0.00
19.25	0.58	0.44	1.31	0.00	0.00	0.00
19.30	0.58	0.44	1.33	0.00	0.00	0.00
19.35	0.59	0.44	1.34	0.00	0.00	0.00

19.40	0.60	0.44	1.36	0.00	0.00	0.00
19.45	0.61	0.44	1.38	0.00	0.00	0.00
19.50	0.62	0.44	1.40	0.00	0.00	0.00
19.55	0.63	0.44	1.42	0.00	0.00	0.00
19.60	0.64	0.44	1.45	0.00	0.00	0.00
19.65	0.66	0.44	1.49	0.00	0.00	0.00
19.70	0.68	0.44	1.54	0.00	0.00	0.00
19.75	0.71	0.44	1.61	0.00	0.00	0.00
19.80	0.75	0.44	1.69	0.00	0.00	0.00
19.85	0.75	0.44	1.69	0.00	0.00	0.00
19.90	0.75	0.44	1.69	0.00	0.00	0.00
19.95	0.75	0.45	1.69	0.00	0.00	0.00
20.00	0.75	0.45	1.68	0.00	0.00	0.00
20.05	0.75	0.45	1.68	0.00	0.00	0.00
20.10	0.75	0.45	1.68	0.00	0.00	0.00
20.15	0.75	0.45	1.68	0.00	0.00	0.00
20.20	0.75	0.45	1.68	0.00	0.00	0.00
20.25	0.75	0.45	1.67	0.00	0.00	0.00
20.30	0.75	0.45	1.67	0.00	0.00	0.00
20.35	0.75	0.45	1.67	0.00	0.00	0.00
20.40	0.75	0.45	1.67	0.00	0.00	0.00
20.45	0.75	0.45	1.67	0.00	0.00	0.00
20.50	0.75	0.45	1.66	0.00	0.00	0.00
20.55	0.75	0.45	1.66	0.00	0.00	0.00
20.60	0.75	0.45	1.66	0.00	0.00	0.00
20.65	0.75	0.45	1.66	0.00	0.00	0.00
20.70	0.75	0.45	1.66	0.00	0.00	0.00
20.75	0.75	0.45	1.66	0.00	0.00	0.00
20.80	0.75	0.45	1.65	0.00	0.00	0.00
20.85	0.75	0.45	1.65	0.00	0.00	0.00
20.90	0.75	0.45	1.65	0.00	0.00	0.00
20.95	0.75	0.46	1.65	0.00	0.00	0.00
21.00	0.75	0.46	1.65	0.00	0.00	0.00
21.05	0.75	0.46	1.64	0.00	0.00	0.00
21.10	0.75	0.46	1.64	0.00	0.00	0.00
21.15	0.75	0.46	1.64	0.00	0.00	0.00
21.20	0.75	0.46	1.64	0.00	0.00	0.00
21.25	0.75	0.46	1.64	0.00	0.00	0.00
21.30	0.75	0.46	1.64	0.00	0.00	0.00
21.35	0.75	0.46	1.63	0.00	0.00	0.00
21.40	0.75	0.46	1.63	0.00	0.00	0.00
21.45	0.75	0.46	1.63	0.00	0.00	0.00
21.50	0.75	0.46	1.63	0.00	0.00	0.00
21.55	0.75	0.46	1.63	0.00	0.00	0.00
21.60	0.75	0.46	1.63	0.00	0.00	0.00
21.65	0.75	0.46	1.62	0.00	0.00	0.00
21.70	0.75	0.46	1.62	0.00	0.00	0.00
21.75	0.75	0.46	1.62	0.00	0.00	0.00
21.80	0.75	0.46	1.62	0.00	0.00	0.00
21.85	0.75	0.46	1.62	0.00	0.00	0.00
21.90	0.75	0.46	1.62	0.00	0.00	0.00
21.95	0.75	0.46	1.62	0.00	0.00	0.00
22.00	0.75	0.46	1.61	0.00	0.00	0.00
22.05	0.75	0.47	1.61	0.00	0.00	0.00
22.10	0.75	0.47	1.61	0.00	0.00	0.00
22.15	0.75	0.47	1.61	0.00	0.00	0.00
22.20	0.75	0.47	1.61	0.00	0.00	0.00
22.25	0.75	0.47	1.61	0.00	0.00	0.00
22.30	0.75	0.47	1.60	0.00	0.00	0.00

22.35	0.75	0.47	1.60	0.00	0.00	0.00
22.40	0.75	0.47	1.60	0.00	0.00	0.00
22.45	0.75	0.47	1.60	0.00	0.00	0.00
22.50	0.75	0.47	1.60	0.00	0.00	0.00
22.55	0.75	0.47	1.60	0.00	0.00	0.00
22.60	0.75	0.47	1.60	0.00	0.00	0.00
22.65	0.75	0.47	1.59	0.00	0.00	0.00
22.70	0.75	0.47	1.59	0.00	0.00	0.00
22.75	0.75	0.47	1.59	0.00	0.00	0.00
22.80	0.75	0.47	1.59	0.00	0.00	0.00
22.85	0.75	0.47	1.59	0.00	0.00	0.00
22.90	0.75	0.47	1.59	0.00	0.00	0.00
22.95	0.75	0.47	1.59	0.00	0.00	0.00
23.00	0.75	0.47	1.58	0.00	0.00	0.00
23.05	0.75	0.47	1.58	0.00	0.00	0.00
23.10	0.75	0.47	1.58	0.00	0.00	0.00
23.15	0.75	0.47	1.58	0.00	0.00	0.00
23.20	0.75	0.48	1.58	0.00	0.00	0.00
23.25	0.75	0.48	1.58	0.00	0.00	0.00
23.30	0.75	0.48	1.58	0.00	0.00	0.00
23.35	0.75	0.48	1.57	0.00	0.00	0.00
23.40	0.75	0.48	1.57	0.00	0.00	0.00
23.45	0.75	0.48	1.57	0.00	0.00	0.00
23.50	0.75	0.48	1.57	0.00	0.00	0.00
23.55	0.75	0.48	1.57	0.00	0.00	0.00
23.60	0.75	0.48	1.57	0.00	0.00	0.00
23.65	0.75	0.48	1.57	0.00	0.00	0.00
23.70	0.75	0.48	1.57	0.00	0.00	0.00
23.75	0.75	0.48	1.56	0.00	0.00	0.00
23.80	0.75	0.48	1.56	0.00	0.00	0.00
23.85	0.75	0.48	1.56	0.00	0.00	0.00
23.90	0.75	0.48	1.56	0.00	0.00	0.00
23.95	0.75	0.48	1.56	0.00	0.00	0.00
24.00	0.75	0.48	1.56	0.00	0.00	0.00
24.05	0.75	0.48	1.56	0.00	0.00	0.00
24.10	0.75	0.48	1.56	0.00	0.00	0.00
24.15	0.75	0.48	1.55	0.00	0.00	0.00
24.20	0.75	0.48	1.55	0.00	0.00	0.00
24.25	0.75	0.48	1.55	0.00	0.00	0.00
24.30	0.75	0.48	1.55	0.00	0.00	0.00
24.35	0.75	0.48	1.55	0.00	0.00	0.00
24.40	0.75	0.48	1.55	0.00	0.00	0.00
24.45	0.75	0.48	1.55	0.00	0.00	0.00
24.50	0.75	0.49	1.55	0.00	0.00	0.00
24.55	0.75	0.49	1.54	0.00	0.00	0.00
24.60	0.75	0.49	1.54	0.00	0.00	0.00
24.65	0.75	0.49	1.54	0.00	0.00	0.00
24.70	0.75	0.49	1.54	0.00	0.00	0.00
24.75	0.75	0.49	1.54	0.00	0.00	0.00
24.80	0.75	0.49	1.54	0.00	0.00	0.00
24.85	0.75	0.49	1.54	0.00	0.00	0.00
24.90	0.75	0.49	1.54	0.00	0.00	0.00
24.95	0.75	0.49	1.54	0.00	0.00	0.00
25.00	0.75	0.49	1.53	0.00	0.00	0.00
25.05	0.75	0.49	1.53	0.00	0.00	0.00
25.10	0.75	0.49	1.53	0.00	0.00	0.00
25.15	0.75	0.49	1.53	0.00	0.00	0.00
25.20	0.75	0.49	1.53	0.00	0.00	0.00
25.25	0.75	0.49	1.53	0.00	0.00	0.00

25.30	0.75	0.49	1.53	0.00	0.00	0.00
25.35	0.75	0.49	1.53	0.00	0.00	0.00
25.40	0.75	0.49	1.53	0.00	0.00	0.00
25.45	0.75	0.49	1.52	0.00	0.00	0.00
25.50	0.75	0.49	1.52	0.00	0.00	0.00
25.55	0.75	0.49	1.52	0.00	0.00	0.00
25.60	0.75	0.49	1.52	0.00	0.00	0.00
25.65	0.75	0.49	1.52	0.00	0.00	0.00
25.70	0.75	0.49	1.52	0.00	0.00	0.00
25.75	0.75	0.49	1.52	0.00	0.00	0.00
25.80	0.75	0.49	1.52	0.00	0.00	0.00
25.85	0.75	0.49	1.52	0.00	0.00	0.00
25.90	0.75	0.50	1.52	0.00	0.00	0.00
25.95	0.75	0.50	1.51	0.00	0.00	0.00
26.00	0.75	0.50	1.51	0.00	0.00	0.00
26.05	0.75	0.50	1.51	0.00	0.00	0.00
26.10	0.75	0.50	1.51	0.00	0.00	0.00
26.15	0.75	0.50	1.51	0.00	0.00	0.00
26.20	0.75	0.50	1.51	0.00	0.00	0.00
26.25	0.75	0.50	1.51	0.00	0.00	0.00
26.30	0.75	0.50	1.51	0.00	0.00	0.00
26.35	0.75	0.50	1.51	0.00	0.00	0.00
26.40	0.75	0.50	1.51	0.00	0.00	0.00
26.45	0.75	0.50	1.50	0.00	0.00	0.00
26.50	0.75	0.50	1.50	0.00	0.00	0.00
26.55	0.75	0.50	1.50	0.00	0.00	0.00
26.60	0.75	0.50	1.50	0.00	0.00	0.00
26.65	0.75	0.50	1.50	0.00	0.00	0.00
26.70	0.75	0.50	1.50	0.00	0.00	0.00
26.75	0.75	0.50	1.50	0.00	0.00	0.00
26.80	0.75	0.50	1.50	0.00	0.00	0.00
26.85	0.75	0.50	1.50	0.00	0.00	0.00
26.90	0.75	0.50	1.50	0.00	0.00	0.00
26.95	0.75	0.50	1.50	0.00	0.00	0.00
27.00	0.75	0.50	1.49	0.00	0.00	0.00
27.05	0.75	0.50	1.49	0.00	0.00	0.00
27.10	0.75	0.50	1.49	0.00	0.00	0.00
27.15	0.75	0.50	1.49	0.00	0.00	0.00
27.20	0.75	0.50	1.49	0.00	0.00	0.00
27.25	0.75	0.50	1.49	0.00	0.00	0.00
27.30	0.75	0.50	1.49	0.00	0.00	0.00
27.35	0.75	0.50	1.49	0.00	0.00	0.00
27.40	0.75	0.50	1.49	0.00	0.00	0.00
27.45	0.75	0.50	1.49	0.00	0.00	0.00
27.50	0.75	0.51	1.49	0.00	0.00	0.00
27.55	0.75	0.51	1.48	0.00	0.00	0.00
27.60	0.75	0.51	1.48	0.00	0.00	0.00
27.65	0.75	0.51	1.48	0.00	0.00	0.00
27.70	0.75	0.51	1.48	0.00	0.00	0.00
27.75	0.75	0.51	1.48	0.00	0.00	0.00
27.80	0.75	0.51	1.48	0.00	0.00	0.00
27.85	0.75	0.51	1.48	0.00	0.00	0.00
27.90	0.75	0.51	1.48	0.00	0.00	0.00
27.95	0.75	0.51	1.48	0.00	0.00	0.00
28.00	0.75	0.51	1.48	0.00	0.00	0.00
28.05	0.75	0.51	1.48	0.00	0.00	0.00
28.10	0.75	0.51	1.47	0.00	0.00	0.00
28.15	0.75	0.51	1.47	0.00	0.00	0.00
28.20	0.75	0.51	1.47	0.00	0.00	0.00

28.25	0.75	0.51	1.47	0.00	0.00	0.00
28.30	0.75	0.51	1.47	0.00	0.00	0.00
28.35	0.75	0.51	1.47	0.00	0.00	0.00
28.40	0.75	0.51	1.47	0.00	0.00	0.00
28.45	0.75	0.51	1.47	0.00	0.00	0.00
28.50	0.75	0.51	1.47	0.00	0.00	0.00
28.55	0.75	0.51	1.47	0.00	0.00	0.00
28.60	0.75	0.51	1.47	0.00	0.00	0.00
28.65	0.75	0.51	1.47	0.00	0.00	0.00
28.70	0.75	0.51	1.47	0.00	0.00	0.00
28.75	0.75	0.51	1.46	0.00	0.00	0.00
28.80	0.75	0.51	1.46	0.00	0.00	0.00
28.85	0.75	0.51	1.46	0.00	0.00	0.00
28.90	0.75	0.51	1.46	0.00	0.00	0.00
28.95	0.75	0.51	1.46	0.00	0.00	0.00
29.00	0.75	0.51	1.46	0.00	0.00	0.00
29.05	0.75	0.51	1.46	0.00	0.00	0.00
29.10	0.75	0.51	1.46	0.00	0.00	0.00
29.15	0.75	0.51	1.46	0.00	0.00	0.00
29.20	0.75	0.51	1.46	0.00	0.00	0.00
29.25	0.75	0.52	1.46	0.00	0.00	0.00
29.30	0.75	0.52	1.46	0.00	0.00	0.00
29.35	0.75	0.52	1.45	0.00	0.00	0.00
29.40	0.75	0.52	1.45	0.00	0.00	0.00
29.45	0.75	0.52	1.45	0.00	0.00	0.00
29.50	0.75	0.52	1.45	0.00	0.00	0.00
29.55	0.75	0.52	1.45	0.00	0.00	0.00
29.60	0.75	0.52	1.45	0.00	0.00	0.00
29.65	0.75	0.52	1.45	0.00	0.00	0.00
29.70	0.75	0.52	1.45	0.00	0.00	0.00
29.75	0.75	0.52	1.45	0.00	0.00	0.00
29.80	0.75	0.52	1.45	0.00	0.00	0.00
29.85	0.75	0.52	1.45	0.00	0.00	0.00
29.90	0.75	0.52	1.45	0.00	0.00	0.00
29.95	0.75	0.52	1.45	0.00	0.00	0.00
30.00	0.75	0.52	1.45	0.00	0.00	0.00
30.05	0.75	0.52	1.45	0.00	0.00	0.00
30.10	0.75	0.52	1.44	0.00	0.00	0.00
30.15	0.75	0.52	1.44	0.00	0.00	0.00
30.20	0.75	0.52	1.44	0.00	0.00	0.00
30.25	0.75	0.52	1.44	0.00	0.00	0.00
30.30	0.75	0.52	1.44	0.00	0.00	0.00
30.35	0.75	0.52	1.44	0.00	0.00	0.00
30.40	0.75	0.52	1.44	0.00	0.00	0.00
30.45	0.75	0.52	1.44	0.00	0.00	0.00
30.50	0.75	0.52	1.44	0.00	0.00	0.00
30.55	0.75	0.52	1.44	0.00	0.00	0.00
30.60	0.75	0.52	1.44	0.00	0.00	0.00
30.65	0.75	0.52	1.44	0.00	0.00	0.00
30.70	0.75	0.52	1.44	0.00	0.00	0.00
30.75	0.75	0.52	1.44	0.00	0.00	0.00
30.80	0.75	0.52	1.44	0.00	0.00	0.00
30.85	0.75	0.52	1.44	0.00	0.00	0.00
30.90	0.75	0.52	1.44	0.00	0.00	0.00
30.95	0.75	0.52	1.44	0.00	0.00	0.00
31.00	0.75	0.52	1.44	0.00	0.00	0.00
31.05	0.75	0.52	1.44	0.00	0.00	0.00
31.10	0.75	0.52	1.44	0.00	0.00	0.00
31.15	0.75	0.52	1.44	0.00	0.00	0.00

31.20	0.75	0.52	1.44	0.00	0.00	0.00
31.25	0.75	0.52	1.44	0.00	0.00	0.00
31.30	0.75	0.52	1.44	0.00	0.00	0.00
31.35	0.75	0.52	1.44	0.00	0.00	0.00
31.40	0.75	0.52	1.44	0.00	0.00	0.00
31.45	0.75	0.52	1.44	0.00	0.00	0.00
31.50	0.75	0.52	1.44	0.00	0.00	0.00
31.55	0.75	0.52	1.44	0.00	0.00	0.00
31.60	0.75	0.52	1.44	0.00	0.00	0.00
31.65	0.75	0.52	1.44	0.00	0.00	0.00
31.70	0.75	0.52	1.44	0.00	0.00	0.00
31.75	0.75	0.52	1.44	0.00	0.00	0.00
31.80	0.75	0.52	1.44	0.00	0.00	0.00
31.85	0.75	0.52	1.44	0.00	0.00	0.00
31.90	0.75	0.52	1.44	0.00	0.00	0.00
31.95	0.75	0.52	1.44	0.00	0.00	0.00
32.00	0.75	0.52	1.44	0.00	0.00	0.00
32.05	0.75	0.52	1.44	0.00	0.00	0.00
32.10	0.75	0.52	1.44	0.00	0.00	0.00
32.15	0.75	0.52	1.43	0.00	0.00	0.00
32.20	0.75	0.52	1.43	0.00	0.00	0.00
32.25	0.75	0.52	1.43	0.00	0.00	0.00
32.30	0.75	0.52	1.43	0.00	0.00	0.00
32.35	0.75	0.52	1.43	0.00	0.00	0.00
32.40	0.75	0.52	1.43	0.00	0.00	0.00
32.45	0.75	0.52	1.43	0.00	0.00	0.00
32.50	0.75	0.52	1.43	0.00	0.00	0.00
32.55	0.75	0.52	1.43	0.00	0.00	0.00
32.60	0.75	0.52	1.43	0.00	0.00	0.00
32.65	0.75	0.52	1.43	0.00	0.00	0.00
32.70	0.75	0.52	1.43	0.00	0.00	0.00
32.75	0.75	0.52	1.43	0.00	0.00	0.00
32.80	0.75	0.52	1.43	0.00	0.00	0.00
32.85	0.75	0.52	1.43	0.00	0.00	0.00
32.90	0.75	0.52	1.43	0.00	0.00	0.00
32.95	0.75	0.52	1.43	0.00	0.00	0.00
33.00	0.75	0.52	1.43	0.00	0.00	0.00
33.05	0.75	0.52	1.43	0.00	0.00	0.00
33.10	0.75	0.52	1.43	0.00	0.00	0.00
33.15	0.75	0.52	1.43	0.00	0.00	0.00
33.20	0.75	0.52	1.43	0.00	0.00	0.00
33.25	0.75	0.52	1.43	0.00	0.00	0.00
33.30	0.75	0.52	1.43	0.00	0.00	0.00
33.35	0.75	0.52	1.43	0.00	0.00	0.00
33.40	0.75	0.52	1.43	0.00	0.00	0.00
33.45	0.75	0.52	1.43	0.00	0.00	0.00
33.50	0.75	0.52	1.43	0.00	0.00	0.00
33.55	0.75	0.52	1.43	0.00	0.00	0.00
33.60	0.75	0.52	1.43	0.00	0.00	0.00
33.65	0.75	0.52	1.43	0.00	0.00	0.00
33.70	0.75	0.52	1.43	0.00	0.00	0.00
33.75	0.75	0.52	1.43	0.00	0.00	0.00
33.80	0.75	0.52	1.43	0.00	0.00	0.00
33.85	0.75	0.52	1.43	0.00	0.00	0.00
33.90	0.75	0.52	1.43	0.00	0.00	0.00
33.95	0.75	0.52	1.43	0.00	0.00	0.00
34.00	0.75	0.52	1.43	0.00	0.00	0.00
34.05	0.75	0.52	1.43	0.00	0.00	0.00
34.10	0.75	0.52	1.43	0.00	0.00	0.00

34.15	0.75	0.52	1.43	0.00	0.00	0.00
34.20	0.75	0.52	1.43	0.00	0.00	0.00
34.25	0.75	0.52	1.43	0.00	0.00	0.00
34.30	0.75	0.52	1.43	0.00	0.00	0.00
34.35	0.75	0.53	1.43	0.00	0.00	0.00
34.40	0.75	0.53	1.43	0.00	0.00	0.00
34.45	0.75	0.53	1.43	0.00	0.00	0.00
34.50	0.75	0.53	1.43	0.00	0.00	0.00
34.55	0.75	0.53	1.43	0.00	0.00	0.00
34.60	0.75	0.53	1.43	0.00	0.00	0.00
34.65	0.75	0.53	1.43	0.00	0.00	0.00
34.70	0.75	0.53	1.43	0.00	0.00	0.00
34.75	0.75	0.53	1.43	0.00	0.00	0.00
34.80	0.75	0.53	1.43	0.00	0.00	0.00
34.85	0.75	0.53	1.43	0.00	0.00	0.00
34.90	0.75	0.53	1.43	0.00	0.00	0.00
34.95	0.75	0.53	1.43	0.00	0.00	0.00
35.00	0.75	0.53	1.43	0.00	0.00	0.00
35.05	0.75	0.53	1.43	0.00	0.00	0.00
35.10	0.75	0.53	1.43	0.00	0.00	0.00
35.15	0.75	0.53	1.43	0.00	0.00	0.00
35.20	0.75	0.53	1.43	0.00	0.00	0.00
35.25	0.75	0.53	1.43	0.00	0.00	0.00
35.30	0.75	0.53	1.43	0.00	0.00	0.00
35.35	0.75	0.53	1.43	0.00	0.00	0.00
35.40	0.75	0.53	1.43	0.00	0.00	0.00
35.45	0.75	0.53	1.43	0.00	0.00	0.00
35.50	0.75	0.53	1.43	0.00	0.00	0.00
35.55	0.75	0.53	1.43	0.00	0.00	0.00
35.60	0.75	0.53	1.43	0.00	0.00	0.00
35.65	0.75	0.53	1.43	0.00	0.00	0.00
35.70	0.75	0.53	1.43	0.00	0.00	0.00
35.75	0.75	0.53	1.43	0.00	0.00	0.00
35.80	0.75	0.53	1.43	0.00	0.00	0.00
35.85	0.75	0.53	1.43	0.00	0.00	0.00
35.90	0.75	0.53	1.43	0.00	0.00	0.00
35.95	0.75	0.53	1.43	0.00	0.00	0.00
36.00	0.75	0.53	1.43	0.00	0.00	0.00
36.05	0.75	0.53	1.43	0.00	0.00	0.00
36.10	0.75	0.53	1.43	0.00	0.00	0.00
36.15	0.75	0.53	1.43	0.00	0.00	0.00
36.20	0.75	0.53	1.43	0.00	0.00	0.00
36.25	0.75	0.53	1.43	0.00	0.00	0.00
36.30	0.75	0.53	1.43	0.00	0.00	0.00
36.35	0.75	0.53	1.43	0.00	0.00	0.00
36.40	0.75	0.53	1.43	0.00	0.00	0.00
36.45	0.75	0.53	1.44	0.00	0.00	0.00
36.50	0.75	0.53	1.44	0.00	0.00	0.00
36.55	0.75	0.53	1.44	0.00	0.00	0.00
36.60	0.75	0.53	1.44	0.00	0.00	0.00
36.65	0.75	0.53	1.43	0.00	0.00	0.00
36.70	0.75	0.53	1.43	0.00	0.00	0.00
36.75	0.75	0.53	1.43	0.00	0.00	0.00
36.80	0.75	0.53	1.43	0.00	0.00	0.00
36.85	0.75	0.53	1.43	0.00	0.00	0.00
36.90	0.75	0.53	1.43	0.00	0.00	0.00
36.95	0.75	0.53	1.43	0.00	0.00	0.00
37.00	0.75	0.53	1.43	0.00	0.00	0.00
37.05	0.75	0.53	1.43	0.00	0.00	0.00

37.10	0.75	0.53	1.43	0.00	0.00	0.00
37.15	0.75	0.53	1.43	0.00	0.00	0.00
37.20	0.75	0.53	1.43	0.00	0.00	0.00
37.25	0.75	0.53	1.43	0.00	0.00	0.00
37.30	0.75	0.53	1.43	0.00	0.00	0.00
37.35	0.75	0.53	1.43	0.00	0.00	0.00
37.40	0.75	0.53	1.43	0.00	0.00	0.00
37.45	0.75	0.53	1.43	0.00	0.00	0.00
37.50	0.75	0.53	1.43	0.00	0.00	0.00
37.55	0.75	0.53	1.43	0.00	0.00	0.00
37.60	0.75	0.53	1.43	0.00	0.00	0.00
37.65	0.75	0.53	1.43	0.00	0.00	0.00
37.70	0.75	0.53	1.43	0.00	0.00	0.00
37.75	0.75	0.53	1.43	0.00	0.00	0.00
37.80	0.75	0.53	1.43	0.00	0.00	0.00
37.85	0.75	0.53	1.43	0.00	0.00	0.00
37.90	0.75	0.53	1.43	0.00	0.00	0.00
37.95	0.75	0.53	1.43	0.00	0.00	0.00
38.00	0.75	0.53	1.43	0.00	0.00	0.00
38.05	0.75	0.53	1.43	0.00	0.00	0.00
38.10	0.75	0.53	1.43	0.00	0.00	0.00
38.15	0.75	0.53	1.43	0.00	0.00	0.00
38.20	0.75	0.53	1.43	0.00	0.00	0.00
38.25	0.75	0.53	1.43	0.00	0.00	0.00
38.30	0.75	0.53	1.43	0.00	0.00	0.00
38.35	0.75	0.53	1.43	0.00	0.00	0.00
38.40	0.75	0.53	1.43	0.00	0.00	0.00
38.45	0.75	0.53	1.43	0.00	0.00	0.00
38.50	0.75	0.53	1.43	0.00	0.00	0.00
38.55	0.75	0.53	1.43	0.00	0.00	0.00
38.60	0.75	0.53	1.43	0.00	0.00	0.00
38.65	0.75	0.53	1.43	0.00	0.00	0.00
38.70	0.75	0.53	1.43	0.00	0.00	0.00
38.75	0.75	0.53	1.43	0.00	0.00	0.00
38.80	0.75	0.53	1.43	0.00	0.00	0.00
38.85	0.75	0.53	1.43	0.00	0.00	0.00
38.90	0.75	0.53	1.43	0.00	0.00	0.00
38.95	0.75	0.53	1.43	0.00	0.00	0.00
39.00	0.75	0.53	1.43	0.00	0.00	0.00
39.05	0.75	0.53	1.43	0.00	0.00	0.00
39.10	0.75	0.53	1.43	0.00	0.00	0.00
39.15	0.75	0.53	1.43	0.00	0.00	0.00
39.20	0.75	0.53	1.43	0.00	0.00	0.00
39.25	0.75	0.53	1.43	0.00	0.00	0.00
39.30	0.75	0.53	1.43	0.00	0.00	0.00
39.35	0.75	0.52	1.43	0.00	0.00	0.00
39.40	0.75	0.52	1.43	0.00	0.00	0.00
39.45	0.75	0.52	1.43	0.00	0.00	0.00
39.50	0.75	0.52	1.43	0.00	0.00	0.00
39.55	0.75	0.52	1.43	0.00	0.00	0.00
39.60	0.75	0.52	1.43	0.00	0.00	0.00
39.65	0.75	0.52	1.43	0.00	0.00	0.00
39.70	0.75	0.52	1.43	0.00	0.00	0.00
39.75	0.75	0.52	1.43	0.00	0.00	0.00
39.80	0.75	0.52	1.43	0.00	0.00	0.00
39.85	0.75	0.52	1.43	0.00	0.00	0.00
39.90	0.75	0.52	1.43	0.00	0.00	0.00
39.95	0.75	0.52	1.43	0.00	0.00	0.00
40.00	0.75	0.52	1.43	0.00	0.00	0.00

40.05	0.75	0.52	1.43	0.00	0.00	0.00
40.10	0.75	0.52	1.43	0.00	0.00	0.00
40.15	0.75	0.52	1.43	0.00	0.00	0.00
40.20	0.75	0.52	1.43	0.00	0.00	0.00
40.25	0.75	0.52	1.43	0.00	0.00	0.00
40.30	0.75	0.52	1.43	0.00	0.00	0.00
40.35	0.75	0.52	1.43	0.00	0.00	0.00
40.40	0.75	0.52	1.43	0.00	0.00	0.00
40.45	0.75	0.52	1.43	0.00	0.00	0.00
40.50	0.75	0.52	1.43	0.00	0.00	0.00
40.55	0.75	0.52	1.43	0.00	0.00	0.00
40.60	0.75	0.52	1.43	0.00	0.00	0.00
40.65	0.75	0.52	1.43	0.00	0.00	0.00
40.70	0.75	0.52	1.43	0.00	0.00	0.00
40.75	0.75	0.52	1.43	0.00	0.00	0.00
40.80	0.75	0.52	1.43	0.00	0.00	0.00
40.85	0.75	0.52	1.43	0.00	0.00	0.00
40.90	0.75	0.52	1.43	0.00	0.00	0.00
40.95	0.75	0.52	1.43	0.00	0.00	0.00
41.00	0.75	0.52	1.43	0.00	0.00	0.00
41.05	0.75	0.52	1.43	0.00	0.00	0.00
41.10	0.75	0.52	1.43	0.00	0.00	0.00
41.15	0.75	0.52	1.43	0.00	0.00	0.00
41.20	0.75	0.52	1.43	0.00	0.00	0.00
41.25	0.75	0.52	1.43	0.00	0.00	0.00
41.30	0.75	0.52	1.43	0.00	0.00	0.00
41.35	0.75	0.52	1.43	0.00	0.00	0.00
41.40	0.75	0.52	1.43	0.00	0.00	0.00
41.45	0.75	0.52	1.43	0.00	0.00	0.00
41.50	0.75	0.52	1.43	0.00	0.00	0.00
41.55	0.75	0.52	1.43	0.00	0.00	0.00
41.60	0.75	0.52	1.43	0.00	0.00	0.00
41.65	0.75	0.52	1.43	0.00	0.00	0.00
41.70	0.75	0.52	1.43	0.00	0.00	0.00
41.75	0.75	0.52	1.43	0.00	0.00	0.00
41.80	0.75	0.52	1.43	0.00	0.00	0.00
41.85	0.75	0.52	1.43	0.00	0.00	0.00
41.90	0.75	0.52	1.43	0.00	0.00	0.00
41.95	0.75	0.52	1.42	0.00	0.00	0.00
42.00	0.75	0.52	1.42	0.00	0.00	0.00
42.05	0.75	0.52	1.42	0.00	0.00	0.00
42.10	0.74	0.52	1.42	0.00	0.00	0.00
42.15	0.74	0.52	1.42	0.00	0.00	0.00
42.20	0.74	0.52	1.42	0.00	0.00	0.00
42.25	0.74	0.52	1.42	0.00	0.00	0.00
42.30	0.74	0.52	1.42	0.00	0.00	0.00
42.35	0.74	0.52	1.42	0.00	0.00	0.00
42.40	0.74	0.52	1.42	0.00	0.00	0.00
42.45	0.74	0.52	1.42	0.00	0.00	0.00
42.50	0.74	0.52	1.42	0.00	0.00	0.00
42.55	0.74	0.52	1.42	0.00	0.00	0.00
42.60	0.74	0.52	1.42	0.00	0.00	0.00
42.65	0.74	0.52	1.42	0.00	0.00	0.00
42.70	0.74	0.52	1.42	0.00	0.00	0.00
42.75	0.74	0.52	1.42	0.00	0.00	0.00
42.80	0.74	0.52	1.42	0.00	0.00	0.00
42.85	0.74	0.52	1.42	0.00	0.00	0.00
42.90	0.74	0.52	1.42	0.00	0.00	0.00
42.95	0.74	0.52	1.42	0.00	0.00	0.00

43.00	0.74	0.52	1.42	0.00	0.00	0.00
43.05	0.74	0.52	1.42	0.00	0.00	0.00
43.10	0.74	0.52	1.42	0.00	0.00	0.00
43.15	0.74	0.52	1.42	0.00	0.00	0.00
43.20	0.74	0.52	1.42	0.00	0.00	0.00
43.25	0.74	0.52	1.42	0.00	0.00	0.00
43.30	0.74	0.52	1.42	0.00	0.00	0.00
43.35	0.74	0.52	1.42	0.00	0.00	0.00
43.40	0.74	0.52	1.42	0.00	0.00	0.00
43.45	0.74	0.52	1.42	0.00	0.00	0.00
43.50	0.74	0.52	1.42	0.00	0.00	0.00
43.55	0.74	0.52	1.42	0.00	0.00	0.00
43.60	0.74	0.52	1.42	0.00	0.00	0.00
43.65	0.74	0.52	1.42	0.00	0.00	0.00
43.70	0.74	0.52	1.42	0.00	0.00	0.00
43.75	0.74	0.52	1.43	0.00	0.00	0.00
43.80	0.74	0.52	1.43	0.00	0.00	0.00
43.85	0.74	0.52	1.43	0.00	0.00	0.00
43.90	0.74	0.52	1.43	0.00	0.00	0.00
43.95	0.74	0.52	1.43	0.00	0.00	0.00
44.00	0.74	0.52	1.43	0.00	0.00	0.00
44.05	0.74	0.52	1.43	0.00	0.00	0.00
44.10	0.74	0.52	1.43	0.00	0.00	0.00
44.15	0.74	0.52	1.43	0.00	0.00	0.00
44.20	0.74	0.52	1.43	0.00	0.00	0.00
44.25	0.74	0.52	1.43	0.00	0.00	0.00
44.30	0.74	0.52	1.43	0.00	0.00	0.00
44.35	0.74	0.52	1.43	0.00	0.00	0.00
44.40	0.74	0.52	1.43	0.00	0.00	0.00
44.45	0.74	0.52	1.43	0.00	0.00	0.00
44.50	0.74	0.52	1.43	0.00	0.00	0.00
44.55	0.74	0.52	1.43	0.00	0.00	0.00
44.60	0.74	0.52	1.43	0.00	0.00	0.00
44.65	0.74	0.52	1.43	0.00	0.00	0.00
44.70	0.74	0.52	1.43	0.00	0.00	0.00
44.75	0.74	0.52	1.43	0.00	0.00	0.00
44.80	0.74	0.52	1.43	0.00	0.00	0.00
44.85	0.74	0.52	1.43	0.00	0.00	0.00
44.90	0.74	0.52	1.43	0.00	0.00	0.00
44.95	0.74	0.52	1.43	0.00	0.00	0.00
45.00	0.74	0.52	1.43	0.00	0.00	0.00
45.05	0.74	0.52	1.43	0.00	0.00	0.00
45.10	0.74	0.52	1.43	0.00	0.00	0.00
45.15	0.74	0.52	1.43	0.00	0.00	0.00
45.20	0.74	0.52	1.43	0.00	0.00	0.00
45.25	0.74	0.52	1.43	0.00	0.00	0.00
45.30	0.74	0.52	1.43	0.00	0.00	0.00
45.35	0.74	0.52	1.43	0.00	0.00	0.00
45.40	0.74	0.52	1.43	0.00	0.00	0.00
45.45	0.74	0.52	1.43	0.00	0.00	0.00
45.50	0.74	0.52	1.43	0.00	0.00	0.00
45.55	0.74	0.52	1.43	0.00	0.00	0.00
45.60	0.74	0.52	1.43	0.00	0.00	0.00
45.65	0.74	0.52	1.43	0.00	0.00	0.00
45.70	0.74	0.52	1.43	0.00	0.00	0.00
45.75	0.74	0.52	1.43	0.00	0.00	0.00
45.80	0.74	0.52	1.43	0.00	0.00	0.00
45.85	0.74	0.52	1.43	0.00	0.00	0.00
45.90	0.74	0.52	1.43	0.00	0.00	0.00

45.95	0.74	0.52	1.43	0.00	0.00	0.00
46.00	0.74	0.52	1.43	0.00	0.00	0.00
46.05	0.74	0.52	1.43	0.00	0.00	0.00
46.10	0.74	0.52	1.43	0.00	0.00	0.00
46.15	0.74	0.52	1.43	0.00	0.00	0.00
46.20	0.74	0.52	1.43	0.00	0.00	0.00
46.25	0.74	0.52	1.43	0.00	0.00	0.00
46.30	0.74	0.52	1.43	0.00	0.00	0.00
46.35	0.74	0.52	1.43	0.00	0.00	0.00
46.40	0.74	0.52	1.43	0.00	0.00	0.00
46.45	0.74	0.52	1.43	0.00	0.00	0.00
46.50	0.74	0.52	1.43	0.00	0.00	0.00
46.55	0.74	0.52	1.43	0.00	0.00	0.00
46.60	0.74	0.52	1.43	0.00	0.00	0.00
46.65	0.74	0.52	1.43	0.00	0.00	0.00
46.70	0.74	0.52	1.43	0.00	0.00	0.00
46.75	0.74	0.52	1.43	0.00	0.00	0.00
46.80	0.74	0.52	1.43	0.00	0.00	0.00
46.85	0.74	0.52	1.43	0.00	0.00	0.00
46.90	0.74	0.52	1.43	0.00	0.00	0.00
46.95	0.74	0.52	1.43	0.00	0.00	0.00
47.00	0.74	0.52	1.43	0.00	0.00	0.00
47.05	0.74	0.52	1.43	0.00	0.00	0.00
47.10	0.74	0.52	1.43	0.00	0.00	0.00
47.15	0.74	0.52	1.43	0.00	0.00	0.00
47.20	0.74	0.52	1.43	0.00	0.00	0.00
47.25	0.74	0.52	1.43	0.00	0.00	0.00
47.30	0.74	0.52	1.43	0.00	0.00	0.00
47.35	0.74	0.52	1.43	0.00	0.00	0.00
47.40	0.74	0.52	1.43	0.00	0.00	0.00
47.45	0.74	0.52	1.43	0.00	0.00	0.00
47.50	0.74	0.52	1.43	0.00	0.00	0.00
47.55	0.74	0.52	1.43	0.00	0.00	0.00
47.60	0.74	0.52	1.43	0.00	0.00	0.00
47.65	0.74	0.52	1.43	0.00	0.00	0.00
47.70	0.74	0.51	1.43	0.00	0.00	0.00
47.75	0.74	0.51	1.43	0.00	0.00	0.00
47.80	0.74	0.51	1.43	0.00	0.00	0.00
47.85	0.74	0.51	1.43	0.00	0.00	0.00
47.90	0.74	0.51	1.43	0.00	0.00	0.00
47.95	0.74	0.51	1.43	0.00	0.00	0.00
48.00	0.74	0.51	1.43	0.00	0.00	0.00
48.05	0.74	0.51	1.43	0.00	0.00	0.00
48.10	0.74	0.51	1.43	0.00	0.00	0.00
48.15	0.74	0.51	1.43	0.00	0.00	0.00
48.20	0.74	0.51	1.43	0.00	0.00	0.00
48.25	0.74	0.51	1.43	0.00	0.00	0.00
48.30	0.74	0.51	1.43	0.00	0.00	0.00
48.35	0.74	0.51	1.43	0.00	0.00	0.00
48.40	0.74	0.51	1.43	0.00	0.00	0.00
48.45	0.74	0.51	1.43	0.00	0.00	0.00
48.50	0.74	0.51	1.43	0.00	0.00	0.00
48.55	0.74	0.51	1.43	0.00	0.00	0.00
48.60	0.74	0.51	1.43	0.00	0.00	0.00
48.65	0.74	0.51	1.43	0.00	0.00	0.00
48.70	0.74	0.51	1.43	0.00	0.00	0.00
48.75	0.73	0.51	1.43	0.00	0.00	0.00
48.80	0.73	0.51	1.43	0.00	0.00	0.00
48.85	0.73	0.51	1.43	0.00	0.00	0.00

48.90	0.73	0.51	1.43	0.00	0.00	0.00
48.95	0.73	0.51	1.43	0.00	0.00	0.00
49.00	0.73	0.51	1.43	0.00	0.00	0.00
49.05	0.73	0.51	1.43	0.00	0.00	0.00
49.10	0.73	0.51	1.43	0.00	0.00	0.00
49.15	0.73	0.51	1.43	0.00	0.00	0.00
49.20	0.73	0.51	1.43	0.00	0.00	0.00
49.25	0.73	0.51	1.43	0.00	0.00	0.00
49.30	0.73	0.51	1.43	0.00	0.00	0.00
49.35	0.73	0.51	1.43	0.00	0.00	0.00
49.40	0.73	0.51	1.43	0.00	0.00	0.00
49.45	0.73	0.51	1.43	0.00	0.00	0.00
49.50	0.73	0.51	1.43	0.00	0.00	0.00
49.55	0.73	0.51	1.44	0.00	0.00	0.00
49.60	0.73	0.51	1.44	0.00	0.00	0.00
49.65	0.73	0.51	1.44	0.00	0.00	0.00
49.70	0.73	0.51	1.44	0.00	0.00	0.00
49.75	0.73	0.51	1.44	0.00	0.00	0.00
49.80	0.73	0.51	1.44	0.00	0.00	0.00
49.85	0.73	0.51	1.44	0.00	0.00	0.00
49.90	0.73	0.51	1.44	0.00	0.00	0.00
49.95	0.73	0.51	1.44	0.00	0.00	0.00
50.00	0.73	0.51	1.44	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units:Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

SOILS ENGINEERING, INC.

PIPELINE RISK ANALYSIS REPORT

PROPOSED CRESCENT ELEMENTARY SCHOOL & MIDDLE SCHOOL #4
Southwest Corner of Cottonwood Road & Panama Lane
Bakersfield, California

Prepared For:

Greenfield Union School District
1624 Fairview Road
Bakersfield, CA 93307
Attn: Mr. Dennis Franey

File No. 07-11968e

Prepared By:

Soils Engineering, Inc.
4400 Yeager Way
Bakersfield, CA 93313

January 2008

SOILS ENGINEERING, INC.

January 14, 2008 File No. 07-11968

Mr. Dennis Franey
Greenfield Union School District
1624 Fairfield Road
Bakersfield, CA 93313

Subject: Pipeline Risk Analysis Report
Proposed School Site
Southwest Corner of Cottonwood Rd & Panama Lane
Bakersfield, California

Mr. Franey:

In accordance with your request and authorization, Soils Engineering, Inc. (SEI) has conducted a Pipeline Risk Analysis in accordance with the California Department of Education (CDE) requirements and the California Code of Regulations (CCR) Title 5, Section 14010(h) at a proposed Elementary School & Middle School Site located at the southwest corner of Cottonwood Rd. & Panama Lane in Bakersfield, CA. (site). This CCR states that proposed school sites shall not be located within 1,500 feet of the easement of an aboveground water or fuel storage tank, aboveground pipeline, or underground pipeline that can pose a safety hazard as established by a risk analysis study. If the risks associated with potential hazards from the pipeline can be mitigated, exemptions to specific sections of these regulations may be granted as described under CCR Title 5 Sections 14010(u) and 14011(n).

The purpose of this risk analysis is to identify potential imminent health and safety risks to future students, faculty, and staff associated with a possible accidental release from high-pressure crude oil pipelines located within 1,500 feet of the site ("crude oil pipelines").

Executive Summary

This risk analysis considered the potential impacts associated with hypothetical worst-case accidental releases from two (2) high-pressure crude oil pipelines located approximately 10' north of the northern property line of the site. Initially these two (2) pipelines were not included in the Geologic Hazard Study for the site dated August 31, 2006. The results of the Stage 2 Risk Analysis indicate that the individual risk probabilities associated with potential releases from the crude oil pipelines are insignificant. The population risk indicator for the site associated with potential full rupture releases from the crude oil pipelines was 50 for the 8" and 90 for a combined pipeline (10") release. SEI utilized the computer modeling programs Breeze Haz Pro, vers. 4.01 and Aloha 5.4.1 to determine more site specific impact distances from a rupture pool fire from the 8" crude oil pipeline and a combination of both 6" and 8" crude oil pipelines rupturing within the same year. These calculations were adjusted for crude oil as the fluid released instead of gasoline as the protocol utilizes in its impact graphs. The results of the Stage 3 Risk Analysis indicate that the individual risk probabilities associated with potential releases from the crude oil pipelines are insignificant. The population risk indicator for the site associated with potential full rupture releases from the crude oil pipelines was reduced to 30 for both the 8" and a combined pipeline (10") release.

Some minor prevention measures are suggested to lower the population risk indicator for the crude oil pipelines. This includes either placing the buildings a minimum of 120' south of the pipelines or including a pipeline rupture as a possible scenario to the emergency evacuation plan for the site; and the Greenfield Union School District being contacted when construction activities are planned adjacent to the high-pressure pipelines along Panama Lane that are within 1500' of the school site.

Background
A review of utility locations near the site have identified two (2) high-pressure crude oil pipelines within 1,500 feet of the site. This includes:

- Kern Oil & Refining Company (Kern Oil) has a 6"-diameter active crude oil pipeline and a new idle 8" crude oil pipeline, which run east-west along the southside of Panama Lane. The 6"-diameter pipeline has a pressure of 200 psi and the 8"-diameter pipeline is currently idle. It is Kern Oil's plan to activate the 8" pipeline at a pressure of 200 psi and make the 6" pipeline idle within the next few months. It is unlikely, but possible, that in the future both pipelines would be operational at the same time. These pipelines are approximately 615' north of the center of the site and approximately 50' north of the first usable portion of the site.

- No high-pressure natural gas pipelines were identified within 1500' of the site.

See Plate 3 for the location of these pipelines.

For the evaluation of pipeline risks at proposed school sites, the document entitled "California Department of Education Guidance Protocol for School Site Pipeline Risk Analysis," dated February 2007 ("the Protocol") was used to evaluate this site. A Stage 2 Probabilistic Analysis ("Stage 2 analysis"), described in the Protocol, was conducted to develop a quantitative estimate of the individual and population risks posed by the two (2) high-pressure crude oil pipelines located along the southside of Panama Lane.

The indication of risk developed by this Stage 2 analysis is intended for use for threat prioritization and planning purposes. In accordance with the Protocol, if a Stage 2 analysis indicates that a significant potential risk exists, risk prevention or mitigation measures should be developed and evaluated with the goal of maximizing public safety by reducing overall risk. Based on the results of the Stage 2 analysis, a more site-specific Stage 3 Analysis was conducted utilizing a variety of computer modeling programs to further evaluate the individual and population risks to the site and its future inhabitants.

Risk Assessment Approach

The purpose of this risk assessment is to analyze the potential imminent health and safety risks to future students, faculty, and staff at the site associated with a possible accidental release from the high-pressure crude oil pipelines. This pipeline risk analysis combines the probability or likelihood of an accident occurring with an estimate of the predicted consequences of the accident to provide an overall indication of risk at the site. This pipeline risk evaluation estimates the probability of harm to people at the school site that could be caused by a possible accidental release from a pipeline. The types of pipeline failure considered in this analysis include leaks or ruptures caused by corrosion, excavation, natural forces, other outside forces, material and weld defects, and operational issues. These are the primary categories of pipeline failure used by the U.S. Department of Transportation (DOT). The potential impact scenarios considered in this analysis were jet fires, flash fires and vapor cloud explosions. The harmful consequences of concern are injuries or fatalities from exposure to fire thermal radiation or explosion blast pressures that exceed safe thresholds.

The Protocol recommends making the assumption that the probability of a fatality from a gas cloud explosion in relatively open areas, such as the site, would be zero.

Individual and population risks were considered as recommended in the Protocol. Individual risk is defined as the annual probability of fatality for an individual at the proposed school site resulting from a pipeline failure. The population risk indicator is a conservative measure of campus site aggregate population threat by the presence of the pipeline if the defined incident occurs.

Risk Analysis Findings

Stage 2 Risk Analysis

Pipeline survey information was obtained from Mr. Bob Warren of the Kern Oil & Refining Company, who provided the information shown on Forms 1 and 2 for the crude oil pipelines near the site. A Pipeline Location map with the location of the school site and the nearby pipelines is attached as Plate 3. The Pipeline Location Map showing the proposed school site indicates that the nearest approach of the Kern Oil crude oil pipelines is approximately 10 feet from the northern border of the site or approximately 50' from the first usable portion of the property. See attached pictures 1 to 3 showing some of the pipeline locations in reference to the site.

The results of the Stage 2 Risk Analysis are summarized in the attached Forms 1, 3 and 3A for a release from the 8" crude oil pipeline and for a release from both pipelines (6" and 8") during a single year, shown as a 10" crude oil pipeline. Three (3) types of accidental release scenarios were considered; a 1" diámeter leak, a full rupture of one of the crude oil pipelines (8"-diameter) and a combined full rupture of both pipelines (equivalent to a 10"-diameter pipeline), if operational at the same time. The releases were assumed to occur under worst-case meteorological conditions of class D atmospheric stability over rural terrain. The maximum occupancy at the Site was estimated to be 2000 people (900 at the Elementary School and 1100 at the Middle School). The liquid released was assumed to be hexane instead of crude oil which is a very conservative approach per the Protocol. Impact distances reported for hexane were reduced by 71% per the Protocol to account for the liquid released actually being crude oil. A leak was assumed to occur through a 1-inch diameter hole, which was assumed to ignite within 15 minutes of the release resulting in either a pool fire or a flash fire. The potential maximum impact distance associated with radiation impacts from a 1" hole release was estimated to be 106 feet based on graphs in the Protocol resulting from a 71' long pool of oil approximately 60 feet wide and 2-inches deep (curb adjustment). The potential maximum impact distance associated with a flash fire from such a release was estimated to be only 14 feet.

A full rupture of either the 6" or 8" crude oil pipelines was assumed to ignite within 15 minutes of the release resulting in either a pool fire or a flash fire. .The potential maximum impact distance associated with 1% mortality radiation impacts (5000 btu/ft2 hr) from a pool fire (60 feet wide and 87' long) from a full release from either pipeline was estimated to be approximately 125 feet. The potential maximum impact distance associated with a flash fire from such a release was estimated to be only 21 feet.

For the combined 6" and 8" crude oil pipelines, the potential maximum impact distance associated with 1% mortality radiation impacts (5000 btu/ft2 hr) from an oil pool fire (175' long x 60' wide and 2" deep) from a combined full release was estimated to be 255 feet. The potential maximum impact distance associated with a flash fire from such a release was estimated to be 39 feet.

These results indicate that if a release of crude oil occurred, resulting in a pool of oil 60 foot wide and 175' long and the pool ignited, the radiation impacts might extend 255' into the site. The individual risk probabilities associated with these scenarios are estimated to be less than 1 in 1,000,000 (2.5×10^{-7}) and is considered insignificant. The population risk indicator was calculated to be 50 for an 8" full rupture and 90 for a combined 10" rupture due to a pool fire. See Forms 3 and 3A and Appendix A for these Stage 2 Risk calculations utilizing the Protocol TIR calculation sheets, the population risk indicator table and the release volume calculations.

Stage 3 Risk Analysis

To further evaluate the risk of the two (2) Kern Oil high-pressure crude oil pipelines, SEI used the computer modeling programs Confined Pool Fire Model (Gas Research Institute) provided in the Breeze Haz Professional version 4.01 software package and Aloha version 5.4.1 to determine more site-specific risk calculations as part of a Stage 3 Risk Analysis. Again hexane was used as the liquid released and the impact distances reported were reduced by 71% to account for the release actually being crude oil. The results of the Stage 3 Risk Analysis are shown on Forms 3B and 3C for the 8" and for the combined 10" pipeline (worst-case scenario) and incorporated the pool-fire radiation impacts into the risk calculations.

The results of the Stage 3 Risk Analysis indicate that a full rupture pool-fire in the 6" and 8" pipelines at the same time would have a radiation impact of 5000 btu/ft2 hr at a distance of approximately 166 feet. A full rupture pool fire of the 8" crude oil pipeline would have a radiation impact of 5000 btu/ft2 hr at a distance of approximately 117 feet. Applying these radiation impact distances, the probabilities for individual risk were calculated to be insignificant at a value of 2.3×10^{-7} for the combined pipelines and 2.2×10^{-7} for the 6" or 8" pipeline. Even if the individual risk was doubled for both pipelines rupturing during the same year, the value would be insignificant at 4.4 x 10^{-7}. The population risk indicator is 30 for both scenarios of a full rupture pool fire. The Stage 3 analysis indicates that a setback of approximately 120 feet from the 8" crude oil pipeline is appropriate for this site, since the Protocol indicates the likelihood of two (2) pipelines rupturing at the same time is so low that it is excluded from further consideration in a risk analysis required by the Protocol. See attached Stage 3 TIR calculations, the population risk indicator tables, the computer modeling printouts for the 8" and combined pipeline rupture (10") attached in Appendix B.

Conclusions

This risk analysis indicates that the individual risk associated with potential releases from the two (2) high-pressure crude oil pipelines are insignificant. The population risk indicator for this site is 30 based on the Stage 3 analysis conducted.

In addition, this risk analysis does not factor in the following information, which improves the safety of the site even more:

- Some of the Stage 2 & 3 risk analysis is based on both of the pipelines being operational at the same time and both rupture and catch fire simultaneously. The Protocol states that the chance of this type of scenario occurring is extremely low and not required to be included in the risk analysis. Kern Oil has no current plans to run both of these pipelines at the same time, although it is a future possibility. The current 6" crude oil pipeline will be idle once the new 8" crude oil pipeline is operational.

- The amount of crude oil estimated to be released within a 15-minute period during a full-rupture was the maximum daily flow rate through the pipeline over a 15-minute period, instead of the average daily flow rate which is less.

Recommendations

SEI recommends that the Greenfield Union School District consider the following prevention measures for the proposed school site to further reduce the individual risk and population risk indicator at the site from a pipeline rupture:

- Place all classroom buildings a minimum of 120' south of the crude oil pipelines to significantly reduce the risk to the site from a rupture pool fire from these pipelines.

And/Or

- A pipeline rupture should be included in the emergency evacuation plan for the school as a possible scenario.

- Any construction activities planned adjacent to the two (2) Kern Oil high-pressure crude oil pipelines located along Panama Lane within 1500' of the site should be overseen by the pipeline company (Kern Oil), and the school district should be notified when these activities are to be conducted. This request can be done by becoming a member of Underground Service Alert (USA) or other utility notification services.

Limitations

This report comprises an evaluation of potential risks that was performed to assist the Greenfield Union School District in evaluating potential risks in the vicinity of a proposed school site and to comply with California Education Code requirements. It should not be construed as predicting if a specific event will occur or as a guarantee that a specific event will not occur more frequently than described herein.

This review was conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. The observations and conclusions presented in this report are professional opinions based on the scope of activities, work schedule, and information obtained through the review of files described herein. It must be recognized that conclusions drawn from these data are limited by the amount, type, distribution, and integrity of the information collected at the time of the review and the methods used to collect and evaluate the data, and that a full and complete determination of the potential frequency of an accident or environmental risks cannot be made.

Although steps have been taken to obtain true copies of available information, no representation or warranty with respect to the accuracy or completeness of this information is made. Because this report is based in part on information provided by others, it is accurate only to the extent that such information is accurate and complete.

Please contact SEI at (661) 831-5100 if you have any questions on this report.

Sincerely,

Robert J. Becker, R.G., CEG. REA II
Environmental & Geologic Manager

CERTIFIED ENGINEERING GEOLOGIST
ROBERT J. BECKER
No. 2238
REN
STATE OF CALIFORNIA

Attachments: Form 1, CDE, Administrative Summary and Signature Form
Form 2, CDE , Pipeline Risk Analysis Input Data
Form 3, CDE, Stage 2 Pipeline Risk Analysis Report, Standard Protocol Calculation Summary (8" Crude Oil)
Form 3A, CDE, Stage 2 Pipeline Risk Analysis Report, Standard Protocol Calculation Summary (10" Crude Oil)
Form 3B, CDE, Stage 3 Pipeline Risk Analysis Report, Standard Protocol Calculation Summary (8" Crude Oil)
Form 3C, CDE, Stage 3 Pipeline Risk Analysis Report, Standard Protocol Calculation Summary (10" Crude Oil)

Location Map, Plate 1
Plot Plan, Plate 2
Pipeline Location Map, Plate 3
Pictures 1 to 3

Appendix A, Stage 2 Risk Analysis Calculations for 6" and 8" and Combined (10") Crude Oil Pipelines, Population Risk Indicator Tables and Release Volume Calculations

Appendix B, Stage 3 Risk Analysis Calculations, Population Risk Indicator Tables & Computer Model Results (Aloha and Breeze) for 8" and Combined Crude Oil Pipelines (10")

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 1 – Administrative, Summary, and Signature Form

Local Educational Agency	
Date 1/11/08	
Local Educational Agency	Greenfield Union School District
Contact	Dennis Franey
Telephone Number	661-837-6000
E-mail Address	FraneyD@gfusd.k12.ca.us]
Street Address	1624 Fairview Rd
Department or Mail Drop	Business Services
City	Bakersfield, CA
County	Kern
Zip Code	93313

Proposed School Campus Site	
Name	Crescent Elementary & Middle School #4
Location Description	Occupying 49.32 acres. SW Corner of Panama Land & Cottonwood Road. Dimensions of the property are approximately 1250' north-south by 1546' east-west. Portion of APN 518-030-06

Pipeline of Interest	
Operator / Owner	Kern Oil & Refining Company
Product Transported	Crude Oil
Pipeline Diameter (inches)	1-6" active, 1-8" new but idle
Operating Pressure (psig)	200 psig
Closet Approach to Property Line (or boundary between the usable and unusable portion of the site if the unusable portion faces the pipeline.) (ft)	50'

Individual Risk Estimate Result						
Type of Analysis (Check One)	Stage 1 →		Stage 2 →	X	Stage 3 →	
Individual Risk Estimate Value	2.2 x 10-7 for 8", 2.5 x 10-7 for combined (10")					
Individual Risk Criterion	1.0E-06 (0.000001)					
IR Significance (check one)	Significant					
	Insignificant	X	For Both			

(Continued on next page)

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 1 – Administrative, Summary, and Signature Form

(Continued from previous page)

Population Risk Indicator Result	
Protocol Average IR	2.2 x 10-8 for 8" & 2.5 x 10-8 for 10"
IR Indicator (Average IR / Property Line IR Ratio)	0.09 to 0.1
Population Risk Indicator	50 for 8", 90 for 10" - Stage 2, 30 for Stage 3 Analysis

Prevention and Mitigation Recommendations/Implementations *(Add additional sheets with more details as needed.)*

Prevention Measures: Suggest that the District locate classroom buildings a minimum of 120' south of pipelines, or/& include pipeline rupture and resulting fire in emergency action plan, and be notified if any work is being conducted on or adjacent to pipeline within 1500' of the site.

Mitigation Measures: None required

Conclusions/Other Suggestions/Recommendations: Pipelines risk analysis meets the individual risk criteria of the protocol. The population risk indicator is 30 based on the Stage 3 analysis. The Likelihood of both pipelines rupturing simultaneously is considered minimal, so 8" pipeline rupture impact distance for a pool fire (117') is what should be used for a worst-case scenario.

Certification and Signatures of Risk Analyst(s)

This analysis was conducted according to the 2007 CDE Protocol except as noted. All modifications within the Stage 2 framework, and Stage 3 analyses and exceptions to the data and processes established in the 2007 CDE Protocol, if any, were based upon my professional opinion and in a manner consistent with the standards of care and skill ordinarily exercised by professionals working on similar projects.

I certify that the estimated risk levels were derived based upon the 2007 CDE Protocol, unless otherwise noted, and that these levels demonstrate, within reasonable expectations of uncertainties for such estimates, that the estimated Individual Risk for the school site, as the site was planned at the time of this analysis, including mitigation measures, if any, meets the Individual Risk Criterion stated in the 2007 CDE Protocol, based on the information provided to me.

CERTIFIED ENGINEERING GEOLOGIST ROBERT J. BECKER No. 2238 REN STATE OF CALIFORNIA

Printed Name	Signature	Position or Title
Robert J. Becker		Environmental Manager, RG, CEG, REA II

Notice: In the event that the Individual Risk Criterion could not be met, at the option of the LEA, CDE will still accept a report for review and consultation with the LEA.

California Department of Education
CCR, Title 5, Pipeline Risk Analysis Report
Form 2 - Pipeline Risk Analysis Input Data

Date: 1/11/08
Local Educational Agency: Greenfield Union School District
Proposed School Site Name: Crescent Elementry & Middle School #4
Proposed School Estimated Population: 2000 Total (900 Elem & 1100 Middle)

Product	*Designate by an "X"*	
Natural gas (NG)		
Crude oil	X	
Gasoline		
Liquefied natural gas (LNG)		
Liquefied petroleum gas (LPG)		
Natural gas liquids (NGL)		
Other refined product (specify)		
Other substance (specify)		

Pipeline Location Attributes	**Units**	**Value**
Segment length	ft	4488
Closest approach to property line	ft	10
Closest approach to usable portion of the school site	ft	50
Land use by class location (49 CFR Part 192)	Class	A

Pipeline Attributes		
Diameter	inches	6" (old), 8" (new)
Maximum operating pressure	psig	200
Average operating pressure	psig	200
Depth of burial	ft	5'
Distance to nearest compressor (gas) or pump station (liquid)	ft	3.7 miles
Throughput		
Liquid (enter value, meter, etc.)	gpm	437 gals/min
Nearest block valve locations, upstream and downstream of segment of concern	0.7 mi. to 3.84 mi. to	upstream downstream
Above ground components within 1500-ft zone	None	
Number		
Type		
Pipeline location on terrain gradient relative to school (Designate with an "X" by appropriate description)		
Flat	X	
Up gradient		
Down gradient		
"Convoluted"		

Caliornia Department of Education

CCR TITLE 5 STAGE 2 PIPELINE RISK ANALYSIS REPORT

FORM 3 - Standard Protocol Calculation Summary (8" Crude Oil Pipeline)

Release Probability Calculations	Variables	Values or Units	Data Source
Basic Data Input			
Baseline frequency per pipeline mile	F0	2.30E-03	Historical release frequency from Table B-6 (All CA Crude Pipelines)
Segment Length within 1500-ft buffer	SEG, Miles	0.85	Determined from site maps
Nearest Property Line Distance	R0, Ft.	10	Determined from site maps
Receptor location distance, if different than nearest	R(i), ft.	50	Easement from Panama Lane
Base release probability	P0	2.30E-03	$P0 = 1 - e^{(-F0 \times t)}$
Probability adjustment factor	PAF	1	Default
Adjusted base probability	PA	2.30E-03	$PA = P0 \times PAF$

Special Seismic Considerations:

Please summarize or list below any adjustments made to the Protocol base risk analysis estimates and the special siesmic conditions and studies upon which these adjustments were based. If adjustments were based upon special seismic conditions, the signature and title of those professionals involved are required.

No special seismic conditions exist at this location.

Signatures for Above, If Needed

Printed Name	Signature	Title

Protocol Basis Scenario Probabities	Variable	Value	Data Source if Different from Protocol
XSEG Length, Leak, Ft:			
Leak jet or pool fire		187	
Leak flash fire		0	
Leak gas or vapor explosion		0	
Release Probability Calculations			
Individual XSEG failure and release probabilities, leak, PA(LX):			
Leak jet or pool fire		106'	
Leak flash fire		14'	
Leak gas or vapor explosion		0	
XSEG Length, rupture, ft:			
Rupture jet or pool fire		229	
Rupture flash fire		0	
Rupture gas or vapor explosion		0	
Individual XSEG failure and release probabilities, rupture, PA(RX):			
Rupture jet or pool fire		125'	
Rupture flash fire		21'	
Rupture gas or vapor explosion		0	

Caliornia Department of Education

CCR TITLE 5 STAGE 2 PIPELINE RISK ANALYSIS REPORT

FORM 3 - Standard Protocol Calculation Summary (8" Crude Oil Pipeline)

Protocol Basis Scenario Probabities	Variable	Value	Data Source if Different from Protocol
Probability of leak	PC(L)	0.8	Default = 0.8, (FEMA, 1989)
Probability of rupture	PC (R)	0.2	Default = 0.2, (FEMA, 1989)
Probability of leak ignition	PC(LIG)	0.03	Crude Oil = 0.03
Probability of rupture ignition	PC(RIG)	0.03	Crude Oil = 0.03
Probability of fire upon ignition	PC(FIG)	0.95	Liquid 0.95
Probability of explosion on ignition	PC(EIG)	0.05	Liquid 0.05
Probability of flash fire	PC(FF)	0.05	Liquid 0.05
Probability of jet fire (gas pipelines) or pool fire (liquid pipelines)	PC(JF)	0.95	Liquid 0.95
Probabability of occupancy	PC(OCC)	0.154	From GUSD
Probabability of outdoor exposure	PC(OUT)	0.25	Default 0.25
Probability of leak jet/pool fire impact	PCI(LJF)	0.065	From TIR CALCS 3.07
Probability of rupture jet fire/pool fire impact	PCI(RJF)	0.005	From TIR CALCS 3.07
Probability of leak flash fire impact	PCI(LFF)	0.003	From TIR CALCS 3.07
Probability of rupture flash fire	PCI(RFF)	0	From TIR CALCS 3.07
Probability of leak explosion impact	PCI(LEX)	0.003	From TIR CALCS 3.07
Probability of rupture explosion impact	PCI(REX)	0	From TIR CALCS 3.07
Individual Risk Summary			
Leak jet/pool fire IR	IR(LJF)	2.00E-07	From TIR CALCS 3.07
Rupture jet fire/pool fire IR	IR(RJF)	2.08E-08	From TIR CALCS 3.07
Leak flash fire IR	IR(LFF)	0.00E+00	From TIR CALCS 3.07
Rupture flash fire IR	IR(RFF)	0.00E+00	From TIR CALCS 3.07
Leak explosion IR	IR(LEX)	0.00E+00	From TIR CALCS 3.07
Rupture explosion IR	IR(REX)	0.00E+00	From TIR CALCS 3.07
Total IR and IRC			
Total Individual Risk	TIR	2.21E-07	TIR = Sum of all IR's
CDE Individual Risk Criterion	IRC	**1.00E-06**	Default Value
Divide the TIR by the IRC	TIR / IRC	0.22	TIR / IRC
Check shaded box as follows:			
If TIR / IRC > 1.0			"significant"
If TIR / IRC < =1.0		X	"insignificant"
IR and Population Risk Indicators			
IR Indicator	IRR	0.09	
Population Risk Indicator	PRI	50	For 10 zones of 125'

Caliornia Department of Education CCR TITLE 5 STAGE 2 PIPELINE RISK ANALYSIS REPORT FORM 3A - Standard Protocol Calculation Summary (10" Crude Oil Pipeline)			
Release Probability Calculations	**Variables**	**Values or Units**	**Data Source**
Basic Data Input			
Baseline frequency per pipeline mile	F0	2.30E-03	Historical release frequency from Table B-6 (All CA Crude Pipelines)
Segment Length within 1500-ft buffer	SEG, Miles	0.85	Determined from site maps
Nearest Property Line Distance	R0, Ft.	10	Determined from site maps
Receptor location distance, if different than nearest	R(i), ft.	50	Easement from Panama Lane
Base release probability	P0	2.30E-03	$P0 = 1 - e^{(-F0 \times t)}$
Probability adjustment factor	PAF	1	Default
Adjusted base probability	PA	2.30E-03	$PA = P0 \times PAF$
Special Seismic Considerations:			
Please summarize or list below any adjustments made to the Protocol base risk analysis estimates and the special siesmic conditions and studies upon which these adjustments were based. If adjustments were based upon special seismic conditions, the signature and title of those professionals involved are required.			
No special seismic conditions exist at this location.			
Signatures for Above, If Needed			
Printed Name	**Signature**		**Title**
Protocol Basis Scenario Probabities	**Variable**	**Value**	**Data Source if Different from Protocol**
XSEG Length, Leak, Ft:			
Leak jet or pool fire		187	
Leak flash fire		0	
Leak gas or vapor explosion		0	
Release Probability Calculations			
Individual XSEG failure and release probabilities, leak, PA(LX):			
Leak jet or pool fire		106'	
Leak flash fire		14'	
Leak gas or vapor explosion		0	
XSEG Length, rupture, ft:			
Rupture jet or pool fire		500	
Rupture flash fire		0	
Rupture gas or vapor explosion		0	
Individual XSEG failure and release probabilities, rupture, PA(RX):			
Rupture jet or pool fire		255'	
Rupture flash fire		39'	
Rupture gas or vapor explosion		0	

Caliornia Department of Education

CCR TITLE 5 STAGE 2 PIPELINE RISK ANALYSIS REPORT

FORM 3A - Standard Protocol Calculation Summary (10" Crude Oil Pipeline)

Protocol Basis Scenario Probabities	Variable	Value	Data Source if Different from Protocol
Probability of leak	PC(L)	0.8	Default = 0.8, (FEMA, 1989)
Probability of rupture	PC (R)	0.2	Default = 0.2, (FEMA, 1989)
Probability of leak ignition	PC(LIG)	0.03	Crude Oil = 0.03
Probability of rupture ignition	PC(RIG)	0.03	Crude Oil = 0.03
Probability of fire upon ignition	PC(FIG)	0.95	Liquid 0.95
Probability of explosion on ignition	PC(EIG)	0.05	Liquid 0.05
Probability of flash fire	PC(FF)	0.05	Liquid 0.05
Probability of jet fire (gas pipelines) or pool fire (liquid pipelines)	PC(JF)	0.95	Liquid 0.95
Probabability of occupancy	PC(OCC)	0.154	From GUSD
Probabability of outdoor exposure	PC(OUT)	0.25	Default 0.25
Probability of leak jet/pool fire impact	PCI(LJF)	0.065	From TIR CALCS 3.07
Probability of rupture jet fire/pool fire impact	PCI(RJF)	0.005	From TIR CALCS 3.07
Probability of leak flash fire impact	PCI(LFF)	0.003	From TIR CALCS 3.07
Probability of rupture flash fire	PCI(RFF)	0	From TIR CALCS 3.07
Probability of leak explosion impact	PCI(LEX)	0.003	From TIR CALCS 3.07
Probability of rupture explosion impact	PCI(REX)	0	From TIR CALCS 3.07
Individual Risk Summary			
Leak jet/pool fire IR	IR(LJF)	2.00E-07	From TIR CALCS 3.07
Rupture jet fire/pool fire IR	IR(RJF)	4.50E-08	From TIR CALCS 3.07
Leak flash fire IR	IR(LFF)	0.00E+00	From TIR CALCS 3.07
Rupture flash fire IR	IR(RFF)	0.00E+00	From TIR CALCS 3.07
Leak explosion IR	IR(LEX)	0.00E+00	From TIR CALCS 3.07
Rupture explosion IR	IR(REX)	0.00E+00	From TIR CALCS 3.07
Total IR and IRC			
Total Individual Risk	TIR	2.45E-07	TIR = Sum of all IR's
CDE Individual Risk Criterion	IRC	**1.00E-06**	Default Value
Divide the TIR by the IRC	TIR / IRC	0.25	TIR / IRC
Check shaded box as follows:			
If TIR / IRC > 1.0			"significant"
If TIR / IRC < =1.0		X	"insignificant"
IR and Population Risk Indicators			
IR Indicator	IRR	0.1	
Population Risk Indicator	PRI	90	For 10 zones of 125'

Caliornia Department of Education

CCR TITLE 5 STAGE 3 PIPELINE RISK ANALYSIS REPORT

FORM 3B - Standard Protocol Calculation Summary (8" Crude Oil Pipeline)

Release Probability Calculations	Variables	Values or Units	Data Source
Basic Data Input			
Baseline frequency per pipeline mile	F0	2.30E-03	Historical release frequency from Table B-6 (All CA Crude Pipelines)
Segment Length within 1500-ft buffer	SEG, Miles	0.85	Determined from site maps
Nearest Property Line Distance	R0, Ft.	10	Determined from site maps
Receptor location distance, if different than nearest	R(i), ft.	50	Easement from Panama Lane
Base release probability	P0	2.30E-03	$P0 = 1 - e^{(-F0 \times t)}$
Probability adjustment factor	PAF	1	Default
Adjusted base probability	PA	2.30E-03	PA = P0 × PAF

Special Seismic Considerations:

Please summarize or list below any adjustments made to the Protocol base risk analysis estimates and the special siesmic conditions and studies upon which these adjustments were based. If adjustments were based upon special seismic conditions, the signature and title of those professionals involved are required.

No special seismic conditions exist at this location.

Signatures for Above, If Needed

Printed Name	Signature	Title

Protocol Basis Scenario Probabities	Variable	Value	Data Source if Different from Protocol
XSEG Length, Leak, Ft:			
Leak jet or pool fire		182	
Leak flash fire		0	
Leak gas or vapor explosion		0	
Release Probability Calculations			
Individual XSEG failure and release probabilities, leak, PA(LX):			
Leak jet or pool fire		104'	
Leak flash fire		14'	
Leak gas or vapor explosion		0	
XSEG Length, rupture, ft:			
Rupture jet or pool fire		212	
Rupture flash fire		0	
Rupture gas or vapor explosion		0	
Individual XSEG failure and release probabilities, rupture, PA(RX):			
Rupture jet or pool fire		117'	
Rupture flash fire		21'	
Rupture gas or vapor explosion		0	

Caliornia Department of Education

CCR TITLE 5 STAGE 3 PIPELINE RISK ANALYSIS REPORT

FORM 3B - Standard Protocol Calculation Summary (8" Crude Oil Pipeline)

Protocol Basis Scenario Probabities	Variable	Value	Data Source if Different from Protocol
Probability of leak	PC(L)	0.8	Default = 0.8, (FEMA, 1989)
Probability of rupture	PC (R)	0.2	Default = 0.2, (FEMA, 1989)
Probability of leak ignition	PC(LIG)	0.03	Crude Oil = 0.03
Probability of rupture ignition	PC(RIG)	0.03	Crude Oil = 0.03
Probability of fire upon ignition	PC(FIG)	0.95	Liquid 0.95
Probability of explosion on ignition	PC(EIG)	0.05	Liquid 0.05
Probability of flash fire	PC(FF)	0.05	Liquid 0.05
Probability of jet fire (gas pipelines) or pool fire (liquid pipelines)	PC(JF)	0.95	Liquid 0.95
Probabability of occupancy	PC(OCC)	0.154	From GUSD
Probabability of outdoor exposure	PC(OUT)	0.25	Default 0.25
Probability of leak jet/pool fire impact	PCI(LJF)	0.065	From TIR CALCS 3.07
Probability of rupture jet fire/pool fire impact	PCI(RJF)	0.005	From TIR CALCS 3.07
Probability of leak flash fire impact	PCI(LFF)	0.003	From TIR CALCS 3.07
Probability of rupture flash fire	PCI(RFF)	0	From TIR CALCS 3.07
Probability of leak explosion impact	PCI(LEX)	0.003	From TIR CALCS 3.07
Probability of rupture explosion impact	PCI(REX)	0	From TIR CALCS 3.07
Individual Risk Summary			
Leak jet/pool fire IR	IR(LJF)	2.00E-07	From TIR CALCS 3.07
Rupture jet fire/pool fire IR	IR(RJF)	1.92E-08	From TIR CALCS 3.07
Leak flash fire IR	IR(LFF)	0.00E+00	From TIR CALCS 3.07
Rupture flash fire IR	IR(RFF)	0.00E+00	From TIR CALCS 3.07
Leak explosion IR	IR(LEX)	0.00E+00	From TIR CALCS 3.07
Rupture explosion IR	IR(REX)	0.00E+00	From TIR CALCS 3.07
Total IR and IRC			
Total Individual Risk	TIR	**2.19E-07**	TIR = Sum of all IR's
CDE Individual Risk Criterion	IRC	**1.00E-06**	Default Value
Divide the TIR by the IRC	TIR / IRC	**0.22**	TIR / IRC
Check shaded box as follows:			
If TIR / IRC > 1.0			"significant"
If TIR / IRC < =1.0		X	"insignificant"
IR and Population Risk Indicators			
IR Indicator	IRR	**0.09**	
Population Risk Indicator	PRI	**30**	For 10 zones of 125'

Caliornia Department of Education

CCR TITLE 5 STAGE 3 PIPELINE RISK ANALYSIS REPORT

FORM 3C - Standard Protocol Calculation Summary (10" Crude Oil Pipeline)

Release Probability Calculations	Variables	Values or Units	Data Source
Basic Data Input			
Baseline frequency per pipeline mile	F0	2.30E-03	Historical release frequency from Table B-6 (All CA Crude Pipelines)
Segment Length within 1500-ft buffer	SEG, Miles	0.85	Determined from site maps
Nearest Property Line Distance	R0, Ft.	10	Determined from site maps
Receptor location distance, if different than nearest	R(i), ft.	50	Easement from Panama Lane
Base release probability	P0	2.30E-03	$P0 = 1 - e^{(-F0 \times t)}$
Probability adjustment factor	PAF	1	Default
Adjusted base probability	PA	2.30E-03	PA = P0 × PAF

Special Seismic Considerations:

Please summarize or list below any adjustments made to the Protocol base risk analysis estimates and the special siesmic conditions and studies upon which these adjustments were based. If adjustments were based upon special seismic conditions, the signature and title of those professionals involved are required.

No special seismic conditions exist at this location.

Signatures for Above, If Needed

Printed Name	Signature	Title

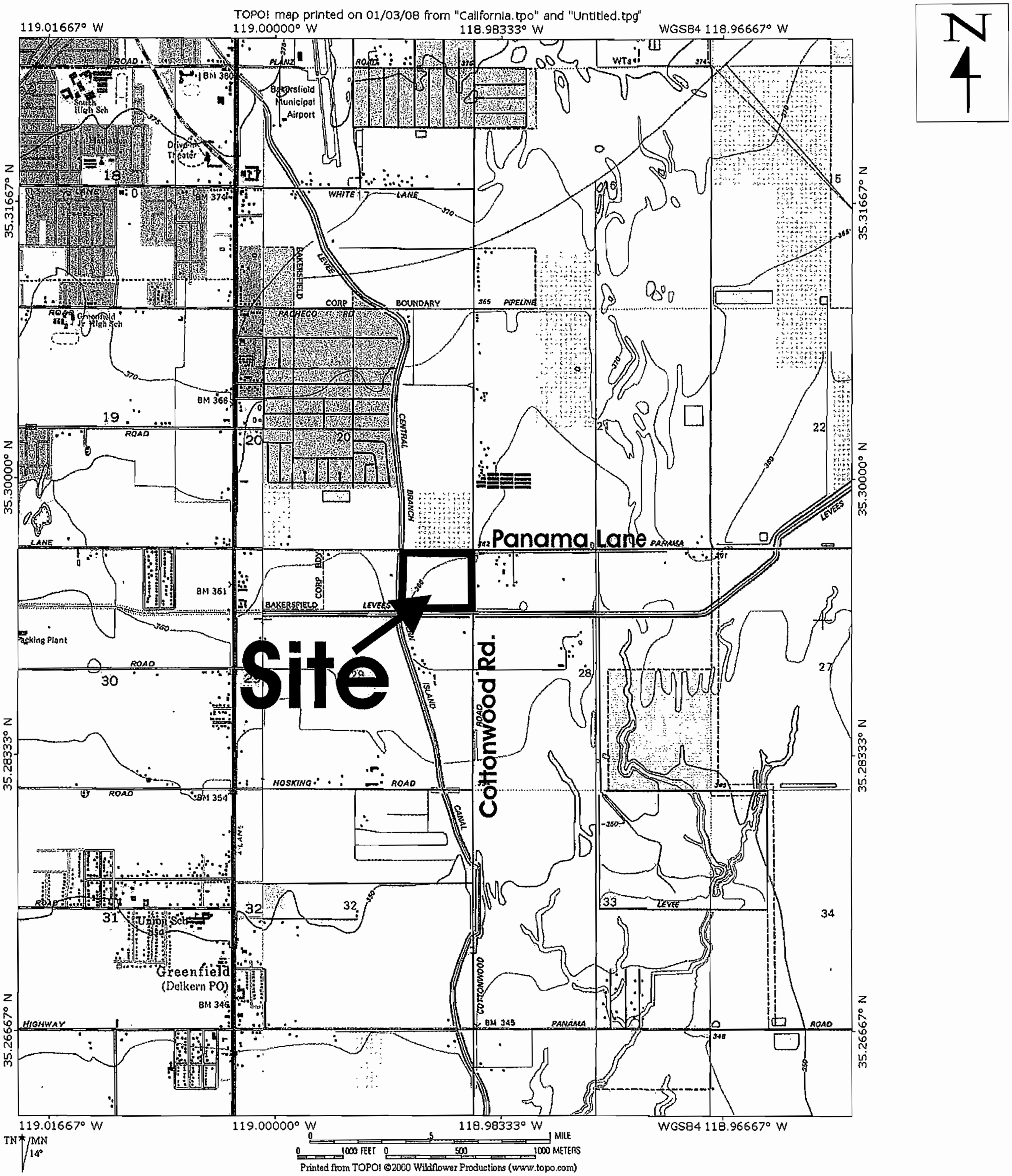
Protocol Basis Scenario Probabities	Variable	Value	Data Source if Different from Protocol
XSEG Length, Leak, Ft:			
Leak jet or pool fire		182	
Leak flash fire		0	
Leak gas or vapor explosion		0	
Release Probability Calculations			
Individual XSEG failure and release probabilities, leak, PA(LX):			
Leak jet or pool fire		104'	
Leak flash fire		14'	
Leak gas or vapor explosion		0	
XSEG Length, rupture, ft:			
Rupture jet or pool fire		317	
Rupture flash fire		0	
Rupture gas or vapor explosion		0	
Individual XSEG failure and release probabilities, rupture, PA(RX):			
Rupture jet or pool fire		166'	
Rupture flash fire		39'	
Rupture gas or vapor explosion		0	

Caliornia Department of Education

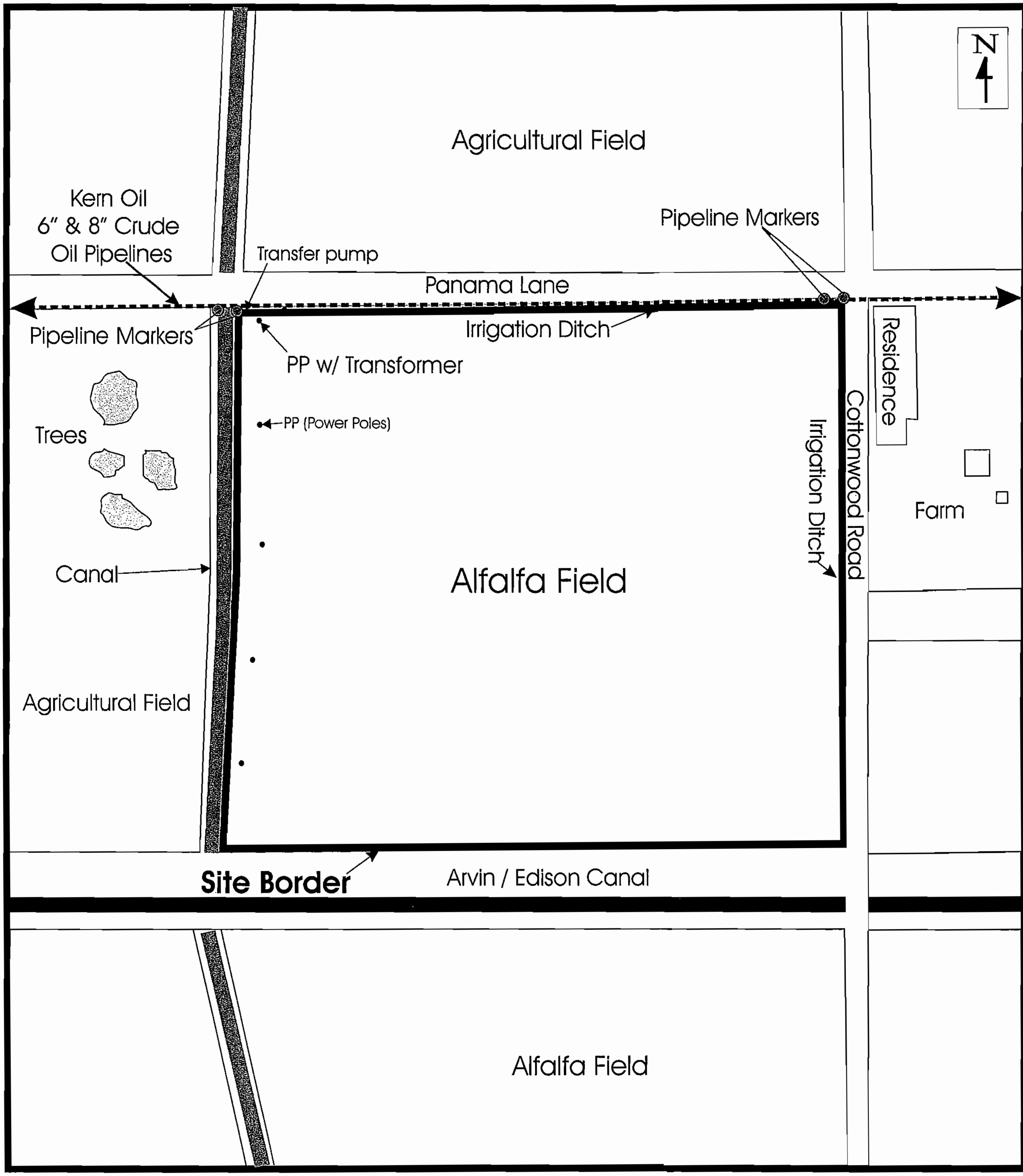
CCR TITLE 5 STAGE 3 PIPELINE RISK ANALYSIS REPORT

FORM 3C - Standard Protocol Calculation Summary (10" Crude Oil Pipeline)

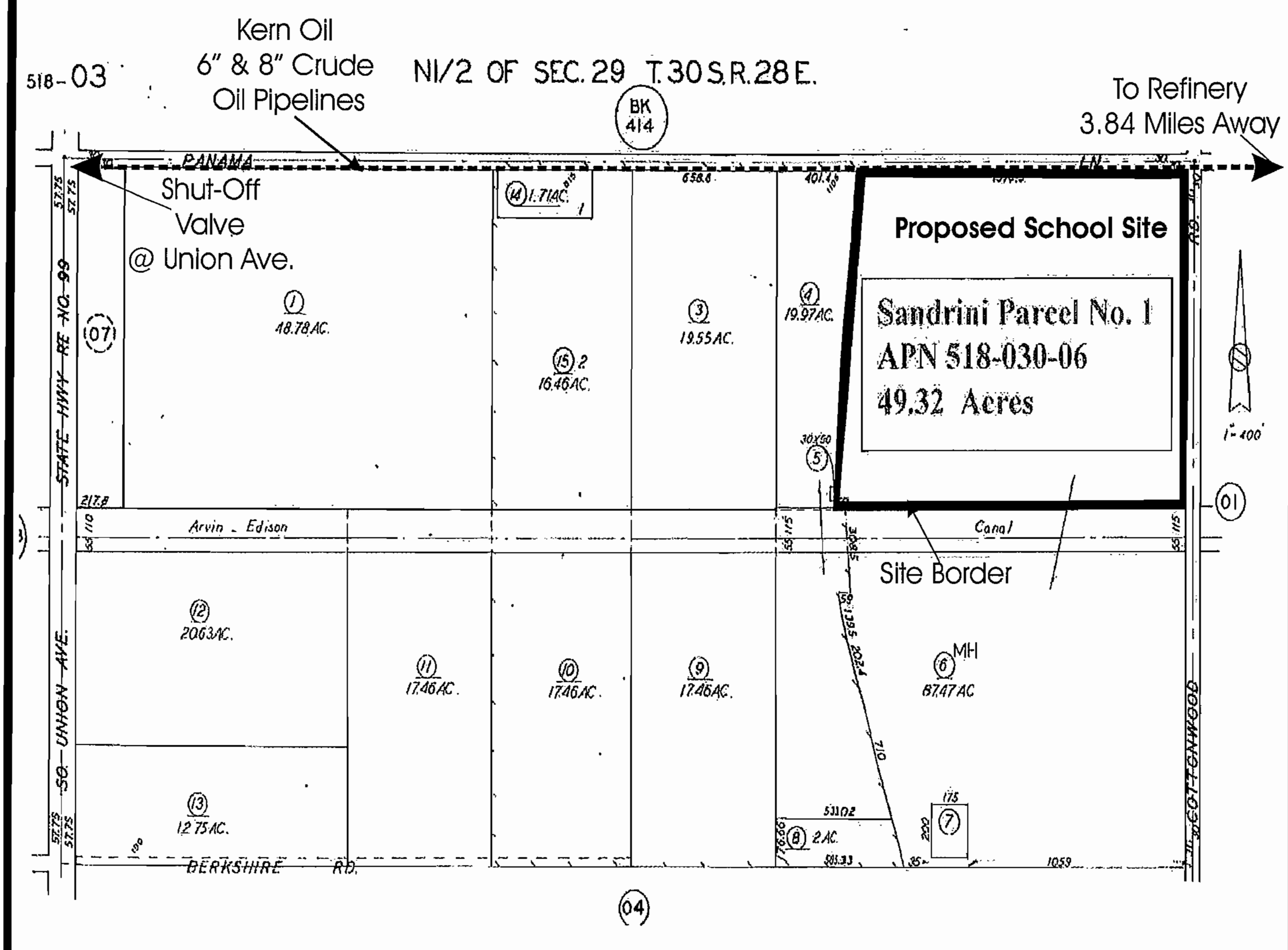
Protocol Basis Scenario Probabities	Variable	Value	Data Source if Different from Protocol
Probability of leak	PC(L)	0.8	Default = 0.8, (FEMA, 1989)
Probability of rupture	PC (R)	0.2	Default = 0.2, (FEMA, 1989)
Probability of leak ignition	PC(LIG)	0.03	Crude Oil = 0.03
Probability of rupture ignition	PC(RIG)	0.03	Crude Oil = 0.03
Probability of fire upon ignition	PC(FIG)	0.95	Liquid 0.95
Probability of explosion on ignition	PC(EIG)	0.05	Liquid 0.05
Probability of flash fire	PC(FF)	0.05	Liquid 0.05
Probability of jet fire (gas pipelines) or pool fire (liquid pipelines)	PC(JF)	0.95	Liquid 0.95
Probabability of occupancy	PC(OCC)	0.154	From GUSD
Probabability of outdoor exposure	PC(OUT)	0.25	Default 0.25
Probability of leak jet/pool fire impact	PCI(LJF)	0.065	From TIR CALCS 3.07
Probability of rupture jet fire/pool fire impact	PCI(RJF)	0.005	From TIR CALCS 3.07
Probability of leak flash fire impact	PCI(LFF)	0.003	From TIR CALCS 3.07
Probability of rupture flash fire	PCI(RFF)	0	From TIR CALCS 3.07
Probability of leak explosion impact	PCI(LEX)	0.003	From TIR CALCS 3.07
Probability of rupture explosion impact	PCI(REX)	0	From TIR CALCS 3.07
Individual Risk Summary			
Leak jet/pool fire IR	IR(LJF)	2.00E-07	From TIR CALCS 3.07
Rupture jet fire/pool fire IR	IR(RJF)	2.88E-08	From TIR CALCS 3.07
Leak flash fire IR	IR(LFF)	0.00E+00	From TIR CALCS 3.07
Rupture flash fire IR	IR(RFF)	0.00E+00	From TIR CALCS 3.07
Leak explosion IR	IR(LEX)	0.00E+00	From TIR CALCS 3.07
Rupture explosion IR	IR(REX)	0.00E+00	From TIR CALCS 3.07
Total IR and IRC			
Total Individual Risk	TIR	2.29E-07	TIR = Sum of all IR's
CDE Individual Risk Criterion	IRC	**1.00E-06**	Default Value
Divide the TIR by the IRC	TIR / IRC	0.23	TIR / IRC
Check shaded box as follows:			
If TIR / IRC > 1.0			"significant"
If TIR / IRC < =1.0		X	"insignificant"
IR and Population Risk Indicators			
IR Indicator	IRR	0.09	
Population Risk Indicator	PRI	30	For 10 zones of 125'



SOILS ENGINEERING, INC.	Crescent Elementary & Middle School #4	PLATE
4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100	SW of Panama Lane and Cottonwood Road Bakersfield, CA	1
DATE: 1/08 PROJECT: 11968e	**Location Map**	



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 8/06 PROJECT: 11833e	Crescent Elementary & Middle School #4 SW of Panama Lane and Cottonwood Road Bakersfield, CA **Plot Plan**	**PLATE** **2**



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 1/08 PROJECT: 11968e	Crescent Elementary & Middle School #4 SW of Panama Lane and Cottonwood Road Bakersfield, CA **Pipeline Location Map**	**PLATE** 3

Picture 1: Looking @ Crude Oil Pipeline Marker Near SW Corner of Site Along Southside of Panama Lane

Picture 2. Looking @ Crude Oil Pipeline Marker Near Panama Lane & Cottonwood Rd.

Picture 3: New Pipeline Marker Sign Near Cottonwood & Panama Lane

Appendix A

Stage 2 Risk Analysis Calculations for 6" and 8" and Combined (10") Crude Oil Pipelines, Population Risk Indicator Tables and Release Volume Calculations

California Department of Education

PIPELINE RISK ANALYSIS PROTOCOL
TOTAL INDIVIDUAL RISK (TIR) ESTIMATING AID

To be used in conjunction with the CDE Guidance Protocol for School Site Pipeline Risk Analysis

March 2007

CDE provides this template for the convenience of Protocol users as a template. It is the responsibility of the user to ensure that calculations match and are appropriate for the risk analysis being conducted for a particular case. While both CDE and its contractor have sought to make this spreadsheet free of errors there is no expressed or implied warranty to that it is so.

XSEG Calculations

Pipe Size, Pressure, and Hazard Type			Front Property Line - Begin Zone 1			Begin Zone 2			Begin Zone 3			Begin Zone 4		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
8	200	LJF	106	50	187	106	175	0	106	300	0	106	425	0
8	200	RJF	125	50	229	125	175	0	125	300	0	125	425	0
8	200	LFF	14	50	0	14	175	0	14	300	0	14	425	0
8	200	RFF	21	50	0	21	175	0	21	300	0	21	425	0
8	200	LEX	0	50	0	0	175	0	0	300	0	0	425	0
8	200	REX	0	50	0	0	175	0	0	300	0	0	425	0

Green cells indicate where input data are entered for the case being analyzed.

The numbers shown apply for a the specific example illustrated. Substitute the appropriate values for the actual number being analyzed.

The Pipe Size is the pipe diameter in inches. The Pressure is the operating pressure in punds per square inch gage (psig).

Hazard acronyms are defined in the Protocol.

The 1% mortality (0.01) probability impact distance RX for each hazard is obtained from the appropriate hazard figure in the Protocol, Chapter 4.

R0 is the receptor distance being analyzed and is explained in the Protocol, Chapter 4.

XSEG is as described in the Protocol, Chapter 4.

Zones 1, 2, and 3 are defined in the Protocol, Chapter 4 for use in the TIR calculations. If more than three zones are used, as explained in the Protocol, Section 4, more worksheets of the same type as shown can be added.

XSEG Calculations

Pipe Size, Pressure, and Hazard Type			Begin Zone 5			Begin Zone 6			Begin Zone 7			Begin Zone 8		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
8	200	LJF	106	550	0	106	675	0	106	800	0	106	925	0
8	200	RJF	125	550	0	125	675	0	125	800	0	125	925	0
8	200	LFF	14	550	0	14	675	0	14	800	0	14	925	0
8	200	RFF	21	550	0	21	675	0	21	800	0	21	925	0
8	200	LEX	0	550	0	0	675	0	0	800	0	0	925	0
8	200	REX	0	550	0	0	675	0	0	800	0	0	925	0

XSEG Calculations

Pipe Size, Pressure, and Hazard Type			Begin Zone 9			Begin Zone 10			End Zone 10 - Back Property Line		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
8	200	LJF	106	1050	0	106	1175	0	106	1250	0
8	200	RJF	125	1050	0	125	1175	0	125	1250	0
8	200	LFF	14	1050	0	14	1175	0	14	1250	0
8	200	RFF	21	1050	0	21	1175	0	21	1250	0
8	200	LEX	0	1050	0	0	1175	0	0	1250	0
8	200	REX	0	1050	0	0	1175	0	0	1250	0

TIR CALCULATIONS - BEGIN ZONE 1 - FRONT PROPERTY LINE

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	50	ft

XSEG	RX(1%)	Units
XSEG(LJF)	187	ft
XSEG(RJF)	229	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

1. These instruction boxes apply to Worksheets TIR1, 2, 3, and 4.
2. Enter the Input Data indicated for the case under analysis.
3. Enter the XSEG values from Worksheet "XSEG Calculations".
4. In the table below enter the F0 data for the appropriate type pf pipeline from the failure frequency data in the Protocol, Chapter 4.
5.Enter a value for the other green cell variables as explained in Chapter 4.

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
Calculated Values:							
PA(LJF)	8.1E-05	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	1.0E-04	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.039
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	8.1E-05	0.06	0.039	**2.0E-07**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	1.0E-04	0.01	0.039	**2.1E-08**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	1.00		2.0E-07	**2.0E-07**
IR(RJF) =	1.00		2.1E-08	**2.08E-08**
IR(LFF) =	0.00		0.0E+00	**0.00E+00**
IR(RFF) =	0.00		0.0E+00	**0.00E+00**
IR(LEX) =	0.00		0.0E+00	**0.00E+00**
IR(REX) =	0.00		0.0E+00	**0.00E+00**
TOTAL INDIVIDUAL RISK, TIR				**2.2E-07**
CDE INDIVIDUAL RISK CRITERION, IRC				**1.0E-06**
TIR/IRC RATIO				**0.22**
PROTOCOL TIR INDICATOR RATIO				**0.09**

6. Enter the maximum fatality probability that corresponds to the maximum impact for each hazard type according to the Protocol, Chapter 4.

TIR CALCULATIONS - END ZONE 1 - BEGIN ZONE 2

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	175	ft

XSEG	**RX(1%)**	**Units**
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		**Leak**		**Rupture**		**Exposure**	
F0	2.3E-03	**PC(L)**	0.8	**PC(R)**	0.2	**PC(OCC)**	0.15
P0	2.3E-03	**PC(LIG)**	0.09	**PC(RIG)**	0.03	**PC(OUT)**	0.25
PAF	1.0	**PC(FIG)**	0.95	**PC(FIG)**	0.95		
PA	2.3E-03	**PC(JF)**	0.95	**PC(JF)**	0.95		
		PC(FF)	0.05	**PC(FF)**	0.05		
		PC(EIG)	0.05	**PC(EIG)**	0.05		
PA(LJF)	0.0E+00	**PCI(LJF)**	0.065	**PCI(RJF)**	0.005		
PA(RJF)	0.0E+00	**PCI(LFF)**	0.003	**PCI(RFF)**	0.000		
PA(LFF)	0.0E+00	**PCI(LEX)**	0.003	**PCI(REX)**	0.000	**PC(EXPO)**	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				**Values**			
PC(LJF) =	**PA(LJF) x**	**PCI(LJF) x**	**PC(EXPO) =**	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	**PA(RJF) x**	**PCI(RJF) x**	**PC(EXPO) =**	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	**PA(LFF) x**	**PCI(LFF) x**	**PC(EXPO) =**	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	**PA(RFF) x**	**PCI(RFF) x**	**PC(EXPO) =**	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	**PA(LEX) x**	**PCI(LEX) x**	**PC(EXPO) =**	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	**PA(REX) x**	**PCI(REX) x**	**PC(EXPO) =**	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		**PC(X)**	**IR(X)**
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.33		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR2 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 2 - BEGIN ZONE 3

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	300	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR3 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 3 - BEGIN ZONE 4

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	425	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR4 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 4 - BEGIN ZONE 5

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	550	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR5 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 5 - BEGIN ZONE 6

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	675	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR6 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 6 - BEGIN ZONE 7

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	800	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR7 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 7 - BEGIN ZONE 8

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	925	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR8 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 8 - BEGIN ZONE 9

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	1050	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR9 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 9 - BEGIN ZONE 10

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	1125	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR10 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 10 - BACK PROPERTY LINE
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	1250	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR11 =				**0.0E+00**

Population Risk Indicator For Pool Fire for 8" Crude Oil Pipeline 10 Zones of 125' - Stage 2							
Zone	**Distance From Pipeline (ft.)**		**Zone Boundary Mortalities (RJF %)**		**Simple Avg. Zone Mortality (RJF) %**	**Zone Population**	**Population Risk Indicator**
	Begin	End	Begin	End			
1	50	175	100	33	66.5	60	40
2	175	300	33	0	16.5	60	10
3	300	425	0	0	0	60	0
4	425	550	0	0	0	60	0
5	550	675	0	0	0	60	0
6	675	800	0	0	0	60	0
7	800	925	0	0	0	60	0
8	925	1050	0	0	0	60	0
9	1050	1175	0	0	0	60	0
10	1175	1250	0	0	0	60	0
				Population Risk Indicator			**50**

XSEG Calculations														
Pipe Size, Pressure, and Hazard Type			Front Property Line - Begin Zone 1			Begin Zone 2			Begin Zone 3			Begin Zone 4		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
10	200	LJF	106	50	187	106	175	0	106	300	0	106	425	0
10	200	RJF	255	50	500	255	175	371	255	300	0	255	425	0
10	200	LFF	14	50	0	14	175	0	14	300	0	14	425	0
10	200	RFF	39	50	0	39	175	0	39	300	0	39	425	0
10	200	LEX	0	50	0	0	175	0	0	300	0	0	425	0
10	200	REX	0	50	0	0	175	0	0	300	0	0	425	0

Green cells indicate where input data are entered for the case being analyzed.

The numbers shown apply for a the specific example illustrated. Substitute the appropriate values for the actual number being analyzed.

The Pipe Size is the pipe diameter in inches. The Pressure is the operating pressure in punds per square inch gage (psig).

Hazard acronyms are defined in the Protocol.

The 1% mortality (0.01) probability impact distance RX for each hazard is obtained from the appropriate hazard figure in the Protocol, Chapter 4.

R0 is the receptor distance being analyzed and is explained in the Protocol, Chapter 4.

XSEG is as described in the Protocol, Chapter 4.

Zones 1, 2, and 3 are defined in the Protocol, Chapter 4 for use in the TIR calculations. If more than three zones are used, as explained in the Protocol, Section 4, more worksheets of the same type as shown can be added.

XSEG Calculations

Pipe Size, Pressure, and Hazard Type			Begin Zone 5			Begin Zone 6			Begin Zone 7			Begin Zone 8		
Pipe Size (in)	Press. (psig)	Hazard X	RX (1%) (ft)	R0 (ft)	XSEG (ft)	RX (1%) (ft)	R0 (ft)	XSEG (ft)	RX (1%) (ft)	R0 (ft)	XSEG (ft)	RX (1%) (ft)	R0 (ft)	XSEG (ft)
10	200	LJF	106	550	0	106	675	0	106	800	0	106	925	0
10	200	RJF	255	550	0	255	675	0	255	800	0	255	925	0
10	200	LFF	14	550	0	14	675	0	14	800	0	14	925	0
10	200	RFF	39	550	0	39	675	0	39	800	0	39	925	0
10	200	LEX	0	550	0	0	675	0	0	800	0	0	925	0
10	200	REX	0	550	0	0	675	0	0	800	0	0	925	0

XSEG Calculations

Pipe Size, Pressure, and Hazard Type			Begin Zone 9			Begin Zone 10			End Zone 10 - Back Property Line		
Pipe Size (in)	Press. (psig)	Hazard X	RX (1%) (ft)	R0 (ft)	XSEG (ft)	RX (1%) (ft)	R0 (ft)	XSEG (ft)	RX (1%) (ft)	R0 (ft)	XSEG (ft)
10	200	LJF	106	1050	0	106	1175	0	106	1300	0
10	200	RJF	255	1050	0	255	1175	0	255	1300	0
10	200	LFF	14	1050	0	14	1175	0	14	1300	0
10	200	RFF	39	1050	0	39	1175	0	39	1300	0
10	200	LEX	0	1050	0	0	1175	0	0	1300	0
10	200	REX	0	1050	0	0	1175	0	0	1300	0

TIR CALCULATIONS - BEGIN ZONE 1 - FRONT PROPERTY LINE
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	50	ft

XSEG	RX(1%)	Units
XSEG(LJF)	187	ft
XSEG(RJF)	500	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

1. These instruction boxes apply to Worksheets TIR1, 2, 3, and 4.
2. Enter the Input Data indicated for the case under analysis.
3. Enter the XSEG values from Worksheet "XSEG Calculations".
4. In the table below enter the F0 data for the appropriate type pf pipeline from the failure frequency data in the Protocol, Chapter 4.
5.Enter a value for the other green cell variables as explained in Chapter 4.

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
Calculated Values:							
PA(LJF)	8.1E-05	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	2.2E-04	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.039
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	8.1E-05	0.06	0.039	**2.0E-07**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	2.2E-04	0.01	0.039	**4.5E-08**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	1.00		2.0E-07	**2.0E-07**
IR(RJF) =	1.00		4.5E-08	**4.54E-08**
IR(LFF) =	0.00		0.0E+00	**0.00E+00**
IR(RFF) =	0.00		0.0E+00	**0.00E+00**
IR(LEX) =	0.00		0.0E+00	**0.00E+00**
IR(REX) =	0.00		0.0E+00	**0.00E+00**
			TOTAL INDIVIDUAL RISK, TIR	**2.5E-07**
			CDE INDIVIDUAL RISK CRITERION, IRC	**1.0E-06**
			TIR/IRC RATIO	**0.25**
			PROTOCOL TIR INDICATOR RATIO	**0.10**

6. Enter the maximum fatality probability that corresponds to the maximum impact for each hazard type according to the Protocol, Chapter 4.

TIR CALCULATIONS - END ZONE 1 - BEGIN ZONE 2

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	175	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	371	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	1.6E-04	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	1.6E-04	0.01	0.039	**3.4E-08**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	1.00		3.4E-08	**3.4E-08**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR2 =				**3.4E-08**

TIR CALCULATIONS - END ZONE 2 - BEGIN ZONE 3

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	300	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR3 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 3 - BEGIN ZONE 4

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	425	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR4 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 4 - BEGIN ZONE 5

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	550	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR5 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 5 - BEGIN ZONE 6

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	675	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR6 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 6 - BEGIN ZONE 7

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	800	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR7 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 7 - BEGIN ZONE 8

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	925	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR8 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 8 - BEGIN ZONE 9

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	1050	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR9 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 9 - BEGIN ZONE 10

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	1125	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR10 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 10 - BACK PROPERTY LINE
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	1250	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR11 =				**0.0E+00**

Population Risk Indicator For Pool Fire for Both Pipelines (10" Crude Oil)							
Zone	**Distance From Pipeline (ft.)**		**Zone Boundary Mortalities (RJF %)**		**Simple Avg. Zone Mortality (RJF) %**	**Zone Population**	**Population Risk Indicator**
	Begin	End	Begin	End			
1	50	450	100	0	50	200	100
2	450	850	0	0	0	200	0
3	850	1250	0	0	0	200	0
				Population Risk Indicator			**100**

Population Risk Indicator For Pool Fire for Both Pipelines (10" Crude Oil) 10 Zones of 125' - Stage 2							
Zone	**Distance From Pipeline (ft.)**		**Zone Boundary Mortalities (RJF %)**		**Simple Avg. Zone Mortality (RJF) %**	**Zone Population**	**Population Risk Indicator**
	Begin	End	Begin	End			
1	50	175	100	100	100	60	60
2	175	300	100	0	50	60	30
3	300	425	0	0	0	60	0
4	425	550	0	0	0	60	0
5	550	675	0	0	0	60	0
6	675	800	0	0	0	60	0
7	800	925	0	0	0	60	0
8	925	1050	0	0	0	60	0
9	1050	1175	0	0	0	60	0
10	1175	1250	0	0	0	60	0
				Population Risk Indicator			**90**

Calculations For Full Bore Release of Liquid

8" crude oil @ 200 psi

Qa =(init flow rate (167.433) ft/min)(3.14/4)(diam/12 ft)^2(7.4805 gallons/ft^3) 68.6

Qa = 437 gals/min (625 bbls/hr)

Vb = 197* Sqrt [(28.4)*(Pt-14.7)*(Density Factor **0.5405**)]+[5.97(Za-Zb elev diff)] + [(2.58x10-5)(Va)^2]

28.4	Pt-14.7	Df	5.97*(Za-Zb)
28.4	**200**	**0.5405**	0

Vb = 10915.58 ft/min
3070.161414

Qrelease = 3.14/4 * (diam/12)^2 * (Vb) * (7.4805) 0.785398163 **0.4444444** 7.4805

Qrelease = 28502.62 gals/min

Density lb/ft3

QRmass = (Qrelease or Qa which ever is less)(Density)/7.4805 **55.56**

QRmass = 3245.566 lb/min

Minutes

QS = (QRmass) * (time release) 15

Total Quantity Released

QS = 48683.49 lbs

Pool Depth Ft. Default Depth Ft.

Pool Area (A) = (QS/density)/depth of pool(Ft.) **0.167** 0.0328

A = **5246.902** Ft2

Pool Width (Ft.)

Pool Length (Ft.) = Pool Area/Pool Width **60**

Pool Length = 87.44837 Ft. **Double for Combination 6" & 8" lines = 175'**

Calculations for Orifice Release (1")

Qa = 436.9694 gals/min
same as above

Hole Area (HA) = (3.14/4) * (Hole Diameter ")^2
HA = 0.785398 inch^2

QR mass = $QR_{mass} = (132.2)(6.4516 \times 10^{-4})(0.8)(HA)\sqrt{(16.018)\rho_1[(2)(9.8)(16.018)\rho_1(LH)(0.0254) + 2(P_g)(6895)]}$

		Vessel Pressure Pg)	= Pipe Diam (")	Density =	1st 1/2 of Equation	2nd 1/2	SQRT of 2nd 1/2
QR Mass =	2656.685 lb/min	**200**	**8**	**55.56**	0.0535894	2.458E+09	49574.84

Q release = (QR mass*7.4805)/density
Q release = 357.6913 gpm

QS = QR mass * Time 15 min
QS = 39850.27 lbs

		Default Depth	Curb Depth
Pool Area (A) = (QS/density)/depth			
A =	4294.895 Ft.	0.0328	**0.167**

Pool Length = A/width Width (Ft.) = **60**
Pool Length = 71.58159 Ft.

Appendix B

Stage 3 Risk Analysis Calculations, Population Risk Indicator Tables & Computer Model Results (Aloha and Breeze) for 8" and Combined Crude Oil Pipelines (10")

California Department of Education

PIPELINE RISK ANALYSIS PROTOCOL
TOTAL INDIVIDUAL RISK (TIR) ESTIMATING AID

To be used in conjunction with the CDE Guidance Protocol for School Site Pipeline Risk Analysis

March 2007

CDE provides this template for the convenience of Protocol users as a template. It is the responsibility of the user to ensure that calculations match and are appropriate for the risk analysis being conducted for a particular case. While both CDE and its contractor have sought to make this spreadsheet free of errors there is no expressed or implied warranty to that it is so.

XSEG Calculations														
Pipe Size, Pressure, and Hazard Type			Front Property Line - Begin Zone 1			Begin Zone 2			Begin Zone 3			Begin Zone 4		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
8	200	LJF	104	50	182	104	175	0	104	300	0	104	425	0
8	200	RJF	117	50	212	117	175	0	117	300	0	117	425	0
8	200	LFF	14	50	0	14	175	0	14	300	0	14	425	0
8	200	RFF	21	50	0	21	175	0	21	300	0	21	425	0
8	200	LEX	0	50	0	0	175	0	0	300	0	0	425	0
8	200	REX	0	50	0	0	175	0	0	300	0	0	425	0

Green cells indicate where input data are entered for the case being analyzed.

The numbers shown apply for a the specific example illustrated. Substitute the appropriate values for the actual number being analyzed.

The Pipe Size is the pipe diameter in inches. The Pressure is the operating pressure in punds per square inch gage (psig).

Hazard acronyms are defined in the Protocol.

The 1% mortality (0.01) probability impact distance RX for each hazard is obtained from the appropriate hazard figure in the Protocol, Chapter 4.

R0 is the receptor distance being analyzed and is explained in the Protocol, Chapter 4.

XSEG is as described in the Protocol, Chapter 4.

Zones 1, 2, and 3 are defined in the Protocol, Chapter 4 for use in the TIR calculations. If more than three zones are used, as explained in the Protocol, Section 4, more worksheets of the same type as shown can be added.

XSEG Calculations														
Pipe Size, Pressure, and Hazard Type			Begin Zone 5			Begin Zone 6			Begin Zone 7			Begin Zone 8		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
8	200	LJF	104	550	0	104	675	0	104	800	0	104	925	0
8	200	RJF	117	550	0	117	675	0	117	800	0	117	925	0
8	200	LFF	14	550	0	14	675	0	14	800	0	14	925	0
8	200	RFF	21	550	0	21	675	0	21	800	0	21	925	0
8	200	LEX	0	550	0	0	675	0	0	800	0	0	925	0
8	200	REX	0	550	0	0	675	0	0	800	0	0	925	0

XSEG Calculations											
Pipe Size, Pressure, and Hazard Type			Begin Zone 9			Begin Zone 10			End Zone 10 - Back Property Line		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
8	200	LJF	104	1050	0	104	1175	0	104	1250	0
8	200	RJF	117	1050	0	117	1175	0	117	1250	0
8	200	LFF	14	1050	0	14	1175	0	14	1250	0
8	200	RFF	21	1050	0	21	1175	0	21	1250	0
8	200	LEX	0	1050	0	0	1175	0	0	1250	0
8	200	REX	0	1050	0	0	1175	0	0	1250	0

TIR CALCULATIONS - BEGIN ZONE 1 - FRONT PROPERTY LINE

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	50	ft

XSEG	RX(1%)	Units
XSEG(LJF)	182	ft
XSEG(RJF)	212	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

1. These instruction boxes apply to Worksheets TIR1, 2, 3, and 4.
2. Enter the Input Data indicated for the case under analysis.
3. Enter the XSEG values from Worksheet "XSEG Calculations".
4. In the table below enter the F0 data for the appropriate type pf pipeline from the failure frequency data in the Protocol, Chapter 4.
5. Enter a value for the other green cell variables as explained in Chapter 4.

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
Calculated Values:							
PA(LJF)	7.9E-05	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	9.2E-05	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.039
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	7.9E-05	0.06	0.039	**2.0E-07**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	9.2E-05	0.01	0.039	**1.9E-08**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation

	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	1.00		2.0E-07	**2.0E-07**
IR(RJF) =	1.00		1.9E-08	**1.92E-08**
IR(LFF) =	0.00		0.0E+00	**0.00E+00**
IR(RFF) =	0.00		0.0E+00	**0.00E+00**
IR(LEX) =	0.00		0.0E+00	**0.00E+00**
IR(REX) =	0.00		0.0E+00	**0.00E+00**
TOTAL INDIVIDUAL RISK, TIR				**2.2E-07**
CDE INDIVIDUAL RISK CRITERION, IRC				**1.0E-06**
TIR/IRC RATIO				**0.22**
PROTOCOL TIR INDICATOR RATIO				**0.09**

6. Enter the maximum fatality probability that corresponds to the maximum impact for each hazard type according to the Protocol, Chapter 4.

TIR CALCULATIONS - END ZONE 1 - BEGIN ZONE 2
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	175	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR2 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 2 - BEGIN ZONE 3
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	300	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR3 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 3 - BEGIN ZONE 4

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	425	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR4 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 4 - BEGIN ZONE 5

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	550	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR5 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 5 - BEGIN ZONE 6

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	675	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR6 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 6 - BEGIN ZONE 7

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	800	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR7 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 7 - BEGIN ZONE 8

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	925	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR8 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 8 - BEGIN ZONE 9

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	1050	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR9 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 9 - BEGIN ZONE 10

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	1125	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR10 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 10 - BACK PROPERTY LINE

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	8	inches
Pressure	200	psig
R0	1250	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR11 =				**0.0E+00**

XSEG Calculations

Pipe Size, Pressure, and Hazard Type			Front Property Line - Begin Zone 1			Begin Zone 2			Begin Zone 3			Begin Zone 4		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
10	200	LJF	104	50	182	104	175	0	104	300	0	104	425	0
10	200	RJF	166	50	317	166	175	0	166	300	0	166	425	0
10	200	LFF	14	50	0	14	175	0	14	300	0	14	425	0
10	200	RFF	39	50	0	39	175	0	39	300	0	39	425	0
10	200	LEX	0	50	0	0	175	0	0	300	0	0	425	0
10	200	REX	0	50	0	0	175	0	0	300	0	0	425	0

Green cells indicate where input data are entered for the case being analyzed.

The numbers shown apply for a the specific example illustrated. Substitute the appropriate values for the actual number being analyzed.

The Pipe Size is the pipe diameter in inches. The Pressure is the operating pressure in punds per square inch gage (psig).

Hazard acronyms are defined in the Protocol.

The 1% mortality (0.01) probability impact distance RX for each hazard is obtained from the appropriate hazard figure in the Protocol, Chapter 4.

R0 is the receptor distance being analyzed and is explained in the Protocol, Chapter 4.

XSEG is as described in the Protocol, Chapter 4.

Zones 1, 2, and 3 are defined in the Protocol, Chapter 4 for use in the TIR calculations. If more than three zones are used, as explained in the Protocol, Section 4, more worksheets of the same type as shown can be added.

XSEG Calculations														
Pipe Size, Pressure, and Hazard Type			Begin Zone 5			Begin Zone 6			Begin Zone 7			Begin Zone 8		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
10	200	LJF	104	550	0	104	675	0	104	800	0	104	925	0
10	200	RJF	166	550	0	166	675	0	166	800	0	166	925	0
10	200	LFF	14	550	0	14	675	0	14	800	0	14	925	0
10	200	RFF	39	550	0	39	675	0	39	800	0	39	925	0
10	200	LEX	0	550	0	0	675	0	0	800	0	0	925	0
10	200	REX	0	550	0	0	675	0	0	800	0	0	925	0

XSEG Calculations											
Pipe Size, Pressure, and Hazard Type			Begin Zone 9			Begin Zone 10			End Zone 10 - Back Property Line		
Pipe Size	Press.	Hazard X	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG	RX (1%)	R0	XSEG
(in)	(psig)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
10	200	LJF	104	1050	0	104	1175	0	104	1300	0
10	200	RJF	166	1050	0	166	1175	0	166	1300	0
10	200	LFF	14	1050	0	14	1175	0	14	1300	0
10	200	RFF	39	1050	0	39	1175	0	39	1300	0
10	200	LEX	0	1050	0	0	1175	0	0	1300	0
10	200	REX	0	1050	0	0	1175	0	0	1300	0

TIR CALCULATIONS - BEGIN ZONE 1 - FRONT PROPERTY LINE

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	50	ft

XSEG	RX(1%)	Units
XSEG(LJF)	182	ft
XSEG(RJF)	317	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

1. These instruction boxes apply to Worksheets TIR1, 2, 3, and 4.
2. Enter the Input Data indicated for the case under analysis.
3. Enter the XSEG values from Worksheet "XSEG Calculations".
4. In the table below enter the F0 data for the appropriate type pf pipeline from the failure frequency data in the Protocol, Chapter 4.
5. Enter a value for the other green cell variables as explained in Chapter 4.

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
Calculated Values:							
PA(LJF)	7.9E-05	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	1.4E-04	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.039
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	7.9E-05	0.06	0.039	**2.0E-07**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	1.4E-04	0.01	0.039	**2.9E-08**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	1.00		2.0E-07	**2.0E-07**
IR(RJF) =	1.00		2.9E-08	**2.88E-08**
IR(LFF) =	0.00		0.0E+00	**0.00E+00**
IR(RFF) =	0.00		0.0E+00	**0.00E+00**
IR(LEX) =	0.00		0.0E+00	**0.00E+00**
IR(REX) =	0.00		0.0E+00	**0.00E+00**
			TOTAL INDIVIDUAL RISK, TIR	**2.3E-07**
			CDE INDIVIDUAL RISK CRITERION, IRC	**1.0E-06**
			TIR/IRC RATIO	**0.23**
			PROTOCOL TIR INDICATOR RATIO	**0.09**

6. Enter the maximum fatality probability that corresponds to the maximum impact for each hazard type according to the Protocol, Chapter 4.

TIR CALCULATIONS - END ZONE 1 - BEGIN ZONE 2

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	175	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR2 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 2 - BEGIN ZONE 3
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	300	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR3 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 3 - BEGIN ZONE 4

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	425	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR4 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 4 - BEGIN ZONE 5

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	550	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR5 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 5 - BEGIN ZONE 6

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	675	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR6 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 6 - BEGIN ZONE 7

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	800	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR7 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 7 - BEGIN ZONE 8

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	925	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR8 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 8 - BEGIN ZONE 9
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	1050	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR9 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 9 - BEGIN ZONE 10

Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	1125	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations							
Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations							
Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR10 =				**0.0E+00**

TIR CALCULATIONS - END ZONE 10 - BACK PROPERTY LINE
Green cells indicate data entry cells.

Input Data		
Product	Crude Oil	
Diameter	10	inches
Pressure	200	psig
R0	1250	ft

XSEG	RX(1%)	Units
XSEG(LJF)	0	ft
XSEG(RJF)	0	ft
XSEG(LFF)	0	ft
XSEG(RFF)	0	ft
XSEG(LEX)	0	ft
XSEG(REX)	0	ft

Base and Conditional Probability Calculations

Base		Leak		Rupture		Exposure	
F0	2.3E-03	PC(L)	0.8	PC(R)	0.2	PC(OCC)	0.15
P0	2.3E-03	PC(LIG)	0.09	PC(RIG)	0.03	PC(OUT)	0.25
PAF	1.0	PC(FIG)	0.95	PC(FIG)	0.95		
PA	2.3E-03	PC(JF)	0.95	PC(JF)	0.95		
		PC(FF)	0.05	PC(FF)	0.05		
		PC(EIG)	0.05	PC(EIG)	0.05		
PA(LJF)	0.0E+00	PCI(LJF)	0.065	PCI(RJF)	0.005		
PA(RJF)	0.0E+00	PCI(LFF)	0.003	PCI(RFF)	0.000		
PA(LFF)	0.0E+00	PCI(LEX)	0.003	PCI(REX)	0.000	PC(EXPO)	0.0385
PA(RFF)	0.0E+00						
PA(LEX)	0.0E+00						
PA(REX)	0.0E+00						

Impact Probability Calculations

Probability Term				Values			
PC(LJF) =	PA(LJF) x	PCI(LJF) x	PC(EXPO) =	0.0E+00	0.06	0.039	**0.0E+00**
PC(RJF) =	PA(RJF) x	PCI(RJF) x	PC(EXPO) =	0.0E+00	0.01	0.039	**0.0E+00**
PC(LFF) =	PA(LFF) x	PCI(LFF) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(RFF) =	PA(RFF) x	PCI(RFF) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**
PC(LEX) =	PA(LEX) x	PCI(LEX) x	PC(EXPO) =	0.0E+00	0.003	0.039	**0.0E+00**
PC(REX) =	PA(REX) x	PCI(REX) x	PC(EXPO) =	0.0E+00	0.000	0.039	**0.0E+00**

Based on data from impact distance figures in Section 4.6 and mortality figures in Section 4.5, enter the maximum impact probability at receptor location for each hazard in MAX PF(X) column.

IR Calculation				
	MAX PF(X)		PC(X)	IR(X)
IR(LJF) =	0.00		0.0E+00	**0.0E+00**
IR(RJF) =	0.00		0.0E+00	**0.0E+00**
IR(LFF) =	0.00		0.0E+00	**0.0E+00**
IR(RFF) =	0.00		0.0E+00	**0.0E+00**
IR(LEX) =	0.00		0.0E+00	**0.0E+00**
IR(REX) =	0.00		0.0E+00	**0.0E+00**
TIR11 =				**0.0E+00**

Population Risk Indicator For Pool Fire for 8" Crude Oil Pipeline 10 Zones of 125' - Stage 3							
Zone	Distance From Pipeline (ft.)		Zone Boundary Mortalities (RJF %)		Simple Avg. Zone Mortality (RJF) %	Zone Population	Population Risk Indicator
	Begin	End	Begin	End			
1	50	175	100	0	50	60	30
2	175	300	0	0	0	60	0
3	300	425	0	0	0	60	0
4	425	550	0	0	0	60	0
5	550	675	0	0	0	60	0
6	675	800	0	0	0	60	0
7	800	925	0	0	0	60	0
8	925	1050	0	0	0	60	0
9	1050	1175	0	0	0	60	0
10	1175	1250	0	0	0	60	0
				Population Risk Indicator			**30**

Population Risk Indicator For Pool Fire for 10" Crude Oil Pipeline 10 Zones of 125' - Stage 3							
Zone	Distance From Pipeline (ft.)		Zone Boundary Mortalities (RJF %)		Simple Avg. Zone Mortality (RJF) %	Zone Population	Population Risk Indicator
	Begin	End	Begin	End			
1	50	175	100	0	50	60	30
2	175	300	0	0	0	60	0
3	300	425	0	0	0	60	0
4	425	550	0	0	0	60	0
5	550	675	0	0	0	60	0
6	675	800	0	0	0	60	0
7	800	925	0	0	0	60	0
8	925	1050	0	0	0	60	0
9	1050	1175	0	0	0	60	0
10	1175	1250	0	0	0	60	0
				Population Risk Indicator			**30**

CONFINED POOL FIRE MODEL

1" leak

RECTANGULAR DIKE FIRE
TRENCH FIRE

FUEL

Name	: HEXANE
Pool temperature	: 77.0 °F

CONSTANT PROPERTIES

Molecular weight	: 86.17
Boiling point	: 155.75 °F
Critical temperature	: 455.27 °F
Critical pressure	: 439.41 psi
Heat of combustion	: 1.92E+04 Btu/lb
Flame temperature	: 1880 °F

CALCULATED PROPERTIES

Liquid compressibility factor	: 0.005
Liquid density	: 41.33 lb/cu ft

DIMENSIONS

Pool width	: 60.0 ft
Pool length	: 71.0 ft
Pool liquid height	: 0.16 ft
Height of flame base	: 0.16 ft
Height for Radiation Calculations	: 1.64 ft

LOCAL AMBIENT CONDITIONS

Air temperature	: 77.0 °F
Ambient pressure	: 1.0 atm
Wind speed	: 3.36 mph
Relative humidity	: 25.0%

RESULTS

Mass burning rate	: 0.021 lb/ft² s
Flame length	: 116.75 ft
Flame tilt from vertical (front view)	: 0.0°
Flame tilt from vertical (side view)	: 0.0°
Flame drag ratio (front view)	: 1.00
Flame drag ratio (side view)	: 1.00
Maximum emissive power	: 52,622 Btu/ft² hr
Effective emissive power (front view)	: 52403.72 Btu/ft² hr
Effective emissive power (side view)	: 52541.99 Btu/ft² hr

Front view (view along dike/trench width)

Thermal flux (Btu/ft² hr)	Distance from center of pool (ft)
9985	101.73
4999	151.63
1600	268.10

Side view (view along dike/trench length)

Thermal flux (Btu/ft² hr)	Distance from center of pool (ft)
9985	99.09
4999	145.21 x .71 = 103'
1600	253.71

Maximum emissive power : 166.0 kW/m²

Front view (view along dike/trench width)

Distance from center of pool (ft)	Thermal flux to horizontal target (Btu/ft² hr)	Thermal flux to vertical target (Btu/ft² hr)	Maximum flux to target (Btu/ft² hr)
45.00	16,512	22,973	27,376
60.00	11,509	17,920	20,655
75.00	8,091	13,933	15,654
90.00	5,803	10,951	12,067
120.00	3,160	7,100	7,598
150.00	1,837	4,867	5,102
180.00	1,130	3,487	3,603
240.00	493.34	1,984	2,017

360.00	142.08	853.45	857.15
600.00	27.07	274.12	273.91

Side view (view along dike/trench length)

Distance from center of pool (ft)	Thermal flux to horizontal target (Btu/ft² hr)	Thermal flux to vertical target (Btu/ft² hr)	Maximum flux to target (Btu/ft² hr)
53.25	14,654	21,317	24,926
71.00	9,119	15,036	17,002
88.75	5,925	10,850	12,003
106.50	4,008	8,117	8,819
142.00	2,001	4,940	5,218
177.50	1,094	3,250	3,368
213.00	644.85	2,262	2,317
284.00	267.49	1,243	1,257
426.00	72.80	512.12	513.12
710.00	13.67	163.20	162.97

CONFINED POOL FIRE MODEL 8" Rupture

RECTANGULAR DIKE FIRE
TRENCH FIRE

FUEL

Name	: HEXANE
Pool temperature	: 77.0 °F

CONSTANT PROPERTIES

Molecular weight	: 86.17
Boiling point	: 155.75 °F
Critical temperature	: 455.27 °F
Critical pressure	: 439.41 psi
Heat of combustion	: 1.92E+04 Btu/lb
Flame temperature	: 1880 °F

CALCULATED PROPERTIES

Liquid compressibility factor	: 0.005
Liquid density	: 41.33 lb/cu ft

DIMENSIONS

Pool width	: 60.0 ft
Pool length	: 87.0 ft
Pool liquid height	: 0.16 ft
Height of flame base	: 0.16 ft
Height for Radiation Calculations	: 1.64 ft

LOCAL AMBIENT CONDITIONS

Air temperature	: 77.0 °F
Ambient pressure	: 1.0 atm
Wind speed	: 3.36 mph
Relative humidity	: 25.0%

RESULTS

Mass burning rate	: 0.021 lb/ft² s
Flame length	: 116.75 ft
Flame tilt from vertical (front view)	: 0.0°
Flame tilt from vertical (side view)	: 0.0°
Flame drag ratio (front view)	: 1.00
Flame drag ratio (side view)	: 1.00
Maximum emissive power	: 52,622 Btu/ft² hr
Effective emissive power (front view)	: 52403.72 Btu/ft² hr
Effective emissive power (side view)	: 52603.25 Btu/ft² hr

Front view (view along dike/trench width)

Thermal flux (Btu/ft² hr)	Distance from center of pool (ft)
9985	112.45
4999	167.27
1600	294.43

Side view (view along dike/trench length)

Thermal flux (Btu/ft² hr)	Distance from center of pool (ft)
9985	107.17
4999	153.33 x .71 = 109
1600	261.87

Maximum emissive power : 166.0 kW/m²

Front view (view along dike/trench width)

Distance from center of pool (ft)	Thermal flux to horizontal target (Btu/ft² hr)	Thermal flux to vertical target (Btu/ft² hr)	Maximum flux to target (Btu/ft² hr)
45.00	17,282	23,427	28,312
60.00	12,647	19,169	22,381
75.00	9,197	15,535	17,599
90.00	6,737	12,555	13,905
120.00	3,752	8,386	8,990
150.00	2,205	5,828	6,114
180.00	1,364	4,206	4,348
240.00	599.54	2,410	2,450

360.00	173.47	1,042	1,046
600.00	33.13	335.47	335.21

Side view (view along dike/trench length)

Distance from center of pool (ft)	Thermal flux to horizontal target (Btu/ft² hr)	Thermal flux to vertical target (Btu/ft² hr)	Maximum flux to target (Btu/ft² hr)
65.25	13,151	19,726	22,862
87.00	7,475	12,937	14,474
108.75	4,537	8,895	9,718
130.50	2,897	6,421	6,879
174.00	1,320	3,700	3,856
217.50	678.13	2,342	2,401
261.00	383.39	1,588	1,612
348.00	153.29	855.02	859.98
522.00	39.29	335.76	335.78
870.00	7.30	106.58	106.41

CONFINED POOL FIRE MODEL 10" Rupture

RECTANGULAR DIKE FIRE
TRENCH FIRE

FUEL

Name	: HEXANE
Pool temperature	: 77.0 °F

CONSTANT PROPERTIES

Molecular weight	: 86.17
Boiling point	: 155.75 °F
Critical temperature	: 455.27 °F
Critical pressure	: 439.41 psi
Heat of combustion	: 1.92E+04 Btu/lb
Flame temperature	: 1880 °F

CALCULATED PROPERTIES

Liquid compressibility factor	: 0.005
Liquid density	: 41.33 lb/cu ft

DIMENSIONS

Pool width	: 60.0 ft
Pool length	: 174.0 ft
Pool liquid height	: 0.16 ft
Height of flame base	: 0.16 ft
Height for Radiation Calculations	: 1.64 ft

LOCAL AMBIENT CONDITIONS

Air temperature	: 77.0 °F
Ambient pressure	: 1.0 atm
Wind speed	: 3.36 mph
Relative humidity	: 25.0%

RESULTS

Mass burning rate	: 0.021 lb/ft² s
Flame length	: 116.76 ft
Flame tilt from vertical (front view)	: 0.0°
Flame tilt from vertical (side view)	: 0.0°
Flame drag ratio (front view)	: 1.06
Flame drag ratio (side view)	: 1.00
Maximum emissive power	: 52,622 Btu/ft² hr
Effective emissive power (front view)	: 52465.31 Btu/ft² hr
Effective emissive power (side view)	: 52621.71 Btu/ft² hr

Front view (view along dike/trench width)

Thermal flux (Btu/ft² hr)	Distance from center of pool (ft)	
9985	157.17	
4999	232.51	x .71 = 164.72'
1600	404.95	

Side view (view along dike/trench length)

Thermal flux (Btu/ft² hr)	Distance from center of pool (ft)
9985	150.67
4999	196.86
1600	305.38

Maximum emissive power : 166.0 kW/m²
Front view (view along dike/trench width)

Distance from center of pool (ft)	Thermal flux to horizontal target (Btu/ft² hr)	Thermal flux to vertical target (Btu/ft² hr)	Maximum flux to target (Btu/ft² hr)
45.00	19,780	25,255	31,301
60.00	16,199	22,132	27,013
75.00	13,004	19,930	23,436
90.00	10,305	17,707	20,162
120.00	6,378	13,519	14,704
150.00	3,985	10,160	10,741
180.00	2,560	7,682	7,977
240.00	1,169	4,618	4,704

360.00	347.50	2,065	2,075
600.00	66.88	672.98	672.52

Side view (view along dike/trench length)

Distance from center of pool (ft)	Thermal flux to horizontal target (Btu/ft² hr)	Thermal flux to vertical target (Btu/ft² hr)	Maximum flux to target (Btu/ft² hr)
130.50	7,478	12,942	14,479
174.00	2,898	6,423	6,882
217.50	1,321	3,702	3,857
261.00	678.37	2,343	2,402
348.00	234.05	1,136	1,147
435.00	103.11	650.76	652.97
522.00	52.56	409.82	410.17
696.00	18.75	202.59	202.37
1,044	4.64	78.34	78.21
1,740	0.86	24.93	24.89

1" leak

SITE DATA:
Location: BAKERSFIELD, CALIFORNIA
Building Air Exchanges Per Hour: 0.37 (unsheltered single storied)
Time: January 11, 2008 0840 hours PST (using computer's clock)

CHEMICAL DATA:
Chemical Name: N-HEXANE Molecular Weight: 86.18 g/mol
TEEL-1: 150 ppm TEEL-2: 250 ppm TEEL-3: 1100 ppm
IDLH: 1100 ppm LEL: 10500 ppm UEL: 76800 ppm
Ambient Boiling Point: 154.8° F
Vapor Pressure at Ambient Temperature: 0.20 atm
Ambient Saturation Concentration: 203,073 ppm or 20.3%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 3.36 miles/hour from NW at 5 meters
Ground Roughness: open country Cloud Cover: 5 tenths
Air Temperature: 77° F Stability Class: B
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:
Burning Puddle / Pool Fire
Puddle Area: 4295 square feet Average Puddle Depth: 2 inches
Initial Puddle Temperature: Air temperature
Flame Length: 44 yards Burn Duration: 5 minutes
Burn Rate: 5,450 pounds/min
Total Amount Burned: 29,316 pounds

THREAT ZONE:
Threat Modeled: Thermal radiation from pool fire
Red : 49 yards --- (15.77 kW/(sq m)) x .71 = 104'
Orange: 93 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 146 yards --- (2.0 kW/(sq m) = pain within 60 sec)

1" leak

Thermal Radiation Threat Zone

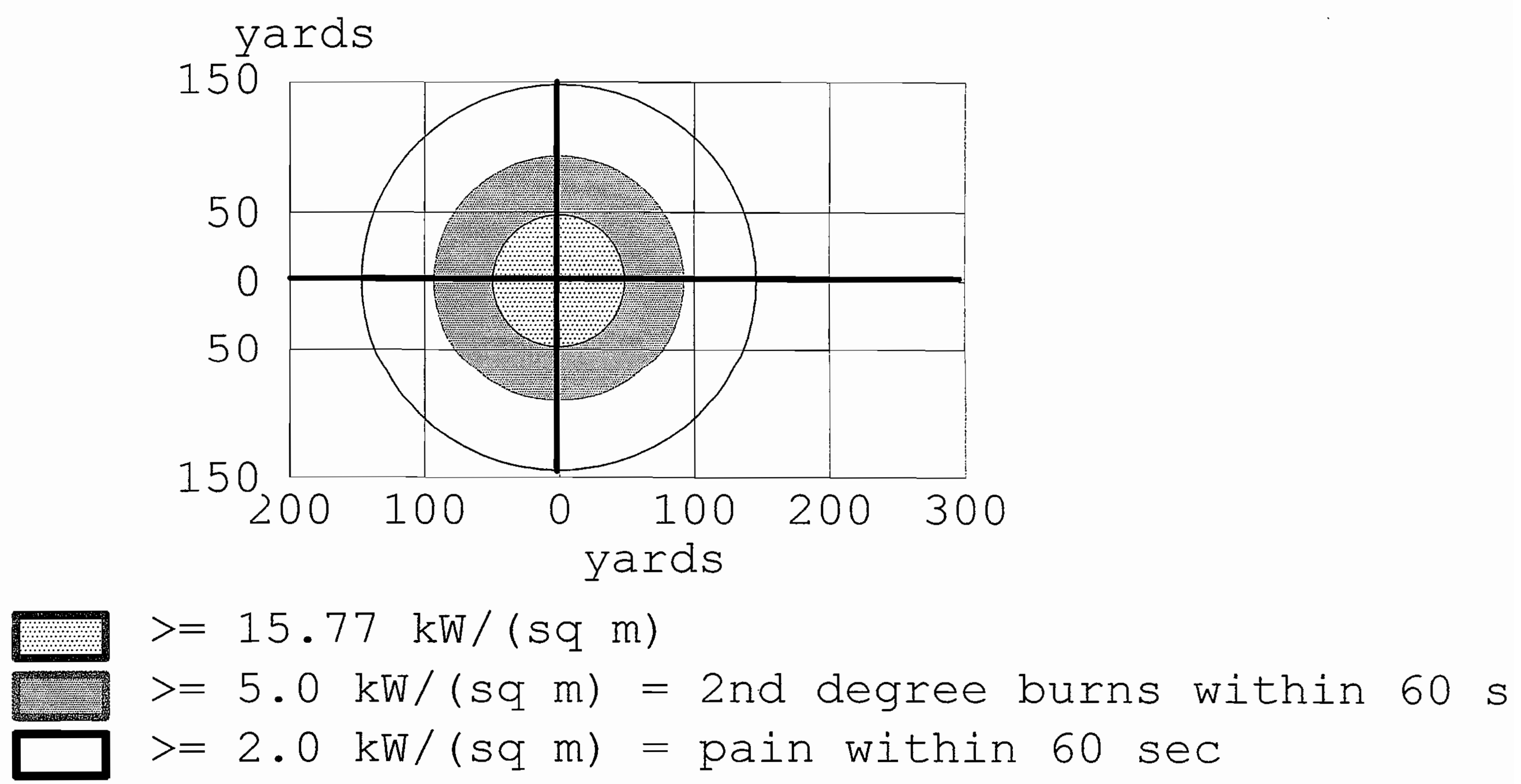
ALOHA® 5.4.1

Time: January 11, 2008 0840 hours PST (using computer's clock)

Chemical Name: N-HEXANE

Wind: 3.36 miles/hour from NW at 5 meters

THREAT ZONE:
  Threat Modeled: Thermal radiation from pool fire
  Red   : 49 yards --- (15.77 kW/(sq m)) x.71 = 104'
  Orange: 93 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
  Yellow: 146 yards --- (2.0 kW/(sq m) = pain within 60 sec)



8" Rupture

Text Summary ALOHA® 5.4.1

SITE DATA:
Location: BAKERSFIELD, CALIFORNIA
Building Air Exchanges Per Hour: 0.37 (unsheltered single storied)
Time: January 11, 2008 0840 hours PST (using computer's clock)

CHEMICAL DATA:
Chemical Name: N-HEXANE Molecular Weight: 86.18 g/mol
TEEL-1: 150 ppm TEEL-2: 250 ppm TEEL-3: 1100 ppm
IDLH: 1100 ppm LEL: 10500 ppm UEL: 76800 ppm
Ambient Boiling Point: 154.8° F
Vapor Pressure at Ambient Temperature: 0.20 atm
Ambient Saturation Concentration: 203,073 ppm or 20.3%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 3.36 miles/hour from NW at 5 meters
Ground Roughness: open country Cloud Cover: 5 tenths
Air Temperature: 77° F Stability Class: B
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:
Burning Puddle / Pool Fire
Puddle Area: 5252 square feet Average Puddle Depth: 2 inches
Initial Puddle Temperature: Air temperature
Flame Length: 47 yards Burn Duration: 5 minutes
Burn Rate: 6,670 pounds/min
Total Amount Burned: 35,848 pounds

THREAT ZONE:
Threat Modeled: Thermal radiation from pool fire
Red : 55 yards --- (15.77 kW/(sq m)) = 117'
Orange: 102 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 161 yards --- (2.0 kW/(sq m) = pain within 60 sec)

8" Rupture

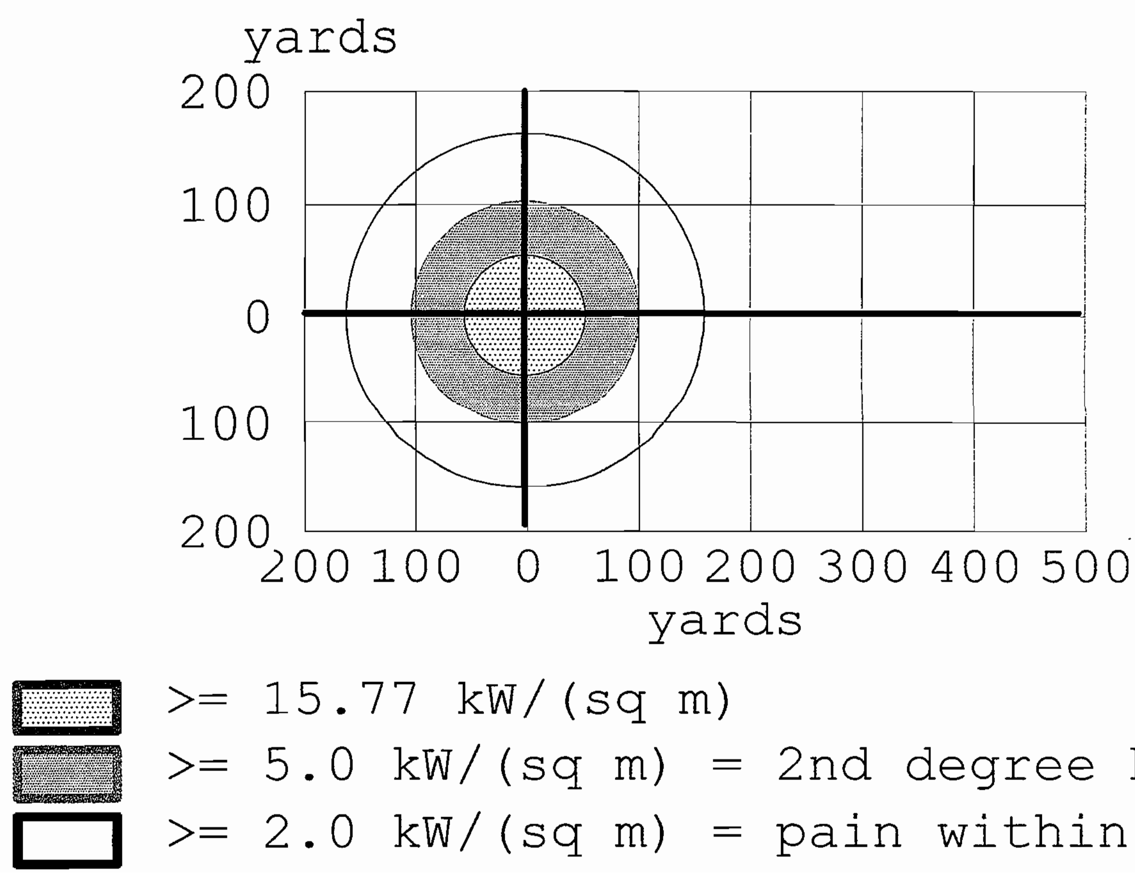
Thermal Radiation Threat Zone ALOHA® 5.4.1

Time: January 11, 2008 0840 hours PST (using computer's clock)

Chemical Name: N-HEXANE

Wind: 3.36 miles/hour from NW at 5 meters

THREAT ZONE:
Threat Modeled: Thermal radiation from pool fire
Red : 55 yards --- (15.77 kW/(sq m)) x .71 = 117-
Orange: 102 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 161 yards --- (2.0 kW/(sq m) = pain within 60 sec)



10" Rupture

SITE DATA:
Location: BAKERSFIELD, CALIFORNIA
Building Air Exchanges Per Hour: 0.37 (unsheltered single storied)
Time: January 11, 2008 0840 hours PST (using computer's clock)

CHEMICAL DATA:
Chemical Name: N-HEXANE Molecular Weight: 86.18 g/mol
TEEL-1: 150 ppm TEEL-2: 250 ppm TEEL-3: 1100 ppm
IDLH: 1100 ppm LEL: 10500 ppm UEL: 76800 ppm
Ambient Boiling Point: 154.8° F
Vapor Pressure at Ambient Temperature: 0.20 atm
Ambient Saturation Concentration: 203,073 ppm or 20.3%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
Wind: 3.36 miles/hour from NW at 5 meters
Ground Roughness: open country Cloud Cover: 5 tenths
Air Temperature: 77° F Stability Class: B
No Inversion Height Relative Humidity: 25%

SOURCE STRENGTH:
Burning Puddle / Pool Fire
Puddle Area: 10500 square feet Average Puddle Depth: 2 inches
Initial Puddle Temperature: Air temperature
Flame Length: 59 yards Burn Duration: 5 minutes
Burn Rate: 13,300 pounds/min
Total Amount Burned: 71,669 pounds

THREAT ZONE:
Threat Modeled: Thermal radiation from pool fire
Red : 78 yards --- (15.77 kW/(sq m)) x .71 = 166
Orange: 143 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
Yellow: 224 yards --- (2.0 kW/(sq m) = pain within 60 sec)

10" Rupture

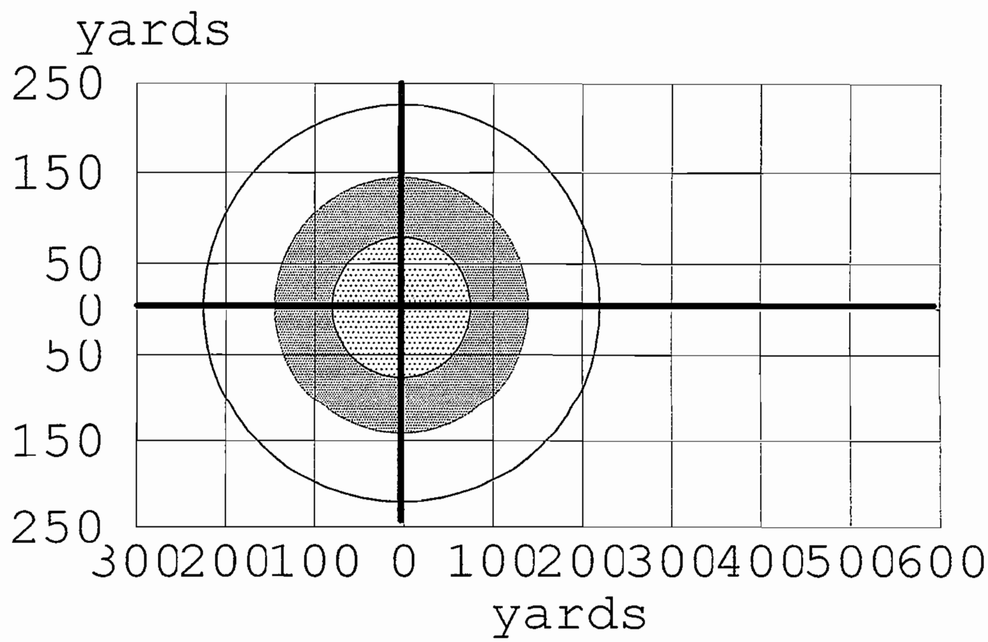
Thermal Radiation Threat Zone ALOHA® 5.4.1

```
Time: January 11, 2008  0840 hours PST (using computer's clock)

Chemical Name: N-HEXANE

Wind: 3.36 miles/hour from NW at 5 meters

THREAT ZONE:
  Threat Modeled: Thermal radiation from pool fire
  Red   : 78 yards --- (15.77 kW/(sq m)) X .71 = 166
  Orange: 143 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
  Yellow: 224 yards --- (2.0 kW/(sq m) = pain within 60 sec)
```



>= 15.77 kW/(sq m)

>= 5.0 kW/(sq m) = 2nd degree burns within 60 s

>= 2.0 kW/(sq m) = pain within 60 sec

GREENFIELD UNION SCHOOL DISTRICT

Phase I Enviromental Site Assement & Geohazard Investigation
Proposed 19 Acre Elementary School Site / East of Union Ave. and North of Hosking Ave
Bakersfield, CA

SEI File No. 06-11833E
September 7, 2006

TEST LOCATION	USCS	% < # 200	D #	CONSOLIDATION			DIRECT SHEAR		ATTERBERG LIMITS		R-VALUE @ 300 psi		MAXIMUM DENSITY	
				C_C	C_S	S.P. (psf)	C, (ksf)	F.A.	LL	PL	R.V.	E.P. (psi)	MDD (pcf)	O.M.
B-1E @ 3'	SM	29	D50 / .22											
B-1E @ 11'	CL	53	**D60** / .10											
B-1E @ 21'	SP	5	D50 / .57											
B-1E @ 31'	SM	32	D50 / .13											
B-1E @ 41'	CL	97	**N/A**											
B-2E @ 16'	SM	43	D50 / .11											
B-2E @ 31'	ML	57	**D60** / .08											
B-2E @ 46'	SM	44	D50 / .09											
B-3E @ 16'	ML	55	**D60** / .09											
B-3E @ 21'	SM	39	D50 / .11											
B-3E @ 26'	SM	22	D50 / .17											
B-3E @ 36'	SM	18	D50 / .18											

CONSOLIDATION
Cc - Compression Index
Cs - Swell Index
S.P. (psf) - Swell Pressure

DIRECT SHEAR
C (ksf) - Cohesion
F.A. - Friction Angle **S.G. -**
Specfic Gravity

E.I. - EXPANSION INDEX
ATTERBERG LIMITS
LL - Liquid Limit
PL - Plastic Limit

(R)ESISTANCE VALUE
RV - R-Value @ 300 psi
EV - Expansion Press @ 300 psi

MAXIMUM DENSITY
MDD (pcf) - Max Dry Density
O.M. - Optimum Moisture

TEST LOCATION	USCS	% < # 200	CONSOLIDATION				DIRECT SHEAR		UNCONFINED COMPRESSION		E.I.	ATTERBERG LIMITS			R-VALUE @ 300 psi		MAXIMUM DENSITY	
			C_C	C_S	S.P. (psf)	HV %	C, (ksf)	F.A.	Q_U, (psi)	C, (ksf)		LL	PL	PI	R.V.	E.P. (psi)	MDD (pcf)	O.M.
B-4 @ 6'	SP-SM	6.2																
B-4 @ 21'	SP	2.9																
B-4 @ 41'	ML	97																
B-6 @ 11'	SM	38																
B-6 @ 21'	SP-SM	8.4																
B-6 @ 46'	ML	54																
B-7 @ 11'	SC	33																
B-7 @ 26'	SP-SM	6.7																
B-8 @ 16'	SM	16																
B-8 @ 31'	ML	57																
B-8 @ 46'	SM	21																

CONSOLIDATION
Cc - Compression Index
Cs - Swell Index
S.P. (psf) - Swell Pressure
HV % - Heave Precentage / Collapase

UNCONFINED COMPRESSION
Q_U (psi) - Unconfined Compression Strength
C, (ksf) - Cohesion

DIRECT SHEAR
C (ksf) - Cohesion
F.A. - Friction Angle

E.I. - EXPANSION INDEX
ATTERBERG LIMITS
LL - Liquid Limit
PL - Plastic Limit
PI - Plasticity Index

(R)ESISTANCE VALUE
RV - R-Value @ 300 psi
EV - Expansion Press @ 300 psi

MAXIMUM DENSITY
MDD (pcf) - Max Dry Density
O.M. - Optimum Moisture

SOILS ENGINEERING, INC.

July 1, 2019 File No. 19-17151

Ms. Lucy Williams
Greenfield Union School District
1624 Fairview Rd.
Bakersfield, CA 93307

Subject: Hazardous Waste Landfills, Potential Hazardous Sites & Naturally Occurring Asbestos at Proposed School Sites (2) SW Corner of Panama Lane & Cottonwood – Totals 49.32 Acres in Bakersfield, CA

Dear Ms. Williams:

A visual site reconnaissance and a regulatory database review indicate that no current or former hazardous waste landfills are located on the subject site or within 1-mile of the proposed school sites. Section 17213 of the California Education Code and Section 21151.8 of the California Public Resources Code prohibit construction of a school upon a current or former hazardous waste disposal site or solid waste disposal site. Based on information reviewed the proposed school site is not situated upon a current or former disposal site. See Plate 1 for a Location Map and Plate 2 for a Plot Plan.

A regulatory database search conducted by EDR, Inc. dated July 1, 2019, indicates that no facilities with current or historical hazardous waste activities are present within ¼ mile of the site. In addition, the Kern County Department of Environmental Health Services and the Bakersfield Fire Department have no records of facilities that have any current environmental issues which could impact the site area. SEI is not aware of any facilities within ¼ mile of the site, which might reasonably be anticipated to emit hazardous air emissions or handle hazardous materials, substances, or wastes that might affect the proposed school site.

No naturally occurring asbestos (NOA) is known to be present within 10 miles of the subject site area based on a review of the map "A General Location Guide For Ultramafic Rocks In California - Areas More Likely To Contain Naturally Occurring Asbestos", Division of Mines and Geology, The State of California, Open-File Report 2000-19.

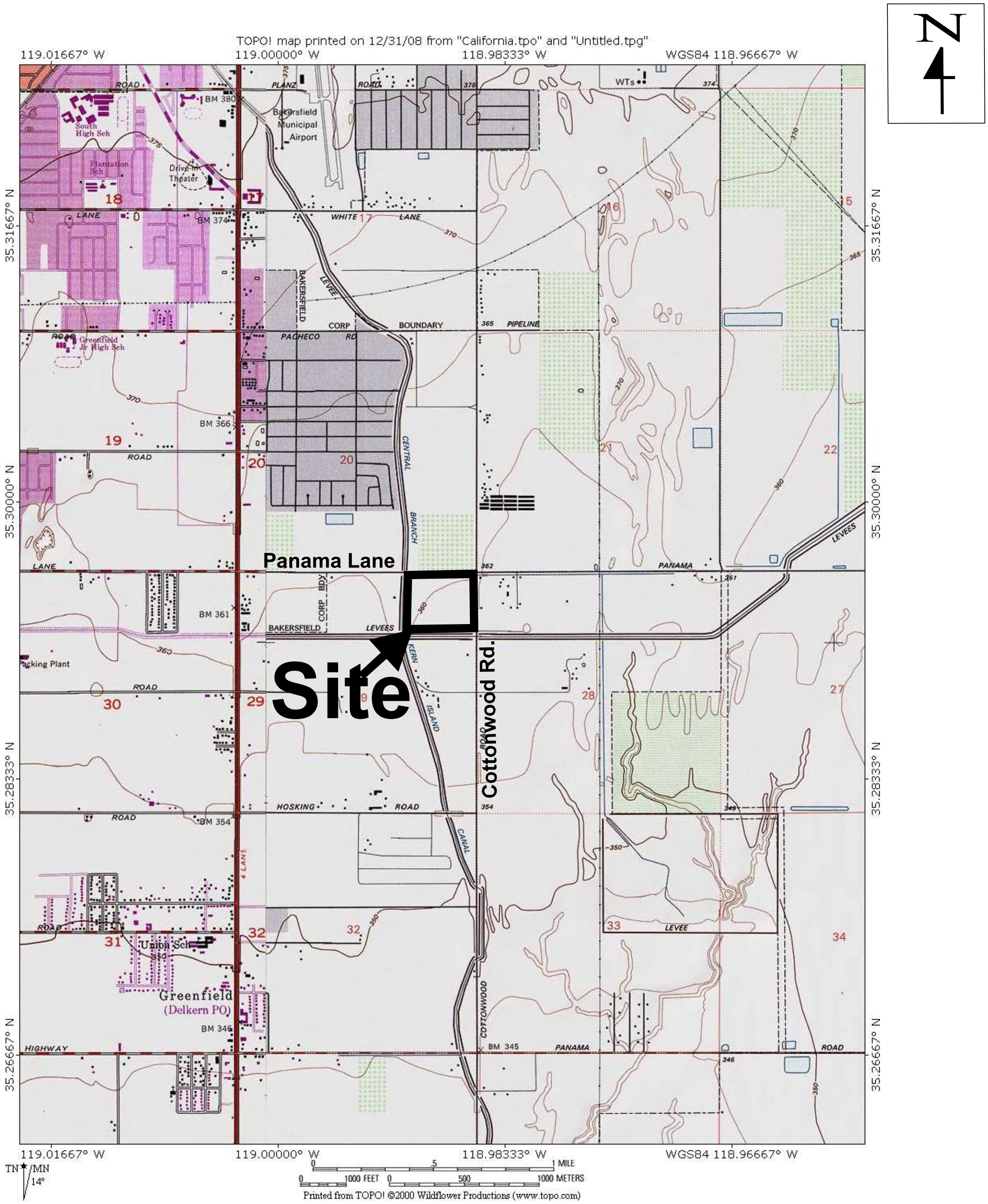
Please contact us if you have any questions or if we can be of further assistance at (661) 831-5100.

Respectfully submitted,
SOILS ENGINEERING, INC.

PROFESSIONAL GEOLOGIST
ROBERT J. BECKER
No. 5076
REN 2/28/21
STATE OF CALIFORNIA

Robert J. Becker. P.G., C.E.G.
Environmental Division Manager

Enclosures: Location Map, Plate 1
Plot Plan, Plate 2



SOILS ENGINEERING, INC.
4400 Yeager Way
Bakersfield, CA 93313
(661) 831 - 5100

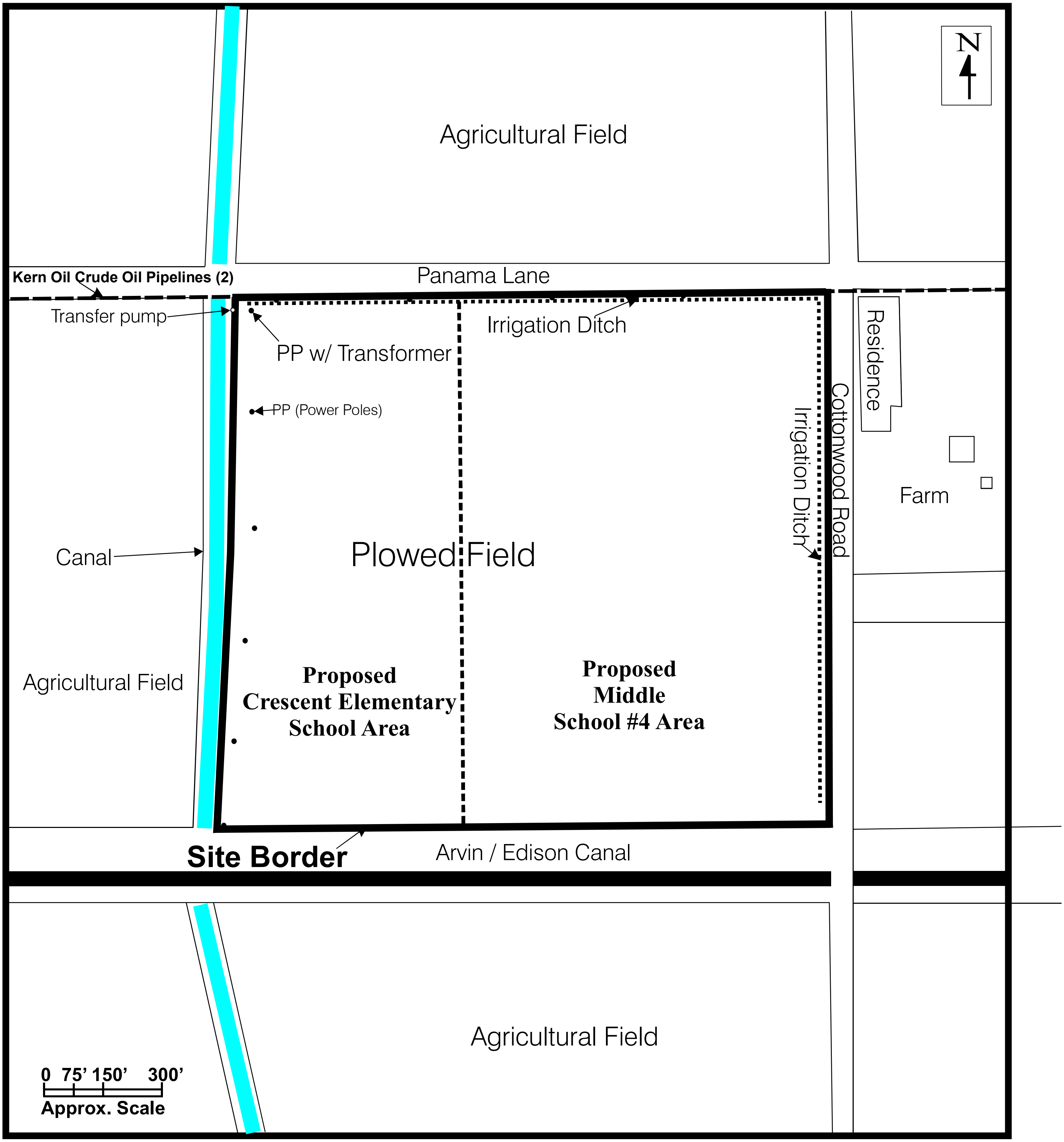
DATE: 7/19
PROJECT: 17151

Crescent Elementary & Middle School #4
SW of Panama Lane and Cottonwood Road
Bakersfield, CA

Location Map

PLATE

1



SOILS ENGINEERING, INC. **4400 Yeager Way** **Bakersfield, CA 93313** **(661) 831 - 5100** DATE: 7/19 PROJECT: 17151	**Crescent Elementary & Middle School #4** **SW of Panama Lane and Cottonwood Road** **Bakersfield, CA** **Plot Plan**	**PLATE** **2**

SOILS ENGINEERING, INC.

July 1, 2019

File No. 19-17151

Ms. Lucy Williams
Greenfield Union School District
1624 Fairview Rd.
Bakersfield, CA 93307

Subject: Power Line Information at Proposed School Sites (2)
SW Corner of Panama Lane & Cottonwood – Totals 49.32 Acres
in Bakersfield, CA

Dear Ms. Williams:

Without a CDE approved exemption request, all proposed school sites shall meet at least the following California *Code of Regulations Title 5* Section 14010(c) setbacks as measured from the edge of easement of overhead transmission lines to the usable portions of the school site (including usable joint-use areas, but excluding gross acreage not available for school uses):

Overhead transmission line easement setbacks
100 feet for 50-133kV line (interpreted by CDE up to <200kV)
150 feet for 220-230 kV line
350 feet for 500-550 kV line

Underground transmission line easement setbacks
25 feet for 50-133kV line (interpreted by CDE up to <200kV)
37.5 feet for 220-230kV line
87.5 feet for 500-550 kV line

A visual site reconnaissance by SEI personnel and discussions with PG&E personnel indicate that no power lines are present within 350' of the site boundaries that carry ≥50 Kilovolt (kV) power overhead or underground. Overhead power lines at 21 kV are present along the south side of Panama Lane (northern site border), on the west side of the site and along the east side of Cottonwood Road as shown on Plate 2. No underground power lines are present within or along the borders of the site. No setbacks from these power lines are required since they carry power <50 kV.

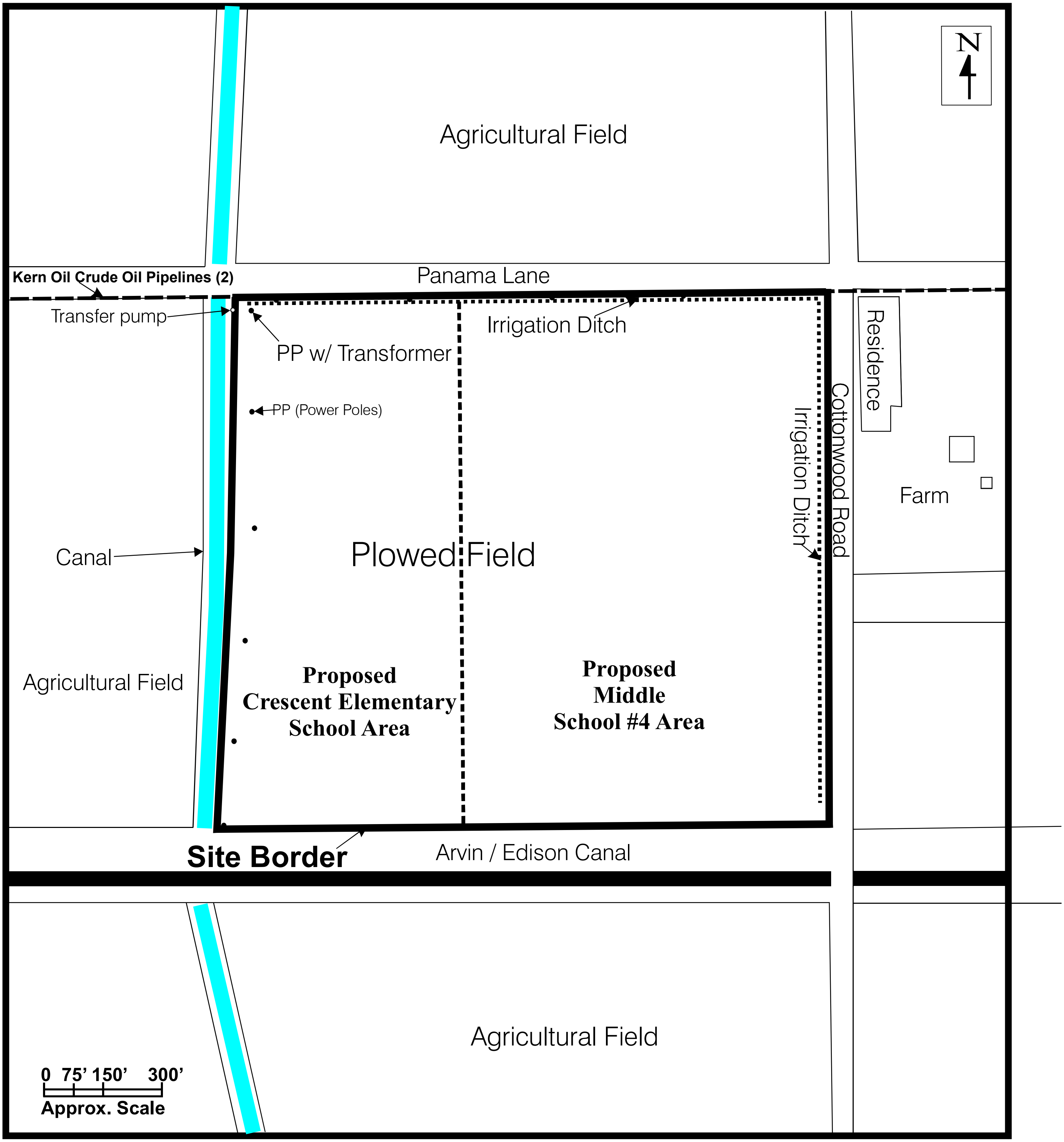
Please contact us if you have any questions or if we can be of further assistance at (661) 831-5100.

Respectfully submitted,
SOILS ENGINEERING, INC.

Robert J. Becker, P.G., C.E.G.
Environmental Division Manager

PROFESSIONAL GEOLOGIST
ROBERT J. BECKER
No. 5076
REN 2/28/21
STATE OF CALIFORNIA

Enclosures: Plot Plan, Plate 2



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 7/19 PROJECT: 17151	**Crescent Elementary & Middle School #4** **SW of Panama Lane and Cottonwood Road** **Bakersfield, CA** **Plot Plan**	**PLATE** **2**

SOILS ENGINEERING, INC.

UPDATE OF PRELIMINARY ENVIRONMENTAL ASSESSMENT REPORT

PROPOSED CRESCENT ELEMENTARY SCHOOL & MIDDLE SCHOOL #4
Southwest Corner of Cottonwood Road & Panama Lane
Bakersfield, California

Prepared For:

Greenfield Union School District
1624 Fairview Road
Bakersfield, CA 93307
Attn: Ms. Lucy Williams

File No. 19-17151

Prepared By:

Soils Engineering, Inc.
4400 Yeager Way
Bakersfield, CA 93313

July 2019

SOILS ENGINEERING, INC.

July 2, 2019

File No. 19-17151

Jose Salcedo
Cleanup Program Schools Evaluations &
Brownfields Outreach, Sacramento
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California 95826

Subject: Update of PEA Report
Greenfield Union School District
Proposed Crescent Elementary and Middle School #4
Southwest Corner of Panama Lane and Cottonwood Road
Bakersfield, California

Dear Mr. Salcedo:

Soils Engineering, Inc. (SEI) has prepared this Update to the Preliminary Environmental Assessment (PEA) Report on the behalf of the Greenfield Union School District (GUSD) for the proposed Crescent Elementary School and Middle School #4. The proposed schools are located southwest of the intersection of Panama Lane and Cottonwood Road in Bakersfield, CA (site) as shown on Plates 1 & 2.

This Update to the PEA Report is prepared following almost 3 years of site activities since the PEA Report was last updated in a letter report dated July 14, 2016. The DTSC responded to this PEA Update in a letter dated February 23, 2017 with no further action required at that time. The original PEA was dated July 15, 2010 (Draft version dated February 9, 2009) and was approved by the DTSC in a letter dated October 26, 2010.

This Update includes a summary of the PEA conducted, a current site description, current site pictures, a new database search, updated agricultural records and conclusions and recommendations for the subject sites.

PEA REPORT SUMMARY

Soils Engineering, Inc. (SEI) previously completed a Preliminary Environmental Assessment (PEA) of the proposed Crescent Elementary School and Middle School #4 located on the south side of Panama Lane and west of Cottonwood Road in Bakersfield, CA (site). The site has historically grown agricultural crops prior to 1946 up to 2008 such as cotton and alfalfa, indicating the use of pesticides and herbicides for approximately 70+ years. The site was idle agricultural land with some weed and alfalfa growth in 2008 when the PEA sampling occurred. An irrigation ditch is present near the northern border and a water transfer pump is present in the northwestern corner of the site. See Plate 2 for a Plot Plan.

As part of an Enhanced Phase 1 Environmental Site Assessment (Phase 1 ESA), SEI collected shallow (0 to 6") discrete soil samples at 36 locations evenly spread across the site, along with soil samples beneath a pole-mounted electrical transformer and adjacent to a water transfer pump in August 2006. The 36 discrete soil samples from the field areas were combined by the analytical laboratory into 12 composite soil samples and were analyzed for organochlorine pesticides (OCPs). Twelve (12) discrete soil samples (-B sample from each composite) were analyzed for CAM 17 metals. The discrete soil samples collected beneath the electrical transformer and adjacent to the water transfer pump were analyzed for PCBs and petroleum hydrocarbons and metals, respectively. The results of this soil sampling event were included in the Enhanced Phase 1 ESA Reports (one for each school site) dated August 31, 2006. The DTSC accepted the results of this sampling event, but required additional soil sampling be conducted in the irrigation ditches and low-lying areas along the northern and eastern property boundaries.

In October 2008, discrete soil samples were collected at depths of 0 to 6" and 2' to 2.5' at nine (9) locations within the irrigation ditches located along the northern and eastern property boundaries and were analyzed for OCPs. The shallow (0 to 6") soil samples collected at the end of the irrigation ditches were also analyzed for CAM 17 metals, with the other shallow soil samples analyzed for arsenic. Oil-stained soil was encountered in the central area of the northern irrigation ditch at sample location D3, so additional soil samples (3 locations) were collected in this area and analyzed for Total Petroleum Hydrocarbons (TPH). Selected soil samples in this area of concern were also analyzed for polynuclear aromatic hydrocarbons (PAHs), volatile organic coumpounds (VOCs) and CAM 17 metals. House-keeping activites were conducted adjacent to the water tranfer pump in the northwestern corner of the site with a total of 10 drums of oil-stained soil collected and disposed/recycled as non-hazardous waste at an approved facility. Confirmation soil samples were collected at the base of this excavation and analyzed for TPH, PAHs and VOCs.

No new background soil samples were collected during this assessment since the results of background soil samples collected from a nearby school site will be utilized for comparison purposes.

Each shallow discrete soil sample (D1-3" to D9-3" and duplicate D10-3") collected within the irrigation ditches was analyzed for organo-chlorine pesticides (OCPs) by EPA Method 8081A and for arsenic or CAM 17 metals by EPA Methods 6010/7471. Soil samples D3-3", D3-2', D3-W-3", D3-W-2', D3-3" East, D3-2' East, D3-S-3" and D3-S-3' were analyzed for TPH (C5 to C36) by EPA Method 8015B. Soil samples D3-3" and D3-W-2' were also analyzed for CAM 17 metals by EPA Method 6010/7471, for VOCs by EPA Method 8260B and for PAHs by EPA Method 8310.

After house-keeping activities were conducted around the water transfer pump, two (2) soil samples were collected from the base of the excavation and analyzed for Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8310, Volatile Organics (BTEX) by EPA Method 8021B, and for TPH (C5-C36) by EPA Method 8015. Soil sample NWC-6" was collected from the excavated oil-stained soil for profiling purposes and analyzed for TPH (C5 to C36) by EPA Method 8015B, for CAM 17 metals by EPA Method 6010/7471, for VOCs by EPA Method 8260B, for pH by EPA Method 9045c and for aquatic bioassay. Based on the TPH results of confirmation soil sample NWC-BTM-N-1' (>1000 mg/kg TPH), additional soil was excavated on October 31, 2008 to a depth of 2-feet on the north-side of the transfer pump and an additional confirmation soil sample NWC-BTM-N-2' was collected from the base of this over-excavation and analyzed for TPH (C5 to C36) and VOCs by EPA Methods 8015B and 8021B, respectively. The excavation was then backfilled and compacted to match existing grade with on-site soil. A total of ten (10) 55-gallon DOT-rated drums were transported off-site to Chemical Waste Managements McKittrick Waste Facility for appropriate disposal/recycling as non-hazardous waste. See Table 2 for analytical results and Plates 3 to 3C for sample locations in the PEA Report.

The analytical results of the 0" to 6" discrete soil samples and the historical composite soil samples analyzed indicate minor concentrations of the organo-chlorinated pesticide (OCP) 4,4'-DDE (<16 to 58.6 ug/kg) are present at most of the on-site locations. See the PEA Report for Table 1 with the analytical results for OCPs.

The results of on-site metal analyses indicated median concentrations within the range of background metal concentrations from the nearby Golden Valley High School, except for copper and arsenic which have slightly higher than background median concentrations. Arsenic concentrations ranged from 2.66 to 9.93 mg/kg in the discrete on-site soil samples analyzed, which is below the DTSC's arsenic concentration of concern (12 mg/kg). Lead concentrations ranged from 3.70 to 32.3 mg/kg on-site.

Soil samples D3-3", D3-2', D3-3" East, D3-W-3" and D3-W-2' had reportable concentrations of TPH, with a high of 1878 mg/kg total TPH in sample D3-W-2'. No VOCs were reported in these soil samples, but sample D3-W-2' had pyrene at 0.024 mg/kg and phenanthrene at 0.011 mg/kg reported in the PAH analysis. The TPH concentration reported in soil sample D3-W-2' was further evaluated by dividing it into aromatic and aliphatic chain hydrocarbons. This oil-stained soil appears to be related to a pipeline leak from the nearby Kern Oil & Refining Company (Kern Oil) 6"-diameter crude oil pipeline in 2005. This crude oil release occurred when a weld burst spilling approximately 150 barrels of crude oil into the irrigation ditch. Kern Oil contained this oil spill within the irrigation ditch west of Cottonwood Road and reported this spill to the OES and other regulatory agencies. Kern Oil apparently removed the majority of the diked crude oil and associated oil-impacted soil within the irrigation ditch. The apparent location of the pipeline burst is located approximately 23' west and 18' north of the soil sample location D3-W. The oil-impacted soil encountered at D3 and D3-W is likely remnants of this crude oil release that was not entirely removed.

The house-keeping confirmation soil sample NWC-BTM-N-1' had 13,970 mg/kg total TPH reported with no VOCs or PAHs. Soil sample NWC-BTM-N-2' collected after over-excavation in this area and confirmation soil sample NWC-BTM-W-2' had no TPH or VOCs reported. The profile soil sample NWC-6" had 26,580 mg/kg total TPH, a pH of 5.3 and passed the aquatic bioassay test indicating a non-hazardous waste. See Table 2 for the on-site and off-site metal concentrations along with the results of TPH, VOC, pH, and PAH testing of soil samples within Appendix B of the PEA Report.

The highest reported concentration of 4,4'-DDE (58.6 ug/kg) was utilized in the human health screening evaluation as potential chemicals of concern (COCs). Lead concentrations in the soil (32.3 mg/kg highest) were evaluated separately utilizing the DTSC's Lead Risk Assessment Spreadsheet calculations. All of the other metals, except for copper were eliminated from the risk and hazard calculations based on the on-site mean (average) concentration of each metal being within the range of the background soil sample concentrations. Copper (51.6 mg/kg), TPH (C9-C16 aromatic 95.5 mg/kg, C9-C18 aliphatic 331 mg/kg, C17-C32 aromatic 576 mg/kg, C19-C35 aliphatic 432 mg/kg), and pyrene (0.024 mg/kg) were included in the risk and hazard evaluation. See Table 2 for on-site and background metal concentration comparisons within Appendix B of the PEA Report.

The cumulative risk for all pathways to human receptors at the site is 3.35×10^{-8}, which is well below the recommended risk limit of 1×10^{-6} suggested by the DTSC. The cumulative hazard index (1.23) for all pathways to human receptors is slightly more than the recommended level of concern (1.0) by the EPA and the DTSC, due to TPH concentrations reported in soil samples D3-W-2' and D3-2'. See the PEA Report for Tables 3, 4 & 5 for the risk and hazard analysis results for the site. The Lead Risk Assessment Spreadsheet (DTSC Lead Spread Vers. 7.0) calculations indicate no significant risk to adults, children or workers at the site from low concentrations of lead in the soil.

The site is absent of significant concentrations of pesticides and metals in the soil. Although TPH was encountered in the area of soil samples D3 and D3-W, elevated concentrations at those locations were shown to be limited in extent and resulted in only a slightly elevated hazard index of 1.23. Hazard indices slightly above the recommended level of concern of 1.0 are not usually considered significant. Based on the limited extent of the TPH with only a slightly elevated hazard index, SEI recommends no further action at the site.

Pursuant to Education Code §17213.2(e), if during construction activities new areas of potential environmental concern are discovered at the site, or the TPH-impacted area along the northern border of the site is significantly greater than estimated, work will cease in these areas and the DTSC will be notified. SEI will discuss these areas with the DTSC to determine the appropriate actions to be taken to assess and/or cleanup any potential areas of concern.

A public notice to open the 30-day public comment period for the PEA Report was published in the Bakersfield Californian on August 25, 2010 and copies of the public notice were posted at the GUSD office. The public hearing to discuss the PEA Report and answer any questions was conducted on September 22, 2010 at 6:30 P.M. During this public hearing the floor was open to the public to make comments and ask questions concerning the proposed school site and the PEA Report. During this hearing no one from the public asked any questions concerning the proposed school site and the PEA Report. No written comments were received concerning the PEA Report.

The DTSC approved the PEA Report in a letter dated October 26, 2010.

Summary of PEA Update July 2016

The PEA Update dated July 14, 2016 discussed the site conditions, included an updated EDR database search and recent agricultural use records.

No significant changes to the site were observed during the site visit in 2016. Very minor surface oil staining was noted around the transfer pump in the NW corner of the site that did not extend more than 1 foot away from the pump.

The only listings in the database search within 1-mile of the site were related to the GUSD school investigations.

The agricultural record review indicated similar use at the site since the PEA sampling was conducted in 2008 with the same operator growing similar crops for all of the years.

The DTSC responded to this PEA Update in a letter dated February 23, 2017 with no further action required at that time.

CURRENT SITE CONDITIONS

The main change to the proposed GUSD school sites is that the Crescent Elementary School will now be located in the far western 1/3 of the site and will be developed first with the Middle School #4 being developed approximately 5 years later in the eastern 2/3 of the property. See Plate 2A for a Potential Site Layout of the Crescent Elementary School. Plate 2 presents the Plot Plan of the site with the approximate division of the property between the 2 school sites. Plate 3 presents a photo map followed by current pictures of the Crescent Elementary School site area that will be developed in the next year or so.

The site is currently a plowed field with no current agricultural activities. An irrigation ditch is present along the northern border of the site area. Dirt Roads and Canals are present along the western and southern borders of the site area. Cottonwood Road is present to the east and Panama Lane to the north. No oil staining was visible around the transfer pump in the northwestern corner of the site.

ENVIRONMENTAL DATABASE SEARCH

SEI contracted with Environmental Data Records (EDR) to conduct a search of local, State and Federal databases for environmental records within 1-mile of the site border. Appendix A includes the EDR Radius Map Report. The following facilities were reported in this database search:

- GUSD – Crescent Elementary School – Listed on EnviroStor and SCH databases for going through DTSC review for a new school site. No Further Action needed.
- GUSD – Middle School #4 - Listed on EnviroStor and SCH databases for going through DTSC review for a new school site. No Further Action needed.
- Kern HSD – Cottonwood/Panama High School, NE of Cottonwood Rd. & E. Panama Lane – Located northeast of the subject site. Listed on EnviroStor and SCH databases for going through DTSC review for a new school site. No Further Action needed.
- Berkshire Road School Site, Berkshire Rd. - Located ½ to 1 mile southwest of the subject site. Listed on Listed on EnviroStor and SCH databases for going through DTSC review for a new school site. No Further Action needed.

No other facilities were listed within 1-mile of the subject sites.

AGRICULTURAL RECORD REVIEW

The Kern County Agricultural Department website was searched for pesticide use records from 2016 to 2019 that included the subject site area. In addition, an interview with the current operator, Don Schulte Farms was conducted. Field #17 within Section 29, Township 30 South, Range 28 East is the subject site that Mr. Schulte was been the operator on since the 1980's. Mr. Schulte stated that he has not farmed field #17 since 2016 and is not aware of anyone else farming the subject site during that timeframe. Below is a summary of the crops grown and the pesticides utilized from 1994 to 2019 on Field #17.

<u>Crops Grown from 1994 to 2019</u>
Cotton - 1994, 1995, 1997, 1999, 2004, 2011, 2012, 2013, 2016
Wheat – 1996, 1998, 2000, 2002, 2003, 2010
Corn for Fod – 1998, 2001, 2005, 2014, 2015
Carrots - 2000, 2003, 2010
Alfalfa – 2006. 2007, 2008, 2009
Idle – 2017 to 2019

<u>Pesticide Use Records (Note: no new records from 2017 to 2019)</u>
Temik – 1994, 1995
Caparol – 1994, 1995
Prowl Herbicide – 1994, 1997
Capture – 1994, 1995, 2004

Organic Oil – 1994, 1995
Lorsban Insecticide – 1994, 1997
Danitol - 1994
Nutrient Buffer Spray - 1994
1st Choice Defoliant - 1994
Accelerate - 1994
1st Choice Herbicide Activator – 1994
Treflan – 1995
Dipeles – 1995
Miller Nu-Film - 1995
Helena Buffer – 1995, 1997, 2011
Zephyr – 1995
Comite – 1996, 1998, 2005
Gramoxone Extra Herbicide – 1997
Herbimax Oil-Surfactant – 1997
Knack Insect Growth Regulator – 1997, 2004
EC Herbicide – 1998
Dupont Staple Herbicide – 1998
Helena Induce – 1998
Monitor Liquid Insecticide – 1998
Cotton Plant Regulator – 1998, 2004, 2011
Nufarm Rhomene MCPA Broadleaf Herbicide – 2003
Clarity Herbicide – 2003
Vapam Soil Fumigant – 2003
Exit – 2003, 2004, 2010, 2013, 2016
Fusilade DX Herbicide – 2003
Linex 50DF – 2003
Assail 70WP Insecticide – 2004
Warrior Insecticide – 2008
Lorox Herbicide – 2010
Roundup – 2010
Shark EW – 2010, 2011
ET Herbicide/Defoliant – 2010
Vydate Insecticide – 2011
Dyne-Amic – 2011, 2014
Gowan Mepiquat Chloride – 2011
Carbine Insecticide – 2011, 2012, 2013, 2016
Oberon Insecticide/Miticide – 2011, 2012
Penetrator Plus – 2011
Crop Oil – 2012
Coreagri Poly-Foliant Defoliant – 2012
Helena Agri-Dex – 2012
Point Blank - 2012

MEPEX – 2013
Cottonquik Cotton Harvest Aid/Defoliant - 2013
Ginstar EC Cotton Defoliant - 2013
Zeal Miticide - 2014
Sniper – 2016
Belt SC Insecticide – 2016
Pix Ultra – 2016

Based on this information it appears that the subject sites usage from mid-2016 to 2019 has been mainly as an idle field. The last pesticides utilized were in 2016 and they do not appear to be a significant threat to the subject site or to future occupants.

CONCLUSIONS & RECOMMENDATIONS

Conclusions

Based on a review of the current site conditions, recent agricultural use, a new database search and the previous PEA conducted at the subject site the following conclusions are presented:

- The site conditions have not changed significantly since the PEA sampling was conducted in 2006 and 2008.
- The sites usage has remained agriculture with crops such as cotton and alfalfa being last grown in 2016. This is similar to the historical usage and the chemicals utilized on the field areas appear to be similar to historical usage and do not appear to be a threat to future occupants. The site has been idle land since late 2016.
- The surrounding facilities listed within 1-mile of the subject site in the EDR database search conducted are not a threat to the subject site.

Recommendations

SEI recommends no additional soil sampling at the subject sites and requests that the DTSC issue a letter confirming that the approval of the PEA for the school sites is still applicable.

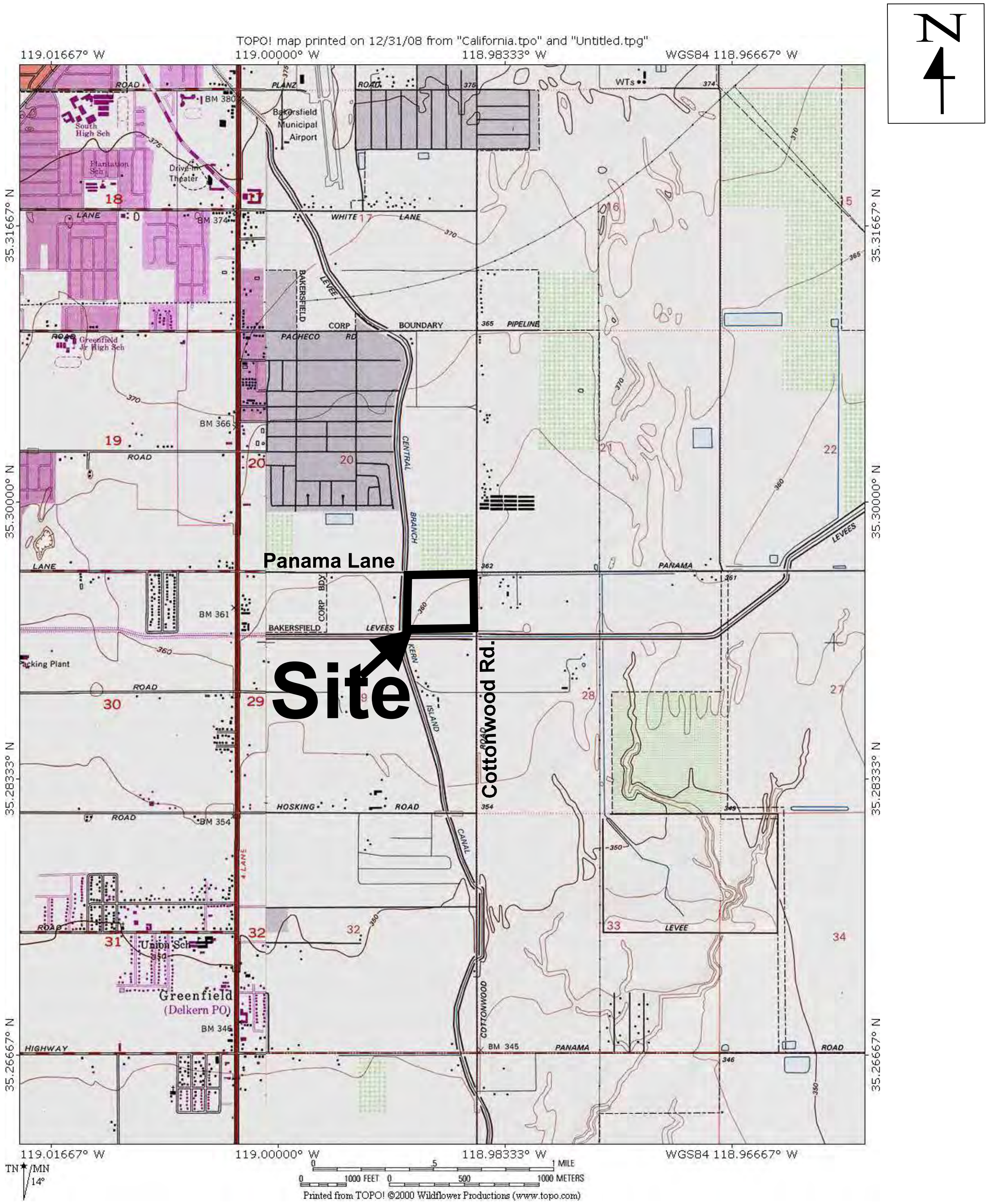
If you have any questions concerning this PEA Update Report please contact SEI at 661-831-5100.

Sincerely,

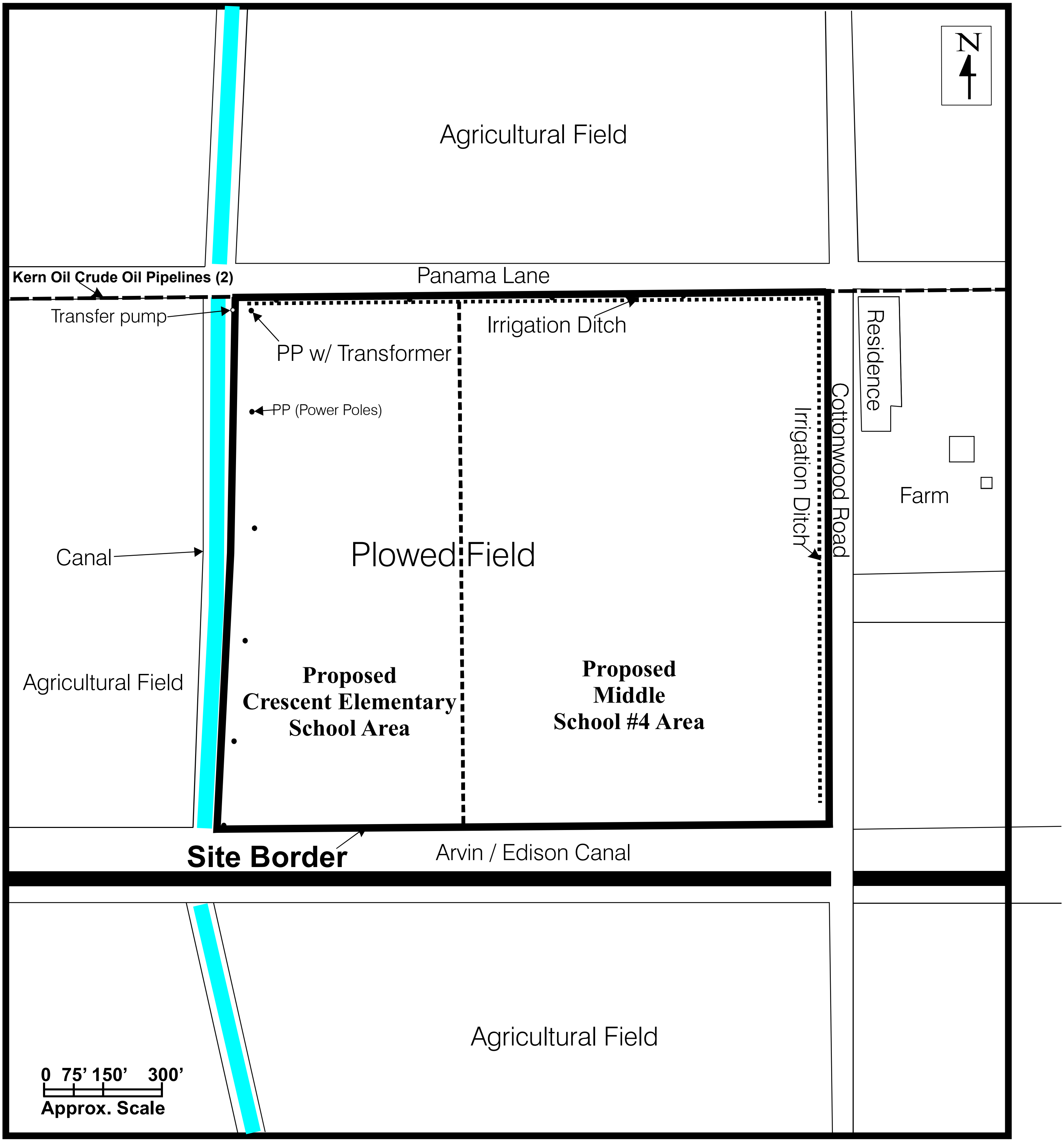
PROFESSIONAL GEOLOGIST
ROBERT J. BECKER
No. 5076
REN 2/28/21
STATE OF CALIFORNIA

Robert J. Becker, P.G., C.E.G., REPA
Environmental & Geologic Manager

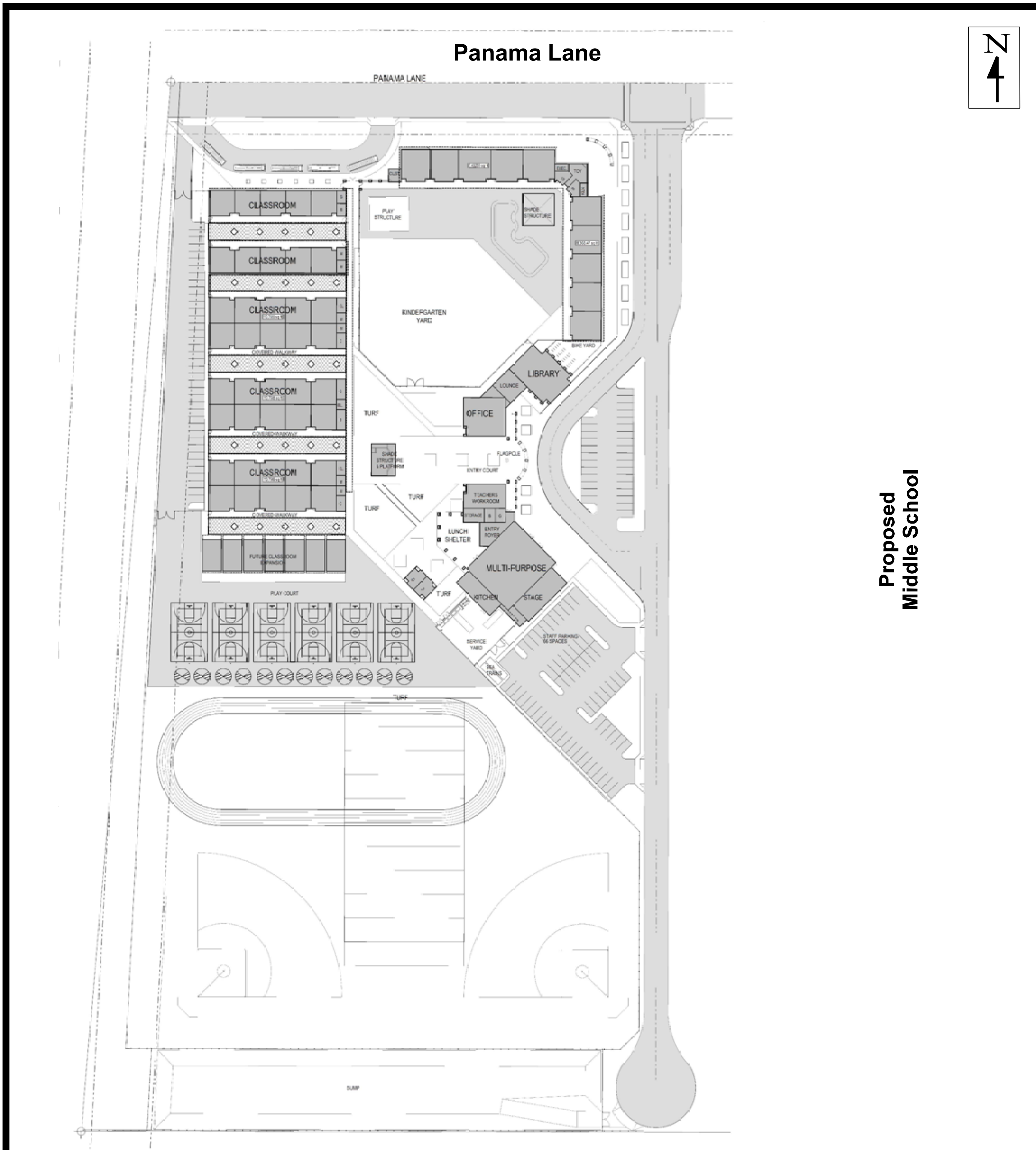
Attachments: Plate 1, Location Map
Plate 2, Plot Plan
Plate 2A, Potential Site Layout for Crescent Elementary School
Plate 3, Photo Map & Pictures
Appendix A – EDR Summary Radius Map Report dated July 1, 2019



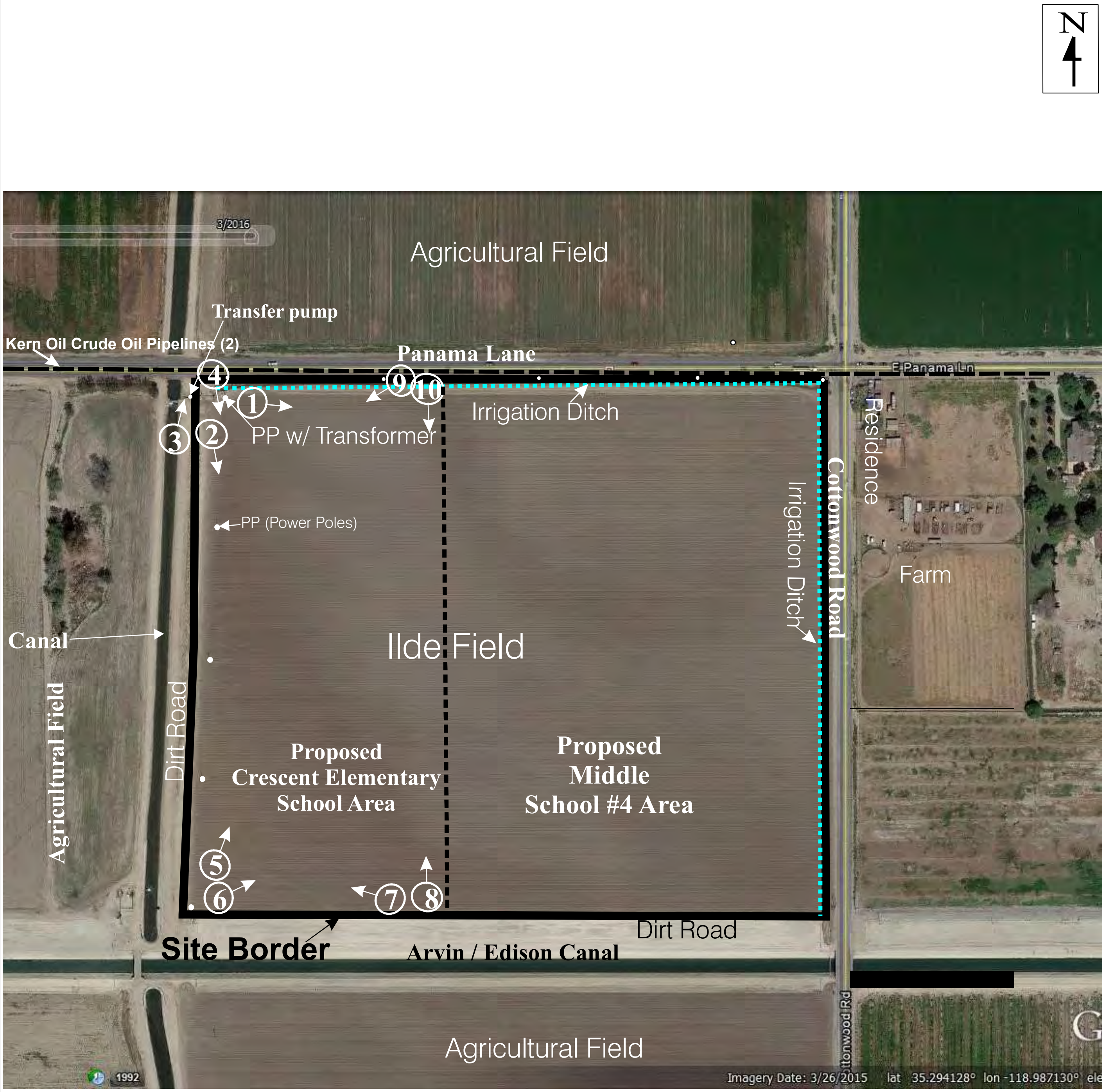
SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 7/19 PROJECT: 17151	Crescent Elementary & Middle School #4 SW of Panama Lane and Cottonwood Road Bakersfield, CA **Location Map**	PLATE **1**



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 7/19 PROJECT: 17151	**Crescent Elementary & Middle School #4** **SW of Panama Lane and Cottonwood Road** **Bakersfield, CA** **Plot Plan**	**PLATE** **2**



SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 **DATE: 6/19** **PROJECT: 17151**	**Greenfield USD-Crescent Elementary School** **S. of Panama Lane and W. of Cottonwood Road** **Bakersfield, CA** **Potential Site Layout Map**	PLATE 2A



\# Photo # and Direction

SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 7/19 PROJECT: 17151	**Crescent Elementary & Middle School #4** **SW of Panama Lane and Cottonwood Road** **Bakersfield, CA** **Photo Map**	**PLATE** **3**

Picture 1. Looking East from the NW Corner of the Crescent Elementary Site

Picture 2. Looking South from the NW Corner of the Crescent Elementary Site

Picture 3. Looking at the Transfer Pump in the NW Corner of the Site

Picture 4. Looking at Elec Transformers in the NW Corner of the Site

Picture 5. Looking North from the SW Corner of the Site

Picture 6. Looking East from the SW Corner of the site

Picture 7. Looking West from the SE Corner of the Crescent Elementary Site

Picture 8. Looking North-NW from the SE Corner of the Crescent Elem. Site

Picture 9. Looking West from NE Corner of the Crescent Elem. Site

Picture 10. Looking South from the NE Corner of the Crescent Elem. Site

Appendix A

EDR Summary Radius Map Report

GUSD Property
Cottonwood and Panama Lane
Bakersfield, CA 93307

Inquiry Number: 5704557.2s
July 01, 2019

EDR Summary Radius Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION **PAGE**

GEOCHECK ADDENDUM

GeoCheck - Not Requested

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

COTTONWOOD AND PANAMA LANE
BAKERSFIELD, CA 93307

COORDINATES

Latitude (North):	35.2939960 - 35˚ 17' 38.38"
Longitude (West):	118.9881700 - 118˚ 59' 17.41"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	319211.1
UTM Y (Meters):	3907261.2
Elevation:	363 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	TP
Source:	U.S. Geological Survey
Target Property:	W
Source:	U.S. Geological Survey

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140617
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
COTTONWOOD AND PANAMA LANE
BAKERSFIELD, CA 93307

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	CRESCENT ELEMENTARY	SW CORNER OF PANAMA	SCH, ENVIROSTOR	Lower	439, 0.083, East
2	MIDDLE SCHOOL #4	SW CORNER OF PANAMA	CERS, SCH, ENVIROSTOR	Higher	1076, 0.204, NE
3	KERN HSD - COTTONWOO	NORTHEAST OF COTTONW	SCH, ENVIROSTOR	Higher	1520, 0.288, NE
4	BERKSHIRE ROAD SCHOO	BERKSHIRE ROAD	SCH, ENVIROSTOR	Higher	4933, 0.934, WSW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

ENVIROSTOR: A review of the ENVIROSTOR list, as provided by EDR, and dated 04/29/2019 has revealed that there are 4 ENVIROSTOR sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MIDDLE SCHOOL #4 Facility Id: 60000438 Status: No Further Action	***SW CORNER OF PANAMA***	***NE 1/8 - 1/4 (0.204 mi.)***	***4***	***8***
KERN HSD - COTTONWOO Facility Id: 60002690 Status: No Further Action	***NORTHEAST OF COTTONW***	***NE 1/4 - 1/2 (0.288 mi.)***	***5***	***9***
BERKSHIRE ROAD SCHOO Facility Id: 15010008 Status: No Action Required	***BERKSHIRE ROAD***	***WSW 1/2 - 1 (0.934 mi.)***	***6***	***9***

Lower Elevation	Address	Direction / Distance	Map ID	Page
CRESCENT ELEMENTARY Facility Id: 60000440 Status: No Further Action	***SW CORNER OF PANAMA***	***E 0 - 1/8 (0.083 mi.)***	***1***	***8***

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Hazardous waste / Contaminated Sites

SCH: A review of the SCH list, as provided by EDR, and dated 04/29/2019 has revealed that there are 2

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Hazardous waste / Contaminated Sites

An online review and analysis by SOILS ENGINEERING, INC. of the SCH list, as provided by EDR, has revealed that there are 2 SCH sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MIDDLE SCHOOL #4 Status: No Further Action: Facility Id: 60000438:	*SW CORNER OF PANAMA*	*NE 1/8 - 1/4 (0.204 mi.)*	*2*	*8*

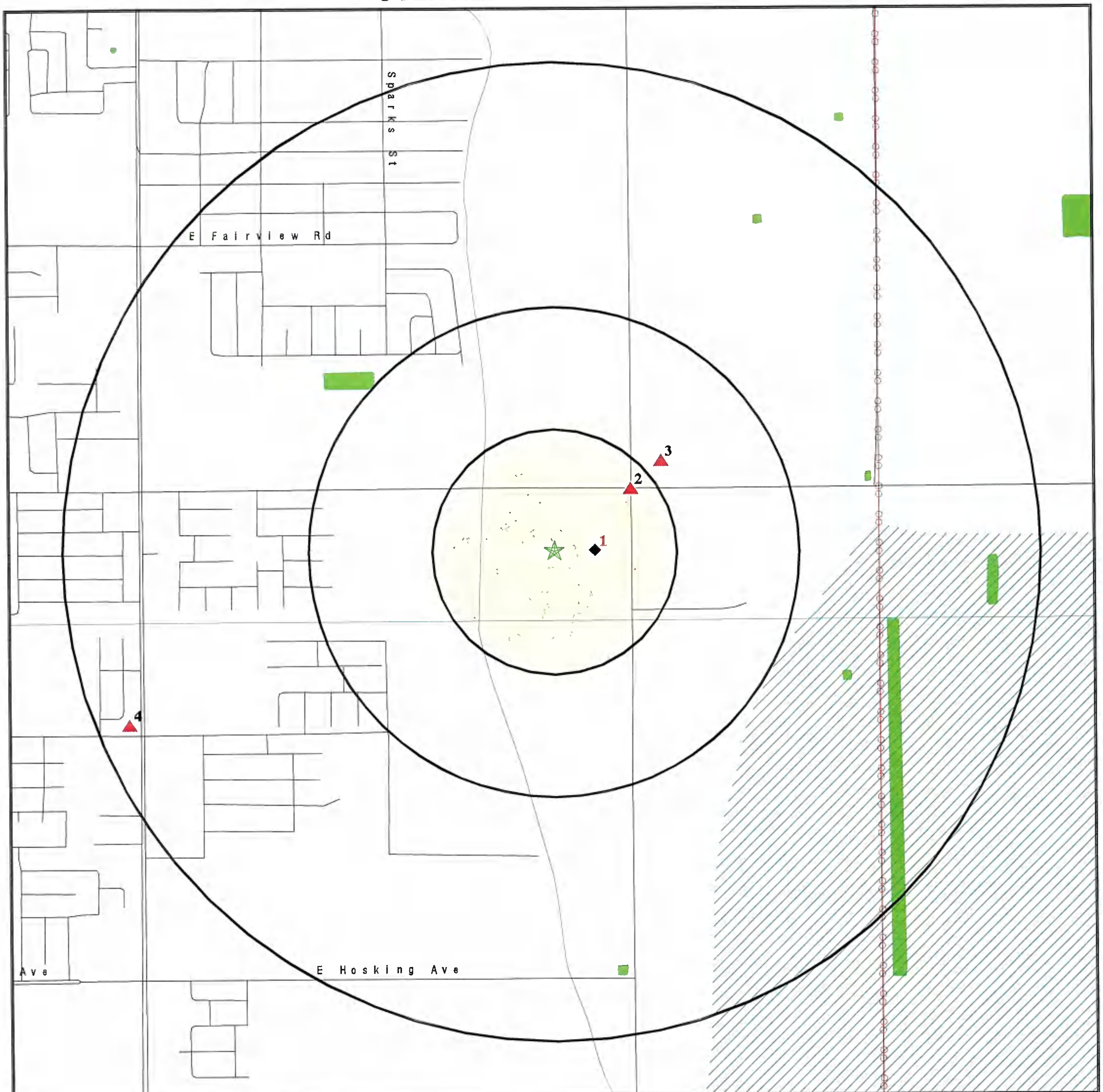
Lower Elevation	Address	Direction / Distance	Map ID	Page
CRESCENT ELEMENTARY Status: No Further Action: Facility Id: 60000440:	*SW CORNER OF PANAMA*	*E 0 - 1/8 (0.083 mi.)*	*1*	*8*

Count: 1 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BAKERSFIELD	S107538209		COTTONWOOD RD (1/4 MI S OF PAN	93307	CDL

OVERVIEW MAP - 5704557.2S



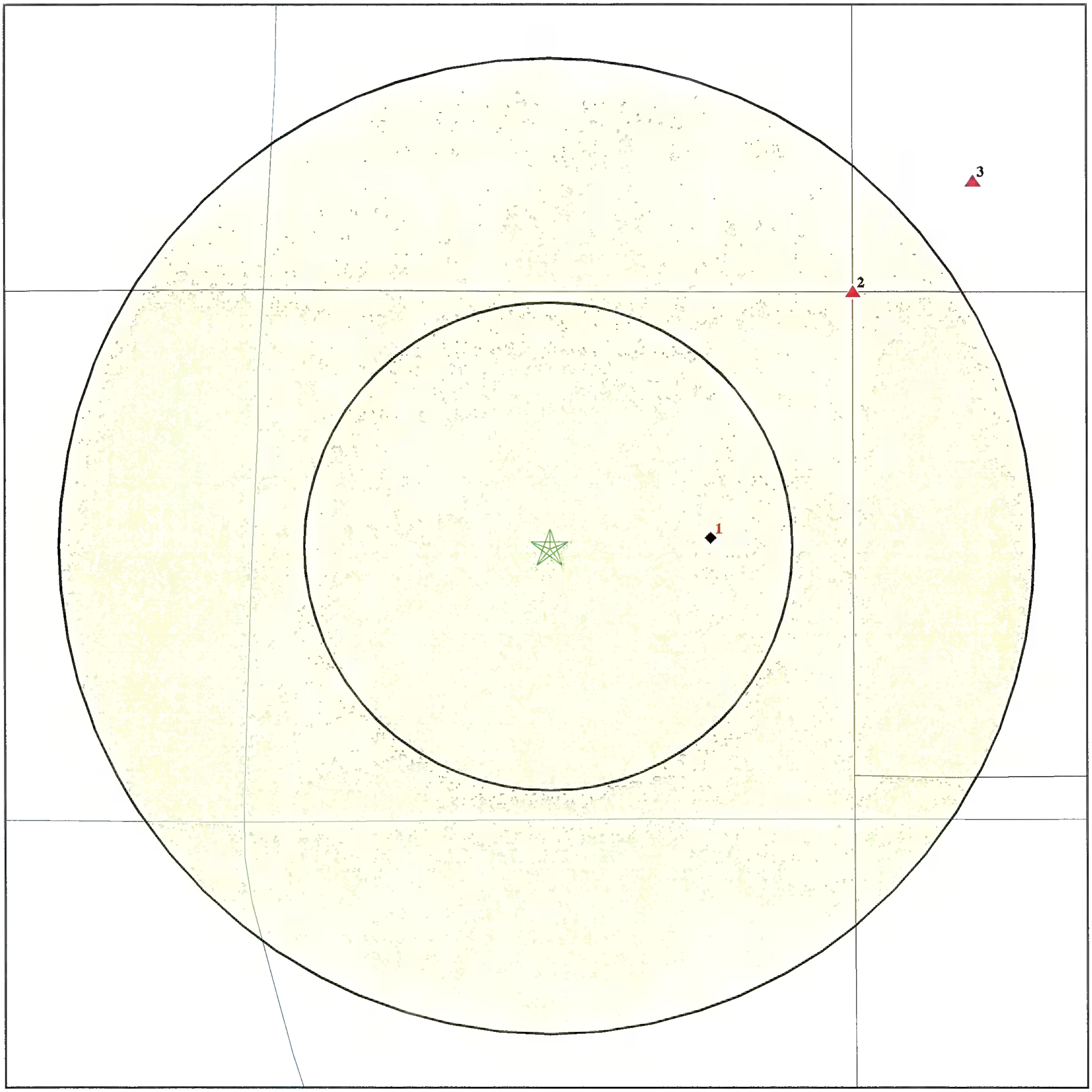
0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	GUSD Property	CLIENT:	Soils Engineering, Inc.
ADDRESS:	Cottonwood and Panama Lane Bakersfield CA 93307	CONTACT:	Robert Becker
		INQUIRY #:	5704557.2s
LAT/LONG:	35.293996 / 118.98817	DATE:	July 02, 2019 7:43 pm

DETAIL MAP - 5704557.2S



0 1/16 1/8 1/4 Miles

- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	GUSD Property	CLIENT:	Soils Engineering, Inc.
ADDRESS:	Cottonwood and Panama Lane	CONTACT:	Robert Becker
	Bakersfield CA 93307	INQUIRY #:	5704557.2s
LAT/LONG:	35.293996 / 118.98817	DATE:	July 02, 2019 7:44 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		1	1	1	1	NR	4
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
CPS-SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		1	1	NR	NR	NR	2
CDL	TP		NR	NR	NR	NR	NR	0
CERS HAZ WASTE	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
CERS TANKS	0.250		0	0	NR	NR	NR	0
CA FID UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LIENS 2	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0
LDS	TP		NR	NR	NR	NR	NR	0
MCS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
HAZNET	TP		NR	NR	NR	NR	NR	0
ICE	TP		NR	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
PEST LIC	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
UIC GEO	TP		NR	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
MILITARY PRIV SITES	TP		NR	NR	NR	NR	NR	0
PROJECT	TP		NR	NR	NR	NR	NR	0
WDR	TP		NR	NR	NR	NR	NR	0
CIWQS	TP		NR	NR	NR	NR	NR	0
CERS	TP		NR	NR	NR	NR	NR	0
NON-CASE INFO	TP		NR	NR	NR	NR	NR	0
OTHER OIL GAS	TP		NR	NR	NR	NR	NR	0
PROD WATER PONDS	TP		NR	NR	NR	NR	NR	0
SAMPLING POINT	TP		NR	NR	NR	NR	NR	0
WELL STIM PROJ	TP		NR	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	2	2	1	1	0	6

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

1
East
< 1/8
0.083 mi.
439 ft.

Relative:
Lower

CRESCENT ELEMENTARY SCHOOL #10
SW CORNER OF PANAMA LANE AND COTTONWOOD ROAD
BAKERSFIELD, CA 93307

SCH **S110653089**
ENVIROSTOR **N/A**

Click here for full text details

SCH
Status: No Further Action:
Facility Id: 60000440:

ENVIROSTOR
Status: No Further Action:
Facility Id: 60000440:

2
NE
1/8-1/4
0.204 mi.
1076 ft.

Relative:
Higher

MIDDLE SCHOOL #4
SW CORNER OF PANAMA LANE AND COTTONWOOD ROAD
BAKERSFIELD, CA 93307

CERS **S108195931**
SCH **N/A**
ENVIROSTOR

Click here for full text details

SCH
Status: No Further Action:
Facility Id: 60000438:

ENVIROSTOR
Status: No Further Action:
Facility Id: 60000438:

3
NE
1/4-1/2
0.288 mi.
1520 ft.

Relative:
Higher

KERN HSD - COTTONWOOD / PANAMA HIGH SCHOOL
NORTHEAST OF COTTONWOOD RD. & E. PANAMA LANE
BAKERSFIELD, CA 93307

SCH **S122495083**
ENVIROSTOR **N/A**

Click here for full text details

SCH
Status: No Further Action:
Facility Id: 60002690:

ENVIROSTOR
Status: No Further Action:
Facility Id: 60002690:

4
WSW
1/2-1
0.934 mi.
4933 ft.

Relative:
Higher

BERKSHIRE ROAD SCHOOL SITE
BERKSHIRE ROAD
BAKERSFIELD, CA 93307

SCH **S118756478**
ENVIROSTOR **N/A**

Click here for full text details

SCH
Status: No Action Required:

BERKSHIRE ROAD SCHOOL SITE (Continued) **S118756478**

Facility Id: 15010008:

ENVIROSTOR

Status: No Action Required:
Facility Id: 15010008:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
CA	AST	Aboveground Petroleum Storage Tank Facilities	California Environmental Protection Agency	07/06/2016	07/12/2016	09/19/2016
CA	BROWNFIELDS	Considered Brownfieds Sites Listing	State Water Resources Control Board	03/25/2019	03/26/2019	04/29/2019
CA	CA BOND EXP. PLAN	Bond Expenditure Plan	Department of Health Services	01/01/1989	07/27/1994	08/02/1994
CA	CA FID UST	Facility Inventory Database	California Environmental Protection Agency	10/31/1994	09/05/1995	09/29/1995
CA	CDL	Clandestine Drug Labs	Department of Toxic Substances Control	12/31/2017	06/12/2018	08/06/2018
CA	CERS	CalEPA Regulated Site Portal Data	California Environmental Protection Agency	04/09/2019	04/11/2019	05/08/2019
CA	CERS HAZ WASTE	CERS HAZ WASTE	CalEPA	04/09/2019	04/11/2019	05/08/2019
CA	CERS TANKS	California Environmental Reporting System (CERS) Tanks	California Environmental Protection Agency	04/09/2019	04/11/2019	05/08/2019
CA	CHMIRS	California Hazardous Material Incident Report System	Office of Emergency Services	10/24/2018	01/24/2019	03/05/2019
CA	CIWQS	California Integrated Water Quality System	State Water Resources Control Board	03/05/2019	03/05/2019	04/02/2019
CA	CORTESE	"Cortese" Hazardous Waste & Substances Sites List	CAL EPA/Office of Emergency Information	03/25/2019	03/26/2019	05/01/2019
CA	CPS-SLIC	Statewide SLIC Cases (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	CUPA LIVERMORE-PLEASANTON	CUPA Facility Listing	Livermore-Pleasanton Fire Department	01/23/2019	02/26/2019	04/01/2019
CA	CUPA SAN FRANCISCO CO	CUPA Facility Listing	San Francisco County Department of Environmen	04/18/2019	04/19/2019	04/30/2019
CA	DEED	Deed Restriction Listing	DTSC and SWRCB	03/04/2019	03/05/2019	04/01/2019
CA	DRYCLEAN AVAQMD	Antelope Valley Air Quality Management District Drycleaner L	Antelope Valley Air Quality Management Distri	02/27/2019	02/28/2019	04/01/2019
CA	DRYCLEAN SOUTH COAST	South Coast Air Quality Management District Drycleaner Listi	South Coast Air Quality Management District	03/19/2019	03/22/2019	04/09/2019
CA	DRYCLEANERS	Cleaner Facilities	Department of Toxic Substance Control	03/01/2019	04/25/2019	05/30/2019
CA	EMI	Emissions Inventory Data	California Air Resources Board	12/31/2017	06/20/2018	08/06/2018
CA	ENF	Enforcement Action Listing	State Water Resrouces Control Board	11/01/2018	11/02/2018	12/13/2018
CA	ENVIROSTOR	EnviroStor Database	Department of Toxic Substances Control	04/29/2019	04/30/2019	06/27/2019
CA	Financial Assurance 1	Financial Assurance Information Listing	Department of Toxic Substances Control	04/22/2019	04/23/2019	06/26/2019
CA	Financial Assurance 2	Financial Assurance Information Listing	California Integrated Waste Management Board	02/15/2019	02/19/2019	03/05/2019
CA	HAULERS	Registered Waste Tire Haulers Listing	Integrated Waste Management Board	03/26/2019	03/27/2019	04/30/2019
CA	HAZNET	Facility and Manifest Data	California Environmental Protection Agency	12/31/2017	04/09/2019	05/29/2019
CA	HIST CAL-SITES	Calsites Database	Department of Toxic Substance Control	08/08/2005	08/03/2006	08/24/2006
CA	HIST CORTESE	Hazardous Waste & Substance Site List	Department of Toxic Substances Control	04/01/2001	01/22/2009	04/08/2009
CA	HIST UST	Hazardous Substance Storage Container Database	State Water Resources Control Board	10/15/1990	01/25/1991	02/12/1991
CA	HWP	EnviroStor Permitted Facilities Listing	Department of Toxic Substances Control	02/19/2019	02/20/2019	03/05/2019
CA	HWT	Registered Hazardous Waste Transporter Database	Department of Toxic Substances Control	04/08/2019	04/09/2019	05/30/2019
CA	ICE	ICE	Department of Toxic Subsances Control	02/19/2019	02/20/2019	03/05/2019
CA	LDS	Land Disposal Sites Listing (GEOTRACKER)	State Water Qualilty Control Board	12/10/2018	12/11/2018	01/15/2019
CA	LIENS	Environmental Liens Listing	Department of Toxic Substances Control	02/28/2019	03/01/2019	04/02/2019
CA	LUST	Leaking Underground Fuel Tank Report (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	LUST REG 1	Active Toxic Site Investigation	California Regional Water Quality Control Boa	02/01/2001	02/28/2001	03/29/2001
CA	LUST REG 2	Fuel Leak List	California Regional Water Quality Control Boa	09/30/2004	10/20/2004	11/19/2004
CA	LUST REG 3	Leaking Underground Storage Tank Database	California Regional Water Quality Control Boa	05/19/2003	05/19/2003	06/02/2003
CA	LUST REG 4	Underground Storage Tank Leak List	California Regional Water Quality Control Boa	09/07/2004	09/07/2004	10/12/2004
CA	LUST REG 5	Leaking Underground Storage Tank Database	California Regional Water Quality Control Boa	07/01/2008	07/22/2008	07/31/2008
CA	LUST REG 6L	Leaking Underground Storage Tank Case Listing	California Regional Water Quality Control Boa	09/09/2003	09/10/2003	10/07/2003
CA	LUST REG 6V	Leaking Underground Storage Tank Case Listing	California Regional Water Quality Control Boa	06/07/2005	06/07/2005	06/29/2005
CA	LUST REG 7	Leaking Underground Storage Tank Case Listing	California Regional Water Quality Control Boa	02/26/2004	02/26/2004	03/24/2004
CA	LUST REG 8	Leaking Underground Storage Tanks	California Regional Water Quality Control Boa	02/14/2005	02/15/2005	03/28/2005
CA	LUST REG 9	Leaking Underground Storage Tank Report	California Regional Water Quality Control Boa	03/01/2001	04/23/2001	05/21/2001
CA	MCS	Military Cleanup Sites Listing (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	MILITARY PRIV SITES	Military Privatized Sites (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	MILITARY UST SITES	Military UST Sites (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
CA	MINES	Mines Site Location Listing	Department of Conservation	12/10/2018	12/12/2018	01/15/2019
CA	MWMP	Medical Waste Management Program Listing	Department of Public Health	02/20/2019	03/05/2019	04/02/2019
CA	NON-CASE INFO	Non-Case Information Sites (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	NOTIFY 65	Proposition 65 Records	State Water Resources Control Board	03/18/2019	03/19/2019	04/29/2019
CA	NPDES	NPDES Permits Listing	State Water Resources Control Board	02/11/2019	02/12/2019	03/07/2019
CA	OTHER OIL GAS	Other Oil & Gas Projects Sites (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	PEST LIC	Pesticide Regulation Licenses Listing	Department of Pesticide Regulation	03/04/2019	03/05/2019	04/05/2019
CA	PFAS	PFAS Contamination Site Location Listing	State Water Resources Control Board	02/21/2019	02/22/2019	04/15/2019
CA	PROC	Certified Processors Database	Department of Conservation	03/11/2019	03/13/2019	04/29/2019
CA	PROD WATER PONDS	Produced Water Ponds Sites (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	PROJECT	Project Sites (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	RESPONSE	State Response Sites	Department of Toxic Substances Control	04/29/2019	04/30/2019	06/27/2019
CA	RGA LF	Recovered Government Archive Solid Waste Facilities List	Department of Resources Recycling and Recover		07/01/2013	01/13/2014
CA	RGA LUST	Recovered Government Archive Leaking Underground Storage Tan	State Water Resources Control Board		07/01/2013	12/30/2013
CA	SAMPLING POINT	Sampling Point ? Public Sites (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	SAN FRANCISCO AST	Aboveground Storage Tank Site Listing	San Francisco County Department of Public Hea	09/11/2018	09/12/2018	10/11/2018
CA	SCH	School Property Evaluation Program	Department of Toxic Substances Control	04/29/2019	04/30/2019	06/27/2019
CA	SLIC REG 1	Active Toxic Site Investigations	California Regional Water Quality Control Boa	04/03/2003	04/07/2003	04/25/2003
CA	SLIC REG 2	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Regional Water Quality Control Board San Fran	09/30/2004	10/20/2004	11/19/2004
CA	SLIC REG 3	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	California Regional Water Quality Control Boa	05/18/2006	05/18/2006	06/15/2006
CA	SLIC REG 4	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Region Water Quality Control Board Los Angele	11/17/2004	11/18/2004	01/04/2005
CA	SLIC REG 5	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Regional Water Quality Control Board Central	04/01/2005	04/05/2005	04/21/2005
CA	SLIC REG 6L	SLIC Sites	California Regional Water Quality Control Boa	09/07/2004	09/07/2004	10/12/2004
CA	SLIC REG 6V	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Regional Water Quality Control Board, Victorv	05/24/2005	05/25/2005	06/16/2005
CA	SLIC REG 7	SLIC List	California Regional Quality Control Board, Co	11/24/2004	11/29/2004	01/04/2005
CA	SLIC REG 8	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	California Region Water Quality Control Board	04/03/2008	04/03/2008	04/14/2008
CA	SLIC REG 9	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	California Regional Water Quality Control Boa	09/10/2007	09/11/2007	09/28/2007
CA	SPILLS 90	SPILLS90 data from FirstSearch	FirstSearch	06/06/2012	01/03/2013	02/22/2013
CA	SWEEPS UST	SWEEPS UST Listing	State Water Resources Control Board	06/01/1994	07/07/2005	08/11/2005
CA	SWF/LF (SWIS)	Solid Waste Information System	Department of Resources Recycling and Recover	02/11/2019	02/12/2019	03/05/2019
CA	SWRCY	Recycler Database	Department of Conservation	03/11/2019	03/13/2019	04/30/2019
CA	TOXIC PITS	Toxic Pits Cleanup Act Sites	State Water Resources Control Board	07/01/1995	08/30/1995	09/26/1995
CA	UIC	UIC Listing	Deaprtment of Conservation	04/27/2018	06/13/2018	07/17/2018
CA	UIC GEO	Underground Injection Control Sites (GEOTRACKER)	State Water Resource Control Board	12/10/2018	12/11/2018	01/15/2019
CA	UST	Active UST Facilities	SWRCB	12/10/2018	12/11/2018	01/15/2019
CA	UST CLOSURE	Proposed Closure of Underground Storage Tank (UST) Cases	State Water Resources Control Board	03/11/2019	03/13/2019	04/03/2019
CA	UST MENDOCINO	Mendocino County UST Database	Department of Public Health	12/04/2018	12/06/2018	12/14/2018
CA	VCP	Voluntary Cleanup Program Properties	Department of Toxic Substances Control	04/29/2019	04/30/2019	06/27/2019
CA	WASTEWATER PITS	Oil Wastewater Pits Listing	RWQCB, Central Valley Region	05/08/2018	07/11/2018	09/13/2018
CA	WDR	Waste Discharge Requirements Listing	State Water Resources Control Board	03/11/2019	03/13/2019	04/29/2019
CA	WDS	Waste Discharge System	State Water Resources Control Board	06/19/2007	06/20/2007	06/29/2007
CA	WELL STIM PROJ	Well Stimulation Project (GEOTRACKER)	State Water Resources Control Board	12/10/2018	12/11/2018	01/15/2019
CA	WIP	Well Investigation Program Case List	Los Angeles Water Quality Control Board	07/03/2009	07/21/2009	08/03/2009
CA	WMUDS/SWAT	Waste Management Unit Database	State Water Resources Control Board	04/01/2000	04/10/2000	05/10/2000
US	2020 COR ACTION	2020 Corrective Action Program List	Environmental Protection Agency	09/30/2017	05/08/2018	07/20/2018
US	ABANDONED MINES	Abandoned Mines	Department of Interior	03/27/2019	03/28/2019	05/01/2019
US	BRS	Biennial Reporting System	EPA/NTIS	12/31/2015	02/22/2017	09/28/2017

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	COAL ASH DOE	Steam-Electric Plant Operation Data	Department of Energy	12/31/2005	08/07/2009	10/22/2009
US	COAL ASH EPA	Coal Combustion Residues Surface Impoundments List	Environmental Protection Agency	07/01/2014	09/10/2014	10/20/2014
US	CONSENT	Superfund (CERCLA) Consent Decrees	Department of Justice, Consent Decree Library	03/31/2019	04/23/2019	05/23/2019
US	CORRACTS	Corrective Action Report	EPA	03/25/2019	03/27/2019	04/17/2019
US	DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations	EPA, Region 9	01/12/2009	05/07/2009	09/21/2009
US	DOCKET HWC	Hazardous Waste Compliance Docket Listing	Environmental Protection Agency	05/31/2018	07/26/2018	10/05/2018
US	DOD	Department of Defense Sites	USGS	12/31/2005	11/10/2006	01/11/2007
US	DOT OPS	Incident and Accident Data	Department of Transporation, Office of Pipeli	12/03/2018	01/29/2019	03/21/2019
US	Delisted NPL	National Priority List Deletions	EPA	04/11/2019	04/18/2019	05/14/2019
US	ECHO	Enforcement & Compliance History Information	Environmental Protection Agency	04/07/2019	04/09/2019	05/23/2019
US	EDR Hist Auto	EDR Exclusive Historical Auto Stations	EDR, Inc.			
US	EDR Hist Cleaner	EDR Exclusive Historical Cleaners	EDR, Inc.			
US	EDR MGP	EDR Proprietary Manufactured Gas Plants	EDR, Inc.			
US	EPA WATCH LIST	EPA WATCH LIST	Environmental Protection Agency	08/30/2013	03/21/2014	06/17/2014
US	ERNS	Emergency Response Notification System	National Response Center, United States Coast	03/25/2019	03/26/2019	05/01/2019
US	FEDERAL FACILITY	Federal Facility Site Information listing	Environmental Protection Agency	04/03/2019	04/05/2019	05/14/2019
US	FEDLAND	Federal and Indian Lands	U.S. Geological Survey	12/31/2005	02/06/2006	01/11/2007
US	FEMA UST	Underground Storage Tank Listing	FEMA	05/15/2017	05/30/2017	10/13/2017
US	FINDS	Facility Index System/Facility Registry System	EPA	02/15/2019	03/05/2019	03/15/2019
US	FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA/Office of Prevention, Pesticides and Toxi	04/09/2009	04/16/2009	05/11/2009
US	FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA	04/09/2009	04/16/2009	05/11/2009
US	FUDS	Formerly Used Defense Sites	U.S. Army Corps of Engineers	03/07/2019	04/03/2019	05/23/2019
US	FUELS PROGRAM	EPA Fuels Program Registered Listing	EPA	02/19/2019	02/21/2019	04/01/2019
US	FUSRAP	Formerly Utilized Sites Remedial Action Program	Department of Energy	08/08/2017	09/11/2018	09/14/2018
US	HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	HIST FTTS INSP	FIFRA/TSCA Tracking System Inspection & Enforcement Case Lis	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	HMIRS	Hazardous Materials Information Reporting System	U.S. Department of Transportation	03/25/2019	03/26/2019	05/14/2019
US	ICIS	Integrated Compliance Information System	Environmental Protection Agency	11/18/2016	11/23/2016	02/10/2017
US	IHS OPEN DUMPS	Open Dumps on Indian Land	Department of Health & Human Serivces, Indian	04/01/2014	08/06/2014	01/29/2015
US	INDIAN LUST R1	Leaking Underground Storage Tanks on Indian Land	EPA Region 1	10/13/2018	03/07/2019	05/01/2019
US	INDIAN LUST R10	Leaking Underground Storage Tanks on Indian Land	EPA Region 10	10/17/2018	03/07/2019	05/01/2019
US	INDIAN LUST R4	Leaking Underground Storage Tanks on Indian Land	EPA Region 4	09/24/2018	03/12/2019	05/01/2019
US	INDIAN LUST R5	Leaking Underground Storage Tanks on Indian Land	EPA, Region 5	10/12/2018	03/07/2019	05/01/2019
US	INDIAN LUST R6	Leaking Underground Storage Tanks on Indian Land	EPA Region 6	11/01/2018	03/07/2019	05/01/2019
US	INDIAN LUST R7	Leaking Underground Storage Tanks on Indian Land	EPA Region 7	02/19/2019	03/07/2019	05/01/2019
US	INDIAN LUST R8	Leaking Underground Storage Tanks on Indian Land	EPA Region 8	10/16/2018	03/07/2019	05/01/2019
US	INDIAN LUST R9	Leaking Underground Storage Tanks on Indian Land	Environmental Protection Agency	10/10/2018	03/08/2019	05/01/2019
US	INDIAN ODI	Report on the Status of Open Dumps on Indian Lands	Environmental Protection Agency	12/31/1998	12/03/2007	01/24/2008
US	INDIAN RESERV	Indian Reservations	USGS	12/31/2014	07/14/2015	01/10/2017
US	INDIAN UST R1	Underground Storage Tanks on Indian Land	EPA, Region 1	10/03/2018	03/07/2019	05/01/2019
US	INDIAN UST R10	Underground Storage Tanks on Indian Land	EPA Region 10	10/17/2018	03/07/2019	05/01/2019
US	INDIAN UST R4	Underground Storage Tanks on Indian Land	EPA Region 4	09/24/2018	03/12/2019	05/01/2019
US	INDIAN UST R5	Underground Storage Tanks on Indian Land	EPA Region 5	10/12/2018	03/07/2019	05/01/2019
US	INDIAN UST R6	Underground Storage Tanks on Indian Land	EPA Region 6	11/01/2018	03/07/2019	05/01/2019
US	INDIAN UST R7	Underground Storage Tanks on Indian Land	EPA Region 7	11/07/2018	03/07/2019	05/01/2019
US	INDIAN UST R8	Underground Storage Tanks on Indian Land	EPA Region 8	10/16/2018	03/07/2019	05/01/2019
US	INDIAN UST R9	Underground Storage Tanks on Indian Land	EPA Region 9	10/10/2018	03/08/2019	05/01/2019

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	INDIAN VCP R1	Voluntary Cleanup Priority Listing	EPA, Region 1	07/27/2015	09/29/2015	02/18/2016
US	INDIAN VCP R7	Voluntary Cleanup Priority Lisitng	EPA, Region 7	03/20/2008	04/22/2008	05/19/2008
US	LEAD SMELTER 1	Lead Smelter Sites	Environmental Protection Agency	04/11/2019	04/18/2019	05/14/2019
US	LEAD SMELTER 2	Lead Smelter Sites	American Journal of Public Health	04/05/2001	10/27/2010	12/02/2010
US	LIENS 2	CERCLA Lien Information	Environmental Protection Agency	04/11/2019	04/18/2019	05/23/2019
US	LUCIS	Land Use Control Information System	Department of the Navy	02/22/2019	03/07/2019	04/17/2019
US	MLTS	Material Licensing Tracking System	Nuclear Regulatory Commission	08/30/2016	09/08/2016	10/21/2016
US	NPL	National Priority List	EPA	04/11/2019	04/18/2019	05/14/2019
US	NPL LIENS	Federal Superfund Liens	EPA	10/15/1991	02/02/1994	03/30/1994
US	ODI	Open Dump Inventory	Environmental Protection Agency	06/30/1985	08/09/2004	09/17/2004
US	PADS	PCB Activity Database System	EPA	03/20/2019	04/10/2019	05/14/2019
US	PCB TRANSFORMER	PCB Transformer Registration Database	Environmental Protection Agency	05/24/2017	11/30/2017	12/15/2017
US	PRP	Potentially Responsible Parties	EPA	04/11/2019	04/18/2019	05/23/2019
US	Proposed NPL	Proposed National Priority List Sites	EPA	04/11/2019	04/18/2019	05/14/2019
US	RAATS	RCRA Administrative Action Tracking System	EPA	04/17/1995	07/03/1995	08/07/1995
US	RADINFO	Radiation Information Database	Environmental Protection Agency	04/02/2019	04/02/2019	05/14/2019
US	RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated	Environmental Protection Agency	03/25/2019	03/27/2019	04/17/2019
US	RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generators	Environmental Protection Agency	03/25/2019	03/27/2019	04/17/2019
US	RCRA-LQG	RCRA - Large Quantity Generators	Environmental Protection Agency	03/25/2019	03/27/2019	04/17/2019
US	RCRA-SQG	RCRA - Small Quantity Generators	Environmental Protection Agency	03/25/2019	03/27/2019	04/17/2019
US	RCRA-TSDF	RCRA - Treatment, Storage and Disposal	Environmental Protection Agency	03/25/2019	03/27/2019	04/17/2019
US	RMP	Risk Management Plans	Environmental Protection Agency	04/25/2019	05/02/2019	05/23/2019
US	ROD	Records Of Decision	EPA	04/11/2019	04/18/2019	05/23/2019
US	SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing	Environmental Protection Agency	01/01/2017	02/03/2017	04/07/2017
US	SEMS	Superfund Enterprise Management System	EPA	04/11/2019	04/18/2019	05/23/2019
US	SEMS-ARCHIVE	Superfund Enterprise Management System Archive	EPA	04/11/2019	04/18/2019	05/23/2019
US	SSTS	Section 7 Tracking Systems	EPA	12/31/2009	12/10/2010	02/25/2011
US	TRIS	Toxic Chemical Release Inventory System	EPA	12/31/2016	01/10/2018	01/12/2018
US	TSCA	Toxic Substances Control Act	EPA	12/31/2016	06/21/2017	01/05/2018
US	UMTRA	Uranium Mill Tailings Sites	Department of Energy	06/23/2017	10/11/2017	11/03/2017
US	US AIRS (AFS)	Aerometric Information Retrieval System Facility Subsystem (	EPA	10/12/2016	10/26/2016	02/03/2017
US	US AIRS MINOR	Air Facility System Data	EPA	10/12/2016	10/26/2016	02/03/2017
US	US BROWNFIELDS	A Listing of Brownfields Sites	Environmental Protection Agency	12/17/2018	12/18/2018	01/11/2019
US	US CDL	Clandestine Drug Labs	Drug Enforcement Administration	02/24/2019	02/26/2019	04/17/2019
US	US ENG CONTROLS	Engineering Controls Sites List	Environmental Protection Agency	01/31/2019	02/04/2019	03/08/2019
US	US FIN ASSUR	Financial Assurance Information	Environmental Protection Agency	03/25/2019	03/26/2019	05/07/2019
US	US HIST CDL	National Clandestine Laboratory Register	Drug Enforcement Administration	02/24/2019	02/26/2019	04/17/2019
US	US INST CONTROL	Sites with Institutional Controls	Environmental Protection Agency	01/31/2019	02/04/2019	03/08/2019
US	US MINES	Mines Master Index File	Department of Labor, Mine Safety and Health A	11/27/2018	02/27/2019	04/01/2019
US	US MINES 2	Ferrous and Nonferrous Metal Mines Database Listing	USGS	12/05/2005	02/29/2008	04/18/2008
US	US MINES 3	Active Mines & Mineral Plants Database Listing	USGS	04/14/2011	06/08/2011	09/13/2011
US	UXO	Unexploded Ordnance Sites	Department of Defense	12/31/2017	01/17/2019	04/01/2019

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
CT	CT MANIFEST	Hazardous Waste Manifest Data	Department of Energy & Environmental Protecti	02/11/2019	02/12/2019	03/04/2019
NJ	NJ MANIFEST	Manifest Information	Department of Environmental Protection	12/31/2018	04/10/2019	05/16/2019
NY	NY MANIFEST	Facility and Manifest Data	Department of Environmental Conservation	01/01/2019	05/01/2019	06/21/2019
PA	PA MANIFEST	Manifest Information	Department of Environmental Protection	12/31/2017	10/23/2018	11/27/2018
RI	RI MANIFEST	Manifest information	Department of Environmental Management	12/31/2017	02/23/2018	04/09/2018
WI	WI MANIFEST	Manifest Information	Department of Natural Resources	12/31/2017	06/15/2018	07/09/2018
US	AHA Hospitals	Sensitive Receptor: AHA Hospitals	American Hospital Association, Inc.			
US	Medical Centers	Sensitive Receptor: Medical Centers	Centers for Medicare & Medicaid Services			
US	Nursing Homes	Sensitive Receptor: Nursing Homes	National Institutes of Health			
US	Public Schools	Sensitive Receptor: Public Schools	National Center for Education Statistics			
US	Private Schools	Sensitive Receptor: Private Schools	National Center for Education Statistics			
CA	Daycare Centers	Sensitive Receptor: Licensed Facilities	Department of Social Services			
US	Flood Zones	100-year and 500-year flood zones	Emergency Management Agency (FEMA)			
US	NWI	National Wetlands Inventory	U.S. Fish and Wildlife Service			
CA	State Wetlands	Wetland Inventory	Department of Fish & Game			
US	Topographic Map		U.S. Geological Survey			
US	Oil/Gas Pipelines		PennWell Corporation			
US	Electric Power Transmission Line Data		PennWell Corporation			

STREET AND ADDRESS INFORMATION

APPENDIX B
SMALL PROJECT ANALYSIS LEVEL

Crescent Elementary School
Small Project Analysis Level

PROJECT DESCRIPTION:

The Greenfield Union School District purchased approximately 19 acres of land in 2006 for the purpose of constructing a new elementary school (Crescent Elementary School) in the southern portion of Bakersfield, California. The project site is located east of State Highway 99, on the southwest corner of Cottonwood Road and Panama Lane in the northeast ¼ of Section 29, Township 30 south, and Range 28 east, MDB&M, of the Lamont, CA, USGS 7.5" topographical quadrangle map. The property is more specifically described as a portion of APN #518-030-06. The proposed school site is located in an unincorporated area of southeast Bakersfield.

The new elementary school is anticipated to have a maximum enrollment of 925 students with a projected build-out date between three to five years after project approval. The construction of the new elementary school will help alleviate the problem of current over crowding, and is designed to provide an elementary school for future students as the population within the District continues to grow.

The project area is currently zoned A (Agriculture) with a Bakersfield Metropolitan General Plan land use designation of R-IA (Resource- Intensive Agriculture), and is currently actively farmed in alfalfa. The project proposes to change the land use designation to Public and Private Schools (PR) and the zone to One-Family Dwelling (R-1).

SMALL PROJECT ANALYSIS LEVEL (SPAL) – ANALYIS REQUIREMENTS:

In order to determine the appropriate level of analysis for a proposed project's air emissions impacts, the SJVAPCD has established a three-tiered analysis program which requires a gradation of analytic rigor based on a proposed project's air emission impacts. It has been determined that this project, Crescent Elementary School #10, meets the analysis requirements for a Small Project Analysis Level (SPAL), the least rigorous analysis required by SJVAPCD. The determination has been made based upon the project description.

Table 5-2 and 5-3 in the SJVAPCD Guide for Assessing and Mitigating Air Quality Impacts lists the qualifying criteria for various types of projects to meet the SPAL analysis level. Utilizing these criteria, the proposed Greenfield School District Crescent Elementary School #10 project meets the requirements for inclusion into the SPAL program, as seen below in Chart 1.

Chart 1

Land Use	SJVAPCD Allowable Project Size	Crescent Elementary Project Size
Elementary School	1875 students	925 students

The number of students for the proposed project falls below the SPAL thresholds and therefore satisfies the SPAL analysis requirements. Student population size projected for the school was determined by the District through their facilities planning process.

As for identifying the toxic air contaminants, hazardous materials, and odors associated with the proposed project and the site vicinity, because the project is educational in nature, it is not expected to result in the generation of odors or hazardous air pollutants. The project is currently located within 1 mile of farming facilities, which may have the potential for environmental conditions. A site visit, conducted by Quad Knopf Registered Environmental Assessor Glen Mears on December 13, 2006, as well as a follow up site visit conducted by Quad Knopf Biologist Paul Rosebush in January 2009 indicated that the project site and the surrounding properties were in good environmental condition and did not appear to be a threat for toxic air contaminants, hazardous materials, or odors. No buildings or structures occur at the site, therefore, no buildings or structures will be required to be demolished or relocated that could be a threat for asbestos emission impacts.

References:

San Joaquin Valley Unified Air Pollution Control District, *Guide For Assessing and Mitigating Air Quality Impacts.* January, 2002.

APPENDIX C
CULTURAL RESOURCES

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691 Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov

September 13, 2019

Jaymie Brauer
Greenfield Unified School District

VIA Email to: jaymie.brauer@qkinc.com

RE: Native American Tribal Consultation, Pursuant to the Assembly Bill 52 (AB 52), Amendments to the California Environmental Quality Act (CEQA) (Chapter 532, Statutes of 2014), Public Resources Code Sections 5097.94 (m), 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2 and 21084.3, Crescent Elementary and Middle School Construction Project, Kern County

Dear Ms. Brauer:

Pursuant to Public Resources Code section 21080.3.1 (c), attached is a consultation list of tribes that are traditionally and culturally affiliated with the geographic area of the above-listed project. Please note that the intent of the AB 52 amendments to CEQA is to avoid and/or mitigate impacts to tribal cultural resources, (Pub. Resources Code §21084.3 (a)) ("Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.")

Public Resources Code sections 21080.3.1 and 21084.3(c) require CEQA lead agencies to consult with California Native American tribes that have requested notice from such agencies of proposed projects in the geographic area that are traditionally and culturally affiliated with the tribes on projects for which a Notice of Preparation or Notice of Negative Declaration or Mitigated Negative Declaration has been filed on or after July 1, 2015. Specifically, Public Resources Code section 21080.3.1 (d) provides:

> Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section.

The AB 52 amendments to CEQA law does not preclude initiating consultation with the tribes that are culturally and traditionally affiliated within your jurisdiction prior to receiving requests for notification of projects in the tribe's areas of traditional and cultural affiliation. The Native American Heritage Commission (NAHC) recommends, but does not require, early consultation as a best practice to ensure that lead agencies receive sufficient information about cultural resources in a project area to avoid damaging effects to tribal cultural resources.

The NAHC also recommends, but does not require that agencies should also include with their notification letters, information regarding any cultural resources assessment that has been completed on the area of potential effect (APE), such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

- A listing of any and all known cultural resources that have already been recorded on or adjacent to the APE, such as known archaeological sites;

- Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;

- Whether the records search indicates a low, moderate, or high probability that unrecorded cultural resources are located in the APE; and

- If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

   - Any report that may contain site forms, site significance, and suggested mitigation measures.

   All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure in accordance with Government Code section 6254.10.

3. The result of any Sacred Lands File (SLF) check conducted through the Native American Heritage Commission was negative.

4. Any ethnographic studies conducted for any area including all or part of the APE; and

5. Any geotechnical reports regarding all or part of the APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS are not exhaustive and a negative response to these searches does not preclude the existence of a tribal cultural resource. A tribe may be the only source of information regarding the existence of a tribal cultural resource.

This information will aid tribes in determining whether to request formal consultation. In the event that they do, having the information beforehand will help to facilitate the consultation process.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our consultation list remains current.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Staff Services Analyst

Attachment

Native American Heritage Commission
Native American Contacts List
9/13/2019

Big Pine Paiute Tribe of the Owens Valley
James Rambeau, Sr., Chairperson
P.O. Box 700 — Paiute - Shoshone
Big Pine ,CA 93513
j.rambeau@bigpinepaiute.org
(760) 938-2003
(976) 938-2942 Fax

Big Pine Paiute Tribe of Owens Valley
Sally Manning, Environmental Director
P.O. Box 700 — Paiute
Big Pine ,CA 93513
s.manning@bigpinepaiute.org
(760) 938-2003
(760) 938-2942 Fax

Big Pine Paiute Tribe of the Owens Valley
Danelle Gutierrez THPO
P.O. Box 700 — Paiute
Big Pine ,CA 93513
d.gutierrez@bigpinepaiute.org
(760) 938-2003, ext. 228
(760) 938-2942 Fax

Chumash Council of Bakersfield
Julio Quair, Chairperson
729 Texas Street — Chumash
Bakersfield ,CA 93307
chumashtribe@sbcglobal.net
(661) 322-0121

Kern Valley Indian Community
Julie Turner, Secretary
P.O. Box 1010 — Kawaiisu, Tubatulabal
Lake Isabella ,CA 93240
(661) 340-0032 Cell

Kern Valley Indian Community
Robert Robinson, Chairperson
P.O. Box 1010 — Tubatulabal, Kawaiisu
Lake Isabella ,CA 93240
bbutterbredt@gmail.com
(760) 378-2915 Cell

Kern Valley Indian Community
Brandy Kendricks
30741 Foxridge Court — Kawaiisu, Tubatulabal
Tehachapi ,CA 93561
krazykendricks@hotmail.com
(661) 821-1733
(661) 972-0445

Kitanemuk & Yowlumne Tejon Indians
Delia Dominguez, Chairperson
115 Radio Street — Yowlumne, Kitanemuk
Bakersfield ,CA 93305
2deedominguez@gmail.com
(626) 339-6785

San Manuel Band of Mission Indians
Lee Clauss, Director-CRM Dept.
26569 Community Center Drive — Serrano
Highland ,CA 92346
lclauss@sanmanuel-nsn.gov
(909) 864-8933
(909) 864-3370 Fax

San Manuel Band of Mission Indians
Lynn Valbuena, Chairwoman
26569 Community Center Dr. — Serrano
Highland ,CA 92346
(909) 864-8933

This list is current as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code,Section 5097.94 of the Public Resources Code, or Section 5097.98 of the Public Resources Code.

**This list is only applicable for contacting local Native Americans Tribes for the proposed:
Crescent Elementary and Middle School Construction Project, Kern County.**

Native American Heritage Commission
Native American Contacts List
9/13/2019

Santa Rosa Rancheria Tachi Yokut Tribe
Rueben Barrios Sr., Chairperson
P.O. Box 8
Lemoore ,CA 93245
(559) 924-1278
(559) 924-3583 Fax

Tache
Tachi
Yokut

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Ct.
Salinas ,CA 93906
kwood8934@aol.com
(831) 443-9702

Foothill Yokuts
Mono
Wuksache

Tejon Indian Tribe
Octavio Escobedo, Chairperson
1731 Hasti-acres Drive, Suite 108
Bakersfield ,CA 93309
oescobedo@tejonindiantribe-nsn.gov
(661) 834-8566
(661) 834-8564 Fax

Kitanemuk

Tejon Indian Tribe
Colin Rambo, Cultural Resources Management
1731 Hasti-Acres Drive, Suite 108
Bakersfield ,CA 93309
colin.rambo@tejonindiantribe-nsn.go
(661) 834-8566
(484) 515-4790 Cell

Kitanemuk

Tubatulabals of Kern Valley
Robert L. Gomez, Jr., Tribal Chairperson
P.O. Box 226
Lake Isabella ,CA 93240
(760) 379-4590
(760) 379-4592 Fax

Tubatulabal

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589
Porterville ,CA 93258
neil.peyron@tulerivertribe-nsn.gov
(559) 781-4271
(559) 781-4610 Fax

Yokuts

This list is current as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code,Section 5097.94 of the Public Resources Code, or Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans Tribes for the proposed:
Crescent Elementary and Middle School Construction Project, Kern County.

TECHNICAL MEMORANDUM

Date: August 27, 2019

Project: Cultural resources records search for the Crescent Elementary School Construction Project- Bakersfield CA

To: Jaymie Brauer

From: Robert Parr, MS, RPA, Senior Archaeologist

Subject: Cultural Resources Records Search Results (RS #19-341)

Background

This Technical Memo is to provide a cultural record search and to determine whether the proposed project would impact cultural resources.

Project Description

The Greenfield School District is proposing to construct and operate an elementary school (Project) within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. Figure 1-1 is a map of the regional location and Figure 1-2 shows the aerial view of the Project site. The elementary school campus will occupy an approximately 23-acre portion of a 49.5-acre parcel.

The construction of the Project would be phased. The initial enrollment would be 750 students with a maximum capacity of 1,080 students at full buildout. There will be seven buildings, with an approximate area totaling almost 74,000 square feet (sq. ft.). These buildings will include classrooms, administrative buildings, and multi-purpose rooms. The construction of the new school would help alleviate the problem of current overcrowding and is designed to provide an elementary school for future students as the population within the District grows.

Project Location

The Project site is located within Section 29, Township 30 South, Range 28 East, Mount Diablo Base and Meridian (MDB&M), within the Lamont U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure3 and Figure 4). The site encompasses approximately 23-acre portion of Assessor's Parcel Number (APN) 518-030-22, on the southwest corner of Panama Lane and Cottonwood Road, Bakersfield, CA.

Results

A cultural resources records search (RS #19-341) was conducted this date at the Southern San Joaquin Valley Information Center, CSU Bakersfield for the Crescent Elementary School Construction Project in southwest Bakersfield, Kern County, California.

A records search of site files and maps was conducted at the Southern San Joaquin Valley IC and a search of the NAHC Sacred Lands File was completed. No cultural resources were known or had been recorded within the project area. No Native American sacred sites or cultural landscapes had been identified within or immediately adjacent to the study area.

The records search covered an area within one-half mile of the subject property and included a review of the National Register of Historic Places, California Points of Historical Interest, California Registry of Historic Resources, California Historical Landmarks, California State Historic Resources Inventory, and a review of cultural resource reports on file.

The records search indicated that the subject property had never been surveyed for cultural resources and it is not known if any exist there. Nine cultural resource studies have been conducted within a half mile of the property (Brady 2003; Hudlow 2005, 2005a, 2005b, 2006; Schiffman and Gold 2005, 2006; Romani 2006; Wills 2011). No cultural resources have been recorded on or within a half mile of the Crescent Elementary School Construction Project property.

Conclusions

Based on the results of cultural records search findings and the lack of historical or archaeological resources previously identified within a 0.5-mile radius of the proposed project, the potential to encounter subsurface cultural resources is minimal. Additionally, construction of the project construction activities would be conducted within the existing facility. The potential to uncover subsurface historical or archaeological deposits is would be considered unlikely. However, construction would involve earth-disturbing activities, and it is still possible that cultural resources may be discovered, possibly in association with archaeological sites. Implementation of the below mitigation measure would ensure that the proposed Project would not directly or indirectly impact previously unknown cultural resources. With implementation of the recommended measures, impact to cultural resources will be less than significant.

MITIGATION MEASURE(S)

> **MM CUL-1: If** prehistoric or historic-era cultural materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified archaeologist can evaluate the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone

tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants. If the qualified archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from Project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation.

MM CUL-2: If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code. The specific protocol, guidelines, and channels of communication outlined by the Native American Heritage Commission, in accordance with Section 7050.5 of the Health and Safety Code, Section 5097.98 of the Public Resources Code (Chapter 1492, Statutes of 1982, Senate Bill 297), and Senate Bill 447 (Chapter 44, Statutes of 1987), shall be followed. Section 7050.5(c) shall guide the potential Native American involvement, in the event of discovery of human remains, at the direction of the county coroner

Robert E. Parr, MS, RPA
Senior Archaeologist

Attachments

References

(Reports on file at the Southern San Joaquin Valley Information Center, California State University, Bakersfield)

Brady, Jon L.

2003 Archaeological Survey Report for Site "A" (APN No.'s 518-040-8, -9, -10), and Site "B' (APN-173-200-9) Bakersfield, Kern County, California. Prepared for John R. Wilson, Civil Engineer, Bakersfield.

Hudlow, Scott M.

2005 A Phase I Cultural Resource Survey for Fallgater/Sheldon Property, City of Bakersfield, California. Submitted to McIntosh and Associates, Bakersfield.

2005a A Phase I Cultural Resource Survey for a Residential Project at Panama Lane and South Union Avenue, City of Bakersfield, California. Submitted to Marino/Associates, Bakersfield.

2005b A Phase I Cultural Resource Survey for Lenox Homes, Berkshire Road and South Union Avenue, City of Bakersfield, California. Submitted to Project Design Consultants, Bakersfield.

2006 A Phase I Cultural Resource Survey for Property at the Southeast Corner of Cottonwood and Berkshire Roads, City of Bakersfield, California. Submitted to Marino/Associates, Bakersfield.

Romani, John F.

2006 Archaeological Survey Report: Rehabilitaion on Panama Lane from Union Avenue to Cottonwood Road, Bakersfield, Kern County, California. Submitted to Kern County Roads Department, Bakersfield.

Schiffman, Robert A. and Alan P. Gold

2005 Cultural Resource Survey for a 98.13-Acre Parcel near the Intersection of Panama lane and Cottonwood Road in Southeast Bakersfield, Kern County, California. Submitted to Pinnacle Engineering, Inc., Bakersfield.

2006 Cultural Resource Survey for a 75-Acre Parcel East of Cottonwood road and North of the Arvin-Edison Canal in Southeast Bakersfield, Kern County, California. Submitted to Global Investment and Development LLC, Los Angeles.

Wills, Carrie

2011 Cultural Resources Records Search and Site Visit for At&T Mobility, LLC Candidate BKO361-01 (KB Farms), 7301 Cottonwood Road, Bakersfield, Kern County, California. Letter report submitted to AT&T Mobility, LLC, Atlanta, GA.

ATTACHMENT A
PROJECT FIGURES

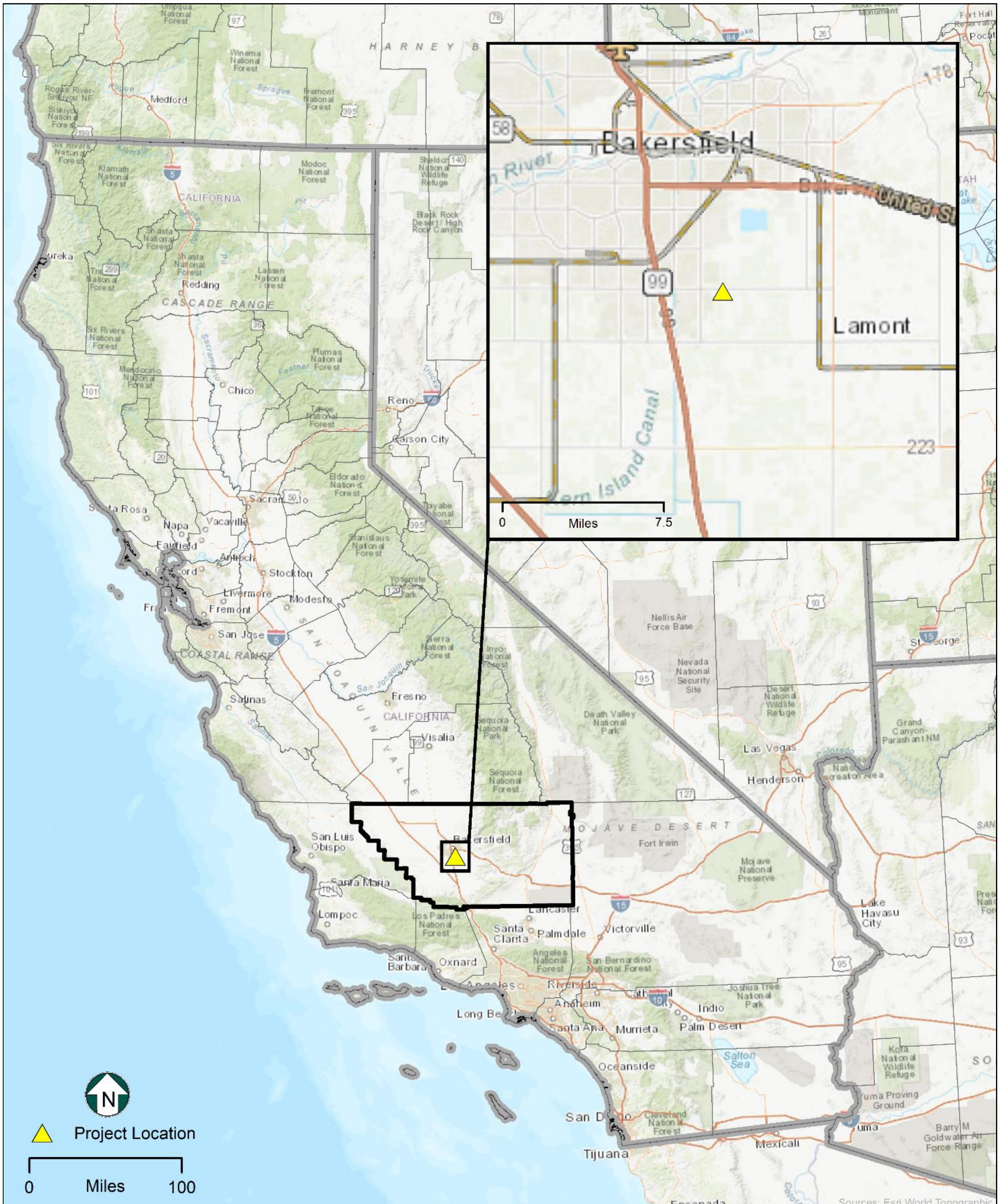


Figure 1
Regional Location

Figure -2
Project Area

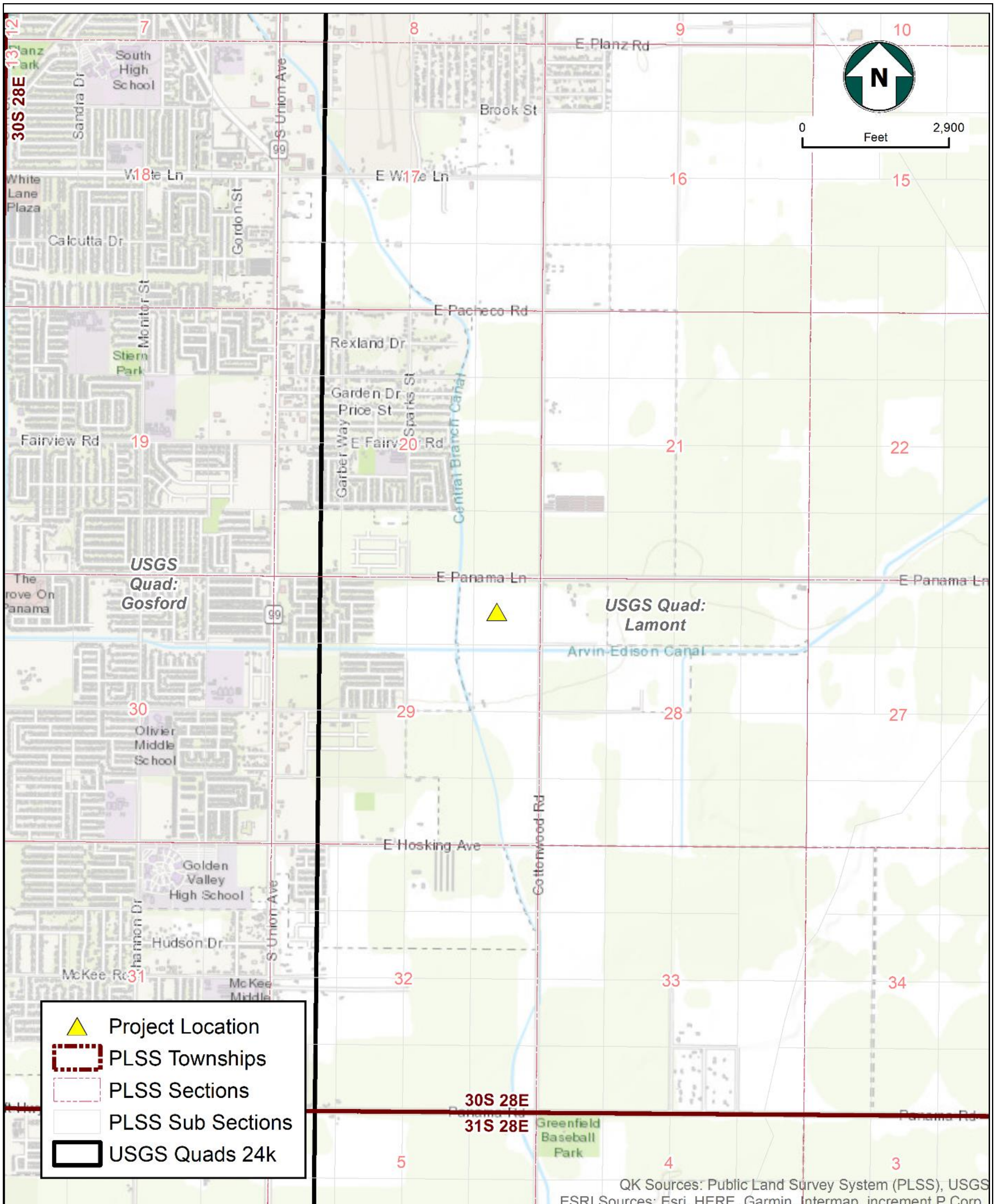


Figure -3
PLSS

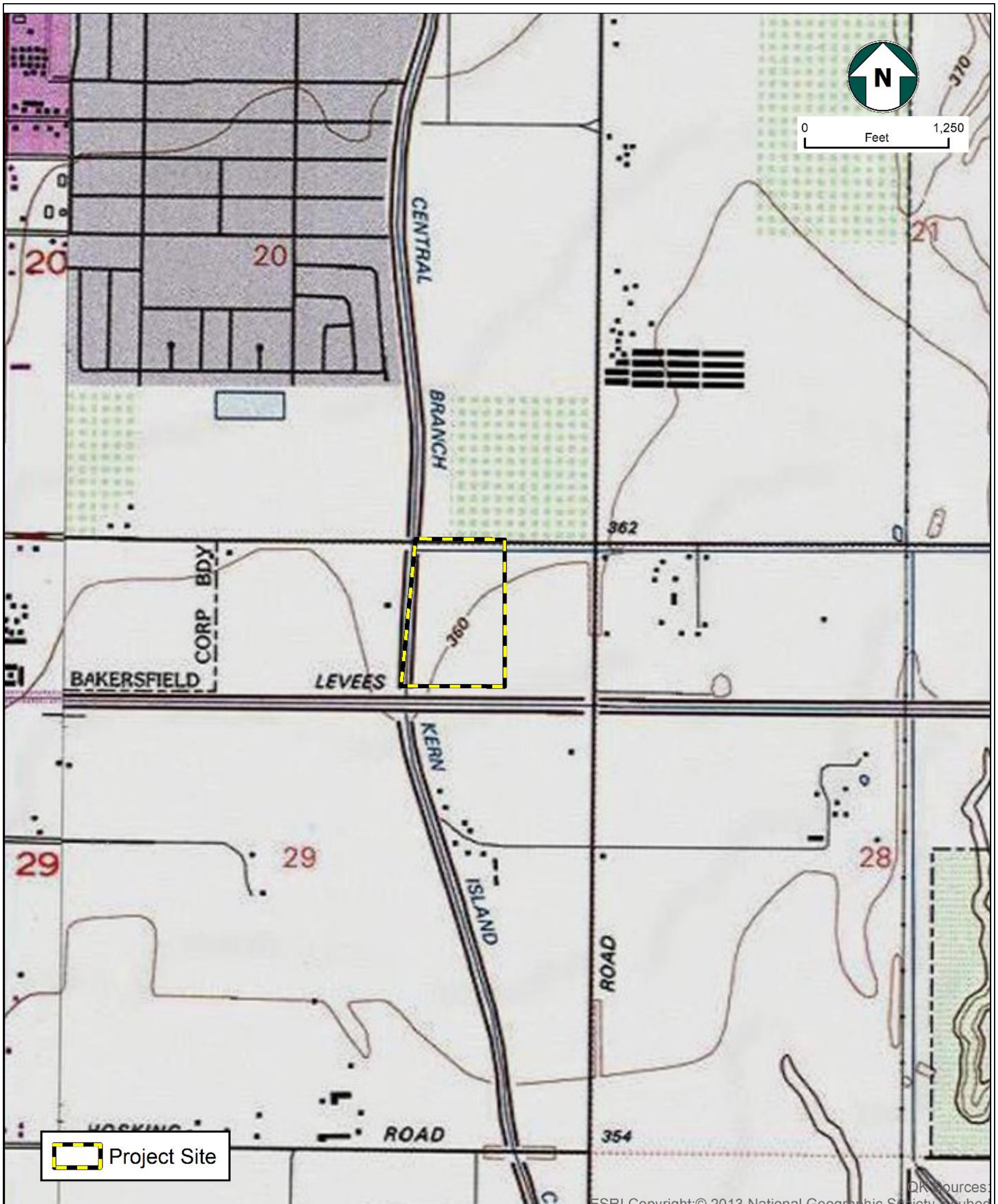


Figure -4
Topo Map

From:	Alexandra McCleary
To:	Conor McKay
Subject:	RE: AB 52 Consultation - Greenfield Union School District
Date:	Wednesday, October 2, 2019 5:15:57 PM
Attachments:	image002.png image641b42.PNG

Dear Conor McKay,

Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. I write to you on behalf of Lee Clauss, Director of the Cultural Resources Management Department. SMBMI appreciates the opportunity to review the project documentation. The proposed project is located outside of Serrano ancestral territory and, as such, SMBMI will not be requesting consulting party status with the lead agency or requesting to participate in the scoping, development, and/or review of documents created pursuant to legal and regulatory mandates.

Kind regards,

Alexandra McCleary

Alexandra McCleary
TRIBAL ARCHAEOLOGIST
O: (909) 864-8933 x502023
M: (909) 633-0054
26569 Community Center Drive Highland CA 92346
SAN MANUEL BAND OF MISSION INDIANS

From: Lee Clauss <LClauss@sanmanuel-nsn.gov>
Sent: Thursday, September 26, 2019 1:53 PM
To: Alexandra McCleary <Alexandra.McCleary@sanmanuel-nsn.gov>
Subject: FW: AB 52 Consultation - Greenfield Union School District

Perhaps OOT…did not pull the maps. Please review and process accordingly.

Lee

Lee Clauss

DIRECTOR, CULTURAL RESOURCES MANAGEMENT
O: (909) 864-8933 x503248
Internal: 50-3248
M: (909) 633-5851
26569 Community Center Drive Highland California 92346
SAN MANUEL
BAND OF MISSION INDIANS

From: Conor McKay <Conor.McKay@qkinc.com>
Sent: Thursday, September 26, 2019 12:26 PM
To: Lee Clauss <LClauss@sanmanuel-nsn.gov>
Subject: AB 52 Consultation - Greenfield Union School District

Hello,

Please see the attached documentation regarding the proposed Crescent Elementary School in Kern County, California.

Please direct all comments to Jaymie Brauer at Jaymie.brauer@qkinc.com.

Very respectfully,

Conor McKay
Assistant Planner
Quad Knopf, Inc, dba QK
5080 California Avenue, Suite 220
Bakersfield, CA 93309
(661) 616-2600 ext 4159- Office
www.QKInc.com

---

copying it and notify the sender by reply e-mail so that the email address record can be corrected. Thank You

APPENDIX D
ENERGY CONSUMPTION TECHNICAL MEMO

MEMO

Date: August 28, 2019 **Project No.:** 190284

To: Greenfield Union School District

From: Jaymie Brauer, Principal Planner

Subject: Crescent Elementary School Project -Bakersfield, California

---

Introduction

This memorandum assesses possible construction and operational Energy Consumption by the development of the Crescent City Elementary School Project by Greenfield Unified School District (Project).

Project Description

The Greenfield Union School District (GUSD, as lead agency) has proposed to construct and operate a new elementary school (Project), within the unincorporated area of central Kern County at the southern end of San Joaquin Valley, California. The elementary school campus will occupy an approximately 23-acre Project site. The enrollment capacity will be 750 students with potential to expand up to 1,080 students. There will be multiple buildings, with an approximate area totaling almost 74,000 square feet (sq. ft.). The school will be completed in phases, with the first phase constructing: an administrative building, a cafeteria/multipurpose room, and 31 classrooms.

It is anticipated that new residential development in the metropolitan Bakersfield area would exacerbate the existing overcrowding conditions without the addition of a new school. The construction of the new school would help alleviate the problem of current overcrowding and is designed to provide an elementary school for future students as the population within the District grows.

The construction activities for the Project generally fall into five main construction categories: 1) site preparation; 2) grading; 3) building construction; 4) paving; and 5) architectural coating. The entire process is estimated to take up to 18 months. Site grading and earthwork is anticipated to begin during the first quarter of 2020. Although the Project may be built in separate phases, for analysis and discussion in this document, construction would be analyzed for the worst-case scenario, which assumes all construction would be conducted concurrently.

The onsite construction workforce for the project is expected to peak at 50 individuals; however, the average workforce is expected to be 25 construction, supervisory, support, and construction management personnel onsite during construction. It is anticipated that the construction workforce would commute to the site each day from local communities. Construction staff not drawn from the local labor pool would stay in local hotels, or other local communities.

Fuel Consumption Standards of Significance

The 2019 CEQA Guidelines Appendix G includes Section VI- *Energy*, which is an analysis of potential impacts of a project related to the consumption of energy resources. The thresholds as written in the Guidelines are:

- Would the Project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?
- Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

While no quantitative thresholds related to energy are included the Guidelines states as follows:

The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

1. decreasing overall per capita energy consumption,
2. decreasing reliance on natural gas and oil, and
3. increasing reliance on renewable energy resources.

Fuel Consumption Impact Analysis

Methodology

QK estimated energy consumption of a typical educational facility Project for the both construction and operation using California Emission Estimator Model version 20163.2 (CalEEMod). CalEEMod is a Statewide program designed to calculate pollutant emissions for development projects in California using land use data. Analysis of the project is also based on research of typical construction phase fuel consumption conducted by Ramboll US Corporation in their preparation of an Energy Use Assessment for the Magee Preserve residential development project in Danville, California (Ramboll US Corp, 2018) as well as the *Air Quality Impact Analysis* prepared for the Kern High School District Southeast School Site Project (Insight, 2018).

Based off information on the Project, there are no unusual project characteristics that would cause construction equipment to be less energy efficient compared with other similar construction sites in other parts of the State. Thus, construction-related fuel consumption at the project would not result in inefficient, wasteful, or unnecessary energy use.

Construction Phase

Energy demand during the construction phase would result from the transportation of materials, construction equipment, and employee vehicle trips. Using a typical fuel efficiency of 5.85 miles per gallon, the delivery of building materials is expected to require approximately 41,240 gallons of diesel per construction phase (Geotab, 2017). Construction equipment includes excavators, graders, off-highway trucks, rubber-tired dozers, scrapers, tractors, loaders, backhoes, forklifts, cement and mortar mixers and cranes. The construction phase of the proposed Project is expected to require a total of approximately 41,240 gallons of diesel fuel (Appendix A, Table 1). The Project will not use natural gas during the construction phase.

Operational Phase

Energy demand during the operational phase would result from maintenance equipment and six (6) existing School buses. According to calculations in CalEEMod and construction equipment data provided by the applicant, the total fuel consumption for the Project would not increase, based off current existing bus routes, parent drop-off and pick-ups. The school district will not be expanding their district. The Project will not use natural gas during the operation phase.

Potential Changes in Electricity Usage

Depending on the current capacity of the electrical grid, the Project may or may not have a less than significant impact on the local power grid. Electrical consumption is expected to fluctuate throughout the life of the Project, as opening day will have approximately 750 students and 85 staff members and at full capacity, 1018 students and 114 staff members. The electricity required to construct and operate the Project is anticipated to have a less than significant impact on the local power grid. Activities involved with be expected to result in lower fuel demand, as technology improves, and equipment becomes more fuel efficient.

Compliance with State and Local Plans

For the purpose of this Energy Element, the Project must comply with Title 24, Chapter 4 of the California Building Standards Commission (August 2019, 4th Edition) for all school buildings and Part 6, 2019 California Energy Code of Regulations. "The term 'school buildings' means the buildings identified in Section 17283 and 81130.5 of the California Education Code, including elementary and secondary schools…" sub-section d. Energy Conservation. Additionally, the Project must comply with Section 100 of the 2019 California Energy Code for information and applications of CEC adoptions. Finally, the Project must comply with the California Code of Regulations (CCR), Title 20 with adoptions of the California Energy Commission (2019 Guide to Title 24).

Kern County General Plan

As a construction project, the Crescent Elementary School Project will construct a new school. Energy saving strategies must be implemented where possible to further reduce the Project's energy consumption, specifically during the construction phase. Strategies being implemented include those recommended by the California Air Resources Board (CARB) that may reduce both the Project's energy consumption, including diesel anti-idling measures, light-duty vehicle technology, usage of alternative fuels such as biodiesel blends and ethanol, and heavy-duty vehicle design measures to reduce energy consumption. Additionally with the Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI), the Project includes recommendations to reduce energy consumption by, shutting down equipment when not in use for extended periods, limiting the usage of construction equipment to eight (8) cumulative hours per day, usage of electric equipment for construction whenever possible in lieu of diesel or gasoline powered equipment, and encouragement of employees to carpool to retail establishments or to remain on-site during lunch breaks.

Energy Saving Measures Included in Project

The Project will incorporate energy saving measures to offset electrical lighting use in the facility by installing Solatube Brighten Up Series skylights throughout the campus. The Project will also save energy by installing photovoltaic solar panels over the staff parking lot for (52 spaces). Energy efficient lighting must be installed throughout the interior of the facility.

Conclusion

The construction phase of the proposed Project would result in the consumption of approximately 15,827 gallons of diesel fuel per phase. Once operational, the Project will result in a less than significant impact on local energy resources.

The Project would therefore not result in potentially significant impacts due to wasteful, inefficient or unnecessary consumption of energy resources. In addition, the Project will be consistent and not conflict with or obstruct a State or local plan. Impacts would be less than significant.

REFERENCES

Geotab, 2017. The State of Fuel Economy in Trucking. (Accessed 7/22/19). https://www.geotab.com/truck-mpg-benchmark/

Insight Environmental Consultants, 2018. *Air Quality Impact Analysis – Kern High School District Southeast School*.

Kern County Planning Department (KCPD), 2004. Kern County General Plan Recirculated Program Environmental Impact Report.

Ramboll US Corporation, 2018. *Energy Use Assessment - Magee Preserve.*

2019 Guide to Title 24, Based on the 2019 California Building Standards Code (Accessed 8/30/19). https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/Guidebooks---Title-24

https://www.convertunits.com/from/horsepower+hour/to/gallon+%5BU.S.%5D+of+diesel+oil

APPENDIX

Appendix A:
CalEEMod Calculations and Fuel Consumption Estimates

Table 1: Site Construction and Installation Fuel Consumption Estimate

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	290.00	113.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	58.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Phase Name	Offroad Equipment Type	total hours	Amount	Usage Hours	Horse Power	Load Factor	HP-Hour	Fuel Consumption (gal)	Total per phase per day	days	total gallons per phase
Site Preparation	Rubber Tired Dozers	24	3	8.00	247	0.40	2371.2	43.440384			
Site Preparation	Tractors/ Loaders/ Backhoes	32	4	8.00	97	0.37	1148.48	21.0401536			
Grading	Excavators	16	2	8.00	158	0.38	960.64	17.5989248	82.079462	132	10834.489
Grading	Graders	8	1	8.00	187	0.41	613.36	11.2367552			
Grading	Rubber Tired Dozers	8	1	8.00	247	0.40	790.4	14.480128			
Grading	Scrapers	16	2	8.00	367	0.48	2818.56	51.6360192			
Grading	Tractors/ Loaders/ Backhoes	16	2	8.00	97	0.37	574.24	10.5200768			
Building Construction	Cranes	7	1	7.00	231	0.29	468.93	8.5907976			
Building Construction	Forklifts	24	3	8.00	89	0.20	427.2	7.826304	104.29008	22	2294.3818
Building Construction	Generator Sets	8	1	8.00	84	0.74	497.28	9.1101696	75.86611	22	1669.0544
Building Construction	Tractors/ Loaders/ Backhoes	21	3	7.00	97	0.37	753.69	13.8076008			
Building Construction	Welders	8	1	8.00	46	0.45	165.6	3.033792			
Paving	Pavers	16	2	8.00	130	0.42	873.6	16.004352			
Paving	Paving Equiptment	16	2	8.00	132	0.36	760.32	13.9290624	46.774807	22	1029.0458
Paving	Rollers	16	2	8.00	80	0.38	486.4	8.910848			
Architectural Coating	Air Compressors	6	1	6.00	78	0.48	224.64	4.1154048			
HP-Hour = Load Factor x Total Hours x Horsepower				Fuel Consumption = HP-Hour x .01832						**Total**	15827

APPENDIX E
CALTRANS AERONAUTICS LETTER

112

JACK O'CONNELL
State Superintendent of
Public Instruction
PHONE: (916) 319-0800

CALIFORNIA
DEPARTMENT OF
EDUCATION

1430 N STREET
SACRAMENTO, CA
95814-5901

November 30, 2005

Darrell Hawley, Facilities Director
Greenfield Union School District
1624 Fairview Road
Bakersfield, CA 93307

Dear Mr. Hawley:

Attached is a copy the Department of Transportation, Division of Aeronautics, assessment of air traffic safety for the proposed elementary and middle schoolsite east of Panama Lane and Cottonwood Road. I know you received this already from the Division of Aeronautics, but I want to forward it to you myself, with a couple comments.

Importantly, the Division of Aeronautics finds that "this site seems to provide an appropriate level of safety suitable for a school." This clears the way for acquisition and use of the property for these campuses once all other required feasibility studies and the environmental review are completed.

I am preparing a letter to Patrick Miles, the author of the November 14 letter, letting him know that the School District does not already own the property. I will copy you on the letter. This may be insignificant, since Aeronautics evaluated the site. However, I want to set the record straight as I know site acquisition in advance of their review is an issue for them.

With regard to Mr. Miles' request for a copy of any School District overrule of the local Airport Land Use Compatibility Plan, you will want to read Public Utilities Code Section 21670 (f) in addition to Section 21676, to which he refers. This is a requirement we have not seen before and it was not expressly made in another recent similar Aeronautics review. Of course, that does not mean it is not an obligation of the School District. You may need to discuss this with district counsel.

Please contact me if you have any questions or need assistance.

Sincerely yours,

George M. Shaw

George M. Shaw, Field Representative
School Facilities Planning Division
ph.: 805-692-9913
GShaw@cde.ca.gov

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS – M.S.#40
1120 N STREET
). BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-4959
FAX (916) 653-9531
TTY (916) 651-6827

Flex your power!
Be energy efficient!

November 14, 2005

Mr. George M. Shaw
Field Representative
School Facilities Planning Division
5380 Overpass Road, # 9
Santa Barbara, CA 93111

Dear Mr. Shaw:

In response to your proposed school site evaluation received on September 22, 2005, and Section 17215 of the Educational Code, the California Department of Transportation (Department), Division of Aeronautics (Division), has reviewed the proposed Greenfield Union Elementary / Middle School Site, located east of the intersection of Panama Lane and Cottonwood Road, approximately 1.7 miles southeast of Runway 34 at the Bakersfield Municipal Airport. We make the following observations for informational purposes only, since the property is already owned by the school district.

In conjunction with our review, we looked at the Kern County Airport Land Use Compatibility Plan (ALUCP), the California Airport Land Use Planning Handbook, our files, and other publications relating to aircraft operations at the Bakersfield Municipal Airport. We noted that the project appears to be in conflict with the adopted Kern County ALUCP. State law (California Public Utilities Code, Section 21676) requires that we (Department of Transportation / Aeronautics Division) review the specific findings that a local government intends to use when proposing to overrule an ALUC. The findings must show evidence that the city/county is "... minimizing the public's exposure to excessive noise and safety hazards within areas around public airports..." A copy of the decision to overrule the ALUCP should be provided to Mr. Ron Bolyard of our Division.

We also conducted an aerial inspection of the site on October 31, 2005. In addition, the Kern County Planning Department and the Bakersfield Public Works Director were asked to comment, and their responses were taken into consideration.

The visual traffic patterns at the Bakersfield Municipal Airport are located west of the runway, and should not adversely impact the school site. Both of the inbound instrument approach courses to Runway 34 (GPS and VOR/DME) are offset approximately one quarter of a mile from the site. If an aircraft strays off course from published instrument procedures, it could overfly the school site at an altitude as low as 400 feet above ground level. This factor should certainly be considered in the decision making process. If the project is approved, noise attenuation methods should be incorporated into building design and construction.

The Department cannot guarantee the safety of this or any site. However, based upon our review of existing conditions and planned development, this site seems to provide an appropriate level of safety suitable for a school.

Sincerely,

Patrick J. Miles

PATRICK J. MILES

APPENDIX F
TRAFFIC IMPACT STUDY

Project No: 605-02

TRAFFIC STUDY

GREENFIELD UNION SCHOOL DISTRICT (GUSD)
PROPOSED ELEMENTARY SCHOOL AT THE SOUTHEAST CORNER OF PANAMA LANE & COTTONWOOD ROAD

Prepared for:

Ordiz-Melby Architects, Inc.

July 2019

Prepared by:

RUETTGERS & SCHULER CIVIL ENGINEERS

1800 30TH STREET, SUITE 260
BAKERSFIELD, CA 93301

Ian J. Parks, RCE 58155

REGISTERED PROFESSIONAL ENGINEER
IAN JEFFREY PARKS
No. C58155
Exp. 6-30-20
CIVIL
STATE OF CALIFORNIA

TABLE OF CONTENTS

INTRODUCTION

The purpose of this study is to evaluate the potential traffic impact of a proposed elementary school located at the southeast corner of Panama Lane and Cottonwood Road in Kern County, California.

A. Land Use, Site and Study Area Boundaries

The proposed project consists of an elementary school, which has an enrollment capacity of 1,080 students. The current land use designation for the project site is R-IA (Intensive Agriculture) and the site is zoned A (Agriculture).

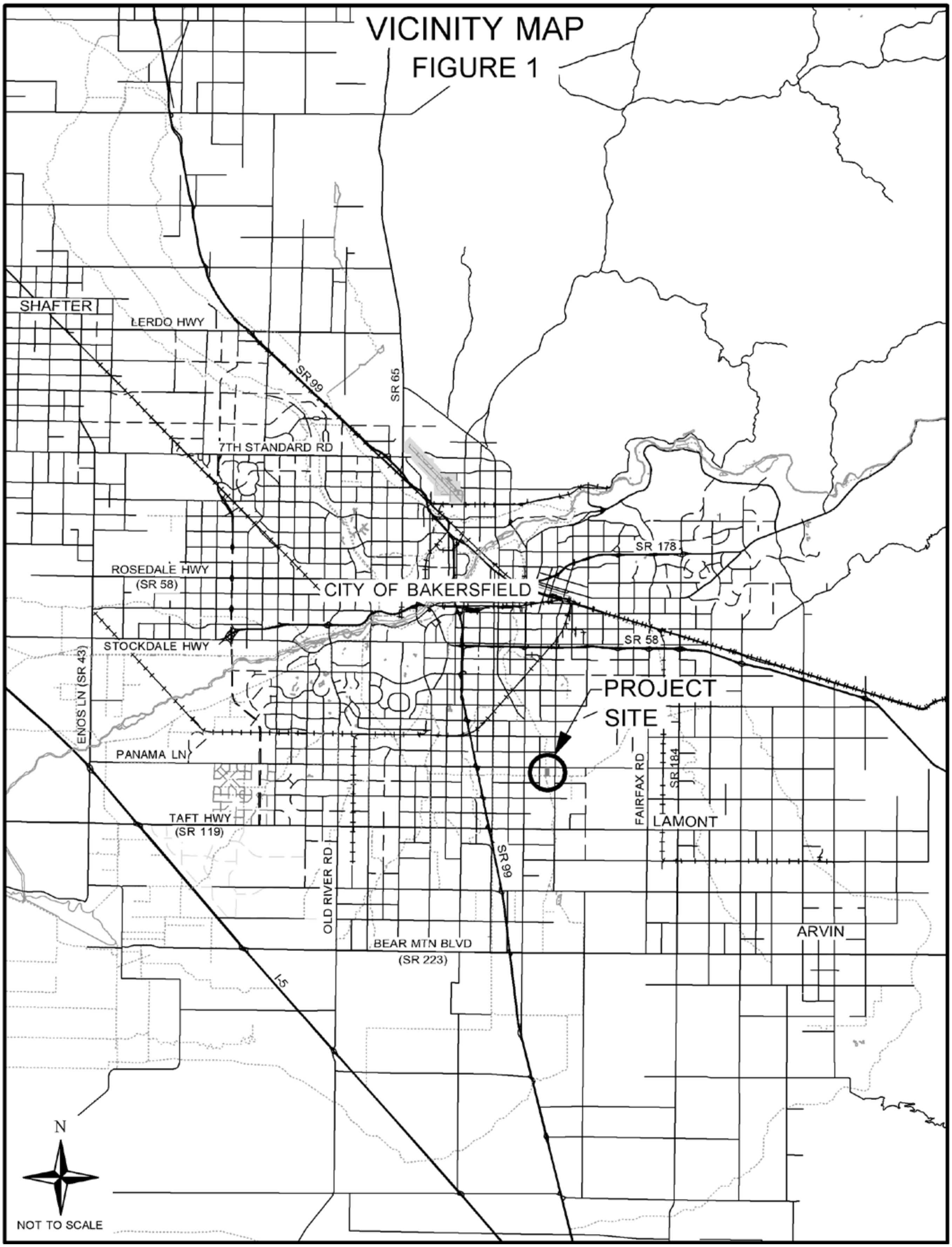
Two unsignalized intersections, five signalized intersections, and one future intersection (project entrance) are included in this study. A vicinity map is presented in Figure 1 and a location map is presented in Figure 2.

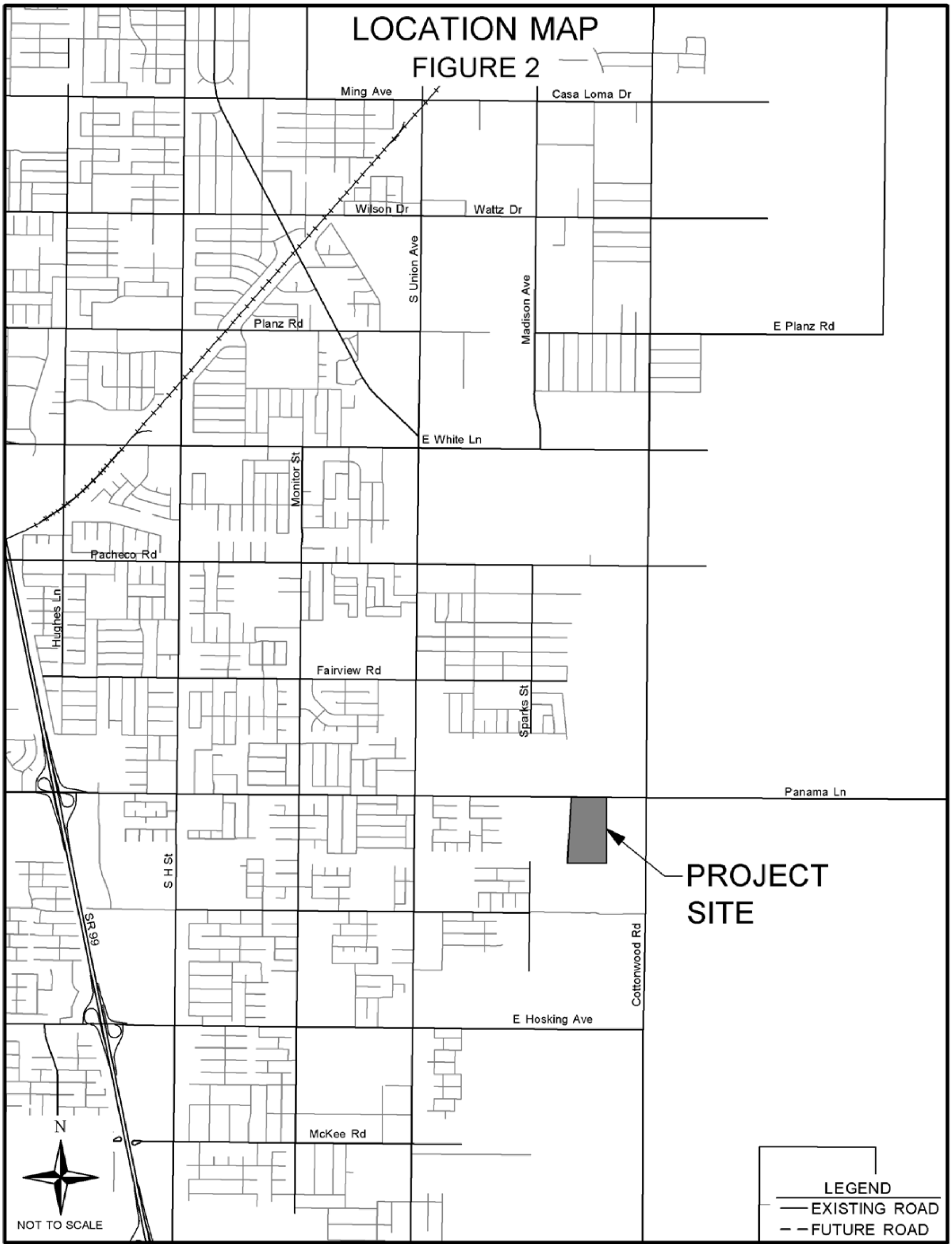
B. Existing Site Uses and Site Access

The project site currently consists of agricultural land, with no building or other structures. Access to the site is proposed along Panama Lane.

C. Existing Uses in Vicinity of the Site

Existing land uses in the vicinity of the project site include agricultural land, which transition to residential uses towards the west.


VICINITY MAP
FIGURE 1
SHAFTER
LERDO HWY
SR 99
SR 65
7TH STANDARD RD
SR 178
ROSEDALE HWY
(SR 58)
CITY OF BAKERSFIELD
SR 58
STOCKDALE HWY
ENOS LN (SR 43)
PROJECT
SITE
PANAMA LN
FAIRFAX RD
SR 184
LAMONT
TAFT HWY
(SR 119)
OLD RIVER RD
SR 99
ARVIN
BEAR MTN BLVD
(SR 223)
I-5
N
NOT TO SCALE


LOCATION MAP
FIGURE 2
Ming Ave
Casa Loma Dr
Wilson Dr
Wattz Dr
S Union Ave
Madison Ave
Planz Rd
E Planz Rd
E White Ln
Monitor St
Pacheco Rd
Hughes Ln
Fairview Rd
Sparks St
Panama Ln
PROJECT SITE
S H St
SR 99
Cottonwood Rd
E Hosking Ave
McKee Rd
N
NOT TO SCALE
LEGEND
EXISTING ROAD
FUTURE ROAD

SITE PLAN
FIGURE 3

RUETTGERS & SCHULER CIVIL ENGINEERS

D. Roadway Descriptions

Cottonwood Road is designated as an arterial. It currently exists within the study area as a two-lane, north-south roadway, with graded shoulders and provides access to agricultural and low-density residential land uses throughout eastern Metropolitan Bakersfield.

Fairview Road is an east-west roadway located east of State Route 99 midway between Panama Lane and Pacheco Road. It is designated as a collector and provides access to residential land uses within the study area. Fairview Road currently exists as a two-lane roadway with graded shoulders adjacent to residential development.

Monitor Street is a two-lane, north-south roadway located midway between South H Street and South Union Avenue. It is designated as a collector and provides access to residential areas.

Pacheco Road is an east-west roadway that is designated as an arterial west of Old River Road and as a collector east of Old River Road. In the vicinity of the project, East Pacheco Road exists as a two-lane roadway with graded shoulders and provides access to residential, commercial, and agricultural areas, as well as a crossing over the Kern Island Canal.

Panama Lane is designated as an arterial. It extends east from State Route 43 near Interstate 5 through the southern Metropolitan Bakersfield area and provides access from agricultural, residential and commercial areas to north-south arterials and collectors and State Routes 43 and 99. In the vicinity of the project, Panama Lane exists as a two-lane facility at various stages of widening adjacent to development.

South H Street is a north-south arterial which extends from Taft Highway to Brundage Lane, and continues northward through downtown Bakersfield as H Street. It exists as a two-lane roadway in the vicinity of the project.

Union Avenue is designated as an arterial and was formerly a segment of State Route 99. South Union Avenue extends from State Route 99 to Brundage Lane and continues north to Columbus Street. In the project vicinity, South Union Avenue operates as a 4-lane divided roadway and provides access to residential and commercial land uses.

PROJECT TRIP GENERATION AND DESIGN HOUR VOLUMES

The trip generation and design hour volumes shown in Table 1 were calculated using the Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition. The ADT, AM and PM peak hour rates, and peak hour directional splits for ITE Land Use Code 520 (Elementary School) were used to estimate the project traffic.

Table 1
Project Trip Generation

General Information			Daily Trips		AM Peak Hour Trips			PM Peak Hour Trips		
ITE Code	Development Type	Variable	ADT RATE	ADT	Rate	In % Split/ Trips	Out % Split/ Trips	Rate	In % Split/ Trips	Out % Split/ Trips
520	Elementary School	1080 Students	eq	2116	0.67	54% 391	46% 333	0.34	45% 165	55% 202

TRIP DISTRIBUTION AND ASSIGNMENT

The project trip distribution in Table 2 represents the most logically traveled routes for traffic accessing the project. Project traffic distribution was estimated based on a review of the potential draw from existing and anticipated population growth within the region and the type of land use involved. These assumptions were used to distribute project traffic as shown in Figure 4.

Table 2
Project Trip Distribution

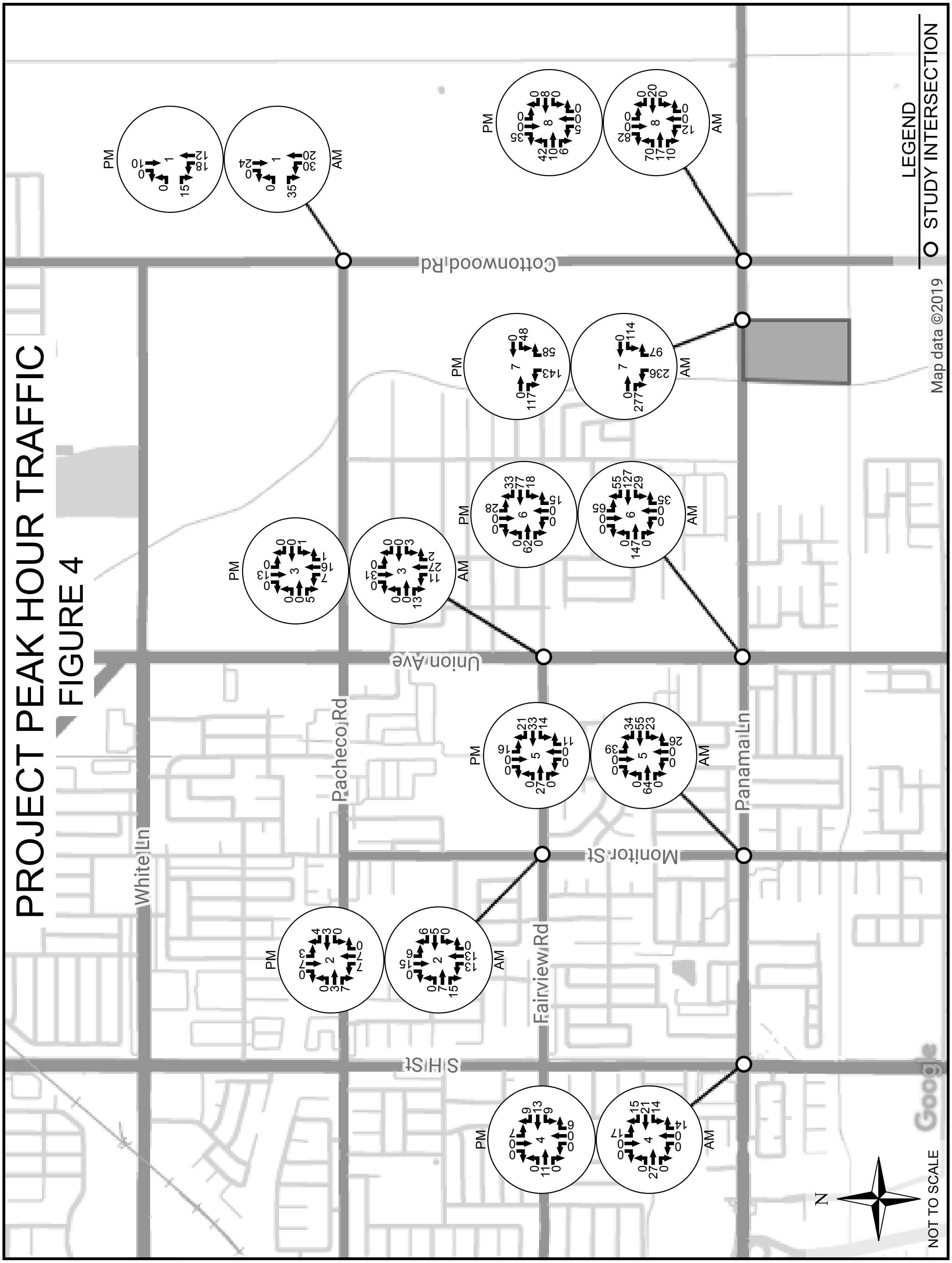
Direction	Percent	Primary Roadway
North	30%	Cottonwood Road
East	5%	Panama Lane
South	20%	Cottonwood Road
West	45%	Panama Lane

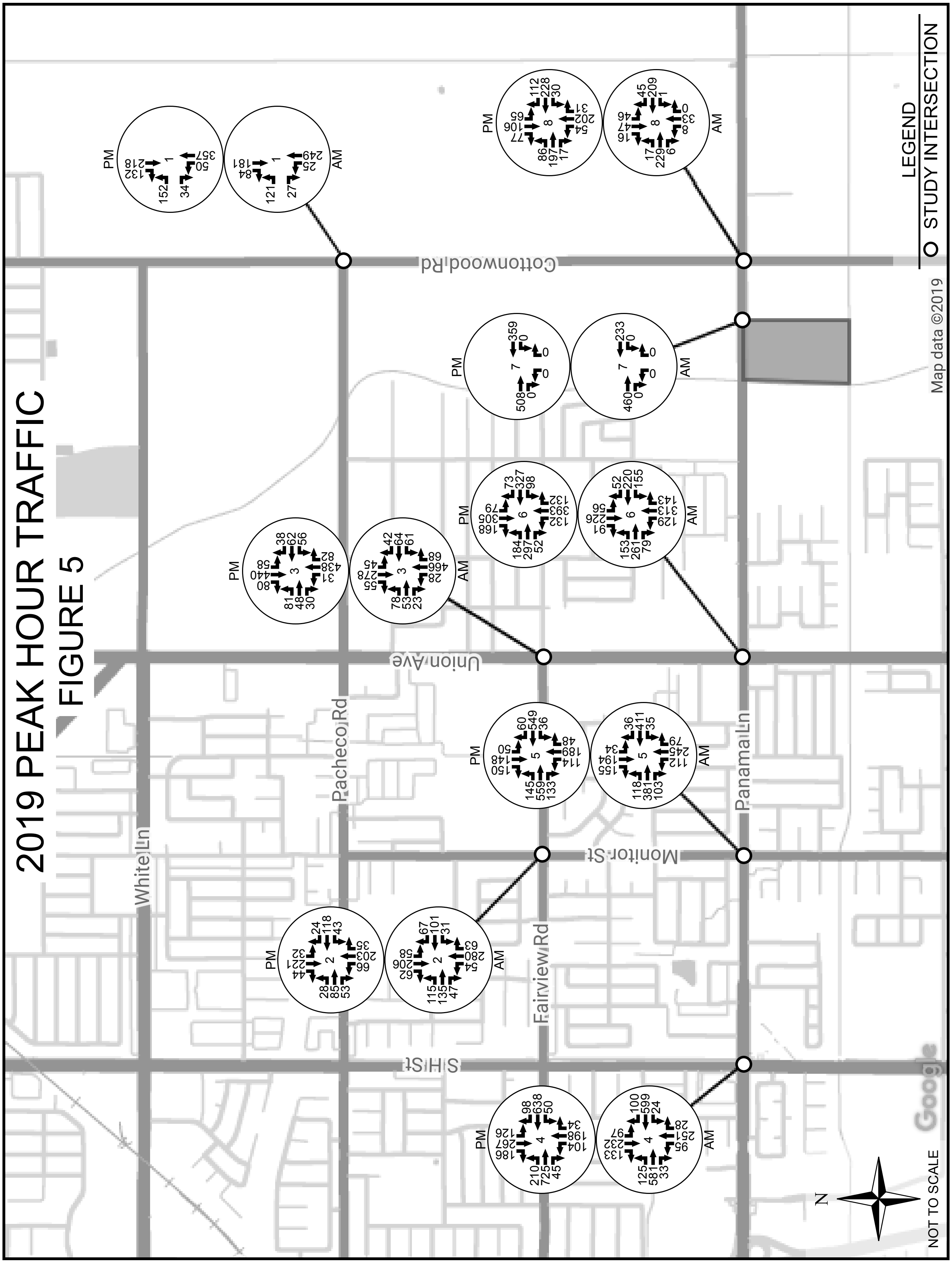
EXISTING AND FUTURE TRAFFIC

Existing peak hour turn movement volumes were field measured in May and October of 2018 at the study intersections for the hours of 7:30-8:30 AM and 3:00-4:00 PM in order to coincide with the school's peak hours of operation. Existing and existing plus project turn movement volumes are shown in Figures 5 and 6.

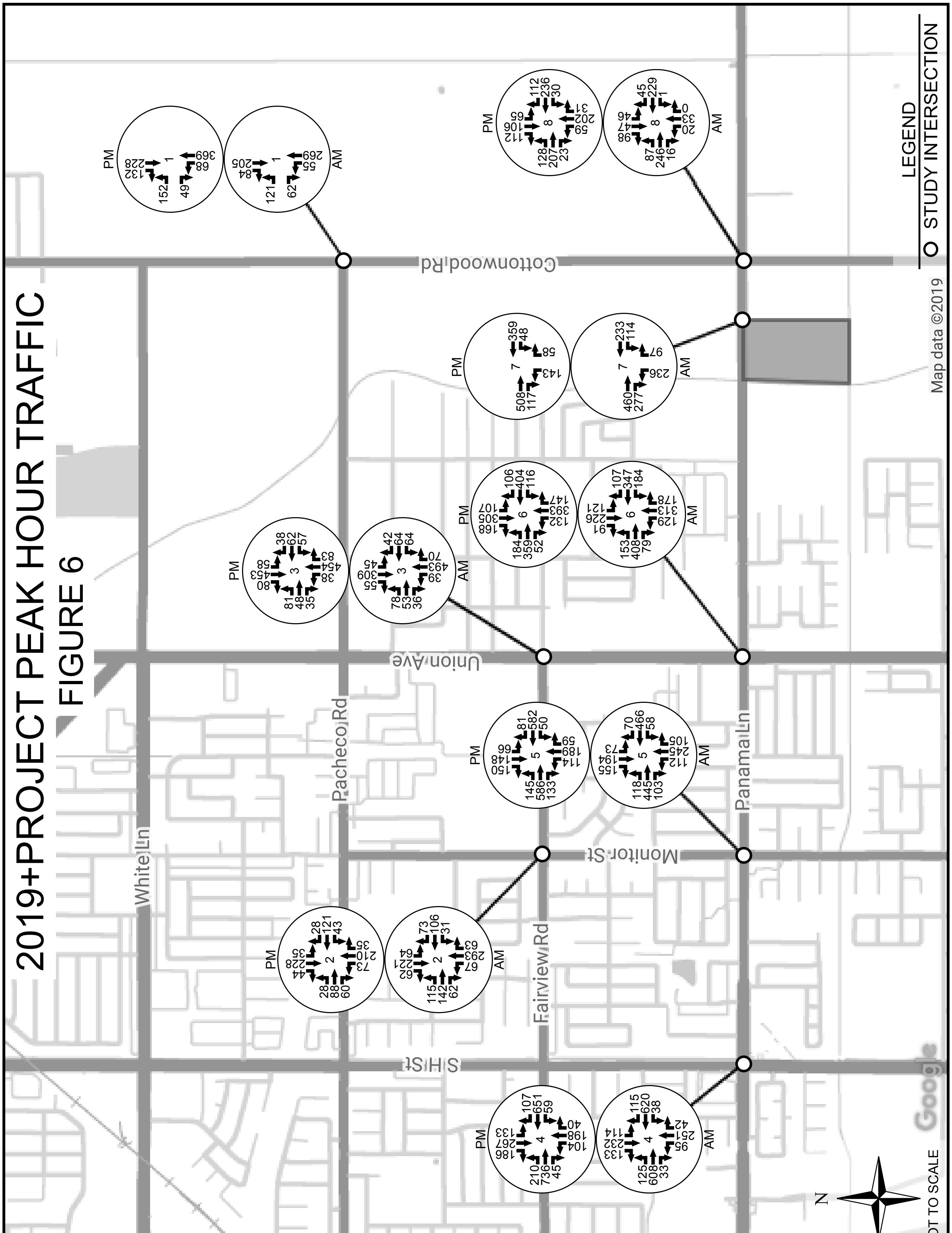
Annual growth rates of up to 3.0% were applied to existing traffic volumes to estimate future traffic volumes for the opening year and 2040 scenarios. These growth rates were estimated based on KernCOG 2040 traffic model data.

An investigation was also conducted for general plan amendments and zone changes for projects that would not yet be accounted for in the KernCOG traffic model. The only project that was found to interact with the roadway system in the study area was the Kern High School District's proposed high school on the northeast corner of Panama Lane and Cottonwood Road. Cumulative trip generation and distribution for the proposed high school was added to the future traffic volume estimates at the study intersections. Future peak hour and peak hour plus project volumes, which include cumulative traffic volumes, are shown in Figures 7 through 10.

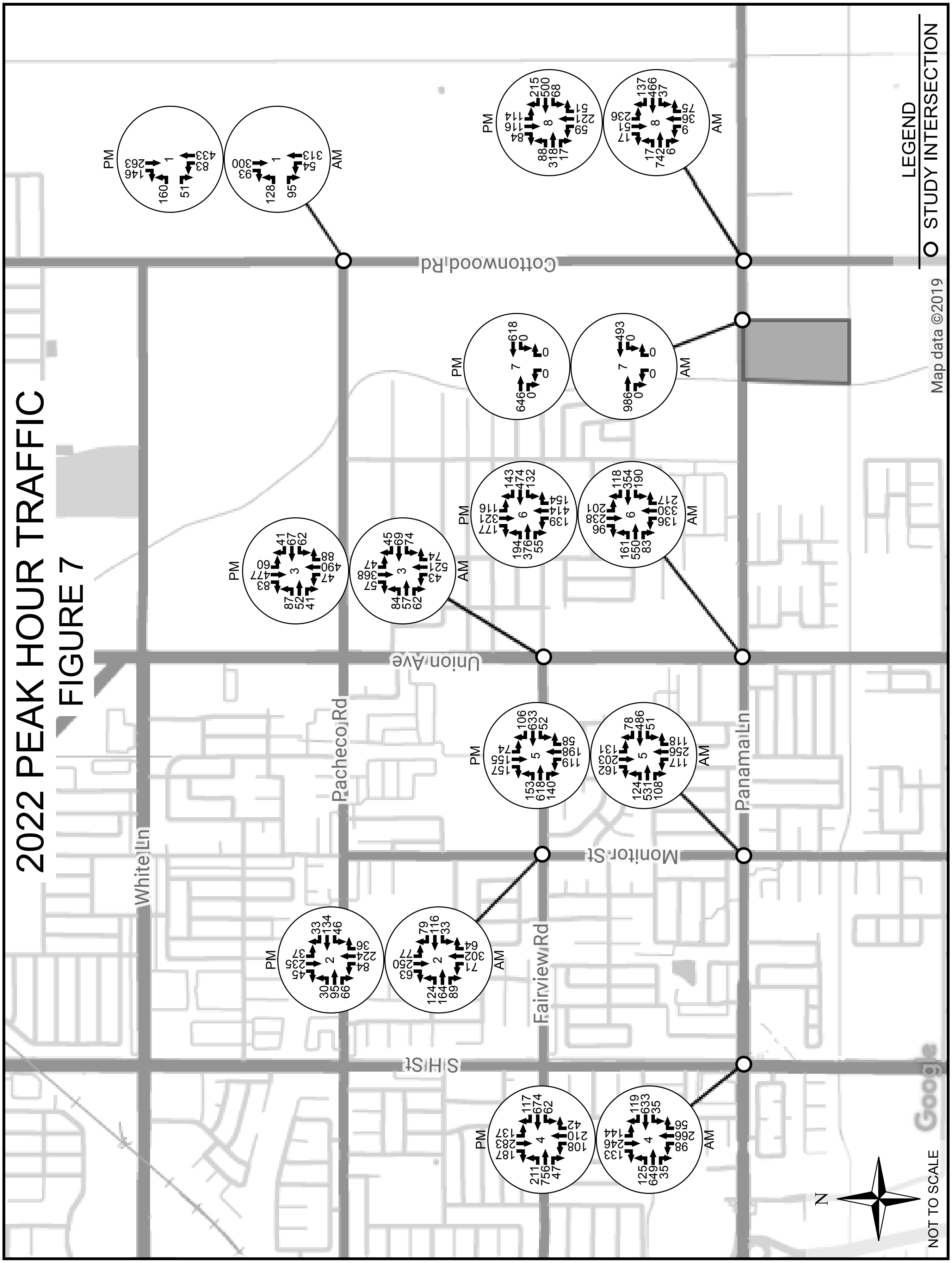

PROJECT PEAK HOUR TRAFFIC
FIGURE 4
LEGEND
STUDY INTERSECTION
Cottonwood Rd
Union Ave
Monitor St
S H St
White Ln
Pacheco Rd
Fairview Rd
Panama Ln
Map data ©2019
NOT TO SCALE
N

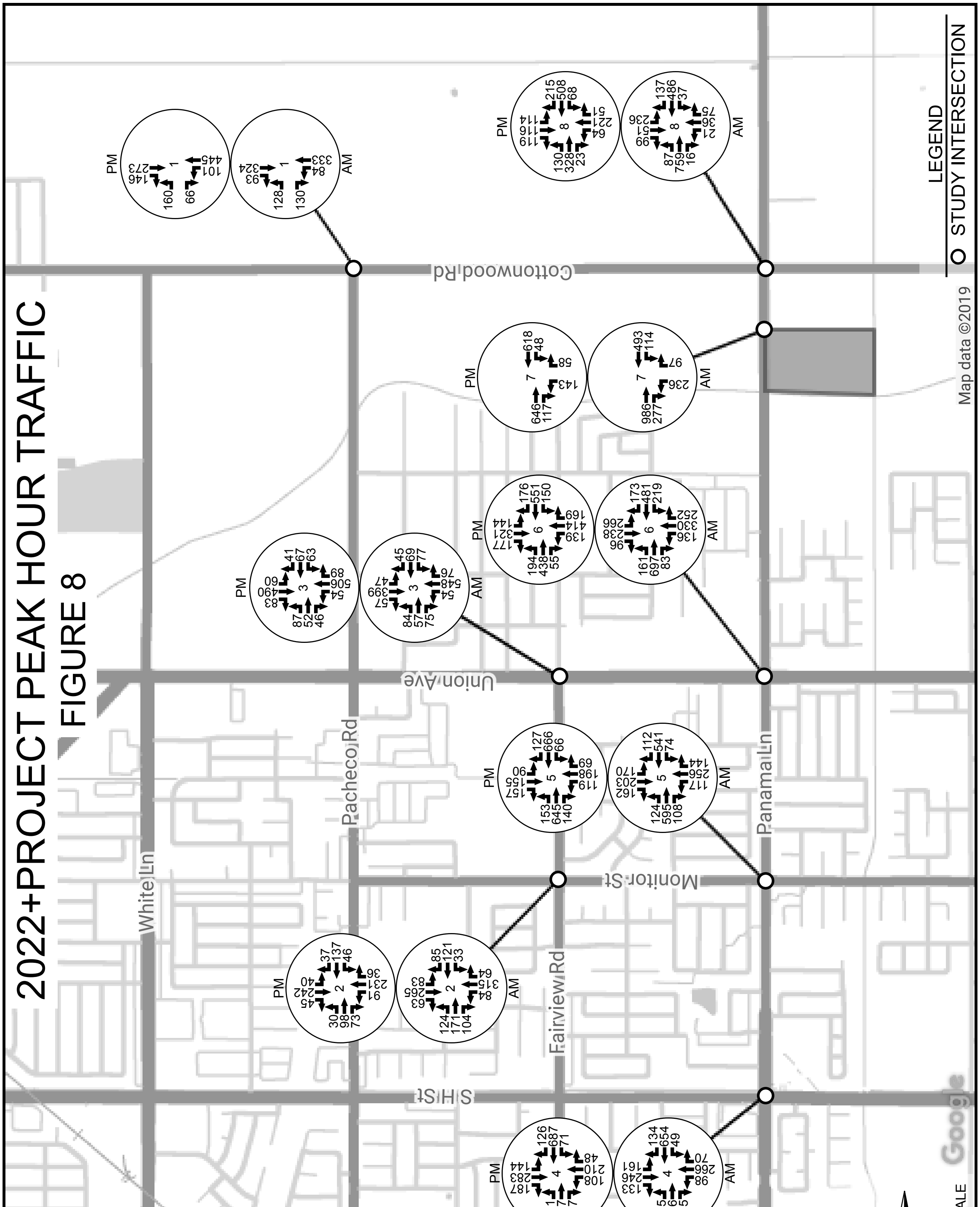


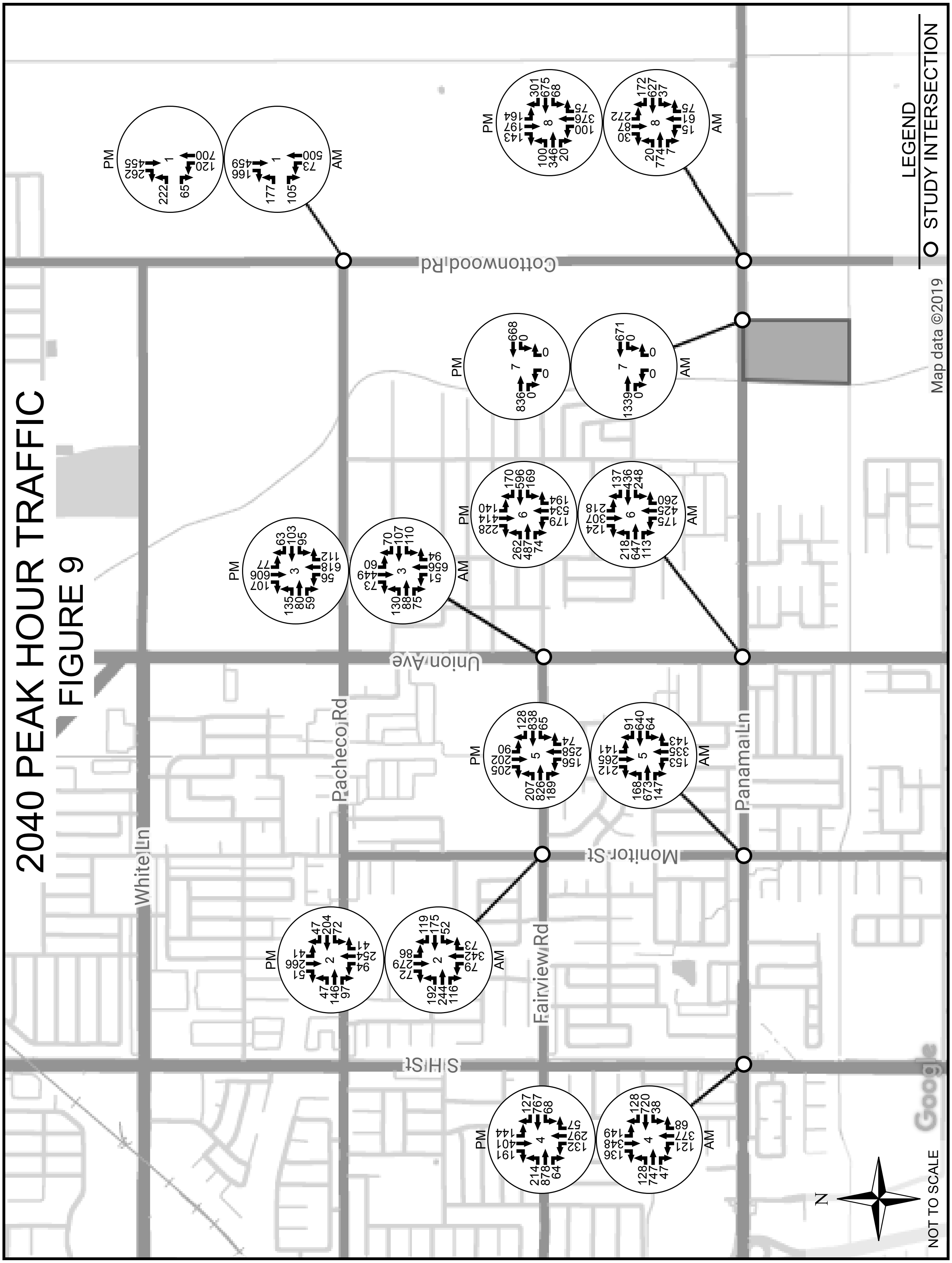
2019 PEAK HOUR TRAFFIC
FIGURE 5
White Ln
Pacheco Rd
Fairview Rd
Panama Ln
Union Ave
Cottonwood Rd
Monitor St
S H St
LEGEND
STUDY INTERSECTION
Map data ©2019
NOT TO SCALE
N
AM
PM

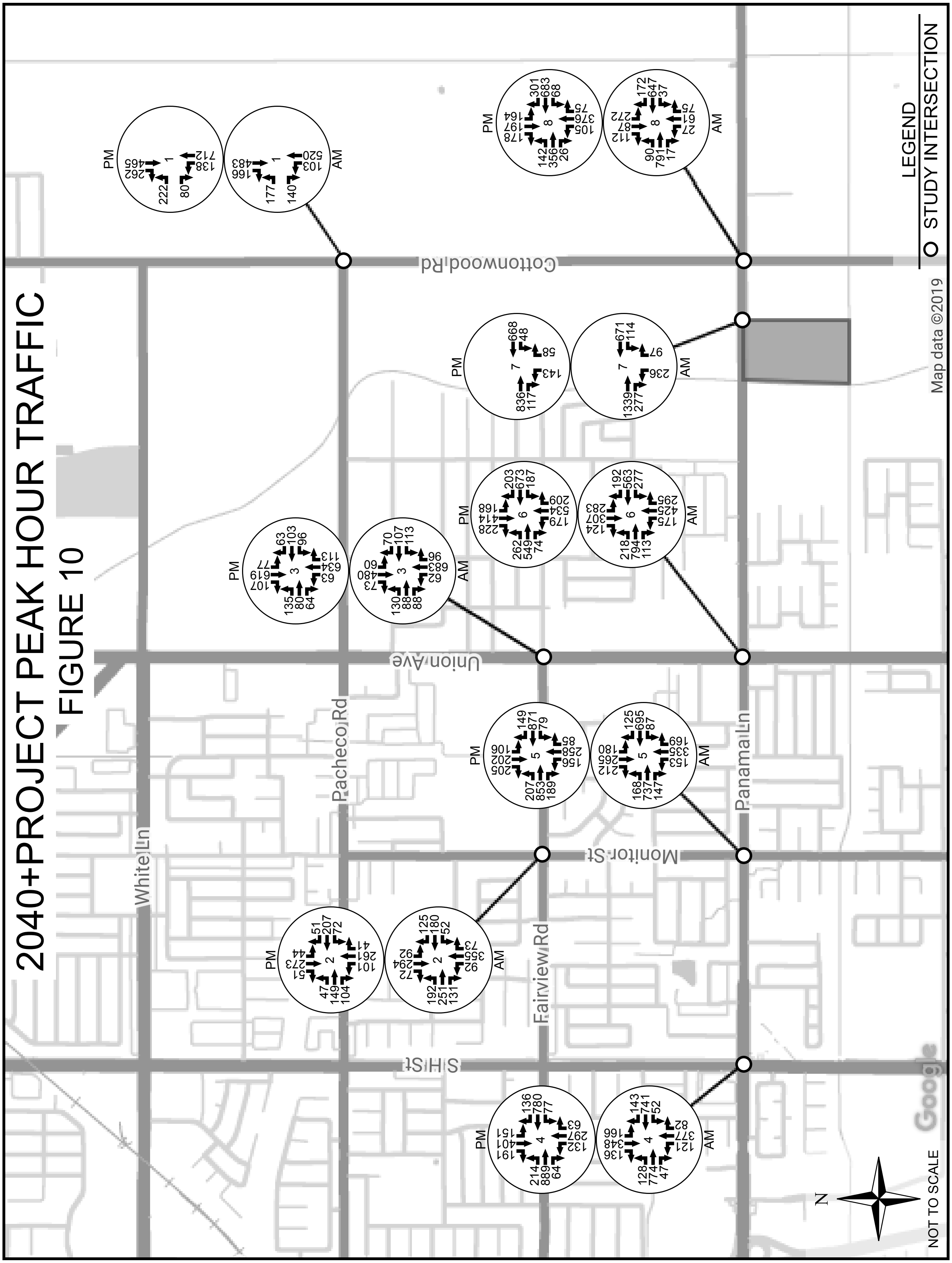


Ruettgers & Schuler Civil Engineers


2022 PEAK HOUR TRAFFIC
FIGURE 7
LEGEND
STUDY INTERSECTION
Cottonwood Rd
Union Ave
Monitor St
S H St
White Ln
Pacheco Rd
Fairview Rd
Panama Ln
AM
PM
Map data ©2019
NOT TO SCALE
N


2022+PROJECT PEAK HOUR TRAFFIC
FIGURE 8
LEGEND
STUDY INTERSECTION
NOT TO SCALE
N
Map data ©2019
Cottonwood Rd
Union Ave
Monitor St
S H St
White Ln
Pacheco Rd
Fairview Rd
Panama Ln
AM
PM


2040 PEAK HOUR TRAFFIC
FIGURE 9
LEGEND
STUDY INTERSECTION
Cottonwood Rd
Union Ave
Monitor St
S H St
White Ln
Pacheco Rd
Fairview Rd
Panama Ln
NOT TO SCALE
N
Map data ©2019



RUETTGERS & SCHULER CIVIL ENGINEERS

INTERSECTION ANALYSIS

A capacity analysis of the study intersections was conducted using Synchro 9 software from Trafficware. This software utilizes the 2010 capacity analysis methodology in the Transportation Research Board's Highway Capacity Manual. The analysis was performed for the following traffic scenarios:

- Existing (2019)
- Existing+Project (2019)
- Future Cumulative (2022)
- Future Cumulative+Project (2022)
- Future Cumulative (2040)
- Future Cumulative+Project (2040)

Criteria for intersection level of service (LOS) are shown in the tables below.

LEVEL OF SERVICE CRITERIA
UNSIGNALIZED INTERSECTION

Average Control Delay (sec/veh)	Level of Service	Expected Delay to Minor Street Traffic
≤ 10	A	Little or no delay
> 10 and ≤ 15	B	Short traffic delays
> 15 and ≤ 25	C	Average traffic delays
> 25 and ≤ 35	D	Long traffic delays
> 35 and ≤ 50	E	Very long traffic delays
> 50	F	Extreme delays

LEVEL OF SERVICE CRITERIA
SIGNALIZED INTERSECTIONS

Volume/Capacity	Control Delay (sec/veh)	Level of Service
< 0.60	≤ 10	A
0.61 - 0.70	> 10 and ≤ 20	B
0.71 - 0.80	> 20 and ≤ 35	C
0.81 - 0.90	> 35 and ≤ 55	D
0.91 - 1.00	> 55 and ≤ 80	E
> 1.0	> 80	F

Level of service for the study intersections is presented in Tables 3a and 3b. According to the County of Kern's Roads Department, the level of service goal for the roadways within the scope of this study is "C".

Table 3a
AM Intersection Level of Service

#	Intersection	Existing Control Type	2019	2019+ Project	2022[1]	2022[1]+ Project	2040[1]	2040[1]+ Project	2040[1]+ Project w/Mitigation[2]
1	Cottonwood Rd & Pacheco Rd	Stop - EB	C	C	C	E (39.5)	F (267.6)	F (>300)	B
2	Monitor St & Fairview Rd	Signal	C	C	C	C	D (35.9)	D (40.6)	C
3	Union Ave & Fairview Rd	Signal	C	C	C	C	C	C	-
4	S H St & Panama Ln	Signal	C	C	C	C	C	C	-
5	Monitor St & Panama Ln	Signal	C	C	C	C	D (35.4)	D (36.2)	C
6	Union Ave & Panama Ln	Signal	C	D (37.9)	D (53.6)	E (62.8)	E (61.3)	F (85.7)	C
7	Project Entrance[4] & Panama Ln	Signal	-[3]	C	-[3]	C	-[3]	C[4]	-
8	Cottonwood Rd & Panama Ln	AWSC	A	B	F (57.2)	F (63.3)	F (65.8)	F (68.4)	C

NOTE: (#) = Delay in seconds; AWSC = All Way Stop Control
[1]Includes cumulative traffic volumes from other projects.
[2]See Table 7 for mitigation details.
[3]Only studied with project.
[4]Analyzed with Panama Lane RTIF Phase IV improvements (addition of 1 EBT, 1 WBT).

Table 3b
PM Intersection Level of Service

#	Intersection	Control Type	2019	2019+ Proje ct	2022[1]	2022[1]+ Project	2040[1]	2040[1]+ Project	2040[1]+ Project w/Mitigation[2]
1	Cottonwood Rd & Pacheco Rd	Stop- EB	D (26.3)	D (31.8)	F (57.7)	F (83.1)	F (>300)	F (>300)	B
2	Monitor St & Fairview Rd	Signal	C	C	C	C	C	C	-
3	Union Ave & Fairview Rd	Signal	C	C	C	C	C	C	-
4	S H St & Panama Ln	Signal	C	C	C	C	D (35.8)	D (44.0)	C
5	Monitor St & Panama Ln	Signal	C	C	C	C	D (40.3)	D (46.1)	C
6	Union Ave & Panama Ln	Signal	D (39.6)	D (44.5)	D (49.0)	E (55.2)	F (93.1)	F (100.1)	C
7	Project Entrance & Panama Ln	Signal	-[3]	B	-[3]	C	-[3]	C[4]	-
8	Cottonwood Rd & Panama Ln	AWSC	C	E (41.9)	F (68.7)	F (72.3)	F (78.1)	F (78.1)	C

NOTE: (#) = Delay in seconds; AWSC = All Way Stop Control
[1]Includes cumulative traffic volumes from other projects.
[2]See Table 7 for mitigation details.
[3]Only studied with project.
[4]Analyzed with Panama Lane RTIF Phase IV improvements (addition of 1 EBT, 1 WBT).

TRAFFIC SIGNAL WARRANT ANALYSIS

Peak hour signal warrants were evaluated for each of the unsignalized intersections within the study based on the California Manual on Uniform Traffic Control Devices (MUTCD). Peak hour signal warrants assess delay to traffic on the minor street approaches when entering or crossing a major street. Signal warrant analysis results for AM and PM peak hours are shown in Tables 4a through 4d.

It is important to note that a signal warrant defines the minimum condition under which signalization of an intersection might be warranted. Meeting this threshold does not suggest traffic signals are required, but rather, that other traffic factors and conditions be considered in order to determine whether signals are truly justified.

It is also noted that signal warrants do not necessarily correlate with level of service. An intersection may satisfy a signal warrant condition and operate at or above an acceptable level of service, or operate below an acceptable level of service and not meet signal warrant criteria.

Table 4a

AM Traffic Signal Warrants - Existing

#	Intersection	2019			2019+Project		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
1	Cottonwood Rd at Pacheco Rd	539	148	NO	613	183	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1084	333	YES
8	Cottonwood Rd at Panama Ln	507	109	NO	624	191	YES

[1]Studied with projcet only.

Table 4b
AM Traffic Signal Warrants - Future

#	Intersection	2022 Cumulative			2022 Cumulative+Project			2040 Cumulative			2040 Cumulative+Project		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
1	Cottonwood Rd at Pacheco Rd	760	233	YES	834	258	YES	1198	282	YES	1272	317	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1870	333	YES	-[1]	-[1]	-[1]	2401	333	YES
8	Cottonwood Rd at Panama Ln	1405	304	YES	1522	386	YES	1637	389	YES	1754	471	YES

[1]Studied with projcet only.

Table 4c
PM Traffic Signal Warrants - Existing

#	Intersection	2019			2019+Project		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
1	Cottonwood Rd at Pacheco Rd	758	186	YES	798	201	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1032	201	YES
8	Cottonwood Rd at Panama Ln	670	287	YES	736	292	YES

[1]Studied with projcet only.

Table 4d
PM Traffic Signal Warrants - Future

#	Intersection	2022 Cumulative			2022 Cumulative+Project			2040 Cumulative			2040 Cumulative+Project		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
1	Cottonwood Rd at Pacheco Rd	926	211	YES	966	226	YES	1579	302	YES	1579	302	YES
7	Project Entrance at Panama Ln	-[1]	-[1]	-[1]	1429	201	YES	-[1]	-[1]	-[1]	1669	201	YES
8	Cottonwood Rd at Panama Ln	1206	331	YES	1272	349	YES	1576	556	YES	1576	556	YES

[1]Studied with projcet only.

ROADWAY ANALYSIS

The volume-to-capacity ratios shown in Table 5b were calculated for roadways with published ADT information and future projected traffic as shown in Table 5a.

A volume-to-capacity ratio (v/c) of greater than 0.80 corresponds to a LOS of less than C, as defined in the Highway Capacity Manual. Mitigation is required where project traffic reduces the LOS to below an acceptable level, or where the pre-existing condition of the roadway is below an acceptable level of service and degrades below the pre-existing LOS with the addition of the project.

Table 5a
Roadway ADT & Capacity

Street	2019[1]	Project ADT	Cum ADT	2022 ADT[2]	2022+ Project[2]	2040 ADT[2]	2040+ Project[2]	Existing Capacity	Mitigated Capacity
Fairview Rd: Monitor St to Union Ave	7435[2]	75	257	8078	8153	10850	10925	20000	-
Panama Ln: S H St to S Union Ave	22985[2]	802	1348	24820	25622	27966	28768	40000	-
Panama Ln: S Union Ave to Cottonwood Rd	8664[2]	1499	2557	11670	13169	14901	16400	15000	40000
Monitor St: Panama Ln to Fairview Rd	7392[2]	213	452	8007	8220	9066	9279	30000	-
S Union Ave: Panama Ln to Fairview Rd	16002[2]	352	688	17669	18021	24942	25294	20000	40000
Cottonwood Rd: Panama Ln to Pacheco Rd	7898[2]	444	945	9655	10099	16607	17051	15000	30000

[1]2019 data not available, traffic grown out from most recent year available.

[2]Cumulative traffic from other porjects included in all future volumes.

Table 5b
Roadway Level Of Service

Street	v/c(Ex) 2019	v/c 2019+Proj	v/c 2022	v/c 2022+Proj	v/c 2040	v/c 2040+Proj
Fairview Rd: Monitor St to Union Ave	0.37	0.38	0.40	0.41	0.54	-
Panama Ln: S H St to S Union Ave	0.57	0.59	0.62	0.64	0.70	-
Panama Ln: S Union Ave to Cottonwood Rd	0.58	0.68	0.78	**0.88**	**0.99**	0.41
Monitor St: Panama Ln to Fairview Rd	0.25	0.25	0.27	0.27	0.30	-
S Union Ave: Panama Ln to Fairview Rd	0.80	**0.82**	**0.88**	**0.90**	**1.25**	0.63
Cottonwood Rd: Panama Ln to Pacheco Rd	0.53	0.56	0.64	0.67	**1.11**	0.57

NOTE: Cumulative traffic from other projects included in all future volumes.

MITIGATION

Intersection and roadway improvements needed by the year 2040 to maintain or improve the operational level of service of the street system in the vicinity of the project is shown in Tables 6 and 7. The Regional Transportation Impact Fee (RTIF) Program is a fee imposed on new development and contains a Regional Transportation Facilities List and a Transportation Impact Fee Schedule. The Facilities List includes many of the facilities needed to maintain a Level of Service (LOS) C or better for new growth or to prevent the degradation of facilities which are currently operating below LOS C. The Fee Schedule sets forth the fees to be collected from new development to mitigate the need for the facilities.

Table 6
Future Intersection Improvements and Local Mitigation

#	Intersection	Total Improvements Required by 2040	Local Mitigation (Improvements not covered by RTIF or adjacent development)	Percent Share
1	Cottonwood Rd & Pacheco Rd	Signal; NBT, SBT	Signal	5.45%
2	Monitor St & Fairview Rd	Change NBT/R to 1 NBT, Add 1 NBR (Striping Only)	-	-
4	S H St & Panama Ln	Add 1 EBT	-	-
5	Monitor St & Panama Ln	Add 1 EBT, 1 WBT NOTE: Roadway has been widened to 6-lane arterial width but is currently striped for 4 lanes only. No widening is necessary, only striping for the addition of one lane in each direction.	-	-
6	Union Ave & Panama Ln	Add 1 EBL, 1 WBL, 1 NBL, 1 SBL Change WBT/R to 2 WBT, Add 1 WBR Change SBT/R to 2 SBT, Add 1 SBR	-	-
7	Project Entrance & Panama Ln	Add 1 EBT, 1 WBT	-	-
8	Cottonwood Rd & Panama Ln	Signal Change EBL/T/R to 2-EBL, 2-EBT, EBR Change WBL/T/R to 2-WBL, 2-WBT, WBR; Change NBL/T/R to 2-NBL, 2 NBT, NBR; Change SBL/T/R to 2-SBL, 2-SBT, SBR	-	-

Notes: NB = Northbound, SB = Southbound, L = Left-Turn Lane, WB = Westbound, T = Through Lane, EB = Eastbound, R = Right-Turn Lane

Table 7
Future Roadway Improvements and Local Mitigation

Roadway Segment	Total Improvements Required by 2040	Local Mitigation (Improvements not covered by RTIF or adjacent development)
Panama Ln: S. Union Ave to Cottonwood Rd	Add 2 Lanes	-
S Union Ave: Panama Ln to Fairview Rd	Add 2 Lanes	-
Cottonwood Rd: Panama Ln to Pacheco Rd	Add 2 Lanes	-

SUMMARY AND CONCLUSIONS

This study evaluated the potential traffic impact of a proposed GUSD elementary school located at the southeast corner of Panama Lane and Cottonwood Road.

Level of Service Analysis

With the exception of Cottonwood Road & Pacheco Road and Union Avenue & Panama Lane all other intersections operate with an acceptable level of service during peak hours in the existing year prior to the addition of project traffic.

With the addition of project traffic to the existing year, the intersection of Cottonwood Road & Panama Lane is anticipated to operate below an acceptable level of service. All other intersections continue to operate at an acceptable level of service through the future year 2022 and are anticipated to do so with the addition of project traffic.

By the future year 2040, it is anticipated that the intersections of Monitor Street & Fairview Road and S H Street & Panama Lane will operate below an acceptable level of service. All other intersections continue to operate at an acceptable level of service in the future year 2040 and are anticipated to do so with the addition of project traffic.

The remaining intersections are anticipated to operate at an acceptable level of service during the peak hour and are expected to continue to do so with the addition of project traffic in the future year.

Roadway Capacity

All roadway segments in the project scope currently operate at an acceptable level of service in the existing year. With the addition of project traffic, all roadway segments continue to operate at an acceptable level of service with the exception of S Union Avenue from Panama Lane to Fairview Road.

All roadway segments operating at an acceptable level of service in the future year 2022 continue to do so. With the addition of project traffic in the future year 2022, it is anticipated that the roadway segment of Panama Lane from S Union Avenue to Cottonwood Road will operate below an acceptable level of service.

In the future year 2040, it is anticipated that the roadway segment of Cottonwood Road from Panama Lane to Pacheco Road will operate below an acceptable level of service. All other roadway segments operating at an acceptable level of service in the future year 2040 will continue to do so with the addition of project traffic.

Conclusion

Based on the County of Kern's standards for determining whether project traffic has a significant impact on intersections and roadways, the mitigation measures identified in Tables 6 and 7 are anticipated to be needed in order to reduce the impacts for the listed facilities to less-than-significant levels in the year 2040.

REFERENCES

1. Annual Traffic Census, Kern COG
2. City of Bakersfield General Plan, approved 2010
3. Highway Capacity Manual, Special Report 209, Transportation Research Board
4. California Manual on Uniform Traffic Control Devices for Streets and Highways, 2014 Edition, Federal Highway Administration (FHA)
5. Trip Generation, 10th Edition, Institute of Transportation Engineers (ITE)

APPENDIX

LEVEL OF SERVICE

Intersection 1
Cottonwood Rd & Pacheco Rd

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	121	27	25	249	181	84
Future Vol, veh/h	121	27	25	249	181	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	132	29	27	271	197	91

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	567	247	288	0	-	0
Stage 1	242	-	-	-	-	-
Stage 2	325	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	485	792	1274	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	732	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	473	789	1269	-	-	-
Mov Cap-2 Maneuver	473	-	-	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	714	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1269	-	510	-	-
HCM Lane V/C Ratio	0.021	-	0.315	-	-
HCM Control Delay (s)	7.9	0	15.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	121	62	55	269	205	84
Future Vol, veh/h	121	62	55	269	205	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	132	67	60	292	223	91

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	680	273	314	0	-	0
Stage 1	268	-	-	-	-	-
Stage 2	412	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	417	766	1246	-	-	-
Stage 1	777	-	-	-	-	-
Stage 2	669	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	393	763	1241	-	-	-
Mov Cap-2 Maneuver	393	-	-	-	-	-
Stage 1	777	-	-	-	-	-
Stage 2	630	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.2	1.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1241	-	470	-	-
HCM Lane V/C Ratio	0.048	-	0.423	-	-
HCM Control Delay (s)	8	0	18.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	2.1	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	128	95	54	313	300	93
Future Vol, veh/h	128	95	54	313	300	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	139	103	59	340	326	101

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	835	382	427	0	-	0
Stage 1	377	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	338	665	1132	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	316	662	1127	-	-	-
Mov Cap-2 Maneuver	316	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	596	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.1	1.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1127	-	407	-	-
HCM Lane V/C Ratio	0.052	-	0.596	-	-
HCM Control Delay (s)	8.4	0	26.1	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	3.7	-	-

Intersection	
Int Delay, s/veh	10

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	128	130	84	333	324	93
Future Vol, veh/h	128	130	84	333	324	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	139	141	91	362	352	101

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	948	408	453	0	-	0
Stage 1	403	-	-	-	-	-
Stage 2	545	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	289	643	1108	-	-	-
Stage 1	675	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	259	640	1103	-	-	-
Mov Cap-2 Maneuver	259	-	-	-	-	-
Stage 1	675	-	-	-	-	-
Stage 2	521	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	39.5	1.7	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1103	-	370	-	-
HCM Lane V/C Ratio	0.083	-	0.758	-	-
HCM Control Delay (s)	8.6	0	39.5	-	-
HCM Lane LOS	A	A	E	-	-
HCM 95th %tile Q(veh)	0.3	-	6.1	-	-

Intersection	
Int Delay, s/veh	51.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	177	105	73	500	459	166
Future Vol, veh/h	177	105	73	500	459	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	192	114	79	543	499	180

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1291	594	679	0	-	0
Stage 1	589	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 180	505	913	-	-	-
Stage 1	554	-	-	-	-	-
Stage 2	491	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 158	503	909	-	-	-
Mov Cap-2 Maneuver	~ 158	-	-	-	-	-
Stage 1	554	-	-	-	-	-
Stage 2	430	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	267.6	1.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	909	-	212	-	-
HCM Lane V/C Ratio	0.087	-	1.446	-	-
HCM Control Delay (s)	9.3	0	267.6	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0.3	-	18.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Intersection	
Int Delay, s/veh	88.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	177	140	103	520	483	166
Future Vol, veh/h	177	140	103	520	483	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	192	152	112	565	525	180

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1404	620	705	0	-	0
Stage 1	615	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 154	488	893	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 126	486	889	-	-	-
Mov Cap-2 Maneuver	~ 126	-	-	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	366	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 441.7	1.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	889	-	187	-	-
HCM Lane V/C Ratio	0.126	-	1.843	-	-
HCM Control Delay (s)	9.6	0	$ 441.7	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0.4	-	24.9	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

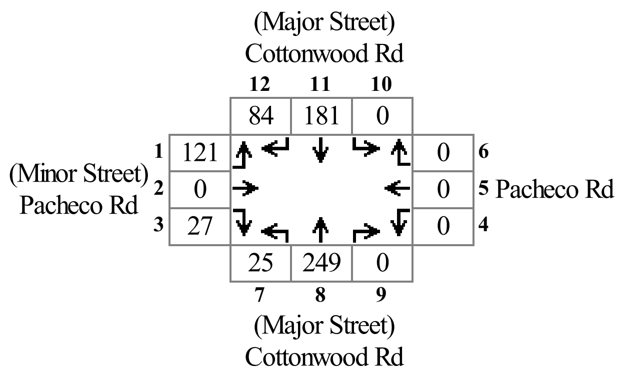
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	177	140	103	520	483	166		
Future Volume (veh/h)	177	140	103	520	483	166		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1716	1750	1750	1716	1716	1750		
Adj Flow Rate, veh/h	192	152	112	565	525	180		
Adj No. of Lanes	0	0	0	2	2	0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	2	2	2	2		
Cap, veh/h	231	183	267	1217	1272	434		
Arrive On Green	0.27	0.27	0.53	0.53	0.53	0.53		
Sat Flow, veh/h	864	684	297	2362	2473	815		
Grp Volume(v), veh/h	345	0	316	361	358	347		
Grp Sat Flow(s),veh/h/ln	1552	0	1098	1483	1630	1572		
Q Serve(g_s), s	9.4	0.0	2.9	6.8	5.9	6.0		
Cycle Q Clear(g_c), s	9.4	0.0	8.8	6.8	5.9	6.0		
Prop In Lane	0.56	0.44	0.35			0.52		
Lane Grp Cap(c), veh/h	414	0	694	791	869	838		
V/C Ratio(X)	0.83	0.00	0.46	0.46	0.41	0.41		
Avail Cap(c_a), veh/h	621	0	694	791	869	838		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.94	0.94	1.00	1.00		
Uniform Delay (d), s/veh	15.5	0.0	6.5	6.5	6.3	6.3		
Incr Delay (d2), s/veh	6.1	0.0	2.0	1.8	1.4	1.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.7	0.0	2.9	3.1	2.9	2.9		
LnGrp Delay(d),s/veh	21.6	0.0	8.5	8.3	7.7	7.8		
LnGrp LOS	C		A	A	A	A		
Approach Vol, veh/h	345			677	705			
Approach Delay, s/veh	21.6			8.4	7.8			
Approach LOS	C			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		28.5		16.5		28.5		
Change Period (Y+Rc), s		4.5		4.5		4.5		
Max Green Setting (Gmax), s		18.0		18.0		18.0		
Max Q Clear Time (g_c+I1), s		10.8		11.4		8.0		
Green Ext Time (p_c), s		3.5		0.7		4.4		
Intersection Summary								
HCM 2010 Ctrl Delay			10.8					
HCM 2010 LOS			B					

Notes

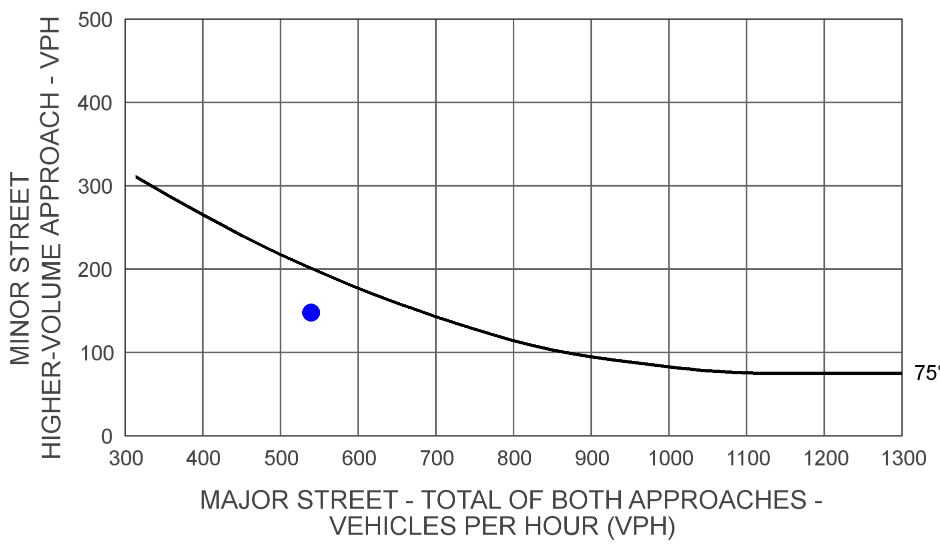
User approved volume balancing among the lanes for turning movement.

Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Existing
Intersection #: 1



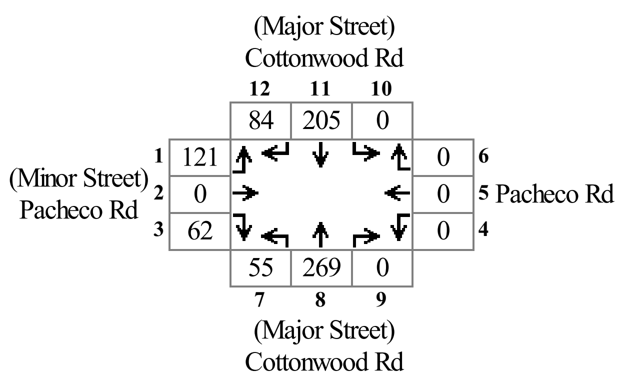
Major Total: 539
Minor High Volume: 148



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

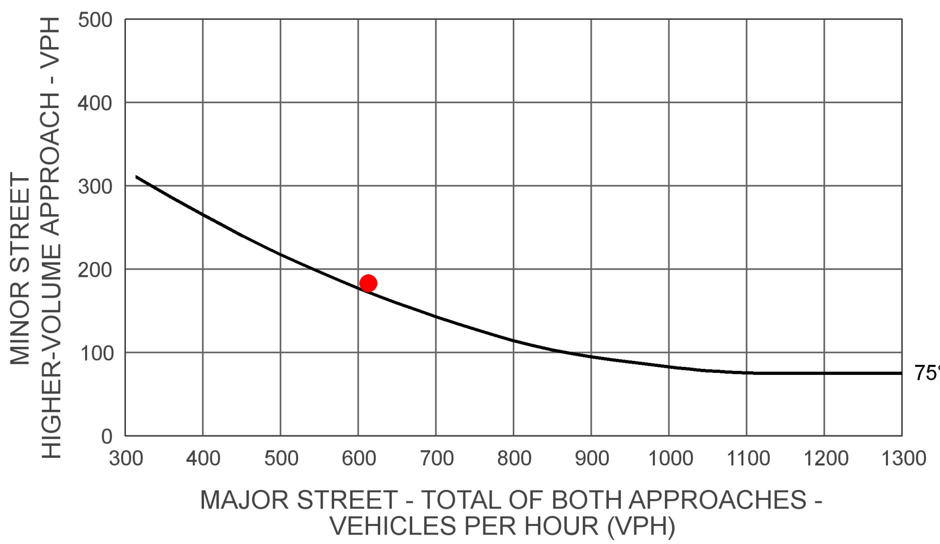
Scenario: AM Existing+Project

Intersection #: 1



Major Total: 613

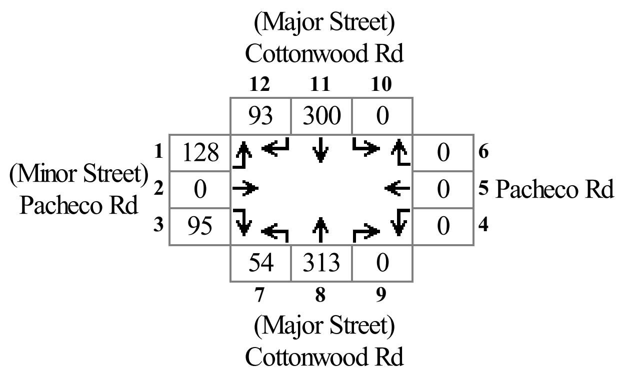
Minor High Volume: 183



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

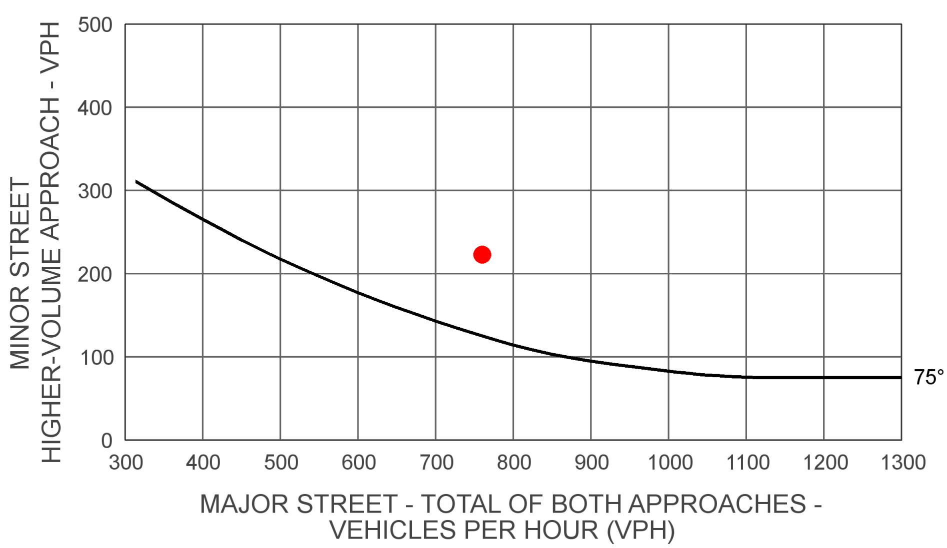
Scenario: AM Future

Intersection #: 1



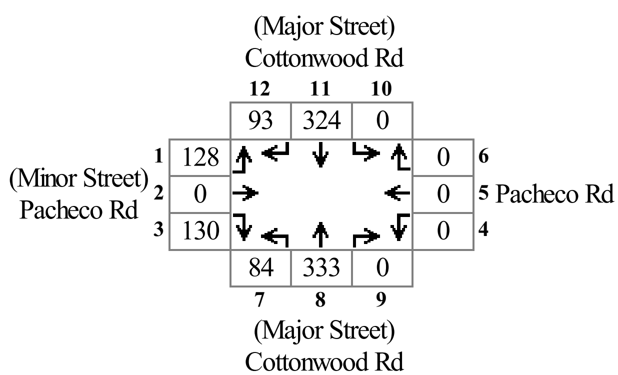
Major Total: 760

Minor High Volume: 223

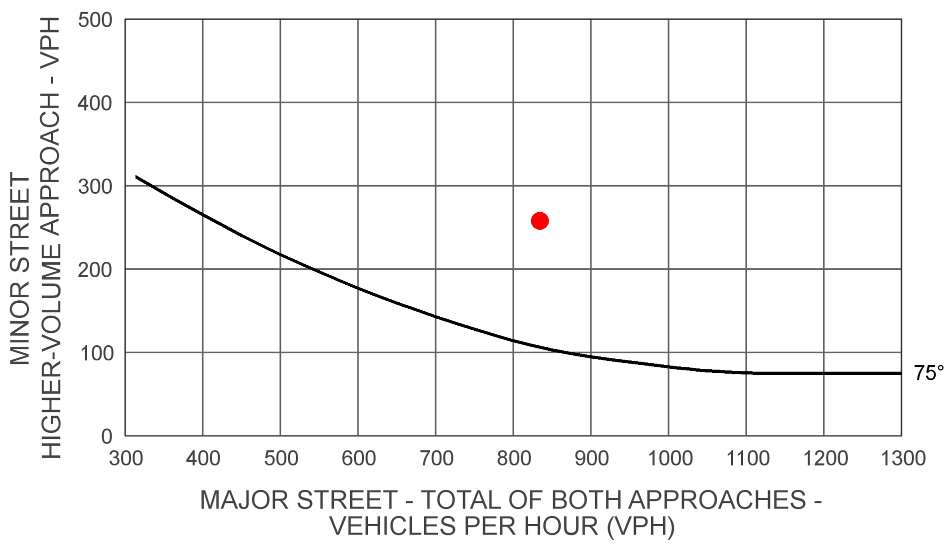


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: AM Future+Project
Intersection #: 1

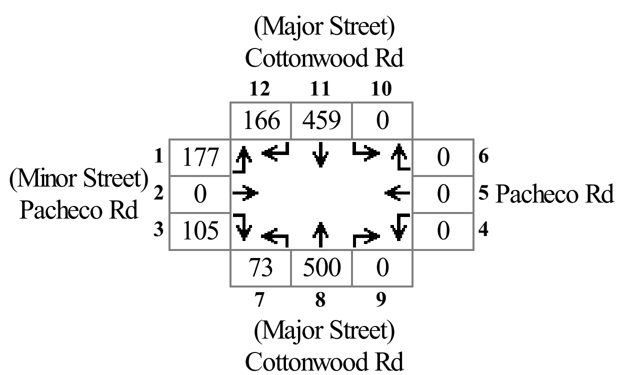


Major Total: 834
Minor High Volume: 258

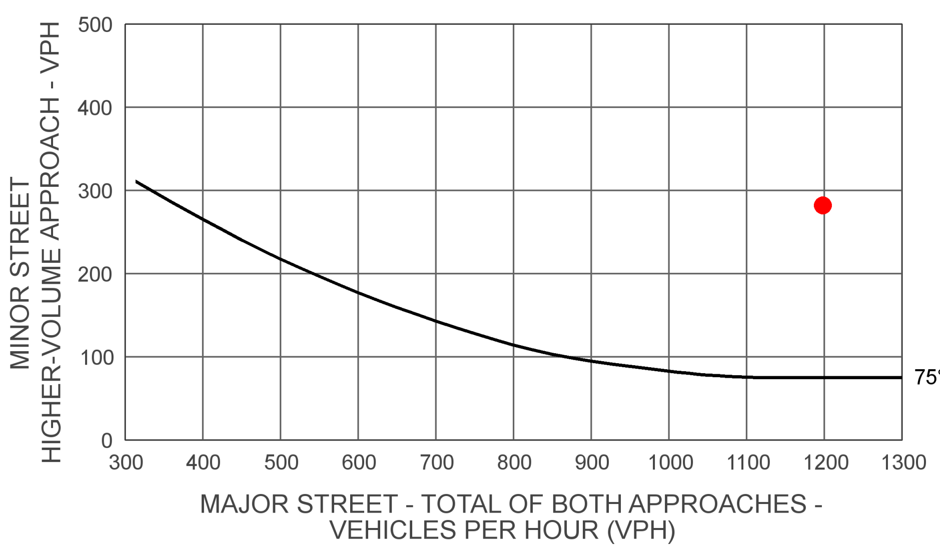


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: AM Future
Intersection #: 1

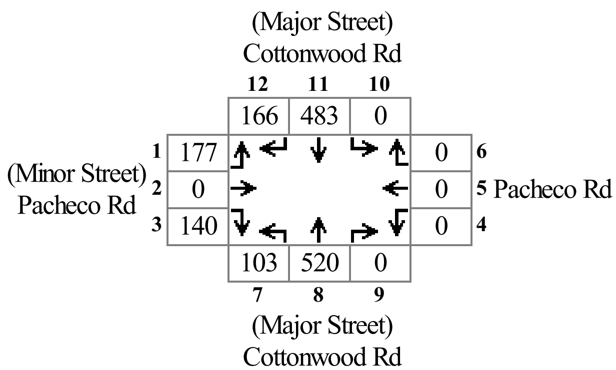


Major Total: 1198
Minor High Volume: 282

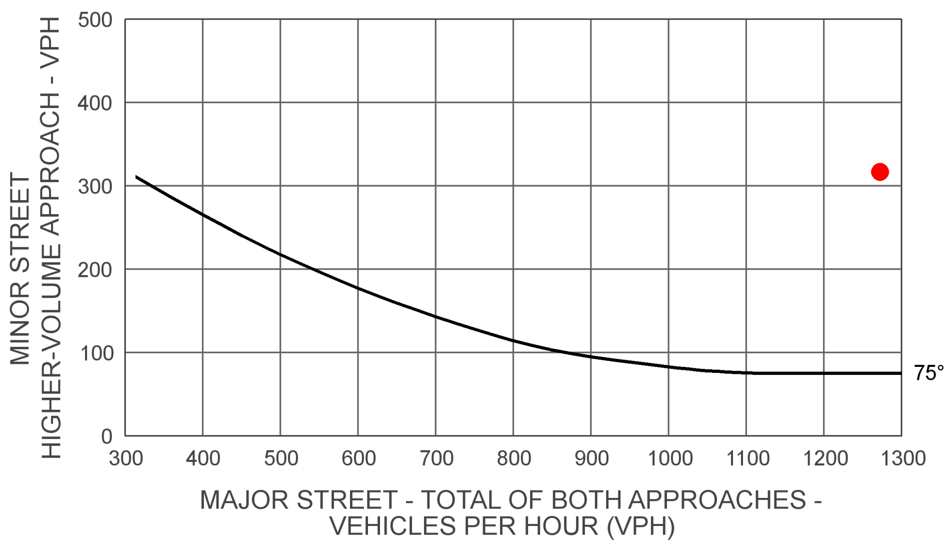


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: AM Future+Project
Intersection #: 1



Major Total: 1272
Minor High Volume: 317



Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	152	34	50	357	218	132
Future Vol, veh/h	152	34	50	357	218	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	37	54	388	237	143

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	806	314	380	0	-	0
Stage 1	309	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	351	726	1178	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	611	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	330	723	1173	-	-	-
Mov Cap-2 Maneuver	330	-	-	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	575	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.3	1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1173	-	366	-	-
HCM Lane V/C Ratio	0.046	-	0.552	-	-
HCM Control Delay (s)	8.2	0	26.3	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	3.2	-	-

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	152	49	68	369	228	132
Future Vol, veh/h	152	49	68	369	228	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	53	74	401	248	143

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	869	325	391	0	-	0
Stage 1	320	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	322	716	1168	-	-	-
Stage 1	736	-	-	-	-	-
Stage 2	579	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	296	713	1163	-	-	-
Mov Cap-2 Maneuver	296	-	-	-	-	-
Stage 1	736	-	-	-	-	-
Stage 2	532	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.8	1.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1163	-	345	-	-
HCM Lane V/C Ratio	0.064	-	0.633	-	-
HCM Control Delay (s)	8.3	0	31.8	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.2	-	4.1	-	-

Intersection	
Int Delay, s/veh	11.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	160	51	83	433	263	146
Future Vol, veh/h	160	51	83	433	263	146
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	174	55	90	471	286	159

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1016	370	445	0	-	0
Stage 1	365	-	-	-	-	-
Stage 2	651	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	264	676	1115	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	519	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	235	673	1110	-	-	-
Mov Cap-2 Maneuver	235	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	462	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	57.7	1.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1110	-	279	-	-
HCM Lane V/C Ratio	0.081	-	0.822	-	-
HCM Control Delay (s)	8.5	0	57.7	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0.3	-	6.7	-	-

Intersection	
Int Delay, s/veh	16.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	160	66	101	445	273	146
Future Vol, veh/h	160	66	101	445	273	146
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	174	72	110	484	297	159

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1079	381	455	0	-	0
Stage 1	376	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	242	666	1106	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	491	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	209	663	1101	-	-	-
Mov Cap-2 Maneuver	209	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	424	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	83.1	1.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1101	-	261	-	-
HCM Lane V/C Ratio	0.1	-	0.941	-	-
HCM Control Delay (s)	8.6	0	83.1	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0.3	-	8.7	-	-

Intersection	
Int Delay, s/veh	174.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	222	65	120	700	455	262
Future Vol, veh/h	222	65	120	700	455	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	241	71	130	761	495	285

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1659	642	779	0	-	0
Stage 1	637	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 107	474	838	-	-	-
Stage 1	527	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 78	472	835	-	-	-
Mov Cap-2 Maneuver	~ 78	-	-	-	-	-
Stage 1	527	-	-	-	-	-
Stage 2	253	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 1106.3	1.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	835	-	96	-	-
HCM Lane V/C Ratio	0.156	-	3.25	-	-
HCM Control Delay (s)	10.1	0	$ 1106.3	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.6	-	30.8	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	217.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	222	80	138	712	465	262
Future Vol, veh/h	222	80	138	712	465	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	241	87	150	774	505	285

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1722	653	790	0	-	0
Stage 1	648	-	-	-	-	-
Stage 2	1074	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 98	467	830	-	-	-
Stage 1	521	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 67	465	827	-	-	-
Mov Cap-2 Maneuver	~ 67	-	-	-	-	-
Stage 1	521	-	-	-	-	-
Stage 2	~ 224	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 1348.2	1.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	827	-	87	-	-
HCM Lane V/C Ratio	0.181	-	3.773	-	-
HCM Control Delay (s)	10.3	0	$ 1348.2	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.7	-	33.8	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	222	80	138	712	465	262		
Future Volume (veh/h)	222	80	138	712	465	262		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1716	1750	1750	1716	1716	1750		
Adj Flow Rate, veh/h	241	87	150	774	505	285		
Adj No. of Lanes	0	0	0	2	2	0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	2	2	2	2		
Cap, veh/h	293	106	259	1216	1102	620		
Arrive On Green	0.25	0.25	0.55	0.55	0.55	0.55		
Sat Flow, veh/h	1160	419	274	2300	2099	1132		
Grp Volume(v), veh/h	329	0	418	506	409	381		
Grp Sat Flow(s),veh/h/ln	1584	0	1013	1483	1630	1516		
Q Serve(g_s), s	8.8	0.0	8.2	10.5	6.8	6.8		
Cycle Q Clear(g_c), s	8.8	0.0	15.1	10.5	6.8	6.8		
Prop In Lane	0.73	0.26	0.36			0.75		
Lane Grp Cap(c), veh/h	400	0	663	812	892	830		
V/C Ratio(X)	0.82	0.00	0.63	0.62	0.46	0.46		
Avail Cap(c_a), veh/h	634	0	663	812	892	830		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	0.83	0.83	1.00	1.00		
Uniform Delay (d), s/veh	15.9	0.0	7.7	7.0	6.1	6.2		
Incr Delay (d2), s/veh	4.9	0.0	3.8	3.0	1.7	1.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.4	0.0	4.6	4.9	3.4	3.2		
LnGrp Delay(d),s/veh	20.7	0.0	11.5	10.0	7.8	8.0		
LnGrp LOS	C		B	A	A	A		
Approach Vol, veh/h	329			924	790			
Approach Delay, s/veh	20.7			10.7	7.9			
Approach LOS	C			B	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		29.1		15.9		29.1		
Change Period (Y+Rc), s		4.5		4.5		4.5		
Max Green Setting (Gmax), s		18.0		18.0		18.0		
Max Q Clear Time (g_c+I1), s		17.1		10.8		8.8		
Green Ext Time (p_c), s		0.7		0.7		5.2		
Intersection Summary								
HCM 2010 Ctrl Delay			11.2					
HCM 2010 LOS			B					

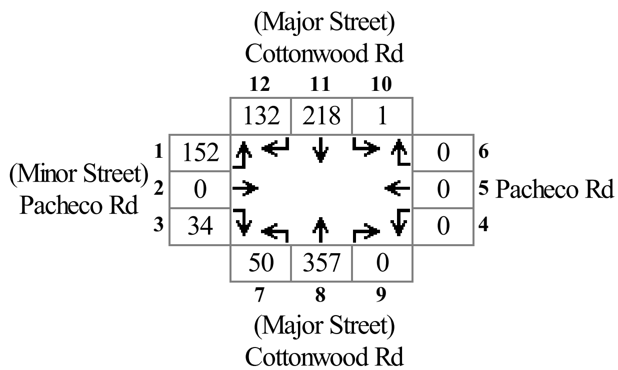
Notes

User approved volume balancing among the lanes for turning movement.

Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

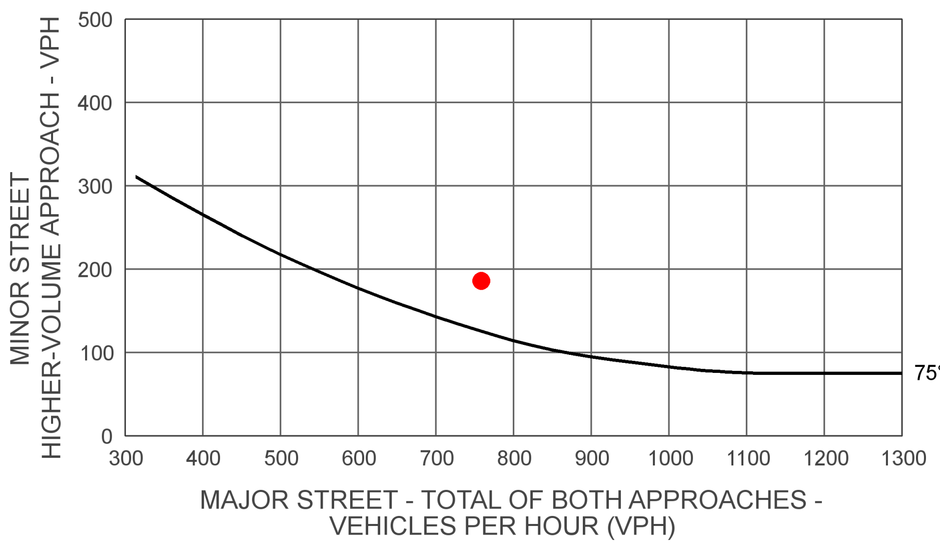
Scenario: PM Existing

Intersection #: 1



Major Total: 758

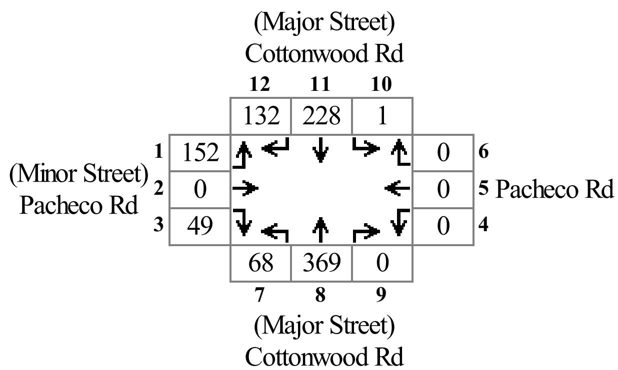
Minor High Volume: 186



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

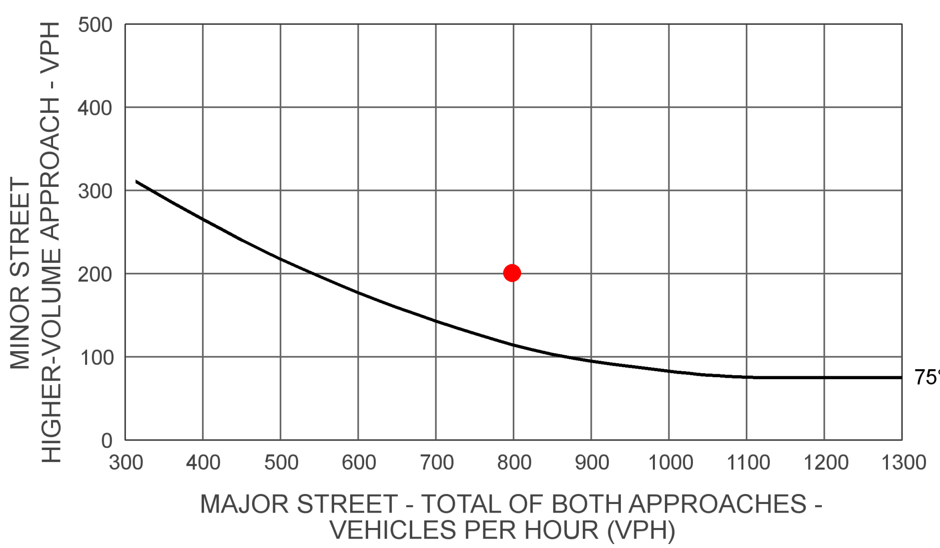
Scenario: PM Existing+Project

Intersection #: 1



Major Total: 798

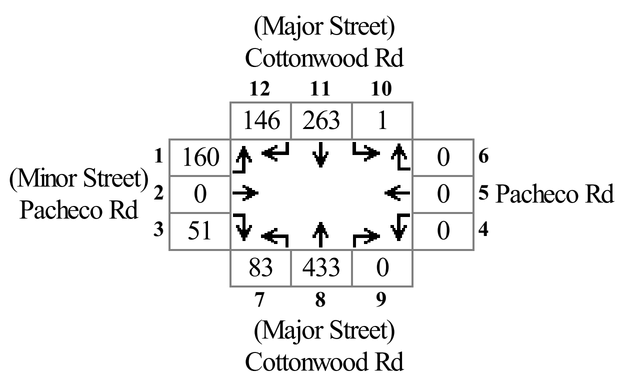
Minor High Volume: 201



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

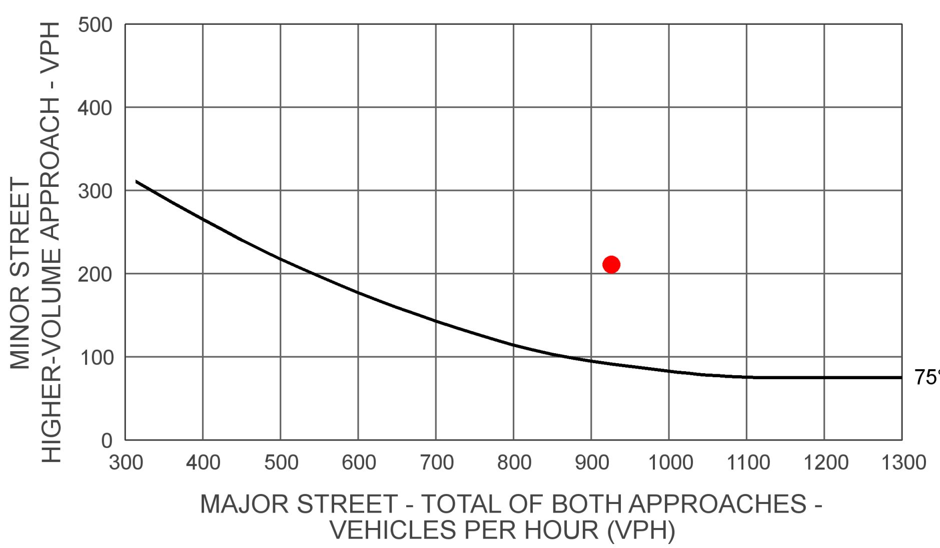
Scenario: PM Future

Intersection #: 1



Major Total: 926

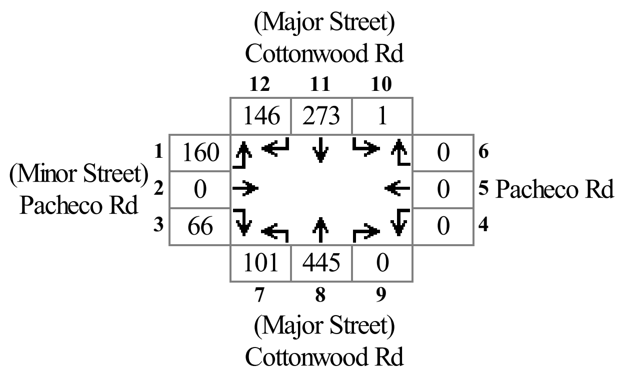
Minor High Volume: 211



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

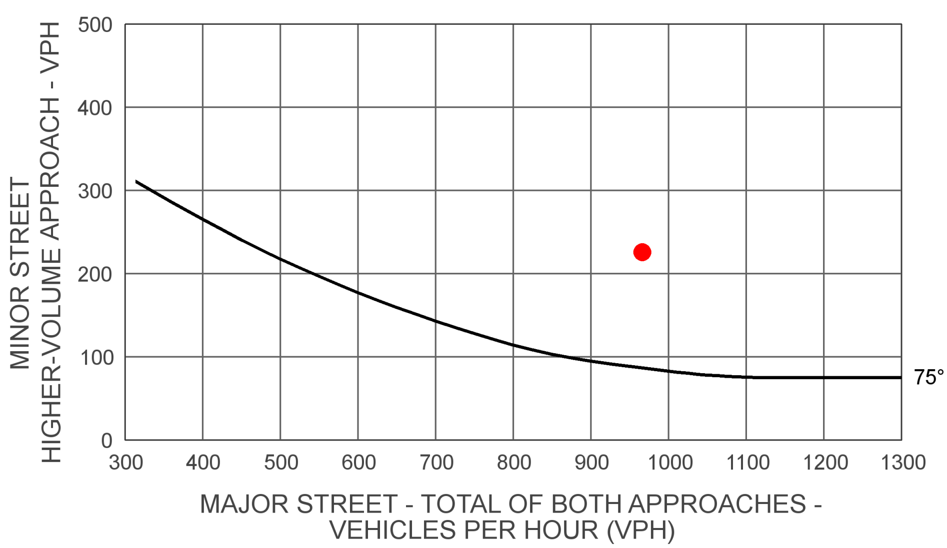
Scenario: PM Future+Project

Intersection #: 1



Major Total: 966

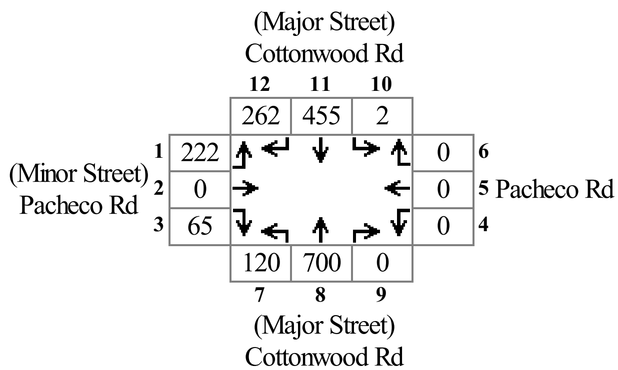
Minor High Volume: 226



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

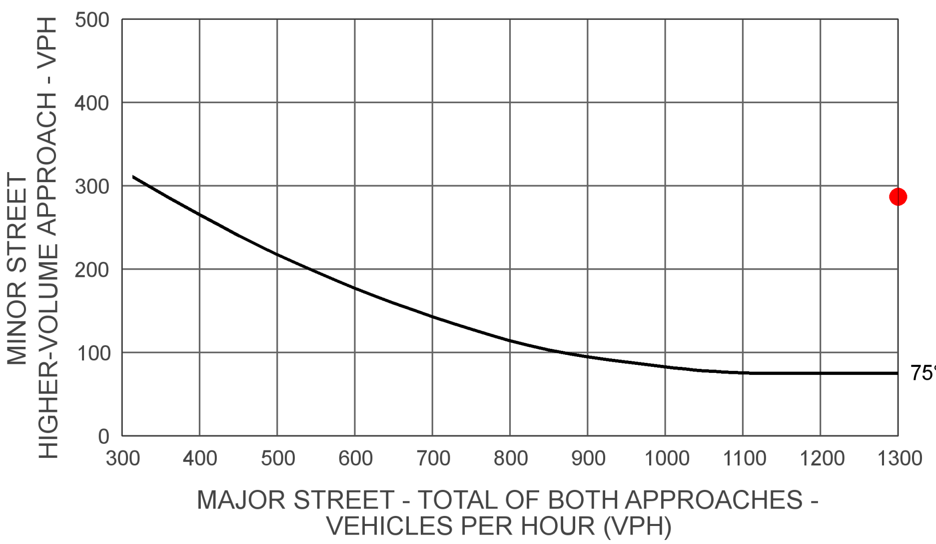
Scenario: PM Future

Intersection #: 1



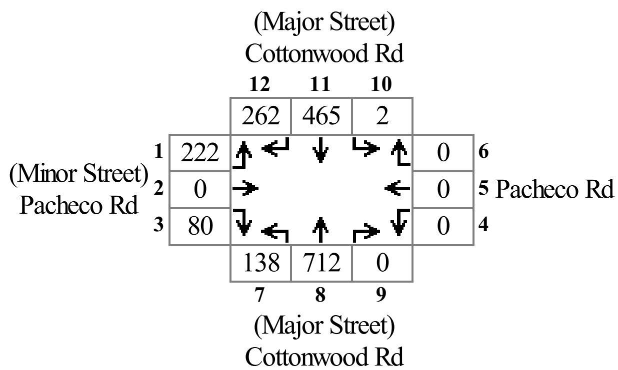
Major Total: 1539

Minor High Volume: 287

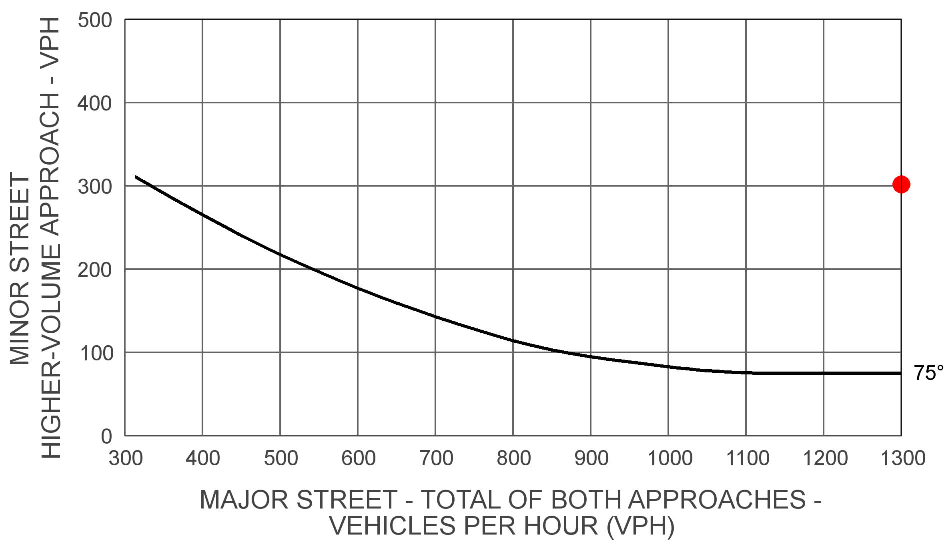


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Future+Project
Intersection #: 1



Major Total: 1579
Minor High Volume: 302



Intersection 2
Monitor St & Fairview Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	135	47	31	101	67	54	280	63	58	206	62
Future Volume (veh/h)	115	135	47	31	101	67	54	280	63	58	206	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	125	147	51	34	110	73	59	304	68	63	224	67
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	299	104	65	163	108	89	728	163	94	684	204
Arrive On Green	0.11	0.23	0.21	0.04	0.16	0.14	0.05	0.50	0.49	0.06	0.50	0.49
Sat Flow, veh/h	1634	1309	454	1634	1026	681	1634	1466	328	1634	1368	409
Grp Volume(v), veh/h	125	0	198	34	0	183	59	0	372	63	0	291
Grp Sat Flow(s),veh/h/ln	1634	0	1763	1634	0	1707	1634	0	1794	1634	0	1777
Q Serve(g_s), s	6.6	0.0	8.8	1.8	0.0	9.1	3.2	0.0	11.9	3.4	0.0	8.8
Cycle Q Clear(g_c), s	6.6	0.0	8.8	1.8	0.0	9.1	3.2	0.0	11.9	3.4	0.0	8.8
Prop In Lane	1.00		0.26	1.00		0.40	1.00		0.18	1.00		0.23
Lane Grp Cap(c), veh/h	178	0	402	65	0	272	89	0	891	94	0	888
V/C Ratio(X)	0.70	0.00	0.49	0.52	0.00	0.67	0.66	0.00	0.42	0.67	0.00	0.33
Avail Cap(c_a), veh/h	218	0	596	116	0	470	142	0	891	145	0	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.00	0.98	0.75	0.00	0.75	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.7	0.0	30.4	42.4	0.0	35.9	41.7	0.0	14.5	41.6	0.0	13.5
Incr Delay (d2), s/veh	7.5	0.0	0.9	6.2	0.0	2.8	6.1	0.0	1.1	7.9	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	4.4	0.9	0.0	4.5	1.6	0.0	6.2	1.7	0.0	4.5
LnGrp Delay(d),s/veh	46.2	0.0	31.3	48.6	0.0	38.7	47.9	0.0	15.5	49.4	0.0	14.5
LnGrp LOS	D		C	D		D	D		B	D		B
Approach Vol, veh/h		323			217			431			354	
Approach Delay, s/veh		37.0			40.3			20.0			20.7	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	48.7	7.6	24.5	8.9	49.0	13.8	18.3
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	7.1	28.3	5.1	29.1	6.9	28.5	10.7	23.5
Max Q Clear Time (g_c+I1), s	5.4	13.9	3.8	10.8	5.2	10.8	8.6	11.1
Green Ext Time (p_c), s	0.0	2.3	0.0	1.1	0.0	2.5	0.3	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	27.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	142	62	31	106	73	67	293	63	64	221	62
Future Volume (veh/h)	115	142	62	31	106	73	67	293	63	64	221	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	125	154	67	34	115	79	73	318	68	70	240	67
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	281	122	62	161	111	106	753	161	102	706	197
Arrive On Green	0.11	0.23	0.22	0.04	0.16	0.15	0.06	0.51	0.50	0.06	0.51	0.50
Sat Flow, veh/h	1634	1217	530	1634	1011	694	1634	1480	317	1634	1393	389
Grp Volume(v), veh/h	125	0	221	34	0	194	73	0	386	70	0	307
Grp Sat Flow(s),veh/h/ln	1634	0	1747	1634	0	1705	1634	0	1797	1634	0	1782
Q Serve(g_s), s	7.4	0.0	11.2	2.0	0.0	10.8	4.4	0.0	13.5	4.2	0.0	10.3
Cycle Q Clear(g_c), s	7.4	0.0	11.2	2.0	0.0	10.8	4.4	0.0	13.5	4.2	0.0	10.3
Prop In Lane	1.00		0.30	1.00		0.41	1.00		0.18	1.00		0.22
Lane Grp Cap(c), veh/h	178	0	403	62	0	272	106	0	915	102	0	903
V/C Ratio(X)	0.70	0.00	0.55	0.55	0.00	0.71	0.69	0.00	0.42	0.69	0.00	0.34
Avail Cap(c_a), veh/h	245	0	582	109	0	426	175	0	915	183	0	903
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.00	0.98	0.84	0.00	0.84	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.0	0.0	34.1	47.3	0.0	40.1	45.8	0.0	15.4	45.9	0.0	14.8
Incr Delay (d2), s/veh	5.3	0.0	1.2	7.3	0.0	3.4	6.6	0.0	1.2	7.8	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	5.5	1.1	0.0	5.3	2.2	0.0	7.0	2.1	0.0	5.3
LnGrp Delay(d),s/veh	48.3	0.0	35.2	54.6	0.0	43.5	52.4	0.0	16.6	53.8	0.0	15.8
LnGrp LOS	D		D	D		D	D		B	D		B
Approach Vol, veh/h		346			228			459			377	
Approach Delay, s/veh		39.9			45.2			22.3			22.8	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	54.9	7.8	27.1	10.5	54.7	14.9	19.9
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	10.3	31.9	5.4	32.0	9.8	32.4	13.7	23.7
Max Q Clear Time (g_c+I1), s	6.2	15.5	4.0	13.2	6.4	12.3	9.4	12.8
Green Ext Time (p_c), s	0.1	2.6	0.0	1.2	0.0	2.7	0.5	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	164	89	33	116	79	71	302	64	77	250	63
Future Volume (veh/h)	124	164	89	33	116	79	71	302	64	77	250	63
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	135	178	97	36	126	86	77	328	70	84	272	68
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	189	279	152	67	176	120	112	679	145	120	664	166
Arrive On Green	0.12	0.25	0.23	0.04	0.17	0.16	0.07	0.46	0.45	0.07	0.46	0.45
Sat Flow, veh/h	1634	1120	610	1634	1014	692	1634	1481	316	1634	1430	358
Grp Volume(v), veh/h	135	0	275	36	0	212	77	0	398	84	0	340
Grp Sat Flow(s),veh/h/ln	1634	0	1730	1634	0	1707	1634	0	1797	1634	0	1788
Q Serve(g_s), s	7.2	0.0	12.8	1.9	0.0	10.6	4.1	0.0	13.9	4.5	0.0	11.4
Cycle Q Clear(g_c), s	7.2	0.0	12.8	1.9	0.0	10.6	4.1	0.0	13.9	4.5	0.0	11.4
Prop In Lane	1.00		0.35	1.00		0.41	1.00		0.18	1.00		0.20
Lane Grp Cap(c), veh/h	189	0	431	67	0	297	112	0	824	120	0	830
V/C Ratio(X)	0.71	0.00	0.64	0.54	0.00	0.71	0.69	0.00	0.48	0.70	0.00	0.41
Avail Cap(c_a), veh/h	218	0	584	116	0	470	142	0	824	145	0	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.71	0.00	0.71	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.4	0.0	30.4	42.3	0.0	35.3	41.0	0.0	17.0	40.7	0.0	16.0
Incr Delay (d2), s/veh	9.0	0.0	1.6	6.5	0.0	3.1	6.9	0.0	1.4	10.8	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	6.3	1.0	0.0	5.2	2.1	0.0	7.2	2.4	0.0	5.9
LnGrp Delay(d),s/veh	47.3	0.0	32.0	48.8	0.0	38.4	47.9	0.0	18.4	51.6	0.0	17.5
LnGrp LOS	D		C	D		D	D		B	D		B
Approach Vol, veh/h		410			248			475			424	
Approach Delay, s/veh		37.0			39.9			23.2			24.3	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	45.3	7.7	26.4	10.2	45.8	14.4	19.7
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	7.1	28.3	5.1	29.1	6.9	28.5	10.7	23.5
Max Q Clear Time (g_c+I1), s	6.5	15.9	3.9	14.8	6.1	13.4	9.2	12.6
Green Ext Time (p_c), s	0.0	2.5	0.0	1.3	0.0	2.7	0.3	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	171	104	33	121	85	84	315	64	83	265	63
Future Volume (veh/h)	124	171	104	33	121	85	84	315	64	83	265	63
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	135	186	113	36	132	92	91	342	70	90	288	68
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	269	164	64	175	122	127	704	144	126	683	161
Arrive On Green	0.12	0.25	0.24	0.04	0.17	0.16	0.08	0.47	0.46	0.08	0.47	0.46
Sat Flow, veh/h	1634	1071	651	1634	1005	700	1634	1493	306	1634	1449	342
Grp Volume(v), veh/h	135	0	299	36	0	224	91	0	412	90	0	356
Grp Sat Flow(s),veh/h/ln	1634	0	1722	1634	0	1705	1634	0	1799	1634	0	1791
Q Serve(g_s), s	8.0	0.0	15.8	2.2	0.0	12.5	5.4	0.0	15.7	5.4	0.0	13.1
Cycle Q Clear(g_c), s	8.0	0.0	15.8	2.2	0.0	12.5	5.4	0.0	15.7	5.4	0.0	13.1
Prop In Lane	1.00		0.38	1.00		0.41	1.00		0.17	1.00		0.19
Lane Grp Cap(c), veh/h	190	0	433	64	0	298	127	0	849	126	0	844
V/C Ratio(X)	0.71	0.00	0.69	0.56	0.00	0.75	0.72	0.00	0.49	0.71	0.00	0.42
Avail Cap(c_a), veh/h	245	0	573	109	0	426	175	0	849	183	0	844
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.96	0.00	0.96	0.82	0.00	0.82	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.6	0.0	34.1	47.2	0.0	39.5	45.0	0.0	18.2	45.1	0.0	17.5
Incr Delay (d2), s/veh	6.5	0.0	2.3	7.2	0.0	4.4	6.9	0.0	1.6	7.3	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	7.8	1.1	0.0	6.2	2.7	0.0	8.2	2.7	0.0	6.8
LnGrp Delay(d),s/veh	49.1	0.0	36.4	54.3	0.0	43.9	51.9	0.0	19.8	52.3	0.0	19.1
LnGrp LOS	D		D	D		D	D		B	D		B
Approach Vol, veh/h		434			260			503			446	
Approach Delay, s/veh		40.3			45.3			25.6			25.8	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	51.2	7.9	29.2	11.8	51.1	15.6	21.5
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	10.3	31.9	5.4	32.0	9.8	32.4	13.7	23.7
Max Q Clear Time (g_c+I1), s	7.4	17.7	4.2	17.8	7.4	15.1	10.0	14.5
Green Ext Time (p_c), s	0.1	2.8	0.0	1.4	0.0	2.9	0.6	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	32.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	244	116	52	175	119	79	342	73	86	279	72
Future Volume (veh/h)	192	244	116	52	175	119	79	342	73	86	279	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	209	265	126	57	190	129	86	372	79	93	303	78
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	399	190	94	240	163	123	518	110	127	500	129
Arrive On Green	0.16	0.34	0.32	0.06	0.24	0.22	0.08	0.35	0.34	0.08	0.35	0.34
Sat Flow, veh/h	1634	1181	562	1634	1019	692	1634	1481	315	1634	1420	365
Grp Volume(v), veh/h	209	0	391	57	0	319	86	0	451	93	0	381
Grp Sat Flow(s),veh/h/ln	1634	0	1743	1634	0	1712	1634	0	1796	1634	0	1785
Q Serve(g_s), s	11.1	0.0	17.3	3.1	0.0	15.8	4.6	0.0	19.6	5.0	0.0	15.8
Cycle Q Clear(g_c), s	11.1	0.0	17.3	3.1	0.0	15.8	4.6	0.0	19.6	5.0	0.0	15.8
Prop In Lane	1.00		0.32	1.00		0.40	1.00		0.18	1.00		0.20
Lane Grp Cap(c), veh/h	261	0	588	94	0	402	123	0	628	127	0	629
V/C Ratio(X)	0.80	0.00	0.66	0.61	0.00	0.79	0.70	0.00	0.72	0.73	0.00	0.61
Avail Cap(c_a), veh/h	272	0	622	140	0	472	138	0	628	127	0	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.95	0.00	0.95	0.65	0.00	0.65	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.4	0.0	25.7	41.4	0.0	32.6	40.6	0.0	25.5	40.6	0.0	24.1
Incr Delay (d2), s/veh	15.1	0.0	2.5	5.9	0.0	7.4	8.6	0.0	4.6	19.3	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	8.7	1.5	0.0	8.3	2.4	0.0	10.5	2.9	0.0	8.5
LnGrp Delay(d),s/veh	51.6	0.0	28.2	47.3	0.0	40.0	49.2	0.0	30.0	59.9	0.0	28.4
LnGrp LOS	D		C	D		D	D		C	E		C
Approach Vol, veh/h		600			376			537			474	
Approach Delay, s/veh		36.3			41.1			33.1			34.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.5	9.2	34.4	10.8	35.7	18.4	25.2
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	6.1	26.3	6.4	30.8	6.7	25.7	13.7	23.5
Max Q Clear Time (g_c+I1), s	7.0	21.6	5.1	19.3	6.6	17.8	13.1	17.8
Green Ext Time (p_c), s	0.0	1.6	0.0	2.3	0.0	2.3	0.0	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	251	131	52	180	125	92	355	73	92	294	72
Future Volume (veh/h)	192	251	131	52	180	125	92	355	73	92	294	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	209	273	142	57	196	136	100	386	79	100	320	78
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	366	191	92	229	159	137	566	116	138	545	133
Arrive On Green	0.15	0.32	0.31	0.06	0.23	0.21	0.08	0.38	0.37	0.08	0.38	0.37
Sat Flow, veh/h	1634	1142	594	1634	1009	700	1634	1493	306	1634	1438	351
Grp Volume(v), veh/h	209	0	415	57	0	332	100	0	465	100	0	398
Grp Sat Flow(s),veh/h/ln	1634	0	1736	1634	0	1709	1634	0	1798	1634	0	1789
Q Serve(g_s), s	12.5	0.0	21.4	3.4	0.0	18.7	6.0	0.0	21.7	6.0	0.0	17.8
Cycle Q Clear(g_c), s	12.5	0.0	21.4	3.4	0.0	18.7	6.0	0.0	21.7	6.0	0.0	17.8
Prop In Lane	1.00		0.34	1.00		0.41	1.00		0.17	1.00		0.20
Lane Grp Cap(c), veh/h	245	0	557	92	0	388	137	0	681	138	0	678
V/C Ratio(X)	0.85	0.00	0.75	0.62	0.00	0.86	0.73	0.00	0.68	0.73	0.00	0.59
Avail Cap(c_a), veh/h	245	0	578	109	0	427	175	0	681	183	0	678
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.95	0.00	0.95	0.67	0.00	0.67	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.4	0.0	30.5	46.2	0.0	37.4	44.7	0.0	26.1	44.7	0.0	24.9
Incr Delay (d2), s/veh	24.0	0.0	5.0	7.3	0.0	14.0	7.2	0.0	3.7	9.3	0.0	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	11.1	1.7	0.0	10.3	3.0	0.0	11.4	3.1	0.0	9.4
LnGrp Delay(d),s/veh	65.4	0.0	35.6	53.5	0.0	51.4	51.9	0.0	29.8	54.0	0.0	28.6
LnGrp LOS	E		D	D		D	D		C	D		C
Approach Vol, veh/h		624			389			565			498	
Approach Delay, s/veh		45.6			51.7			33.7			33.7	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	41.9	9.6	36.1	12.4	41.9	19.0	26.7
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	10.3	31.9	5.4	32.0	9.8	32.4	13.7	23.7
Max Q Clear Time (g_c+I1), s	8.0	23.7	5.4	23.4	8.0	19.8	14.5	20.7
Green Ext Time (p_c), s	0.1	2.4	0.0	1.7	0.0	3.0	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	40.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	251	131	52	180	125	92	355	73	92	294	72
Future Volume (veh/h)	192	251	131	52	180	125	92	355	73	92	294	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	209	273	142	57	196	136	100	386	79	100	320	78
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	323	168	94	301	206	138	603	123	127	572	139
Arrive On Green	0.18	0.28	0.27	0.06	0.16	0.15	0.08	0.40	0.39	0.08	0.40	0.39
Sat Flow, veh/h	1634	1141	594	1634	1863	1398	1634	1493	306	1634	1438	351
Grp Volume(v), veh/h	209	0	415	57	196	136	100	0	465	100	0	398
Grp Sat Flow(s),veh/h/ln	1634	0	1735	1634	1863	1398	1634	0	1798	1634	0	1789
Q Serve(g_s), s	10.8	0.0	20.3	3.1	8.9	6.5	5.4	0.0	18.7	5.4	0.0	15.5
Cycle Q Clear(g_c), s	10.8	0.0	20.3	3.1	8.9	6.5	5.4	0.0	18.7	5.4	0.0	15.5
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.17	1.00		0.20
Lane Grp Cap(c), veh/h	292	0	491	94	301	206	138	0	727	127	0	711
V/C Ratio(X)	0.72	0.00	0.85	0.61	0.65	0.66	0.72	0.00	0.64	0.79	0.00	0.56
Avail Cap(c_a), veh/h	320	0	644	163	513	365	138	0	727	127	0	711
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.94	0.94	0.81	0.00	0.81	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.8	0.0	30.6	41.4	35.3	22.5	40.2	0.0	21.6	40.8	0.0	21.1
Incr Delay (d2), s/veh	6.8	0.0	8.0	5.9	2.2	3.4	14.1	0.0	3.5	27.1	0.0	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	10.8	1.5	4.8	2.7	3.0	0.0	10.0	3.4	0.0	8.3
LnGrp Delay(d),s/veh	41.6	0.0	38.6	47.3	37.6	25.9	54.3	0.0	25.1	67.9	0.0	24.3
LnGrp LOS	D		D	D	D	C	D		C	E		C
Approach Vol, veh/h		624			389			565			498	
Approach Delay, s/veh		39.6			34.9			30.3			33.0	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	40.4	9.2	29.5	11.6	39.8	20.1	18.6
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	6.1	23.7	7.7	32.1	6.7	23.1	16.3	23.5
Max Q Clear Time (g_c+I1), s	7.4	20.7	5.1	22.3	7.4	17.5	12.8	10.9
Green Ext Time (p_c), s	0.0	1.2	0.0	1.9	0.0	1.9	0.9	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	34.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	85	53	43	118	24	66	203	35	32	221	44
Future Volume (veh/h)	28	85	53	43	118	24	66	203	35	32	221	44
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	30	92	58	47	128	26	72	221	38	35	240	48
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	83	149	94	81	209	42	106	918	158	59	850	170
Arrive On Green	0.05	0.14	0.13	0.05	0.14	0.13	0.06	0.60	0.59	0.04	0.57	0.56
Sat Flow, veh/h	1634	1048	661	1634	1490	303	1634	1543	265	1634	1500	300
Grp Volume(v), veh/h	30	0	150	47	0	154	72	0	259	35	0	288
Grp Sat Flow(s),veh/h/ln	1634	0	1710	1634	0	1792	1634	0	1808	1634	0	1800
Q Serve(g_s), s	1.6	0.0	7.4	2.5	0.0	7.3	3.9	0.0	6.1	1.9	0.0	7.5
Cycle Q Clear(g_c), s	1.6	0.0	7.4	2.5	0.0	7.3	3.9	0.0	6.1	1.9	0.0	7.5
Prop In Lane	1.00		0.39	1.00		0.17	1.00		0.15	1.00		0.17
Lane Grp Cap(c), veh/h	83	0	242	81	0	252	106	0	1076	59	0	1020
V/C Ratio(X)	0.36	0.00	0.62	0.58	0.00	0.61	0.68	0.00	0.24	0.60	0.00	0.28
Avail Cap(c_a), veh/h	218	0	577	116	0	494	142	0	1076	145	0	1020
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.00	0.98	0.67	0.00	0.67	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.3	0.0	36.6	41.9	0.0	36.5	41.2	0.0	8.6	42.7	0.0	10.1
Incr Delay (d2), s/veh	2.6	0.0	2.6	6.4	0.0	2.4	5.4	0.0	0.4	9.3	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	3.7	1.3	0.0	3.8	1.9	0.0	3.1	1.0	0.0	3.9
LnGrp Delay(d),s/veh	43.9	0.0	39.1	48.3	0.0	38.9	46.6	0.0	9.0	52.1	0.0	10.8
LnGrp LOS	D		D	D		D	D		A	D		B
Approach Vol, veh/h		180			201			331			323	
Approach Delay, s/veh		39.9			41.1			17.2			15.3	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	57.6	8.4	16.8	9.8	55.0	8.6	16.6
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	7.1	28.3	5.1	29.1	6.9	28.5	10.7	23.5
Max Q Clear Time (g_c+I1), s	3.9	8.1	4.5	9.4	5.9	9.5	3.6	9.3
Green Ext Time (p_c), s	0.0	2.0	0.0	0.6	0.0	2.0	0.3	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	25.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	88	60	43	121	28	73	210	35	35	228	44
Future Volume (veh/h)	28	88	60	43	121	28	73	210	35	35	228	44
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	30	96	65	47	132	30	79	228	38	38	248	48
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	84	145	98	79	203	46	113	949	158	61	875	169
Arrive On Green	0.05	0.14	0.13	0.05	0.14	0.13	0.07	0.61	0.60	0.04	0.58	0.57
Sat Flow, veh/h	1634	1016	688	1634	1455	331	1634	1551	258	1634	1510	292
Grp Volume(v), veh/h	30	0	161	47	0	162	79	0	266	38	0	296
Grp Sat Flow(s),veh/h/ln	1634	0	1704	1634	0	1786	1634	0	1809	1634	0	1802
Q Serve(g_s), s	1.8	0.0	9.0	2.8	0.0	8.6	4.7	0.0	6.7	2.3	0.0	8.3
Cycle Q Clear(g_c), s	1.8	0.0	9.0	2.8	0.0	8.6	4.7	0.0	6.7	2.3	0.0	8.3
Prop In Lane	1.00		0.40	1.00		0.19	1.00		0.14	1.00		0.16
Lane Grp Cap(c), veh/h	84	0	243	79	0	249	113	0	1107	61	0	1045
V/C Ratio(X)	0.36	0.00	0.66	0.60	0.00	0.65	0.70	0.00	0.24	0.63	0.00	0.28
Avail Cap(c_a), veh/h	245	0	567	109	0	446	175	0	1107	183	0	1045
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.00	0.98	0.88	0.00	0.88	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.8	0.0	40.8	46.6	0.0	40.8	45.5	0.0	8.9	47.5	0.0	10.6
Incr Delay (d2), s/veh	2.5	0.0	3.1	6.9	0.0	2.8	6.7	0.0	0.5	10.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	4.4	1.4	0.0	4.4	2.3	0.0	3.5	1.2	0.0	4.3
LnGrp Delay(d),s/veh	48.4	0.0	43.9	53.5	0.0	43.6	52.2	0.0	9.3	57.6	0.0	11.3
LnGrp LOS	D		D	D		D	D		A	E		B
Approach Vol, veh/h		191			209			345			334	
Approach Delay, s/veh		44.6			45.8			19.1			16.6	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	65.2	8.8	18.3	10.9	62.0	9.2	17.9
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	10.3	31.9	5.4	32.0	9.8	32.4	13.7	23.7
Max Q Clear Time (g_c+I1), s	4.3	8.7	4.8	11.0	6.7	10.3	3.8	10.6
Green Ext Time (p_c), s	0.0	2.2	0.0	0.6	0.0	2.1	0.4	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	28.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	95	66	46	134	33	84	224	36	37	235	45
Future Volume (veh/h)	30	95	66	46	134	33	84	224	36	37	235	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	33	103	72	50	146	36	91	243	39	40	255	49
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	156	109	84	221	54	129	898	144	64	811	156
Arrive On Green	0.05	0.16	0.14	0.05	0.15	0.14	0.08	0.58	0.57	0.04	0.54	0.53
Sat Flow, veh/h	1634	1002	700	1634	1430	352	1634	1560	250	1634	1512	291
Grp Volume(v), veh/h	33	0	175	50	0	182	91	0	282	40	0	304
Grp Sat Flow(s),veh/h/ln	1634	0	1703	1634	0	1782	1634	0	1811	1634	0	1802
Q Serve(g_s), s	1.8	0.0	8.7	2.7	0.0	8.7	4.9	0.0	7.1	2.2	0.0	8.5
Cycle Q Clear(g_c), s	1.8	0.0	8.7	2.7	0.0	8.7	4.9	0.0	7.1	2.2	0.0	8.5
Prop In Lane	1.00		0.41	1.00		0.20	1.00		0.14	1.00		0.16
Lane Grp Cap(c), veh/h	86	0	264	84	0	275	129	0	1043	64	0	967
V/C Ratio(X)	0.39	0.00	0.66	0.59	0.00	0.66	0.71	0.00	0.27	0.62	0.00	0.31
Avail Cap(c_a), veh/h	218	0	575	116	0	491	142	0	1043	145	0	967
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	0.66	0.00	0.66	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.2	0.0	36.0	41.7	0.0	35.9	40.4	0.0	9.6	42.6	0.0	11.7
Incr Delay (d2), s/veh	2.8	0.0	2.8	6.3	0.0	2.6	9.2	0.0	0.4	9.4	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	4.3	1.4	0.0	4.5	2.5	0.0	3.7	1.1	0.0	4.5
LnGrp Delay(d),s/veh	44.1	0.0	38.9	48.0	0.0	38.6	49.6	0.0	10.0	52.0	0.0	12.5
LnGrp LOS	D		D	D		D	D		B	D		B
Approach Vol, veh/h		208			232			373			344	
Approach Delay, s/veh		39.7			40.6			19.7			17.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	55.8	8.7	18.0	11.1	52.3	8.7	17.9
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	7.1	28.3	5.1	29.1	6.9	28.5	10.7	23.5
Max Q Clear Time (g_c+I1), s	4.2	9.1	4.7	10.7	6.9	10.5	3.8	10.7
Green Ext Time (p_c), s	0.0	2.2	0.0	0.7	0.0	2.1	0.4	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	98	73	46	137	37	91	231	36	40	242	45
Future Volume (veh/h)	30	98	73	46	137	37	91	231	36	40	242	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	33	107	79	50	149	40	99	251	39	43	263	49
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	88	153	113	83	214	58	136	929	144	67	836	156
Arrive On Green	0.05	0.16	0.14	0.05	0.15	0.14	0.08	0.59	0.58	0.04	0.55	0.54
Sat Flow, veh/h	1634	977	721	1634	1401	376	1634	1569	244	1634	1521	283
Grp Volume(v), veh/h	33	0	186	50	0	189	99	0	290	43	0	312
Grp Sat Flow(s),veh/h/ln	1634	0	1698	1634	0	1777	1634	0	1812	1634	0	1804
Q Serve(g_s), s	2.0	0.0	10.4	3.0	0.0	10.1	5.9	0.0	7.8	2.6	0.0	9.4
Cycle Q Clear(g_c), s	2.0	0.0	10.4	3.0	0.0	10.1	5.9	0.0	7.8	2.6	0.0	9.4
Prop In Lane	1.00		0.42	1.00		0.21	1.00		0.13	1.00		0.16
Lane Grp Cap(c), veh/h	88	0	265	83	0	272	136	0	1073	67	0	992
V/C Ratio(X)	0.38	0.00	0.70	0.61	0.00	0.70	0.73	0.00	0.27	0.64	0.00	0.31
Avail Cap(c_a), veh/h	245	0	565	109	0	444	175	0	1073	183	0	992
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.96	0.00	0.96	0.88	0.00	0.88	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.7	0.0	40.3	46.5	0.0	40.3	44.7	0.0	9.9	47.2	0.0	12.3
Incr Delay (d2), s/veh	2.7	0.0	3.4	6.7	0.0	3.1	9.2	0.0	0.5	9.6	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	5.1	1.5	0.0	5.2	3.0	0.0	4.0	1.4	0.0	4.9
LnGrp Delay(d),s/veh	48.4	0.0	43.6	53.2	0.0	43.3	53.9	0.0	10.5	56.8	0.0	13.1
LnGrp LOS	D		D	D		D	D		B	E		B
Approach Vol, veh/h		219			239			389			355	
Approach Delay, s/veh		44.3			45.4			21.5			18.4	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	63.2	9.1	19.6	12.3	59.0	9.4	19.3
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	10.3	31.9	5.4	32.0	9.8	32.4	13.7	23.7
Max Q Clear Time (g_c+I1), s	4.6	9.8	5.0	12.4	7.9	11.4	4.0	12.1
Green Ext Time (p_c), s	0.0	2.3	0.0	0.7	0.0	2.3	0.5	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	146	97	72	204	47	94	254	41	41	266	51
Future Volume (veh/h)	47	146	97	72	204	47	94	254	41	41	266	51
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	51	159	105	78	222	51	102	276	45	45	289	55
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	121	208	137	116	289	66	141	788	128	71	701	133
Arrive On Green	0.07	0.20	0.19	0.07	0.20	0.18	0.09	0.51	0.50	0.04	0.46	0.45
Sat Flow, veh/h	1634	1031	681	1634	1454	334	1634	1556	254	1634	1514	288
Grp Volume(v), veh/h	51	0	264	78	0	273	102	0	321	45	0	344
Grp Sat Flow(s),veh/h/ln	1634	0	1712	1634	0	1789	1634	0	1810	1634	0	1802
Q Serve(g_s), s	2.7	0.0	13.1	4.2	0.0	13.0	5.5	0.0	9.6	2.4	0.0	11.4
Cycle Q Clear(g_c), s	2.7	0.0	13.1	4.2	0.0	13.0	5.5	0.0	9.6	2.4	0.0	11.4
Prop In Lane	1.00		0.40	1.00		0.19	1.00		0.14	1.00		0.16
Lane Grp Cap(c), veh/h	121	0	345	116	0	355	141	0	916	71	0	835
V/C Ratio(X)	0.42	0.00	0.77	0.67	0.00	0.77	0.72	0.00	0.35	0.63	0.00	0.41
Avail Cap(c_a), veh/h	218	0	578	116	0	493	142	0	916	145	0	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.93	0.00	0.93	0.29	0.00	0.29	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	0.0	34.2	40.8	0.0	34.2	40.0	0.0	13.4	42.3	0.0	16.1
Incr Delay (d2), s/veh	2.3	0.0	3.6	13.1	0.0	4.5	5.1	0.0	0.3	9.0	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	6.5	2.3	0.0	6.9	2.7	0.0	4.8	1.3	0.0	6.0
LnGrp Delay(d),s/veh	42.2	0.0	37.7	53.8	0.0	38.7	45.1	0.0	13.7	51.4	0.0	17.6
LnGrp LOS	D		D	D		D	D		B	D		B
Approach Vol, veh/h		315			351			423			389	
Approach Delay, s/veh		38.5			42.1			21.3			21.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.9	49.6	10.4	22.1	11.8	45.7	10.7	21.9
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	7.1	28.3	5.1	29.1	6.9	28.5	10.7	23.5
Max Q Clear Time (g_c+I1), s	4.4	11.6	6.2	15.1	7.5	13.4	4.7	15.0
Green Ext Time (p_c), s	0.0	2.4	0.0	1.0	0.0	2.4	0.6	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	29.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	149	104	72	207	51	101	261	41	44	273	51
Future Volume (veh/h)	47	149	104	72	207	51	101	261	41	44	273	51
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	51	162	113	78	225	55	110	284	45	48	297	55
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	203	142	109	281	69	149	822	130	74	731	135
Arrive On Green	0.07	0.20	0.19	0.07	0.20	0.18	0.09	0.53	0.52	0.05	0.48	0.47
Sat Flow, veh/h	1634	1006	702	1634	1434	351	1634	1563	248	1634	1522	282
Grp Volume(v), veh/h	51	0	275	78	0	280	110	0	329	48	0	352
Grp Sat Flow(s),veh/h/ln	1634	0	1707	1634	0	1785	1634	0	1811	1634	0	1804
Q Serve(g_s), s	3.0	0.0	15.3	4.7	0.0	15.0	6.6	0.0	10.5	2.9	0.0	12.6
Cycle Q Clear(g_c), s	3.0	0.0	15.3	4.7	0.0	15.0	6.6	0.0	10.5	2.9	0.0	12.6
Prop In Lane	1.00		0.41	1.00		0.20	1.00		0.14	1.00		0.16
Lane Grp Cap(c), veh/h	119	0	345	109	0	350	149	0	952	74	0	866
V/C Ratio(X)	0.43	0.00	0.80	0.71	0.00	0.80	0.74	0.00	0.35	0.65	0.00	0.41
Avail Cap(c_a), veh/h	245	0	569	109	0	446	175	0	952	183	0	866
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.92	0.00	0.92	0.81	0.00	0.81	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.4	0.0	38.2	45.7	0.0	38.4	44.3	0.0	13.8	47.0	0.0	16.8
Incr Delay (d2), s/veh	2.4	0.0	4.3	18.1	0.0	7.3	10.7	0.0	0.8	9.2	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	7.7	2.7	0.0	8.1	3.4	0.0	5.4	1.5	0.0	6.6
LnGrp Delay(d),s/veh	46.8	0.0	42.5	63.8	0.0	45.7	55.0	0.0	14.6	56.1	0.0	18.3
LnGrp LOS	D		D	E		D	D		B	E		B
Approach Vol, veh/h		326			358			439			400	
Approach Delay, s/veh		43.2			49.6			24.7			22.8	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	56.6	10.7	24.2	13.1	52.0	11.3	23.6
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	10.3	31.9	5.4	32.0	9.8	32.4	13.7	23.7
Max Q Clear Time (g_c+I1), s	4.9	12.5	6.7	17.3	8.6	14.6	5.0	17.0
Green Ext Time (p_c), s	0.0	2.6	0.0	1.1	0.0	2.5	0.8	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	34.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	149	104	72	207	51	101	261	41	44	273	51
Future Volume (veh/h)	47	149	104	72	207	51	101	261	41	44	273	51
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	51	162	113	78	225	55	110	284	45	48	297	55
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	209	146	120	322	221	138	773	123	75	694	129
Arrive On Green	0.11	0.21	0.19	0.07	0.17	0.16	0.08	0.49	0.48	0.05	0.46	0.45
Sat Flow, veh/h	1634	1006	702	1634	1863	1400	1634	1563	248	1634	1522	282
Grp Volume(v), veh/h	51	0	275	78	225	55	110	0	329	48	0	352
Grp Sat Flow(s),veh/h/ln	1634	0	1708	1634	1863	1400	1634	0	1811	1634	0	1804
Q Serve(g_s), s	2.6	0.0	13.7	4.2	10.2	2.5	5.9	0.0	10.1	2.6	0.0	11.9
Cycle Q Clear(g_c), s	2.6	0.0	13.7	4.2	10.2	2.5	5.9	0.0	10.1	2.6	0.0	11.9
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.14	1.00		0.16
Lane Grp Cap(c), veh/h	178	0	356	120	322	221	138	0	896	75	0	823
V/C Ratio(X)	0.29	0.00	0.77	0.65	0.70	0.25	0.80	0.00	0.37	0.64	0.00	0.43
Avail Cap(c_a), veh/h	320	0	634	163	513	366	138	0	896	127	0	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.94	0.94	0.72	0.00	0.72	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.9	0.0	33.9	40.6	35.0	22.5	40.4	0.0	14.1	42.2	0.0	16.6
Incr Delay (d2), s/veh	0.9	0.0	3.6	5.4	2.6	0.5	20.4	0.0	0.8	8.8	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	6.8	2.1	5.5	1.0	3.5	0.0	5.2	1.4	0.0	6.2
LnGrp Delay(d),s/veh	37.7	0.0	37.5	46.0	37.6	23.0	60.9	0.0	14.9	51.0	0.0	18.2
LnGrp LOS	D		D	D	D	C	E		B	D		B
Approach Vol, veh/h		326			358			439			400	
Approach Delay, s/veh		37.5			37.2			26.4			22.2	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	48.5	10.6	22.7	11.6	45.0	13.8	19.5
Change Period (Y+Rc), s	4.9	4.9	5.3	5.3	4.9	4.9	5.3	5.3
Max Green Setting (Gmax), s	6.1	23.7	7.7	32.1	6.7	23.1	16.3	23.5
Max Q Clear Time (g_c+I1), s	4.6	12.1	6.2	15.7	7.9	13.9	4.6	12.2
Green Ext Time (p_c), s	0.0	2.2	0.0	1.1	0.0	2.0	1.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	30.2
HCM 2010 LOS	C

Intersection 3
Union Ave & Fairview Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	53	23	61	64	42	28	466	68	45	278	55
Future Volume (veh/h)	78	53	23	61	64	42	28	466	68	45	278	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	85	58	25	66	70	46	30	507	74	49	302	60
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	148	64	105	196	149	767	1787	260	96	490	96
Arrive On Green	0.08	0.12	0.11	0.06	0.11	0.11	0.47	0.58	0.56	0.06	0.17	0.15
Sat Flow, veh/h	1634	1223	527	1634	1863	1415	1634	3090	449	1634	2930	572
Grp Volume(v), veh/h	85	0	83	66	70	46	30	289	292	49	180	182
Grp Sat Flow(s),veh/h/ln	1634	0	1751	1634	1863	1415	1634	1770	1770	1634	1770	1732
Q Serve(g_s), s	4.5	0.0	4.0	3.5	3.1	2.2	0.9	7.4	7.6	2.6	8.5	8.8
Cycle Q Clear(g_c), s	4.5	0.0	4.0	3.5	3.1	2.2	0.9	7.4	7.6	2.6	8.5	8.8
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.25	1.00		0.33
Lane Grp Cap(c), veh/h	131	0	212	105	196	149	767	1023	1023	96	296	290
V/C Ratio(X)	0.65	0.00	0.39	0.63	0.36	0.31	0.04	0.28	0.29	0.51	0.61	0.63
Avail Cap(c_a), veh/h	200	0	599	174	608	462	767	1023	1023	127	543	531
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	1.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	36.7	41.0	37.4	24.0	12.9	9.6	9.7	41.1	34.7	35.2
Incr Delay (d2), s/veh	5.0	0.0	1.1	6.0	1.1	1.2	0.0	0.6	0.6	4.2	9.0	9.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	2.0	1.8	1.7	0.9	0.4	3.8	3.8	1.3	4.9	5.0
LnGrp Delay(d),s/veh	45.1	0.0	37.8	47.0	38.5	25.2	12.9	10.1	10.3	45.3	43.8	45.0
LnGrp LOS	D		D	D	D	C	B	B	B	D	D	D
Approach Vol, veh/h		168			182			611			411	
Approach Delay, s/veh		41.5			38.2			10.4			44.5	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	56.0	9.8	14.9	46.3	19.1	11.2	13.5
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	24.6	8.3	29.5	4.0	25.6	9.7	28.1
Max Q Clear Time (g_c+I1), s	4.6	9.6	5.5	6.0	2.9	10.8	6.5	5.1
Green Ext Time (p_c), s	0.0	1.9	0.0	0.5	0.3	1.1	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	28.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	53	36	64	64	42	39	493	70	45	309	55
Future Volume (veh/h)	78	53	36	64	64	42	39	493	70	45	309	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	85	58	39	70	70	46	42	536	76	49	336	60
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	128	122	82	112	202	154	767	1816	256	94	517	91
Arrive On Green	0.08	0.12	0.10	0.07	0.11	0.11	0.47	0.59	0.56	0.06	0.17	0.15
Sat Flow, veh/h	1634	1026	690	1634	1863	1415	1634	3103	438	1634	2987	526
Grp Volume(v), veh/h	85	0	97	70	70	46	42	305	307	49	197	199
Grp Sat Flow(s),veh/h/ln	1634	0	1716	1634	1863	1415	1634	1770	1772	1634	1770	1743
Q Serve(g_s), s	4.8	0.0	5.0	3.9	3.3	2.8	1.3	8.1	8.3	2.7	9.7	10.0
Cycle Q Clear(g_c), s	4.8	0.0	5.0	3.9	3.3	2.8	1.3	8.1	8.3	2.7	9.7	10.0
Prop In Lane	1.00		0.40	1.00		1.00	1.00		0.25	1.00		0.30
Lane Grp Cap(c), veh/h	128	0	204	112	202	154	767	1035	1037	94	306	302
V/C Ratio(X)	0.66	0.00	0.48	0.63	0.35	0.30	0.05	0.29	0.30	0.52	0.64	0.66
Avail Cap(c_a), veh/h	209	0	573	184	594	452	767	1035	1037	122	546	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.00	0.89	1.00	1.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	0.0	38.9	42.6	38.8	38.6	13.6	9.8	9.9	43.0	36.2	36.6
Incr Delay (d2), s/veh	5.1	0.0	1.5	5.7	1.0	1.1	0.0	0.6	0.6	4.4	10.0	10.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	2.4	1.9	1.7	1.1	0.6	4.1	4.2	1.4	5.6	5.7
LnGrp Delay(d),s/veh	47.2	0.0	40.5	48.3	39.8	39.7	13.6	10.3	10.5	47.4	46.2	47.3
LnGrp LOS	D		D	D	D	D	B	B	B	D	D	D
Approach Vol, veh/h		182			186			654			445	
Approach Delay, s/veh		43.6			43.0			10.6			46.8	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	59.0	10.4	15.2	48.1	20.3	11.4	14.2
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	27.0	9.3	30.1	5.0	27.0	10.7	28.7
Max Q Clear Time (g_c+I1), s	4.7	10.3	5.9	7.0	3.3	12.0	6.8	5.3
Green Ext Time (p_c), s	0.0	2.2	0.2	0.3	0.5	1.2	0.1	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	57	62	74	69	45	43	521	74	47	368	57
Future Volume (veh/h)	84	57	62	74	69	45	43	521	74	47	368	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	91	62	67	80	75	49	47	566	80	51	400	62
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	114	124	123	201	153	675	1693	239	98	587	90
Arrive On Green	0.11	0.14	0.13	0.08	0.11	0.11	0.41	0.55	0.52	0.06	0.19	0.17
Sat Flow, veh/h	1634	808	873	1634	1863	1415	1634	3104	437	1634	3058	470
Grp Volume(v), veh/h	91	0	129	80	75	49	47	322	324	51	230	232
Grp Sat Flow(s),veh/h/ln	1634	0	1680	1634	1863	1415	1634	1770	1772	1634	1770	1758
Q Serve(g_s), s	4.7	0.0	6.5	4.3	3.4	2.3	1.6	9.1	9.2	2.7	10.9	11.1
Cycle Q Clear(g_c), s	4.7	0.0	6.5	4.3	3.4	2.3	1.6	9.1	9.2	2.7	10.9	11.1
Prop In Lane	1.00		0.52	1.00		1.00	1.00		0.25	1.00		0.27
Lane Grp Cap(c), veh/h	178	0	238	123	201	153	675	965	966	98	340	338
V/C Ratio(X)	0.51	0.00	0.54	0.65	0.37	0.32	0.07	0.33	0.34	0.52	0.68	0.69
Avail Cap(c_a), veh/h	200	0	575	174	608	462	675	965	966	127	543	539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.00	0.85	1.00	1.00	1.00	0.76	0.76	0.76	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.9	0.0	36.2	40.5	37.3	23.8	15.9	11.4	11.5	41.0	33.8	34.1
Incr Delay (d2), s/veh	1.9	0.0	1.6	5.7	1.1	1.2	0.0	0.7	0.7	4.2	10.3	10.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	3.1	2.1	1.8	1.0	0.7	4.6	4.7	1.3	6.3	6.4
LnGrp Delay(d),s/veh	39.8	0.0	37.9	46.2	38.4	25.0	16.0	12.1	12.3	45.2	44.1	45.0
LnGrp LOS	D		D	D	D	C	B	B	B	D	D	D
Approach Vol, veh/h		220			204			693			513	
Approach Delay, s/veh		38.7			38.2			12.4			44.6	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	53.1	10.8	16.7	41.2	21.3	13.8	13.7
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	24.6	8.3	29.5	4.0	25.6	9.7	28.1
Max Q Clear Time (g_c+I1), s	4.7	11.2	6.3	8.5	3.6	13.1	6.7	5.4
Green Ext Time (p_c), s	0.0	2.2	0.0	0.7	0.1	1.3	0.2	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	57	75	77	69	45	54	548	76	47	399	57
Future Volume (veh/h)	84	57	75	77	69	45	54	548	76	47	399	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	91	62	82	84	75	49	59	596	83	51	434	62
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	135	104	138	129	263	200	667	1700	236	97	612	87
Arrive On Green	0.08	0.15	0.13	0.08	0.14	0.14	0.41	0.55	0.53	0.06	0.20	0.18
Sat Flow, veh/h	1634	717	948	1634	1863	1421	1634	3110	432	1634	3095	439
Grp Volume(v), veh/h	91	0	144	84	75	49	59	338	341	51	247	249
Grp Sat Flow(s),veh/h/ln	1634	0	1665	1634	1863	1421	1634	1770	1773	1634	1770	1765
Q Serve(g_s), s	5.1	0.0	7.6	4.7	3.4	2.9	2.1	10.1	10.2	2.8	12.2	12.4
Cycle Q Clear(g_c), s	5.1	0.0	7.6	4.7	3.4	2.9	2.1	10.1	10.2	2.8	12.2	12.4
Prop In Lane	1.00		0.57	1.00		1.00	1.00		0.24	1.00		0.25
Lane Grp Cap(c), veh/h	135	0	242	129	263	200	667	967	969	97	350	349
V/C Ratio(X)	0.67	0.00	0.60	0.65	0.29	0.24	0.09	0.35	0.35	0.53	0.70	0.71
Avail Cap(c_a), veh/h	209	0	556	184	594	454	667	967	969	122	546	544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.00	0.80	1.00	1.00	1.00	0.53	0.53	0.53	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	0.0	38.0	42.1	36.1	35.9	17.1	11.9	12.1	42.9	35.1	35.5
Incr Delay (d2), s/veh	4.6	0.0	1.9	5.5	0.6	0.6	0.0	0.5	0.5	4.4	11.3	11.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	3.6	2.3	1.8	1.2	0.9	5.0	5.1	1.4	7.1	7.2
LnGrp Delay(d),s/veh	46.5	0.0	39.8	47.6	36.7	36.5	17.1	12.5	12.6	47.3	46.5	47.2
LnGrp LOS	D		D	D	D	D	B	B	B	D	D	D
Approach Vol, veh/h		235			208			738			547	
Approach Delay, s/veh		42.4			41.1			12.9			46.9	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	55.4	11.4	17.6	42.4	22.6	11.8	17.3
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	27.0	9.3	30.1	5.0	27.0	10.7	28.7
Max Q Clear Time (g_c+I1), s	4.8	12.2	6.7	9.6	4.1	14.4	7.1	5.4
Green Ext Time (p_c), s	0.0	2.4	0.2	0.5	0.3	1.4	0.1	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	88	75	110	107	70	51	656	94	60	449	73
Future Volume (veh/h)	130	88	75	110	107	70	51	656	94	60	449	73
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	141	96	82	120	116	76	55	713	102	65	488	79
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	225	150	128	168	239	182	551	1502	215	116	664	107
Arrive On Green	0.14	0.16	0.15	0.10	0.13	0.13	0.34	0.49	0.46	0.07	0.22	0.20
Sat Flow, veh/h	1634	917	784	1634	1863	1419	1634	3097	443	1634	3036	489
Grp Volume(v), veh/h	141	0	178	120	116	76	55	407	408	65	283	284
Grp Sat Flow(s),veh/h/ln	1634	0	1701	1634	1863	1419	1634	1770	1770	1634	1770	1755
Q Serve(g_s), s	7.3	0.0	8.8	6.4	5.2	3.5	2.1	13.8	14.0	3.5	13.4	13.6
Cycle Q Clear(g_c), s	7.3	0.0	8.8	6.4	5.2	3.5	2.1	13.8	14.0	3.5	13.4	13.6
Prop In Lane	1.00		0.46	1.00		1.00	1.00		0.25	1.00		0.28
Lane Grp Cap(c), veh/h	225	0	277	168	239	182	551	858	859	116	387	384
V/C Ratio(X)	0.63	0.00	0.64	0.71	0.48	0.42	0.10	0.47	0.47	0.56	0.73	0.74
Avail Cap(c_a), veh/h	225	0	582	174	608	464	551	858	859	127	543	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.00	0.72	1.00	1.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.6	0.0	35.5	39.1	36.5	22.2	20.4	15.5	15.7	40.4	32.7	33.0
Incr Delay (d2), s/veh	3.9	0.0	1.8	12.4	1.5	1.5	0.0	1.1	1.1	4.5	11.6	12.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	4.3	3.5	2.8	1.4	0.9	6.9	7.1	1.7	7.8	7.8
LnGrp Delay(d),s/veh	40.5	0.0	37.3	51.4	38.0	23.7	20.5	16.6	16.8	45.0	44.3	45.1
LnGrp LOS	D		D	D	D	C	C	B	B	D	D	D
Approach Vol, veh/h		319			312			870			632	
Approach Delay, s/veh		38.7			39.7			16.9			44.7	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	47.7	13.3	18.7	34.4	23.7	16.4	15.6
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	24.6	8.3	29.5	4.0	25.6	9.7	28.1
Max Q Clear Time (g_c+I1), s	5.5	16.0	8.4	10.8	4.1	15.6	9.3	7.2
Green Ext Time (p_c), s	0.0	2.3	0.0	0.6	0.0	1.5	0.1	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	88	88	113	107	70	62	683	96	60	480	73
Future Volume (veh/h)	130	88	88	113	107	70	62	683	96	60	480	73
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	141	96	96	123	116	76	67	742	104	65	522	79
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	143	143	171	293	224	542	1509	211	115	688	104
Arrive On Green	0.12	0.17	0.16	0.10	0.16	0.16	0.33	0.49	0.46	0.07	0.22	0.20
Sat Flow, veh/h	1634	844	844	1634	1863	1423	1634	3106	435	1634	3068	462
Grp Volume(v), veh/h	141	0	192	123	116	76	67	423	423	65	300	301
Grp Sat Flow(s),veh/h/ln	1634	0	1689	1634	1863	1423	1634	1770	1772	1634	1770	1761
Q Serve(g_s), s	7.8	0.0	10.0	6.9	5.3	4.5	2.7	15.2	15.3	3.6	14.9	15.1
Cycle Q Clear(g_c), s	7.8	0.0	10.0	6.9	5.3	4.5	2.7	15.2	15.3	3.6	14.9	15.1
Prop In Lane	1.00		0.50	1.00		1.00	1.00		0.25	1.00		0.26
Lane Grp Cap(c), veh/h	190	0	286	171	293	224	542	860	861	115	397	395
V/C Ratio(X)	0.74	0.00	0.67	0.72	0.40	0.34	0.12	0.49	0.49	0.57	0.76	0.76
Avail Cap(c_a), veh/h	209	0	564	184	594	454	542	860	861	122	546	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.00	0.68	1.00	1.00	1.00	0.57	0.57	0.57	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	36.9	40.7	35.6	35.2	21.9	16.3	16.5	42.3	34.1	34.4
Incr Delay (d2), s/veh	8.5	0.0	1.9	11.7	0.9	0.9	0.1	1.1	1.1	5.4	12.6	13.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	4.9	3.6	2.8	1.8	1.2	7.7	7.7	1.8	8.6	8.7
LnGrp Delay(d),s/veh	48.7	0.0	38.8	52.5	36.4	36.1	21.9	17.5	17.7	47.7	46.7	47.4
LnGrp LOS	D		D	D	D	D	C	B	B	D	D	D
Approach Vol, veh/h		333			315			913			666	
Approach Delay, s/veh		43.0			42.6			17.9			47.1	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	49.7	13.9	19.9	35.2	25.1	14.9	18.8
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	27.0	9.3	30.1	5.0	27.0	10.7	28.7
Max Q Clear Time (g_c+I1), s	5.6	17.3	8.9	12.0	4.7	17.1	9.8	7.3
Green Ext Time (p_c), s	0.0	2.6	0.1	0.6	0.1	1.6	0.0	1.1

Intersection Summary	
HCM 2010 Ctrl Delay	33.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	48	30	56	62	38	31	438	82	58	440	80
Future Volume (veh/h)	81	48	30	56	62	38	31	438	82	58	440	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	88	52	33	61	67	41	34	476	89	63	478	87
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	134	132	84	99	193	147	682	1682	312	113	651	118
Arrive On Green	0.08	0.13	0.11	0.06	0.10	0.10	0.42	0.57	0.54	0.07	0.22	0.20
Sat Flow, veh/h	1634	1053	668	1634	1863	1414	1634	2967	551	1634	2976	538
Grp Volume(v), veh/h	88	0	85	61	67	41	34	283	282	63	283	282
Grp Sat Flow(s),veh/h/ln	1634	0	1721	1634	1863	1414	1634	1770	1748	1634	1770	1744
Q Serve(g_s), s	4.7	0.0	4.1	3.3	3.0	1.9	1.1	7.4	7.6	3.4	13.4	13.6
Cycle Q Clear(g_c), s	4.7	0.0	4.1	3.3	3.0	1.9	1.1	7.4	7.6	3.4	13.4	13.6
Prop In Lane	1.00		0.39	1.00		1.00	1.00		0.32	1.00		0.31
Lane Grp Cap(c), veh/h	134	0	216	99	193	147	682	1003	991	113	387	381
V/C Ratio(X)	0.66	0.00	0.39	0.62	0.35	0.28	0.05	0.28	0.28	0.56	0.73	0.74
Avail Cap(c_a), veh/h	200	0	589	174	608	462	682	1003	991	127	543	535
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.00	0.91	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.1	0.0	36.4	41.3	37.5	23.3	15.6	10.1	10.3	40.5	32.7	33.1
Incr Delay (d2), s/veh	4.9	0.0	1.1	6.1	1.1	1.0	0.0	0.5	0.6	4.2	11.6	12.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	2.0	1.6	1.6	0.8	0.5	3.8	3.8	1.7	7.8	7.8
LnGrp Delay(d),s/veh	44.9	0.0	37.5	47.3	38.5	24.3	15.6	10.6	10.8	44.7	44.3	45.2
LnGrp LOS	D		D	D	D	C	B	B	B	D	D	D
Approach Vol, veh/h		173			169			599			628	
Approach Delay, s/veh		41.3			38.3			11.0			44.7	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	55.0	9.5	15.3	41.6	23.7	11.4	13.3
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	24.6	8.3	29.5	4.0	25.6	9.7	28.1
Max Q Clear Time (g_c+I1), s	5.4	9.6	5.3	6.1	3.1	15.6	6.7	5.0
Green Ext Time (p_c), s	0.0	1.9	0.0	0.6	0.2	1.5	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	48	35	57	62	38	38	454	83	58	453	80
Future Volume (veh/h)	81	48	35	57	62	38	38	454	83	58	453	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	88	52	38	62	67	41	41	493	90	63	492	87
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	114	83	113	194	147	695	1718	312	112	656	115
Arrive On Green	0.08	0.12	0.10	0.07	0.10	0.10	0.43	0.58	0.56	0.07	0.22	0.20
Sat Flow, veh/h	1634	987	721	1634	1863	1414	1634	2979	541	1634	2991	526
Grp Volume(v), veh/h	88	0	90	62	67	41	41	292	291	63	290	289
Grp Sat Flow(s),veh/h/ln	1634	0	1709	1634	1863	1414	1634	1770	1751	1634	1770	1747
Q Serve(g_s), s	4.9	0.0	4.6	3.5	3.1	2.5	1.4	7.9	8.1	3.5	14.4	14.6
Cycle Q Clear(g_c), s	4.9	0.0	4.6	3.5	3.1	2.5	1.4	7.9	8.1	3.5	14.4	14.6
Prop In Lane	1.00		0.42	1.00		1.00	1.00		0.31	1.00		0.30
Lane Grp Cap(c), veh/h	132	0	197	113	194	147	695	1020	1009	112	388	383
V/C Ratio(X)	0.67	0.00	0.46	0.55	0.35	0.28	0.06	0.29	0.29	0.56	0.75	0.75
Avail Cap(c_a), veh/h	209	0	571	184	594	451	695	1020	1009	122	546	539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.00	0.86	1.00	1.00	1.00	0.60	0.60	0.60	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.0	0.0	39.1	42.3	39.1	38.9	15.9	10.1	10.3	42.4	34.2	34.6
Incr Delay (d2), s/veh	4.9	0.0	1.4	4.1	1.1	1.0	0.0	0.4	0.4	4.9	12.3	12.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	2.3	1.7	1.7	1.0	0.6	3.9	4.0	1.7	8.3	8.4
LnGrp Delay(d),s/veh	46.9	0.0	40.5	46.4	40.2	39.9	15.9	10.5	10.7	47.3	46.6	47.5
LnGrp LOS	D		D	D	D	D	B	B	B	D	D	D
Approach Vol, veh/h		178			170			624			642	
Approach Delay, s/veh		43.7			42.4			11.0			47.1	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	58.2	10.5	14.8	44.0	24.6	11.6	13.8
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	27.0	9.3	30.1	5.0	27.0	10.7	28.7
Max Q Clear Time (g_c+I1), s	5.5	10.1	5.5	6.6	3.4	16.6	6.9	5.1
Green Ext Time (p_c), s	0.0	2.1	0.2	0.3	0.4	1.6	0.1	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	52	41	62	67	41	47	490	88	60	477	83
Future Volume (veh/h)	87	52	41	62	67	41	47	490	88	60	477	83
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	95	57	45	67	73	45	51	533	96	65	518	90
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	123	97	107	199	151	652	1663	298	116	687	119
Arrive On Green	0.09	0.13	0.11	0.07	0.11	0.11	0.40	0.56	0.53	0.07	0.23	0.21
Sat Flow, veh/h	1634	952	752	1634	1863	1415	1634	2986	535	1634	3000	519
Grp Volume(v), veh/h	95	0	102	67	73	45	51	315	314	65	304	304
Grp Sat Flow(s),veh/h/ln	1634	0	1704	1634	1863	1415	1634	1770	1751	1634	1770	1749
Q Serve(g_s), s	5.1	0.0	5.0	3.6	3.3	2.1	1.7	8.6	8.8	3.5	14.4	14.6
Cycle Q Clear(g_c), s	5.1	0.0	5.0	3.6	3.3	2.1	1.7	8.6	8.8	3.5	14.4	14.6
Prop In Lane	1.00		0.44	1.00		1.00	1.00		0.31	1.00		0.30
Lane Grp Cap(c), veh/h	143	0	220	107	199	151	652	986	976	116	405	400
V/C Ratio(X)	0.67	0.00	0.46	0.63	0.37	0.30	0.08	0.32	0.32	0.56	0.75	0.76
Avail Cap(c_a), veh/h	200	0	583	174	608	462	652	986	976	127	543	536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.00	0.88	1.00	1.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.8	0.0	36.6	41.0	37.4	23.1	16.8	10.7	10.9	40.4	32.3	32.7
Incr Delay (d2), s/veh	4.7	0.0	1.3	6.0	1.1	1.1	0.0	0.6	0.6	4.5	12.1	12.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	2.4	1.8	1.7	0.9	0.8	4.4	4.4	1.7	8.4	8.4
LnGrp Delay(d),s/veh	44.4	0.0	37.9	46.9	38.5	24.1	16.8	11.3	11.6	45.0	44.4	45.3
LnGrp LOS	D		D	D	D	C	B	B	B	D	D	D
Approach Vol, veh/h		197			185			680			673	
Approach Delay, s/veh		41.1			38.1			11.9			44.9	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	54.1	9.9	15.6	39.9	24.6	11.9	13.6
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	24.6	8.3	29.5	4.0	25.6	9.7	28.1
Max Q Clear Time (g_c+I1), s	5.5	10.8	5.6	7.0	3.7	16.6	7.1	5.3
Green Ext Time (p_c), s	0.0	2.1	0.0	0.7	0.1	1.6	0.2	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	52	46	63	67	41	54	506	89	60	490	83
Future Volume (veh/h)	87	52	46	63	67	41	54	506	89	60	490	83
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	95	57	50	68	73	45	59	550	97	65	533	90
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	112	99	112	200	152	665	1698	298	115	693	117
Arrive On Green	0.09	0.12	0.11	0.07	0.11	0.11	0.41	0.57	0.55	0.07	0.23	0.21
Sat Flow, veh/h	1634	903	792	1634	1863	1415	1634	2997	526	1634	3014	507
Grp Volume(v), veh/h	95	0	107	68	73	45	59	324	323	65	312	311
Grp Sat Flow(s),veh/h/ln	1634	0	1695	1634	1863	1415	1634	1770	1753	1634	1770	1752
Q Serve(g_s), s	5.3	0.0	5.6	3.8	3.4	2.8	2.1	9.1	9.3	3.6	15.5	15.7
Cycle Q Clear(g_c), s	5.3	0.0	5.6	3.8	3.4	2.8	2.1	9.1	9.3	3.6	15.5	15.7
Prop In Lane	1.00		0.47	1.00		1.00	1.00		0.30	1.00		0.29
Lane Grp Cap(c), veh/h	140	0	211	112	200	152	665	1003	994	115	407	403
V/C Ratio(X)	0.68	0.00	0.51	0.61	0.37	0.30	0.09	0.32	0.33	0.57	0.77	0.77
Avail Cap(c_a), veh/h	209	0	566	184	594	452	665	1003	994	122	546	540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.00	0.83	1.00	1.00	1.00	0.55	0.55	0.55	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.7	0.0	38.7	42.6	39.0	38.7	17.2	10.8	11.0	42.3	33.8	34.2
Incr Delay (d2), s/veh	4.7	0.0	1.6	5.3	1.1	1.1	0.0	0.5	0.5	5.4	12.9	13.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	2.7	1.9	1.8	1.1	0.9	4.5	4.6	1.8	9.0	9.0
LnGrp Delay(d),s/veh	46.4	0.0	40.3	47.8	40.1	39.8	17.2	11.3	11.5	47.7	46.7	47.6
LnGrp LOS	D		D	D	D	D	B	B	B	D	D	D
Approach Vol, veh/h		202			186			706			688	
Approach Delay, s/veh		43.2			42.8			11.9			47.2	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	57.3	10.4	15.7	42.2	25.6	12.1	14.1
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	27.0	9.3	30.1	5.0	27.0	10.7	28.7
Max Q Clear Time (g_c+I1), s	5.6	11.3	5.8	7.6	4.1	17.7	7.3	5.4
Green Ext Time (p_c), s	0.0	2.3	0.2	0.3	0.3	1.7	0.1	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	32.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	80	59	95	103	63	56	618	112	77	606	107
Future Volume (veh/h)	135	80	59	95	103	63	56	618	112	77	606	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	147	87	64	103	112	68	61	672	122	84	659	116
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	153	113	150	235	179	502	1482	269	127	802	141
Arrive On Green	0.12	0.16	0.14	0.09	0.13	0.13	0.31	0.50	0.48	0.08	0.27	0.25
Sat Flow, veh/h	1634	987	726	1634	1863	1419	1634	2979	540	1634	2992	526
Grp Volume(v), veh/h	147	0	151	103	112	68	61	399	395	84	389	386
Grp Sat Flow(s),veh/h/ln	1634	0	1712	1634	1863	1419	1634	1770	1750	1634	1770	1749
Q Serve(g_s), s	7.8	0.0	7.4	5.5	5.0	3.1	2.4	13.2	13.3	4.5	18.6	18.7
Cycle Q Clear(g_c), s	7.8	0.0	7.4	5.5	5.0	3.1	2.4	13.2	13.3	4.5	18.6	18.7
Prop In Lane	1.00		0.42	1.00		1.00	1.00		0.31	1.00		0.30
Lane Grp Cap(c), veh/h	197	0	266	150	235	179	502	880	870	127	474	469
V/C Ratio(X)	0.74	0.00	0.57	0.69	0.48	0.38	0.12	0.45	0.45	0.66	0.82	0.82
Avail Cap(c_a), veh/h	200	0	586	174	608	463	502	880	870	127	543	536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.00	0.78	1.00	1.00	1.00	0.46	0.46	0.46	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	0.0	35.5	39.6	36.6	21.7	22.4	14.7	14.9	40.3	30.9	31.2
Incr Delay (d2), s/veh	11.1	0.0	1.5	8.9	1.5	1.3	0.0	0.8	0.8	12.0	14.7	15.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	3.6	2.9	2.7	1.3	1.1	6.6	6.6	2.5	11.0	11.0
LnGrp Delay(d),s/veh	49.3	0.0	37.0	48.6	38.0	23.1	22.5	15.5	15.7	52.3	45.6	46.2
LnGrp LOS	D		D	D	D	C	C	B	B	D	D	D
Approach Vol, veh/h		298			283			855			859	
Approach Delay, s/veh		43.0			38.3			16.1			46.6	
Approach LOS		D			D			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	48.8	12.2	18.0	31.6	28.1	14.9	15.4
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	5.0	24.6	8.3	29.5	4.0	25.6	9.7	28.1
Max Q Clear Time (g_c+I1), s	6.5	15.3	7.5	9.4	4.4	20.7	9.8	7.0
Green Ext Time (p_c), s	0.0	2.4	0.0	1.0	0.0	1.4	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	33.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	80	64	96	103	63	63	634	113	77	619	107
Future Volume (veh/h)	135	80	64	96	103	63	63	634	113	77	619	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1716	1716	1863	1750	1716	1863	1750
Adj Flow Rate, veh/h	147	87	70	104	112	68	68	689	123	84	673	116
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	139	112	155	226	172	116	1540	275	136	1585	273
Arrive On Green	0.12	0.15	0.13	0.09	0.12	0.12	0.07	0.52	0.50	0.08	0.53	0.51
Sat Flow, veh/h	1634	945	760	1634	1863	1418	1634	2988	533	1634	3007	518
Grp Volume(v), veh/h	147	0	157	104	112	68	68	408	404	84	396	393
Grp Sat Flow(s),veh/h/ln	1634	0	1705	1634	1863	1418	1634	1770	1752	1634	1770	1755
Q Serve(g_s), s	8.7	0.0	8.7	6.2	5.6	3.5	4.0	14.5	14.7	5.0	13.6	13.8
Cycle Q Clear(g_c), s	8.7	0.0	8.7	6.2	5.6	3.5	4.0	14.5	14.7	5.0	13.6	13.8
Prop In Lane	1.00		0.45	1.00		1.00	1.00		0.30	1.00		0.29
Lane Grp Cap(c), veh/h	197	0	251	155	226	172	116	912	903	136	933	925
V/C Ratio(X)	0.75	0.00	0.63	0.67	0.50	0.40	0.58	0.45	0.45	0.62	0.42	0.43
Avail Cap(c_a), veh/h	245	0	528	219	548	417	131	912	903	147	933	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.00	0.74	1.00	1.00	1.00	0.22	0.22	0.22	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	0.0	40.4	43.8	41.1	25.0	45.0	15.3	15.5	44.3	14.4	14.6
Incr Delay (d2), s/veh	6.9	0.0	1.9	5.0	1.7	1.5	1.2	0.4	0.4	6.8	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	4.2	3.0	3.0	1.4	1.9	7.1	7.1	2.5	7.0	7.0
LnGrp Delay(d),s/veh	49.4	0.0	42.2	48.7	42.8	26.5	46.2	15.6	15.9	51.2	15.8	16.1
LnGrp LOS	D		D	D	D	C	D	B	B	D	B	B
Approach Vol, veh/h		304			284			880			873	
Approach Delay, s/veh		45.7			41.0			18.1			19.3	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	55.5	13.5	18.7	11.1	56.7	16.1	16.1
Change Period (Y+Rc), s	6.0	6.0	5.3	5.3	6.0	6.0	5.3	5.3
Max Green Setting (Gmax), s	7.0	28.6	12.1	29.7	6.0	29.6	13.7	28.1
Max Q Clear Time (g_c+I1), s	7.0	16.7	8.2	10.7	6.0	15.8	10.7	7.6
Green Ext Time (p_c), s	0.0	5.1	0.3	0.5	0.0	5.5	0.3	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
HCM 2010 LOS	C

Intersection 4
S H St & Panama Ln

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	581	33	24	599	100	95	251	28	97	232	133
Future Volume (veh/h)	125	581	33	24	599	100	95	251	28	97	232	133
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	136	632	36	26	651	109	103	273	30	105	252	145
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	212	1214	69	83	1219	201	162	816	329	165	506	281
Arrive On Green	0.13	0.36	0.33	0.05	0.28	0.25	0.10	0.23	0.23	0.10	0.23	0.21
Sat Flow, veh/h	1634	3401	194	1634	4384	724	1634	3539	1429	1634	2181	1208
Grp Volume(v), veh/h	136	329	339	26	501	259	103	273	30	105	203	194
Grp Sat Flow(s),veh/h/ln	1634	1770	1824	1634	1695	1718	1634	1770	1429	1634	1770	1619
Q Serve(g_s), s	4.8	9.0	9.0	0.9	7.7	7.9	3.7	3.9	1.0	3.8	6.1	6.5
Cycle Q Clear(g_c), s	4.8	9.0	9.0	0.9	7.7	7.9	3.7	3.9	1.0	3.8	6.1	6.5
Prop In Lane	1.00		0.11	1.00		0.42	1.00		1.00	1.00		0.75
Lane Grp Cap(c), veh/h	212	632	651	83	943	478	162	816	329	165	411	376
V/C Ratio(X)	0.64	0.52	0.52	0.31	0.53	0.54	0.64	0.33	0.09	0.64	0.49	0.52
Avail Cap(c_a), veh/h	319	905	933	152	1386	703	248	1840	743	266	940	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	15.6	15.7	28.1	18.8	19.2	26.6	19.7	18.6	26.5	20.4	21.0
Incr Delay (d2), s/veh	3.2	0.7	0.6	2.1	0.5	1.0	4.1	0.2	0.1	4.1	0.9	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	4.5	4.7	0.5	3.6	3.9	1.8	2.0	0.4	1.9	3.1	3.0
LnGrp Delay(d),s/veh	28.5	16.2	16.3	30.2	19.2	20.1	30.7	19.9	18.7	30.6	21.3	22.1
LnGrp LOS	C	B	B	C	B	C	C	B	B	C	C	C
Approach Vol, veh/h		804			786			406			502	
Approach Delay, s/veh		18.4			19.9			22.6			23.6	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	18.1	7.1	25.9	10.1	18.3	12.0	21.1
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	8.7	30.6	4.0	29.7	8.0	31.3	10.3	23.4
Max Q Clear Time (g_c+I1), s	5.8	5.9	2.9	11.0	5.7	8.5	6.8	9.9
Green Ext Time (p_c), s	0.1	2.8	0.0	5.7	0.1	2.8	0.1	5.0

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	608	33	38	620	115	95	251	42	114	232	133
Future Volume (veh/h)	125	608	33	38	620	115	95	251	42	114	232	133
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	136	661	36	41	674	125	103	273	46	124	252	145
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	1091	59	400	1934	354	148	499	200	219	403	223
Arrive On Green	0.12	0.32	0.30	0.24	0.45	0.43	0.09	0.14	0.14	0.13	0.18	0.17
Sat Flow, veh/h	1634	3410	186	1634	4310	789	1634	3539	1421	1634	2179	1207
Grp Volume(v), veh/h	136	343	354	41	528	271	103	273	46	124	203	194
Grp Sat Flow(s),veh/h/ln	1634	1770	1826	1634	1695	1708	1634	1770	1421	1634	1770	1616
Q Serve(g_s), s	8.0	16.3	16.4	1.9	10.2	10.5	6.1	7.2	2.9	7.1	10.6	11.2
Cycle Q Clear(g_c), s	8.0	16.3	16.4	1.9	10.2	10.5	6.1	7.2	2.9	7.1	10.6	11.2
Prop In Lane	1.00		0.10	1.00		0.46	1.00		1.00	1.00		0.75
Lane Grp Cap(c), veh/h	190	566	584	400	1522	767	148	499	200	219	327	299
V/C Ratio(X)	0.72	0.61	0.61	0.10	0.35	0.35	0.70	0.55	0.23	0.57	0.62	0.65
Avail Cap(c_a), veh/h	245	566	584	400	1522	767	217	1062	426	261	579	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.6	28.7	28.8	29.2	18.0	18.3	44.2	40.0	38.1	40.6	37.5	38.2
Incr Delay (d2), s/veh	6.9	4.7	4.6	0.1	0.6	1.2	5.8	0.9	0.6	2.3	1.9	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	8.7	9.0	0.9	4.9	5.2	3.0	3.6	1.2	3.3	5.4	5.2
LnGrp Delay(d),s/veh	49.5	33.4	33.4	29.3	18.6	19.5	50.0	40.9	38.7	42.9	39.4	40.6
LnGrp LOS	D	C	C	C	B	B	D	D	D	D	D	D
Approach Vol, veh/h		833			840			422			521	
Approach Delay, s/veh		36.0			19.4			42.9			40.7	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.4	18.1	28.5	36.0	13.0	22.5	15.6	48.9
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	14.7	28.7	4.3	30.3	12.0	31.4	13.3	21.3
Max Q Clear Time (g_c+I1), s	9.1	9.2	3.9	18.4	8.1	13.2	10.0	12.5
Green Ext Time (p_c), s	1.0	1.2	0.0	2.1	0.1	1.8	0.1	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	32.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	649	35	35	633	119	98	266	56	144	246	133
Future Volume (veh/h)	125	649	35	35	633	119	98	266	56	144	246	133
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	136	705	38	38	688	129	107	289	61	157	267	145
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	1218	66	94	1227	227	165	706	285	223	523	274
Arrive On Green	0.13	0.36	0.33	0.06	0.29	0.26	0.10	0.20	0.20	0.14	0.23	0.21
Sat Flow, veh/h	1634	3412	184	1634	4299	795	1634	3539	1427	1634	2227	1169
Grp Volume(v), veh/h	136	365	378	38	541	276	107	289	61	157	210	202
Grp Sat Flow(s),veh/h/ln	1634	1770	1826	1634	1695	1704	1634	1770	1427	1634	1770	1627
Q Serve(g_s), s	5.1	10.7	10.8	1.4	8.7	8.9	4.0	4.6	2.3	5.9	6.6	7.0
Cycle Q Clear(g_c), s	5.1	10.7	10.8	1.4	8.7	8.9	4.0	4.6	2.3	5.9	6.6	7.0
Prop In Lane	1.00		0.10	1.00		0.47	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	210	632	652	94	968	487	165	706	285	223	415	382
V/C Ratio(X)	0.65	0.58	0.58	0.41	0.56	0.57	0.65	0.41	0.21	0.70	0.51	0.53
Avail Cap(c_a), veh/h	306	868	896	145	1329	668	237	1764	711	255	901	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	16.7	16.8	29.1	19.4	19.9	27.7	22.3	21.4	26.4	21.3	21.8
Incr Delay (d2), s/veh	3.3	0.8	0.8	2.8	0.5	1.0	4.2	0.4	0.4	7.2	1.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	5.3	5.5	0.7	4.1	4.3	2.0	2.2	0.9	3.1	3.3	3.2
LnGrp Delay(d),s/veh	29.8	17.5	17.6	31.9	19.9	20.9	31.9	22.7	21.8	33.7	22.2	23.0
LnGrp LOS	C	B	B	C	B	C	C	C	C	C	C	C
Approach Vol, veh/h		879			855			457			569	
Approach Delay, s/veh		19.5			20.8			24.7			25.6	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	16.8	7.7	26.9	10.5	19.0	12.2	22.3
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	8.7	30.6	4.0	29.7	8.0	31.3	10.3	23.4
Max Q Clear Time (g_c+I1), s	7.9	6.6	3.4	12.8	6.0	9.0	7.1	10.9
Green Ext Time (p_c), s	0.0	3.1	0.0	6.1	0.0	3.1	0.1	5.3

Intersection Summary	
HCM 2010 Ctrl Delay	22.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	676	35	49	654	134	98	266	70	161	246	133
Future Volume (veh/h)	125	676	35	49	654	134	98	266	70	161	246	133
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	136	735	38	53	711	146	107	289	76	175	267	145
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	1095	57	380	1845	374	152	518	208	231	433	227
Arrive On Green	0.12	0.32	0.30	0.23	0.44	0.42	0.09	0.15	0.15	0.14	0.19	0.18
Sat Flow, veh/h	1634	3421	177	1634	4227	857	1634	3539	1422	1634	2226	1168
Grp Volume(v), veh/h	136	380	393	53	568	289	107	289	76	175	210	202
Grp Sat Flow(s),veh/h/ln	1634	1770	1828	1634	1695	1694	1634	1770	1422	1634	1770	1625
Q Serve(g_s), s	8.0	18.6	18.6	2.6	11.4	11.7	6.4	7.6	4.8	10.3	10.9	11.5
Cycle Q Clear(g_c), s	8.0	18.6	18.6	2.6	11.4	11.7	6.4	7.6	4.8	10.3	10.9	11.5
Prop In Lane	1.00		0.10	1.00		0.51	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	190	566	585	380	1480	740	152	518	208	231	344	316
V/C Ratio(X)	0.72	0.67	0.67	0.14	0.38	0.39	0.70	0.56	0.37	0.76	0.61	0.64
Avail Cap(c_a), veh/h	245	566	585	380	1480	740	217	1062	427	261	579	531
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.89	0.89	0.89	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.6	29.4	29.5	30.4	19.1	19.5	44.0	39.7	38.5	41.3	36.8	37.5
Incr Delay (d2), s/veh	6.9	6.2	6.1	0.1	0.7	1.4	5.8	0.9	1.1	10.7	1.8	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	10.1	10.4	1.2	5.4	5.7	3.1	3.8	1.9	5.4	5.5	5.3
LnGrp Delay(d),s/veh	49.5	35.7	35.6	30.6	19.7	20.8	49.8	40.6	39.6	52.1	38.6	39.7
LnGrp LOS	D	D	D	C	B	C	D	D	D	D	D	D
Approach Vol, veh/h		909			910			472			587	
Approach Delay, s/veh		37.7			20.7			42.5			43.0	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.1	18.6	27.3	36.0	13.3	23.4	15.6	47.7
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	14.7	28.7	4.3	30.3	12.0	31.4	13.3	21.3
Max Q Clear Time (g_c+I1), s	12.3	9.6	4.6	20.6	8.4	13.5	10.0	13.7
Green Ext Time (p_c), s	0.6	1.4	0.0	2.2	0.1	2.1	0.1	2.4

Intersection Summary		
HCM 2010 Ctrl Delay		34.2
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	747	47	38	720	128	121	377	68	149	348	136
Future Volume (veh/h)	128	747	47	38	720	128	121	377	68	149	348	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	139	812	51	41	783	139	132	410	74	162	378	148
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	1201	75	88	1228	216	189	840	339	221	639	246
Arrive On Green	0.13	0.36	0.33	0.05	0.28	0.26	0.12	0.24	0.24	0.14	0.26	0.24
Sat Flow, veh/h	1634	3378	212	1634	4337	763	1634	3539	1429	1634	2483	957
Grp Volume(v), veh/h	139	425	438	41	611	311	132	410	74	162	268	258
Grp Sat Flow(s),veh/h/ln	1634	1770	1821	1634	1695	1710	1634	1770	1429	1634	1770	1671
Q Serve(g_s), s	6.0	15.0	15.0	1.8	11.6	11.8	5.7	7.3	3.1	7.0	9.7	10.1
Cycle Q Clear(g_c), s	6.0	15.0	15.0	1.8	11.6	11.8	5.7	7.3	3.1	7.0	9.7	10.1
Prop In Lane	1.00		0.12	1.00		0.45	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	206	629	647	88	960	484	189	840	339	221	455	430
V/C Ratio(X)	0.67	0.68	0.68	0.46	0.64	0.64	0.70	0.49	0.22	0.73	0.59	0.60
Avail Cap(c_a), veh/h	267	755	777	127	1157	584	207	1535	620	222	784	741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	20.1	20.2	33.8	23.0	23.5	31.3	24.2	22.6	30.5	23.9	24.3
Incr Delay (d2), s/veh	4.4	1.9	1.8	3.8	0.8	1.8	9.0	0.4	0.3	11.6	1.2	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	7.6	7.9	0.9	5.5	5.8	3.0	3.6	1.2	3.9	4.9	4.8
LnGrp Delay(d),s/veh	35.0	22.0	22.0	37.5	23.9	25.2	40.3	24.6	22.9	42.1	25.1	25.7
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1002			963			616			688	
Approach Delay, s/veh		23.8			24.9			27.8			29.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	21.5	8.0	30.2	12.5	22.9	13.3	24.8
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	8.7	30.6	4.0	29.7	8.0	31.3	10.3	23.4
Max Q Clear Time (g_c+I1), s	9.0	9.3	3.8	17.0	7.7	12.1	8.0	13.8
Green Ext Time (p_c), s	0.0	4.2	0.0	6.2	0.0	4.1	0.1	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	26.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	774	47	52	741	143	121	377	82	166	348	136
Future Volume (veh/h)	128	774	47	52	741	143	121	377	82	166	348	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	139	841	51	57	805	155	132	410	89	180	378	148
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	193	1535	93	98	1689	323	179	630	254	243	540	208
Arrive On Green	0.12	0.45	0.44	0.06	0.40	0.38	0.11	0.18	0.18	0.15	0.22	0.20
Sat Flow, veh/h	1634	3387	205	1634	4276	817	1634	3539	1425	1634	2482	957
Grp Volume(v), veh/h	139	439	453	57	637	323	132	410	89	180	268	258
Grp Sat Flow(s),veh/h/ln	1634	1770	1822	1634	1695	1702	1634	1770	1425	1634	1770	1669
Q Serve(g_s), s	8.2	18.1	18.1	3.4	14.0	14.3	7.8	10.8	4.4	10.5	14.0	14.4
Cycle Q Clear(g_c), s	8.2	18.1	18.1	3.4	14.0	14.3	7.8	10.8	4.4	10.5	14.0	14.4
Prop In Lane	1.00		0.11	1.00		0.48	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	193	802	826	98	1339	672	179	630	254	243	385	363
V/C Ratio(X)	0.72	0.55	0.55	0.58	0.48	0.48	0.74	0.65	0.35	0.74	0.70	0.71
Avail Cap(c_a), veh/h	245	802	826	98	1339	672	217	1062	428	261	579	546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	19.9	20.0	45.8	22.5	22.9	43.1	38.2	23.0	40.7	36.1	36.6
Incr Delay (d2), s/veh	7.3	2.7	2.6	6.2	0.9	1.8	10.0	1.1	0.8	9.9	2.3	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	9.4	9.7	1.7	6.7	7.0	4.0	5.3	1.8	5.4	7.1	6.9
LnGrp Delay(d),s/veh	49.9	22.6	22.6	52.0	23.4	24.7	53.2	39.3	23.8	50.6	38.3	39.2
LnGrp LOS	D	C	C	D	C	C	D	D	C	D	D	D
Approach Vol, veh/h		1031			1017			631			706	
Approach Delay, s/veh		26.3			25.4			40.0			41.8	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.9	21.8	10.0	49.3	14.9	25.8	15.8	43.5
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	14.7	28.7	4.3	30.3	12.0	31.4	13.3	21.3
Max Q Clear Time (g_c+I1), s	12.5	12.8	5.4	20.1	9.8	16.4	10.2	16.3
Green Ext Time (p_c), s	0.7	1.9	0.0	5.6	0.1	2.4	0.1	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	31.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	774	47	52	741	143	121	377	82	166	348	136
Future Volume (veh/h)	128	774	47	52	741	143	121	377	82	166	348	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	139	841	51	57	805	155	132	410	89	180	378	148
Adj No. of Lanes	1	3	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	2212	134	95	1432	273	179	635	256	241	540	208
Arrive On Green	0.17	0.45	0.43	0.06	0.33	0.32	0.11	0.18	0.18	0.15	0.22	0.20
Sat Flow, veh/h	1634	4899	296	1634	4275	816	1634	3539	1425	1634	2482	957
Grp Volume(v), veh/h	139	581	311	57	637	323	132	410	89	180	268	258
Grp Sat Flow(s),veh/h/ln	1634	1695	1805	1634	1695	1701	1634	1770	1425	1634	1770	1669
Q Serve(g_s), s	7.5	11.1	11.2	3.3	15.1	15.4	7.7	10.5	4.3	10.3	13.7	14.1
Cycle Q Clear(g_c), s	7.5	11.1	11.2	3.3	15.1	15.4	7.7	10.5	4.3	10.3	13.7	14.1
Prop In Lane	1.00		0.16	1.00		0.48	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	286	1531	815	95	1136	570	179	635	256	241	385	363
V/C Ratio(X)	0.49	0.38	0.38	0.60	0.56	0.57	0.74	0.65	0.35	0.75	0.69	0.71
Avail Cap(c_a), veh/h	286	1531	815	95	1136	570	183	1083	436	241	596	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.65	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.5	17.8	17.9	45.0	26.7	27.1	42.3	37.3	22.4	40.0	35.3	35.8
Incr Delay (d2), s/veh	1.3	0.7	1.4	6.6	0.4	0.9	14.3	1.1	0.8	12.0	2.3	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	5.3	5.9	1.7	7.1	7.4	4.2	5.2	1.7	5.5	6.9	6.7
LnGrp Delay(d),s/veh	37.8	18.5	19.3	51.7	27.1	28.0	56.6	38.4	23.2	52.0	37.6	38.4
LnGrp LOS	D	B	B	D	C	C	E	D	C	D	D	D
Approach Vol, veh/h		1031			1017			631			706	
Approach Delay, s/veh		21.3			28.8			40.1			41.6	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.5	21.6	9.7	48.3	14.7	25.3	21.1	36.8
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	12.7	28.7	4.0	30.6	9.7	31.7	13.3	21.3
Max Q Clear Time (g_c+I1), s	12.3	12.5	5.3	13.2	9.7	16.1	9.5	17.4
Green Ext Time (p_c), s	0.1	1.9	0.0	4.0	0.0	2.3	1.6	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	31.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	725	45	50	638	98	104	198	34	126	267	186
Future Volume (veh/h)	210	725	45	50	638	98	104	198	34	126	267	186
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	228	788	49	54	693	107	113	215	37	137	290	202
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	1251	78	103	1185	181	168	799	322	196	486	328
Arrive On Green	0.17	0.37	0.35	0.06	0.27	0.24	0.10	0.23	0.23	0.12	0.24	0.22
Sat Flow, veh/h	1634	3381	210	1634	4440	678	1634	3539	1428	1634	2007	1354
Grp Volume(v), veh/h	228	412	425	54	527	273	113	215	37	137	255	237
Grp Sat Flow(s),veh/h/ln	1634	1770	1821	1634	1695	1727	1634	1770	1428	1634	1770	1591
Q Serve(g_s), s	9.8	13.8	13.9	2.3	9.8	10.0	4.8	3.6	1.5	5.8	9.2	9.7
Cycle Q Clear(g_c), s	9.8	13.8	13.9	2.3	9.8	10.0	4.8	3.6	1.5	5.8	9.2	9.7
Prop In Lane	1.00		0.12	1.00		0.39	1.00		1.00	1.00		0.85
Lane Grp Cap(c), veh/h	271	655	674	103	905	461	168	799	322	196	429	386
V/C Ratio(X)	0.84	0.63	0.63	0.52	0.58	0.59	0.67	0.27	0.11	0.70	0.59	0.62
Avail Cap(c_a), veh/h	271	769	792	129	1178	600	210	1563	631	226	799	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.2	18.7	18.8	32.8	23.0	23.4	31.2	23.1	22.2	30.5	24.2	24.9
Incr Delay (d2), s/veh	20.3	1.3	1.2	4.1	0.6	1.2	5.8	0.2	0.2	7.7	1.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	7.0	7.2	1.2	4.6	4.9	2.4	1.8	0.6	3.0	4.6	4.4
LnGrp Delay(d),s/veh	49.5	20.0	20.0	36.9	23.6	24.6	37.0	23.2	22.4	38.3	25.5	26.5
LnGrp LOS	D	B	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1065			854			365			629	
Approach Delay, s/veh		26.3			24.7			27.4			28.7	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	20.3	8.6	30.7	11.4	21.5	16.0	23.3
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	8.7	30.6	4.0	29.7	8.0	31.3	10.3	23.4
Max Q Clear Time (g_c+I1), s	7.8	5.6	4.3	15.9	6.8	11.7	11.8	12.0
Green Ext Time (p_c), s	0.0	3.0	0.0	5.9	0.0	2.9	0.0	5.3

Intersection Summary			
HCM 2010 Ctrl Delay			26.5
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	736	45	59	651	107	104	198	40	133	267	186
Future Volume (veh/h)	210	736	45	59	651	107	104	198	40	133	267	186
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	228	800	49	64	708	116	113	215	43	145	290	202
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	1609	99	98	1696	275	159	445	178	292	416	280
Arrive On Green	0.15	0.48	0.46	0.06	0.39	0.37	0.10	0.13	0.13	0.18	0.21	0.19
Sat Flow, veh/h	1634	3385	207	1634	4400	713	1634	3539	1419	1634	2006	1353
Grp Volume(v), veh/h	228	418	431	64	544	280	113	215	43	145	255	237
Grp Sat Flow(s),veh/h/ln	1634	1770	1822	1634	1695	1722	1634	1770	1419	1634	1770	1589
Q Serve(g_s), s	13.8	16.2	16.3	3.8	11.7	12.0	6.7	5.7	2.2	8.0	13.3	14.0
Cycle Q Clear(g_c), s	13.8	16.2	16.3	3.8	11.7	12.0	6.7	5.7	2.2	8.0	13.3	14.0
Prop In Lane	1.00		0.11	1.00		0.41	1.00		1.00	1.00		0.85
Lane Grp Cap(c), veh/h	245	841	866	98	1307	664	159	445	178	292	367	329
V/C Ratio(X)	0.93	0.50	0.50	0.65	0.42	0.42	0.71	0.48	0.24	0.50	0.69	0.72
Avail Cap(c_a), veh/h	245	841	866	98	1307	664	217	1062	426	292	579	519
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.0	18.0	18.1	46.0	22.5	22.8	43.8	40.7	25.9	37.0	36.7	37.5
Incr Delay (d2), s/veh	38.9	2.1	2.0	12.8	0.9	1.7	6.6	0.8	0.7	1.3	2.4	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	8.4	8.6	2.1	5.7	6.0	3.3	2.8	0.9	3.7	6.8	6.4
LnGrp Delay(d),s/veh	80.9	20.1	20.1	58.8	23.3	24.6	50.4	41.5	26.6	38.3	39.1	40.4
LnGrp LOS	F	C	C	E	C	C	D	D	C	D	D	D
Approach Vol, veh/h		1077			888			371			637	
Approach Delay, s/veh		33.0			26.3			42.5			39.4	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.9	16.6	10.0	51.6	13.7	24.7	19.0	42.6
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	14.7	28.7	4.3	30.3	12.0	31.4	13.3	21.3
Max Q Clear Time (g_c+I1), s	10.0	7.7	5.8	18.3	8.7	16.0	15.8	14.0
Green Ext Time (p_c), s	1.2	1.0	0.0	5.6	0.1	1.7	0.0	4.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	211	756	47	62	674	117	108	210	42	137	283	187
Future Volume (veh/h)	211	756	47	62	674	117	108	210	42	137	283	187
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	229	822	51	67	733	127	117	228	46	149	308	203
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	264	1222	76	119	1189	204	172	793	320	207	504	323
Arrive On Green	0.16	0.36	0.34	0.07	0.27	0.25	0.11	0.22	0.22	0.13	0.25	0.23
Sat Flow, veh/h	1634	3381	210	1634	4357	747	1634	3539	1428	1634	2053	1315
Grp Volume(v), veh/h	229	430	443	67	569	291	117	228	46	149	264	247
Grp Sat Flow(s),veh/h/ln	1634	1770	1821	1634	1695	1713	1634	1770	1428	1634	1770	1598
Q Serve(g_s), s	10.2	15.3	15.3	2.9	10.9	11.2	5.1	4.0	1.9	6.5	9.9	10.3
Cycle Q Clear(g_c), s	10.2	15.3	15.3	2.9	10.9	11.2	5.1	4.0	1.9	6.5	9.9	10.3
Prop In Lane	1.00		0.12	1.00		0.44	1.00		1.00	1.00		0.82
Lane Grp Cap(c), veh/h	264	640	658	119	925	468	172	793	320	207	435	393
V/C Ratio(X)	0.87	0.67	0.67	0.56	0.61	0.62	0.68	0.29	0.14	0.72	0.61	0.63
Avail Cap(c_a), veh/h	264	747	769	125	1144	578	204	1517	612	220	775	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	20.0	20.1	33.4	23.6	24.0	32.1	23.9	23.1	31.2	24.9	25.5
Incr Delay (d2), s/veh	25.2	1.9	1.9	5.2	0.7	1.4	7.0	0.2	0.2	10.2	1.4	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	7.7	8.0	1.5	5.1	5.5	2.6	2.0	0.8	3.5	4.9	4.7
LnGrp Delay(d),s/veh	55.6	22.0	22.0	38.5	24.3	25.4	39.1	24.1	23.4	41.4	26.3	27.2
LnGrp LOS	E	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1102			927			391			660	
Approach Delay, s/veh		29.0			25.7			28.5			30.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	20.7	9.4	30.9	11.8	22.3	16.0	24.3
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	8.7	30.6	4.0	29.7	8.0	31.3	10.3	23.4
Max Q Clear Time (g_c+I1), s	8.5	6.0	4.9	17.3	7.1	12.3	12.2	13.2
Green Ext Time (p_c), s	0.0	3.2	0.0	5.9	0.0	3.1	0.0	5.3

Intersection Summary	
HCM 2010 Ctrl Delay	28.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	211	767	47	71	687	126	108	210	48	144	283	187
Future Volume (veh/h)	211	767	47	71	687	126	108	210	48	144	283	187
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	229	834	51	77	747	137	117	228	52	157	308	203
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	1583	97	98	1629	296	163	458	184	299	436	279
Arrive On Green	0.15	0.47	0.45	0.06	0.38	0.36	0.10	0.13	0.13	0.18	0.21	0.20
Sat Flow, veh/h	1634	3385	207	1634	4315	783	1634	3539	1419	1634	2052	1315
Grp Volume(v), veh/h	229	436	449	77	585	299	117	228	52	157	264	247
Grp Sat Flow(s),veh/h/ln	1634	1770	1822	1634	1695	1708	1634	1770	1419	1634	1770	1597
Q Serve(g_s), s	13.9	17.4	17.4	4.6	13.0	13.3	6.9	6.0	2.7	8.7	13.8	14.4
Cycle Q Clear(g_c), s	13.9	17.4	17.4	4.6	13.0	13.3	6.9	6.0	2.7	8.7	13.8	14.4
Prop In Lane	1.00		0.11	1.00		0.46	1.00		1.00	1.00		0.82
Lane Grp Cap(c), veh/h	245	827	852	98	1280	645	163	458	184	299	376	339
V/C Ratio(X)	0.93	0.53	0.53	0.79	0.46	0.46	0.72	0.50	0.28	0.53	0.70	0.73
Avail Cap(c_a), veh/h	245	827	852	98	1280	645	217	1062	426	299	579	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.0	18.8	18.9	46.4	23.4	23.8	43.6	40.5	25.8	36.9	36.5	37.2
Incr Delay (d2), s/veh	39.9	2.4	2.3	28.6	1.0	2.0	7.2	0.8	0.8	1.7	2.4	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	9.0	9.3	2.9	6.3	6.6	3.4	3.0	1.1	4.1	7.0	6.7
LnGrp Delay(d),s/veh	81.9	21.2	21.2	75.0	24.4	25.8	50.9	41.3	26.6	38.6	38.9	40.2
LnGrp LOS	F	C	C	E	C	C	D	D	C	D	D	D
Approach Vol, veh/h		1114			961			397			668	
Approach Delay, s/veh		33.7			28.9			42.2			39.3	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.3	16.9	10.0	50.8	14.0	25.2	19.0	41.8
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	14.7	28.7	4.3	30.3	12.0	31.4	13.3	21.3
Max Q Clear Time (g_c+I1), s	10.7	8.0	6.6	19.4	8.9	16.4	15.9	15.3
Green Ext Time (p_c), s	0.4	1.1	0.0	5.6	0.1	1.8	0.0	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	34.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	878	64	68	767	127	132	297	57	144	401	191
Future Volume (veh/h)	214	878	64	68	767	127	132	297	57	144	401	191
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	233	954	70	74	834	138	143	323	62	157	436	208
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	236	1184	87	112	1223	201	183	935	378	197	632	298
Arrive On Green	0.14	0.35	0.33	0.07	0.28	0.26	0.11	0.26	0.26	0.12	0.27	0.26
Sat Flow, veh/h	1634	3339	245	1634	4388	721	1634	3539	1430	1634	2319	1095
Grp Volume(v), veh/h	233	506	518	74	643	329	143	323	62	157	332	312
Grp Sat Flow(s),veh/h/ln	1634	1770	1814	1634	1695	1719	1634	1770	1430	1634	1770	1644
Q Serve(g_s), s	11.8	21.5	21.5	3.7	14.0	14.3	7.1	6.1	2.8	7.8	13.9	14.3
Cycle Q Clear(g_c), s	11.8	21.5	21.5	3.7	14.0	14.3	7.1	6.1	2.8	7.8	13.9	14.3
Prop In Lane	1.00		0.14	1.00		0.42	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	236	627	643	112	945	479	183	935	378	197	482	448
V/C Ratio(X)	0.99	0.81	0.81	0.66	0.68	0.69	0.78	0.35	0.16	0.80	0.69	0.70
Avail Cap(c_a), veh/h	236	669	685	112	1024	519	183	1358	549	197	694	645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.5	24.2	24.4	37.8	26.7	27.1	35.9	24.8	23.5	35.6	27.1	27.6
Incr Delay (d2), s/veh	55.0	6.8	6.7	13.4	1.7	3.4	19.4	0.2	0.2	20.3	1.8	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	11.6	11.9	2.1	6.7	7.2	4.2	3.0	1.1	4.6	7.1	6.7
LnGrp Delay(d),s/veh	90.5	31.1	31.0	51.2	28.4	30.5	55.4	25.0	23.7	55.9	28.8	29.5
LnGrp LOS	F	C	C	D	C	C	E	C	C	E	C	C
Approach Vol, veh/h		1257			1046			528			801	
Approach Delay, s/veh		42.1			30.6			33.1			34.4	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	25.9	9.7	33.5	13.3	26.6	16.0	27.2
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	8.7	30.6	4.0	29.7	8.0	31.3	10.3	23.4
Max Q Clear Time (g_c+I1), s	9.8	8.1	5.7	23.5	9.1	16.3	13.8	16.3
Green Ext Time (p_c), s	0.0	4.3	0.0	4.2	0.0	3.8	0.0	4.6

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	889	64	77	780	136	132	297	63	151	401	191
Future Volume (veh/h)	214	889	64	77	780	136	132	297	63	151	401	191
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	233	966	70	84	848	148	143	323	68	164	436	208
Adj No. of Lanes	1	2	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	1069	77	261	1435	249	190	548	220	335	565	267
Arrive On Green	0.15	0.32	0.30	0.16	0.33	0.31	0.12	0.15	0.15	0.21	0.24	0.23
Sat Flow, veh/h	1634	3342	242	1634	4349	754	1634	3539	1423	1634	2318	1094
Grp Volume(v), veh/h	233	511	525	84	660	336	143	323	68	164	332	312
Grp Sat Flow(s),veh/h/ln	1634	1770	1815	1634	1695	1713	1634	1770	1423	1634	1770	1643
Q Serve(g_s), s	14.1	27.6	27.7	4.6	16.2	16.4	8.5	8.5	4.2	8.9	17.5	17.8
Cycle Q Clear(g_c), s	14.1	27.6	27.7	4.6	16.2	16.4	8.5	8.5	4.2	8.9	17.5	17.8
Prop In Lane	1.00		0.13	1.00		0.44	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	245	566	581	261	1119	565	190	548	220	335	431	400
V/C Ratio(X)	0.95	0.90	0.90	0.32	0.59	0.59	0.75	0.59	0.31	0.49	0.77	0.78
Avail Cap(c_a), veh/h	245	566	581	261	1119	565	217	1062	427	335	579	537
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.49	0.49	0.49	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	32.5	32.6	37.2	27.9	28.3	42.8	39.3	37.5	35.1	35.2	35.7
Incr Delay (d2), s/veh	43.9	20.2	19.9	0.3	1.1	2.2	12.0	1.0	0.8	1.1	4.4	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	16.7	17.1	2.1	7.7	8.1	4.4	4.2	1.7	4.1	9.0	8.7
LnGrp Delay(d),s/veh	86.0	52.8	52.5	37.5	29.0	30.5	54.8	40.3	38.3	36.2	39.6	40.9
LnGrp LOS	F	D	D	D	C	C	D	D	D	D	D	D
Approach Vol, veh/h		1269			1080			534			808	
Approach Delay, s/veh		58.8			30.1			43.9			39.4	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.5	19.5	20.0	36.0	15.6	28.4	19.0	37.0
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	14.7	28.7	4.3	30.3	12.0	31.4	13.3	21.3
Max Q Clear Time (g_c+I1), s	10.9	10.5	6.6	29.7	10.5	19.8	16.1	18.4
Green Ext Time (p_c), s	1.3	1.5	0.0	0.3	0.1	2.1	0.0	1.4

Intersection Summary		
HCM 2010 Ctrl Delay		44.0
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	889	64	77	780	136	132	297	63	151	401	191
Future Volume (veh/h)	214	889	64	77	780	136	132	297	63	151	401	191
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1750	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	233	966	70	84	848	148	143	323	68	164	436	208
Adj No. of Lanes	1	3	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	274	2035	147	95	1355	235	183	552	222	329	569	268
Arrive On Green	0.17	0.42	0.40	0.06	0.31	0.29	0.11	0.16	0.16	0.20	0.25	0.23
Sat Flow, veh/h	1634	4835	350	1634	4349	754	1634	3539	1423	1634	2318	1095
Grp Volume(v), veh/h	233	677	359	84	660	336	143	323	68	164	332	312
Grp Sat Flow(s),veh/h/ln	1634	1695	1794	1634	1695	1713	1634	1770	1423	1634	1770	1643
Q Serve(g_s), s	13.6	14.2	14.3	5.0	16.3	16.6	8.3	8.3	3.3	8.7	17.1	17.4
Cycle Q Clear(g_c), s	13.6	14.2	14.3	5.0	16.3	16.6	8.3	8.3	3.3	8.7	17.1	17.4
Prop In Lane	1.00		0.19	1.00		0.44	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	274	1427	755	95	1056	534	183	552	222	329	434	403
V/C Ratio(X)	0.85	0.47	0.48	0.88	0.62	0.63	0.78	0.58	0.31	0.50	0.76	0.77
Avail Cap(c_a), veh/h	274	1427	755	95	1056	534	183	1083	436	329	596	553
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.6	20.5	20.7	45.8	28.8	29.2	42.3	38.4	23.6	34.7	34.3	34.9
Incr Delay (d2), s/veh	21.7	1.1	2.1	39.3	0.7	1.4	19.1	1.0	0.8	1.2	4.0	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	6.8	7.5	3.3	7.7	8.0	4.7	4.2	1.4	4.0	8.8	8.4
LnGrp Delay(d),s/veh	61.3	21.7	22.8	85.1	29.5	30.6	61.4	39.4	24.4	35.9	38.3	39.5
LnGrp LOS	E	C	C	F	C	C	E	D	C	D	D	D
Approach Vol, veh/h		1269			1080			534			808	
Approach Delay, s/veh		29.3			34.2			43.4			38.3	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.7	19.3	9.7	45.3	15.0	28.0	20.4	34.5
Change Period (Y+Rc), s	5.3	5.3	5.7	5.7	5.3	5.3	5.7	5.7
Max Green Setting (Gmax), s	12.7	28.7	4.0	30.6	9.7	31.7	13.3	21.3
Max Q Clear Time (g_c+I1), s	10.7	10.3	7.0	16.3	10.3	19.4	15.6	18.6
Green Ext Time (p_c), s	0.7	1.5	0.0	4.7	0.0	2.1	0.0	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.7
HCM 2010 LOS	C

Intersection 5
Monitor St & Panama Ln

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	381	103	35	411	36	112	245	79	34	194	155
Future Volume (veh/h)	118	381	103	35	411	36	112	245	79	34	194	155
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	128	414	112	38	447	39	122	266	86	37	211	168
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	1840	738	75	1129	451	127	427	328	60	350	268
Arrive On Green	0.25	0.52	0.52	0.05	0.32	0.32	0.08	0.23	0.23	0.04	0.19	0.19
Sat Flow, veh/h	1634	3539	1420	1634	3539	1415	1634	1863	1429	1634	1863	1426
Grp Volume(v), veh/h	128	414	112	38	447	39	122	266	86	37	211	168
Grp Sat Flow(s),veh/h/ln	1634	1770	1420	1634	1770	1415	1634	1863	1429	1634	1863	1426
Q Serve(g_s), s	6.1	6.0	3.9	2.2	9.4	1.4	7.1	12.2	4.7	2.1	9.9	5.9
Cycle Q Clear(g_c), s	6.1	6.0	3.9	2.2	9.4	1.4	7.1	12.2	4.7	2.1	9.9	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	403	1840	738	75	1129	451	127	427	328	60	350	268
V/C Ratio(X)	0.32	0.22	0.15	0.51	0.40	0.09	0.96	0.62	0.26	0.62	0.60	0.63
Avail Cap(c_a), veh/h	403	1840	738	117	1129	451	127	708	543	84	659	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.84	0.84	0.84	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	29.2	12.4	11.9	44.3	25.2	13.4	43.6	32.9	30.0	45.1	35.3	11.5
Incr Delay (d2), s/veh	0.4	0.3	0.4	4.5	0.9	0.3	66.8	1.5	0.4	9.5	1.6	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	3.0	1.6	1.1	4.7	0.6	5.5	6.5	1.9	1.1	5.2	2.5
LnGrp Delay(d),s/veh	29.7	12.7	12.3	48.8	26.1	13.8	110.4	34.4	30.4	54.7	36.9	13.8
LnGrp LOS	C	B	B	D	C	B	F	C	C	D	D	B
Approach Vol, veh/h		654			524			474			416	
Approach Delay, s/veh		15.9			26.8			53.2			29.1	
Approach LOS		B			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	25.8	8.3	53.4	11.4	21.9	27.4	34.3
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	4.0	35.2	5.1	29.5	6.5	32.7	6.0	28.6
Max Q Clear Time (g_c+I1), s	4.1	14.2	4.2	8.0	9.1	11.9	8.1	11.4
Green Ext Time (p_c), s	0.0	2.8	0.0	2.6	0.0	2.8	0.0	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	29.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	445	103	58	466	70	112	245	105	73	194	155
Future Volume (veh/h)	118	445	103	58	466	70	112	245	105	73	194	155
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	128	484	112	63	507	76	122	266	114	79	211	168
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	1089	435	440	1671	670	163	376	288	112	319	244
Arrive On Green	0.10	0.31	0.31	0.27	0.47	0.47	0.10	0.20	0.20	0.07	0.17	0.17
Sat Flow, veh/h	1634	3539	1414	1634	3539	1419	1634	1863	1427	1634	1863	1425
Grp Volume(v), veh/h	128	484	112	63	507	76	122	266	114	79	211	168
Grp Sat Flow(s),veh/h/ln	1634	1770	1414	1634	1770	1419	1634	1863	1427	1634	1863	1425
Q Serve(g_s), s	8.0	11.5	6.3	3.1	9.3	3.1	7.6	14.0	4.0	5.0	11.1	8.9
Cycle Q Clear(g_c), s	8.0	11.5	6.3	3.1	9.3	3.1	7.6	14.0	4.0	5.0	11.1	8.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	171	1089	435	440	1671	670	163	376	288	112	319	244
V/C Ratio(X)	0.75	0.44	0.26	0.14	0.30	0.11	0.75	0.71	0.40	0.70	0.66	0.69
Avail Cap(c_a), veh/h	171	1089	435	440	1671	670	179	626	480	187	635	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.69	0.69	0.69	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	45.7	29.2	27.3	29.2	17.1	15.5	46.0	39.0	10.8	47.8	40.7	23.7
Incr Delay (d2), s/veh	15.3	1.2	1.3	0.1	0.3	0.2	14.6	2.4	0.9	7.3	2.2	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	5.8	2.6	1.4	4.6	1.3	4.1	7.4	1.6	2.5	5.9	3.7
LnGrp Delay(d),s/veh	61.0	30.4	28.7	29.3	17.4	15.7	60.5	41.4	11.7	55.1	42.9	26.9
LnGrp LOS	E	C	C	C	B	B	E	D	B	E	D	C
Approach Vol, veh/h		724			646			502			458	
Approach Delay, s/veh		35.5			18.4			39.3			39.2	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	25.2	32.3	36.3	14.5	22.0	15.0	53.6
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	11.1	34.4	7.7	30.6	10.6	34.9	9.3	29.0
Max Q Clear Time (g_c+I1), s	7.0	16.0	5.1	13.5	9.6	13.1	10.0	11.3
Green Ext Time (p_c), s	0.1	1.8	0.8	2.3	0.2	1.4	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	32.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	531	108	51	486	78	117	256	118	131	203	162
Future Volume (veh/h)	124	531	108	51	486	78	117	256	118	131	203	162
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	135	577	117	55	528	85	127	278	128	142	221	176
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	391	1766	709	97	1129	451	127	413	317	84	364	279
Arrive On Green	0.24	0.50	0.50	0.06	0.32	0.32	0.08	0.22	0.22	0.05	0.20	0.20
Sat Flow, veh/h	1634	3539	1420	1634	3539	1415	1634	1863	1428	1634	1863	1427
Grp Volume(v), veh/h	135	577	117	55	528	85	127	278	128	142	221	176
Grp Sat Flow(s),veh/h/ln	1634	1770	1420	1634	1770	1415	1634	1863	1428	1634	1863	1427
Q Serve(g_s), s	6.5	9.3	4.3	3.1	11.3	3.1	7.4	13.0	7.3	4.9	10.3	6.2
Cycle Q Clear(g_c), s	6.5	9.3	4.3	3.1	11.3	3.1	7.4	13.0	7.3	4.9	10.3	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	391	1766	709	97	1129	451	127	413	317	84	364	279
V/C Ratio(X)	0.35	0.33	0.17	0.57	0.47	0.19	1.00	0.67	0.40	1.68	0.61	0.63
Avail Cap(c_a), veh/h	391	1766	709	117	1129	451	127	708	543	84	659	505
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.54	0.54	0.54	1.00	1.00	1.00	0.91	0.91	0.91
Uniform Delay (d), s/veh	30.0	14.2	13.0	43.5	25.9	13.1	43.8	33.8	31.6	45.1	34.9	11.6
Incr Delay (d2), s/veh	0.4	0.4	0.4	2.9	0.8	0.5	79.1	1.9	0.8	350.2	1.5	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	4.6	1.8	1.5	5.6	1.3	6.1	6.9	3.0	10.4	5.4	2.6
LnGrp Delay(d),s/veh	30.4	14.7	13.4	46.4	26.7	13.6	122.8	35.7	32.4	395.2	36.4	13.7
LnGrp LOS	C	B	B	D	C	B	F	D	C	F	D	B
Approach Vol, veh/h		829			668			533			539	
Approach Delay, s/veh		17.0			26.6			55.7			123.5	
Approach LOS		B			C			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	25.1	9.6	51.4	11.4	22.6	26.7	34.3
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	4.0	35.2	5.1	29.5	6.5	32.7	6.0	28.6
Max Q Clear Time (g_c+I1), s	6.9	15.0	5.1	11.3	9.4	12.3	8.5	13.3
Green Ext Time (p_c), s	0.0	3.2	0.0	3.3	0.0	3.2	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	49.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	595	108	74	541	112	117	256	144	170	203	162
Future Volume (veh/h)	124	595	108	74	541	112	117	256	144	170	203	162
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	135	647	117	80	588	122	127	278	157	185	221	176
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	1089	435	363	1505	603	231	379	290	187	328	251
Arrive On Green	0.10	0.31	0.31	0.22	0.43	0.43	0.14	0.20	0.20	0.11	0.18	0.18
Sat Flow, veh/h	1634	3539	1414	1634	3539	1418	1634	1863	1427	1634	1863	1425
Grp Volume(v), veh/h	135	647	117	80	588	122	127	278	157	185	221	176
Grp Sat Flow(s),veh/h/ln	1634	1770	1414	1634	1770	1418	1634	1863	1427	1634	1863	1425
Q Serve(g_s), s	8.5	16.3	6.6	4.2	12.0	5.7	7.6	14.7	6.2	11.9	11.6	9.3
Cycle Q Clear(g_c), s	8.5	16.3	6.6	4.2	12.0	5.7	7.6	14.7	6.2	11.9	11.6	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	171	1089	435	363	1505	603	231	379	290	187	328	251
V/C Ratio(X)	0.79	0.59	0.27	0.22	0.39	0.20	0.55	0.73	0.54	0.99	0.67	0.70
Avail Cap(c_a), veh/h	171	1089	435	363	1505	603	231	626	480	187	635	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	0.39	0.39	0.39	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	45.9	30.8	27.4	33.4	20.8	19.0	41.9	39.2	13.6	46.4	40.4	23.5
Incr Delay (d2), s/veh	19.0	2.1	1.3	0.1	0.3	0.3	2.7	2.8	1.6	59.8	2.2	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	8.2	2.7	1.9	5.9	2.3	3.6	7.9	2.6	8.4	6.2	3.9
LnGrp Delay(d),s/veh	64.9	32.9	28.8	33.5	21.1	19.3	44.7	41.9	15.2	106.2	42.6	26.7
LnGrp LOS	E	C	C	C	C	B	D	D	B	F	D	C
Approach Vol, veh/h		899			790			562			582	
Approach Delay, s/veh		37.2			22.1			35.1			58.0	
Approach LOS		D			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	25.3	27.4	36.3	18.9	22.5	15.0	48.7
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	11.1	34.4	7.7	30.6	10.6	34.9	9.3	29.0
Max Q Clear Time (g_c+I1), s	13.9	16.7	6.2	18.3	9.6	13.6	10.5	14.0
Green Ext Time (p_c), s	0.0	1.6	0.6	2.7	0.3	1.5	0.0	3.0

Intersection Summary			
HCM 2010 Ctrl Delay			36.8
HCM 2010 LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	673	147	64	640	91	153	335	143	141	265	212
Future Volume (veh/h)	168	673	147	64	640	91	153	335	143	141	265	212
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	183	732	160	70	696	99	166	364	155	153	288	230
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	1484	595	112	1001	400	204	469	360	190	453	348
Arrive On Green	0.20	0.42	0.42	0.07	0.28	0.28	0.12	0.25	0.25	0.12	0.24	0.24
Sat Flow, veh/h	1634	3539	1418	1634	3539	1413	1634	1863	1430	1634	1863	1429
Grp Volume(v), veh/h	183	732	160	70	696	99	166	364	155	153	288	230
Grp Sat Flow(s),veh/h/ln	1634	1770	1418	1634	1770	1413	1634	1863	1430	1634	1863	1429
Q Serve(g_s), s	11.1	16.8	8.2	4.6	19.5	4.2	11.0	20.2	10.1	10.1	15.4	9.9
Cycle Q Clear(g_c), s	11.1	16.8	8.2	4.6	19.5	4.2	11.0	20.2	10.1	10.1	15.4	9.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	335	1484	595	112	1001	400	204	469	360	190	453	348
V/C Ratio(X)	0.55	0.49	0.27	0.63	0.70	0.25	0.81	0.78	0.43	0.80	0.64	0.66
Avail Cap(c_a), veh/h	335	1484	595	158	1001	400	221	597	459	191	564	433
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.77	0.77	0.77	0.22	0.22	0.22	1.00	1.00	1.00	0.81	0.81	0.81
Uniform Delay (d), s/veh	39.5	23.6	21.1	50.3	35.5	14.8	47.3	38.6	34.9	47.8	37.6	14.2
Incr Delay (d2), s/veh	1.4	0.9	0.9	1.3	0.9	0.3	19.1	4.9	0.8	17.9	1.3	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	8.4	3.4	2.1	9.6	1.7	6.1	11.1	4.0	5.5	8.1	4.1
LnGrp Delay(d),s/veh	41.0	24.5	21.9	51.6	36.4	15.1	66.4	43.6	35.7	65.7	38.9	16.4
LnGrp LOS	D	C	C	D	D	B	E	D	D	E	D	B
Approach Vol, veh/h		1075			865			685			671	
Approach Delay, s/veh		26.9			35.2			47.3			37.3	
Approach LOS		C			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.9	31.9	11.6	50.6	17.9	31.0	26.7	35.4
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	12.1	34.7	9.0	34.0	14.1	32.7	13.3	29.7
Max Q Clear Time (g_c+I1), s	12.1	22.2	6.6	18.8	13.0	17.4	13.1	21.5
Green Ext Time (p_c), s	0.0	3.6	0.0	4.2	0.1	3.9	0.0	2.3

Intersection Summary			
HCM 2010 Ctrl Delay			35.4
HCM 2010 LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	737	147	87	695	125	153	335	169	180	265	212
Future Volume (veh/h)	168	737	147	87	695	125	153	335	169	180	265	212
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	183	801	160	95	755	136	166	364	184	196	288	230
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	1449	580	122	1285	514	269	448	344	212	384	294
Arrive On Green	0.12	0.41	0.41	0.07	0.36	0.36	0.16	0.24	0.24	0.13	0.21	0.21
Sat Flow, veh/h	1634	3539	1418	1634	3539	1416	1634	1863	1429	1634	1863	1427
Grp Volume(v), veh/h	183	801	160	95	755	136	166	364	184	196	288	230
Grp Sat Flow(s),veh/h/ln	1634	1770	1418	1634	1770	1416	1634	1863	1429	1634	1863	1427
Q Serve(g_s), s	12.2	19.0	4.5	6.3	19.0	4.7	10.4	20.3	9.7	13.0	16.0	12.3
Cycle Q Clear(g_c), s	12.2	19.0	4.5	6.3	19.0	4.7	10.4	20.3	9.7	13.0	16.0	12.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	1449	580	122	1285	514	269	448	344	212	384	294
V/C Ratio(X)	0.93	0.55	0.28	0.78	0.59	0.26	0.62	0.81	0.53	0.92	0.75	0.78
Avail Cap(c_a), veh/h	198	1449	580	122	1285	514	269	598	459	212	611	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.09	0.09	0.09	1.00	1.00	1.00	0.81	0.81	0.81
Uniform Delay (d), s/veh	47.9	24.8	6.4	50.0	28.4	9.9	42.7	39.4	22.4	47.3	41.0	22.4
Incr Delay (d2), s/veh	37.1	1.2	0.9	3.0	0.2	0.1	4.2	6.2	1.3	35.5	2.4	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	9.5	1.9	3.0	9.3	1.8	5.0	11.2	3.9	8.0	8.5	5.2
LnGrp Delay(d),s/veh	84.9	26.0	7.4	53.0	28.6	10.0	46.9	45.7	23.7	82.8	43.4	26.1
LnGrp LOS	F	C	A	D	C	B	D	D	C	F	D	C
Approach Vol, veh/h		1144			986			714			714	
Approach Delay, s/veh		32.8			28.4			40.3			48.6	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.3	30.5	12.2	49.0	22.1	26.7	17.3	43.9
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	13.4	34.4	6.5	34.5	12.6	35.2	11.6	29.4
Max Q Clear Time (g_c+I1), s	15.0	22.3	8.3	21.0	12.4	18.0	14.2	21.0
Green Ext Time (p_c), s	0.0	1.8	0.0	7.1	0.0	1.9	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	36.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	737	147	87	695	125	153	335	169	180	265	212
Future Volume (veh/h)	168	737	147	87	695	125	153	335	169	180	265	212
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	183	801	160	95	755	136	166	364	184	196	288	230
Adj No. of Lanes	2	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	1400	561	111	1221	488	208	457	350	222	473	363
Arrive On Green	0.12	0.40	0.40	0.07	0.34	0.34	0.13	0.25	0.25	0.14	0.25	0.25
Sat Flow, veh/h	3170	3539	1417	1634	3539	1416	1634	1863	1429	1634	1863	1430
Grp Volume(v), veh/h	183	801	160	95	755	136	166	364	184	196	288	230
Grp Sat Flow(s),veh/h/ln	1585	1770	1417	1634	1770	1416	1634	1863	1429	1634	1863	1430
Q Serve(g_s), s	5.6	18.2	7.9	5.9	18.3	7.2	10.2	18.9	9.0	12.1	14.1	10.5
Cycle Q Clear(g_c), s	5.6	18.2	7.9	5.9	18.3	7.2	10.2	18.9	9.0	12.1	14.1	10.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	1400	561	111	1221	488	208	457	350	222	473	363
V/C Ratio(X)	0.49	0.57	0.29	0.86	0.62	0.28	0.80	0.80	0.53	0.88	0.61	0.63
Avail Cap(c_a), veh/h	376	1400	561	111	1221	488	247	638	490	222	609	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.74	0.74	0.74	1.00	1.00	1.00	0.74	0.74	0.74
Uniform Delay (d), s/veh	42.5	24.3	21.2	47.5	28.1	24.4	43.7	36.5	20.7	43.7	33.9	17.4
Incr Delay (d2), s/veh	0.9	1.5	1.1	35.6	0.7	0.2	14.4	4.8	1.2	25.0	0.9	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	9.2	3.3	3.8	9.0	2.8	5.4	10.3	3.6	7.0	7.3	4.3
LnGrp Delay(d),s/veh	43.3	25.8	22.3	83.1	28.8	24.7	58.1	41.3	21.9	68.7	34.8	18.7
LnGrp LOS	D	C	C	F	C	C	E	D	C	E	C	B
Approach Vol, veh/h		1144			986			714			714	
Approach Delay, s/veh		28.1			33.5			40.2			39.0	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	29.2	11.0	44.8	17.1	30.2	16.2	39.5
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	13.1	34.4	5.3	29.0	14.7	32.8	5.0	29.3
Max Q Clear Time (g_c+I1), s	14.1	20.9	7.9	20.2	12.2	16.1	7.6	20.3
Green Ext Time (p_c), s	0.0	1.9	0.0	3.5	0.1	2.7	0.0	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	34.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	559	133	36	549	60	114	189	48	50	148	150
Future Volume (veh/h)	145	559	133	36	549	60	114	189	48	50	148	150
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	158	608	145	39	597	65	124	205	52	54	161	163
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	447	1932	776	76	1129	451	127	352	270	82	300	230
Arrive On Green	0.27	0.55	0.55	0.05	0.32	0.32	0.08	0.19	0.19	0.05	0.16	0.16
Sat Flow, veh/h	1634	3539	1421	1634	3539	1415	1634	1863	1426	1634	1863	1424
Grp Volume(v), veh/h	158	608	145	39	597	65	124	205	52	54	161	163
Grp Sat Flow(s),veh/h/ln	1634	1770	1421	1634	1770	1415	1634	1863	1426	1634	1863	1424
Q Serve(g_s), s	7.4	8.9	4.9	2.2	13.1	2.3	7.2	9.5	2.9	3.1	7.5	5.7
Cycle Q Clear(g_c), s	7.4	8.9	4.9	2.2	13.1	2.3	7.2	9.5	2.9	3.1	7.5	5.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	447	1932	776	76	1129	451	127	352	270	82	300	230
V/C Ratio(X)	0.35	0.31	0.19	0.51	0.53	0.14	0.97	0.58	0.19	0.66	0.54	0.71
Avail Cap(c_a), veh/h	447	1932	776	117	1129	451	127	708	542	84	659	503
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.71	0.71	0.71	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	27.8	11.8	10.9	44.2	26.5	13.0	43.7	35.1	32.4	44.3	36.6	11.5
Incr Delay (d2), s/veh	0.4	0.3	0.4	3.8	1.3	0.5	71.6	1.5	0.3	16.2	1.4	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	4.4	2.0	1.1	6.6	1.0	5.8	5.0	1.2	1.8	4.0	2.5
LnGrp Delay(d),s/veh	28.1	12.2	11.3	48.0	27.8	13.5	115.3	36.6	32.8	60.5	38.0	15.3
LnGrp LOS	C	B	B	D	C	B	F	D	C	E	D	B
Approach Vol, veh/h		911			701			381			378	
Approach Delay, s/veh		14.8			27.6			61.7			31.4	
Approach LOS		B			C			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	22.0	8.4	55.9	11.4	19.3	30.0	34.3
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	4.0	35.2	5.1	29.5	6.5	32.7	6.0	28.6
Max Q Clear Time (g_c+I1), s	5.1	11.5	4.2	10.9	9.2	9.5	9.4	15.1
Green Ext Time (p_c), s	0.0	2.3	0.0	3.7	0.0	2.3	0.0	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	28.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	586	133	50	582	81	114	189	59	66	148	150
Future Volume (veh/h)	145	586	133	50	582	81	114	189	59	66	148	150
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	158	637	145	54	633	88	124	205	64	72	161	163
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	1089	435	472	1740	698	164	349	267	104	281	215
Arrive On Green	0.10	0.31	0.31	0.29	0.49	0.49	0.10	0.19	0.19	0.06	0.15	0.15
Sat Flow, veh/h	1634	3539	1414	1634	3539	1420	1634	1863	1426	1634	1863	1422
Grp Volume(v), veh/h	158	637	145	54	633	88	124	205	64	72	161	163
Grp Sat Flow(s),veh/h/ln	1634	1770	1414	1634	1770	1420	1634	1863	1426	1634	1863	1422
Q Serve(g_s), s	10.1	16.0	8.3	2.6	11.6	3.5	7.8	10.5	2.1	4.5	8.4	8.8
Cycle Q Clear(g_c), s	10.1	16.0	8.3	2.6	11.6	3.5	7.8	10.5	2.1	4.5	8.4	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	171	1089	435	472	1740	698	164	349	267	104	281	215
V/C Ratio(X)	0.92	0.59	0.33	0.11	0.36	0.13	0.76	0.59	0.24	0.69	0.57	0.76
Avail Cap(c_a), veh/h	171	1089	435	472	1740	698	179	626	479	187	635	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.58	0.58	0.58	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	46.6	30.7	28.0	27.5	16.5	14.5	46.0	38.9	10.2	48.2	41.4	25.1
Incr Delay (d2), s/veh	42.2	2.0	1.7	0.1	0.3	0.2	15.5	1.6	0.5	7.7	1.8	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	8.1	3.5	1.2	5.7	1.4	4.2	5.6	0.9	2.3	4.5	3.8
LnGrp Delay(d),s/veh	88.8	32.6	29.8	27.5	16.9	14.7	61.4	40.5	10.6	55.8	43.2	30.4
LnGrp LOS	F	C	C	C	B	B	E	D	B	E	D	C
Approach Vol, veh/h		940			775			393			396	
Approach Delay, s/veh		41.6			17.4			42.2			40.2	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	23.7	34.3	36.3	14.5	19.8	15.0	55.6
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	11.1	34.4	7.7	30.6	10.6	34.9	9.3	29.0
Max Q Clear Time (g_c+I1), s	6.5	12.5	4.6	18.0	9.8	10.8	12.1	13.6
Green Ext Time (p_c), s	0.1	1.4	1.1	2.8	0.1	1.2	0.0	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	34.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	618	140	52	633	106	119	198	58	74	155	157
Future Volume (veh/h)	153	618	140	52	633	106	119	198	58	74	155	157
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	166	672	152	57	688	115	129	215	63	80	168	171
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	1866	749	99	1129	451	127	358	274	84	309	236
Arrive On Green	0.27	0.53	0.53	0.06	0.32	0.32	0.08	0.19	0.19	0.05	0.17	0.17
Sat Flow, veh/h	1634	3539	1420	1634	3539	1415	1634	1863	1426	1634	1863	1424
Grp Volume(v), veh/h	166	672	152	57	688	115	129	215	63	80	168	171
Grp Sat Flow(s),veh/h/ln	1634	1770	1420	1634	1770	1415	1634	1863	1426	1634	1863	1424
Q Serve(g_s), s	7.9	10.5	5.4	3.2	15.6	4.3	7.4	10.0	3.5	4.6	7.9	6.0
Cycle Q Clear(g_c), s	7.9	10.5	5.4	3.2	15.6	4.3	7.4	10.0	3.5	4.6	7.9	6.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	440	1866	749	99	1129	451	127	358	274	84	309	236
V/C Ratio(X)	0.38	0.36	0.20	0.57	0.61	0.25	1.01	0.60	0.23	0.95	0.54	0.72
Avail Cap(c_a), veh/h	440	1866	749	117	1129	451	127	708	542	84	659	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	0.22	0.22	0.22	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	28.2	13.1	11.9	43.4	27.3	13.4	43.8	35.1	32.4	44.9	36.3	11.5
Incr Delay (d2), s/veh	0.4	0.4	0.5	1.2	0.6	0.3	83.4	1.6	0.4	78.8	1.4	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	5.2	2.2	1.5	7.7	1.7	6.3	5.3	1.4	3.9	4.2	2.6
LnGrp Delay(d),s/veh	28.6	13.5	12.3	44.6	27.9	13.7	127.3	36.7	32.9	123.7	37.8	15.5
LnGrp LOS	C	B	B	D	C	B	F	D	C	F	D	B
Approach Vol, veh/h		990			860			407			419	
Approach Delay, s/veh		15.9			27.1			64.8			45.1	
Approach LOS		B			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	22.2	9.8	54.1	11.4	19.7	29.6	34.3
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	4.0	35.2	5.1	29.5	6.5	32.7	6.0	28.6
Max Q Clear Time (g_c+I1), s	6.6	12.0	5.2	12.5	9.4	9.9	9.9	17.6
Green Ext Time (p_c), s	0.0	2.4	0.0	4.0	0.0	2.4	0.0	2.7

Intersection Summary	
HCM 2010 Ctrl Delay	31.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	645	140	66	666	127	119	198	69	90	155	157
Future Volume (veh/h)	153	645	140	66	666	127	119	198	69	90	155	157
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	166	701	152	72	724	138	129	215	75	98	168	171
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	1089	435	461	1716	688	169	327	251	134	289	220
Arrive On Green	0.10	0.31	0.31	0.28	0.48	0.48	0.10	0.18	0.18	0.08	0.15	0.15
Sat Flow, veh/h	1634	3539	1414	1634	3539	1420	1634	1863	1425	1634	1863	1423
Grp Volume(v), veh/h	166	701	152	72	724	138	129	215	75	98	168	171
Grp Sat Flow(s),veh/h/ln	1634	1770	1414	1634	1770	1420	1634	1863	1425	1634	1863	1423
Q Serve(g_s), s	10.6	18.0	8.8	3.5	13.9	5.8	8.1	11.3	2.6	6.1	8.8	9.3
Cycle Q Clear(g_c), s	10.6	18.0	8.8	3.5	13.9	5.8	8.1	11.3	2.6	6.1	8.8	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	171	1089	435	461	1716	688	169	327	251	134	289	220
V/C Ratio(X)	0.97	0.64	0.35	0.16	0.42	0.20	0.76	0.66	0.30	0.73	0.58	0.78
Avail Cap(c_a), veh/h	171	1089	435	461	1716	688	179	626	479	187	635	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.09	0.09	0.09	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	46.8	31.4	28.2	28.3	17.5	15.4	45.8	40.3	11.2	47.0	41.2	25.0
Incr Delay (d2), s/veh	52.1	2.3	1.7	0.0	0.1	0.1	16.8	2.2	0.7	8.2	1.8	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	9.1	3.6	1.6	6.8	2.3	4.4	6.0	1.1	3.1	4.7	4.0
LnGrp Delay(d),s/veh	98.9	33.7	29.9	28.3	17.6	15.5	62.7	42.6	11.8	55.2	43.0	30.5
LnGrp LOS	F	C	C	C	B	B	E	D	B	E	D	C
Approach Vol, veh/h		1019			934			419			437	
Approach Delay, s/veh		43.8			18.1			43.3			40.8	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	22.5	33.6	36.3	14.8	20.3	15.0	54.9
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	11.1	34.4	7.7	30.6	10.6	34.9	9.3	29.0
Max Q Clear Time (g_c+I1), s	8.1	13.3	5.5	20.0	10.1	11.3	12.6	15.9
Green Ext Time (p_c), s	0.1	1.5	1.0	2.9	0.1	1.3	0.0	3.4

Intersection Summary			
HCM 2010 Ctrl Delay			34.7
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	826	189	65	838	128	156	258	74	90	202	205
Future Volume (veh/h)	207	826	189	65	838	128	156	258	74	90	202	205
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	225	898	205	71	911	139	170	280	80	98	220	223
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	389	1719	690	117	1129	451	127	415	318	84	366	280
Arrive On Green	0.24	0.49	0.49	0.07	0.32	0.32	0.08	0.22	0.22	0.05	0.20	0.20
Sat Flow, veh/h	1634	3539	1420	1634	3539	1415	1634	1863	1428	1634	1863	1427
Grp Volume(v), veh/h	225	898	205	71	911	139	170	280	80	98	220	223
Grp Sat Flow(s),veh/h/ln	1634	1770	1420	1634	1770	1415	1634	1863	1428	1634	1863	1427
Q Serve(g_s), s	11.6	16.6	8.2	4.0	22.4	5.3	7.4	13.1	4.4	4.9	10.2	8.1
Cycle Q Clear(g_c), s	11.6	16.6	8.2	4.0	22.4	5.3	7.4	13.1	4.4	4.9	10.2	8.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	389	1719	690	117	1129	451	127	415	318	84	366	280
V/C Ratio(X)	0.58	0.52	0.30	0.61	0.81	0.31	1.34	0.67	0.25	1.16	0.60	0.80
Avail Cap(c_a), veh/h	389	1719	690	117	1129	451	127	708	543	84	659	505
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	0.09	0.09	0.09	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	32.0	16.8	14.7	42.8	29.7	13.7	43.8	33.8	30.4	45.1	34.8	12.0
Incr Delay (d2), s/veh	1.3	0.7	0.7	0.8	0.6	0.2	194.7	1.9	0.4	142.5	1.4	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	8.3	3.4	1.8	11.0	2.1	10.2	6.9	1.8	5.5	5.4	3.5
LnGrp Delay(d),s/veh	33.3	17.5	15.4	43.6	30.3	13.8	238.5	35.7	30.8	187.5	36.2	16.6
LnGrp LOS	C	B	B	D	C	B	F	D	C	F	D	B
Approach Vol, veh/h		1328			1121			530			541	
Approach Delay, s/veh		19.9			29.1			100.0			55.5	
Approach LOS		B			C			F			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	25.2	10.8	50.2	11.4	22.7	26.6	34.3				
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7				
Max Green Setting (Gmax), s	4.0	35.2	5.1	29.5	6.5	32.7	6.0	28.6				
Max Q Clear Time (g_c+I1), s	6.9	15.1	6.0	18.6	9.4	12.2	13.6	24.4				
Green Ext Time (p_c), s	0.0	3.2	0.0	4.5	0.0	3.2	0.0	1.9				
Intersection Summary												
HCM 2010 Ctrl Delay			40.3									
HCM 2010 LOS			D									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	853	189	79	871	149	156	258	85	106	202	205
Future Volume (veh/h)	207	853	189	79	871	149	156	258	85	106	202	205
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	225	927	205	86	947	162	170	280	92	115	220	223
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	1089	435	395	1574	631	191	381	292	153	338	258
Arrive On Green	0.10	0.31	0.31	0.24	0.44	0.44	0.12	0.20	0.20	0.09	0.18	0.18
Sat Flow, veh/h	1634	3539	1414	1634	3539	1419	1634	1863	1427	1634	1863	1425
Grp Volume(v), veh/h	225	927	205	86	947	162	170	280	92	115	220	223
Grp Sat Flow(s),veh/h/ln	1634	1770	1414	1634	1770	1419	1634	1863	1427	1634	1863	1425
Q Serve(g_s), s	11.0	25.8	12.3	4.4	21.3	7.5	10.8	14.8	3.3	7.2	11.5	12.1
Cycle Q Clear(g_c), s	11.0	25.8	12.3	4.4	21.3	7.5	10.8	14.8	3.3	7.2	11.5	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	171	1089	435	395	1574	631	191	381	292	153	338	258
V/C Ratio(X)	1.31	0.85	0.47	0.22	0.60	0.26	0.89	0.74	0.32	0.75	0.65	0.86
Avail Cap(c_a), veh/h	171	1089	435	395	1574	631	191	626	480	187	635	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.69	0.09	0.09	0.09	1.00	1.00	1.00	0.89	0.89	0.89
Uniform Delay (d), s/veh	47.0	34.1	29.4	31.8	22.1	18.3	45.7	39.1	11.9	46.4	39.9	24.0
Incr Delay (d2), s/veh	167.3	6.0	2.5	0.0	0.2	0.1	36.8	2.8	0.6	11.4	1.9	7.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	13.5	5.1	2.0	10.4	3.0	6.8	7.9	1.4	3.7	6.1	5.3
LnGrp Delay(d),s/veh	214.3	40.1	32.0	31.9	22.2	18.4	82.5	41.9	12.5	57.8	41.8	31.5
LnGrp LOS	F	D	C	C	C	B	F	D	B	E	D	C
Approach Vol, veh/h		1357			1195			542			558	
Approach Delay, s/veh		67.8			22.4			49.6			41.0	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.8	25.5	29.4	36.3	16.3	23.0	15.0	50.7
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	11.1	34.4	7.7	30.6	10.6	34.9	9.3	29.0
Max Q Clear Time (g_c+I1), s	9.2	16.8	6.4	27.8	12.8	14.1	13.0	23.3
Green Ext Time (p_c), s	0.1	1.6	0.8	1.5	0.0	1.7	0.0	2.7

Intersection Summary	
HCM 2010 Ctrl Delay	46.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	853	189	79	871	149	156	258	85	106	202	205
Future Volume (veh/h)	207	853	189	79	871	149	156	258	85	106	202	205
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	225	927	205	86	947	162	170	280	92	115	220	223
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	1583	635	96	1321	529	201	382	293	210	392	301
Arrive On Green	0.13	0.45	0.45	0.12	0.75	0.75	0.12	0.21	0.21	0.13	0.21	0.21
Sat Flow, veh/h	1634	3539	1419	1634	3539	1417	1634	1863	1427	1634	1863	1428
Grp Volume(v), veh/h	225	927	205	86	947	162	170	280	92	115	220	223
Grp Sat Flow(s),veh/h/ln	1634	1770	1419	1634	1770	1417	1634	1863	1427	1634	1863	1428
Q Serve(g_s), s	13.3	19.6	5.3	5.2	14.6	3.8	10.2	14.1	4.4	6.6	10.6	14.6
Cycle Q Clear(g_c), s	13.3	19.6	5.3	5.2	14.6	3.8	10.2	14.1	4.4	6.6	10.6	14.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	218	1583	635	96	1321	529	201	382	293	210	392	301
V/C Ratio(X)	1.03	0.59	0.32	0.89	0.72	0.31	0.85	0.73	0.31	0.55	0.56	0.74
Avail Cap(c_a), veh/h	218	1583	635	96	1321	529	201	658	504	210	652	500
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	0.73	0.73	0.73	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	43.3	20.7	5.8	43.8	9.8	8.4	42.9	37.2	21.7	40.9	35.3	36.9
Incr Delay (d2), s/veh	64.6	1.3	1.1	47.4	1.4	0.2	26.9	2.7	0.6	2.6	1.1	3.1
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	9.8	2.3	3.6	7.1	1.4	6.1	7.5	1.8	3.1	5.6	6.0
LnGrp Delay(d),s/veh	108.0	22.0	6.9	91.2	11.2	8.7	69.8	39.9	22.3	43.5	36.4	40.1
LnGrp LOS	F	C	A	F	B	A	E	D	C	D	D	D
Approach Vol, veh/h		1357			1195			542			558	
Approach Delay, s/veh		34.0			16.6			46.3			39.3	
Approach LOS		C			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.8	24.5	9.9	48.7	16.3	25.1	17.3	41.3
Change Period (Y+Rc), s	4.9	4.9	5.7	5.7	4.9	4.9	5.7	5.7
Max Green Setting (Gmax), s	11.1	34.4	4.2	29.1	11.4	34.1	4.9	28.4
Max Q Clear Time (g_c+I1), s	8.6	16.1	7.2	21.6	12.2	16.6	15.3	16.6
Green Ext Time (p_c), s	0.3	1.3	0.0	3.7	0.0	1.6	0.0	4.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C

Intersection 6
Union Ave & Panama Ln

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	261	79	155	220	52	129	313	143	56	226	91
Future Volume (veh/h)	153	261	79	155	220	52	129	313	143	56	226	91
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	166	284	86	168	239	57	140	340	155	61	246	99
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	220	1277	517	367	654	156	174	706	291	102	411	160
Arrive On Green	0.13	0.36	0.36	0.22	0.45	0.44	0.11	0.20	0.20	0.06	0.17	0.15
Sat Flow, veh/h	1634	3539	1433	1634	1449	346	1634	3539	1458	1634	2471	963
Grp Volume(v), veh/h	166	284	86	168	0	296	140	340	155	61	174	171
Grp Sat Flow(s),veh/h/ln	1634	1770	1433	1634	0	1795	1634	1770	1458	1634	1770	1664
Q Serve(g_s), s	10.3	5.9	2.9	9.3	0.0	11.4	8.8	8.9	5.8	3.8	9.5	10.1
Cycle Q Clear(g_c), s	10.3	5.9	2.9	9.3	0.0	11.4	8.8	8.9	5.8	3.8	9.5	10.1
Prop In Lane	1.00		1.00	1.00		0.19	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	220	1277	517	367	0	810	174	706	291	102	295	277
V/C Ratio(X)	0.76	0.22	0.17	0.46	0.00	0.37	0.80	0.48	0.53	0.60	0.59	0.62
Avail Cap(c_a), veh/h	303	1277	517	367	0	810	174	951	392	154	474	445
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	1.00	0.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	43.8	23.3	10.6	35.2	0.0	19.0	45.8	37.2	12.8	47.9	40.4	41.1
Incr Delay (d2), s/veh	6.8	0.4	0.7	0.9	0.0	1.3	23.1	0.5	1.5	5.4	1.9	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	2.9	1.2	4.3	0.0	5.9	5.1	4.4	2.4	1.9	4.8	4.8
LnGrp Delay(d),s/veh	50.6	23.7	11.3	36.0	0.0	20.3	68.9	37.7	14.3	53.4	42.3	43.3
LnGrp LOS	D	C	B	D		C	E	D	B	D	D	D
Approach Vol, veh/h		536			464			635			406	
Approach Delay, s/veh		30.0			26.0			38.9			44.4	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	24.9	27.6	41.9	14.0	21.5	18.1	51.4
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	8.2	26.5	11.3	36.2	9.5	26.4	17.8	29.7
Max Q Clear Time (g_c+I1), s	5.8	10.9	11.3	7.9	10.8	12.1	12.3	13.4
Green Ext Time (p_c), s	0.0	3.0	0.0	1.5	0.0	2.9	0.2	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	34.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	408	79	184	347	107	129	313	178	121	226	91
Future Volume (veh/h)	153	408	79	184	347	107	129	313	178	121	226	91
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	166	443	86	200	377	116	140	340	193	132	246	99
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	1252	507	383	621	191	181	554	228	180	412	160
Arrive On Green	0.13	0.35	0.35	0.23	0.46	0.44	0.11	0.16	0.16	0.11	0.17	0.15
Sat Flow, veh/h	1634	3539	1433	1634	1362	419	1634	3539	1458	1634	2471	963
Grp Volume(v), veh/h	166	443	86	200	0	493	140	340	193	132	174	171
Grp Sat Flow(s),veh/h/ln	1634	1770	1433	1634	0	1781	1634	1770	1458	1634	1770	1664
Q Serve(g_s), s	10.8	10.2	3.1	11.7	0.0	23.0	9.2	9.9	8.5	8.6	10.0	10.6
Cycle Q Clear(g_c), s	10.8	10.2	3.1	11.7	0.0	23.0	9.2	9.9	8.5	8.6	10.0	10.6
Prop In Lane	1.00		1.00	1.00		0.24	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	215	1252	507	383	0	813	181	554	228	180	295	277
V/C Ratio(X)	0.77	0.35	0.17	0.52	0.00	0.61	0.77	0.61	0.84	0.73	0.59	0.62
Avail Cap(c_a), veh/h	229	1252	507	383	0	813	181	869	358	180	452	425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	0.96	0.00	0.96	1.00	1.00	1.00	0.98	0.98	0.98
Uniform Delay (d), s/veh	46.2	26.3	11.5	36.7	0.0	22.6	47.6	43.3	16.2	47.4	42.4	43.1
Incr Delay (d2), s/veh	13.7	0.8	0.7	1.2	0.0	3.2	18.4	1.1	10.4	14.2	1.8	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	5.1	1.3	5.4	0.0	12.0	5.0	4.9	4.1	4.6	5.0	5.0
LnGrp Delay(d),s/veh	59.9	27.0	12.2	38.0	0.0	25.9	65.9	44.4	26.6	61.6	44.2	45.2
LnGrp LOS	E	C	B	D		C	E	D	C	E	D	D
Approach Vol, veh/h		695			693			673			477	
Approach Delay, s/veh		33.0			29.4			43.8			49.4	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.1	21.2	29.8	42.9	15.0	22.3	18.5	54.2
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	10.4	25.3	14.3	37.2	10.5	26.4	13.7	37.8
Max Q Clear Time (g_c+I1), s	10.6	11.9	13.7	12.2	11.2	12.6	12.8	25.0
Green Ext Time (p_c), s	0.0	3.0	0.1	2.2	0.0	3.0	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	37.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	550	83	190	354	118	136	330	217	201	238	96
Future Volume (veh/h)	161	550	83	190	354	118	136	330	217	201	238	96
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	175	598	90	207	385	128	148	359	236	218	259	104
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	1411	572	187	524	174	162	746	308	202	611	238
Arrive On Green	0.12	0.40	0.40	0.11	0.39	0.38	0.10	0.21	0.21	0.12	0.25	0.23
Sat Flow, veh/h	1634	3539	1434	1634	1332	443	1634	3539	1458	1634	2474	964
Grp Volume(v), veh/h	175	598	90	207	0	513	148	359	236	218	183	180
Grp Sat Flow(s),veh/h/ln	1634	1770	1434	1634	0	1776	1634	1770	1458	1634	1770	1669
Q Serve(g_s), s	11.1	12.8	4.2	12.0	0.0	26.0	9.4	9.4	16.0	13.0	9.1	9.6
Cycle Q Clear(g_c), s	11.1	12.8	4.2	12.0	0.0	26.0	9.4	9.4	16.0	13.0	9.1	9.6
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	196	1411	572	187	0	698	162	746	308	202	437	412
V/C Ratio(X)	0.89	0.42	0.16	1.11	0.00	0.74	0.91	0.48	0.77	1.08	0.42	0.44
Avail Cap(c_a), veh/h	196	1411	572	187	0	698	162	873	360	202	501	472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	1.00	0.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97
Uniform Delay (d), s/veh	45.5	22.8	20.3	46.5	0.0	27.4	46.9	36.4	39.0	46.0	33.2	33.8
Incr Delay (d2), s/veh	31.2	0.8	0.5	97.9	0.0	6.8	46.6	0.5	8.2	84.4	0.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	6.4	1.8	10.5	0.0	14.0	6.3	4.6	7.1	10.6	4.5	4.5
LnGrp Delay(d),s/veh	76.8	23.6	20.7	144.4	0.0	34.2	93.4	36.9	47.2	130.4	33.8	34.5
LnGrp LOS	E	C	C	F		C	F	D	D	F	C	C
Approach Vol, veh/h		863			720			743			581	
Approach Delay, s/veh		34.1			65.9			51.4			70.3	
Approach LOS		C			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	26.1	16.0	45.9	13.2	29.9	16.6	45.3
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	11.3	24.2	10.3	36.4	8.7	28.0	10.9	35.8
Max Q Clear Time (g_c+I1), s	15.0	18.0	14.0	14.8	11.4	11.6	13.1	28.0
Green Ext Time (p_c), s	0.0	2.2	0.0	5.2	0.0	3.5	0.0	3.3

Intersection Summary		
HCM 2010 Ctrl Delay		53.6
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	697	83	219	481	173	136	330	252	266	238	96
Future Volume (veh/h)	161	697	83	219	481	173	136	330	252	266	238	96
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	175	758	90	238	523	188	148	359	274	289	259	104
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	227	1258	509	271	498	179	196	664	274	238	554	216
Arrive On Green	0.14	0.36	0.36	0.17	0.38	0.37	0.12	0.19	0.19	0.15	0.22	0.21
Sat Flow, veh/h	1634	3539	1433	1634	1302	468	1634	3539	1458	1634	2474	964
Grp Volume(v), veh/h	175	758	90	238	0	711	148	359	274	289	183	180
Grp Sat Flow(s),veh/h/ln	1634	1770	1433	1634	0	1770	1634	1770	1458	1634	1770	1668
Q Serve(g_s), s	11.4	19.3	3.2	15.6	0.0	42.1	9.6	10.1	13.8	16.0	9.9	10.4
Cycle Q Clear(g_c), s	11.4	19.3	3.2	15.6	0.0	42.1	9.6	10.1	13.8	16.0	9.9	10.4
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	227	1258	509	271	0	678	196	664	274	238	396	373
V/C Ratio(X)	0.77	0.60	0.18	0.88	0.00	1.05	0.75	0.54	1.00	1.22	0.46	0.48
Avail Cap(c_a), veh/h	227	1258	509	271	0	678	201	833	343	238	476	449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.96	0.00	0.96	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	45.7	29.1	10.9	44.8	0.0	34.2	46.8	40.4	19.9	47.0	37.0	37.6
Incr Delay (d2), s/veh	13.1	1.8	0.6	25.2	0.0	47.5	14.6	0.7	45.3	128.3	0.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	9.7	1.4	9.0	0.0	29.5	5.2	5.0	9.0	15.7	4.9	4.9
LnGrp Delay(d),s/veh	58.8	30.9	11.6	70.0	0.0	81.6	61.4	41.1	65.2	175.3	37.8	38.5
LnGrp LOS	E	C	B	E		F	E	D	F	F	D	D
Approach Vol, veh/h		1023			949			781			652	
Approach Delay, s/veh		34.0			78.7			53.4			98.9	
Approach LOS		C			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	24.6	22.3	43.1	16.0	28.6	19.3	46.1
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	14.3	24.2	11.3	37.4	11.8	27.9	8.3	40.4
Max Q Clear Time (g_c+I1), s	18.0	15.8	17.6	21.3	11.6	12.4	13.4	44.1
Green Ext Time (p_c), s	0.0	2.7	0.0	3.4	0.0	3.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	63.3
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	218	647	113	248	436	137	175	425	260	218	307	124
Future Volume (veh/h)	218	647	113	248	436	137	175	425	260	218	307	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	237	703	123	270	474	149	190	462	283	237	334	135
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	1153	467	281	470	148	227	764	315	251	591	234
Arrive On Green	0.15	0.33	0.33	0.17	0.35	0.33	0.14	0.22	0.22	0.15	0.24	0.23
Sat Flow, veh/h	1634	3539	1432	1634	1353	425	1634	3539	1458	1634	2462	975
Grp Volume(v), veh/h	237	703	123	270	0	623	190	462	283	237	238	231
Grp Sat Flow(s),veh/h/ln	1634	1770	1432	1634	0	1779	1634	1770	1458	1634	1770	1667
Q Serve(g_s), s	17.3	20.1	7.6	19.7	0.0	41.7	13.6	14.1	22.7	17.2	14.2	14.7
Cycle Q Clear(g_c), s	17.3	20.1	7.6	19.7	0.0	41.7	13.6	14.1	22.7	17.2	14.2	14.7
Prop In Lane	1.00		1.00	1.00		0.24	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	245	1153	467	281	0	618	227	764	315	251	425	400
V/C Ratio(X)	0.97	0.61	0.26	0.96	0.00	1.01	0.84	0.60	0.90	0.95	0.56	0.58
Avail Cap(c_a), veh/h	245	1153	467	281	0	618	227	764	315	251	425	400
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	1.00	0.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	50.7	34.0	29.8	49.3	0.0	39.4	50.3	42.4	45.8	50.3	40.0	40.7
Incr Delay (d2), s/veh	43.7	2.0	1.2	43.4	0.0	38.2	22.8	1.4	26.9	39.5	1.5	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	10.1	3.2	12.2	0.0	27.0	7.6	7.1	11.5	10.5	7.1	7.0
LnGrp Delay(d),s/veh	94.4	36.1	31.0	92.7	0.0	77.6	73.1	43.8	72.7	89.8	41.6	42.5
LnGrp LOS	F	D	C	F		F	E	D	E	F	D	D
Approach Vol, veh/h		1063			893			935			706	
Approach Delay, s/veh		48.5			82.1			58.5			58.1	
Approach LOS		D			F			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.4	29.9	24.6	43.1	19.5	32.8	22.0	45.7
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	16.7	24.2	18.9	37.4	15.0	27.1	16.3	40.0
Max Q Clear Time (g_c+I1), s	19.2	24.7	21.7	22.1	15.6	16.7	19.3	43.7
Green Ext Time (p_c), s	0.0	0.0	0.0	5.8	0.0	3.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	61.3
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	218	794	113	277	563	192	175	425	295	283	307	124
Future Volume (veh/h)	218	794	113	277	563	192	175	425	295	283	307	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	237	863	123	301	612	209	190	462	321	308	334	135
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	1200	486	319	545	186	236	633	261	242	448	177
Arrive On Green	0.12	0.34	0.34	0.19	0.41	0.40	0.14	0.18	0.18	0.15	0.18	0.17
Sat Flow, veh/h	1634	3539	1433	1634	1322	452	1634	3539	1458	1634	2460	974
Grp Volume(v), veh/h	237	863	123	301	0	821	190	462	321	308	238	231
Grp Sat Flow(s),veh/h/ln	1634	1770	1433	1634	0	1774	1634	1770	1458	1634	1770	1663
Q Serve(g_s), s	14.0	24.5	7.1	20.9	0.0	47.4	12.9	14.2	13.2	17.0	14.6	15.2
Cycle Q Clear(g_c), s	14.0	24.5	7.1	20.9	0.0	47.4	12.9	14.2	13.2	17.0	14.6	15.2
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	199	1200	486	319	0	731	236	633	261	242	322	303
V/C Ratio(X)	1.19	0.72	0.25	0.95	0.00	1.12	0.80	0.73	1.23	1.28	0.74	0.76
Avail Cap(c_a), veh/h	199	1200	486	319	0	731	236	831	342	242	508	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.75	0.75	0.75	0.93	0.00	0.93	1.00	1.00	1.00	0.91	0.91	0.91
Uniform Delay (d), s/veh	50.5	33.2	27.5	45.7	0.0	34.0	47.6	44.6	19.4	49.0	44.4	45.1
Incr Delay (d2), s/veh	117.3	2.8	0.9	34.5	0.0	71.3	17.9	2.3	129.9	149.7	3.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	12.5	3.0	12.5	0.0	37.7	7.0	7.1	14.7	17.7	7.4	7.3
LnGrp Delay(d),s/veh	167.8	36.0	28.4	80.2	0.0	105.3	65.5	46.9	149.3	198.7	47.5	48.7
LnGrp LOS	F	D	C	F		F	E	D	F	F	D	D
Approach Vol, veh/h		1223			1122			973			777	
Approach Delay, s/veh		60.8			98.6			84.3			107.8	
Approach LOS		E			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	24.6	26.4	43.0	20.6	24.9	18.0	51.4
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	5.7	* 5.7	5.7	5.7
Max Green Setting (Gmax), s	15.3	25.3	14.3	37.3	10.5	* 31	12.3	39.3
Max Q Clear Time (g_c+I1), s	19.0	16.2	22.9	26.5	14.9	17.2	16.0	49.4
Green Ext Time (p_c), s	0.0	2.3	0.0	3.4	0.0	1.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	85.7
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	218	794	113	277	563	192	175	425	295	283	307	124
Future Volume (veh/h)	218	794	113	277	563	192	175	425	295	283	307	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	237	863	123	301	612	209	190	462	321	308	334	135
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	790	1314	532	339	810	303	295	885	365	369	1009	384
Arrive On Green	0.50	0.74	0.74	0.11	0.23	0.21	0.09	0.25	0.25	0.12	0.29	0.27
Sat Flow, veh/h	3170	3539	1433	3170	3539	1428	3170	3539	1458	3170	3539	1430
Grp Volume(v), veh/h	237	863	123	301	612	209	190	462	321	308	334	135
Grp Sat Flow(s),veh/h/ln	1585	1770	1433	1585	1770	1428	1585	1770	1458	1585	1770	1430
Q Serve(g_s), s	4.5	12.6	2.7	9.7	16.6	10.2	6.0	11.6	21.8	9.8	7.7	4.2
Cycle Q Clear(g_c), s	4.5	12.6	2.7	9.7	16.6	10.2	6.0	11.6	21.8	9.8	7.7	4.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	790	1314	532	339	810	303	295	885	365	369	1009	384
V/C Ratio(X)	0.30	0.66	0.23	0.89	0.76	0.69	0.64	0.52	0.88	0.83	0.33	0.35
Avail Cap(c_a), veh/h	790	1314	532	339	1199	460	295	890	367	369	1014	386
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	0.72	0.92	0.92	0.92	1.00	1.00	1.00	0.91	0.91	0.91
Uniform Delay (d), s/veh	20.5	10.0	8.7	45.4	37.0	20.1	45.0	33.3	37.1	44.5	29.1	8.6
Incr Delay (d2), s/veh	0.2	1.9	0.7	22.3	1.4	2.6	4.7	0.5	21.0	13.9	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	6.2	1.2	5.3	8.2	4.2	2.8	5.7	10.9	5.0	3.8	1.7
LnGrp Delay(d),s/veh	20.7	11.8	9.4	67.7	38.5	22.6	49.7	33.9	58.1	58.4	29.2	9.1
LnGrp LOS	C	B	A	E	D	C	D	C	E	E	C	A
Approach Vol, veh/h		1223			1122			973			777	
Approach Delay, s/veh		13.3			43.4			45.0			37.3	
Approach LOS		B			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	29.8	15.0	42.2	12.4	33.4	29.7	27.6
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	10.3	24.2	9.3	36.4	7.9	27.8	12.5	33.2
Max Q Clear Time (g_c+I1), s	11.8	23.8	11.7	14.6	8.0	9.7	6.5	18.6
Green Ext Time (p_c), s	0.0	0.2	0.0	5.6	0.0	5.1	2.9	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	33.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	297	52	98	327	73	132	393	132	79	305	168
Future Volume (veh/h)	184	297	52	98	327	73	132	393	132	79	305	168
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	200	323	57	107	355	79	143	427	143	86	332	183
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	250	1574	638	154	568	126	192	833	343	131	461	248
Arrive On Green	0.15	0.44	0.44	0.09	0.39	0.37	0.12	0.24	0.24	0.08	0.21	0.19
Sat Flow, veh/h	1634	3539	1435	1634	1471	327	1634	3539	1458	1634	2204	1187
Grp Volume(v), veh/h	200	323	57	107	0	434	143	427	143	86	265	250
Grp Sat Flow(s),veh/h/ln	1634	1770	1435	1634	0	1798	1634	1770	1458	1634	1770	1622
Q Serve(g_s), s	13.0	6.1	2.5	7.0	0.0	21.5	9.3	11.5	9.1	5.6	15.3	15.9
Cycle Q Clear(g_c), s	13.0	6.1	2.5	7.0	0.0	21.5	9.3	11.5	9.1	5.6	15.3	15.9
Prop In Lane	1.00		1.00	1.00		0.18	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	250	1574	638	154	0	694	192	833	343	131	370	339
V/C Ratio(X)	0.80	0.21	0.09	0.70	0.00	0.63	0.75	0.51	0.42	0.66	0.72	0.74
Avail Cap(c_a), veh/h	282	1574	638	166	0	694	211	911	375	190	452	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	1.00	0.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97
Uniform Delay (d), s/veh	45.0	18.7	17.7	48.3	0.0	27.5	47.0	36.6	35.6	49.1	40.5	41.3
Incr Delay (d2), s/veh	13.1	0.3	0.3	10.9	0.0	4.2	12.3	0.5	0.8	5.3	4.0	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	3.1	1.0	3.6	0.0	11.4	4.9	5.7	3.8	2.7	7.9	7.6
LnGrp Delay(d),s/veh	58.1	18.9	17.9	59.2	0.0	31.7	59.2	37.0	36.4	54.4	44.5	46.5
LnGrp LOS	E	B	B	E		C	E	D	D	D	D	D
Approach Vol, veh/h		580			541			713			601	
Approach Delay, s/veh		32.3			37.1			41.4			46.7	
Approach LOS		C			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	29.9	14.4	52.9	15.7	27.0	20.8	46.5
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	11.1	26.6	9.5	40.0	12.5	26.4	17.3	32.2
Max Q Clear Time (g_c+I1), s	7.6	13.5	9.0	8.1	11.3	17.9	15.0	23.5
Green Ext Time (p_c), s	0.1	3.7	0.0	3.4	0.0	3.0	0.1	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	359	52	116	404	106	132	393	147	107	305	168
Future Volume (veh/h)	184	359	52	116	404	106	132	393	147	107	305	168
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	200	390	57	126	439	115	143	427	160	116	332	183
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	353	1594	646	174	483	127	189	588	242	225	438	236
Arrive On Green	0.22	0.45	0.45	0.11	0.34	0.33	0.12	0.17	0.17	0.14	0.20	0.18
Sat Flow, veh/h	1634	3539	1435	1634	1418	371	1634	3539	1458	1634	2204	1187
Grp Volume(v), veh/h	200	390	57	126	0	554	143	427	160	116	265	250
Grp Sat Flow(s),veh/h/ln	1634	1770	1435	1634	0	1789	1634	1770	1458	1634	1770	1621
Q Serve(g_s), s	12.6	7.8	2.6	8.6	0.0	34.0	9.8	13.2	8.9	7.6	16.2	16.9
Cycle Q Clear(g_c), s	12.6	7.8	2.6	8.6	0.0	34.0	9.8	13.2	8.9	7.6	16.2	16.9
Prop In Lane	1.00		1.00	1.00		0.21	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	353	1594	646	174	0	610	189	588	242	225	351	322
V/C Ratio(X)	0.57	0.24	0.09	0.73	0.00	0.91	0.75	0.73	0.66	0.51	0.75	0.78
Avail Cap(c_a), veh/h	353	1594	646	242	0	610	193	797	328	256	485	444
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	0.93	0.00	0.93	1.00	1.00	1.00	0.97	0.97	0.97
Uniform Delay (d), s/veh	40.3	19.5	18.1	49.8	0.0	36.4	49.2	45.5	25.5	46.0	43.4	44.3
Incr Delay (d2), s/veh	2.0	0.3	0.3	6.1	0.0	18.7	15.2	2.2	3.1	1.8	4.2	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	3.9	1.1	4.2	0.0	20.0	5.2	6.6	3.8	3.5	8.4	8.0
LnGrp Delay(d),s/veh	42.3	19.9	18.3	55.8	0.0	55.1	64.5	47.6	28.6	47.8	47.7	49.9
LnGrp LOS	D	B	B	E		E	E	D	C	D	D	D
Approach Vol, veh/h		647			680			730			631	
Approach Delay, s/veh		26.7			55.2			46.7			48.6	
Approach LOS		C			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.9	23.1	16.2	55.8	16.1	26.8	28.8	43.2
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	16.3	24.2	15.3	36.4	11.9	29.8	14.2	37.5
Max Q Clear Time (g_c+I1), s	9.6	15.2	10.6	9.8	11.8	18.9	14.6	36.0
Green Ext Time (p_c), s	1.4	1.7	0.1	2.6	0.0	1.8	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	44.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	376	55	132	474	143	139	414	154	116	321	177
Future Volume (veh/h)	194	376	55	132	474	143	139	414	154	116	321	177
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	211	409	60	143	515	155	151	450	167	126	349	192
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	224	1521	616	193	562	169	166	777	320	143	476	257
Arrive On Green	0.14	0.43	0.43	0.12	0.41	0.39	0.10	0.22	0.22	0.09	0.22	0.20
Sat Flow, veh/h	1634	3539	1434	1634	1370	412	1634	3539	1458	1634	2204	1188
Grp Volume(v), veh/h	211	409	60	143	0	670	151	450	167	126	279	262
Grp Sat Flow(s),veh/h/ln	1634	1770	1434	1634	0	1782	1634	1770	1458	1634	1770	1622
Q Serve(g_s), s	14.1	8.2	2.7	9.3	0.0	39.1	10.1	12.5	11.1	8.4	16.1	16.7
Cycle Q Clear(g_c), s	14.1	8.2	2.7	9.3	0.0	39.1	10.1	12.5	11.1	8.4	16.1	16.7
Prop In Lane	1.00		1.00	1.00		0.23	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	224	1521	616	193	0	731	166	777	320	143	382	350
V/C Ratio(X)	0.94	0.27	0.10	0.74	0.00	0.92	0.91	0.58	0.52	0.88	0.73	0.75
Avail Cap(c_a), veh/h	224	1521	616	247	0	731	166	917	378	143	452	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	1.00	0.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	47.0	20.2	18.7	46.9	0.0	30.8	48.9	38.4	37.8	49.6	40.1	40.9
Incr Delay (d2), s/veh	41.3	0.4	0.3	8.5	0.0	18.2	44.1	0.7	1.3	41.7	4.7	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	4.1	1.1	4.7	0.0	22.9	6.6	6.2	4.6	5.4	8.4	8.0
LnGrp Delay(d),s/veh	88.3	20.6	19.0	55.4	0.0	49.0	93.0	39.1	39.1	91.4	44.8	46.8
LnGrp LOS	F	C	B	E		D	F	D	D	F	D	D
Approach Vol, veh/h		680			813			768			667	
Approach Delay, s/veh		41.5			50.1			49.7			54.4	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.6	28.2	17.0	51.3	14.0	27.8	19.1	49.1
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	7.9	26.8	14.9	37.6	9.5	26.4	13.4	39.1
Max Q Clear Time (g_c+I1), s	10.4	14.5	11.3	10.2	12.1	18.7	16.1	41.1
Green Ext Time (p_c), s	0.0	3.9	0.1	5.3	0.0	3.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	438	55	150	551	176	139	414	169	144	321	177
Future Volume (veh/h)	194	438	55	150	551	176	139	414	169	144	321	177
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	211	476	60	163	599	191	151	450	184	157	349	192
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	205	1555	630	214	600	191	150	622	256	178	449	242
Arrive On Green	0.13	0.44	0.44	0.13	0.44	0.43	0.09	0.18	0.18	0.11	0.20	0.19
Sat Flow, veh/h	1634	3539	1434	1634	1348	430	1634	3539	1458	1634	2204	1187
Grp Volume(v), veh/h	211	476	60	163	0	790	151	450	184	157	279	262
Grp Sat Flow(s),veh/h/ln	1634	1770	1434	1634	0	1778	1634	1770	1458	1634	1770	1622
Q Serve(g_s), s	13.8	9.6	2.7	10.6	0.0	48.8	10.1	13.2	9.4	10.4	16.4	17.0
Cycle Q Clear(g_c), s	13.8	9.6	2.7	10.6	0.0	48.8	10.1	13.2	9.4	10.4	16.4	17.0
Prop In Lane	1.00		1.00	1.00		0.24	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	205	1555	630	214	0	791	150	622	256	178	360	330
V/C Ratio(X)	1.03	0.31	0.10	0.76	0.00	1.00	1.01	0.72	0.72	0.88	0.77	0.79
Avail Cap(c_a), veh/h	205	1555	630	269	0	791	150	856	353	178	452	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	0.89	0.00	0.89	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	48.1	20.0	18.0	46.2	0.0	30.7	49.9	42.8	21.9	48.3	41.4	42.2
Incr Delay (d2), s/veh	68.0	0.5	0.3	8.6	0.0	30.1	75.2	1.9	4.3	35.8	6.1	7.8
Initial Q Delay(d3),s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	4.8	1.1	5.3	0.0	30.5	7.7	6.6	4.1	6.5	8.6	8.3
LnGrp Delay(d),s/veh	116.3	20.4	18.3	54.8	0.0	60.8	125.2	44.7	26.2	84.1	47.5	50.1
LnGrp LOS	F	C	B	D		E	F	D	C	F	D	D
Approach Vol, veh/h		747			953			785			698	
Approach Delay, s/veh		47.3			59.8			55.8			56.7	
Approach LOS		D			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	23.3	18.4	52.3	12.9	26.4	17.8	52.9
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	8.7	24.9	16.4	37.2	8.4	26.4	12.1	41.5
Max Q Clear Time (g_c+I1), s	12.4	15.2	12.6	11.6	12.1	19.0	15.8	50.8
Green Ext Time (p_c), s	0.0	1.9	0.2	6.5	0.0	1.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	55.2
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	487	74	169	596	170	179	534	194	140	414	228
Future Volume (veh/h)	262	487	74	169	596	170	179	534	194	140	414	228
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	285	529	80	184	648	185	195	580	211	152	450	248
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	1429	579	163	523	149	181	919	379	149	550	300
Arrive On Green	0.13	0.40	0.40	0.10	0.38	0.36	0.11	0.26	0.26	0.09	0.25	0.24
Sat Flow, veh/h	1634	3539	1434	1634	1388	396	1634	3539	1458	1634	2193	1199
Grp Volume(v), veh/h	285	529	80	184	0	833	195	580	211	152	362	336
Grp Sat Flow(s),veh/h/ln	1634	1770	1434	1634	0	1785	1634	1770	1458	1634	1770	1622
Q Serve(g_s), s	14.0	11.5	3.9	11.0	0.0	41.4	12.2	16.0	13.8	10.0	21.2	21.6
Cycle Q Clear(g_c), s	14.0	11.5	3.9	11.0	0.0	41.4	12.2	16.0	13.8	10.0	21.2	21.6
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		0.74
Lane Grp Cap(c), veh/h	208	1429	579	163	0	672	181	919	379	149	444	407
V/C Ratio(X)	1.37	0.37	0.14	1.13	0.00	1.24	1.08	0.63	0.56	1.02	0.82	0.83
Avail Cap(c_a), veh/h	208	1429	579	163	0	672	181	968	399	149	468	429
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	1.00	0.00	1.00	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	48.0	23.0	20.7	49.5	0.0	34.5	48.9	36.0	35.2	50.0	38.8	39.6
Incr Delay (d2), s/veh	189.1	0.6	0.4	108.3	0.0	120.2	88.5	1.2	1.5	75.0	9.1	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.2	5.7	1.6	9.9	0.0	42.8	9.9	8.0	5.7	7.6	11.5	10.8
LnGrp Delay(d),s/veh	237.1	23.6	21.1	157.8	0.0	154.6	137.4	37.3	36.8	125.3	48.0	50.1
LnGrp LOS	F	C	C	F		F	F	D	D	F	D	D
Approach Vol, veh/h		894			1017			986			850	
Approach Delay, s/veh		91.4			155.2			57.0			62.6	
Approach LOS		F			F			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	32.6	15.0	48.4	15.0	31.6	18.0	45.4
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	8.3	28.4	9.3	41.2	10.5	27.4	12.3	38.2
Max Q Clear Time (g_c+I1), s	12.0	18.0	13.0	13.5	14.2	23.6	16.0	43.4
Green Ext Time (p_c), s	0.0	4.6	0.0	7.5	0.0	2.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	93.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	549	74	187	673	203	179	534	209	168	414	228
Future Volume (veh/h)	262	549	74	187	673	203	179	534	209	168	414	228
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1750	1716	1863	1716	1716	1863	1750
Adj Flow Rate, veh/h	285	597	80	203	732	221	195	580	227	183	450	248
Adj No. of Lanes	1	2	1	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	218	1381	559	245	557	168	166	719	296	202	515	281
Arrive On Green	0.13	0.39	0.39	0.15	0.41	0.39	0.10	0.20	0.20	0.12	0.23	0.22
Sat Flow, veh/h	1634	3539	1434	1634	1368	413	1634	3539	1458	1634	2193	1198
Grp Volume(v), veh/h	285	597	80	203	0	953	195	580	227	183	362	336
Grp Sat Flow(s),veh/h/ln	1634	1770	1434	1634	0	1782	1634	1770	1458	1634	1770	1622
Q Serve(g_s), s	16.0	14.8	4.3	14.5	0.0	48.8	12.2	18.7	12.2	13.3	23.7	24.0
Cycle Q Clear(g_c), s	16.0	14.8	4.3	14.5	0.0	48.8	12.2	18.7	12.2	13.3	23.7	24.0
Prop In Lane	1.00		1.00	1.00		0.23	1.00		1.00	1.00		0.74
Lane Grp Cap(c), veh/h	218	1381	559	245	0	725	166	719	296	202	415	381
V/C Ratio(X)	1.31	0.43	0.14	0.83	0.00	1.31	1.17	0.81	0.77	0.91	0.87	0.88
Avail Cap(c_a), veh/h	218	1381	559	245	0	725	166	829	341	202	429	393
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	0.91	0.00	0.91	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	52.0	26.8	23.6	49.5	0.0	35.8	53.9	45.6	21.6	51.9	44.2	44.9
Incr Delay (d2), s/veh	162.1	0.8	0.4	19.0	0.0	150.5	124.3	5.2	8.7	35.4	15.4	17.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.0	7.4	1.8	7.8	0.0	54.3	11.2	9.7	5.7	8.0	13.4	12.6
LnGrp Delay(d),s/veh	214.1	27.6	24.0	68.5	0.0	186.3	178.2	50.8	30.4	87.3	59.6	62.6
LnGrp LOS	F	C	C	E		F	F	D	C	F	E	E
Approach Vol, veh/h		962			1156			1002			881	
Approach Delay, s/veh		82.6			165.6			71.0			66.5	
Approach LOS		F			F			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.8	28.4	22.0	50.8	15.0	32.2	20.0	52.8
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	10.3	26.4	16.3	44.2	10.5	27.4	14.3	46.2
Max Q Clear Time (g_c+I1), s	15.3	20.7	16.5	16.8	14.2	26.0	18.0	50.8
Green Ext Time (p_c), s	0.0	1.8	0.0	9.1	0.0	0.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	100.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	549	74	187	673	203	179	534	209	168	414	228
Future Volume (veh/h)	262	549	74	187	673	203	179	534	209	168	414	228
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	285	597	80	203	732	221	195	580	227	183	450	248
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	401	874	353	450	929	351	298	1267	522	294	1306	504
Arrive On Green	0.04	0.08	0.08	0.14	0.26	0.25	0.09	0.36	0.36	0.09	0.37	0.35
Sat Flow, veh/h	3170	3539	1430	3170	3539	1429	3170	3539	1458	3170	3539	1433
Grp Volume(v), veh/h	285	597	80	203	732	221	195	580	227	183	450	248
Grp Sat Flow(s),veh/h/ln	1585	1770	1430	1585	1770	1429	1585	1770	1458	1585	1770	1433
Q Serve(g_s), s	8.9	16.4	3.9	5.9	19.2	10.3	5.9	12.6	7.1	5.6	9.2	8.9
Cycle Q Clear(g_c), s	8.9	16.4	3.9	5.9	19.2	10.3	5.9	12.6	7.1	5.6	9.2	8.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	401	874	353	450	929	351	298	1267	522	294	1306	504
V/C Ratio(X)	0.71	0.68	0.23	0.45	0.79	0.63	0.65	0.46	0.43	0.62	0.34	0.49
Avail Cap(c_a), veh/h	418	1320	533	450	1207	463	298	1267	522	330	1306	504
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	0.72	0.96	0.96	0.96	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	46.1	42.1	20.2	39.3	34.3	18.9	43.7	24.6	8.8	43.7	22.8	10.9
Incr Delay (d2), s/veh	3.8	0.7	0.2	0.7	2.6	1.8	5.1	1.2	2.6	2.6	0.6	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	8.1	1.6	2.6	9.7	4.3	2.8	6.3	3.2	2.5	4.6	3.9
LnGrp Delay(d),s/veh	49.9	42.8	20.5	40.0	36.9	20.7	48.8	25.8	11.4	46.3	23.4	13.8
LnGrp LOS	D	D	C	D	D	C	D	C	B	D	C	B
Approach Vol, veh/h		962			1156			1002			881	
Approach Delay, s/veh		43.0			34.3			27.0			25.5	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	39.8	18.2	28.7	12.2	40.9	16.7	30.2
Change Period (Y+Rc), s	5.7	5.7	5.7	5.7	4.5	5.7	5.7	5.7
Max Green Setting (Gmax), s	8.7	24.6	8.3	35.6	7.7	26.8	11.5	32.4
Max Q Clear Time (g_c+I1), s	7.6	14.6	7.9	18.4	7.9	11.2	10.9	21.2
Green Ext Time (p_c), s	0.1	4.7	0.1	2.7	0.0	5.9	0.1	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Intersection 7
Project Entrance & Panama Ln

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	460	277	114	233	236	97
Future Volume (veh/h)	460	277	114	233	236	97
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	500	301	124	253	257	105
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	598	508	156	855	783	698
Arrive On Green	0.32	0.32	0.09	0.46	0.44	0.44
Sat Flow, veh/h	1863	1583	1774	1863	1774	1583
Grp Volume(v), veh/h	500	301	124	253	257	105
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1863	1774	1583
Q Serve(g_s), s	22.4	14.3	6.2	7.7	8.5	3.6
Cycle Q Clear(g_c), s	22.4	14.3	6.2	7.7	8.5	3.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	598	508	156	855	783	698
V/C Ratio(X)	0.84	0.59	0.80	0.30	0.33	0.15
Avail Cap(c_a), veh/h	797	677	266	1169	783	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	25.6	40.3	15.2	16.4	15.1
Incr Delay (d2), s/veh	5.4	1.0	8.8	0.2	1.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.4	6.4	3.4	4.0	4.4	1.6
LnGrp Delay(d),s/veh	33.8	26.6	49.1	15.4	17.6	15.5
LnGrp LOS	C	C	D	B	B	B
Approach Vol, veh/h	801			377	362	
Approach Delay, s/veh	31.1			26.5	17.0	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		44.2	12.4	33.4				45.8
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5
Max Green Setting (Gmax), s		24.5	13.5	38.5				56.5
Max Q Clear Time (g_c+I1), s		10.5	8.2	24.4				9.7
Green Ext Time (p_c), s		0.9	0.1	4.5				5.8

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	986	277	114	493	236	97
Future Volume (veh/h)	986	277	114	493	236	97
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1072	301	124	536	257	105
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1290	577	184	1833	678	605
Arrive On Green	0.36	0.36	0.10	0.52	0.38	0.38
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583
Grp Volume(v), veh/h	1072	301	124	536	257	105
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583
Q Serve(g_s), s	24.9	13.4	6.1	7.7	9.4	3.9
Cycle Q Clear(g_c), s	24.9	13.4	6.1	7.7	9.4	3.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1290	577	184	1833	678	605
V/C Ratio(X)	0.83	0.52	0.68	0.29	0.38	0.17
Avail Cap(c_a), veh/h	1514	677	266	2222	678	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.66	0.66	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	22.4	38.9	12.3	20.1	18.4
Incr Delay (d2), s/veh	2.4	0.5	4.3	0.1	1.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.5	5.9	3.2	3.7	4.9	1.8
LnGrp Delay(d),s/veh	28.5	22.9	43.2	12.4	21.7	19.0
LnGrp LOS	C	C	D	B	C	B
Approach Vol, veh/h	1373			660	362	
Approach Delay, s/veh	27.2			18.2	20.9	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		38.9	13.8	37.3				51.1
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5
Max Green Setting (Gmax), s		24.5	13.5	38.5				56.5
Max Q Clear Time (g_c+I1), s		11.4	8.1	26.9				9.7
Green Ext Time (p_c), s		0.9	1.7	5.9				3.8

Intersection Summary		
HCM 2010 Ctrl Delay		23.8
HCM 2010 LOS		C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1339	277	114	671	236	97
Future Volume (veh/h)	1339	277	114	671	236	97
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1455	301	124	729	257	105
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1646	736	174	2170	509	454
Arrive On Green	0.46	0.46	0.10	0.61	0.29	0.29
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583
Grp Volume(v), veh/h	1455	301	124	729	257	105
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583
Q Serve(g_s), s	33.6	11.3	6.1	9.0	10.9	4.6
Cycle Q Clear(g_c), s	33.6	11.3	6.1	9.0	10.9	4.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1646	736	174	2170	509	454
V/C Ratio(X)	0.88	0.41	0.71	0.34	0.50	0.23
Avail Cap(c_a), veh/h	1750	783	207	2340	509	454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.51	0.51	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	15.9	39.4	8.5	26.8	24.5
Incr Delay (d2), s/veh	3.0	0.2	8.9	0.1	3.5	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.0	5.0	3.4	4.4	5.8	2.1
LnGrp Delay(d),s/veh	24.8	16.1	48.3	8.6	30.3	25.7
LnGrp LOS	C	B	D	A	C	C
Approach Vol, veh/h	1756			853	362	
Approach Delay, s/veh	23.3			14.4	29.0	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		30.3	13.3	46.3				59.7
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5
Max Green Setting (Gmax), s		21.5	10.5	44.5				59.5
Max Q Clear Time (g_c+I1), s		12.9	8.1	35.6				11.0
Green Ext Time (p_c), s		0.7	1.1	6.2				5.4

Intersection Summary	
HCM 2010 Ctrl Delay	21.4
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1339	277	114	671	236	97
Future Volume (veh/h)	1339	277	114	671	236	97
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1455	301	124	729	257	105
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2477	1108	213	2477	355	317
Arrive On Green	0.70	0.70	1.00	1.00	0.20	0.20
Sat Flow, veh/h	3632	1583	272	3632	1774	1583
Grp Volume(v), veh/h	1455	301	124	729	257	105
Grp Sat Flow(s),veh/h/ln	1770	1583	272	1770	1774	1583
Q Serve(g_s), s	18.8	6.3	35.2	0.0	12.2	5.1
Cycle Q Clear(g_c), s	18.8	6.3	54.0	0.0	12.2	5.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2477	1108	213	2477	355	317
V/C Ratio(X)	0.59	0.27	0.58	0.29	0.72	0.33
Avail Cap(c_a), veh/h	2477	1108	213	2477	355	317
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	0.81	0.81	1.00	1.00
Uniform Delay (d), s/veh	6.9	5.0	8.1	0.0	33.7	30.8
Incr Delay (d2), s/veh	0.7	0.4	9.0	0.2	12.1	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	2.9	3.1	0.1	7.2	2.5
LnGrp Delay(d),s/veh	7.6	5.4	17.1	0.2	45.8	33.6
LnGrp LOS	A	A	B	A	D	C
Approach Vol, veh/h	1756			853	362	
Approach Delay, s/veh	7.2			2.7	42.3	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		22.5		67.5				67.5
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		18.0		63.0				63.0
Max Q Clear Time (g_c+I1), s		14.2		20.8				56.0
Green Ext Time (p_c), s		0.4		29.6				6.4

Intersection Summary			
HCM 2010 Ctrl Delay			10.2
HCM 2010 LOS			B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	508	117	48	359	143	58
Future Volume (veh/h)	508	117	48	359	143	58
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	552	127	52	390	155	63
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	662	563	67	825	810	723
Arrive On Green	0.36	0.36	0.04	0.44	0.46	0.46
Sat Flow, veh/h	1863	1583	1774	1863	1774	1583
Grp Volume(v), veh/h	552	127	52	390	155	63
Grp Sat Flow(s),veh/h/ln	1863	1583	1774	1863	1774	1583
Q Serve(g_s), s	24.4	5.1	2.6	13.3	4.7	2.0
Cycle Q Clear(g_c), s	24.4	5.1	2.6	13.3	4.7	2.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	662	563	67	825	810	723
V/C Ratio(X)	0.83	0.23	0.78	0.47	0.19	0.09
Avail Cap(c_a), veh/h	942	800	168	1211	810	723
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	20.3	42.9	17.6	14.5	13.8
Incr Delay (d2), s/veh	4.3	0.2	17.7	0.4	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	2.2	1.6	6.9	2.4	0.9
LnGrp Delay(d),s/veh	30.8	20.5	60.7	18.1	15.1	14.1
LnGrp LOS	C	C	E	B	B	B
Approach Vol, veh/h	679			442	218	
Approach Delay, s/veh	28.9			23.1	14.8	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		45.6	7.9	36.5				44.4
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5
Max Green Setting (Gmax), s		22.5	8.5	45.5				58.5
Max Q Clear Time (g_c+I1), s		6.7	4.6	26.4				15.3
Green Ext Time (p_c), s		0.5	0.0	5.6				6.6

Intersection Summary	
HCM 2010 Ctrl Delay	24.7
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	646	117	48	618	143	58
Future Volume (veh/h)	646	117	48	618	143	58
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	702	127	52	672	155	63
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1046	468	67	1356	917	819
Arrive On Green	0.30	0.30	0.04	0.38	0.52	0.52
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583
Grp Volume(v), veh/h	702	127	52	672	155	63
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583
Q Serve(g_s), s	15.7	5.5	2.6	13.0	4.2	1.8
Cycle Q Clear(g_c), s	15.7	5.5	2.6	13.0	4.2	1.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1046	468	67	1356	917	819
V/C Ratio(X)	0.67	0.27	0.78	0.50	0.17	0.08
Avail Cap(c_a), veh/h	1475	660	227	2104	917	819
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.9	24.3	42.9	21.1	11.5	10.9
Incr Delay (d2), s/veh	0.7	0.3	17.5	0.3	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	2.4	1.6	6.4	2.1	0.8
LnGrp Delay(d),s/veh	28.5	24.6	60.4	21.4	11.9	11.1
LnGrp LOS	C	C	E	C	B	B
Approach Vol, veh/h	829			724	218	
Approach Delay, s/veh	27.9			24.2	11.7	
Approach LOS	C			C	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		51.0	7.9	31.1				39.0
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5
Max Green Setting (Gmax), s		27.5	11.5	37.5				53.5
Max Q Clear Time (g_c+I1), s		6.2	4.6	17.7				15.0
Green Ext Time (p_c), s		0.5	0.0	8.9				11.3

Intersection Summary		
HCM 2010 Ctrl Delay		24.4
HCM 2010 LOS		C

Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Traffic Volume (veh/h)	836	117	48	668	143	58		
Future Volume (veh/h)	836	117	48	668	143	58		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	909	127	52	726	155	63		
Adj No. of Lanes	2	1	1	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	1143	511	94	1507	841	751		
Arrive On Green	0.32	0.32	0.05	0.43	0.47	0.47		
Sat Flow, veh/h	3632	1583	1774	3632	1774	1583		
Grp Volume(v), veh/h	909	127	52	726	155	63		
Grp Sat Flow(s),veh/h/ln	1770	1583	1774	1770	1774	1583		
Q Serve(g_s), s	21.1	5.3	2.6	13.3	4.5	2.0		
Cycle Q Clear(g_c), s	21.1	5.3	2.6	13.3	4.5	2.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	1143	511	94	1507	841	751		
V/C Ratio(X)	0.80	0.25	0.55	0.48	0.18	0.08		
Avail Cap(c_a), veh/h	1671	748	187	2222	841	751		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.83	0.83	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	27.8	22.4	41.6	18.7	13.6	13.0		
Incr Delay (d2), s/veh	1.4	0.2	5.0	0.2	0.5	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	10.5	2.4	1.4	6.5	2.3	0.9		
LnGrp Delay(d),s/veh	29.2	22.6	46.6	18.9	14.1	13.2		
LnGrp LOS	C	C	D	B	B	B		
Approach Vol, veh/h	1036			778	218			
Approach Delay, s/veh	28.4			20.8	13.8			
Approach LOS	C			C	B			
Timer	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		47.2	9.3	33.6				42.8
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5
Max Green Setting (Gmax), s		24.5	9.5	42.5				56.5
Max Q Clear Time (g_c+I1), s		6.5	4.6	23.1				15.3
Green Ext Time (p_c), s		0.5	2.0	6.0				5.1
Intersection Summary								
HCM 2010 Ctrl Delay			23.9					
HCM 2010 LOS			C					

Intersection 8
Cottonwood Rd & Panama Ln

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	17	229	6	0	1	209	45	0	8	33	0	0	46	47	16
Future Vol, veh/h	0	17	229	6	0	1	209	45	0	8	33	0	0	46	47	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	249	7	0	1	227	49	0	9	36	0	0	50	51	17
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	10.1	8.9	9.4
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	7%	0%	42%
Vol Thru, %	80%	91%	82%	43%
Vol Right, %	0%	2%	18%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	252	255	109
LT Vol	8	17	1	46
Through Vol	33	229	209	47
RT Vol	0	6	45	16
Lane Flow Rate	45	274	277	118
Geometry Grp	1	1	1	1
Degree of Util (X)	0.067	0.356	0.352	0.173
Departure Headway (Hd)	5.41	4.676	4.576	5.245
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	656	764	782	679
Service Time	3.494	2.73	2.628	3.316
HCM Lane V/C Ratio	0.069	0.359	0.354	0.174
HCM Control Delay	8.9	10.3	10.1	9.4
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.2	1.6	1.6	0.6

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	87	246	16	0	1	229	45	0	20	33	0	0	46	47	98
Future Vol, veh/h	0	87	246	16	0	1	229	45	0	20	33	0	0	46	47	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	95	267	17	0	1	249	49	0	22	36	0	0	50	51	107
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.2	12	9.9	11.1
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	38%	25%	0%	24%
Vol Thru, %	62%	70%	83%	25%
Vol Right, %	0%	5%	16%	51%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	349	275	191
LT Vol	20	87	1	46
Through Vol	33	246	229	47
RT Vol	0	16	45	98
Lane Flow Rate	58	379	299	208
Geometry Grp	1	1	1	1
Degree of Util (X)	0.099	0.544	0.429	0.318
Departure Headway (Hd)	6.173	5.166	5.163	5.519
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	579	698	696	650
Service Time	4.229	3.201	3.2	3.563
HCM Lane V/C Ratio	0.1	0.543	0.43	0.32
HCM Control Delay	9.9	14.2	12	11.1
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0.3	3.3	2.2	1.4

Intersection	
Intersection Delay, s/veh	57.2
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	17	742	6	0	37	466	137	0	9	36	75	0	236	51	17
Future Vol, veh/h	0	17	742	6	0	37	466	137	0	9	36	75	0	236	51	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	807	7	0	40	507	149	0	10	39	82	0	257	55	18
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	67.1	66.5	15.3	29.5
HCM LOS	F	F	C	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	2%	6%	78%
Vol Thru, %	30%	97%	73%	17%
Vol Right, %	62%	1%	21%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	765	640	304
LT Vol	9	17	37	236
Through Vol	36	742	466	51
RT Vol	75	6	137	17
Lane Flow Rate	130	832	696	330
Geometry Grp	1	1	1	1
Degree of Util (X)	0.309	1	1	0.728
Departure Headway (Hd)	8.523	7.13	7.013	7.93
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	423	516	522	456
Service Time	6.564	5.194	5.077	5.956
HCM Lane V/C Ratio	0.307	1.612	1.333	0.724
HCM Control Delay	15.3	67.1	66.5	29.5
HCM Lane LOS	C	F	F	D
HCM 95th-tile Q	1.3	13.7	13.8	5.8

Intersection	
Intersection Delay, s/veh	63.3
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	87	759	16	0	37	486	137	0	21	36	75	0	236	51	99
Future Vol, veh/h	0	87	759	16	0	37	486	137	0	21	36	75	0	236	51	99
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	95	825	17	0	40	528	149	0	23	39	82	0	257	55	108
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	70.1	69.5	17.2	53.4
HCM LOS	F	F	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	10%	6%	61%
Vol Thru, %	27%	88%	74%	13%
Vol Right, %	57%	2%	21%	26%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	132	862	660	386
LT Vol	21	87	37	236
Through Vol	36	759	486	51
RT Vol	75	16	137	99
Lane Flow Rate	143	937	717	420
Geometry Grp	1	1	1	1
Degree of Util (X)	0.361	1	1	0.922
Departure Headway (Hd)	9.06	7.718	7.595	7.907
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	397	478	481	462
Service Time	7.12	5.804	5.682	5.938
HCM Lane V/C Ratio	0.36	1.96	1.491	0.909
HCM Control Delay	17.2	70.1	69.5	53.4
HCM Lane LOS	C	F	F	F
HCM 95th-tile Q	1.6	13.2	13.3	10.5

Intersection	
Intersection Delay, s/veh	65.8
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	20	774	7	0	37	627	172	0	15	61	75	0	272	87	30
Future Vol, veh/h	0	20	774	7	0	37	627	172	0	15	61	75	0	272	87	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	841	8	0	40	682	187	0	16	66	82	0	296	95	33
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	71.2	70.6	18.8	62.7
HCM LOS	F	F	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	2%	4%	70%
Vol Thru, %	40%	97%	75%	22%
Vol Right, %	50%	1%	21%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	151	801	836	389
LT Vol	15	20	37	272
Through Vol	61	774	627	87
RT Vol	75	7	172	30
Lane Flow Rate	164	871	909	423
Geometry Grp	1	1	1	1
Degree of Util (X)	0.419	1	1	0.961
Departure Headway (Hd)	9.187	7.943	7.828	8.178
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	392	461	463	444
Service Time	7.252	6.04	5.926	6.214
HCM Lane V/C Ratio	0.418	1.889	1.963	0.953
HCM Control Delay	18.8	71.2	70.6	62.7
HCM Lane LOS	C	F	F	F
HCM 95th-tile Q	2	13	13.1	11.5

Intersection	
Intersection Delay, s/veh	68.4
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	90	791	17	0	37	647	172	0	27	61	75	0	272	87	112
Future Vol, veh/h	0	90	791	17	0	37	647	172	0	27	61	75	0	272	87	112
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	98	860	18	0	40	703	187	0	29	66	82	0	296	95	122
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	72.1	71.6	20.2	72
HCM LOS	F	F	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	10%	4%	58%
Vol Thru, %	37%	88%	76%	18%
Vol Right, %	46%	2%	20%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	163	898	856	471
LT Vol	27	90	37	272
Through Vol	61	791	647	87
RT Vol	75	17	172	112
Lane Flow Rate	177	976	930	512
Geometry Grp	1	1	1	1
Degree of Util (X)	0.462	1	1	1
Departure Headway (Hd)	9.388	8.241	8.121	8.205
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	386	449	456	445
Service Time	7.388	6.241	6.121	6.205
HCM Lane V/C Ratio	0.459	2.174	2.039	1.151
HCM Control Delay	20.2	72.1	71.6	72
HCM Lane LOS	C	F	F	F
HCM 95th-tile Q	2.4	12.8	12.9	12.8

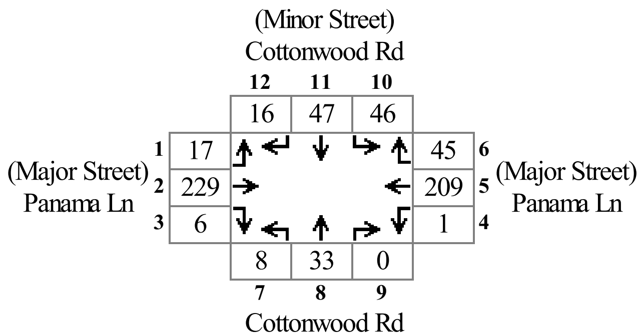
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	791	17	37	647	172	27	61	75	272	87	112
Future Volume (veh/h)	90	791	17	37	647	172	27	61	75	272	87	112
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	98	860	18	40	703	187	29	66	82	296	95	122
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	1006	414	89	935	385	73	767	316	859	1645	678
Arrive On Green	0.05	0.28	0.28	0.03	0.26	0.26	0.02	0.22	0.22	0.27	0.46	0.46
Sat Flow, veh/h	3170	3539	1458	3170	3539	1458	3170	3539	1458	3170	3539	1458
Grp Volume(v), veh/h	98	860	18	40	703	187	29	66	82	296	95	122
Grp Sat Flow(s),veh/h/ln	1585	1770	1458	1585	1770	1458	1585	1770	1458	1585	1770	1458
Q Serve(g_s), s	2.7	20.7	0.7	1.1	16.4	4.8	0.8	1.3	4.2	6.8	1.3	4.4
Cycle Q Clear(g_c), s	2.7	20.7	0.7	1.1	16.4	4.8	0.8	1.3	4.2	6.8	1.3	4.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	152	1006	414	89	935	385	73	767	316	859	1645	678
V/C Ratio(X)	0.64	0.86	0.04	0.45	0.75	0.49	0.40	0.09	0.26	0.34	0.06	0.18
Avail Cap(c_a), veh/h	158	1278	527	158	1278	527	158	767	316	859	1645	678
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	42.1	30.5	16.0	43.1	30.4	6.9	43.4	28.1	29.3	26.4	13.2	14.1
Incr Delay (d2), s/veh	6.6	3.9	0.0	3.5	1.7	0.9	3.5	0.2	2.0	0.2	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	10.6	0.3	0.5	8.2	2.0	0.4	0.7	1.9	3.0	0.7	1.9
LnGrp Delay(d),s/veh	48.7	34.3	16.1	46.6	32.1	7.8	46.9	28.4	31.2	26.6	13.3	14.6
LnGrp LOS	D	C	B	D	C	A	D	C	C	C	B	B
Approach Vol, veh/h		976			930			177			513	
Approach Delay, s/veh		35.4			27.8			32.7			21.3	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.9	24.0	7.0	30.1	6.6	46.3	8.8	28.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	19.5	4.5	32.5	4.5	30.5	4.5	32.5
Max Q Clear Time (g_c+I1), s	8.8	6.2	3.1	22.7	2.8	6.4	4.7	18.4
Green Ext Time (p_c), s	1.3	0.4	0.6	2.9	0.0	2.2	0.0	3.5

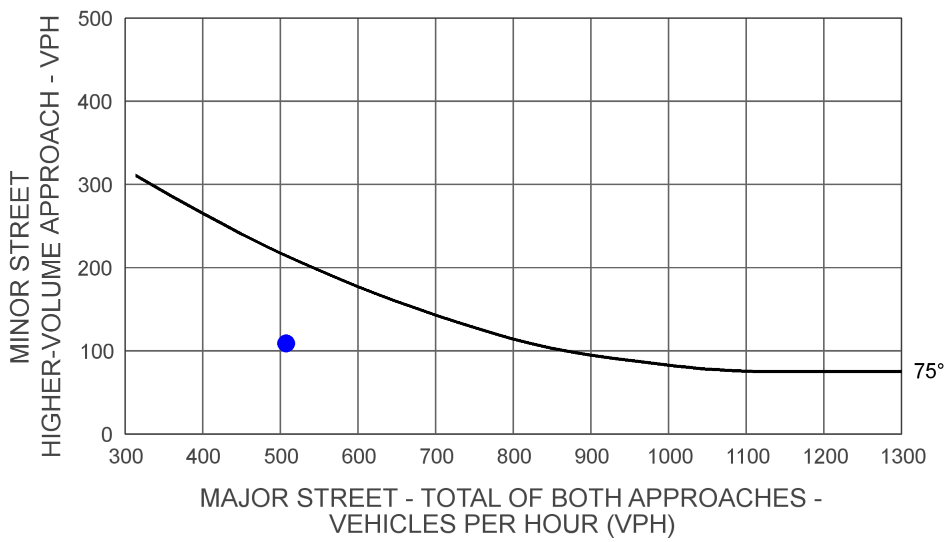
Intersection Summary	
HCM 2010 Ctrl Delay	29.7
HCM 2010 LOS	C

Rural Peak Hour Signal Warrant
Intersection Does Not Meet Signal Warrant

Scenario: AM Existing
Intersection #: 8

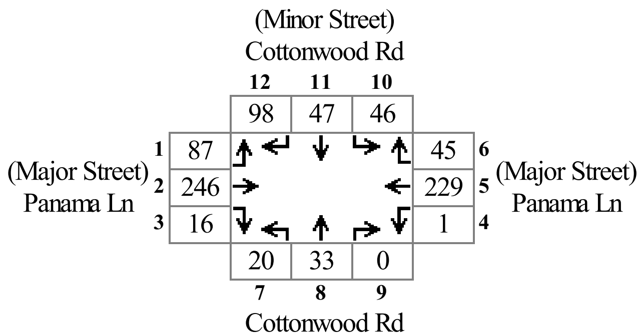


Major Total: 507
Minor High Volume: 109

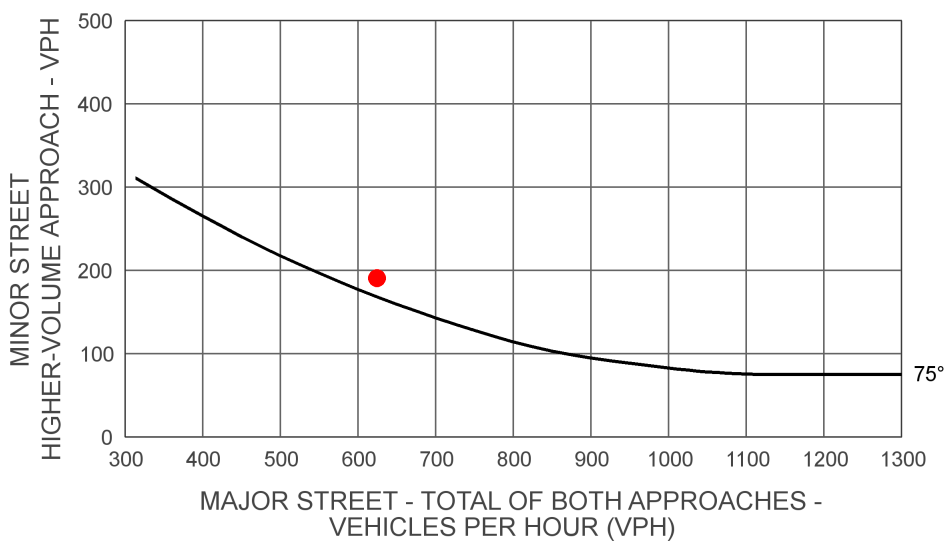


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: AM Existing+Project
Intersection #: 8

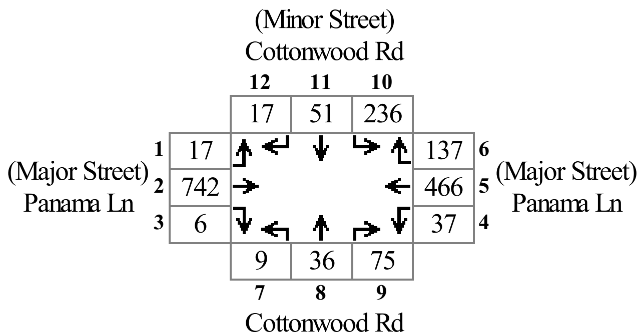


Major Total: 624
Minor High Volume: 191

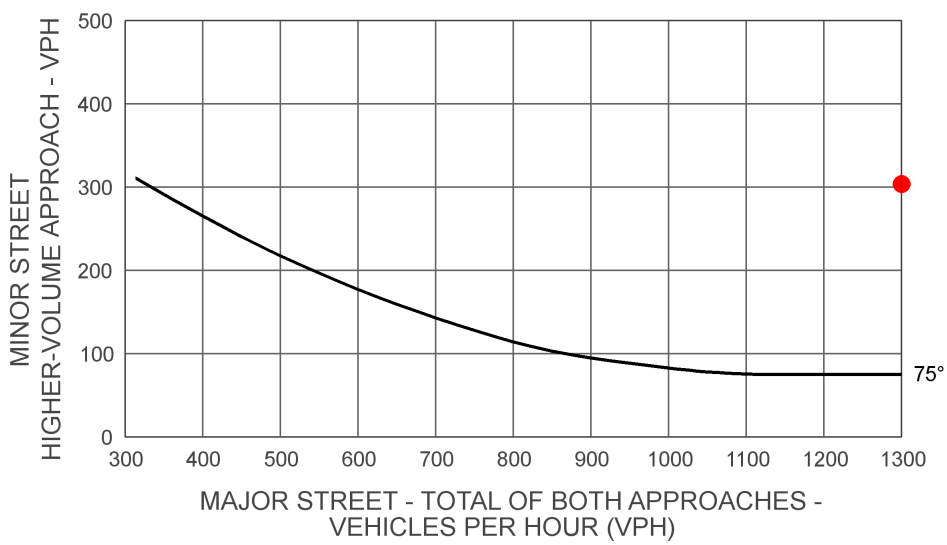


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: AM Future
Intersection #: 8

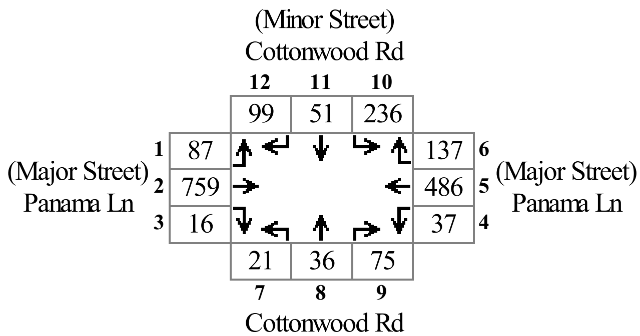


Major Total: 1405
Minor High Volume: 304

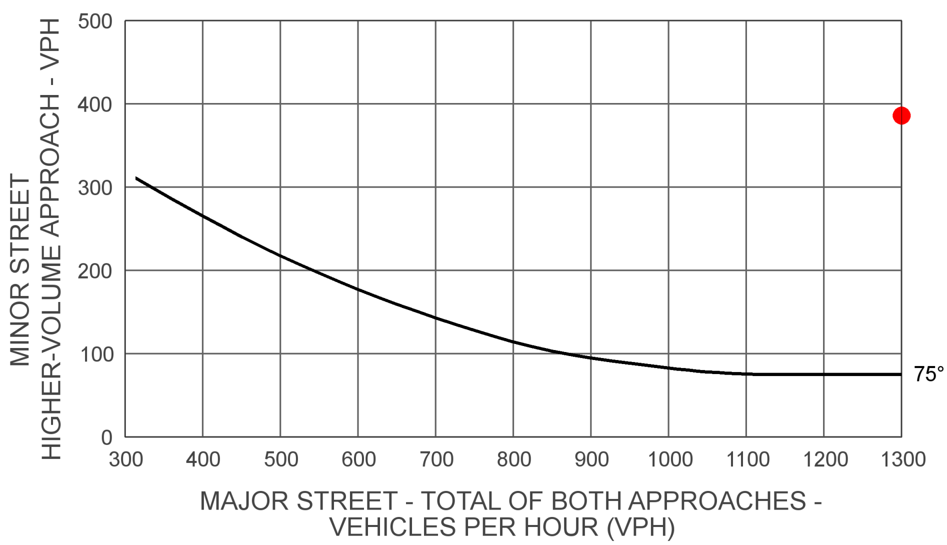


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: AM Future+Project
Intersection #: 8

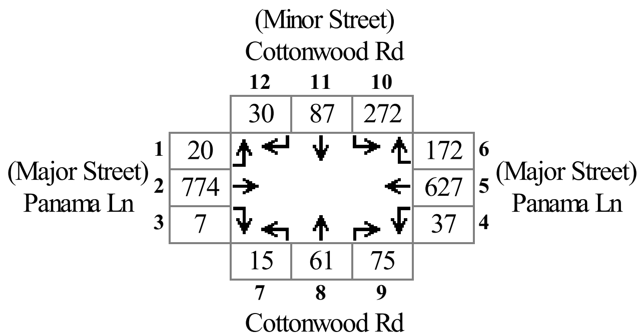


Major Total: 1522
Minor High Volume: 386

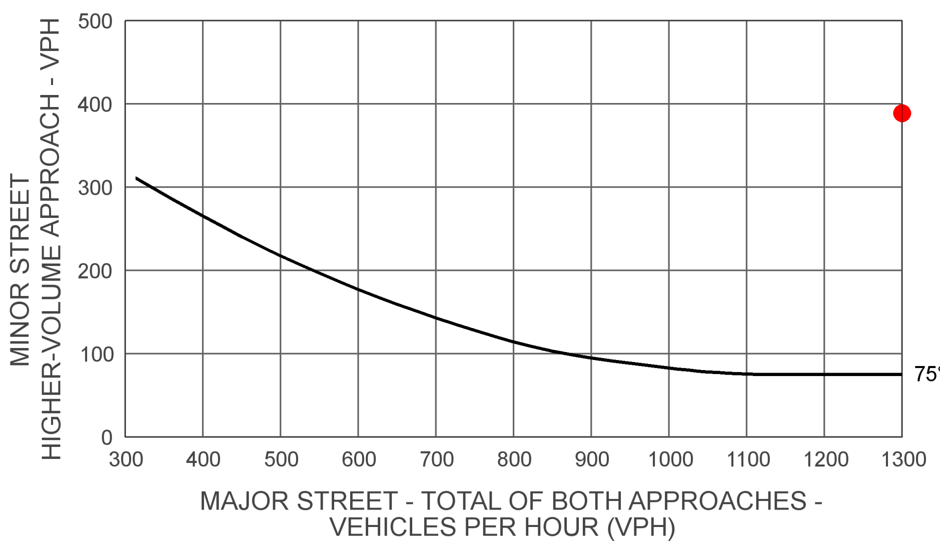


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: AM Future
Intersection #: 8



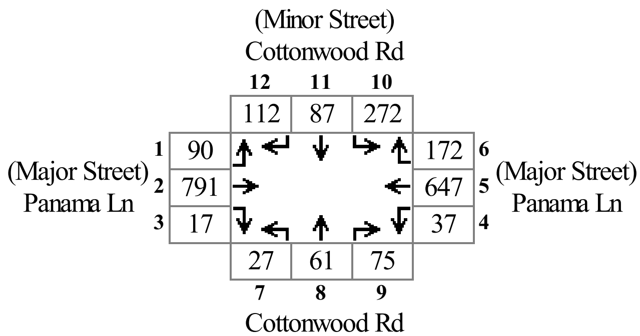
Major Total: 1637
Minor High Volume: 389



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

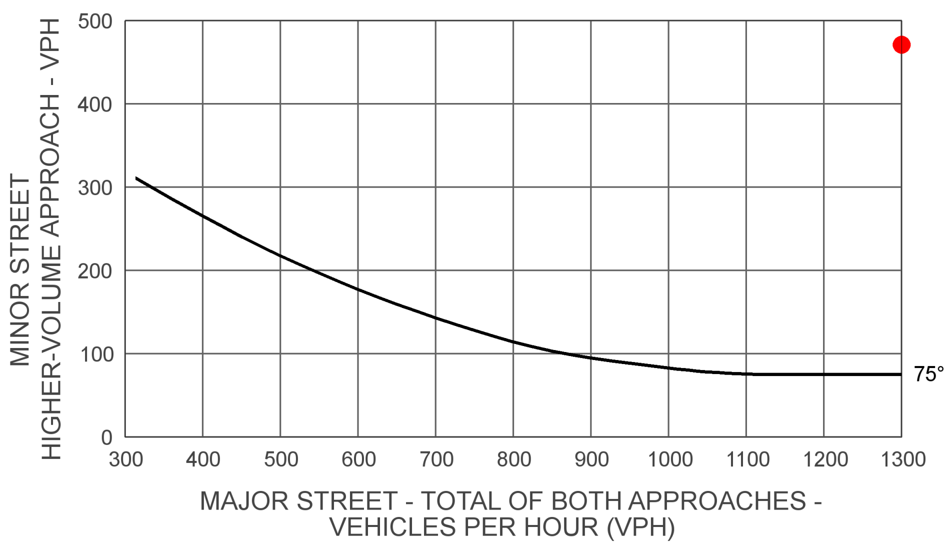
Scenario: AM Future+Project

Intersection #: 8



Major Total: 1754

Minor High Volume: 471



Intersection	
Intersection Delay, s/veh	24.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	86	197	17	0	30	228	112	0	54	202	31	0	65	106	77
Future Vol, veh/h	0	86	197	17	0	30	228	112	0	54	202	31	0	65	106	77
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	93	214	18	0	33	248	122	0	59	220	34	0	71	115	84
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	23.4	29.5	22.5	19.3
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	29%	8%	26%
Vol Thru, %	70%	66%	62%	43%
Vol Right, %	11%	6%	30%	31%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	287	300	370	248
LT Vol	54	86	30	65
Through Vol	202	197	228	106
RT Vol	31	17	112	77
Lane Flow Rate	312	326	402	270
Geometry Grp	1	1	1	1
Degree of Util (X)	0.636	0.658	0.769	0.553
Departure Headway (Hd)	7.342	7.26	6.885	7.388
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	490	496	523	485
Service Time	5.427	5.345	4.963	5.478
HCM Lane V/C Ratio	0.637	0.657	0.769	0.557
HCM Control Delay	22.5	23.4	29.5	19.3
HCM Lane LOS	C	C	D	C
HCM 95th-tile Q	4.4	4.7	6.8	3.3

Intersection	
Intersection Delay, s/veh	41.9
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	128	207	23	0	30	236	112	0	59	202	31	0	65	106	112
Future Vol, veh/h	0	128	207	23	0	30	236	112	0	59	202	31	0	65	106	112
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	139	225	25	0	33	257	122	0	64	220	34	0	71	115	122
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	48.5	51.2	33.1	30.2
HCM LOS	E	F	D	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	36%	8%	23%
Vol Thru, %	69%	58%	62%	37%
Vol Right, %	11%	6%	30%	40%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	292	358	378	283
LT Vol	59	128	30	65
Through Vol	202	207	236	106
RT Vol	31	23	112	112
Lane Flow Rate	317	389	411	308
Geometry Grp	1	1	1	1
Degree of Util (X)	0.749	0.886	0.908	0.717
Departure Headway (Hd)	8.497	8.196	7.953	8.395
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	425	440	456	428
Service Time	6.582	6.276	6.03	6.483
HCM Lane V/C Ratio	0.746	0.884	0.901	0.72
HCM Control Delay	33.1	48.5	51.2	30.2
HCM Lane LOS	D	E	F	D
HCM 95th-tile Q	6.1	9.3	10	5.5

Intersection	
Intersection Delay, s/veh	68.7
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	88	318	17	0	68	500	215	0	59	221	51	0	114	116	84
Future Vol, veh/h	0	88	318	17	0	68	500	215	0	59	221	51	0	114	116	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	96	346	18	0	74	543	234	0	64	240	55	0	124	126	91
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	76.3	75.6	58.7	51.7
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	21%	9%	36%
Vol Thru, %	67%	75%	64%	37%
Vol Right, %	15%	4%	27%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	331	423	783	314
LT Vol	59	88	68	114
Through Vol	221	318	500	116
RT Vol	51	17	215	84
Lane Flow Rate	360	460	851	341
Geometry Grp	1	1	1	1
Degree of Util (X)	0.92	1	1	0.879
Departure Headway (Hd)	9.203	9.148	8.983	9.273
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	396	400	417	389
Service Time	7.26	7.148	6.983	7.336
HCM Lane V/C Ratio	0.909	1.15	2.041	0.877
HCM Control Delay	58.7	76.3	75.6	51.7
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	9.8	12.1	12.3	8.7

Intersection	
Intersection Delay, s/veh	75.3
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	130	328	23	0	68	508	215	0	64	221	51	0	114	116	119
Future Vol, veh/h	0	130	328	23	0	68	508	215	0	64	221	51	0	114	116	119
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	141	357	25	0	74	552	234	0	70	240	55	0	124	126	129
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	78	77.3	68.8	73.4
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	27%	9%	33%
Vol Thru, %	66%	68%	64%	33%
Vol Right, %	15%	5%	27%	34%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	336	481	791	349
LT Vol	64	130	68	114
Through Vol	221	328	508	116
RT Vol	51	23	215	119
Lane Flow Rate	365	523	860	379
Geometry Grp	1	1	1	1
Degree of Util (X)	0.962	1	1	0.984
Departure Headway (Hd)	9.482	9.537	9.365	9.342
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	383	387	396	391
Service Time	7.537	7.537	7.365	7.394
HCM Lane V/C Ratio	0.953	1.351	2.172	0.969
HCM Control Delay	68.8	78	77.3	73.4
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	10.8	11.9	12	11.5

Intersection	
Intersection Delay, s/veh	78.1
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	100	346	20	0	68	675	301	0	100	376	75	0	164	197	143
Future Vol, veh/h	0	100	346	20	0	68	675	301	0	100	376	75	0	164	197	143
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	109	376	22	0	74	734	327	0	109	409	82	0	178	214	155
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	78.5	77.8	78.3	78
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	21%	7%	33%
Vol Thru, %	68%	74%	65%	39%
Vol Right, %	14%	4%	29%	28%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	551	466	1044	504
LT Vol	100	100	68	164
Through Vol	376	346	675	197
RT Vol	75	20	301	143
Lane Flow Rate	599	507	1135	548
Geometry Grp	1	1	1	1
Degree of Util (X)	1	1	1	1
Departure Headway (Hd)	9.586	9.648	9.471	9.526
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	383	380	397	383
Service Time	7.586	7.648	7.471	7.526
HCM Lane V/C Ratio	1.564	1.334	2.859	1.431
HCM Control Delay	78.3	78.5	77.8	78
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	11.9	11.8	11.9	11.9

Intersection	
Intersection Delay, s/veh	78.1
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	142	356	26	0	68	683	301	0	105	376	75	0	164	197	178
Future Vol, veh/h	0	142	356	26	0	68	683	301	0	105	376	75	0	164	197	178
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	154	387	28	0	74	742	327	0	114	409	82	0	178	214	193
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	78.6	77.8	78.3	77.9
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	27%	6%	30%
Vol Thru, %	68%	68%	65%	37%
Vol Right, %	13%	5%	29%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	556	524	1052	539
LT Vol	105	142	68	164
Through Vol	376	356	683	197
RT Vol	75	26	301	178
Lane Flow Rate	604	570	1143	586
Geometry Grp	1	1	1	1
Degree of Util (X)	1	1	1	1
Departure Headway (Hd)	9.588	9.656	9.472	9.494
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	387	382	400	387
Service Time	7.588	7.656	7.472	7.494
HCM Lane V/C Ratio	1.561	1.492	2.857	1.514
HCM Control Delay	78.3	78.6	77.8	77.9
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	11.9	11.8	11.9	11.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	356	26	68	683	301	105	376	75	164	197	178
Future Volume (veh/h)	142	356	26	68	683	301	105	376	75	164	197	178
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1716	1863	1716	1716	1863	1716	1716	1863	1716	1716	1863	1716
Adj Flow Rate, veh/h	154	387	28	74	742	327	114	409	82	178	214	193
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	158	1019	420	121	977	403	158	767	316	815	1500	618
Arrive On Green	0.02	0.10	0.10	0.04	0.28	0.28	0.05	0.22	0.22	0.26	0.42	0.42
Sat Flow, veh/h	3170	3539	1458	3170	3539	1458	3170	3539	1458	3170	3539	1458
Grp Volume(v), veh/h	154	387	28	74	742	327	114	409	82	178	214	193
Grp Sat Flow(s),veh/h/ln	1585	1770	1458	1585	1770	1458	1585	1770	1458	1585	1770	1458
Q Serve(g_s), s	4.4	9.2	1.6	2.1	17.3	9.5	3.2	9.2	3.5	4.0	3.3	7.9
Cycle Q Clear(g_c), s	4.4	9.2	1.6	2.1	17.3	9.5	3.2	9.2	3.5	4.0	3.3	7.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	158	1019	420	121	977	403	158	767	316	815	1500	618
V/C Ratio(X)	0.97	0.38	0.07	0.61	0.76	0.81	0.72	0.53	0.26	0.22	0.14	0.31
Avail Cap(c_a), veh/h	158	1278	527	158	1278	527	158	767	316	815	1500	618
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.89	0.89
Uniform Delay (d), s/veh	44.2	33.2	29.7	42.6	29.8	7.8	42.1	31.2	19.8	26.3	15.9	17.2
Incr Delay (d2), s/veh	60.8	0.2	0.1	4.9	2.0	7.2	14.6	2.6	2.0	0.1	0.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	4.6	0.6	1.0	8.7	4.6	1.7	4.8	1.6	1.7	1.7	3.4
LnGrp Delay(d),s/veh	105.0	33.4	29.8	47.5	31.8	15.0	56.7	33.9	21.8	26.4	16.1	18.4
LnGrp LOS	F	C	C	D	C	B	E	C	C	C	B	B
Approach Vol, veh/h		569			1143			605			585	
Approach Delay, s/veh		52.6			28.0			36.5			20.0	
Approach LOS		D			C			D			B	

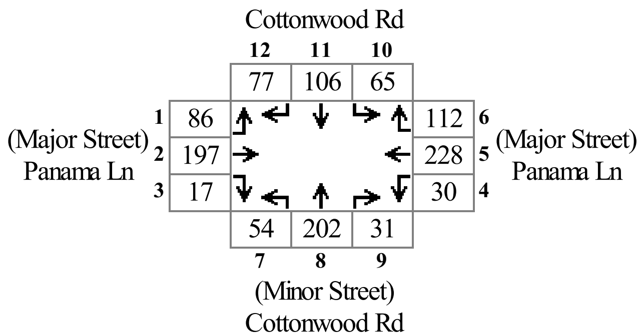
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.6	24.0	7.9	30.4	9.0	42.6	9.0	29.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	19.5	4.5	32.5	4.5	30.5	4.5	32.5
Max Q Clear Time (g_c+I1), s	6.0	11.2	4.1	11.2	5.2	9.9	6.4	19.3
Green Ext Time (p_c), s	1.8	1.4	0.0	6.8	0.0	2.4	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	33.0
HCM 2010 LOS	C

Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

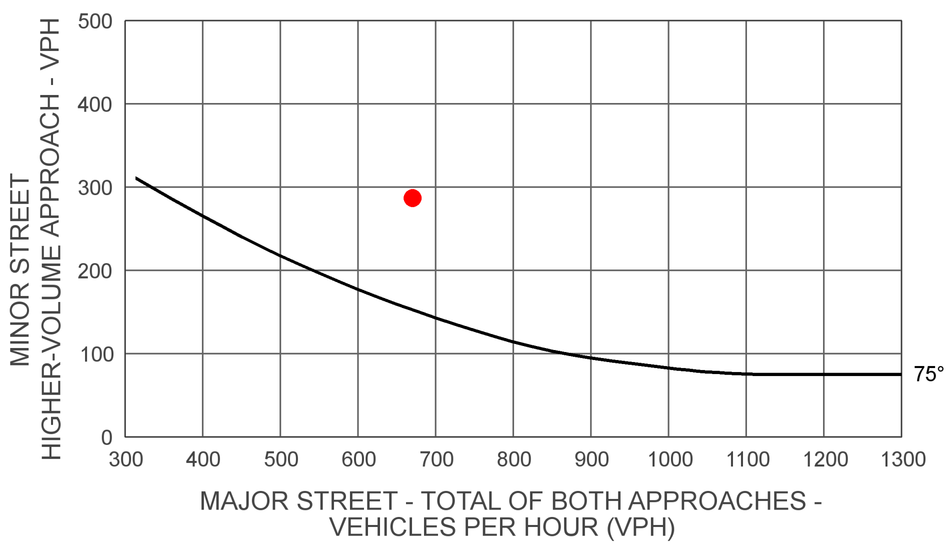
Scenario: PM Existing

Intersection #: 8



Major Total: 670

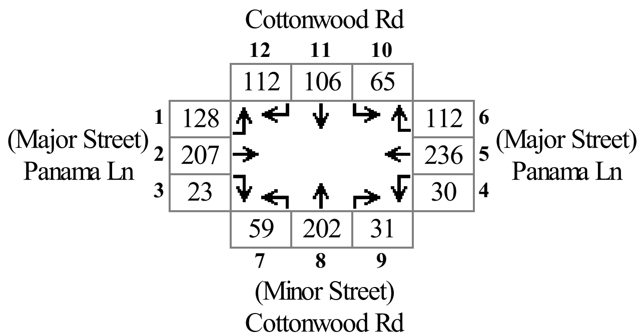
Minor High Volume: 287

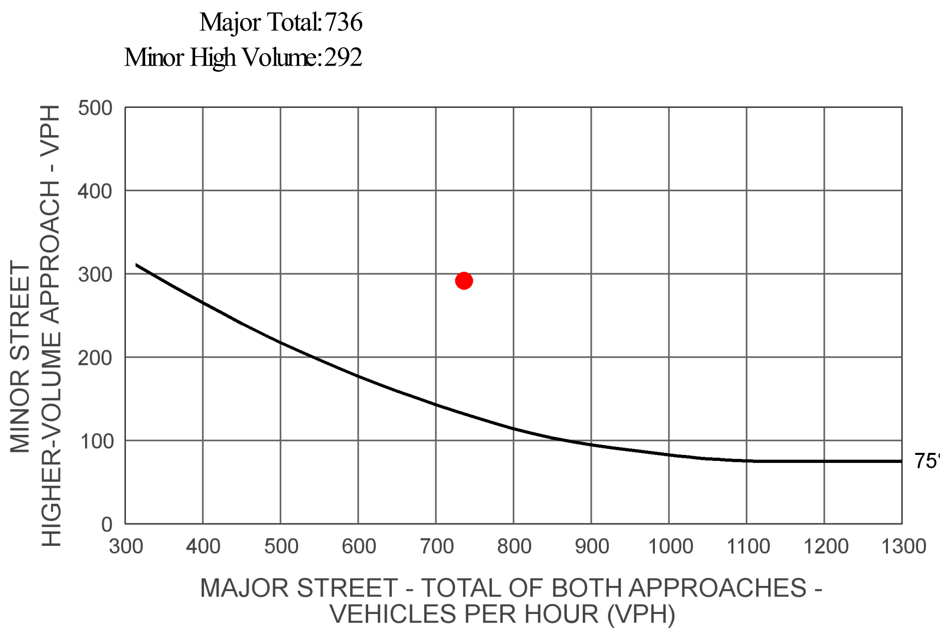


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Existing+Project

Intersection #: 8

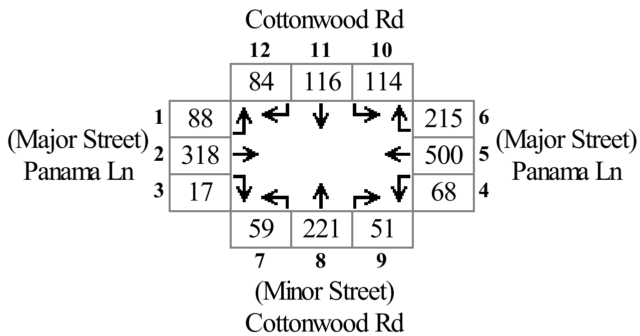




Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

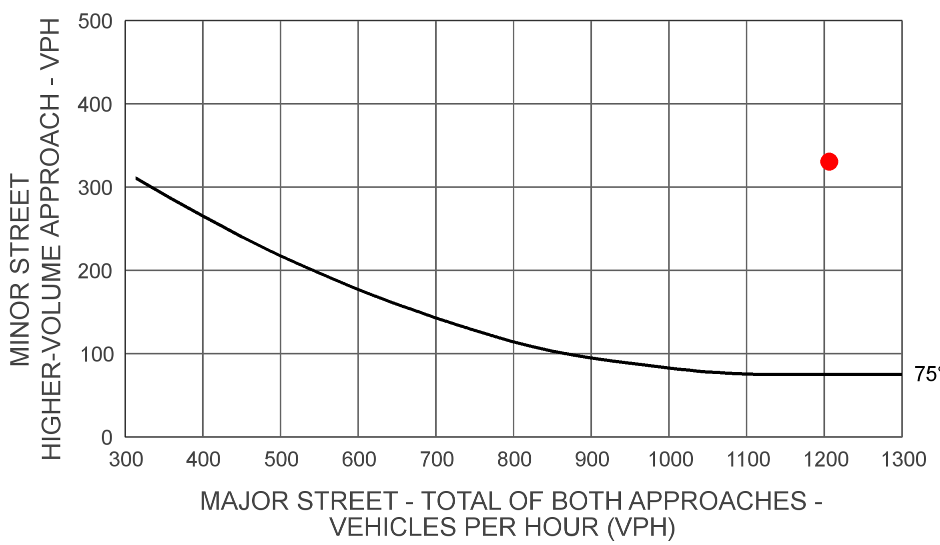
Scenario: PM Future

Intersection #: 8



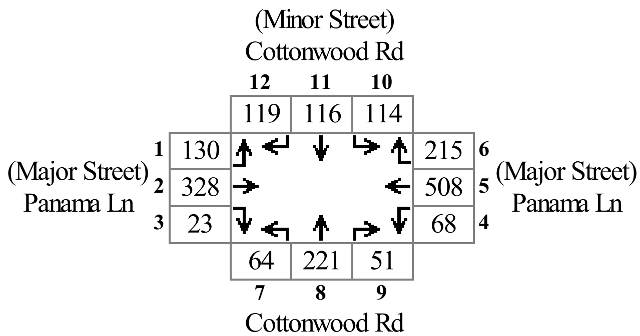
Major Total: 1206

Minor High Volume: 331

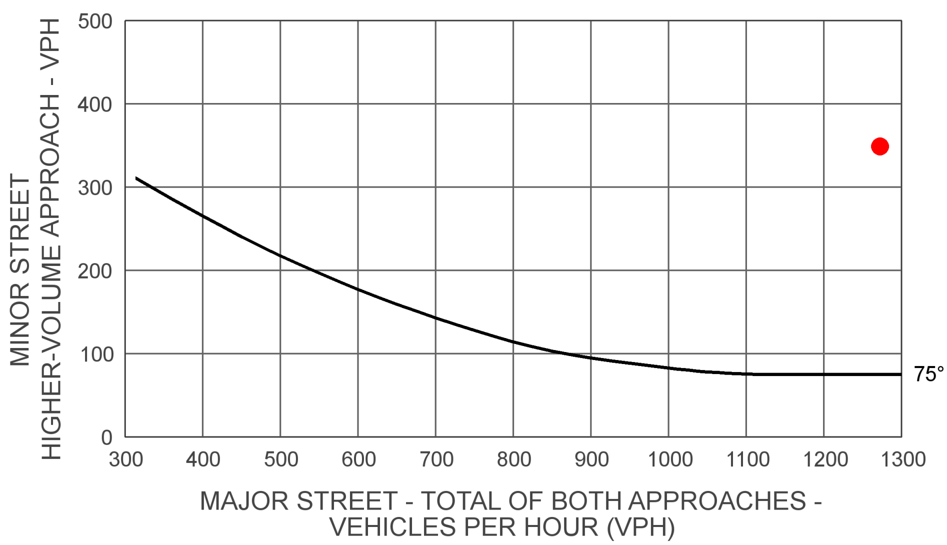


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Future+Project
Intersection #: 8

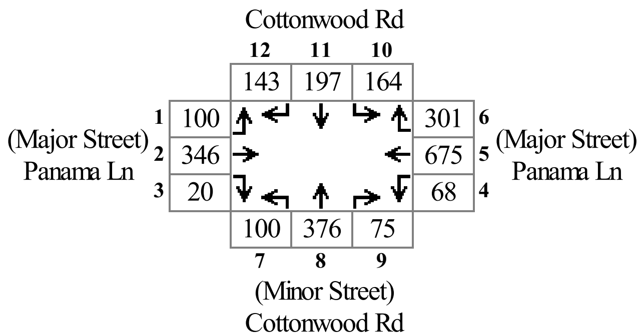


Major Total: 1272
Minor High Volume: 349

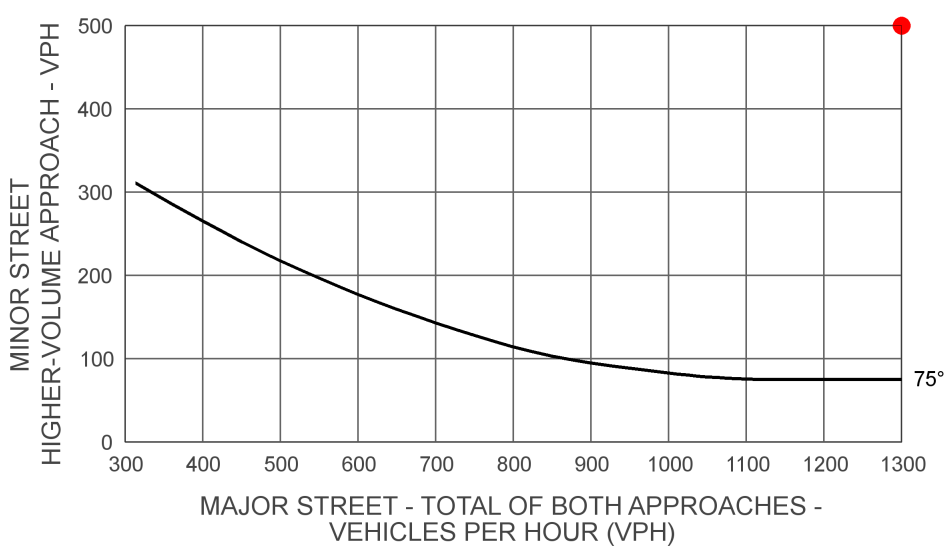


Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

Scenario: PM Future
Intersection #: 8



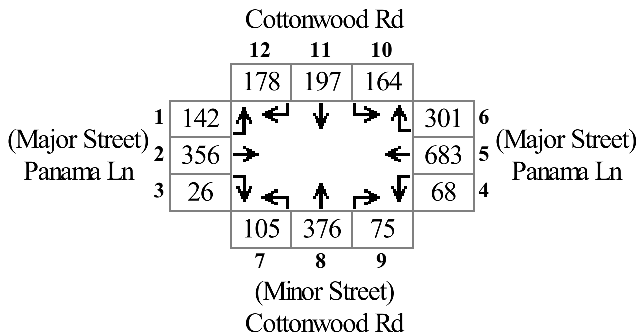
Major Total: 1510
Minor High Volume: 551



Rural Peak Hour Signal Warrant
Intersection Meets Signal Warrant

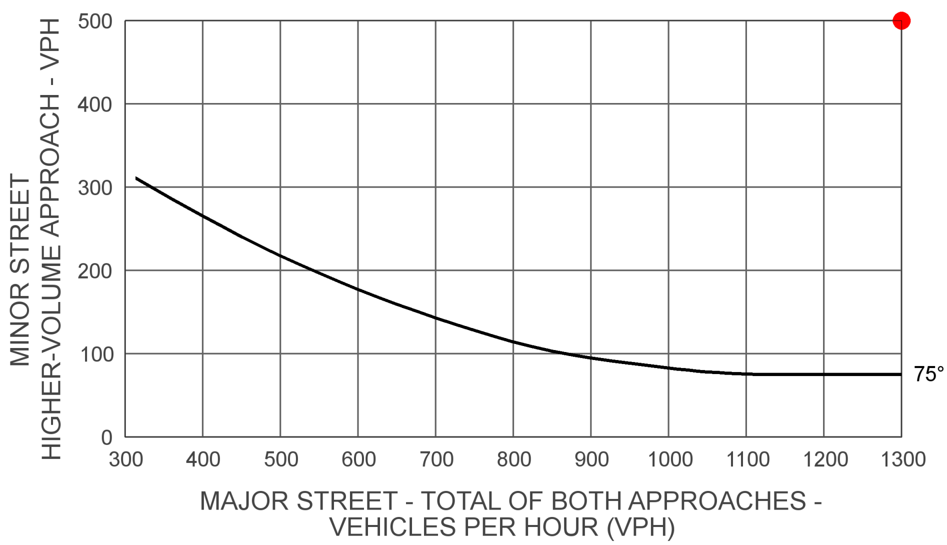
Scenario: PM Future+Project

Intersection #: 8



Major Total: 1576

Minor High Volume: 556



VEHICLE TURNING MOVEMENT COUNTS

Location ID: 1
North/South: Cottonwood Road
East/West: E Pacheco Road

Date: 5/8/2018
City: Bakersfield, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
7:30	26	46	0	0	0	0	0	66	5	7	0	33	183
7:45	21	62	0	0	0	0	0	76	8	6	0	36	209
8:00	17	44	0	0	0	0	0	55	3	9	0	25	153
8:15	20	29	0	0	0	0	0	52	9	5	0	27	142
Total Volume:	84	181	0	0	0	0	0	249	25	27	0	121	687
Approach %	32%	68%	0%	0%	0%	0%	0%	91%	9%	18%	0%	82%	

Peak Hr Begin:	7:30												
PHV	84	181	0	0	0	0	0	249	25	27	0	121	687
PHF	0.798			0.000			0.815			0.881			0.822

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
15:00	33	35	1	0	0	0	0	81	11	7	0	32	200
15:15	29	50	0	0	0	0	0	92	15	7	0	44	237
15:30	36	70	0	0	0	0	0	105	11	6	0	40	268
15:45	34	63	0	0	0	0	0	79	13	14	0	36	239
Total Volume:	132	218	1	0	0	0	0	357	50	34	0	152	944
Approach %	38%	62%	0%	0%	0%	0%	0%	88%	12%	18%	0%	82%	

Peak Hr Begin:	15:00												
PHV	132	218	1	0	0	0	0	357	50	34	0	152	944
PHF	0.828			0.000			0.877			0.912			0.881

Location ID:	2		
North/South:	Monitor St	Date:	10/11/2018
East/West:	Fairview Rd	City:	Bakersfield, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
7:00													
7:15													
7:30	10	52	11	14	26	9	7	57	22	14	31	11	264
7:45	10	46	14	19	25	4	25	57	14	11	48	18	291
8:00	17	57	18	16	25	9	18	86	10	10	32	40	338
8:15	25	51	15	18	25	9	13	80	8	12	24	46	326
8:30													
8:45													
Total Volume:	62	206	58	67	101	31	63	280	54	47	135	115	1219
Approach %	19%	63%	18%	34%	51%	16%	16%	71%	14%	16%	45%	39%	
Peak Hr Begin:	7:30												
PHV	62	206	58	67	101	31	63	280	54	47	135	115	1219
PHF		0.886			0.957			0.871			0.905		0.902

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	21	80	9	8	28	10	9	47	20	13	19	8	272
16:15	10	42	4	5	26	15	5	59	17	15	22	8	228
16:30	7	62	11	5	25	12	9	53	15	14	21	10	244
16:45	6	37	8	6	39	6	12	44	14	11	23	2	208
17:00													
17:15													
17:30													
17:45													
Total Volume:	44	221	32	24	118	43	35	203	66	53	85	28	952
Approach %	15%	74%	11%	13%	64%	23%	12%	67%	22%	32%	51%	17%	
Peak Hr Begin:	16:00												
PHV	44	221	32	24	118	43	35	203	66	53	85	28	952
PHF		0.675			0.907			0.938			0.922		0.875

Location ID:	3		
North/South:	S Union Ave	Date:	10/16/2018
East/West:	Fairview Rd	City:	Bakersfield, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
7:00													
7:15													
7:30	16	80	14	13	18	14	16	130	4	4	15	24	348
7:45	17	55	12	16	17	22	17	122	8	3	16	18	323
8:00	13	71	8	6	19	18	21	110	8	3	15	15	307
8:15	9	72	11	7	10	7	14	104	8	13	7	21	283
8:30													
8:45													
Total Volume:	55	278	45	42	64	61	68	466	28	23	53	78	1261
Approach %	15%	74%	12%	25%	38%	37%	12%	83%	5%	15%	34%	51%	

Peak Hr Begin:	7:30												
PHV	55	278	45	42	64	61	68	466	28	23	53	78	1261
PHF		0.859			0.759			0.937			0.895		0.906

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	20	112	14	7	14	10	17	99	4	12	11	16	336
16:15	18	105	20	8	17	28	21	87	9	5	9	24	351
16:30	24	111	10	14	15	7	24	124	6	8	12	22	377
16:45	18	112	14	9	16	11	20	128	12	5	16	19	380
17:00													
17:15													
17:30													
17:45													
Total Volume:	80	440	58	38	62	56	82	438	31	30	48	81	1444
Approach %	14%	76%	10%	24%	40%	36%	15%	79%	6%	19%	30%	51%	

Peak Hr Begin:	16:00												
PHV	80	440	58	38	62	56	82	438	31	30	48	81	1444
PHF		0.990			0.736			0.861			0.946		0.950

Location ID: 4
North/South: S H St
East/West: Panama Ln

Date: 10/11/2018
City: Bakersfield, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
7:00													
7:15													
7:30	38	77	31	27	195	6	9	87	32	10	117	26	655
7:45	34	67	29	32	170	8	11	81	23	9	143	42	649
8:00	34	57	25	25	113	4	5	47	20	6	122	34	492
8:15	27	31	12	16	121	6	3	36	20	8	199	23	502
8:30													
8:45													
Total Volume:	133	232	97	100	599	24	28	251	95	33	581	125	2298
Approach %	29%	50%	21%	14%	83%	3%	7%	67%	25%	4%	79%	17%	

Peak Hr Begin:	7:30												
PHV	133	232	97	100	599	24	28	251	95	33	581	125	2298
PHF		0.791			0.793			0.730			0.803		0.877

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	37	76	36	20	160	17	9	56	22	10	187	56	686
16:15	37	64	25	32	148	11	10	29	23	13	156	39	587
16:30	58	60	37	21	166	12	11	51	39	11	182	49	697
16:45	54	67	28	25	164	10	4	62	20	11	200	66	711
17:00													
17:15													
17:30													
17:45													
Total Volume:	186	267	126	98	638	50	34	198	104	45	725	210	2681
Approach %	32%	46%	22%	12%	81%	6%	10%	59%	31%	5%	74%	21%	

Peak Hr Begin:	16:00												
PHV	186	267	126	98	638	50	34	198	104	45	725	210	2681
PHF		0.934			0.987			0.832			0.884		0.943

Location ID:	5		
North/South:	Monitor Street	Date:	5/8/2018
East/West:	Panama Lane	City:	Bakersfield, CA

	Southbound			*Westbound*			*Northbound*			*Eastbound*			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
7:30	41	59	6	9	126	7	28	71	38	26	113	17	541
7:45	44	57	6	8	88	10	27	72	29	43	107	30	521
8:00	35	55	13	9	114	12	13	76	30	26	78	33	494
8:15	35	23	9	10	83	6	11	26	15	8	83	38	347
Total Volume:	155	194	34	36	411	35	79	245	112	103	381	118	1903
Approach %	40%	51%	9%	7%	85%	7%	18%	56%	26%	17%	63%	20%	
Peak Hr Begin:	7:30												
PHV	155	194	34	36	411	35	79	245	112	103	381	118	1903
PHF		0.895			0.849			0.796			0.836		0.879

	Southbound			*Westbound*			*Northbound*			*Eastbound*			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
15:00	48	53	17	14	133	11	13	88	52	39	125	40	633
15:15	37	32	10	18	124	9	13	48	24	22	134	31	502
15:30	33	34	13	17	142	8	11	30	21	32	131	38	510
15:45	32	29	10	11	150	8	11	23	17	40	169	36	536
Total Volume:	150	148	50	60	549	36	48	189	114	133	559	145	2181
Approach %	43%	43%	14%	9%	85%	6%	14%	54%	32%	16%	67%	17%	
Peak Hr Begin:	15:00												
PHV	150	148	50	60	549	36	48	189	114	133	559	145	2181
PHF		0.737			0.954			0.574			0.854		0.861

Location ID:	6		
North/South:	S Union Avenue	Date:	5/8/2018
East/West:	Panama Lane	City:	Bakersfield, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
7:30	20	81	15	11	64	60	45	106	52	28	79	40	601
7:45	23	60	14	14	48	33	44	85	35	22	69	51	498
8:00	23	45	18	14	53	32	27	70	28	15	52	25	402
8:15	25	40	9	13	55	30	27	52	14	14	61	37	377
Total Volume:	91	226	56	52	220	155	143	313	129	79	261	153	1878
Approach %	24%	61%	15%	12%	52%	36%	24%	54%	22%	16%	53%	31%	
Peak Hr Begin:	7:30												
PHV	91	226	56	52	220	155	143	313	129	79	261	153	1878
PHF		0.804			0.791			0.720			0.838		0.781

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
15:00	39	84	23	20	80	34	32	91	36	14	79	54	586
15:15	38	72	19	24	70	18	40	116	36	15	59	46	553
15:30	51	76	17	10	92	23	32	105	26	8	71	47	558
15:45	40	73	20	19	85	23	28	81	34	15	88	37	543
Total Volume:	168	305	79	73	327	98	132	393	132	52	297	184	2240
Approach %	30%	55%	14%	15%	66%	20%	20%	60%	20%	10%	56%	35%	
Peak Hr Begin:	15:00												
PHV	168	305	79	73	327	98	132	393	132	52	297	184	2240
PHF		0.945			0.929			0.855			0.906		0.956

Location ID:	8		
North/South:	Cottonwood Road	Date:	5/8/2018
East/West:	Panama Road	City:	Bakersfield, CA

	Southbound			Westbound			Northbound			Eastbound			Totals:
	1	2	3	4	5	6	7	8	9	10	11	12	
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
7:30	3	13	17	9	67	0	0	5	2	2	71	2	191
7:45	5	17	15	17	39	0	0	8	4	1	78	10	194
8:00	5	11	9	11	47	0	0	8	2	0	45	4	142
8:15	3	6	5	8	56	1	0	12	0	3	35	1	130
Total Volume:	16	47	46	45	209	1	0	33	8	6	229	17	657
Approach %	15%	43%	42%	18%	82%	0%	0%	80%	20%	2%	91%	7%	

Peak Hr Begin:	7:30												
PHV	16	47	46	45	209	1	0	33	8	6	229	17	657
PHF		0.736			0.839			0.854			0.708		0.847

	Southbound			Westbound			Northbound			Eastbound			Totals:
	1	2	3	4	5	6	7	8	9	10	11	12	
Lanes:	R	T	L	R	T	L	R	T	L	R	T	L	
15:00	4	12	11	21	53	3	1	28	4	1	62	18	218
15:15	5	10	15	25	65	3	0	40	0	4	82	9	258
15:30	2	16	14	19	82	0	0	34	2	7	65	11	252
15:45	8	10	15	20	72	3	2	25	5	1	67	9	237
Total Volume:	19	48	55	85	272	9	3	127	11	13	276	47	965
Approach %	16%	39%	45%	23%	74%	2%	2%	90%	8%	4%	82%	14%	

Peak Hr Begin:	15:00												
PHV	19	48	55	85	272	9	3	127	11	13	276	47	965
PHF		0.924			0.906			0.881			0.884		0.935