Kings County
Board of Supervisors

Kings County Government Center
1400 W. Lacey Boulevard ❖ Hanford, California 93230
☎ (559) 852-2362 FAX (559) 585-8047

In compliance with the Americans with Disabilities Act, if you require a modification or accommodation to participate in this meeting, including agenda or other materials in an alternative format, please contact the Board of Supervisors Office at (559) 852-2362 (California Relay 711) by 3:00 p.m. on the Friday prior to this meeting. The Clerk of the Board will provide assistive listening devices upon request.

Agenda

March 20, 2018

Place: **Board of Supervisors Chambers**
Kings Government Center, Hanford, CA

Chairman:	**Richard Valle**	**(District 2)**	**Staff:**	**Rebecca Campbell, County Administrative Officer**
Vice Chairman:	**Joe Neves**	**(District 1)**		**Colleen Carlson, County Counsel**
Board Members:	**Doug Verboon**	**(District 3)**		**Catherine Venturella, Clerk of the Board**
	Craig Pedersen	**(District 4)**		
	Richard Fagundes	**(District 5)**		

Please turn off cell phones and pagers, as a courtesy to those in attendance.

I 9:00 AM **CALL TO ORDER**
ROLL CALL – Clerk of the Board
INVOCATION – Tim Howard – Koinonia Church
PLEDGE OF ALLEGIANCE

II 9:00 AM **UNSCHEDULED APPEARANCES**
Any person may directly address the Board at this time on any item on the agenda, or on any other items of interest to the public, that is within the subject matter jurisdiction of the Board. Five (5) minutes are allowed for each item.

ADJOURN AS THE BOARD OF SUPERVISORS

III 9:05 AM **CONVENE AS THE BOARD OF EQUALIZATION**
1. Consider accepting a withdrawal on Application for Changed Assessment No. 17-016 filed by Blackheart Capital LLC.
2. Consider accepting stipulations on Applications for Changed Assessment No. 17-004 & 17-005 filed by 7-Eleven.

ADJOURN AS THE BOARD OF EQUALIZATION

RECONVENE AS THE BOARD OF SUPERVISORS

IV 9:10 AM **CONSENT CALENDAR**
All items listed under the consent calendar are considered to be routine and will be enacted by one motion. For any discussion of an item on the consent calendar, it will be removed at the request of any Board Member and made a part of the regular agenda.

A. Approval of the Minutes: March 13, 2018

B. County Counsel:
Consider making two reappointments to the Hanford Cemetery District Board of Trustees.

C. Human Services Agency:
Consider adopting a Resolution proclaiming the month of March 2018 as Social Worker Appreciation Month.

CONSENT CALENDAR CONTINUED

D. Public Works Department:

1. Consider approving the Notice of Completion for Bush Engineering and the Partial Notice of Completion for Accelerated Modular Concepts for the Human Services Agency modular building project.
2. Consider adopting a Resolution stating that there are no unmet transit needs in Kings County.

V REGULAR AGENDA ITEMS

9:15 AM A. Child Support Services Department – Barbi Brokhoff
Consider authorizing the Chairman to sign letters addressed to the California Department of Finance and Delegation Members to support legislative efforts for equitable funding for County Child Support Departments.

9:20 AM B. Fire Department – Clay Smith
Consider authorizing the Purchasing Manager to sign purchase orders for a tilt bed equipment trailer and three-axle semi truck to transport a bulldozer for fire prevention and suppression efforts and authorizing the Clerk of the Board to sign the budget appropriation and transfer form. **(4/5 vote required)**

9:25 AM C. Public Works – Kevin McAlister
Consider authorizing the Chairman to sign an Amendment to the Lease Termination Agreement with the Mosquito Abatement District for a one year extension.

9:30 AM D. Administrative Office – Rebecca Campbell/Domingo Cruz
Consider authorizing the Chairman to sign the response to the Kings County Grand Jury Report entitled "Kings County Juvenile Center" and authorizing the Clerk of the Board to submit the response to the Presiding Judge of the Superior Court on or before May 28, 2018.

9:35 AM E. Community Development Agency – Greg Gatzka
Consider accepting the Smart Growth State Route 41 Corridor Improvement Plan Study.

VI 9:40 AM F. STUDY SESSION
County Counsel – Colleen Carlson/Diane Walker Freeman
Community Development Agency – Greg Gatka/Darren Verdegaal/Chuck Kinney
Health Department – Edward Hill/Jeff Taber
Information regarding the Local Agency Management Plan for onsite Wastewater Treatment System.

9:55 AM G. Board Member Announcements or Reports
On their own initiative Board Members may make a brief announcement or a brief report on their own activities. They may ask questions for clarification, make a referral to staff or take action to have staff place a matter of business on a future agenda (Gov. Code Section 54954.2a).

- Board Correspondence
- Upcoming Events
- Information on Future Agenda Items

VII **H. ADJOURNMENT**

The next regularly scheduled meeting is scheduled for March 27, 2018, at 9:00 a.m.

FUTURE MEETINGS AND EVENTS		
March 27	9:00 AM	Regular Meeting
March 27	11:00 AM	California Public Finance Authority Regular Meeting
March 27	1:30 PM	Kings County Housing Authority Board of Directors Regular Meeting
March 27	2:00 PM	Kings In-Home Supportive Services Board Regular Meeting
April 3	9:00 AM	Regular Meeting
April 10	9:00 AM	Regular Meeting
April 10	11:00 AM	California Public Finance Authority Regular Meeting
April 17	9:00 AM	Regular Meeting
April 24	9:00 AM	Regular Meeting
April 24	11:00 AM	California Public Finance Authority Regular Meeting
May 1	--	Regular Meeting Cancelled due to Annual Employee Recognition Barbecue

Agenda backup information and any public records provided to the Board after the posting of the agenda will be available for the public to review at the Board of Supervisors office, 1400 W. Lacey Blvd, Hanford, for the meeting date listed on this agenda.

COUNTY OF KINGS
BOARD OF EQUALIZATION

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM

March 20, 2018

SUBMITTED BY: BOARD OF EQUALIZATION

SUBJECT: Application for Changed Assessment

RECOMMENDED ACTION: **Accept withdrawal on Application for Changed Assessment No. 17-016 filed by Blackheart Capital LLC**

DISCUSSION:

The County Assessor recommended acceptance of the withdrawal as presented by the applicant.

BOARD ACTION

I hereby certify that the above order was passed
and adopted on ___________________, 2018.
Catherine Venturella, Clerk to the Board of Supervisors

By: ____

Cc: Assessor
County Counsel
Applicant

COUNTY OF KINGS
BOARD OF EQUALIZATION

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM

March 20, 2018

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SUBMITTED BY: BOARD OF EQUALIZATION

SUBJECT: Application for Changed Assessment 7-Eleven.
3200 Hackberry Rd.
Irving, TX 75063

RECOMMENDED ACTION: Accept Stipulations on Application for Changed Assessment Nos. 17-004 & 17-005

DISCUSSION:

The Assessor sets forth the following facts upon which the requested change is premised: The current assessed value is being corrected to reflect a reduction in the original base year value in Assessment Appeals 17-004 and 17-005.

Application No.	Parcel No.	Assessed Value	Corrected Value
Appl 17-004	**012-035-005**	**$3,736,250**	**$376,700**
Appl 17-005	**010-011-001**	**$4,693,570**	**$734,070**

BOARD ACTION

I hereby certify that the above order was passed

and adopted on ___________________, 2018.

CATHERINE VENTURELLA, Clerk to the Board of Equalization

cc: Assessor
County Counsel
Applicant

By ____
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Kings County
Board of Supervisors

Kings County Government Center
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Action Summary

March 13, 2018

Place: **Board of Supervisors Chambers**
Kings Government Center, Hanford, CA

Chairman:	**Richard Valle**	**(District 2)**	**Staff:**	**Rebecca Campbell, County Administrative Officer**
Vice Chairman:	**Joe Neves**	**(District 1)**		**Colleen Carlson, County Counsel**
Board Members:	**Doug Verboon**	**(District 3)**		**Catherine Venturella, Clerk of the Board**
	Craig Pedersen	**(District 4)**		
	Richard Fagundes	**(District 5)**		

Please turn off cell phones and pagers, as a courtesy to those in attendance.

I B 1 **CALL TO ORDER**
ROLL CALL – Clerk of the Board
INVOCATION – Chad Fagundes – Koinonia Church
PLEDGE OF ALLEGIANCE
ALL MEMBERS PRESENT

II B 2 **UNSCHEDULED APPEARANCES**
Any person may directly address the Board at this time on any item on the agenda, or on any other items of interest to the public, that is within the subject matter jurisdiction of the Board. Five (5) minutes are allowed for each item.
Scott Holwell, Veteran's Service Officer & Public Guardian stated that the Honor a Hero, Hire a Vet job fair will be held on March 15, 2018 at the Civic Auditorium.

Julia Patino, Child Abuse Prevention Coordinating Council (CAPCC) member stated that April is Child Abuse Awareness month.

Trish Shubert, Child Abuse Prevention Coordinating Council member stated that the members are planning events in the community pin wheel gardens, a blue ribbon campaign, a proclamation before the Board on April 3, 2018, an office decorating contest on April 17, 2018, a walk against Child Abuse on April 21, 2018 from Hanford Civic Auditorium to the Hanford Mall and a Children's Memorial flag to be flown in the County on April 27, 2018.

Clay Smith, Kings County Fire Chief introduced Rick Levy who was recently promoted to Fire Marshall.

Marlana Brown, Naval Air Station Lemoore Community Planning Liaison Officer introduced John Dirickson, as the interim replacement until the position is filled.

Josh Speer, Deputy Sheriff's Association President thanked the Board for working with them on the negotiations process and moving forward.

ADJOURN AS THE BOARD OF SUPERVISORS

III B 3 **CONVENE AS THE BOARD OF EQUALIZATION**

Consider accepting a withdrawal on Application for Changed Assessment No. 17-024 filed by JPMorgan Chase Bank.

ACTION: ACCEPTED WITHDRAWAL AS PRESENTED (JN/RF/DV/CP/RV-Aye)

ADJOURN AS THE BOARD OF EQUALIZATION

RECONVENE AS THE BOARD OF SUPERVISORS

IV B 4 **CONSENT CALENDAR**

All items listed under the consent calendar are considered to be routine and will be enacted by one motion. For any discussion of an item on the consent calendar, it will be removed at the request of any Board Member and made a part of the regular agenda.

A. Approval of the Minutes: February 27, 2018 & March 1, 2018

B. Behavioral Health Department:

1. Consider adopting a Resolution authorizing the Director of Behavioral Health to sign an Agreement with the California Department of Health Care Services for Substance Abuse Disorder Services and any addendums effective July 1, 2017 through June 30, 2020. **[Reso 18-017]**
2. Consider adopting a Resolution authorizing the Director of Behavioral Health to sign an Agreement and any addendums with the California Mental Health Services Authority for negotiation and development of agreements with the California Department of State Hospitals for July 1, 2017 through June 30, 2019. **[Reso 18-018]**

C. Fire Department:

Consider retroactively accepting a donation of 236 one-day Park Hopper Tickets from Disneyland Resort.

D. Human Services Agency:

Consider authorizing the Chairman to sign Amendment Agreements with Kings/Tulare Area Agency on Aging and Kings Commission on Aging for allocation augmentations of $34,539 per agency for providing senior services. **[Agmt 18-010.1, Agmt 18-011.1]**

E. Human Services Agency/Probation Department:

Consider authorizing the Chairman to sign the Memorandum of Understanding with the Kings County Office of Education for foster youth demographic data sharing. **[Agmt 18-017]**

F. Information Technology Department:

Consider authorizing the Chairman to sign an Agreement for information technology services with the City of Avenal. **[Agmt 18-018]. ITEM PULLED FOR DISCUSSION. ACTION: APPROVED AS RECOMMENDED (DV/JN/CP/RF/RV-Aye)**

G. Public Works Department/Information Technology Department:

Consider authorizing the Purchasing Manager to sign the purchase order of the man lift equipment from Pape Material Handling, Inc. for the County Building Maintenance Division's use.

H. Public Works Department:

Consider awarding a construction contract to Emmett's Excavation Inc. as the apparent low bidder for the 18th Avenue and Jersey Avenue asphalt concrete overlay project, authorizing the Chairman to sign the Agreement and the Public Works Director to approve additional costs up to 10% of the contract amount. **[Agmt 18-019]**

ACTION: APPROVED CONSENT CALENDAR AS AMENDED (CP/DV/JN/RF/RV-Aye)

V **REGULAR AGENDA ITEMS**

B 5 **A. Health Department – Ed Hill/Scott Waite**

Report on actions taken by the First 5 Kings County Children and Families Commission its February 6, 2018 meeting.

INFORMATION ONLY - NOA

B. Child Support Services Department – Barbi Brokhoff
Consider authorizing the Chairman to sign letters addressed to the California Department of Finance and Delegation Members to support legislative efforts for equitable funding for County Child Support Departments.
ITEM PULLED BY DEPARTMENT AND WILL BE PLACED ON A FUTURE AGENDA

B 6 **C. Health Department – Ed Hill**
Human Services Agency – Sanja Bugay
Behavioral Health Department– Lisa Lewis
Consider authorizing the Chairman to sign a letter in support of Assembly Bill 1795, as introduced on January 9, 2018 and to sign future letters through the legislative process with similar content in support of the bill.
ACTION: APPROVED AS PRESENTED (CP/DV/JN/RF/RV-Aye)

B 7 **D. Human Resources – Leslie McCormick Wilson**
1. Consider authorizing the Human Resources Director and designated staff to sign the Agreement with the Deputy Sheriff's Association that ends June 30, 2020 and approve reversing the 4% employee pick-up of the employer share of the Public Employee Retirement System (PERS) contribution for Sheriff Operations and District Attorney law enforcement management positions.
   ACTION: APPROVED AS PRESENTED (DV/JN/RF/CP/RV-Aye)
2. Consider approving a new job specification for the Quality Assurance Specialist and set the salary range at Range 181.0 ($3,640 -$4,441).
   ACTION: APPROVED AS PRESENTED (CP/DV/JN/RF/RV-Aye)

B 8 **E. Human Services Agency – Sanja Bugay/Wendy Osikafo**
Consider making six appointments to the In-Home Supportive Services Advisory Committee.
ACTION: APPROVED AS PRESENTED (DV/CP/JN/RF/RV-Aye)

B 9 **F. Job Training Office – John Lehn**
Consider authorizing the Job Training Office Director to submit comments to the State Department of Finance, supporting the designation of identified census tracts in Kings County as meeting the minimum Opportunity Zone qualification thresholds; including the request that Kings County census tracts 5 and 12 be included in the Governor's recommendation for Opportunity Zone designation.
ACTION: APPROVED CONSENT CALENDAR AS PRESENTED (CP/DV/JN/RF/RV-Aye)

B 10 **G. Public Works Department – Kevin McAllister/George Cowett**
Information Technology Department– John Devlin/Dan Willhite
Consider authorizing the Purchasing Manager to sign the purchase order for a patch truck from PB Loader Corp. to replace outdated equipment for patching roadways and authorizing the Clerk of the Board to sign the budget appropriation and transfer form. **(4/5 vote required)**
ACTION: APPROVED CONSENT CALENDAR AS PRESENTED (JN/DV/RF/CP/RV-Aye)

B 13 **H. Board Member Announcements or Reports**
On their own initiative Board Members may make a brief announcement or a brief report on their own activities. They may ask questions for clarification, make a referral to staff or take action to have staff place a matter of business on a future agenda (Gov. Code Section 54954.2a).
Supervisor Pedersen stated that he attended the National Association of Counties (NACo) conference in Washington, D.C. on March 2-8, 2018 and discussed topics from the meetings he attended.

Supervisor Verboon stated that he attended the Temperance Flat Joint Powers Authority meeting on March 2, 2018, attended the NACo conference in Washington, D.C. on March 4-8, 2018 and discussed topics from the meetings he attended. He stated that he facilitated a tour of Kelly Slater's Surf Ranch in Lemoore for Assemblymember Rudy Salas, Assemblymember Ian Calderon, Senator Andy Vidak and Congressman David Valadao on March 10, 2018 and discussed upcoming events at the facility.

Supervisor Neves stated that he attended the Kings Waste Recycling Authority meeting, the Local Agency Formation Commission, the Kings County Area Public Transit Agency meeting and the Kings County Association of Governments meeting on February 28, 2018. He stated that he attended the Behavioral Health Advisory Committee meeting on March 2, 2018, cooked for the Island School District carnival on March 3, 2018 and thanked Supervisor Verboon for his help with the event. He stated that he attended the Cabrillo Club membership meeting on March 4, 2018, participated in conference calls for the Hospital Board, attended CalViva Health Public Policy committee meeting and a Cal-ID/Remote Access Network (RAN) Board meeting on March 7, 2018, announced baseball at Lemoore High School, attended a CalVans meeting on March 8, 2018, cooked for the Lemoore Elementary band fundraiser on March 10, 2018 and thanked Supervisor Fagundes & District Attorney Keith Fagundes for their help with the event. He stated that he attended the Hanford Fraternal Hall annual meeting on March 11, 2018 and attended the Lemoore Oversight Board bond meeting on March 12, 2018.

Supervisor Valle thanked the Board members and staff that attended NACo working on behalf of the County and stated that Jose Ramirez, Olympic Boxer from Avenal will be boxing in New York City on March 17, 2018 and an official viewing party will be held at Dave & Busters in Fresno at 5:00 p.m.

County Administrative Officer, Rebecca Campbell stated that she would like to thank Congressman David Valadao's office for the letter of support on the simulcast public safety communications project.

- Board Correspondence: **Rebecca Campbell stated that the Board received correspondence from the California Public Utilities Commission stating that they will hold a workshop on "Internet For All Now" to be held on March 16, 2018 from 10:00 a.m. to 4:00 p.m. She stated that the Board received correspondence from the State Water Resources Control Board Notice of Petition for temporary change involving the transfer of up to 17,433 acre feet of water from Sutter extension water district to State Water contractor agencies under license 9063 comments are due by April 11, 2018. She stated that the Board received an invitation from the California Highway Patrol Hanford Division to attend a Chapter Uniform Inspection on May 9, 2018.**
- Upcoming Events: **Rebecca Campbell stated that the Honor a Hero, Hire a Vet job resource fair will be on March 15, 2018 at the Hanford Civic Auditorium, Kings County 4-H Color Me Green run on 5K run on March 17, 2018, Child Abuse Awareness office decorating contest on April 17, 2018 and the Employee Recognition barbecue will be held on May 1, 2018.**

- Information on Future Agenda Items: **Rebecca Campbell stated the following items would be on a future agenda: Jail parking lot and Armona Pathways project, Public Works termination to lease with Mosquito Abatement District and Local Transportation Fund claim resolution, Juvenile Center grand jury response, County Counsel reappointments of Trustees to the Hanford Cemetery District, Local Agency Management Plan (LAMP) study session, letter of support for the equitable funding for Child Support, Economic Development Corporation Agreement, Kettleman City 41 study, Public Works Highway safety improvement program and Phase 1 of SB 1 road improvement projects improvements, Redevelopment Agency Oversight Board, Resolution recognizing National Woman's History month where the Board will recognize local leaders and the Child Abuse Prevention Coordinating Council proclamation for Child Abuse Awareness.**

  Supervisor Valle asked the two college students to come to the podium and introduce themselves. Rodrigo Alvarez stated that he was a College of Sequoias student required to attend a meeting for Political Science class and would be meeting with Supervisor Verboon following meeting. Elijah Burros stated that he also was a College of Sequoias student attending a meeting for Political Science class and would be meeting with Supervisor Neves following the meeting.

VI B 11 I. PUBLIC HEARING
Administration – Rebecca Campbell
California Public Finance Authority – Caitlin Lanctot
Conduct a public hearing under the requirements of the Tax Equity and Fiscal Responsibility Act (TEFRA) and the Internal Revenue Code of 1986 and consider adopting a Resolution approving the tax-exempt financing and issuance of obligations by the California Public Finance Authority for financing or refinancing the acquisition and construction of multifamily rental housing for Coronado Apartments. **[Reso 18-018]**
Supervisor Valle opened the public hearing, no testimony was received and the public hearing was closed.
ACTION: APPROVED PRESENTED (CP/RF/JN/DV/RV-Aye)

B 12 J. PUBLIC HEARING
Community Development Agency – Greg Gatzka/Kao Nou Yang
Conduct a public hearing to consider authorizing an alcoholic beverage control license for Dollar General in Armona and making a Determination of Public Convenience or Necessity.
Supervisor Valle opened the public hearing, testimony was received from Steve Rawlings and the public hearing was closed.
ACTION: APPROVED PRESENTED (RF/DV/JN/CP/RV-Aye)

VII B 14 K. ADJOURNMENT
The next regularly scheduled meeting is scheduled for March 20, 2018, at 9:00 a.m.

VIII 11:00 AM L. CALIFORNIA PUBLIC FINANCE AUTHORITY- REGULAR MEETING

FUTURE MEETINGS AND EVENTS		
March 20	9:00 AM	Regular Meeting
March 27	9:00 AM	Regular Meeting
March 27	11:00 AM	California Public Finance Authority Regular Meeting
March 27	1:30 PM	Kings County Housing Authority Board of Directors Regular Meeting
March 27	2:00 PM	Kings In-Home Supportive Services Board Regular Meeting
April 3	9:00 AM	Regular Meeting
April 10	9:00 AM	Regular Meeting
April 10	11:00 AM	California Public Finance Authority Regular Meeting
April 17	9:00 AM	Regular Meeting

Agenda backup information and any public records provided to the Board after the posting of the agenda will be available for the public to review at the Board of Supervisors office, 1400 W. Lacey Blvd, Hanford, for the meeting date listed on this agenda.

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **County Counsel – Colleen Carlson/Diane Walker Freeman**

SUBJECT: **APPOINTMENT OF TRUSTEES TO THE HANFORD CEMETERY DISTRICT**

SUMMARY:

Overview:
Under Health and Safety Code section 9024, the Board of Supervisors appoints trustees to public cemetery district boards for four year terms. The four year terms of two trustees of the Hanford Cemetery District have expired creating a present need to appoint two members to fill the openings.

Recommendation:
Appoint Loretta Toledo and Deborah Wilson as Trustees to the Hanford Cemetery District.

Fiscal Impact:
None.

BACKGROUND:
The Hanford Cemetery District has a five-member Board of Trustees. The Trustees each serve a four year term. Applications have been received by the Clerk of the Board of Supervisors requesting appointment to two of those seats. Loretta Toledo and Deborah Wilson are incumbents for the positions. The District has requested that the Board of Supervisors appoint Trustees Loretta Toledo and Deborah Wilson to new four year terms.

BOARD ACTION: APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk of the Board

By ___________________________________, Deputy.

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **Human Services Agency-Sanja Bugay/Wendy Osikafo**

SUBJECT: **SOCIAL WORKER APPRECIATION MONTH RESOLUTION**

SUMMARY:

Overview:
The month of March has been declared to be a time when everyone in the nation, state and local communities should acknowledge the important work of the Social Work profession. The Human Services Agency has approximately 91 Social Workers that provide services to Kings County's most vulnerable populations. As March is national social worker month, this is an opportunity for Kings County to turn the spotlight on the profession and highlight the important contributions they make to the community.

Recommendation:
Adopt a Resolution proclaiming the month of March 2018 as Social Worker Appreciation Month.

Fiscal Impact:
None

BACKGROUND:
The National Professional Social Work Month was first organized in March of 1963 by the National Association of Social Workers as a way to encourage public support for the profession. Then in 1984, a joint resolution of Congress was passed and was proclaimed by President Ronald Reagan under Proclamation 5167 on March 22, as National Professional Social Work Month.

(Cont'd)

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk of the Board

By ___________________________________, Deputy.

Social workers across the country work as advocates, advisors, counselors and facilitators in nonprofits, schools, clinics, businesses and government offices. In their roles, they provide support to people of all backgrounds to communities and to employers in both crisis and just everyday life situations. Kings County Social Workers are in the community providing an array of services and support to meet the needs of the most vulnerable such as children, aged, blind, and disabled. Programs include; Child Welfare Services, Adult Protective Services, In-Home Support Services, Public Authority and Supportive Services. Our Social Workers are trained to look at situations in a holistic way, while helping bring together people and communities to find ways to address issues such as safety, hunger, affordable housing, and rehabilitation. Social workers assist individuals obtain employable skills, locate family connections, help build resiliency, and provide individual support to encourage self reliance.

Social workers follow the National Association of Social Workers (NASW) Code of Ethics, which calls on members of the profession to enhance human-well being and meet the basic needs of all people, with particular attention on the needs and empowerment of those who are vulnerable, oppressed or living in poverty.

County Counsel has reviewed and approved the resolution.

BEFORE THE BOARD OF SUPERVISORS
OF THE COUNTY OF KINGS, STATE OF CALIFORNIA

****

IN THE MATTER OF PROCLAIMING THE MONTH OF MARCH 2018, AS SOCIAL WORKER APPRECIATION MONTH___________/

RESOLUTION NO. _______

WHEREAS, the Kings County Board of Supervisors desires to bring to the attention of all citizens the importance of social workers; and

WHEREAS, the Social Work Profession is dedicated to enhancing the well-being of others and meeting the basic needs of all people, especially the most vulnerable in our society; and

WHEREAS, Social Workers promote safety and well being of the families of Kings County to achieve family permanence, stability and self-reliance; and

WHEREAS, Social Workers are present throughout our community, parterning with families and community members, engaging service providers, teaming with networks, exploring opportunitites, advocating for our most vulnerable populations and helping to achieve positive outcomes; and

WHEREAS, Social Workers are present in times of crisis, helping people overcome issues such as death and grief and help people maintain safety within their family units, support connections with their tribal community, assist familes into their homes, support our aged, blind and disabled populations, locate providers, and provide technical assistance; and

NOW, THEREFORE, **IT IS HEREBY RESOLVED** as follows:

1. The Kings County Board of Supervisors designates the month of March 2018, as Kings County Social Worker Appreciation Month.

2. The official proclamation is to be presented to the Kings County Human Services Agency on _____.

The foregoing Resolution was adopted upon motion by Supervisor _________, seconded by Supervisor __________, at a regular meeting held ______, by the following vote:

AYES: Supervisors
NOES: Supervisors
ABSENT: Supervisors
ABSTAIN: Supervisors

____
Chairperson of the Board of Supervisors
County of Kings, State of California

IN WITNESS WHEREOF, I have set my hand this ___th day of March, 2018.

____

Clerk of said Board of Supervisors

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **Public Works Department – Kevin McAlister**

SUBJECT: **HUMAN SERVICES AGENCY MODULAR BUILDING CONTRACTS NOTICES OF COMPLETION**

SUMMARY:

Overview:
Pursuant to our contracts with Bush Engineering and Accelerated Modular Concepts, Notices of Completion must be filed to provide notice to interested parties that the work has been completed.

Recommendation:

1. **Approve the Notice of Completion for Bush Engineering for the Human Services Agency modular building project; and**
2. **Approve the Partial Notice of Completion for Accelerated Modular Concepts for the Human Services Agency modular building project.**

Fiscal Impact:
These building projects are budgeted in the current County's adopted budget in budget unit 700000.

BACKGROUND:
These contracts were approved by your Board on December 6, 2016. The work on each contract was substantially completed a few weeks ago, with minor punch list items outstanding. The Notice of Completion for Accelerated Modular is for all the work, save some data cable installation. This work cannot be completed until the furniture is installed and this is being done under a separate contract. The partial Notice is being recommended in order for the contractor to receive the majority of retention on completed work as soon as possible.

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk to the Board

By ___________________________________, Deputy.

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **Public Works Department – Kevin McAlister**

SUBJECT: **HUMAN SERVICES AGENCY MODULAR BUILDING CONTRACTS NOTICES OF COMPLETION**

SUMMARY:

Overview:
Pursuant to our contracts with Bush Engineering and Accelerated Modular Concepts, Notices of Completion must be filed to provide notice to interested parties that the work has been completed.

Recommendation:

1. **Approve the Notice of Completion for Bush Engineering for the Human Services Agency modular building project; and**
2. **Approve the Partial Notice of Completion for Accelerated Modular Concepts for the Human Services Agency modular building project.**

Fiscal Impact:
These building projects are budgeted in the current County's adopted budget in budget unit 700000.

BACKGROUND:
These contracts were approved by your Board on December 6, 2016. The work on each contract was substantially completed a few weeks ago, with minor punch list items outstanding. The Notice of Completion for Accelerated Modular is for all the work, save some data cable installation. This work cannot be completed until the furniture is installed and this is being done under a separate contract. The partial Notice is being recommended in order for the contractor to receive the majority of retention on completed work as soon as possible.

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk to the Board

By ___________________________________, Deputy.

When Recorded Return to:
Department of Public Works
Kevin McAlister, P.E., Director

NOTICE OF COMPLETION
(Partial)

TO WHOM IT MAY CONCERN:

YOU ARE HEREBY NOTIFIED AS FOLLOWS:

1. The work of Improvement is located at: The Human Services Agency Modular Building, 1400 W. Lacey Blvd, Hanford CA 93230.
2. The Improvement is particularly described as: Construction the 2 Story Modular Building for Kings County Human Services Agency. This Notice of Completion does not include data cable work added to the contract by change order.
3. The date of completion of the work of Improvement: March 20, 2018
4. The owner of the work of Improvement: County of Kings
5. The nature of the owner's interest or estate: County owned building.
6. The name of the original contractor for the work of Improvement: American Modular Concepts, Inc.

I certify under penalty of perjury that the foregoing is true and correct. Dated this 20th day of March, 2018.

____
Chairman, Board of Supervisors
County of Kings, State of California

I, the undersigned, say:
I am the person who signed the foregoing notice. I have read the above notice and know its contents, and the facts stated therein are true of my own knowledge.

I declare under penalty of perjury that the foregoing is true and correct.

Executed at Hanford, California, this 20th Day of March, 2018.

____
Chairman, Board of Supervisors
County of Kings, State of California

When Recorded Return to:
Department of Public Works
Kevin McAlister, P.E., Director

NOTICE OF COMPLETION

TO WHOM IT MAY CONCERN:

YOU ARE HEREBY NOTIFIED AS FOLLOWS:

1. The work of Improvement is located at: The Human Services Agency Modular Building, 1400 W. Lacey Blvd, Hanford CA 93230.
2. The Improvement is particularly described as: Construction of Site Work for the 2 Story Modular Building for Kings County Human Services Agency.
3. The date of completion of the work of Improvement: March 20, 2018
4. The owner of the work of Improvement: County of Kings
5. The nature of the owner's interest or estate: County owned building.
6. The name of the original contractor for the work of Improvement: Bush Engineering, Inc.

I certify under penalty of perjury that the foregoing is true and correct. Dated this 20th day of March, 2018.

____
Chairman, Board of Supervisors
County of Kings, State of California

I, the undersigned, say:
I am the person who signed the foregoing notice. I have read the above notice and know its contents, and the facts stated therein are true of my own knowledge.

I declare under penalty of perjury that the foregoing is true and correct.

Executed at Hanford, California, this 20th Day of March, 2018.

____
Chairman, Board of Supervisors
County of Kings, State of California

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **Child Support Services – Barbi Brokhoff**

SUBJECT: **EQUITABLE FUNDING FOR COUNTY CHILD SUPPORT DEPARTMENTS**

SUMMARY:

Overview:
California's base funding for the child support program has not increased since fiscal year (FY) 2002/03. As a result, local child support agencies (LCSA's) have not received an increase in basic administrative funding for the past 14 fiscal years, despite the fact that operating costs continue to rise on an annual basis.

Recommendation:
Authorize the Chairman to sign the letters addressed to the California Department of Finance and Delegation Members to support legislative efforts for equitable funding for County Child Support Departments.

Fiscal Impact:
There would be no additional fiscal impact or Net County Cost.

BACKGROUND:
Out of a caseload of 8,984, 26% are families currently receiving public assistance (currently aided); 55% of families are no longer receiving aid (formerly aided); and 17% of the families have never received public assistance (never aided).

(Cont'd)

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk of the Board

By ___________________________________, Deputy.

Services include:

- Establishment, modification, and enforcement of court-ordered child support and medical support orders;
- Establishment of paternity for the child, identifying the father through genetic tests through a contracted vendor;
- Locating absent parents and their assets to determine ability to pay and to establish child support orders that the noncustodial parent can afford.
- We do not have the authority or funding to address custody and visitation issues at this time.

The current model for allocating funds to local child support agencies was developed in the 1990s when the child support program was managed by local district attorneys. In 2000, oversight of the program was transferred to a new and independent child support department. The California Department of Child Support Services (CDCSS) adopted and continues to use the same base allocation methodology that was developed several decades ago. Furthermore, the methodology does not account for additional expenses including increased county costs, cost of living or salary/benefit negotiations.

In 2009-2010, the CDCSS requested additional funding from the State legislature to maintain revenue generating caseworker staffing levels in order to stabilize child support collections. The revenue stabilization funds were approved by the legislature and each county received a share of the funds. Kings County's share was and continues to be $120,015 annually. The base administrative allocation and revenue stabilization fund is no longer sufficient to maintain an adequate number of caseworkers to generate the court-ordered amount of child support collections for Kings County families.

The impacts of the CDCSS outdated allocation methodology are significant and affect County residents:

- Child support caseworker staffing has decreased from 81 (2002) to 51 (2017) in order to absorb increased operating costs;
- Child support is a safety net for lower income families. A decreased ability to collect support for lower income families results in a higher incidence of child poverty in the County;
- Fewer caseworkers requires more reliance on automated enforcement measures and diminishes customer service;
- Fewer caseworkers results in a time lag for customer requests such as support order modifications;
- Decreased collections result in less family self-sufficiency;
- The quality of customer service may result in constituent complaints; and
- Fewer caseworkers may contribute to reduced employee morale.

The attached letters addressed to the Department of Finance and Delegation members were previously completed by County Supervisors, County Executives, and Directors of Child Support department representing the Counties of Fresno, Glenn, Kern, Los Angeles, Madera, Merced, Riverside, Sacramento, San Bernardino, San Joaquin, Stanislaus, and Tehama. The letters are requesting Equitable Funding for County Child Support Departments. The request asks that as the 2018-2019 State Budget is being compiled, that the State provides an increase to the State Department of Child Support in order to then increase funding to our County Departments. The requested increase is $126 million ($42.8 million State general fund and $83.2 million federal financial participation) in ongoing new funding in order to ensure that all departments across the State are receiving equitable amounts.

Staff respectfully requests your Board sign the Department of Finance and Delegation letters in support of Equitable Funding.

Additional documents are on file with the Clerk of the Board for review.

The Benefits of Opening a Child Support Case

CALIFORNIA'S CHILD SUPPORT PROGRAM:

A Resource for Parents ...

Providing basic necessities such as food, clothing and shelter is a financial challenge for many families. Opening a child support case is important to ensure that both parents share the responsibility for supporting their children. The Department of Child Support Services (DCSS) is here to help you.

The Benefits of Opening a Child Support Case

The Child Support Program offers an array of services and easy access to information to assist you with your child support case. We provide:

- **Accurate Accounting**

  Both parents benefit from knowing that DCSS will accurately record all payments received. A history of payments made can be obtained 24 hours a day through Customer Connect, our secure, self-service website.

- **Automated Enforcement**

  DCSS has a variety of automated measures to enforce current and past due payments of child support. They include: wage garnishment, tax intercepts, property liens and license suspension.

- **Modification**

  Either parent may request DCSS to review their child support order when there is a change in circumstances, such as earnings or timeshare. DCSS will file the documents with the court and ensure the correct earnings and deductions are used in the calculation of support.

- **Excellent Customer Service**

  Child support professionals will work with you to provide answers to questions you have about your child support case.

A Day in the Life......

A judge ordered a parent to pay child support through a divorce action. When the parent failed to pay, the custodial parent opened a case with DCSS. A wage garnishment was issued, the custodial parent signed up for direct deposit and began receiving regular monthly payments deposited to her account without hiring an attorney to enforce the order.

Open a child support case today! It's quick, easy, and secure.
Go to: http://www.childsup.ca.gov and click on "Apply for Services" or,
call: 1-866-901-3212 to have an application mailed to you today!

Child Support Directors Association
A Coalition of Experts Collecting Billions for California's Children

"Child Support... An Investment in the Future of Our Children"

CHILD SUPPORT DIRECTORS ASSOCIATION

www.csdaca.org

Paternity Establishment (Fatherhood)

CALIFORNIA'S CHILD SUPPORT PROGRAM:

A Resource for Parents . . .

Paternity establishment is the process of determining a child's legal father. The benefits of establishing paternity are numerous for all parties, but most of all for your child. Establishing paternity is necessary before custody, visitation and child support issues can be addressed by the court. Research shows that fathers who pay child support are more likely to be engaged in a child's life.

Who needs to establish paternity?

If the parents are not married at the time of conception, paternity needs to be established. By law, a man is presumed to be the legal father when he is married to the mother at the time the child is conceived. If the marriage occurs after the child is conceived, paternity still must be established legally.

How can I establish paternity?

1. By Voluntary Declaration

The Declaration of Paternity (CS 909) is a legal form that, when signed by both parties and sent to the state, establishes that the man is the legal father of the named child without having to go to court. The form can be obtained at the hospital right after your child is born, and may also be obtained through the child support office, or at the court via the Family Law Facilitator. For more information, call the Paternity Opportunity Program (POP) at: 1-866-249-0773.

2. By Court Order

The mother or father of a child can request assistance from the local child support agency to pursue legal action to establish paternity. In many instances the local child support agency can facilitate genetic testing as part of the process to establish a court order of paternity.

Why is Establishing Paternity Important?

Paternity provides a child of unmarried parents the same legal rights as a child born to married parents.

Once paternity is legally established, children are entitled to the following:

- Financial support
- Access to Family Medical History
- Inheritance Rights

And if available:

- Medical and life insurance benefits
- Social security benefits

Contact your local child support agency: 1-866-901-3212 or: TTY:1-866-399-4096
http://www.childsup.ca.gov

Child Support Directors Association
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www.csdaca.org

How is the Amount of My Child Support Determined?

CALIFORNIA'S CHILD SUPPORT PROGRAM:

A Resource for Parents ...

The amount of child support parents are required to pay is determined by a "Statewide Uniform Guideline Formula". California courts, local child support agencies and private attorneys all use this formula to set the legal amount of child support.

The guideline child support formula takes the following factors into account:

Income

Both parents' average (after tax) income from any source including income from salaries, unemployment benefits, rental income, self-employment and some social security or disability insurance benefits is used in the child support calculation.

Mandatory union dues, retirement contributions, health insurance and child and spousal support paid for separate relationships are deducted from the parents' income.

Timeshare Factor

Spending time taking care of the child is considered to be support of the child. The court or the local child support agency uses the time each parent spends with the child as a factor in the child support calculation. The time both parents spend with their child through visitation or custody arrangement impacts the amount of child support ordered.

Other Factors

The courts or local child support agency may also take into account job related expenses, extraordinary health expenses and the minimum basic living expenses of either parent's child from another relationship who lives with the parent in calculating support if these create an undue hardship.

FAQs

Is my current spouse's income included in the child support order?

Except in extraordinary cases, the income of the current spouse is NOT considered when determining or modifying child support.

Will my child support be reduced because I am paying for another child?

Any child or spousal support payment that is being paid for another child or spouse may be deducted from your income used to calculate child support. You will be asked by the court or the local child support agency for proof of these payments.

Contact your local child support agency: 1-866-901-3212, or TTY: 1-866-399-4096

Child Support Directors Association

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CHILD SUPPORT DIRECTORS ASSOCIATION

www.csdaca.org

Revised: April, 2011

Importance of Paying Child Support From the Beginning

CALIFORNIA'S CHILD SUPPORT PROGRAM:

A Resource for Parents ...

California law states that both parents are mutually responsible for the support of their child. By paying child support in a timely manner, your child's future will be more secure with a greater likelihood that he/she will succeed.

Every child has the right to be supported by his/her parents:

- Until the age of 18, unless he/she marries, becomes legally emancipated; or,
- Until he/she finishes high school or reaches age 19, whichever comes first

If you pay your support in a timely manner and do not owe past due child support:

- You will not have to pay interest on past due child support
- Your IRS, state tax refunds and lottery winnings may not be intercepted
- The funds in your bank account will not be taken
- Your driver license, business and other professional license will not be suspended.
- The court will not force you to seek work or hold you in contempt

Although the wage garnishment (Income Withholding Order) takes effect immediately, it may take some time for the employer to process and send the first payment. **To be sure past due child support and interest do not accrue, payment should be made by the parent owing support until the wage withholding goes into effect.**

Impact of a Father's Involvement With their Child:[1]

1. Child performs better in school:
   a. Improved grades
   b. Child is less likely to be expelled and/or repeat grades
   c. Improved math and verbal skills
2. Improved emotional development
3. Greater level of curiosity

[1]"Father Involvement in Children's Education, Care and Support" National Child Care Information and Assistance Center, Administration for Children and Families (2011)

Contact your local child support agency: 1-866-901-3212, or TTY: 1-866-399-4096

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CHILD SUPPORT DIRECTORS ASSOCIATION

www.csdaca.org

Revised: March, 2011

Child Support
Directors Association

CHILD SUPPORT PROGRAM FUNDING

PROGRAM BACKGROUND

The child support program was established to provide a means for children to receive the financial, medical and emotional support they need to help ensure a bright future. Child support payments help provide food, shelter, clothing and other basic living expenses for children. By providing vital income to families, the program helps promote family self-sufficiency and is an important part of the fight against poverty. In addition, recipients of public assistance are required to open a child support case, with collections being used to recoup the cost of providing that assistance.

The program is funded by a combination of federal and State funding. With a few exceptions, the majority of counties do not provide any program funding.

PROGRAM FUNDING

The State's base funding for the child support program has not increased since fiscal year (FY) 2002/03. As a result, local child support agencies (LCSAs) have not received an increase in basic administrative funding for the past 14 fiscal years, despite the fact that those agencies' operating costs have continued to rise. In addition, no increase is being proposed for FY 2017/18.

In response, the State provided a Revenue Stabilization funding augmentation ($18.7 million--$6.4 million State General Fund) in 2009/10. The State recognized the negative impact of flat funding on LCSAs' ability to provide services, indicating that the funding was being provided to "maintain revenue generating caseworker staffing levels in order to stabilize child support collections". While Revenue Stabilization funding has been included in the State budget each year since FY 2009/10, these monies have not been added to the base and are subject to deletion in future budgets. The State has estimated that, in the absence of this funding, there would have been a total loss of $135.3 million in statewide collections due to the loss of caseworker staff throughout California.

LCSAs have continually discussed the need for additional funding in order to maintain services and increase collections with the State for over a decade. In response, the State Department of Child Support Services has held two series of budget allocation meetings (one in 2006, and the other beginning in 2015). Despite LCSA participation in these meetings, there has been no change to the program's base funding.

An additional factor which makes the lack of adequate program funding even more serious is the State's model for allocating the existing funding between counties. The current model is based on a methodology which was developed in the 1990's prior to the implementation of federal performance measures for the program and the transition of the program from county district attorneys to the current separate, county-based LCSAs. The methodology considered a number of factors, including county collections and the extent to which counties were in compliance with case processing requirements at the time. The continued use of this methodology two decades later has resulted in significant inequities in funding between the counties, which exacerbates the problem of inadequate funding for those LCSAs that are relatively the most-underfunded. Despite ongoing discussions with the State about the need for a new allocation methodology, as well as an increase in program funding, no changes have been made to the existing methodology.

OPERATING COSTS

While funding has not increased for 14 years, LCSA operating costs continue to increase each year. LCSAs have been forced to absorb these costs within their existing operating budgets. While non-staffing operating costs are typically the first to be reduced, staffing is the single largest operating cost for LCSAs; therefore, budget reductions inevitably result in staffing reductions. These reductions impact caseworker levels, which has a direct negative effect on the ability of LCSAs to maintain or increase collections.

Furthermore, as the recession ended and the California economy improved, the majority of counties have granted cost-of-living adjustments (COLAs) to county employees as part of the collective bargaining process. The size of COLAs varies between counties; however, an informal survey of LCSAs conducted last year by the Child Support Directors Association indicated that the majority of increases ranged from 3-5 percent per year.

While county general funds are not provided to the typical LCSA, child support employees nonetheless receive the same pay and benefit increases as other county employees. In most cases, county agencies funded with county general funds receive additional funding to defray the cost of these increases. However, LCSAs do not receive any additional funding (typically the program is viewed at the local level as a "State" program due to the lack of county funding in the program; therefore, the belief is that the State should deal with any issues related to program funding or the costs of operations).

IMPACT OF FLAT FUNDING

As State funding continues to remain flat, LCSAs' ability to provide vital services is impacted, causing a number of issues, including the following:

- As LCSAs are forced to reduce caseworker staffing in order to absorb increasing operating costs, their ability to collect child support is negatively affected.
- Child support collections make up a significant portion of family income for many families, particularly lower-income families. Reduced collections result in increased incidence of child poverty. In addition, research shows a relationship between reliable child support collections and improved outcomes for children in areas such as their health and performance in school.
- Reduced collections negatively affect family self-sufficiency. Many families who have moved off of assistance depend on reliable child support in order to provide for their

basic support. Without that source of income, these families are more likely to return to public assistance.

- As collections are negatively impacted, the amount of public assistance funds recouped through child support collections is reduced. California has a relatively high portion of child support cases where families are receiving public assistance. In terms of ability to collect support, these cases are often the most challenging part of the child support caseload. As caseworker staffing levels are reduced, the extent to which collections are made on these cases, and funds returned to county government to recoup the costs of providing assistance, is negatively impacted.
- The quality of customer service child support customers received can be negatively affected as staff caseloads increase, which may leave negative impressions with citizens about county services.

DATE

The Honorable Holly Mitchell
Chair, Senate Budget Committee

The Honorable Dr. Richard Pan
Chair, Senate Budget Subcommittee on Health and Human Services

State Capitol Room 5019
Sacramento, CA 95814

The Honorable Phil Ting
Chair, Assembly Budget Committee

The Honorable Dr. Joaquin Arambula
Chair, Assembly Budget Subcommittee on Health and Human Services

State Capitol Room 6026
Sacramento, CA 95814

RE: Equitable Funding for County Child Support Departments

Dear Chairs Mitchell, Ting, Pan and Arambula:

As the Legislative Representatives of the Counties of Fresno, Glenn, Kern, Kings, Los Angeles, Madera, Merced, Riverside, Sacramento, San Bernardino, San Joaquin, Stanislaus and Tehama, we collectively and respectfully request that as you undertake the construction of the 2018-2019 State Budget, your committees take into consideration the historically underfunded child support departments in our counties.

We are requesting an ongoing increase to the State Department of Child Support in the amount of $42.8 million – which would be matched by the Federal government with $83.2 million. We request your

Committees direct the State Child Support Department to allocate this $126 million overall increase in funds to the 14 counties that have been underfunded relative to the rest of the counties.

Despite a significant effort to restructure how federal and State funds flow to county child support departments, no changes have been made by the State. A more equitable distribution to all counties is the optimal, most reasonable solution to this inequitable funding issue. However, failing a change to the allocation methodology, an increase in funding is required to adequately fund all 14 county departments. This funding is critical to the long-term welfare of the children and families we represent. Furthermore, the State's investment in the child support program more than makes up for the general fund contribution. The State's average return on investment for every dollar spent funding child support staff and operations returns $2.51. In some counties, the return is as much as $4.70 for every $1 of investment.

We firmly believe that if your Committees make this investment in our county departments, there will be economic and social benefits most importantly to the families in our districts, but also to the State. The funding request could result in the addition of more than 1,000 caseworkers over the next three to four years, which has the potential to bring in nearly $500,000,000 in additional collections. The result will be increased family self-sufficiency, better outcomes for children and an infusion of money into local economies. We believe these benefits will outweigh the immediate General Fund impact.

For these reasons we are respectfully requesting a permanent increase of $42.8 million State General Fund dollars with accompanying direction to the State to ensure these funds are first maximized at the Federal level and directed only to those counties that have been historically underfunded.

Respectfully submitted,

____

Kari Gilbert

Department of Child Support Services, Fresno County

John K. Viegas
____

John K. Viegas

Chairman, Glenn County Board of Supervisors

____

Mike Maggard

Kern County Chairperson

____

Richard Valle

Chairman, Kings County Board of Supervisors

____

Steven J. Golightly, Ph.D.

Director, Los Angeles County Child Support Services Department

____

Jerry O'Banion

Chairman, Merced County

____

Chuck Washington

Riverside County Chairperson

____

Susan Peters

Chair, Sacramento County Board of Supervisors

____

Robert A. Lovingood

Chairman, San Bernardino County Board of Supervisors

____

Robert V. Elliott

Chair, San Joaquin County

____

Jim DeMartini

Stanislaus County Chairperson

Candy Carlson

Candy Carlson

Tehama County Chairperson

CC: Members, Senate Budget Committee
Members, Assembly Budget Committee
Michael Wilkening, Interim Director, California Department of Child Support Services
Mark Beckley, Chief Deputy Director, California Department of Child Support Services
Supervisor Leticia Perez, President, California State Association of Counties
Supervisor Rex Bohn, Chair, Rural County Representatives of California
Camille Wagner, Governor's Office
Diane Cummins, Department of Finance
California State Association of Counties
Urban Counties Caucus
Rural County Representatives of California
San Joaquin County State Legislative Delegation
Fresno County State Legislative Delegation
Glenn County State Legislative Delegation
Kern County State Legislative Delegation
Kings County State Legislative Delegation
Los Angeles County State Legislative Delegation
Madera County State Legislative Delegation
Merced County State Legislative Delegation
Riverside County State Legislative Delegation
Sacramento County State Legislative Delegation
San Bernardino County State Legislative Delegation
Stanislaus County State Legislative Delegation
Tehama County State Legislative Delegation

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **Fire Department – Clay Smith**

SUBJECT: **PURCHASE OF TRAILER AND SEMI TRUCK**

SUMMARY:

Overview:
The Kings County Fire Department has a need to purchase a tilt bed equipment trailer and a three-axle semi truck to transport a bulldozer for fire prevention and suppression efforts.

Recommendation:

1. **Authorize the Purchasing Manager to sign the purchase orders for a trailer and semi truck; and**
2. **Authorize the Clerk of the Board to sign the budget appropriation and transfer form. (4/5 vote required)**

Fiscal Impact
The total cost for the trailer is $41,035 and the total cost for the semi truck is $65,000. The Kings County Fire Department will transfer $106,035 from the Maintenance SI&G account 241000/82218000 to cover the cost of purchasing both a trailer and semi truck.

BACKGROUND:
The Kings County Fire Department has actively been conducting research in support of purchasing a bulldozer and transportation for fire prevention and suppression efforts. It was determined the most favorable opportunity available would be to purchase a new trailer and used semi truck for cost saving measures and reliability purposes. The desired trailer is a 2018 Trail Max, which will serve as the bulldozer transport in addition to the used semi truck. The Fire Department will return to your Board at a later date for the purchase of the bulldozer.

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk to the Board

By ___________________________________, Deputy.

COUNTY OF KINGS PURCHASING DEPARTMENT
SOLE SOURCE JUSTIFICATION

This form must accompany any requisition whenever a sole source purchase is requested. State and local laws subject the County of Kings to competitive bidding requirements. Requisitions for goods and services that are to be purchased from a specific vendor or limited to a specific brand, where substitutes to the suggested vendor or brand are unacceptable, must be accompanied by a written justification explaining the circumstances that make alternatives unacceptable. The justification must be signed by the requestor and forwarded to the County's Purchasing Manager.

The Purchasing Manager will determine whether the justification is appropriate. Sole source justifications are to be supported by factual statements that will pass an internal, state or federal audit.

1. Please check all applicable categories (a through d) below and provide additional information where indicated.

☐ a. The requested product is an integral repair part or compatible only with *existing* equipment

Existing Equipment

Manufacturer/Model Number

Age

Current Estimated Value $

☒ b. The requested product or service has a unique design/performance specification or quality requirement, which is essential to my Departments needs and is not available in comparable products/service providers.

☐ c. The requested product or service is one with which I (or my staff) have specialized training and/or extensive expertise. Retraining would incur substantial cost in time and/or money.

☐ d. Other factors (provide detailed explanation in #2 below).

2. Provide a detailed explanation for categories checked in 1a through 1d above. Attach additional sheets if necessary. See attached.

3. Was an evaluation of other equipment, products, or services completed? Yes ☒ No ☐

4. List below the names of each individual who was involved in the evaluation, if conducted, and in making the recommendation to sole source this purchase.

5. I certify that the above information is true and a signed copy of the Sole Source Justification Form will be kept on file and available for audit in my department. I further certify that myself, or anyone else participating in the decision to recommend this sole source purchase, do not have a personal or business relationship nor financial interest in the suggested vendor.

Signature	Printed Name and Title	Date
[signature]	Clay Smith Fire Chief	3-15-18

Purchasing Manager: Approved as written ✓ Rejected_____ Signed [signature]
Dan Willhite, Purchasing Manager

KINGS COUNTY
FIRE DEPARTMENT

280 Campus Drive, Hanford, CA 93230
P (559) 852-2881 • F (559) 582-8261
"Promote, Preserve and Protect Public Safety"
Clay Smith, Fire Chief

March 15, 2018

Dan Willhite, Purchasing Manager
1400 W. Lacey Boulevard
Hanford, CA 93230

Dear Mr. Willhite:

We request that you support our application for sole source justification due to the fact that the proposed equipment is priced sensibly making the purchase feasible for the Kings County Fire Department. Additionally, the Kings County Fire Department has a need for the purchase with respect to providing a transport for a bulldozer to assist in fire prevention and suppression efforts. The trailer is specifically built for the purpose of heavy equipment with a tilt bed. The equipment will meet the Kings County Fire Department's specific needs for bulldozer transport. The following equipment shall be included in the sole source justification request:

1. 2018 Trail Max trailer by Trail Max Gem State Manufacturing, Inc., valued at $41,035
2. 2010 Kenworth T800 semi truck by Rolling Stock Plus, valued at $29,500

The fiscal impact of the purchase is estimated to be $70,535. The cost for the equipment will be transferred after Board approval.

If you have any questions or comments regarding this matter please feel free to contact Kings County Fire Administration at (559) 852-2881.

Sincerely,

Clay Smith
County Fire Chief
Kings County Fire Department

Trailer cannot be found locally,
HE trailers hard to come by -
TPW

TRAILMAX®

Quality Trailers From
Gem State Manufacturing, Inc.

SALES PROPOSAL (28795-A)

PO Box 987, Caldwell, ID 83606 PHONE: 1-800-447-0213 / 208-455-7551 FAX: 208-455-7554
sales@trailmax.com

Sold To	Ship To:		
Kings County Fire Department	Same	Date:	03/15/2018
Attn: Brandon Jones		Prepared by:	Steven
280 N. Campus Dr.		Terms:	COD
Hanford, CA 93230			

Phone: 559-852-2884 Cell: Fax:
com

THE PROPOSED TRAILER(S) IS IN ACCORDANCE TO THE ATTACHED SPECIFICATIONS

QUANTITY	MODEL	UNIT PRICE	TOTAL PRICE
1 ea.	**2018 TrailMax 18185 FWTD-44-T W/**	**$ 33,559.76**	**$ 33,559.76**
Options & Accessories:			
1 ea.	19886 Traction Bar Assy	$ 2,081.04	$ 2,081.04

Note: See list of other Options & Accessories available for this model

*Approximate Delivery*____________________

F.O.B. Hanford, CA

Sub Total	***$ 35,640.80***
Will Call/Freight	*$ 1,215.00*
F.E.T.	*$ 4,178.58*
St. Tax	*$ .00*
Title Fee	*$ .00*
Total	***$ 41,034.38***
Deposit	*$ .00*
Balance	***$ 41,034.38***

Upon acceptance of this Proposal, please sign on the line below, and send or fax back to us. An Order Confirmation will be sent back to you confirming delivery date and will reflect any changes agreed upon this Proposal.

AUTHORIZED SIGNATURE: ____________________ *DATE SIGNED:* ________________

PURCHASE ORDER NO.: ____________________

ROLLING STOCK PLUS

2010 KENWORTH T800

For Sale Price: $29,500

Contact Information

ROLLING STOCK PLUS

Montebello, California 90640
Phone: (562) 273-7030
Contact: Truck Sales

Description

2010 KENWORTH T800, Cummins ISM 425V, 433k original miles, 10 speed, ps, ac, air bag dump valve,12k fronts, 34k rears, ratio: 3.90, WB 188", sing fuel tank, all aluminum wheels, tires: LP 22:5. FLEET MAINTAINED, DPF FILTER, CARB COMPLIANT. $29,500

A/C Condition: Excellent

Specifications

Quantity	1	**Stock Number**	CARB COMPLIANT

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **Public Works Department- Kevin McAlister**

SUBJECT: **FIRST AMENDMENT TO LEASE TERMINATION AGREEMENT WITH MOSQUITO ABATEMENT DISTRICT**

SUMMARY:

Overview:
The First Amendment provides for a one year extension of the lease termination transition terms between the County and the Mosquito Abatement District ("District"). The District has occupied the 4.25 acres of County-owned property since March 10, 1997.

Recommendation:
Authorize the Chairman to sign the First Amendment to Lease Termination Agreement with the Mosquito Abatement District for a one year extension.

Fiscal Impact:
County forfeited rent from January 1, 2017 through December 31, 2018 per the underlying termination agreement. The District will pay rent at the rate of $400 per month during the one year extension ending December 31, 2019. The underlying Agreement and First Amendment rent are in exchange for transfer of all improvements made by District to County.

BACKGROUND:
The District originally planned to build new facilities and worked with the County to develop the underlying Lease Termination Agreement No. 17-010, executed February 7, 2017. The District's building plans changed and the District requested a one year extension of Agreement No. 17-010. Public Works obtained a rent study for the property and it determined a fair market rent of $400 per month.

Although the Sheriff has expressed a need for additional storage and operations facilities which this termination may accommodate, he agreed that an extension of one year is acceptable, to allow the District to finalize alternative location plans. The Sheriff has been working with Administration regarding future use of the site. Your approval of the First Amendment to Lease Termination is requested. The agreement was reviewed and approved by County Counsel.

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk of the Board

By __________________________________, Deputy.

FIRST AMENDMENT TO LEASE TERMINATION AGREEMENT
(Kings County Agr. #17-010 dated 2/7/2017)

This First Amendment to Lease Termination Agreement is entered into this 14 day of March, 2018, by and between the Kings Mosquito Abatement District ("District") and the County of Kings ("County") as follows:

RECITALS

A. A Lease Termination Agreement was entered February 7, 2017 and assigned Kings County Agreement #17-010. It was executed by all parties and recorded in the records of the Kings County Clerk Recorder as Official Document Number 1703362 on February 22, 2017 (the "Termination Agreement"); and

B. The Parties desire to amend the Termination Agreement essentially to extend the final move-out date by one year and charging rent during the extended year of $400 per month.

NOW, THEREFORE, the parties agree as follows:

1. Section 2. [Rent and Other Costs.], Subdivision A. of the Termination Agreement shall be amended to read as follows:

   "The District's obligations under the Lease to pay rent shall be excused beginning on January 1, 2017, through December 31, 2017. Effective January 1, 2018, the District shall pay $400 per month through its final move out date, no later than December 31, 2019."

2. This amendment shall be recorded in the Official Records of the Kings County Clerk Recorder.

3. Except as specifically indicated herein, all terms, obligations and conditions of the Termination Agreement will remain in full force and effect through the final move-out date.

KINGS MOSQUITO ABATEMENT DISTRICT	COUNTY OF KINGS
By: [signature]	By:____________________
Title: District Manager	Chairman, Kings Co. Board of Supervisors
Date: 3/14/2018	Date:____________________

[All signatures must be notarized]

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **ADMINISTRATION – Rebecca Campbell/Domingo Cruz**

SUBJECT: **GRAND JURY REPORT RESPONSE – KINGS COUNTY JUVENILE CENTER**

SUMMARY:

Overview:
Pursuant to Section 933 of the California Penal Code, departmental response to the Grand Jury's Report is being presented for your Board's review and consideration. The response from your Board to the Grand Jury's report on the Kings County Juvenile Center has been prepared for your Board.

Recommendation:
1. **Authorize the Chairman to sign the response to the Kings County Grand Jury Report entitled Kings County Juvenile Center; and**
2. **Authorize the Clerk to the Board to submit the response to the Presiding Judge of the Superior Court on or before May 28, 2018.**

Fiscal Impact:
None.

BACKGROUND:
On February 27, 2018, the County received a copy of a Grand Jury Report, Kings County Juvenile Center, which requires a response from your Board. In order for a response to this report to be timely, your Board must issue it within 90 days, or by May 28, 2018. Attached is a proposed letter by staff, with response from the Chief Probation Officer, for your review and approval.

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk of the Board

By ___________________________________, Deputy.

OFFICE LOCATION
1424 Forum Drive

Kelly M. Zuniga
Chief Probation Officer

KINGS COUNTY PROBATION DEPARTMENT

HANFORD, CALIFORNIA 93230
(559) 852-2850 · FAX (559) 583-1467

MAILING ADDRESS
Kings County Government Center

March 13, 2018

The Honorable Donna Tarter, Presiding Judge
Kings County Superior Court
1640 Kings County Drive
Hanford, CA 93230

RE: Grand Jury Report: "Kings County Juvenile Center"

Dear Judge Tarter;

On February 27, 2018, the Kings County Grand Jury provided their report regarding the findings pertaining to their tour of the Kings County Juvenile Center. The Kings County Grand Jury toured the facility on October 17, 2017. In accordance with §933 of the California Penal Code, this response is provided.

Finding 1: The 2017-2018 Kings County Grand Jury observed positive interaction between the juveniles and staff.

Response 1:

We have worked diligently in the Juvenile Center to build rapport between the staff and the youth in our care. We are uniquely positioned to have a positive impact on these youth as they are under our supervision twenty-four hours a day. We strive to teach these youth the importance of leading a law abiding lifestyle and being a positive member of our community. We have implemented a risk assessment tool that assists us in properly identifying programs that will provide the biggest benefit to the youth. We have assigned staff to youth while they are in custody so that each youth has an identified staff member that can provide counsel when the youth begin to struggle.

Finding 2: The incentive program as developed by staff is exemplary.

Response 2:

Our incentive program has introduced positive reinforcement of appropriate behaviors. As this program has proven successful, we are seeking to expand this program. Data proves that when given hope individuals in custody behave better while in custody and have improved decision making when released. We hope to incorporate an even more robust incentive program upon the completion of our remodel project which will provide us additional programming space to continue to bring proven programming to our youth.

We are pleased to have had the opportunity to showcase the positive changes in the Kings Juvenile Center and we are appreciative of the Grand Jury's time and interest.

Respectfully submitted,

Kelly M. Zuniga
Chief Probation Officer

COUNTY OF KINGS
BOARD OF SUPERVISORS

KINGS COUNTY GOVERNMENT CENTER
1400 W. LACEY BOULEVARD.HANFORD, CA 93230
(559) 852-2362, FAX: (559) 585-8047
Web Site: http://www.countyofkings.com

March 20, 2018

The Honorable Donna Tarter
Presiding Judge
Kings County Superior Court
1640 Kings County Drive
Hanford, CA 93230

Re: Grand Jury Report: "Kings County Juvenile Center"

Dear Judge Tarter,

On behalf of the Board of Supervisors and in accordance with Section 933 of the California Penal Code, the following are the Board's responses to the Grand Jury Report entitled, "Kings County Juvenile Center" received by the County on February 27, 2018. The Board of Supervisors has consulted with the Chief Probation Officer to assist with this response.

Under the Findings and Recommendations Section of the Report, the Grand Jury states:

Finding 1: The 2017-2018 Kings County Grand Jury observed positive interaction between the juveniles and staff.

We agree with this finding. The staff in the Juvenile Center always carries themselves in a professional manner focusing on rehabilitating juveniles in order to make sure that they integrate in the community as good citizens.

Recommendation 1: None

We concur.

Finding 2: The incentive program as developed by staff is exemplary.

We agree with this finding. The staff always strives to investigate other ways to encourage juveniles to improve their behavior while in the Juvenile Center so that they can practice when they are released.

Recommendation 1: The incentive program should be continued.

We concur. Since this is a locally developed program to improve positive behavior, it will continue to be evaluated to determine if it is making an impact or not to juveniles and to ensure that dedicated resources are properly utilized within fiscal constraints.

Sincerely,

Richard Valle, Chairman
Kings County Board of Supervisors

Cc: Grand Jury Foreperson, Richard E. Hoffmaster

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **Community Development Agency- Greg Gatzka**

SUBJECT: **SMART GROWTH STATE ROUTE 41 CORRIDOR IMPROVEMENT PLAN.**

SUMMARY:

Overview:
In 2015, the California Department of Transportation (Caltrans) awarded Kings County a State Transportation Planning Grant for the development of a Smart Growth State Route 41 Corridor Improvement Plan for the unincorporated community of Kettleman City. The *Smart Growth State Route 41 Corridor Improvement Plan* identifies and addresses deficiencies at the State Route 41 corridor.

Recommendation:
Accept the Smart Growth State Route 41 Corridor Improvement Plan Study.

Fiscal Impact:
The County was required to provide a $29,908 match as part of the grant agreement with Caltrans. The match was funded through the Community Development Agency's Fiscal Year 2016/2017 and Fiscal Year 2017/2018 budgets.

BACKGROUND:
As part of the County's General Plan, Kettleman City is one of four unincorporated communities that a Community Plan has been developed for. The Kettleman City Community Plan identified traffic circulation issues, and as new development projects have been proposed, review of traffic circulation has highlighted a need for a coordinated strategy to be developed in conjunction with Caltrans to address the ultimate build out of the highway commercial area in Kettleman City.

(Cont'd)

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk of the Board

By ___________________________________, Deputy.

The Kettleman City Community is bisected by State Route 41 and the highway commercial area of Kettleman City is limited to two access points along each side of State Route 41 connecting to County roadways. The current design of the roadway system is limited in capacity for future development and a traffic circulation plan is needed to address deficiencies and plan for the ultimate build out of the highway commercial area. This will allow development to continue in a logical cohesive manner that helps coordinate both County and State traffic circulation planning and infrastructure.

The Community Development Agency (CDA) in coordination with the Public Works Department has been working to address this situation and sought grant funding through the Caltrans Sustainable Community Planning Grant to help fund the necessary coordinated study between the County and Caltrans to identify areas of improvement and possible strategies to enhance traffic circulation, safety and connectivity within the Kettleman City community.

In 2015, the County was awarded a $230,842 grant to develop a Smart Growth State Route 41 Corridor Improvement Plan. In 2016, the County went through a Request for Proposals (RFP) process in which QK, Inc. was awarded a contract to develop the plan. The development of the plan started in August 2016 and the final product must be completed by March 31, 2018.

The attached document presents a Smart Growth State Route 41 Corridor Improvement Plan to identify and address deficiencies at the State Route (SR) 41 corridor in the unincorporated community of Kettleman City.

Kettleman City has approximately 1,500 residents. It is located midway between San Francisco and Los Angeles along Interstate 5 (I-5), at the State Route 41 interchange. This location positions the community as a strategic shipping and logistics hub, with Federal Express (FedEx), United Postal Service (UPS), and XP Logistics (previously occupied by Con-way Freight) transfer stations located in the community. The community is also a popular stop for Central Valley residents traveling to the Central Coast via State Route 41. While this location is ideal for new business development, lack of efficient transportation circulation and infrastructure hinder growth.

Water service provided by the Kettleman City Community Services District has also been a limiting factor for new growth. However, the community presently has grant funding and State Department of Water Resources approval to transition from water wells to a surface water treatment facility and water delivery from the California Aqueduct. A new water treatment plant is expected to become operational and potentially alleviate the long moratorium on new water hookups. Besides providing clean, healthy drinking water to residents, the facility will potentially allow for new business development.

The plan process involved community stakeholder meetings and identified priority circulation areas that, when enhanced, will aid in improved traffic flow, increased safety, and expanded infrastructure that enables Kettleman City growth around a well-planned and strategic transportation system. Input from Caltrans, the regional transportation agency, local businesses, law enforcement, and residents have contributed to this plan that evaluates corridor deficiencies, identifies alternatives, and prioritizes proposed solutions based on a logical evaluation process.

The Smart Growth State Route 41 Corridor Improvement Plan will address four key deficiencies:

1. Poor Traffic Flow. Only one fully-controlled intersection exists in the commercial area, and traffic bottlenecks at this signalized intersection. In 2006, the Average Daily Traffic (ADT) at State Route 41 and I-5 was 9,500 with a Level of Service (LOS) B. The 2035 ADT projection is 14,000 with a LOS of D. Holiday weekends are especially busy on State Route 41 and require additional traffic enforcement patrols to control and direct traffic because the roadway system is severely congested which can lead to collisions and driver frustration. Many side streets connecting State Route 41 traffic to restaurants, gas stations, and lodging are dead-ends, preventing circular traffic flow.

2. Lack of Pedestrian and Bicycle Infrastructure. Bicycle lanes, multi-use paths, or sidewalks to facilitate non-motorized transportation on State Route 41 do not exist. Many residents walk, bike, or use public transportation. Roadways consist of pavement meeting dirt shoulders, leaving no separation between pedestrians and vehicular traffic and forcing pedestrians to walk in muddy conditions during the rainy season. If pedestrians choose to walk to the commercial district, they have to walk along the shoulders of State Route 41 or walk through private property to avoid conflicts with traffic.

3. Rapid-moving Traffic in Residential Area. State Route 41 is a two-lane highway with a posted speed limit of 55 miles per hour (mph), slowing to 45 miles per hour (mph) between Edwards Street and 25th Avenue. Traffic calming measures to slow traffic during the 1.2-mile segment transitioning from Interstate 5 to the community do not exist. Residents along the east side of State Route 41 must regularly cross the busy highway to access the Kettleman City Elementary School, businesses and services. Currently there are no signalized crosswalks for the safety of children walking or biking to the west side of State Route 41. From 2007 – 2016, three fatalities are reported as having occurred on State Route 41 within the Kettleman City community, including three pedestrian or bicycle associated collisions (Statewide Integrated Traffic Records System 2007-2016). Residents have said the fast-moving highway traffic poses a significant safety risk and has a negative impact on their community and quality of life.

4. Limited Crossings of State Route 41 over the California State Aqueduct. The crossing of State Route 41, 800-feet north of Hubert Way, is the only crossing of State Route 41 over the California State Aqueduct in the Kettleman City community. The closest crossings are 18 miles north on State Highway 198 or 5 miles south to Utica Avenue. If State Route 41 traffic is severe, the Aqueduct crossing is a bottleneck for highway travel and can be severely congested.

A copy of the Smart Growth State Route 41 Corridor Improvement Plan is provided, and is available at the Clerk of the Board.

KINGS COUNTY

DRAFT

STATE ROUTE 41 CORRIDOR SMART GROWTH IMPROVEMENT PLAN

MARCH 2018

DRAFT

STATE ROUTE 41 CORRIDOR SMART GROWTH IMPROVEMENT PLAN

Prepared For:

Kings County

1400 West Lacey Boulevard, Building #6
Hanford, CA 93230
Gregory Gatzka, Community Development Director
Phone: (559) 852-2670

Prepared By:

QK

901 East Main Street
Visalia, CA 93292
Steve Brandt, AICP
Phone: (559) 733-0440

March 2018

PREPARED FOR:

Kings County
Greg Gatzka, Community Development Director
Kevin McAlister, PE, Director of Public Works
Dominic Tyburski, Chief Engineer
1400 West Lacey Boulevard, Building #6
Hanford, CA 93230
Phone: (559) 852-2670
Fax: (559) 584-8989

PREPARED BY:

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Mike Ratajski, Senior Planner
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Quincy Engineering
Lance Schrey, PE
11017 Cobblerock Drive
Rancho Cordova, CA 95670

FUNDING SOURCE:

Funding for the *Smart Growth SR 41 Improvement Plan* was provided by a grant from Caltrans' Sustainable Communities Transportation Planning Grant program (FY 2015-2016), along with a local cash match from Kings County.

Acknowledgements:

Caltrans
Sandra Scherr, Associate Transportation Planner
California Department of Transportation
District 6 - Planning South Branch
1352 West Olive Avenue
Fresno, CA 93778-2616

Reef-Sunset Unified School District
Dr. David East, Superintendent
Kettleman City Elementary School
Kristi Castillo, Principal
Noemi Ferdinand, Administrative Assistant
701 General Petroleum Avenue
Kettleman City, CA 93239

Kettleman City Family Resource Center
April Hatfield
75 5th Street
Kettleman City, CA 93239

Kettleman City Chamber of Commerce
Cris Gonzalez, President
101 4th Street / P.O. Box 66
Kettleman City, CA 93239

California Highway Patrol
Lieutenant Jason Elsome, Commander
Sargent Adams
125 South 6th Street
Coalinga, CA 93210

TABLE OF CONTENTS

List of Figures

List of Tables

Appendices

ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AITS	Agricultural Industries Transportation Services
ATP	Active Transportation Program
BTA	Bicycle Transportation Account
Cal EPA	California Environmental Protection Agency
CalSTA	California State Transportation Agency
Caltrans	California Department of Transportation
CalVans	California VanPool Authority
CCC	California Conservation Corps
CCROPP	Central California Regional Obesity Prevention Program
CDBG	Community Development Block Grant
CEQA	California Environmental Quality Act
CHP	California Highway Patrol
CMAQ	Congestion Mitigation and Air Quality Program
CTP	California Transportation Plan 2040
DD	Deputy Directive
DOT	Department of Transportation
FAR	Floor-to-area ratio
FAST Act	Fixing America's Surface Transportation Act
FedEx	Federal Express
FTA	Federal Transit Administration
GHG	Greenhouse Gas
HSIP	Highway Safety Improvement Program
IBank	California Infrastructure and Economic Development Bank
ISRF	Infrastructure State Revolving Fund Program
ITIP	Interregional Transportation Improvement Plan
KART	Kings Area Rural Transit
KCAG	Kings County Association of Governments
KCAPTA	Kings County Area Public Transit Agency
KCCSD	Kettleman City Community Service District
LOS	Level of Service
LTF	Local Transportation Fund
LTL	Less-than-truckload
MPH	Miles Per Hour
MUTCD	California Manual on Uniform Traffic Control Devices
NEPA	National Environmental Protection Act
OTS	California Office of Traffic Safety
RSTP	Regional Surface Transportation Program
RTP	Regional Transportation Plan
RTPA	Regional Transportation Agency

RTIP	Regional Transportation Improvement Plan
SB	Senate Bill
SCCP	Solutions for Congested Corridors Program
SCO	State Controller's Office
SCS	Sustainable Communities Strategy
SGCIP	State Route 41 Corridor Smart Growth Improvement Plan
SHS	State Highway System
SHSP	Strategic Highway Safety Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District Bikeway Program
SMF	Smart Mobility Framework
SR	State Route
SR2S	State Safe Routes to School
SSARP	Systemic Safety Analysis Report Program
STA	State Transit Assistance Fund
STBG	Surface Transportation Block Grant
STIP	State Transportation Improvement Program
SWITRS	Statewide Integrated Traffic Records System
TA	Transportation Alternatives
TAP	Transportation Alternatives Program
TCR	Traffic Concept Report, State Route 41
TDA	Transportation Development Act
TIGER	Transportation Investment Generating Economic Recovery
TAP	Transportation Alternatives Program
UPS	United Postal Service

CHAPTER 1 INTRODUCTION, BACKGROUND, AND VISION

1.1 - Introduction

This document presents a *State Route 41 Corridor Smart Growth Improvement Plan* (SGCIP) to identify and address deficiencies at the State Route (SR) 41 corridor in the unincorporated community of Kettleman City. Funding for the SGCIP was provided by a grant from Caltrans' Sustainable Communities Transportation Planning Grant program (FY 2015-2016), along with a local cash match from Kings County.

Kettleman City is an unincorporated community in Kings County with almost 1,500 residents. It is located midway between San Francisco and Los Angeles along Interstate 5 (I-5), at the SR 41 interchange. This location strategically positions the community as an ideal shipping and logistics hub with Federal Express (FedEx), United Postal Service (UPS), and XPO Logistics[1] transfer stations located in the community. The community is also a popular stop for Central Valley residents traveling to the Central Coast via SR 41.

While Kettleman City's location is ideal for new business development, lack of efficient water infrastructure is impeding growth. However, a new water treatment plant is expected to become operational after a long moratorium on new water hookups. Besides providing clean, healthy drinking water to residents, the plant will facilitate the development of new businesses within the community.

The purpose of the SGCIP is to identify priority infrastructure improvements that, when implemented, will result in improved traffic flow, increased safety, and expanded infrastructure that will enable the Kettleman City area to grow and prosper around a well-planned and strategic transportation system. With input from Caltrans, the regional transportation agency, local businesses, law enforcement, and residents, this Plan evaluates corridor deficiencies, identifies alternatives, and prioritizes proposed solutions based on a logical evaluation process. While the SGCIP is based on goals and policies from the Kettleman City Community Plan, it does not take the place of the Community Plan.

The *State Route 41 Corridor Smart Growth Improvement Plan* will address four key deficiencies:

1. *Poor Traffic Flow.* Only one fully-controlled intersection exists in the highway commercial area, and traffic bottlenecks at this signalized intersection. In 2006, the Average Daily Traffic (ADT) at SR 41 and I-5 was 9,500 with a Level of Service (LOS) B. The 2035 ADT projection is 14,000 with a LOS of D. Holiday weekends are especially busy on SR 41 and require additional patrols by the California Highway Patrol (CHP) to control and direct traffic. Many side streets connecting SR 41 traffic to restaurants, gas stations, and lodging are dead-ends, preventing circular traffic flow.

[1] Con-way Freight was acquired by XPO Logistics, Inc. in October 2015.

2. *Lack of Pedestrian and Bicycle Infrastructure.* Bicycle lanes, multi-use paths, or sidewalks to facilitate non-motorized transportation on SR 41 do not exist. Many residents of this low-income community do not own cars and therefore must walk, bike, or use public transportation. There is no separation between pedestrians/bicyclists and vehicular traffic along SR 41 between the Residential and Highway Commercial Areas. Those who work in the highway commercial district walk along the shoulders of SR 41 or walk through private property to avoid conflicts with traffic. Bicyclists traveling through the area are forced to use this same route.

3. *Rapid-moving Traffic in the Residential Area.* SR 41 is a two-lane highway with posted speed limits that vary between 45 mph and 55 mph in the Study Area. Residents must cross the highway regularly, yet there are no signalized crosswalks for children walking or biking to Kettleman City Elementary School or to one of the three bus stops on the west side of SR 41. During the past 10 years, four people have been killed on SR 41 in the Kettleman City area (Statewide Integrated Traffic Records System 2007-2016).

4. *Limited Crossings of SR 41 over the California State Aqueduct.* The crossing of SR 41 800-feet north of Hubert Way is the only crossing of SR 41 over the California State Aqueduct within the Study Area. The next closest crossings are located 5 miles south on Utica Avenue, and 18 miles north on SR 198 outside of the community. If SR 41 traffic is severe, the Aqueduct crossing becomes congested, backing-up traffic within the highway commercial area.

1.2 - Location

Kettleman City is an unincorporated community located in southwest Kings County, California at the intersection of I-5 and State Route 41 approximately 30 miles southwest of Hanford and 50 miles northeast of Paso Robles. Kettleman City is located midway between San Francisco and Los Angeles. Figure 1-1 depicts the location of Kettleman City as a direct route from northeast areas within the San Joaquin Valley to ocean communities along the central coast (i.e. Pismo, Avila Beach, and Morro Bay). Figure 1-2 depicts the immediate Kettleman City area.

Figure 1-1
Regional Location Map

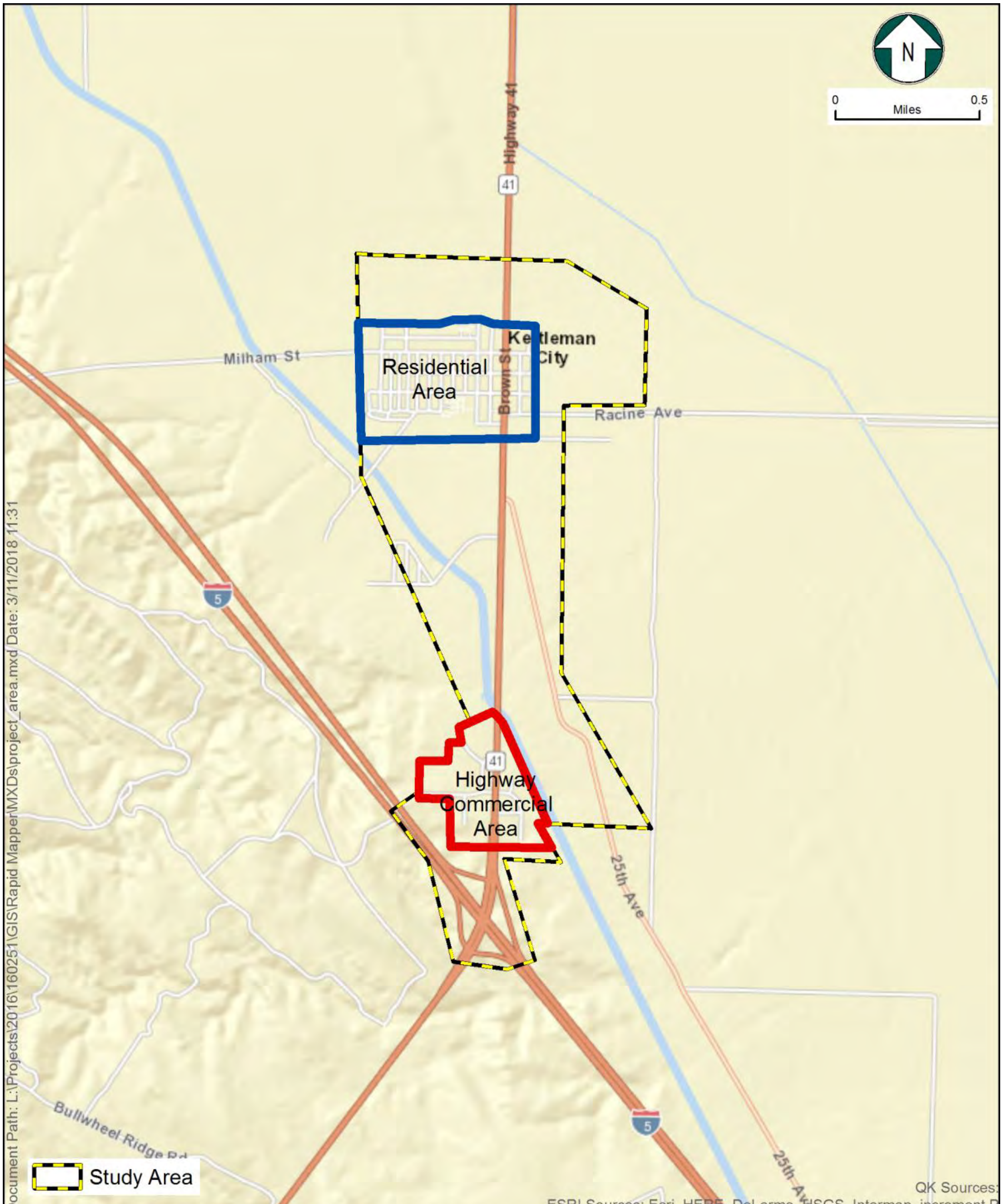


Figure 1-2
Community Location Map

1.3 - Demographics

1.3.1 - Population Characteristics[2]

The current population is 1,439 residents. The Kettleman City Community Plan looks to accommodate growth up to 9,326 by 2035, however municipal services to accommodate that growth do not currently exist, and zoning for residential expansion remains conditioned upon adequate services. More than one-third of the population (549) are school age or younger. 56.1% or 807 residents are of working age (18 to 65). Kettleman City has 350 occupied homes. 38.5% are owner-occupied and 61.4% are renter-occupied. The average household size is approximately 4.1 residents per household. 96% of the community is of Hispanic origin. 2.9% of the population is older than 65 years.

1.3.2 - Socioeconomic Conditions

Bicycling and walking networks, access to public transportation, and safe local streets and highways are beneficial for all residents, but especially important for disadvantaged communities who may have limited access to automobile travel. With limited funding available, prioritizing improvements that connect Kettleman City to key employment areas like the highway commercial area serves to enhance the quality of life within this disadvantaged community, while also making the best use of limited funding on active transportation facilities and other key improvements.

There are four indicators listed below that identify Kettleman City community as a disadvantaged community. Figure 1-3 is a graphic representation of the last two indicators, showing that the entire community of Kettleman City is considered a disadvantaged community.

- <u>Zero automobile households:</u> The share of households in each census tract that do not own a car. 5.36% of workers who live in Kettleman City walk to work. Roughly 4-5% of the households in Kettleman City do not have cars.[3]
- <u>School Lunch Program</u>: 92.8% of Kettleman City Elementary School students receive a free or discounted lunch. Schools with higher shares are more disadvantaged.[4]
- <u>CalEnviroScreen 3.0 Score Percentile:</u> CalEnviroScreen is a mapping tool established by the California Environmental Protection agency to measure environmental health by census tract. Inputs include socioeconomic factors, population characteristics, pollution factors, and environmental factors. Tracts with higher percentiles are more disadvantaged. Of the over 8000 census tracts in California, Kettleman City has a Population Characteristic score of 91 and a Pollution Burden score of 84. A higher score indicates a higher relative burden.

[2] https://suburbanstats.org/population/california/how-many-people-live-in-kettleman-city
[3] https://datausa.io/profile/geo/kettleman-city-ca/
[4] 92.8% of Kettleman City Elementary School students receive a free or discounted lunch

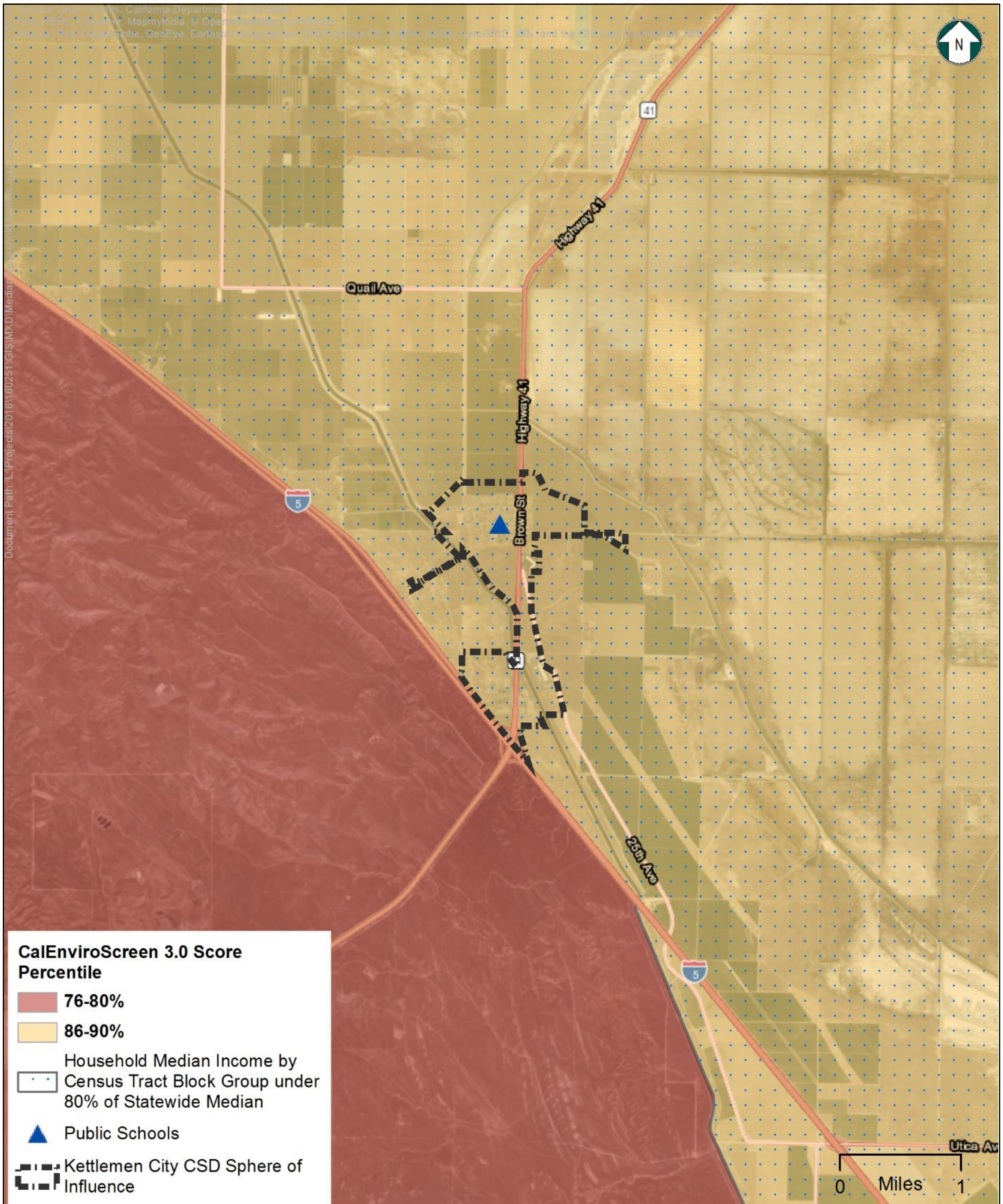


Figure 1-3
CalEnviroScreen 3.0 Score Percentile and Household Median Income Map

- Household Median Income: Census tracts with median households under 80% of the statewide median. The median income of Kettleman City is $33,193 which is approximately half of the statewide median income.[5]

The community has received the following funding within the last seven years due in large part to its disadvantaged community status.

- 2017 - Kettleman City Leadership Academy: Kettleman City has many pollution sources nearby and suffers from numerous unexplained birth defects, infant deaths, and childhood cancer. This study was funded $20,000 by the California Environmental Protection Agency (Cal EPA) for the Environmental Justice Small Grants Program. The study is aimed at building skills, knowledge, and capacity of community members; creating new youth and adult leaders; educating residents about environmental health issues including reproductive and children's health and cumulative impacts; increasing civic engagement in government decision-making processes; and reducing pollution via a series of trainings over the course of a year.
- 2016 - Kettleman City Safe Routes to School Project: Kings County received $637,000 from the State and Federal Safe Routes to School program and $600,000 from the Kings County Road Fund. The project includes the construction of curbs, gutters, sidewalks, roadway reconstruction, and an in-pavement lighted sidewalk across from Kettleman City Elementary School. The improvements were constructed on General Petroleum Avenue from State Route 41 to Fifth Avenue, Standard Oil Avenue from Seventh Street to Ninth Street and Seventh, Eighth, and Ninth Streets from General Petroleum Avenue to Standard Oil Avenue.
- 2014 - Kettleman City San Joaquin Valley Health Fund Award: Greenaction for Health and Environmental Justice received $52,312 from the Center for Health Program Management (Sierra Health Foundation) to support a health, environment, and climate project in Kettleman City to evaluate potential issues with hazardous waste landfill expansion outside of the community in the Kettleman Hills, to bring clean drinking water to residents, and to reduce air emissions. Greenaction's community-wide project used education, outreach, organizing and advocacy to help address environmental issues that may have implications for the San Joaquin Valley.
- 2013 – Community Development Block Grant (CDBG) Grant: Kettleman City received $500,000 from the state's CDBG program to support local anti-poverty efforts, which included a new fire truck for the county fire station that will assist with the reduction of fire insurance premiums.
- 2011 - Kings County Diesel Education, Emission Reduction and Environmental Health: With a $25,000 budget, the Kings County Diesel Education, Emission Reduction, and Environmental Health aimed to reduce diesel emissions impacting the air quality of Kettleman City and Avenal, and create a replicable diesel education and emissions program model that can be spread to other San Joaquin Valley communities impacted by diesel pollution. Greenaction conducted community outreach to educate stakeholders (including community members, businesses, truckers and trucking

[5] https://www.point2homes.com/US/Neighborhood/CA/Kettleman-City-Demographics.html

companies, schools, bus drivers, and parents) on diesel issues impacting their community, implement behavior changes (complying with anti-idling laws), and encourage equipment changes that will lead to a reduction of emissions and improve residents' respiratory health. The project informed residents, drivers, businesses and school administrators about the diesel emissions issues impacting their community.

1.3.3 - Employment[6]

In October 2017 the community's unemployment rate was 7.4%, much higher than the statewide average of 4.3%. Estimated average household income in 2017 was $34,286. 71.1% of the working population is employed in agriculture; 11.5% are employed in educational services, health care or social assistance; and 5.6% are employed in retail trade. About 35% of households were considered below the poverty line. Employment opportunities within the community are minimal. The community desires a stronger economic base and more community-oriented businesses and job opportunities.

1.4 - Land Use and Community Character

Kettleman City is generally recognized as two separate areas, the *Highway Commercial Area* along SR 41 immediately north of Interstate 5, and the *Residential Area* located along SR 41, about a mile and a half north of the commercial area. The Residential Area is identified as a compact neighborhood of mostly single-family homes with strong ties to agriculture. The Highway Commercial Area is represented by highway traveler-oriented businesses that provide food, gas and lodging. Many residents in the community are employed by local farming operations or other related industries. The highway commercial area is a major stopping point for residents from Fresno, Tulare, and Kings Counties heading to or back from the coast, and Interstate 5 travelers between Los Angeles and the Bay Area. Given the major north/south Interstate and valley/coast travel, the Highway Commercial Area can become congested with traffic during busy summer and holiday weekends.

1.4.1 - Highway Commercial Area

The Highway Commercial Area is strategically located at the intersection of two main highways, and primarily consists of highway commercial uses such as gas stations, convenience stores, fast food restaurants, motels, and other similar businesses. The Highway Commercial Area is built along the east and west sides of SR 41, a quarter mile north of the SR 41 and Interstate 5 interchange. The Highway Commercial Area was first established in the 1970's.

The Highway Commercial Area is bounded to the north by the California Aqueduct, which acts as a permanent buffer separation between the two distinct areas of Kettleman City. North of the aqueduct is an open space area slightly less than a mile-long with some vacant

[6] http://www.homefacts.com/unemployment/California/Kings-County/Kettleman-City.html

land and industrial uses that include a Chevron facility to the west and XPO Logistics to the east.

1.4.2 - Residential Area

Kettleman City Community Center

The Residential Area, located at the north end of the community about 1.7 miles north of Interstate 5, is also bisected by SR 41. Properties along SR 41 are designated for commercial uses, however, only a few commercial businesses currently exist here. These include a gas station, two small convenience stores, an auto parts dealer, and two towing companies. Most of the vacant parcels are located on the east side of SR 41. The remainder of the Residential Area is made up largely of older single-family homes with an average 1,100 square feet unit size. It has a fairly large proportion of mobile homes, which make up about 14% of all residential units[7]. Approximately 300 residential units are located west of SR 41, and 46 units to the east. Community facilities such as the Kettleman City Community Service District (KCCSD) Office, KCCSD Park, Kettleman Elementary School, Family Resource Center, County Fire Station No. 9, County Library, Chamber of Commerce, and Medical Clinic are all located west of the highway.

1.5 - Circulation

Traffic and pedestrian circulation within the area is a concern of the community. The residential community faces circulation challenges associated with the location of SR 41. Missing street and pedestrian infrastructure also contributes significantly to the deficient circulation network.

1.5.1 - Interstate 5

Interstate 5 is a four-lane divided interstate highway that connects northern and southern California. The ADT count on I-5 near Kettleman City is 34,500. Because of its location half way between Los Angeles and San Francisco, the community is strategically positioned as a midway shipping and logistics transfer point. Federal Express, UPS, and XPO Logistics have truck transfer stations at this interchange. The southbound on- and off-ramps are signalized at SR 41. The northbound on and off-ramps have a stop sign only on the off-ramp.

[7] Kettleman City Community Plan. 2009 Kings County General Plan.

1.5.2 - State Route 41

State Route 41 is a two-lane undivided state highway that travels through the Residential Area and Highway Commercial Area. Within the Highway Commercial Area between Bernard Drive and Interstate 5, the roadway expands to four lanes. Left turn lanes are also present along SR 41 within this Highway Commercial Area. A concrete median separates traffic along both the north and south sides of Bernard Drive. No sidewalks are provided along either side of SR 41. The paved shoulder varies in width from eight to ten feet. SR 41 is enclosed by concrete barriers on either side of the shoulders as it crosses the aqueduct.

The latest Transportation Concept Report (TCR) for State Route 41 was prepared in September 2017.[8] The SGCIP Study Area is within Segment 3 and the southerly 1.5 miles (approximately) of Segment 4, as identified in the TCR.

SR 41 at Aqueduct Crossing

1.5.3 - Commercial Streets

Bernard Drive, a two-lane roadway that ends in a cul-de-sac on both the east side and west side of SR 41, is the Highway Commercial Area's main roadway. The intersection of Bernard Drive is signalized at SR 41. Other streets providing access to businesses are Powers Drive, Cyril Place, and Hubert Way west of SR 41 and Ward Drive and Dana Circle east of SR 41. Ward Drive and Hubert Way have direct access to SR 41. Ward Drive is a right-in and right-out only intersection controlled by a one-way stop sign.

Bernard Drive east of SR 41

25th Avenue provides access to the light industrial businesses east of SR 41. The nearest intersection to the local businesses, XPO Logistics and Federal Express, is one mile north of Bernard Drive and one-and-a-half miles north of the interchange at Interstate 5. The only

[8] The Transportation Concept Report for State Route 41 can be found at: http://www.dot.ca.gov/d6/planning/tcrs/sr41tcr/sr41-tcr-final.pdf

other point of access to 25th Avenue is from the Utica Road/Interstate 5 Interchange approximately 5 miles southeast of the businesses.

1.5.4 - RESIDENTIAL STREETS

The Residential Area has a grid street system with short block lengths that are conducive to greater walkability. Most existing roadways remain open with pavement meeting dirt shoulders, leaving no separation between pedestrians and traveling vehicles. Excessive traffic speeds, such as those that occur along State Route 41, erode a community's small-town residential neighborhood feel, and contribute to the decline of a sense of safety and well-being. Without more pedestrian street features (sidewalks, landscape strip, street trees, curb-and-gutter, benches) residents often feel uncomfortable using the street system.

Typical Kettleman City Residential Street

The 2035 Kings County General Plan proposed a grid street pattern for all new growth areas to increase connectivity. This will allow future residents to travel from their homes west of SR 41 to stores and community uses in the proposed downtown area and back without having to enter and exit SR 41.

1.5.5 - PEDESTRIAN AND BICYCLE CIRCULATION

Kettleman City does not have bike lanes or pedestrian pathways. Currently, there is no permanent bike/pedestrian path between the Residential Area and the Highway Commercial Area. Some residents use a remote route through the fields to the southwest, over a bridge across the aqueduct, and through the Chevron utility area to reach the Highway Commercial Area. Others walk or bike in the shoulder adjacent to SR 41. Recent street improvements along General Petroleum Avenue include sidewalks

Crosswalk at SR 41 and General Petroleum Avenue

from SR 41 to 5th Street, which will provide some safety and convenience for residents and students in Kettleman City.

Students currently travel to and from Kettleman City Elementary School using any available routes. Some students must cross SR 41 when traveling to and from their homes on the east side of SR 41. Most pedestrian crossings occur at General Petroleum Avenue, at Milham Avenue, and at Standard Oil Avenue.

1.6 - Transit Services

1.6.1 - KART

Public transit services are provided by the Kings County Area Public Transit Agency (KCAPTA) through the Kings Area Rural Transit (KART) system. KART offers fixed route bus service between cities and communities in Kings County, including Kettleman City. This route is illustrated in orange in Figure 1-4. Dial-A-Ride demand response service is available for those residents of Hanford, Lemoore, Armona, and Avenal traveling more than one-half of a mile from an existing fixed bus route, but not for Kettleman City.

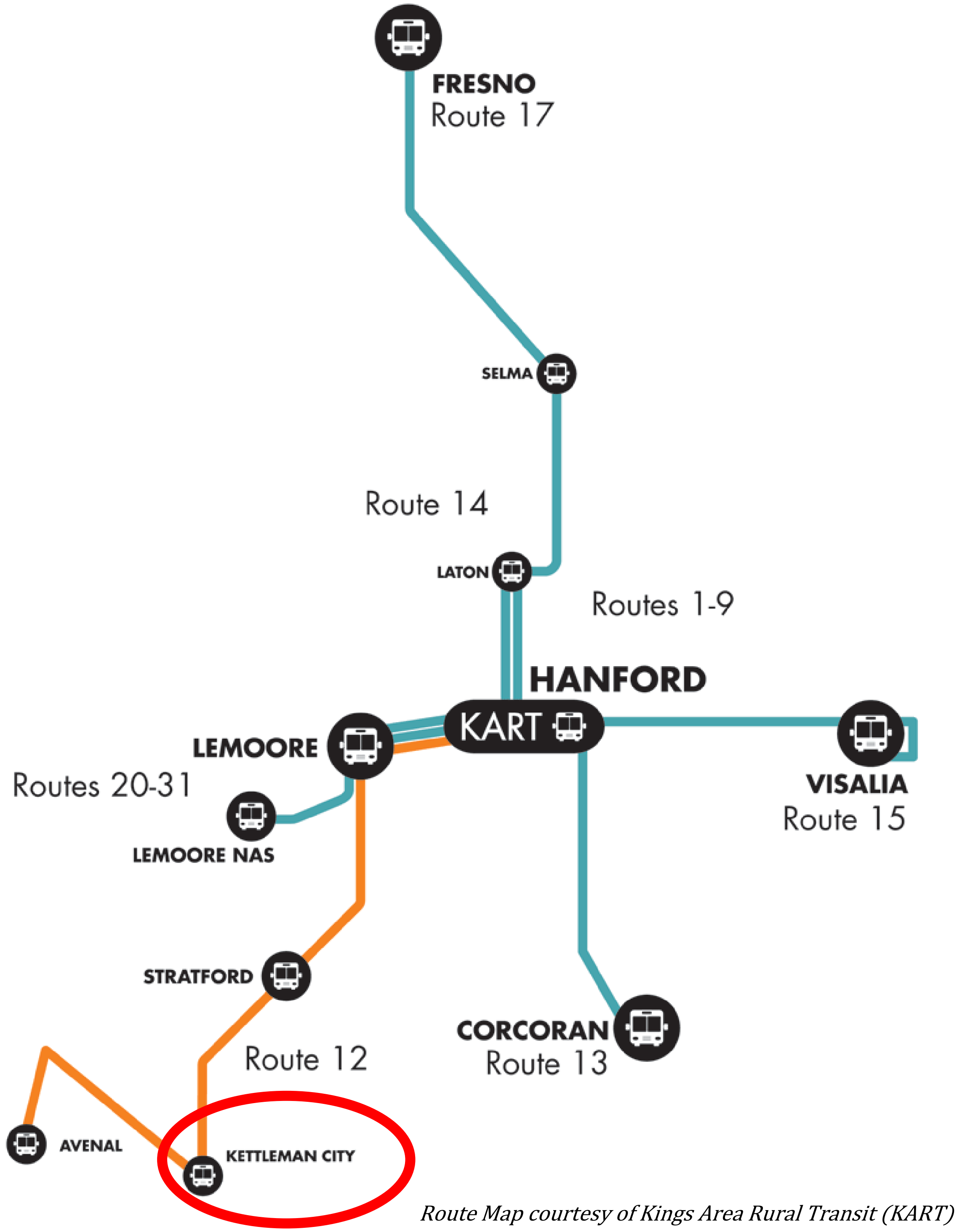
KART bus service is limited for residents of Kettleman City. Route 12 South provides service from Kettleman City to Avenal, Stratford, Lemoore, Armona, and Hanford at 12:20pm and 5:40pm on Monday through Friday and once a day on Saturday at 3:10pm. The bus stops in Kettleman City at seven locations along General Petroleum Avenue, 3rd Street, Milham Avenue, and Becky Pease Street. The stops do not have benches or shade structures. The bus does not have a stop in the Highway Commercial Area. Use of KART to get to work or school is not practical. Residents must use their own form of transportation. When used, most residents take the bus for medical or shopping purposes.

1.6.2 - CalVans

The California VanPool Authority (CalVans) is a nonprofit vanpool program serving Kings County and the region by providing transportation to both public and agricultural workers for school and employment purposes. Beginning as a pilot program in 2002, the Agricultural Industries Transportation Services (AITS) addressed the pervasive absence of safe and viable options to travel to and from the agricultural worksites for thousands of workers who sustain California's agricultural industry. Since that time, CalVans has grown to include vanpool options for commuters and students as well. Participation in both vanpool programs is voluntary, and employers can assist in the cost of transportation through vouchers. CalVans receives federal formula funding through Caltrans from the Federal Transit Administration (FTA).

1.6.3 - Orange Belt Bus Stops

Orange Belt Stages offers daily trips to Las Vegas and to areas along the Central Coast. Currently, service is offered on four routes: Hanford-Bakersfield (via Goshen, Visalia, Farmersville, Exeter, Lindsay and Porterville), Visalia-Santa Maria (via Hanford, Lemoore,



Route Map courtesy of Kings Area Rural Transit (KART)

Figure 1-4
KART Countywide Transit Service

Paso Robles and San Luis Obispo), Porterville-Fresno (via Lindsay, Tulare, Visalia, Dinuba, Reedley, Parlier and Sanger), and Fresno-Bakersfield-Las Vegas (also serving Delano, Mojave, Boron and Barstow). There are four Orange Belt stops within Kings County. One in Hanford at the Amtrak Station, one in Kettleman City at the Carl's Jr. on Hubert Way, one in Lemoore at the Lemoore Chamber of Commerce, and one at the Naval Air Station Lemoore.

1.6.4 - AMTRAK

In addition to rail passenger service, Amtrak operates connecting bus service from Paso Robles and Visalia that connects with the Hanford Depot. Three route stops in Kings County: two in Lemoore and one in Kettleman City at the Carl's Jr. Restaurant on Hubert Way. Amtrak train tickets are required for use of this bus service.

1.7 - Traffic Safety and Enforcement

1.7.1 - SAFE ROUTES TO SCHOOL IMPROVEMENTS

Construction of street improvements has recently been completed on a portion of General Petroleum Avenue; one block sections of 7th, 8th, and 9th Streets between Standard Oil Avenue and General Petroleum Avenue; and, a portion of Standard Oil Avenue. Installation of sidewalks, as well as the curb and gutters, provided a safer pedestrian-oriented pathway for residents and school children to use that is separated from the vehicle travel lanes. Prior to these improvements, students chose to walk in the street to avoid the pooling water and muddy conditions when it rained. ADA compliant ramps at all corners and crosswalk locations provide easier access for the disabled community. The widening of the roadway pavement to provide a parking lane provides a shared area for bikes and on-street parking. The parking lane provides a buffer between street traffic and pedestrians and will better delineate areas for parents to park while picking up and dropping off students. The pre-existing loading area in front of the school serves as a pedestrian shelter and clearly defines the student pick-up and drop-off area.

1.7.2 - SAFETY PROGRAMS

Kettleman City Elementary School staff expressed that they are committed to educating students on the recommended routes to school. They will continue to incorporate exercises on walking/biking to school into the curriculum, such as a “walking school bus."[9]

A local organization, Cultiva La Salud, formerly known as the Central California Regional Obesity Prevention Program, actively promotes healthy living and provides help fighting

[9] A “walking school bus” is a type of student transport for school aged children who are typically chaperoned by two adults: a "Driver" who leads the students and a "conductor" who follows at the rear of the line or group). The students walk to school, in much the same way a school bus would drive them to school. Like a traditional bus, walking school buses have a fixed route with designated "bus stops" and "pick up times" in which they pick up children.

obesity within Kettleman City at the Family Resource Center. The organization also promotes walking and biking to school.

Local California Highway Patrol, Sheriff, and Fire Department representatives also periodically provide classroom sessions during school hours on walking and biking safety. They plan on continuing this tradition annually. Bicycle helmets were given out to children by CHP and Sheriff's deputies at previous community gatherings.

1.7.3 - ENFORCEMENT

Traffic enforcement in the community is provided by the CHP. Because of the community's concerns with high speeds along SR 41, speed radar signs were placed in the Kettleman City Residential Area, with funding provided by Waste Management. Increased enforcement on Kettleman City surface streets is also being conducted.

CHAPTER 2 PUBLIC OUTREACH AND PUBLIC INPUT PROCESS

2.1 - Introduction

The Consultant team conducted three community-based meetings to gather information and opinions. Two meetings targeted the residents of the Residential Area of the community, and one meeting targeted the business owners in the Highway Commercial Area. The meetings with the residents were conducted in English, with Spanish translators sitting at tables with the Spanish-speaking participants. The meeting with the business community was conducted in English; a Spanish translator was offered but was not needed. The meetings introduced the SGCIP to the public, defined the study's parameters, and solicited opinions from the community to help inform the development of the 'Smart Growth SR 41 Corridor Improvement Plan'. Workshops occurred on a weeknight with the Kettleman City residents and local businesses at the elementary school cafeteria and lasted approximately one-and-a-half to two hours. One meeting with the businesses occurred at the consultant's office in Fresno, California. The facilities where all meetings and workshops were held were ADA accessible. Activities such as coloring books and crayons, board games, and playing cards were available to keep children entertained while the parents participated in the workshops. In addition, interviews were conducted with sheriff, fire, and highway patrol in person or by questionnaires.

The theme of the workshops focused on the following goals and objectives as originally identified by Kings County:

- **Increase the safety of the transportation system for motorized and non-motorized users.** The proposed plan will analyze existing safety issues and recommend countermeasures to improve safety for all users of the transportation system.

- **Support a vibrant economy.** The proposed plan will offer guidelines to increase system capacity, which will enhance the community's ability to continue growing as a shipping and logistics hub, and as a convenient stop for Central Valley travelers. The recommendations will support the creation of new jobs and economic sustainability.

- **Foster livable and healthy communities and promote social equity.** Kings County staff and the qualified Consultant will gather community feedback to develop a plan that will integrate community values with suggested alternatives for transportation deficiencies. The plan will offer countermeasures for poor traffic flow in the business sector and over the California State Aqueduct, lack of pedestrian and bicycle infrastructure, speeding traffic in residential areas, and storm drain system inadequacies affecting the transportation network.

2.2 - Advertising for the Workshops

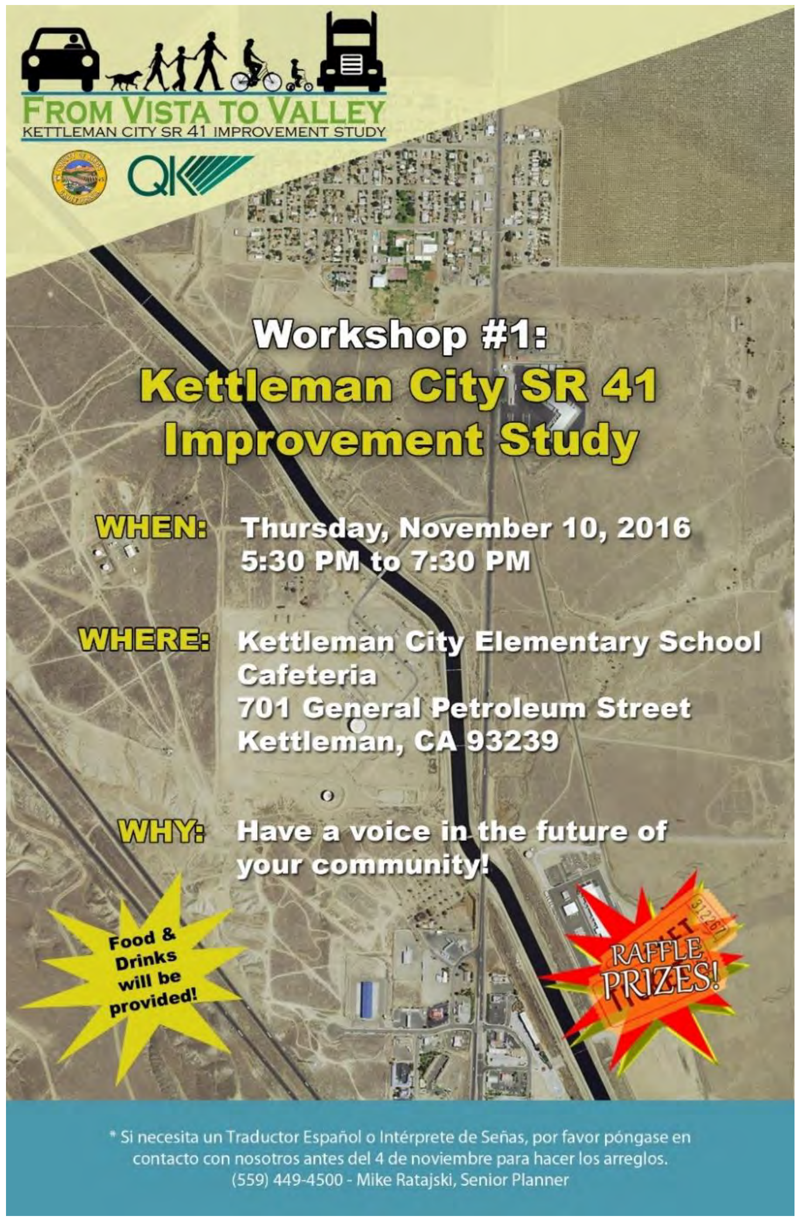
2.2.1 - Announcements

Announcements were made throughout the community and Study Area by visiting or contacting the following organizations: Kettleman City Chamber of Commerce, Kettleman City Elementary School, Kettleman City Community Service District, and local civic group meetings.

Announcements were sent home to all parents with school age children who attended Kettleman City Elementary School to alert residents about the SGCIP, the County's desire for residents' participation, and to provide contact information and information about community meetings. The neighborhood outreach included bilingual announcements.

2.2.2 - Flyers

Flyers were distributed to the Kettleman City Elementary School, the Kettleman City Library, Kettleman City Community Center, Kettleman City Community Services, and the local post office.



SR 41 Improvement Study Poster and Email Flyer Advertising Workshop #1

2.3 - Workshops

2.3.1 - Workshop #1 - General Public

The first community workshop took place at Kettleman City Elementary School on November 9, 2016, from 5:30 to 7:00 pm. The workshop was attended by members of the public, residents, school employees, and several children of the residents. Fifteen participants signed in at the workshop. Spanish translation was provided to the Spanish speakers in the group. County staff from the Public Works Department and Community Development Agency were also in attendance.

Public Workshop at Kettleman City Elementary School

The first workshop introduced the SGCIP to the public, defined parameters, and solicited opinions and concerns from the community to help shape the development of a plan. Prior to this workshop, the consultant team had conducted preliminary research, toured the area and recorded digital images, reviewed previous studies, and identified the findings on a poster-sized existing conditions and opportunities map on which participants could review and comment. The first workshop included images of Kettleman City's existing transportation network. PowerPoint and Turning Point software were used to solicit ideas, concerns, and needs from the residents, and to hear their preferences using a series of multiple choice questions. Open discussion was also available, and County staff were present to answer questions about the SGCIP.

Workshop Contents

The contents of the first workshop included:

- Team introductions.
- Schedule.
- A graphic description of the study area boundaries.
- Images of the existing system.
- Purpose and objectives of the study.
- Results of a 2010 study for Kettleman City.
- Recent improvements and improvements under construction or planned.

- Ongoing maintenance and law enforcement.
- Current programs to improve safety (i.e., school bus service for east side, speed radar guns, distribution of bicycle helmets, and increased law enforcement and safety education at school).
- Comments from local law enforcement and fire personnel.
- Available safety improvement options.
- Survey and roundtable discussion.
- Preliminary findings on existing conditions, existing barriers to pedestrian and bicycle access, and conceptual diagram depicting ideas on improvements.

Workshop Takeaways (based on participant comments)

- For exercise, residents often walk along either Milham Street or General Petroleum Avenue to the aqueduct, then walk along the north side of the aqueduct to SR 41. They then follow a path along SR 41 back to Milham Street or General Petroleum, making a triangular loop. They felt this is a solid reason to construct a bike path along SR 41.

- Truckers walk along SR 41 from XPO Logistics and Federal Express to the commercial area to stretch their legs, get food, and stay in the motels. This provides another reason for a bike/pedestrian path.

- A few years ago, the community asked Caltrans to do a speed study in hopes of lowering the speed limit on SR 41; but, the findings were not able to support a reduction in speed. Increasing the speed could make it unsafe for school children and other pedestrians in Kettleman City.

- Tourists (that's what they called anyone who didn't live or work there) do not respect the red curbs where parking is prohibited and felt it does not appear to be enforced.

- Trucks park on the shoulder of SR 41, which blocks views for pedestrians and cars trying to enter SR 41 from one of the residential cross streets.
- None of the participants worked in the commercial area. However, when asked, they estimated that half of the commercial area's employees live in the residential area.

- More lighting is needed along SR 41 in the residential area. They believe that cars cannot see them when they are crossing the street.

- They are open to the use of roundabouts.

- They seemed to support many of the ideas suggested by the QK team, such as constructing a roadway behind Taco Bell and a new road with a bridge to get to 25th Avenue from SR 41 in the Highway Commercial Area. They liked the idea of an alternative route for trucks.

Trucks often park on the shoulders in the residential area, which blocks views of oncoming traffic from pedestrians and vehicles on the local streets.

The community was asked to place "icon stickers", labeled in both English and Spanish, onto aerial maps of the residential community where they live and the Highway Commercial Area. The icon stickers had images of roadway improvements, safety improvements, and alternative modes of transportation. The participants divided into four roundtable discussion groups. The following lists are a summary of their responses:

RESIDENTIAL COMMUNITY:

- Pedestrian overpass at SR 41 (suggested by one table).
- Improve Edward Street east of SR 41.
- Issue traffic citations at Edward Street and SR 41.
- Lighting, stop signs, KART bus stops, and improved roads throughout.
- Trail along aqueduct and SR 41.
- Crosswalk at Milham Street.
- Roundabout at General Petroleum Avenue.
- Traffic signal and/or pedestrian crossing warnings at 25th Avenue.
- 4-way stop sign at Milham Avenue.
- Roundabout at Edward Street or Milham Avenue.
- More lighting along SR 41 (Note: Only one crosswalk is there now.)
- Trucks parked along SR 41 are a safety problem due to decreased visibility of residents crossing the highway at this location.

COMMERCIAL AREA:

- Pedestrian overpass at SR 41 at or near Bernard Drive (suggested by one table).
- KART bus stop.
- Crosswalks at Bernard Drive and SR 41.
- Pedestrian bridge near aqueduct at SR 41 crossing.
- More sidewalks along local streets.
- New roadway from Interstate 5 exit ramps crossing aqueduct to 25th Avenue.

2.3.2 - WORKSHOP #2 - BUSINESS OWNERS

The second community workshop was a meeting with interested business owners. The meeting took place at QK's Fresno office, since several of the business owners lived and/or had offices in Fresno and asked that the meeting occur in Fresno as a convenience. The meeting location was approved by Kings County staff. Meeting minutes were shared with Kings County staff members.

Meeting Contents

The meeting consisted of an open discussion and exhibit boards with the local business owners. A Spanish translator was offered but was not needed.

The meeting with business owners included a discussion of the input from residents who attended workshop #1 and a summary of the comments from law enforcement, fire department, elementary school, and community center. The business owners shared their concerns, ideas, and issues for a better and more efficient transportation network, what transportation improvements they would like to see to spur economic development, what their plans are for growth and expansions, and what their needs are for a better community. The contents of the meeting included:

- Team introductions.
- Purpose and objectives of the study.
- A graphic description of the study area boundaries.
- Images of the existing system.
- Comments from local law enforcement and fire personnel.
- Comments from the first workshop with residents of Kettleman City.
- Trip destinations and proposed General Plan land uses.
- Preliminary needs, deficiencies, and opportunities.
- Informal discussion of the business owners' ideas and concerns.
- Next meetings.

Meeting Results

The following comments were discussed at the meeting:

- They believe that traffic congestion is not the issue. It's only at its "worst two or three days per year". The issue was more a lack of traffic (economic issue). In fact, they stated that law enforcement is only there to assist with traffic "once or twice a year".

- They felt that the east side gets a majority of the business while the west side continues to struggle. They referred to the west side as "almost a ghost town". Access to the west side is problematic; access to the east side is convenient because of the first right-in turn off I-5. They cited an example that even though prices at the pumps at a gas station on the west side are often advertised at a lower cost than the east side gas prices, motorists go to the more expensive station because of the convenience that access to it affords.

- Property has been difficult to sell and it's hard to get tenants in the area.

- They were not open to any improvements that would benefit just one side of SR-41 or one business owner. They were open to improving the industrial corridor along 25th Avenue and improving businesses for everyone, not just the east side.

- They felt that more roadways on the east side would only mean more vehicles will be parked on the side of the road creating a more dangerous situation.

- They believed that commercial area would benefit from a tall and highly visible pylon sign that identifies multiple tenants/businesses near the SR 41 and Interstate 5 interchange. Harris Ranch and Wheeler Ridge were the two interchanges cited that provided a pylon sign for the businesses there. They stated that studies indicate that pylon signs have a 12% increase in business. They would be willing to pay for it, if funding is not available through the county or grant monies.

- An RV park would only be successful if it were advertised on the pylon sign. They cited the Almond Tree RV Park on Jayne Avenue and I-5 as being successful.

- They liked the idea about a Class I trail along SR 41 that would bring Kettleman City residents to and from the commercial area. They believed that about half of the employees in the commercial area live in Kettleman City.

- The option of a roundabout at Bernard Drive was an idea that they did not denounce nor endorse; but, their concern was improving access to the west side. They thought that an additional access point to the west side between Bernard Drive and the northbound Interstate 5 entrance ramp might be of some help to improve businesses there.

- They would like the consultants/County/Caltrans to consider an additional northbound travel lane; suggested taking available roadway width on the west side of SR-41 (southbound travel) and somehow utilize it on the east side of SR-41 (northbound travel).

Before the Next Workshops. Prior to the next pair of workshops, the QK team discussed the transportation strategies and preliminary prioritization of these strategies to the County for their review and feedback.

2.3.3 - Workshop #3 -General Public and Local Businesses

The third community workshop took place at Kettleman City Elementary School on November 14, 2017, from 6:00 to 7:30 pm. The third workshop included members of the public and local businesses. It attracted a similar sized group as the first workshop, although many of the participants in Workshop #3 did not attend Workshop #1. Spanish translation was provided for Spanish speaking participants.

Transportation improvement strategy alternatives were presented. The consultant team presented the recommended improvement alternatives (in Section 9 of this document), identified the pros and cons of each alternative, and asked the community to select their preferences and rank them in order of most important to least important. TurningPoint software and voting dots were placed on large scale exhibits utilized both at the workshop when determining preferences and priorities. The participants were also invited to leave our team with additional written and verbal comments. The contents of this workshop included:

- Team Introductions.
- Schedule.
- Recap of Workshops 1 and 2.
- What we heard from the community at workshops #1 and 2 – both survey and roundtable results.
- New transportation improvement strategy alternatives (graphic images).

Meeting Results

Residential Area. Following were the preferences associated with the residential area (in order of first, second, and third preferences):

1. 25^{th} Avenue bypass beginning at Edward Street and connecting to 25^{th} Avenue south of XPO Logistics.
2. Intersection improvements at General Petroleum Avenue and SR 41.
3. Bicycle/pedestrian trail.

Additional comments provided included (in no particular order unless noted):

- A roundabout was the preferred intersection improvement for General Petroleum and SR 41 (45%).
- Residents of Kettleman City were in support of the bypass identified in Item 1 above, whereas the business owners were not.
- Lighting needed along SR 41 in the residential area.

- A truck and pedestrian collision occurred in late October in the residential area on SR 41.

Highway Commercial Area. Following were the preferences associated with the commercial area (in order of first, second, and third preferences):

1. A new roadway connecting the east side to 25th Avenue via a crossing at the aqueduct but not from SR 41 (45%).
2. New local roadway and sidewalks west of SR 41 and north of Bernard Drive.
3. Pylon sign and intersection improvements at Bernard Drive and SR 41 (tie with Item 2).

Additional comments provided included (in no particular order unless noted):

- More than half would like to see more lanes added at the intersection of SR 41 and Bernard Drive.
- No connection from SR 41 to the east side south of In-N-Out.
- No roundabout at the intersection of the Interstate 5 exit ramps and SR 41.
- Business owners expressed concern or were opposed to a 25th Avenue bypass.
- Expand SR 41 to four lanes.
- Roundabout at SR 41 and roadway leading to Chevron facility if new connection to 25th Avenue is constructed.

Regarding a Bike/Pedestrian Trail.

Following were the comments associated with a bike/pedestrian trail along SR 41:

- 78% preferred to see a trail constructed on the west side of SR 41.
- Trail amenities, in order of preference, included: Solar powered lighting, shade trees and trash containers were tied for second. There seemed to be little interest (5% or less) for benches, distance markers, and pet waste stations.
- Community wanted a pedestrian/bicycle bridge separated from the vehicular traffic of SR 41.

2.4 - Interviews

The following groups or individuals were interviewed to get their input on concerns, issues, problem areas, and needs. These discussions were either one-on-one or group interviews and email surveys sent to individuals who could not meet in person. Most of the information obtained was included in each of the workshops.

2.4.1 - Kings County Fire Department

Contacts: Captain Nunez and Stephen Luis

The Fire Department participants were interviewed by the consultant. They provided information and opinions about vehicle safety and traffic controls.

2.4.2 - Kings County Sheriff Department

Contacts: Commander Dodd, Deputy Hayner, and Deputy Calhoun

The Sheriff Department participants were interviewed by the consultant team. They provided their insight on existing conditions and suggested ideas for improving public safety for both vehicle occupants and pedestrians.

2.4.3 - California Highway Patrol

Contact: Officer Valle

Officer Valle joined the public workshop and provided input with the local citizens on the questions that were also posed to them. His comments were included with the summaries of the community workshops that have been previously identified in this chapter. Officer Valle echoed many of their concerns.

2.5 - Presentation to Kings County Board of Supervisors

The final plan was presented to the Kings County Board of Supervisors on March 20, 2018, at their regularly scheduled Board of Supervisors meeting. Community residents, business owners, and employees were invited and encouraged to attend the meeting to support and provide final comments on the plan. The County acknowledged Caltrans for providing grant funds to support the planning process and develop the plan.

CHAPTER 3 EVALUATION OF EXISTING, BUILT ENVIRONMENT

3.1 - Transportation

SR 41. State Route 41 divides the Residential Area into two separate neighborhoods, and residents have expressed critical concern over the speed of traffic and unsafe conditions that pedestrians face. Although the speed limit through the Residential Area is posted at 45 mph, highway travelers often travel at speeds faster than the posted speed limit. This traffic is strongly viewed by residents as a priority safety concern and detrimental factor to the community, and they are worried about pedestrians and children that must cross the highway.

According to the Kettleman City Community Plan, CHP officers, and residents, there is a need for increased efforts to bring attention to the chronic speeding that occurs along SR 41 at the residential area within the 45-mph speed zone, and there is need for a stronger CHP presence in Kettleman City. Inquiries with many travelers has indicated that most drivers are unaware of the residential community and perceive the highway as simply a route through which to quickly travel. The Highway Commercial Area is typically recognized as the main area to slow down because of the increased traffic entering and exiting Interstate 5, the signalized intersection at Bernard Avenue, and the many travel related businesses that motorists seek.

3.2 - Land Use

3.2.1 - EXISTING LAND USE

Highway Commercial. There currently are approximately 30.5 acres of highway commercial land uses located on the west side of SR 41 and approximately 13.5 acres of highway commercial land uses on the east side of SR 41. Uses include two hotels, both fast-food and sit-down restaurants, coffee shops, gasoline and automobile service stations, a freight shipping company, UPS distribution center, and the remnants of an RV park.

Kettleman City. Kettleman City lacks a central commercial area for the community. The residential area has some limited commercial uses along State Route 41, which consist of a gas station, a few small convenience stores, an auto parts store, and other small commercial uses. There is no identifiable or functional downtown area for commercial businesses to locate or Kettleman City residences to frequent. Vacant land south of the County Fire Station and west of State Route 41 provides an excellent location to establish a new downtown commercial core that can tie into the rest of the residential area and draw from highway traffic sales.

The Kettleman Elementary School is located on the west side of the highway. Some students must cross the highway at intersections that provide little to no warning for drivers to slow down and where motorists often fail to obey posted speed limit signs and marked crosswalks. A school bus provides transportation to local students who live on the east side of SR 41. However, these children face greater personal risk by having to cross SR 41 to access the park, visit friends, go to the store, or attend after school events.

Despite safe route to school improvements, the community still has limited curb and gutter infrastructure. Most roadways are open with pavement meeting dirt shoulders, leaving no curbed separation between pedestrians/bicyclists and traveling vehicles. This lack of pedestrian facilities contributes to the decline of a sense of personal safety, which may cause residents to feel uncomfortable walking in their community. In areas still lacking infrastructure improvements, the residents' exposure to conflicts with traffic are increased, making driving and bicycling difficult. The community has limited curb and gutter infrastructure. Some improvements have occurred in 2016-2017. In winter months, street shoulders without curbs and gutters may temporarily flood. These conditions can make walking and bicycling more difficult on these streets.

In October 2016, portions of General Petroleum Avenue, 7th Street, 8th Street, 9th Street, and Standard Oil Avenue were reconstructed with curb, gutter, sidewalks, and repaving (approximately 6/10 of a mile). The remainder of the streets could benefit from similar improvements to increase safety and walkability in the community.

25th Avenue. 25th Avenue is a two-lane roadway (12-foot wide lanes) with paved shoulders that currently provide access to a Federal Express distribution facility and XPO Logistics. 25th Avenue provides access to SR 41 approximately one-and-a-half miles north of Interstate 5. The only other point of access to 25th Avenue is at Utica Avenue which is located about five miles south of the Federal Express facility and provides on- and off- ramp access to Interstate 5. 25th Avenue also interconnects with SR 41 mid way along the route between the residential area and highway commercial area. The primary barrier to additional intersections/connections to 25th Avenue is the aqueduct.

3.2.2 - General Plan Land Use

The Kettleman City Community Plan was adopted on January 26, 2010 as part of the Kings 2035 Kings County General Plan update. This community plan for Kettleman City establishes the general plan land use for the entire community which can be identified by three sub areas. The Highway Commercial Area located in the south part of the community between California Aqueduct and Interstate 5, and along both sides of SR 41. The developable Industrial Area located in the middle of the community area along 25th Avenue and north of the California Aqueduct. The Residential Area located in the north part of the community, and along both sides of SR 41.

Highway Commercial Area. The Highway Commercial Area land use is all designated "Transportation Commercial" which allows a range of highway traveler-oriented type retail businesses and services. These uses are provided access along local streets near SR 41. Most available land for future development is located on the west side of SR 41. Another area for future expansion is located at the southeast portion of this area and accessed along Bernard Drive.

Industrial Area. The developable Industrial Area land use identified along 25th Avenue has a mixture of "Heavy Industrial", "Rural Commercial", and "Service Commercial" which allows a range of business, service and industry options. Most of the development taking place here centers around transfer stations for truck transport of goods. Some neighborhood commercial is identified near the intersection with SR 41, and agriculture is planned for the remainder of the 25th Avenue corridor for approximately 1.3 miles south towards Utica Avenue. Only two businesses are currently operating here which includes XPO Logistics and Federal Express. Additional "Heavy Industrial" designated land exists west of SR 41 and south of the California Aqueduct, but owned by oil industry businesses and has restricted access.

Residential Area. The Residential Area land use is designated with a diverse range of residential density from single family to multi-family, as well as residential allowance in Mixed Use designations that combine commercial business allowance. Residential development is planned to occur in three phases, however residential expansion in undeveloped areas is conditioned upon adequate community services being made available which is currently a significant limiting factor. Should residential expansion proceed, the first phase would occur west of the community. The second phase would expand the community north of Edward Street. The third phase for consideration and least likely to be developed is east of SR 41.

Downtown mixed use is planned for an 8.5-acre area on the west side of SR 41 south of the library and fire station.

3.3 - Smart Mobility Framework

3.3.1 - Introduction to Smart Mobility Framework

The Smart Mobility 2010: A Call to Action for the New Decade is a planning guide developed by Caltrans that furthers integration of smart growth concepts into transportation planning in California. This tool provides a common method for evaluating the existing, built environment. Development of a Smart Mobility Framework (SMF) helps to move people and freight while enhancing California's economic, environmental, and human resources by emphasizing:

- Convenient and safe multimodal travel
- Speed suitability
- Accessibility
- Management of the circulation network
- Efficient use of land

SMF can help guide and assess how well plans, programs, and projects meet the definition of "smart mobility." Smart Mobility outcomes, achievable over a long-term time frame, include:

- Improved accessibility
- Reduction in average length and number of vehicle trips
- Social equity
- Reduction in environmental impact of travel
- Reduction of direct environmental impacts
- Improved public health
- Reduced energy costs
- Economic development

By using the Smart Mobility Framework principles, the proposed improvement strategies for the SR 41 corridor can respond to the transportation needs of the corridor's people and businesses, address climate change, advance social equity and environmental justice, support economic and community development, and reduce per capita vehicle miles traveled.

3.3.2 - Smart Mobility Principles[10]

The benefits of Smart Mobility can best be achieved through focus on some key principles. The principles that have been identified are:

Location Efficiency

- Integrate transportation and land use to achieve high levels of non-motorized travel and transit use, reduced vehicle trip making, and shorter average trip length while providing a high level of accessibility.

Reliable Mobility

- Manage, reduce, and avoid congestion by emphasizing multi-modal options and network management through operational improvements and other strategies.

[10] Smart Mobility 2010: A Call to Action for the New Decade. Caltrans. February 2010. Exhibit 3, Page 17.

- Provide predictability and capacity increases focused on travel that supports economic productivity.

Health and Safety

- Design, operate, and manage the transportation system to reduce serious injuries and fatalities, promote active living, and lessen exposure to pollution.

Environmental Stewardship

- Protect and enhance the State's transportation system and its built and natural environment.
- Act to reduce the transportation system's emission of greenhouse gases (GHG) that contribute to global climate change.

Social Equity

- Provide mobility for people who are economically, socially, or physically disadvantaged to support their full participation in society.
- Design and manage the transportation system to equitably distribute its benefits and burdens.

Robust Economy

- Invest in transportation improvements – including operational improvements – that support the economic health of the State and local governments, the competitiveness of California's businesses, and the welfare of California residents.

The goals of the stakeholders in the SGCIP are consistent with the principles of the Smart Mobility Framework. For example, Kings County is interested in improving transportation to make it safer for residents and travelers, and to enhance economic opportunities in the commercial area and in goods movement. The residents would like to improve infrastructure to improve safety while encouring more safe walking and biking. Public safety officials would like to improve safety and decrease periods of congestion. The commercial business owners and operators desire easier access, safety, and economic opportunities. All stakeholders recognize the need for environmental stewardship and the social equity issues of Kettleman City.

3.3.3 - Place Types[11]

The Smart Mobility Framework uses Place Types as a tool for general classification of towns, cities, and larger areas. Strategies that work in urban areas will not be the same strategies used in rural areas. Identifying a location Place Type will help to identify the transportation improvements that will be more effective for that area.

[11] Smart Mobility 2010: A Call to Action for the New Decade. Caltrans. February 2010. Exhibit 7, Page 27.

Table 3-1 identifies and describes the Place Types used in the SMF. Applying these Place Types to the Study Area, Kettleman City as a whole is consistent with the description of Place Type 5a, Rural Towns. Like the description, Kettleman City provides a mix of housing and services and public institutions in a compact form that also serve the surrounding rural areas. It is located at the crossroads of SR 41 and Interstate 5, and it serves tourists, not so much as a destination but as a resting or stopping point either along Interstate 5 or along SR 41.

Looking at the Study Area more specifically, there are three subareas of land uses: the commercial area, an undeveloped rural area, and the residential area. While these areas could each be identified with their own Place Type, the benefits of doing so do not appear to provide additional insight because of the relatively small area being identified. Therefore, for the purposes of identifying Place Types, the entire Study Area will be identified as Rural Town (Place Type 5a).

3.4 - Existing Smart Mobility Evaluation

The Rural Town Place Type suggests that Kettleman City will continue to depend on a high level of automobile use because origins and destinations are relatively dispersed, and because not all necessary services are provided in the community. The Rural Town Place Type suggests that the following approaches would be beneficial for Kettleman City:

Use a flexible approach for design and operations of state highways operating as Main Streets. A key concern of the residents is traffic speed through the residential area. They claim that a recent speed study conducted at their request actually increased the speed limit through the Residential Area. (A follow-up of this claim confirmed that in 2012 Caltrans recommended changes to the speed limit based upon a study. The speed limit had been 45 mph. The recommended changes increased the speed limit to 50 mph between the I-5 interchange and the aqueduct bridge and increased to 55 mph between the aqueduct bridge and the Residential Area. The Residential Area remained at 45 mph.) Given the current road configuration and adjacent land uses that are set back relatively far from the highway, it is not surprising that a speed study prepared using standard practices would result in an increase rather than the hoped-for decrease in the speed limit. This suggests that strategies and designs are needed in the residential area that will naturally reduce traffic speeds.

Provide adequate freight capacity for movement of products. While the community does not generate freight trips, its location at the half-way point between the Bay Area and Los Angeles result in a greater than typical demand for truck transfer facilities. Promoting more of these uses is beneficial for economic development but is detrimental to traffic. This suggests that strategies for transportation improvements should provide for additional truck trips while finding ways to separate them from the local and tourist traffic or minimizing their negative effects.

Focus walking and bicycle improvements on safety rather than connectivity or increased use. A community like Kettleman City will not generate the number of walking and bicycle trips that an urban area would generate. However, the trips that do occur are occurring in

Table 3-1
Smart Mobility Place Types

Place Type	Summary Description (Existing or Planned Character)	Presence of Location Efficiency Factors: Community Design	+	Regional Accessibility	Examples
1. Urban Centers	High density, mixed use places with high jobs-housing ratios overall, well-connected street networks, high levels of transit service and pedestrian supportive environments. Transit-oriented development (TOD) fits into all the urban place types.				
1a. Urban Cores	Central cities and large downtowns with full range of horizontally- and vertically-mixed land uses and with high capacity transit stations/corridors present or planned. Urban cores are hubs of transit systems with excellent transit coverage, service levels, and intermodal passenger transfer opportunities including convenient airport access.	Strongest	+	Strongest	Downtowns of Long Beach, San Francisco, San Jose, Sacramento, Los Angeles, San Diego, Oakland
1b. Urban Centers	Major activity centers with full range of horizontally- and vertically-mixed land uses .and with high capacity transit stations/corridors present or planned.	Strong	+	Strong	Irvine, Berkeley, Palo Alto, Pasadena, Walnut Creek, Santa Rosa, Century City, Fresno, Stockton, Bakersfield, Modesto
2. Close-in Compact Communities	Located near Urban Core or Urban Centers, close-in compact communities are comprised primarily of housing but with scattered mixed-use centers and arterial corridors forming the skeleton of the transportation system. Housing is varied in density and type. Transit is available to connect neighborhoods to multiple destinations, with an emphasis on serving commute trips. Residents may think of these communities as suburban, but the Smart Mobility Framework differentiates them from suburban communities because of the greater presence of location efficiency factors.				
2a. Close-in Centers	Small and medium sized downtowns, Transit-Oriented Developments, institutions, lifestyle centers, and other centers of activity.	Moderate	+	Strong	Downtowns of San Rafael, Carlsbad, Orange, Santa Monica and Playa Vista, Uptown San Diego

Place Type	Summary Description (Existing or Planned Character)	Presence of Location Efficiency Factors: Community Design	+	Regional Accessibility	Examples
2b. Close-in Corridors	Arterial streets with a variety of fronting development types, with frequent transit service and transfer opportunities.	Moderate	+	Strong	San Pablo Avenue, Alameda County
2c. Close-in Neighborhoods	Walkable neighborhoods with housing near shops, services, and public facilities, as well as good multi-modal connections to urban centers. Housing density varies from medium to high. Fine-grained circulation network of streets with high comfort for pedestrians and bicyclists.	Moderate	+	Strong	Midtown, Curtis Park, and Land Park Sacramento, Rockridge Oakland, Little Italy San Diego, and Fillmore and Mission Districts in San Francisco
3. Compact Communities	Historic cities and towns as well as newer places characterized by strong presence of community design elements. While most compact communities are outside of metropolitan regions, some are on the periphery of metropolitan regions.	High	+	Moderate to Low	Eureka, San Luis Obispo, Paso Robles, Santa Barbara
4. Suburban Communities	Communities characterized by a low level of integration of housing with jobs, retail, and services, poorly connected street networks, low levels of transit service, large amounts of surface parking, and inadequate walkability. For the purposes of the Smart Mobility Framework, suburban communities are defined by weak-to-moderate presence of location efficient community design factors. They vary with respect to regional accessibility; some suburban communities are located within easy commute distance of urban centers, while others are not. Places that share characteristics with suburban communities—such as a high proportion of detached housing, are categorized as being in the suburban community place type only if they match the place type characterization relative to location efficiency factors.				
4a. Centers	Mid-size and small downtowns, lifestyle centers, or other activity centers embedded within suburban communities.	Moderate	+	Variable	

Place Type	Summary Description (Existing or Planned Character)	Presence of Location Efficiency Factors: Community Design	+	Presence of Location Efficiency Factors: Regional Accessibility	Examples
4b. Corridors	Arterial streets with a variety of fronting development types, frequently characterized by inadequate walk and bike environments, low land use efficiency and poor aesthetics.	Weak	+	Variable	Moderate to High density examples: Orange County and Inland Empire counties. Low to Moderate density examples: Central Valley, Salinas Valley, and Sierra foothill suburbs
4c. Dedicated Use Areas	Large tracts of land used for commercial purposes such as business or industrial park or warehousing, or for recreational purposes such as golf courses.	Weak	+	Variable	
4d. Neighborhoods	Residential subdivisions and complexes including housing, public facilities and local-serving commercial uses, typically separated by arterial corridors.	Weak to Moderate	+	Variable	
5. Rural and Agricultural Lands	Settlement pattern with widely-spaced towns separated by farms, vineyards, orchard, or grazing lands. The rural and agricultural place type may include tourist and recreation destinations which can significantly affect land uses, character and mobility needs.				
5a. Rural Towns	Rural towns provide a mix of housing, services and public institutions in compact form that serve surrounding rural areas. They vary in size from crossroads with single clusters of commercial uses to towns offering a full range of retail and service businesses. Towns may also be the focus of tourist and recreational activity or gateways to recreation areas in protected lands.	Moderate to High	+	Low	Hilmar, St. Helena, Ferndale, Mariposa

Place Type	Summary Description (Existing or Planned Character)	Presence of Location Efficiency Factors Community Design	+	Regional Accessibility	Examples
5b. Rural Settlements and Agricultural Lands	Scattered dwelling units and supporting commercial uses and public facilities, no significant subdivisions and limited nonagricultural industrial or commercial land use, and lands in agricultural or grazing use.	Very Low	+	Low	
6. Protected Lands	Lands protected from development by ownership, long-term regulation, or resource constraints.	Very Low	+	Variable	National forest and National Park, lands held in perpetuity by land trusts.
7. Special Use Areas	Large tracts of single use lands that are outside of, or poorly integrated with, their surroundings.	Low	+	Variable	Airports, large industrial facilities, military installations, some universities

an environment without sidewalks or shoulders that are wide enough to encourage safe walking and bicycling. This suggests that strategies for walking and bicycle improvements focus on designs that improve safety. This is likely accomplished by providing paths that are separated from the highway by barriers or by distance.

Provide visitor-oriented transportation services due to the strong weekend and holiday peak demand. It is anticipated that the demand for visitor-oriented commercial services will continue to increase. In the past, local road infrastructure has not been well interconnected in the Highway Commercial Area, leaving only one way to or from most businesses. Future commercial development should be required to construct additional roadway facilities that are needed for their development in a way that improves the connectivity of the roadways.

Manage the transition in vehicle speeds from rural highway to rural town. Roundabouts have been successful strategies that reduce speed without reducing capacity. Properly located, they can serve as a cue to the driver that land uses are transiting from rural to town. This suggests that roundabouts may provide multiple benefits that the community desires.

These approaches have been used as a starting point to identify the transportation strategies that are described later.

CHAPTER 4 EVALUATION OF EXISTING PLANS AND POLICIES AFFECTING STUDY AREA

There have been several previous plans and studies that have reviewed transportation along SR 41 through Kettleman City. This chapter contains applicable goals, policies, and conclusions taken directly from the following sources:

- Kings County 2035 General Plan
- Kettleman City Community Plan
- Federal Sustainable Transportation Planning Goals
- State of California Transportation Plan 2040
- Kings County 2014 Regional Transportation Plan (RTP)
- Kettleman City Safety and Community Study
- SR 41 and Bernard Drive Commercials in Kettleman City Traffic Impact Study
- Draft Traffic Impact Analysis: Kettleman City Commercial Phase 2 at the Southeast Corner of Bernard Drive and Ward Drive

4.1 - Kings County 2035 General Plan

The following goals and policies are taken from the Kings County 2035 General Plan and are relevant to the SGCIP.

> **LU GOAL D1: Community districts establish sustainable community areas that meet the needs of existing residents and serve to accommodate unincorporated urban growth that is guided according to individual community plans.**
>
> The County's four unincorporated communities of Armona, Home Garden, Kettleman City, and Stratford comprise the four separate Community District areas. These communities are the only areas served by either a community services district or a public utilities district that provide municipal water and wastewater services. A diversity of urban type land uses is already accommodated within these communities and include residential, commercial, industrial, open space, and public. Community Districts; therefore, hold the most potential for accommodating urban growth within the unincorporated territory of the County. Development in these rural communities must be accomplished in accordance with County zoning, building, and subdivision ordinances and County Improvement Standards.
>
> **C Policy A1.1.3:** Integrate Kings County Association of Governments participation in all County projects involving consultation with the California Department of Transportation.
>
> **C Policy A1.3.1:** Maintain and manage County roadway systems to maintain a minimum Level of Service Standard "D" or better on all major roadways and arterial intersections.
>
> **C Policy A1.3.3:** Implement traffic operational improvements such as road widening, signals, and lanes to maximize service and efficiency.
>
> **C Policy A1.3.4:** Prioritize roadway improvement projects for funding where deficiencies are identified along critical emergency service routes.
>
> **C Policy B1.2.2:** Seek "Safe Routes to School" funding to implement traffic calming features at key intersections that elementary school children use during the school year to reduce traffic speeds and increase safety.

C Policy B1.2.3: Integrate pedestrian infrastructure that includes sidewalks, tree lined streets, and traffic calming crossings to balance both car and people use of neighborhood streets in new mixed-use development.

C GOAL C1: Integrate through the County's regional transportation system, an efficient and coordinated goods and people moving network of highways, railroads, public transit, and non-motorized options that reduce overall fuel consumption and associated air emissions.

C Policy C1.4.1: Identify and plan for pedestrian and bicycle pathways in strategic locations within Community Districts to connect residents to commercial businesses, community gathering places, and educational facilities.

4.2 - Kettleman City Community Plan

The following objectives and policies are taken from the Kettleman City Community Plan, which is part of the Kings County General Plan. They are relevant to the SGCIP. They have been organized into the following groups: Downtown Commercial Area, Highway Commercial Area, Community Access to Open Space, Community Storm Water, Community Circulation, and Community Health and Safety.

Figure 4-1 depicts the land use designations shown in the Community Plan. Nearly seventy percent (70%) of the Commercial Highway Area is currently built out. However, numerous vacant commercial lots still currently exist within this area. As future residential and commercial growth occurs, expansion of this area may be necessary to accommodate additional revenue-producing commercial growth that will act to provide jobs, economic value, and increase redevelopment tax revenue for the community. The minor expansion of the highway commercial resulting from this plan will provide a small additional area to the southeast (of existing east side development) that has highway visibility and potential for access from the major roadways.

Downtown Commercial Area

KCCP OBJECTIVE 2B.2: Establish a new Downtown Commercial Area made up of mixed commercial and residential use that serves as the new town center for the Kettleman City community and is visually demonstrative of a town center to travelers along Highway 41.

KCCP Policy 2B.2.1: The 8.5-acre area immediately south of the County Fire Station and west of State Highway 41 shall be established as the Downtown Mixed-Use core area for the community.

KCCP Policy 2B.2.3: Require new development within the Downtown Mixed Use to be designed with small setbacks which promote the implementation of pedestrian oriented landscaping and amenities to shape outdoor spaces and streetscape.

Highway Commercial Area

KCCP OBJECTIVE B.3: Allow for minor expansion of the Commercial Highway Area when sufficient infill development has occurred.

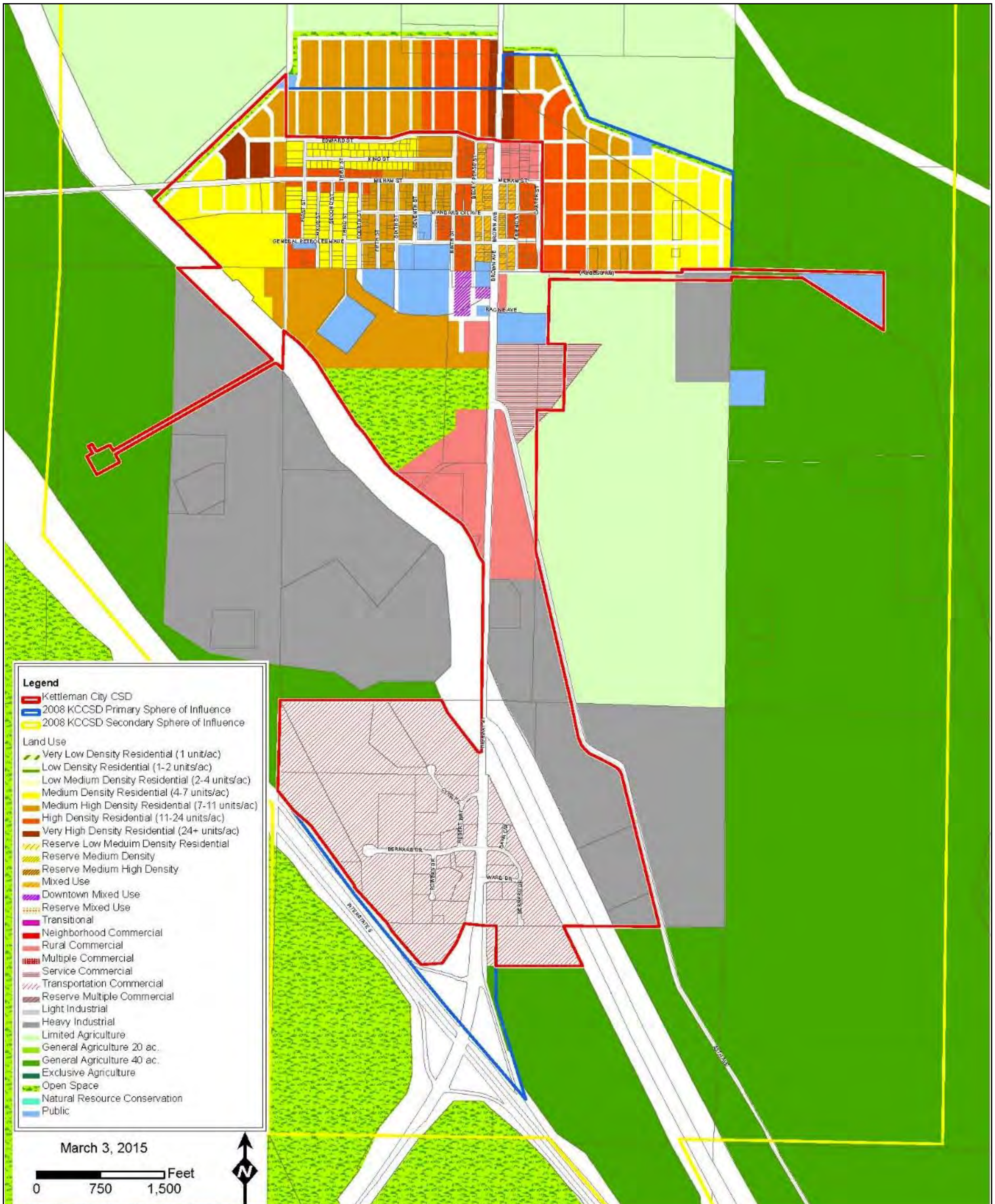


Figure 4-1
Kettleman City Community Plan Land Use Map -
Kings County General Plan

KCCP Policy 2B.3.1: Expand the Commercial Transportation land use to include 10 acres at the southeast corner of the Commercial Highway Area.

Community Access to Open Space

KCCP GOAL 3B: Enhance community connectivity to encourage pedestrian outdoor use of open space and increase outdoor physical activity.

KCCP OBJECTIVE 3B.1: Establish pedestrian and bicycling connectivity routes that link residential, commercial, open space, and recreational uses.

KCCP Policy 3B.1.1: Require walkable infrastructure such as sidewalks and bike paths to be included in all new growth areas and connect to existing developed areas. Kettleman City has limited walkability infrastructure.

Community Storm Water

KCCP GOAL 5B: Kettleman City establishes a communitywide storm drainage system that removes standing pools of water along roadways and drains runoff into a diverse number of receiving facilities.

KCCP OBJECTIVE 5B.1: Establish a diverse series of site hydrologic functions to receive and detain storm water runoff.

KCCP Policy 5B.1.1: Require new development to integrate onsite stormwater drainage features to increase the stormwater detention throughout the community.

KCCP Policy 5B.1.2: Integrate stormwater detention basins into the design of parks, parkways, medians, and other open space areas to serve as dual purpose facilities. Areas of common use and parts of the new streetscape can all be used as part of a stormwater management system.

KCCP OBJECTIVE 5C.1: Key infrastructure improvements to essential community services such as water, sewer, and storm drainage connection lines and stations are made throughout the community.

KCCP Policy 5C.1.1: The Redevelopment Area tax increment funds set aside for community use should be devoted to first improving the water quality issue, then the communitywide infrastructure for water and sewer, community storm drainage, and other community enhancing investments determined essential to the long-term sustainability of the entire community.

KCCP Policy 5C.1.2: Sidewalks, curbs, and gutters shall be required on all development and must integrate with a storm drainage system that is either onsite or can be connected to a community system. All development shall be consistent with the Kings County Public Works Improvement Standards for sidewalk, curb, gutter, and storm drainage.

Community Circulation

KCCP GOAL 6A: The Kettleman City circulation system adequately serves a diverse transportation system that accommodates pedestrians, bicycling, public transit, and motorists.

KCCP OBJECTIVE 6A.1: Establish a community-oriented street design and grid layout system that enhances circulation of the existing commercial and residential areas, and areas of future growth.

KCCP Policy 6A.1.2: Establish a grid street pattern for new growth areas to enhance traffic flow through the entire community and channel traffic to key intersections along Highway 41.

KCCP OBJECTIVE 6A.2: Enhance pedestrian and bicycle access and safety through the use of Traffic Calming Street Design Measures.

KCCP Policy 6A.2.1: Adopt traffic calming street design standards into the Kings County Public Works Improvement Standards to make available “Pedestrian Friendly” street design alternatives along community streets.

KCCP Policy 6A.2.2: Seek “Safe Routes to School” funding to implement traffic calming features at key intersections that elementary school children use during the school year to reduce traffic speeds and increase safety.

KCCP Policy 6A.2.3: Integrate traffic calming street designs into the construction of new community streets where feasible to maximize traffic circulation and promote speed reduction in residential areas, commercial areas, and along parkways.

KCCP OBJECTIVE 6A.3: Provide maximum connectivity for motorists, pedestrians, and bicyclists throughout the planning area.

KCCP Policy 6A.3.1: Enhance multi-modal street connectivity to increase resident accessibility throughout the community and to the Downtown Commercial Area.

KCCP Policy 6A.3.2: Establish multi-use bicycle/pedestrian pathways in new growth areas unless non-motorized uses are prohibited or there is no identifiable need now and in the future.

KCCP Policy 6A.3.3: Plan for a multi-use bicycle/pedestrian pathway extending from Ninth Street to the Highway Commercial Area.

KCCP OBJECTIVE 6A.4: Establish truck and trailer vehicle overnight parking areas and designate specific truck routes within the community.

KCCP Policy 6A.4.1: The Highway Commercial Area shall have designated truck parking and allow unlimited truck access.

KCCP GOAL 6D: Facilitate managed highway traffic flows and improved safety for motorists and pedestrians.

KCCP OBJECTIVE 6D.1: Enhance the SR 41 corridor to allow safe and efficient traffic flows while also providing neighborhood street accessibility and accommodating the community’s need for heightened pedestrian safety at key highway crossings.

KCCP Policy 6D.1.1: Pursue design alternatives with Caltrans for the State Route 41 right of way at the General Petroleum Avenue/State Route 41 intersection within the Residential Area to increase safety for elementary school children and other pedestrians crossing the highway.

KCCP Policy 6D.1.2: Work with Caltrans to improve State Route 41 connections to local streets, through improvements to through streets, traffic signs, and other community safety features.

KCCP Policy 6D.1.3: Pursue signalization of the intersection at General Petroleum Avenue and State Route 41 once Planned Growth Phase C is ready to develop. [12]

[12] The three phases planned for future growth in Kettleman City are based on future growth projections to 2035. Once each phase has reached 60% of buildout, development is expected to shift to the new phase area. Phase A is located immediately north and west of the existing residential area. Phase B is located to the southwest and north of Phase A. Phase C is located east of the existing residential area. Phase or Area A is expected to yield 320 units. Phase or Area B is expected to yield 1,164 units. Phase or Area C is expected to yield 1,648 units.

Pedestrian and vehicle traffic levels will have substantially increased after Growth Phase Areas A and B have developed, and with the onset of pending growth occurring in Phase C the justification for a signalized intersection may be warranted.

Community Health & Safety

KCCP GOAL 7C: Establish safe routes for pedestrians within the community.

KCCP OBJECTIVE 7C.1: Safety features should be implemented along critical pedestrian crossings with the State Route 41 crossing at General Petroleum Avenue made a priority.

KCCP Policy 7C.1.1: Secure funding through the Kings County Association of Governments, Caltrans, or other grant funds to install traffic calming or other safety features at State Highway 41 and General Petroleum Avenue.

KCCP Policy 7C.1.2: Pursue design alternatives with Caltrans for the State Highway 41 right of way within the Residential Area and the General Petroleum Avenue and highway intersection.

KCCP Policy 7C.1.4: Pursue signalization of the intersection at General Petroleum Avenue and Highway 41 once Planned Growth Phase C is proposed for development.

4.3 - Federal Sustainable Transportation Planning Goals

Federal law designates that metropolitan planning organizations (MPOs) develop long-range transportation plans and transportation improvement programs for their respective regions. Kings County Association of Governments (KCAG) is the MPO for the Kings County area. This same law (23 U.S. Code Section 134)[13] requires that the transportation planning process provide for consideration of projects and strategies that will:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
- Increase the safety of the transportation system for motorized and non-motorized users.
- Increase the security of the transportation system for motorized and non-motorized users.
- Increase accessibility and mobility of people and freight.
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
- Promote efficient system management and operation.
- Emphasize the preservation of the existing transportation system.
- Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.
- Enhance travel and tourism.

[13] https://www.gpo.gov/fdsys/pkg/USCODE-2011-title23/pdf/USCODE-2011-title23-chap1-sec134.pdf

4.4 - State of California Transportation Plan 2040

In June 2016, Caltrans adopted the California Transportation Plan 2040 (CTP)[14]. The CTP represents the State's long-range strategic approach to address California's future transportation trends and opportunities. The CTP has six goals.

- Improve Multimodal Mobility and Accessibility for All People
- Preserve the Multimodal Transportation System
- Support a Vibrant Economy
- Improve Public Safety and Security
- Foster Livable and Healthy Communities and Promote Social Equity
- Practice Environmental Stewardship

4.5 - Kings County 2014 Regional Transportation Plan (RTP)

KCAG is required to develop a comprehensive long-range planning document or Regional Transportation Plan (RTP) every four years. The RTP establishes regional goals and identifies present and future needs, deficiencies, and constraints, and fiscally constrained infrastructure improvements. The RTP discusses the major transportation issues in the Kings County region including state highways, transportation systems management, and transportation control measures.

The RTP represents an accumulation of all the plans and programs adopted by the local agencies, including the cities of Avenal, Corcoran, Hanford, and Lemoore in addition to the unincorporated communities of Kings County. Figure 4-2 illustrates the long-range highway capacity projects.

The 2014 RTP, for the first time, included the newly developed Sustainable Communities Strategy (SCS) in accordance with California Senate Bill 375 (SB 375). SB 375 was developed as an adjunct to help cities and counties reach their greenhouse gas emissions (GHG) reductions mandated by California Assembly Bill 32 (AB 32). The SCS details how the Kings County region will reduce our GHG emissions from passenger vehicle and light duty trucks to achieve the regional reduction targets as set by the California Air Resources Board.

The relevant goals and policies have been organized into the following groups: Overall Goal, Public Participation, Regional Highway System, Transportation System Management, Highway Safety, and Non-motorized Vehicles.

Overall Goal

Goal: To develop a transportation system that encourages and promotes the safe and efficient development, management, and operation of surface transportation systems to serve the mobility needs of people and freight (including meeting the Americans with Disabilities Act requirements, accessible

[14] http://www.dot.ca.gov/hq/tpp/californiatransportationplan2040/Final%20CTP/FINALCTP2040-Report-WebReady.pdf

pedestrian walkways, and bicycle transportation facilities) and foster economic growth and development, while minimizing transportation-related fuel consumption and air pollution.

Public Participation

Transportation facilities and services should meet the needs of all segments of the population. KCAG employs an environmental justice approach to its public participation policy and procedures and welcomes community comment and guidance in its transportation planning and decision-making process.

1. Continue building an active citizen participation forum.

2. Seek representation from the entire community, including the elderly, low income, persons with disabilities, and the census-identified environmental justice areas of Kings County.

3. Hold citizen meetings at convenient times and places.

4. Seek citizen comments early in the planning process, preferably in the problem identification stage of project preparation.

5. Work to create an atmosphere that encourages the expression of all viewpoints, allowing both obvious and latent issues to be brought into the open.

6. Explore alternative methods of obtaining the public's views. Use surveys, make presentations to special interest groups, etc.

7. Keep local media informed of transportation issues and encourage their attendance at public meetings held by KCAG.

Regional Highway System

Goal: Maintain, upgrade and complete a regional system of roadways which is convenient, safe, and efficient, and which serves the needs of all users.

Policy: Support the efforts of the trucking and rail industries to transport commodities safely and efficiently.

Policy: Develop plans to mitigate congestion on local streets and at intersections where heavy truck traffic occurs.

Policy: Improve the existing transportation system to better accommodate bicycles and pedestrians as well as automobiles and trucks; improve public awareness of and competence in bicycle use; and improve public and private sector responsiveness to bicycle and pedestrian transportation.

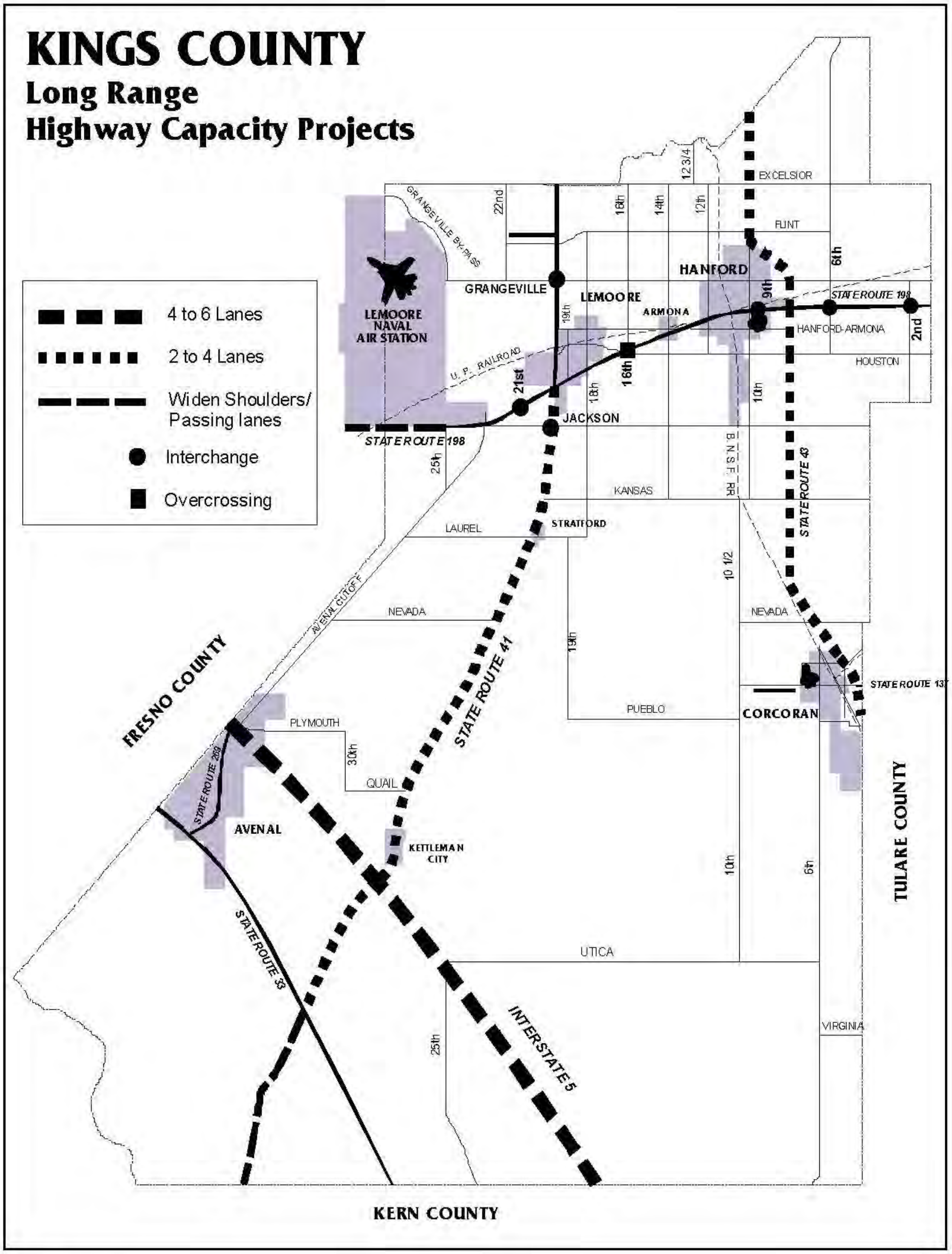
Long-Range Highway Plan Proposal: Increase SR 41 from 2 lanes to a 4-lane expressway from SR 198 to SR 33 (located south of Interstate 5). It should provide an ample system to serve traffic loads expected before the year 2040.

Transportation System Management

Policy: Maintain and improve the quality of the existing transportation system.

Objectives:

1. Shorten the travel time required to move people and goods on the existing system.



Source: KCAG

Figure 4-2
Long Range Highway Capacity Projects

2. Lower travel costs required to move people and goods on the existing system.
3. Increase the safety of the existing system.
4. Improve the personal security of persons using the existing system.
5. Improve the comfort and convenience of the existing system.
6. Enhance the reliability of the existing system.

Highway Safety

Policy: Improve routes of regional significance to promote the safe operation of vehicular traffic, especially during high accident probability times such as times of heavy winter fog, night, etc.

Objectives:

1. Assist night- and especially fog-driving by providing and maintaining highly reflective "fog" or edge striping, and center divider lines on routes of regional significance.
2. Provide adequate shoulder areas on all state highways and rural regional routes.
3. Install traffic control measures on roads and at intersections when such measures are deemed necessary in accordance with the California Manual on Uniform Traffic Control Devices.
4. Improve and maintain regional route road surfaces and drainage.
5. Widen or rehabilitate bridges where needed.
6. Provide adequate railroad grade protection devices.
7. Encourage the enforcement of posted speed limits.

Non-Motorized Vehicles

Policy: Improve the existing transportation system to better accommodate bicycles and pedestrians as well as automobiles and trucks; improve public awareness of and competence in bicycle use; and improve public and private sector responsiveness to bicycle and pedestrian transportation.

Objectives:

1. Provide a well-developed, safe and convenient, intermodally-connected system of bikeways complete with support facilities.
2. Ensure that future development supports and facilitates the expansion, improvement, and maintenance of the bikeway system.
3. Provide on-going bicycle safety education and information programs.
4. Implement bikeways that will connect major employers, educational facilities, and recreational areas.
5. Encourage partnerships between private, non-profit, governmental and citizens groups to implement bicycle and pedestrian improvements.

6. Fund road maintenance that will also provide better roads for bicycles.
7. Correct roadway surface and hazards on bikeways.
8. Provide theft-resistant parking facilities at high-use destinations.
9. Eliminate physical barriers to bicycle travel.
10. Encourage enforcement of bicycle traffic laws.
11. Keep the freeway sections of State Route 198 closed to bicycles to prevent children from playing on the freeway.
12. Start public awareness programs to increase acceptance of the bicycle.
13. Integrate bicycle and pedestrian considerations into local planning agendas.
14. Encourage local jurisdictions to implement complete streets and other multi-modal concepts as outlined by the California Complete Streets Act of 2008 (AB 1358), as well as Caltrans Deputy Directive 64-R1 (DD-64-R1).
15. Encourage the use of bicycle and pedestrian modes of transportation to enhance air quality and improve human health.
16. Implement the projects identified in the current "Kings County Regional Bicycle Plan".

4.6 - Kettleman City Safety and Community Study

The Kettleman City Safety and Community Study was prepared between 2009-2010 with the goal of increasing transportation safety within the community. It was funded by a Caltrans Environmental Justice Planning Grant. The Safety and Community Study was developed using information from the recently completed Kings County General Plan Update and the Kettleman City Community Plan. This community-based study identified improvements in the community to General Petroleum Avenue and SR 41 adjoining the residential areas of Kettleman City. The overall goal of the improvements on General Petroleum Avenue were to provide phased, improved facilities for all modes of travel on what is proposed to be the major east-west street in the community. These improvements included:

- wider sidewalks with shade trees
- sidewalk bulb-outs at marked crosswalks
- traffic calming features
- a student plaza area in place of the current bus turnout

One purpose of the Study was to direct the students to routes that best take advantage of the proposed improvements along General Petroleum Avenue. The proposed hierarchy of travel to school will be to travel east-west to the nearest north-south street which most directly provides access to General Petroleum Avenue via marked crosswalks. Crossings in front of the school would also be consolidated to reduce conflicts and take advantage of the teachers acting as crossing guards at General Petroleum and 8th Street. The student drop-off and pick-up area is located just east of 8th Street on General Petroleum Avenue.

To improve the existing roadway and pedestrian facilities in the study area, community members and government leaders came together to develop a plan to provide for the ease of travel for vehicles, bicyclists, and pedestrians and to promote smart growth principles such as slower travel speeds, enhanced pedestrian facilities and access locations, and improved bike facilities.

The Kettleman City Safety and Community Study concluded with the following proposed improvements:

- Three (3) travel lanes with raised median along SR 41
- Five (5) travel lanes with raised median along SR 41
- Construction of the Town Center Drive intersection midway between 25th Avenue and General Petroleum Avenue.
- Construction of the North Street intersection approximately 1,000 feet to 1,200 feet north of Milham Avenue.
- Access limitations on Standard Oil Avenue and Edward Street.
- Integration of transit stops throughout Kettleman City.
- Parallel parking facilities along SR 41.
- Implementation of Class I and Class II bike facilities in the study area.
- Improved pedestrian facilities
    - Construction of sidewalk facilities
    - Addition of marked crosswalks in the study

4.7 - SR 41/Bernard Drive and Ward Drive Traffic Impact Study

The study prepared by Yamabe & Horn Engineering, Inc. in October 2011 made the following findings and recommendations relative to two intersections within the commercial area of Kettleman City – SR 41 and Bernard Drive and SR 41 and Ward Drive. The study was prepared to assess the impacts of development of the proposed SR 41 and Bernard Drive Commercial Project to the transportation facilities near the Project. The study recommended that a left-turn pocket for the westbound approach of Bernard Drive at SR 41 be installed.

4.8 - Draft Traffic Impact Analysis: Kettleman City Commercial Phase 2 at the Southeast Corner of Bernard Drive/Ward Drive

This Traffic Impact Analysis was prepared in October 2014 by JLB Traffic Engineering, Inc. to evaluate the development of a 72-room hotel, 6,400 square feet of general shopping center, and two fast food restaurants and its impact on traffic on the study intersections in the area. The Analysis recommended the following improvements be made by the Year 2035:

- Intersection of SR 41 / Bernard Drive: Modify the intersection geometrics and modify the traffic signal to accommodate the added lanes and recommended traffic signal phasing.

CHAPTER 5 SUMMARY OF PLANNING PROCESS

5.1 - Smart Growth Planning Process

One of the underlying goals of the 2035 General Plan Update for Kings County is to integrate smart growth principles and compact centralized growth in the County's four unincorporated communities, where the County is most likely able to accommodate future unincorporated urban growth demands. Detailed community plans were developed for each community district to foster sustainable community strategies that are locally defined and unique to each respective community's resources and constraints. Common themes reflected in the community district land use changes are centered on downtown revitalization, alternative transportation mode accessibility, and other quality of life enhancements.

5.2 - SAN Joaquin VALLEY SMART GROWTH PRINCIPLES

The San Joaquin Valley Blueprint was a Valley-wide planning effort involving the eight Councils of Governments, including Kings County Association of Governments. As part of that process, 12 Smart Growth Principles were adopted for the Valley. Smart growth principles represent the core values of the San Joaquin Valley and can be used as the basis for planning and implementation of the proposed transportation improvement strategies identified in the SGCIP. The smart growth principles establish a benchmark for related decision-making and guidance. Decision-making for the proposed improvement strategies include the following adopted San Joaquin Valley smart growth principles:

- **Create a range of housing opportunities and choices**
- **Create walkable neighborhoods**
- **Encourage community and stakeholder collaboration**
- **Foster distinctive, attractive communities with a strong sense of place**
- **Make development decisions predictable, fair, and cost-effective**
- **Mix land uses**
- **Preserve open space, farmland, natural beauty, and critical environmental areas**
- **Provide a variety of transportation choices**
- **Strengthen and direct development towards existing communities**
- **Take advantage of compact building design Enhance the economic vitality of the region**
- **Support actions that encourage environmental resource management**

5.3 - Planning Using Caltrans Local Roadway Safety Manual

The planning process using Caltrans Local Roadway Safety Manual analyzes roadway networks with the goal of yielding the best overall safety benefits. A wide range of data sources to get an overall picture of the safety needs is considered. The following sources were used:

1. State (SWITRS)[15] and local crash databases
2. SafeTREC's TIMS website (or locally preferred mapping software)
3. Law enforcement crash reports
4. Visual field assessments and informal sources
5. Citizen identification of safety concerns

Examining crash history will help practitioners identify locations with an existing roadway safety problem and identify locations that are susceptible to future roadway crashes. In addition to location identification, this data can provide information regarding crash causation that ultimately provides insight into identifying potentially effective countermeasures. Chapter 8 lists the various likely safety countermeasures identified by Caltrans that could be applied to the SGCIP.

5.4 - Complete Streets Planning Process

A Complete Street is a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit riders, and motorists – appropriate to the function and context of the facility. Identification of complete streets and multimodal improvements on state highway routes are included in the planning process.

Caltrans provides for the needs of travelers of all ages and abilities in all planning, programming, design, construction, operations, and maintenance activities and products on the State highway system. The department views all transportation improvements as opportunities to improve safety, access, and mobility for all travelers in California and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system.

Caltrans develops integrated multimodal projects in balance with community goals, plans, and values. Addressing the safety and mobility needs of bicyclists, pedestrians, and transit users in all projects is implicit. Bicycle, pedestrian, and transit travel is facilitated by creating "complete streets". Throughout California and America, the movement to build "complete streets" will allow people to get around safely, even when they aren't inside a car. Conventional street design promotes traffic congestion, pollution, and collisions, and discourages physical activity. Complete streets, on the other hand, are designed and built so that people of all ages and abilities can travel easily and safely. Street design and land use policies that plan for complete streets and allow people to get around safely on foot, bicycle, or public transportation is now required by law.

The California Global Warming Solutions Act of 2006 (known as AB 32) sets a mandate for the reduction of greenhouse gas emissions in California, and the Sustainable Communities

[15] California's central repository for storing crash data, Statewide Integrated Traffic Records System (SWITRS) is a comprehensive data source for doing roadway safety analysis that includes nearly all public roads in the database except roads on tribal lands. SWITRS information is available to California's local agencies.

and Climate Protection Act of 2008, SB 375, requires emissions reductions through coordinated regional planning that integrates transportation, housing, and land-use policy, and achieving the goals of these laws will require significant increases in travel by public transit, bicycling, and walking. State and federal laws require Caltrans and local agencies to promote and facilitate increased bicycling and walking.

In the planning process and implementation of complete street projects, Kings County shall maintain sensitivity to local conditions and needs in both residential and business districts and shall work with residents, merchants, and other stakeholders to ensure that the needs of motorists, pedestrians, bicyclists, transit users, and the transporting of goods are met.

Many options for developing safe, accessible, and functioning complete streets that improve multimodal mobility, support a vibrant economy, improve safety, foster a healthy and livable community, and promote social equity will be met. Depending upon local conditions and needs, improvements to be considered may include travel lanes that accommodate motorists, transit, and commercial vehicles, shared use paths, bicycle lanes, bicycle routes, paved shoulders, traffic signals, traffic calming measures, street trees and landscaping, planting strips, accessible curb ramps, crosswalks, refuge islands, pedestrian signals, signs, bicycle parking facilities, public transportation stops, bridge improvements, and other features assisting in the provision of safe travel for all users.

Chapter 8 identifies potential improvement strategies that would include improvements for safe mobility, pedestrians, bicyclists, traffic calming, crosswalks and pedestrian signals, bridge improvements, and other improvements considered in the Complete Streets Planning Process.

CHAPTER 6 FUTURE PROJECTIONS ON EXISTING BUILT ENVIRONMENT

6.1 - Land Use Projections

Table 6-1 lists the land uses planned for the Kettleman City area, including the residential neighborhoods, the Highway Commercial Area north of Interstate 5 and along both sides of SR 41, and the industrial development along 25th Avenue.

Table 6-1
Projected 2035 Land Use and Population[16]

Land Use	Acreage / Population
Residential	258.6
Commercial	208.0
Industrial	303.1
Mixed Use	7.4
Public/Quasi Public	38.6
Open Space/Natural Resources	43.0
Total	**858.7 acres / 9,326 persons**

The Community Plan calls for an 8.5-acre area immediately south of the County Fire Station and west of State Route 41 to be designated as the downtown mixed-use core area for the community. The downtown commercial core may eventually house a grocery store, mixed use with affordable housing component, laundromat, pharmacy, a central public square, and "family-oriented businesses".

Nearly seventy percent (70%) of the Highway Commercial Area is currently developed. However, numerous vacant commercial lots still exist within this area. As future residential and commercial growth occur, expansion of this area may be necessary to accommodate additional revenue-producing commercial growth that will act to provide jobs, economic value, and increase tax revenue for the community.

Residential land uses would include a combination of single-family detached and multifamily residential units. Commercial land uses would include mostly travel-associated uses within the highway commercial zoned area; typical uses include full-service hotels, motels, eating establishments, tourist-oriented retail goods, entertainment, and automobile related service and repair. Some commercial land uses would include neighborhood serving uses adjacent to the residential areas. The Community Plan anticipates mixed uses in the proposed downtown area of Kettleman City. Industrial uses would be located primarily along the 25th Avenue corridor. Currently, Federal Express and XPO Logistics are the only industries located along 25th Avenue. UPS operates a transfer facility on Bernard Drive west of SR 41 in the Highway Commercial Area, and ABF Freight System, regional and long-haul freight LTL (less-than-truckload) shipping services, is also located west of SR 41 along Cyril Place.

[16] Kettleman City Community Plan. County of Kings General Plan, 2009.

The following table identifies the general plan land uses proposed in the 2009 Kettleman City Community Plan. The likely total square feet of commercial and industrial uses and the number of dwelling units that could result using a typical floor-to-area ratio (FAR) or density associated with each land use is identified below.

Table 6-2
Proposed Land Use Projections

Land Use	Acreage	Floor Area Ratio (FAR) / Density	Square Footage / Number of DU's
Residential	258.64	10.4	2,580
Commercial	208.04	.25	2,265,000
Industrial	303.14	.2	2,641,000
Mixed Use	7.41	.25/10	80,000/74
Notes: Commercial includes highway and neighborhood commercial uses.			

Source: Land Use and Acreages: 2009 Kettleman City Community Plan; FAR and Densities: City of Hanford 2035 General Plan Update. Land Use & Community Design Element, October 2015.

6.2 - Future Smart Mobility Evaluation

The Smart Mobility Framework (SMF) provides a mechanism for identifying whether the potential for future growth should inform the types of transportation improvements to be considered (for an Introduction to the Smart Mobility Framework, see Section 3.3.). Kettleman City has been identified as a Rural Town Place Type. However, over time place types can transition because of increased population or new land uses. This section analyzes whether such a transition should be considered when identifying transportation strategies.

The SMF suggests that each Place Type can be in one of two categories, either an Anchored Place or a Transitional Place. Anchored Places are places where the Place Type will likely not change over time. Transitional Places are places that are evolving over time from one Place Type to a different Place Type. Generally, the Rural Town Place Type (the Place Type identified for Kettleman City) can be either an Anchored Place or a Transitional Place.

The Kettleman City Community Plan can accommodate an increase in population up to roughly 9,000 people, a significant increase from roughly 1,400. However, the housing market has yet to show interest in constructing new housing in the community. If the community does grow, the residential growth will occur north, west, and south of the existing residential area that is west of SR 41, or east of the residential area that is east of SR 41 (see Figure 4-1 - Kettleman City Community Plan Land Use Map - Kings County General Plan.)

Even if all planned population growth occurred, the future area would still be best categorized as a Rural Town and not likely to transition to another place type as all the projected growth occurs. Known as an Anchored Place, Kettleman City will remain as their present place type. Ranking on the Smart Mobility factors may change somewhat but will not vary significantly over time. Investment emphasis in anchored places is most often focused on maintenance and enhancement to maximize smart mobility benefits.

In this instance, proposed transportation strategies may not likely depend on future land use patterns. As an example, transportation strategies to realign future intersections based on future planned development can ensure that problems are resolved before they occur. Based upon this evaluation, the transportation strategies identified in Chapter 8 consider future land use patterns in addition to the existing patterns.

CHAPTER 7 SAFETY ANALYSIS

7.1 - Collision Data

The Statewide Integrated Traffic Records System (SWITRS) is an online database[17] maintained by the California Highway Patrol (CHP) that collects and processes data gathered from a collision scene. The SWITRS processes all reported fatal and injury collisions that occurred on California's state highways and all other roadways, excluding private property. There are a variety of standardized reports that also meet pre-selected criteria as determined by the CHP. Collision data are important to the identification of SR 41 transportation strategies and the successful pursuit of federal, state, and local funding. The following table summarizes the collisions that have been recorded. The locations of the collisions are identified in the Traffic Technical Report in Appendix A. Recent collisions may have not yet been recorded by SWITRS.

Table 7-1 summarizes collision data for the Study Area obtained from the Transportation Injury Mapping System (TIMS), which uses data from the Statewide Integrated Traffic Records System (SWITRS) between 2007-2016, the most recent years available.

Table 7-1
Collision Data (2007-2016)

Total Collisions	Fatalities	Injuries	Pedestrian or Bicycle Related
180	3	81	3

Primary Collision Factor (Top 3)			Collision Type (Top 3)		
Unsafe Speed	Improper Turn	Right of Way	Read End	Broadside	Sideswipe
28%	18%	14%	35%	22%	21%

For collision breakdown by location, see Appendix A - Smart Growth SR 41 Corridor Improvement Plan: Traffic Technical Report. The top six highest frequency of collisions have occurred at or near the intersections shown Table 7-2 below.

Collision prevention is a crucial factor in assessing a roadway improvement strategy's benefit and associated priority. The collisions shown above were factored into the prioritization of the infrastructure improvement strategies.

[17] SWITRS can be accessed at: http://iswitrs.chp.ca.gov/Reports/jsp/CollisionReports.jsp

Table 7-2
Collision Frequency – Top 6 Locations (2007-2016)

Intersection	Number of Collisions
I-5 Ramps	60
Bernard Drive	40
25th Avenue	17
Ward Drive	15
Milham Avenue	10
Standard Oil Avenue	7

CHAPTER 8 EVALUATION OF CONSTRAINTS

8.1 - SR 41

The community faces substantial challenges with the Residential Area split by SR 41 and other traffic generated at and near the interchange with Interstate 5. Kettleman Elementary School is located on the west side of the highway, which often requires that students living east of SR 41 cross at intersections that provide little to no warning for drivers to slow down.

Although the SR 41 speed limit through the residential area is posted at 45 mph, highway travelers heading between the Valley and the Coast often travel at speeds faster than the posted speed limit. Kettleman City does not meet the requirements for signalization for pedestrian and vehicular traffic as required by the California Manual on Uniform Traffic Control Devices (MUTCD). Currently, only a marked crosswalk and school crossing warning sign alert drivers at the General Petroleum Avenue and SR 41 intersection. In addition, advanced pavement markings indicate that a school crossing is approaching. Law enforcement, school officials, and residents have expressed safety concerns at this location.

8.2 - Street Lighting

Currently, there is limited street lighting in the residential areas of town; Kettleman City has only one street light for every intersection along SR 41, except 9th Avenue – approximately one street light every 375-feet. Lighting also alerts motorists to the presence of pedestrians and/or bicyclists in an area and reduces headlight glare. Existing street lighting in the Highway Commercial Area is provided by adjacent businesses, not by lighting within the street rights of way.

8.3 - California Aqueduct

Residents in the Residential Area currently use a remote route through the fields to the southwest of their neighborhood, over a bridge across the aqueduct, and through the Chevron utility area to reach the Highway Commercial Area. Crossing the aqueduct along SR 41 at the bridge crossing can be hazardous to both pedestrians and bicyclists who share the bridge with fast-moving vehicles.

8.4 - Lack of Walkability and Bikeability Infrastructure

The Residential Area has limited walkability infrastructure. Currently, residents have no means of walking or biking to the Highway Commercial Area or the industrial area along 25th Avenue. Sidewalks are wide in the Highway Commercial Area, but many intersections lack ADA ramps west of SR 41. Certain sections of Hubert Way, Cyril Place, and Powers Drive lack sidewalks. Many frequently used destinations, such as stores, restaurants, other businesses, and public facilities, have limited or no bicycle parking. There are no bikeways along SR 41 or any of the streets in either the residential neighborhood or the Highway Commercial Area

8.5 - Truck and Trailer Parking

Trucks park in various areas throughout the community, including the Residential Area and the Highway Commercial Area. This creates aesthetic problems, roadway blockages, and reduced parking options for other motorists. Some of these trucks may belong to local residents, but diesel trucks can be disruptive to the community. Health studies show that exposure to diesel exhaust primarily affects the respiratory system and worsens asthma, allergies, bronchitis, and lung function, and there is some evidence that diesel exhaust exposure can increase the risk of heart problems, premature death, and lung cancer[18]. Designated truck and trailer parking areas could help alleviate the problems.

8.6 - Economic Development

XPO Logistics (formerly Con-way) at the intersection of SR 41 and 25th Avenue

The community lacks sufficient economic development activity to support existing and future residents of the community. The October 2017 unemployment rate for Kettleman City was 7.4%[19], approximately 3 percentage points above the state's average. Major employment industries in Kettleman City are currently based in agriculture and commercial services. However, the lack of non-agricultural and non-service jobs leads many young residents to move away from the community to find other employment opportunities. Others must travel to other cities such has Hanford and Lemoore. To support the local labor force, the community needs additional business investments along with workforce training opportunities to maintain long-term economic stability of the community. Only two industries are located along 25th Avenue, XPO Logistics and Federal Express. An abundance of vacant land here represents great economic development opportunities for additional transfer facilities.

8.7 - Transfer Facilities

Besides the truck transfer facilities located on SR 41 and on 25th Avenue, there are transfer facilities located within the Highway Commercial Area. Some facilities have outgrown their current location and are using the public streets as an overflow parking area. Local business owners view the truck congestion as a negative impact to their businesses.

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[18] https://www.arb.ca.gov/research/diesel/diesel-health.htm
[19] http://www.homefacts.com/unemployment/California/Kings-County/Kettleman-City.html

CHAPTER 9 IDENTIFICATION OF TRANSPORTATION STRATEGIES

This chapter suggests possible transportation improvement strategies that may improve the efficiency and effectiveness of the SR 41 corridor in Kettleman City. We have determined several viable options for solutions to roadway congestion, improved transportation choices, and improved safety. Infrastructure construction, traffic control, increased enforcement, and traffic calming may help improve circulation, economic development, and safety. Based on all the information and input described in previous sections of this study, several potential transportation strategies and their alternative solutions are described in the paragraphs that follow. These strategies are illustrated in Figures 9-1 and 9-2.

The improvement strategies take into consideration the plans, studies, and recommendations that have preceded this study. The proposed improvement strategies complement and are compatible with previous specific recommendations, which are described below:

The *Kettleman City Safety and Community Study* and the *Kettleman City Community Plan* (see Section 4.2 and 4.6) identify the following strategies:

- A multi-use pathway linking the Residential Area to the Highway Commercial Area.
- Overnight truck and trailer parking and designated truck routes within the community.
- Pedestrian safety features at General Petroleum Avenue and SR 41.
- Traffic calming or other safety features at State Route 41 and General Petroleum Avenue.

The *Kettleman City Safety and Community Study* (see Section 4.6) also recommends the construction of new intersections at SR 41 with North Avenue and Town Center Drive. These roadways have not been constructed and should ultimately be developer funded improvements.

Previous recommendations from the two traffic impact analyses prepared by JLB and Yamabe & Horn traffic planning consultants recommended improvements at the Bernard Drive and SR 41 intersection (see Sections 4.7 and 4.8.) The recommendations for improvements were based on future development east of SR 41 in the Highway Commercial Area and a 20-year horizon.

9.1 - Transportation Improvement Strategies

The following transportation improvement strategies have been identified by "Publicly-funded Strategies", "Developer-funded Strategies" or "Rejected Strategies". Each strategy, except the "Rejected Strategy" includes a recommended improvement strategy and alternatives to the recommendation. When an alternative is identified as "None", the

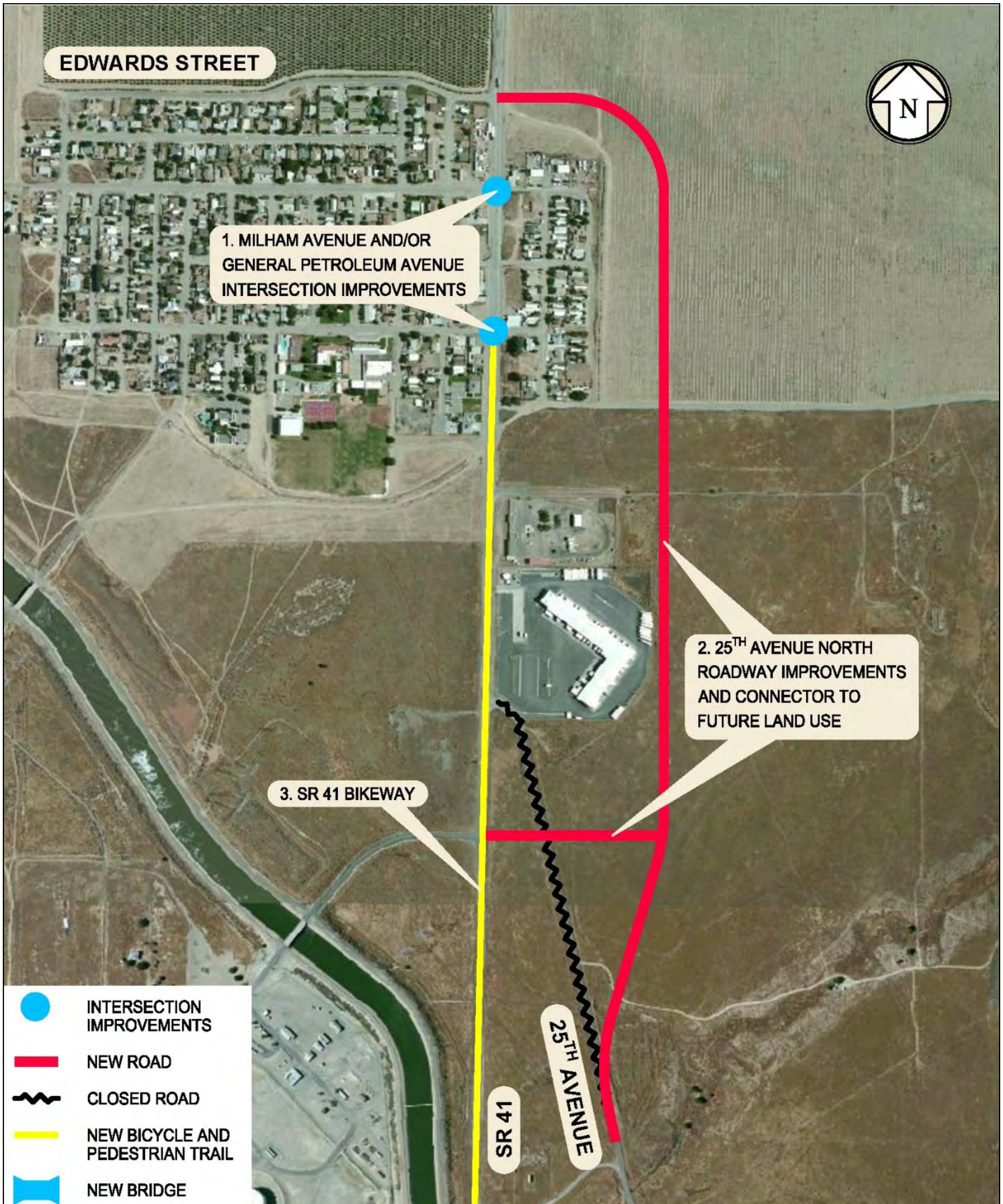

Figure 9-1
Proposed Improvements - North

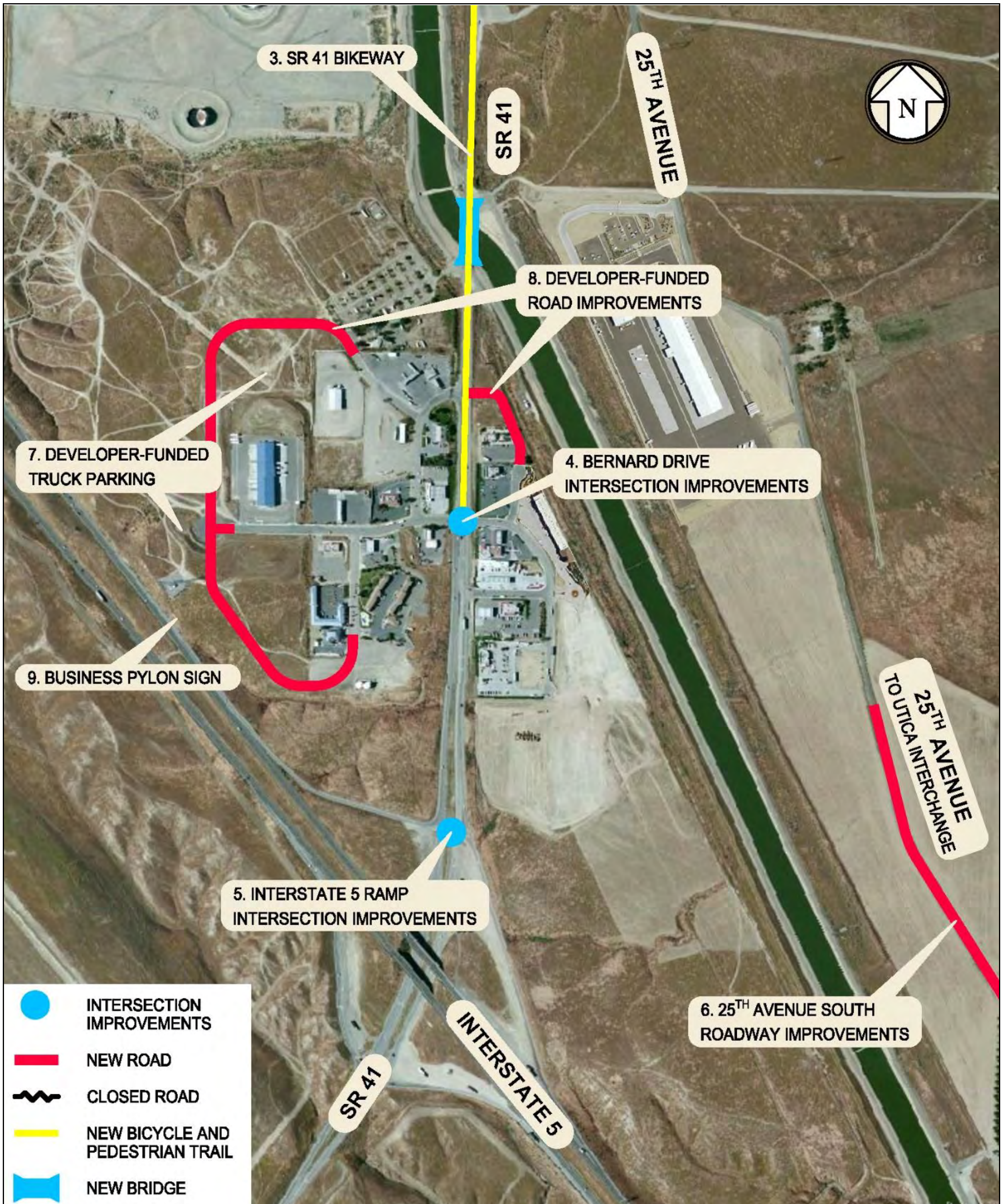

Figure 9-2
Proposed Improvements - South

alternative strategy implies that the existing condition, though not preferred, is the alternative to the recommended strategy. For the "Rejected Strategy", the strategy was initially considered, but early analysis and discussions rejected it from being carried forward as a recommendation.

9.1.1 - Publicly-funded Strategies

1. **Milham Avenue and/or General Petroleum Avenue Intersection Improvements.** According to the 2009 Community Plan, the population in Kettleman City is likely to reach between approximately 6,000 and 7,000 by 2027 and more than 9,000 by 2035. Milham Avenue and General Petroleum Avenue are the primary intersections for both vehicles and pedestrians to cross SR 41. Improvements at these intersections are recommended as the population in Kettleman City grows and the increased traffic along the SR 41 corridor and the crossing warrants it.

   Alternative(s): (a) Single-lane roundabouts. (b) Traffic signals. (c) Solar flashing pedestrian crossing beacon at General Petroleum Avenue – the beacon was suggested as a traffic calming solution in the Kettleman City Community Plan. (d) Ridged roadway surfaces – also suggested as a traffic calming solution in the Kettleman City Community Plan.[20]

2. **25th Avenue North Roadway Improvements and Connector to Future Land Use.** Re-routing the existing 25th Avenue alignment to the east of the XPO Logistics property and extending it north to intersect with SR 41 at Edwards Street is another solution to reducing congestion along the corridor. Industrial trucks traveling to and from the north could be entirely re-routed around the commercial and Residential Areas. This realignment is also consistent with the land use and circulation policies in the Kettleman City Community Plan that plan for adjacent land to develop.

   Alternative(s): None.

The marked and signed crosswalk at SR 41 and General Petroleum Avenue.

[20] While ridged roadway surfaces are a viable alternative, they are not analyzed in detail because this strategy not listed as a quantifiable countermeasure by Caltrans.

3. **SR 41 Class I Bikeway.** A path that links the Residential Area to the Highway Commercial Area for approximately one-and-a-quarter miles may be considered. The path would connect to existing sidewalks within the commercial area. A bicycle bridge would need to be installed where the path crosses the aqueduct. New development should provide for a percentage of on-site bicycle parking spaces in addition to vehicle parking spaces in commercial areas.

SR 41 as it crosses the aqueduct

   Alternative(s): (a) Class IV bikeway. (b) New bridge to accommodate both bikeway(s) and vehicular traffic.

4. **Bernard Drive Intersection Improvements.** This intersection has been identified as a highly congested intersection during summer weekends and busy holidays.

   Alternative(s): (a) Dual-lane roundabout. (b) Additional traffic lanes.

The intersection of SR 41 and Bernard Drive looking east

5. **Interstate 5 Ramp Intersection Improvements.** The County may wish to pursue improvements to the Interstate 5 northbound exit ramp with Caltrans.

   Alternative(s): (a) Dual-lane roundabout at SR 41. (b) Traffic signal.

6. **25th Avenue South Roadway Improvements.** Trucks and other vehicles using 25th Avenue could also use the Utica Road interchange to access Interstate 5 and thus avoid the SR 41 traffic. To accommodate the increased traffic, the roadway would need to be reconstructed.

   Alternative(s): None.

9.1.2 - Developer-funded Strategies

7. **Developer-funded Truck Parking.** Trucks often park along local streets, causing unsafe conditions and increased congestion in the Highway Commercial Area as well as the Residential Area. Overnight parking facilities for trucks should be considered. Multiple locations were identified in the Kettleman City Community Plan on the west side of SR 41 – one at the west end of Bernard Drive and a second location adjacent to Cyril Place (see red-outlined area sourced from the Community Plan shown in adjacent photo). In addition, the County should restrict truck parking in Kettleman City Residential Area (except when making quick delivery of merchandise or other goods) and propose routes where no trucks are permitted.

Potential truck and RV parking locations

   Alternative(s): (a) Coordinate with law enforcement to enforce parking violations. (b) Develop overnight truck parking areas away from residential areas.

The following transportation improvement strategies may occur independently from improvements identified in the publicly-funded list of potential transportation strategies that follow. In addition, new developers would likely contribute to funding for some of the Publicly-funded Strategies, such as "fair share" portions of traffic signal, roundabout, and/or road widening costs.

8. **Developer-funded Road Improvements.** As new businesses arrive in the area and existing businesses expand, streets, sidewalks, and other associated transportation improvements will need to be constructed to meet the needs of vehicular and pedestrian traffic. Businesses will have the responsibility to construct or improve existing roadways for their customers, employees, and service vehicles. The Kings County General Plan Circulation Policy C-A1.3.5 states that "new development shall be required to pay its fair share of costs for street and traffic improvements based on traffic generated and its impact to traffic levels of service".

   Alternative(s): No alternative actions. As new business arrives to the area, the County requires that they construct new roadways to support new development.

9. **Business Pylon Sign.** Business owners and the Kettleman City Chamber of Commerce have discussed the need for a pylon sign along Interstate 5 that identifies local businesses and attracts the traveling public.

Alternative(s): Business owners can decide not to pursue.

9.1.3 - Rejected Strategies

New Roadway and Bridge over the 25th Avenue Aqueduct. A potential solution to reducing congestion on SR 41 was to direct industrial truck and employee traffic to 25th Avenue directly from the Interstate 5 northbound exit ramp. The two-lane roadway would provide for an alternate route to the current SR 41 heavily used corridor. However, opposition from Caltrans, poor reception from the public at outreach meetings, and the anticipated cost of a new bridge over the canal influenced the decision to not recommend the strategy. Caltrans did not support this potential solution because it would require either a new street connection to SR 41 that would be too close to the 1-5 northbound off-ramp, or it would require the I-5 northbound off-ramp to exit onto the new street instead of exiting directly to SR 41.

9.2 - Potential Caltrans Local Roadway Safety Countermeasures

"Caltrans strives to reduce collisions while providing a safe, sustainable, integrated and efficient transportation system. To accomplish this goal, high collision concentration locations are systematically investigated to determine if measures can be taken to improve safety. The Program of State Highway Safety Improvement Projects is a system that ensures that the limited funds available for upgrading existing roadways on the [State Highway System (SHS)] will be spent at locations where the expenditure will result in the greatest benefit to the highway user. To be eligible for [Highway Safety Improvement Program] (HSIP) funds, all highway safety improvement projects must:

1. Address a [Strategic Highway Safety Plan (SHSP)] priority
2. Be identified through a data-driven process, and
3. Contribute to a reduction in fatalities and serious injuries

HSIP funded projects are typically stand-alone safety projects that utilize low-cost proven safety countermeasures at high concentration collision areas or locations with potential for safety improvement. A random sample of safety projects showed that 90% of capital funds are directly related to the safety improvement."[21]

Local Roadway Safety – A Manual for California's Local Road Owners, Version 1.3 published April 2016 by Caltrans,[22] outlines countermeasures for reducing traffic collisions. The proposed strategies outlined in this study are matched with the associated Crash Reduction Factors (CRF) listed in the manual, if applicable. Table 9-1 indicates associated countermeasures, if applicable, for each strategy. The CRF may be used to contribute to each strategy's benefit and prioritization, addressed in Chapters 9 and 10, respectively.

[21] *California Highway Safety Improvement Program*, published by Caltrans in 2017. http://www.dot.ca.gov/trafficops/hsip/docs/ca-hsip-2017.pdf
[22] http://dot.ca.gov/hq/LocalPrograms/HSIP/2016/CA-LRSM.pdf

Table 9-1
Caltrans Countermeasures

	Improvement Strategy	Associated Countermeasure Number	CRF	Notes
1a	Milham Avenue Traffic Signal	NS3	25%	
	Milham Avenue Roundabout	NS4B	Varies	
1b	General Petroleum Avenue Traffic Signal	NS3	25%	
	General Petroleum Avenue Roundabout	NS4B	Varies	
	General Petroleum Avenue Flashing Beacon	NS18	10%	Calculated from the difference of NS17 and NS18, based on adding enhanced safety features to the existing crossing
2	25th Avenue North and Connector	-	-	No countermeasure identified in the manual
3	Class I Bikeway and New Bridge	R37	80%	
	Class IV Bikeway and Bridge Widening	R36	35%	
4	Bernard Drive Roundabout	S18	Varies	
	Bernard Drive Additional Lanes	S14 and S16	-	S14 and S16 are listed as obsolete in the manual, so CRF's are not included
5	I-5 Ramp Traffic Signal	NS3	25%	
	I-5 Ramp Roundabout	NS4B	Varies	
6	25th Avenue South	-	-	No countermeasure identified in the manual

7	Developer-funded Truck Parking	-	-	Not applicable
8	Developer-funded Road Improvements	-	-	Not applicable
9	Business Pylon Sign	-	-	Not applicable

CHAPTER 10 BENEFIT COST ANALYSIS AND PRIORITIZATION OF PROPOSED STRATEGIES

10.1 - Opinion of Probable Costs

Strategies expected to be financed with public funds were fiscally evaluated and are shown below in Table 10-1. The amounts shown are planning-level in nature and utilize present-day costs. Because this is planning-level cost estimate, a higher-than-normal contingency of 20% was used. Ancillary costs include engineering, environmental studies, construction management, and right of way acquisition, and are assumed to be 40% of the construction cost.

Table 10-1
Opinion of Probable Costs

		Construction Costs	Ancillary Costs	Total Costs
1a	Milham Avenue Traffic Signal	$450,000	$180,000	$630,000
	Milham Avenue Roundabout	$3,650,000	$1,460,000	$5,110,000
1b	General Petroleum Avenue Traffic Signal	$450,000	$180,000	$630,000
	General Petroleum Avenue Roundabout	$3,650,000	$1,460,000	$5,110,000
	General Petroleum Avenue Flashing Beacon	$84,000	$33,600	$117,600
2	25th Avenue North and Connector	$4,200,000	$1,680,000	$5,880,000
3	Class I Bikeway and New Bridge	$3,700,000	$1,480,000	$5,180,000
	Class IV Bikeway and Bridge Widening	$2,560,000	$1,024,000	$3,584,000
4	Bernard Drive Roundabout	$3,650,000	$1,460,000	$5,110,000

		Construction Costs	Ancillary Costs	Total Costs
4	Bernard Drive Additional Lanes	$840,000	$336,000	$1,176,000
5	I-5 Ramp Traffic Signal	$450,000	$180,000	$630,000
	I-5 Ramp Roundabout	$3,650,000	$1,460,000	$5,110,000
6	25th Avenue South	$11,200,000	$4,480,000	$15,680,000
7	Developer-funded Truck Parking	N/A	N/A	N/A
8	Developer-funded Road Improvements	N/A	N/A	N/A
9	Business Pylon Sign	N/A	N/A	N/A

10.2 - *Benefit Metric Strategies*[23]

To effectively prioritize the proposed transportation strategies identified in Section 9.1, clear metrics for improvement strategy success should be identified and met. Transportation clear metrics consist of a set of goals and measurable objectives - measurable criteria that are used to help prioritize the proposed transportation improvements. The metrics for each strategy may include, for example, changes in transportation-related injuries and fatalities, air quality, and number or percent of system users using or offered various modes of travel. Measures appropriate to rural areas, such as Kettleman City, may not be the same as the situations for urban and metropolitan areas.

Table 10-2 describes the metrics, goals, and objectives used to prioritize the proposed transportation strategies. A **goal** is general in nature and characterized by a sense of timelessness. It is something desirable to work toward, the result for which effort is directed. An **objective** is a specific action to achieve the associated goal. The scale by which the attainment of a goal is measured is defined as a **metric**. These goals, objectives, and the subsequent metrics include: safety, nondiscrimination/social justice, air quality, environmental issues, data, public involvement, economic development, and sustainability. While not a benefit, goals and objectives of fiscal constraints are also included as a metric.

[23] https://www.dir.ca.gov/
http://www.dot.ca.gov/perf/library/pdf/Caltrans_Strategic_Mgmt_Plan_033015.pdf
https://www.epa.gov/sites/production/files/2014-01/documents/sustainable_transpo_performance.pdf
http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SMF_Handbook-TAC_Draft_5-23-09%20v4.pdf

Table 10-2
SR 41 Benefit Metrics

Metric	Goal	Objective
Safety	Improved safety on SR 41 and adjacent roadways.	The number of transportation-related deaths and serious injuries is reduced.
		The dollar losses from high-consequence, reportable transportation incidents and their related costs is reduced.
		An efficient street and highway network is maintained and managed.
		The strategy promotes walkability and bikeability and trails, bike lanes, sidewalks, transit, and multi-modal amenities are planned or provided.
		Effective ingress and egress for emergency vehicles.
		Safer routes for school children.
Nondiscrimination/ Social Justice	Integration of social equity concerns into transportation decisions and investments.	Cost-competitive transportation options for all users are offered by making walking, biking, and transit trips readily available, affordable, and competitive compared to the cost of driving.
		The adverse effects of siting, construction, and operation of transportation facilities on the natural environment and communities, particularly disadvantaged communities, is reduced.
		Mobility for people who are economically, socially, or physically disadvantaged is provided.
		Public health for residents and employees resulting from fewer serious collisions, fewer pollutant emissions, and access to more physically-active travel among all population groups is improved.
		Improved accessibility by making walking and biking trips competitive choices.
		People with disabilities and other special needs at public transit facilities, sidewalks and curb ramps, and trails are accommodated.
Air Quality	Reduction in environmental impacts from the transportation system with emphasis on supporting a statewide reduction of greenhouse gas emissions to achieve 80% below 1990 levels by 2050.	Accessibility to the use of transit, carpools, walking, and biking to satisfy travel needs through a shift away from higher-polluting modes is being met.
		Public exposure to toxic pollutants generated by the transportation sector is reduced. The issue of exposure to diesel exhaust is of concern because of its serious health impacts and the rising volume of freight movement.
Environmental Issues	Minimal environmental impacts of the proposed transportation system.	Transportation-related pollutants and greenhouse gases released into the environment are reduced.
		Natural habitat and important agricultural resources are protected from adverse impacts of transportation improvements and associated development.
		Can be implemented without significant mitigation costs and environment assessment.

Metric	Goal	Objective
		Compliance with federal and state air quality standards, including strategies to reduce vehicle miles traveled and GHG.
Data	Utilizes data to identify area-wide transportation issues.	Data and tools needed, including performance measures, are collected, developed, and used.
		Available data used to identify locations where SR 41 collisions occurred.
		Compliance with current General Plan and Community Plan goals and policies
		Cooperation with KART to gather necessary data to determine potential for transit routes and stops in the Kettleman City area.
Public Involvement	Recognition that public involvement is an important part of the regional transportation decision-making process.	An SR 41 transportation improvement plan that has solicited community input.
		Residents, business owners, and other stakeholders are able to gather and meet and express their community's ideas.
		Fiscally and socially responsible community wants and needs are identified and incorporated into a SR 41 improvement plan.
Economic Development	Long-term economic vitality, increased tax revenue, increased job opportunities for the community, and improved freight movement.	Investments in transportation improvements support the economic health of the County, and the welfare of Kettleman City residents.
		Travel distance and travel expenses between housing and job centers in distressed communities are improved.
		The Kettleman City area is made more attractive to passing motorists and business patrons by reducing congestion and improving access to businesses within the Highway Commercial Area as well as the Residential Area.
		Also by providing street trees, landscaping, and street furnishings along local streets so that visitors would be encouraged to walk between businesses.
		Parked trucks, which decrease safety, increase congestion, and detract from the quality of a community's image, are removed from local streets by providing truck parking facilities in the Highway Commercial Area.
		Traffic congestion is reduced and roadway conditions are made safer so that commercial development whether new or existing, may succeed, expand, and grow.
		The economic well-being of the adjacent area is improved, and the number of local job opportunities is increased.
		Mobility and safety for goods movement to support the local economy while maintaining community livability is enhanced.

Metric	Goal	Objective
Sustainability	A well-funded, well-managed, cost-effective, and operational transportation system.	The sustainability and livability of communities through investments in transportation facilities is improved.
		Compliance with Kings County General Plan stating that public safety, retention, efficiency, and maintenance of existing transportation system are important guiding criteria.
		Coordination with Caltrans identifying and maintaining state highway projects.
Fiscal Constraints	A transportation improvement plan that recognizes financial constraints.	Compliance with Kings County General Plan stating that public safety, retention, efficiency, and maintenance of existing transportation system are important guiding criteria.
		Adequate resources for transit and other alternative travel modes is identified.
		Funding sources for community entrance signs that display the Kettleman City "Vista to the Valley" logo is sought. This helps fulfill a policy of the Kettleman City Community Plan.
		Preservation of the existing roadway network is emphasized to the extent possible.
		Available funding sources that will support transportation improvements and maintenance.
		Establishment of a development fee program to collect funds to pay for roadway improvements necessitated by new development.

10.3 - Proposed Improvements and Scoring Using Benefit Metrics

The following ranking method is used to help prioritize the proposed transportation strategies. The evaluation method enables decision makers to more quickly evaluate and rank the proposed transportation improvement strategies. Each strategy is scored by how well it met the metrics indicated in Table 10-2 above – safety, nondiscrimination/social justice, air quality, environmental issues, fiscal constraints, data, public involvement, economic development, and sustainability. Each of the metrics is assigned a number from 0 to 3. The number for each metric is described below:

- 0 – the proposed strategy does not meet the metric
- 1 – the proposed strategy barely meets the metric
- 2 – the proposed strategy satisfactorily meets the metric
- 3 – the proposed strategy strongly meets the metric

Table 10-3 shows the scores for each strategy. Each strategy's benefit is adjusted by its associated cost, rated on a metric from -5 for the most expensive to 0 for the least expensive. Priorities are indicated based on the highest benefit / cost score.

Table 10-3
SR 41 Benefit / Cost Matrix

		Safety	Non-discrimination/ Social Justice	Air Quality	Environmental Issues	Data	Public Involvement	Economic Development	Sustainability	Benefit Score	Fiscal Constraints	Benefit / Cost Score
1a	Milham Avenue Traffic Signal	2	3	1	2	3	3	2	2	**18**	0	**18**
	Milham Avenue Roundabout	3	3	2	2	3	3	2	2	**20**	-2	**18**
1b	General Petroleum Avenue Traffic Signal	2	3	1	2	3	3	2	2	**18**	0	**18**
	General Petroleum Avenue Roundabout	3	3	2	2	3	3	2	2	**20**	-2	**18**
	General Petroleum Avenue Flashing Beacon	3	3	3	2	3	3	2	2	**21**	0	**21**
2	25th Avenue North and Connector	3	1	2	1	1	2	3	1	**14**	-2	**12**
3	Class I Bikeway and New Bridge	3	3	3	3	3	3	3	3	**24**	-2	**22**
3	Class IV Bikeway and Bridge Widening	3	3	3	3	3	3	3	3	**24**	-1	**23**
4	Bernard Drive Roundabout	3	3	2	2	3	2	3	3	**21**	-2	**19**
	Bernard Drive Additional Lanes	2	3	2	2	3	2	3	3	**20**	0	**20**
5	I-5 Ramp Traffic Signal	2	2	1	2	1	2	3	1	**14**	0	**14**

		Safety	Non-discrimination/ Social Justice	Air Quality	Environmental Issues	Data	Public Involvement	Economic Development	Sustainability	Benefit Score	Fiscal Constraints	Benefit / Cost Score
	I-5 Ramp Roundabout	3	2	2	2	1	2	3	1	**16**	-2	**14**
6	25th Avenue South	3	1	2	3	3	3	3	3	**21**	-5	**16**
7	Developer-funded Truck Parking	2	0	0	2	2	3	3	1	**13**	0	**13**
8	Developer-funded Road Improvements	0	2	0	1	0	0	3	1	**7**	0	**7**
9	Business Pylon Sign	0	1	1	0	0	1	3	0	**6**	0	**6**

10.4 - Transportation Improvement Phasing[24]

10.4.1 - Priority Improvement Strategies #1

The following strategies have been identified as the first priority list of strategies based on scoring 19 or above in the matrix in Table 10-3.

Class I or IV Bikeway

General Petroleum Avenue Flashing Beacon

Bernard Drive Additional Lanes or Roundabout

10.4.2 - Priority Improvement Strategies #2

The following strategies have been identified as the second priority list of strategies based on scoring 16 to 18 in the matrix in Table 10-3.

[24] It is worth noting again that this SGCIP is not intended to determine the specific type of intersection improvement (i.e. traffic signal or roundabout.) It is also worth noting, that the during the public review period for SGCIP, persons spoke at the Board of Supervisors meeting and at the Chamber of Commerce meeting against the use of roundabouts as an intersection improvement strategy.

Milham Avenue Traffic Signal or Roundabout

General Petroleum Traffic Signal or Roundabout

25th Avenue South

It should be noted that the Traffic Technical Report authored by VRPA (Appendix A) did not recommend traffic signal or roundabout improvements at the intersections of SR 41 Milham Avenue or SR 41 at General Petroleum Avenue. While the construction of either of these would improve the Level of Service of these intersections dramatically (from LOS D to LOS A in the Cumulative Year 2040 scenario), the minor approaches do not have high enough traffic volumes to trigger traffic signal warrants.

This factor may warrant the strategies to be lower in priority than the SR 41 Benefit / Cost Analysis suggests, or it could warrant implementation be delayed until the traffic on Milham Avenue and/or General Petroleum Avenue increases to levels that would trigger the traffic signal warrant. As with any of these strategies, more detailed analysis will be required when funding is imminent. In the case of the intersection improvements at Milham Avenue and General Petroleum Avenue, a complete warrant study would be appropriate.

10.4.3 - Priority Improvement Strategies #3

The following strategies have been identified as the third priority list of strategies based on scoring 15 or less in the matrix in Table 10-3.

I-5 Traffic Signal or Roundabout

25th Avenue North and Connector

Developer-funded Truck Parking

10.4.4 - Improvement Strategies Funded by Others

The following strategies have been identified as strategies that can be completed without public funding and can be constructed by others.

Developer-funded Road Improvements

Business Pylon Sign

CHAPTER 11 NEXT STEPS/IMPLEMENTATION

This section describes the next steps that would be needed prior to construction to implement the improvement strategies identified in Section 8.2. These steps are presented in their relative order, although some variation may be appropriate depending on future circumstances.

11.1 - General Plan Amendments

All the improvement strategies appear to be consistent with the future land use pattern identified in the Kettleman City Community Plan (see Figure 4-1.) The improvements complement that land use pattern and do not induce development in areas not planned for growth.

The improvement strategies also appear to be consistent with the circulation pattern. However, for clarity, Kings County should consider whether to amend the Community Plan to identify the proposed 25th Avenue North Roadway Improvements (Strategy 2) as an Arterial roadway.

Many of the improvement strategies will implement objectives related to community circulation (See the KCCP Policies and Objectives listed in Section 4.2.5).

11.2 - Funding

Currently, none of the public strategies (Strategies 1 through 7) have identified funding sources. Section 12 identifies and describes potential funding sources. Kings County would be responsible to identify and apply for competitive funds. Funding sources that can fund environmental review, design, and construction together are preferred. Funding applications should emphasize:

- Kettleman City's Disadvantaged Community status (see Section 1.3)
- Consistency with existing General Plan and other plans (see Section 4)
- Consistency with the Smart Mobility Framework (see Section 3.3 and 5.2)
- Safety issues (See Sections 6 and 7)
- Consistency with comments and requests heard at community outreach events (see Section 2)

11.3 - Preliminary Design

Some level of preliminary design (20% or 30%) will be needed to determine the scope of the project, define a project description for environmental review, and determine the level of review by Caltrans.

11.4 - Cooperative Agreement

Projects on the State Route will require that a cooperative agreement be established between Caltrans and Kings County. This agreement describes the responsibilities of each agency during the design, review, and construction of the project. The agreement will describe the funding source or sources, how the CEQA/NEPA process will be administered, who will be responsible for design, how review of the design will occur and be approved, and how right of way acquisition and construction will take place. The cooperative agreement will be approved by Caltrans and by the Kings County Board of Supervisors.

11.5 - Environmental Review

Each project will need an environmental document that complies with the California Environmental Quality Act (CEQA). If funding comes from Federal sources, then the environmental document must also comply with the National Environmental Protection Act (NEPA). The cooperative agreement will state who the lead agency for environmental review will be for each project.

11.6 - Land Acquisition

11.6.1 - Bikeway

If the Bikeway (Strategy 3) is to be a Class I trail, additional right of way or an easement must be acquired. Until preliminary design can establish the needed width of the right of way, roughly 20 feet should be assumed.

11.6.2 - 25th Avenue Bypass

The south improvements to 25th Avenue (Strategy 6) can be completed within existing right of way. However, the north improvements to 25th Avenue (Strategy 2) will require that new right of way be acquired. Since current and future industrial uses, specifically truck transfer stations, would be the main benefactor of the Strategy 2, Kings County could consider the establishment of an assessment district to fund right of way acquisition. The assessment district could cover the properties zoned for industrial development on the east side of the California Aqueduct.

11.6.3 - Roundabouts or Intersection Improvements

The I-5 ramp intersection improvements (Strategy 5) may be able to be designed to fit within existing Caltrans right of way. Milham and/or General Petroleum Avenue intersection improvements will likely require some additional right of way if a roundabout is chosen as the strategy alternative. Buildings are set back from existing right of way, so building demolition will not be needed to complete these improvements, but existing parking spaces in front of these buildings may be lost.

11.7 - Design

The design process of all strategies, except for Strategy 5, can be managed by Kings County. However, some of the strategies, such as Strategy 1 and 4, could be managed as Caltrans projects. The County and Caltrans should develop an understanding on who should plan on taking the lead in the design process. All strategies, with the possible exception of Strategies 6 and 7, will require Caltrans approval of design plans.

CHAPTER 12 IDENTIFICATION OF FUNDING OPTIONS

The California State Transportation Agency (CalSTA) is responsible for developing and coordinating the policies and programs of the state's transportation entities to improve the mobility, safety, and environmental sustainability of California's transportation system. The California Department of Transportation (Caltrans) designs and oversees the construction of state highways, operates and maintains the highway system, operates three intercity passenger rail routes (nearly 900 miles of track), and provides funding for local transportation projects. Caltrans maintains 50,000 lane miles of state and federal highways and nearly 13,000 state-owned bridges and inspects more than 400 public-use and special-use airports and heliports.

The Governor's 2017–2018 Budget outlined a package of additional funding for state and local transportation priorities along with key program reforms. The package includes a combination of new revenues, additional investments of Cap and Trade auction proceeds, accelerated loan repayments, Caltrans efficiencies and streamlined project delivery, accountability measures, and constitutional protections for the new revenues. The proposed new revenues are split evenly between state and local transportation priorities, and the ten-year funding plan provides a total of $36 billion for transportation with an emphasis on a "fix-it first" strategy that focuses on repairing and maintaining the existing transportation infrastructure. It also includes significant investments in public transit. Specifically, the proposal includes annualized resources as follows:

- Road Improvement Charge-$2 billion from a new $65 fee on all vehicles, including hybrids and electrics.
- Stabilize Gasoline Excise Tax-$500 million by setting the gasoline excise tax beginning in 2017-18 at the historical average of 18 cents and eliminating the current annual adjustments. The broader gasoline tax would then be adjusted annually for inflation to maintain purchasing power.
- Diesel Excise Tax-$500 million from an 11-cent increase in the diesel excise tax beginning in 2017-18. This tax would also be adjusted annually for inflation to maintain purchasing power.
- Cap and Trade-$500 million in additional Cap and Trade proceeds.
- Caltrans Efficiencies-$100 million in cost-saving reforms.
- Accelerated Loan Repayments-$879 million in loan repayments over the next four years to be used for the Transit and Intercity Rail Capital Program, trade corridor improvements, and repairs on local roads and the state highway system. The Legislature has already adopted the first year's repayment of $173 million.

Over the next ten years, the $36 billion transportation package will provide $16.2 billion for highway repairs and maintenance and will invest $2.3 billion in the state's trade corridors. Local roads will receive more than $13.5 billion in new funding. Transit and intercity rail will receive over $4 billion in additional funding. Because the state's disadvantaged communities are often located in areas affected by poor air quality, a minimum of $2 billion (50 percent) of these transit and rail funds will be spent on projects that benefit these communities.

The federal, state, and local options that are available for funding SR 41 improvements are as follows:

12.1 - Federal Funding Options

Highway Safety Improvement Program (HSIP). The purpose of this program is to reduce traffic fatalities and serious injuries on public roads through the implementation of infrastructure-related highway safety improvements. Work on any publicly-owned roadway or pedestrian/bicycle pathway or trail that corrects or improves the safety for its users is eligible. Proposed projects are evaluated based on a benefit/cost ratio and those with the highest ratio will be selected for funding. Therefore, those projects with a higher collision history (both in frequency and severity) and a lower cost will score higher.

Website: http://www.dot.ca.gov/hq/LocalPrograms/hsip.htm

Website: https://www.fhwa.dot.gov/fastact/factsheets/hsipfs.cfm

Website: https://safety.fhwa.dot.gov/legislationandpolicy/fast/guidance.cfm

Surface Transportation Block Grant (STBG) Program. In December 2015, the Fixing America's Surface Transportation Act (FAST Act) amended the Surface Transportation Program (STP) and changed it to the STBG Program. This program provides the most flexible funding among all Federal-aid highway programs to best address state and local transportation needs, including for bicycle and pedestrian facilities. This funding may be used for safety infrastructure improvements during preliminary engineering, design, and construction.

Website: https://www.fhwa.dot.gov/specialfunding/stp/160307.cfm

Website: https://www.fhwa.dot.gov/fastact/factsheets/stbgfs.cfm

Transportation Alternatives (TA). The Fixing America's Surface Transportation Act (FAST Act) replaced the Transportation Alternatives Program (TAP) with it with a set-aside of Surface Transportation Block Grant (STBG) program funding for transportation alternatives (TA). This funding provides for a variety of alternative transportation projects including those associated with improving transportation options for pedestrians, bicyclists, and other non-motorized transportation modes.

Website:
https://www.fhwa.dot.gov/environment/transportation_alternatives/guidance/guidance_2016.cfm

Website: https://www.fhwa.dot.gov/fastact/factsheets/transportationalternativesfs.cfm

Systemic Safety Analysis Report Program (SSARP). Currently, there is no active SSARP call for applications open. $10 million from the Highway Safety Improvement Program (HSIP) was set aside and exchanged for state funds to implement a new safety analysis program, the Systemic Safety Analysis Report Program (SSARP). The intent of the SSARP is to assist local agencies in performing collision analysis, identifying safety issues on their roadway network, and developing a list of systemic low-cost countermeasures that can be used to prepare future HSIP and other safety program applications.

Website: http://www.dot.ca.gov/hq/LocalPrograms/HSIP/SSARP.htm

Congestion Mitigation and Air Quality (CMAQ) Program. The purpose of the CMAQ Program is to fund transportation projects or programs that will contribute to attainment or maintenance of the national ambient air quality standards reducing congestion and improving air quality. This program will fund the construction of bicycle and pedestrian facilities, as well as bicycle support programs such as brochures, maps, and public service announcements. Funds are awarded through KCAG which announces a call for projects approximately every two years.

Website:
http://www.dot.ca.gov/hq/transprog/federal/cmaq/Official_CMAQ_Web_Page.htm

Website: https://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.cfm

TIGER Discretionary Grants. In September 2017, the US Department of Transportation (DOT) announced $500 million will be made available for transportation projects across the country under a ninth round of the highly successful Transportation Investment Generating Economic Recovery (TIGER) competitive grant program. The FY 2017 TIGER program will give special consideration to projects which emphasize improved access to reliable, safe, and affordable transportation for communities in rural areas, such as projects that improve infrastructure conditions, address public health and safety, promote regional connectivity, or facilitate economic growth or competitiveness.

Website: https://www.transportation.gov/tiger

Regional Surface Transportation Program (RSTP). The Regional Surface Transportation Program (RSTP) utilizes Surface Transportation Block Grant (STBG) Program funds. This program provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge projects on any public road, pedestrian and bicycle infrastructure, and transit capital and intercity passenger projects. While most of the funding is delivered to urban areas with a population greater than 200,000, approximately $2 million is apportioned annually to Kings County.

Website: http://www.dot.ca.gov/hq/transprog/federal/rstp/Official_RSTP_Web_Page.htm

12.2 - State of California Funding Options

Active Transportation Program (ATP). The Active Transportation Program (ATP) program was originally enacted in 2013. The ATP consolidates existing federal and state transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single program.

The program focuses on increasing bicycle and pedestrian trips, health, and safety. This is currently the most important funding source for pedestrian and bikeway improvements. Funding for the ATP may be used to fund the development of community-wide active transportation plans within areas specifically encompassing disadvantaged communities. State and federal law segregate the ATP into multiple, overlapping components as identified in Section 2.2.8 – 2017 Active Transportation Program Guidelines. Kettleman City is considered a disadvantaged community.

The purpose of ATP is to encourage increased use of active modes of transportation by achieving the following goals:

- Increase the proportion of trips accomplished by biking and walking,
- Increase safety and mobility for non-motorized users,
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas (GHG) reduction goals, pursuant to SB 375 (0f 2008) and SB 341 (of 2009),
- Enhance public health,
- Ensure that disadvantaged communities fully share in the benefits of the program, and
- Provide a broad spectrum of projects to benefit many types of active transportation users.

Each ATP programming cycle will include four years of funding. The latter two years of funding in each cycle will consist of approximately $123 million per year of other Active Transportation Program funds (SHA, STBG, and other federal funds). The 2019 ATP will cover fiscal years 2019-20 through 2022-23. The guidelines for the fourth program will be adopted by March 2018.

Website: http://www.dot.ca.gov/hq/LocalPrograms/atp/atp_infocycle-4.html

Road Repair and Accountability Act of 2017 (Senate Bill 1). Senate Bill 1 (SB 1) provides an increase in transportation funding for transportation infrastructure and new funding programs.

- $700 million in new public transit funding in FY 2018-19.
- $200 million per year for the State and Local Partnership to reward self-help counties.
- $110 million per year the State Transportation Improvement Program.
- $100 million per year the Active Transportation Program (ATP) to expand and improve bicycle and pedestrian facilities.
- $25 million per year to fund planning grants to assist regions with developing and updating their Regional Transportation Plans and Sustainable Community Strategies.
- $1.5 billion per year for fix-it first highway projects.
- $1.5 billion per year for fix-it first local streets and roads projects.

Website: http://www.catc.ca.gov/programs/SB1.html

California Infrastructure and Economic Development Bank (IBank). The mission of IBank is to finance public infrastructure and private development to promote a healthy climate for jobs, contribute to a strong economy, and improve the quality of life in California communities. Kings County would like to promote economic development within the Highway Commercial Area and the 25th Avenue corridor, and this source may be a likely opportunity to pursue. The Infrastructure State Revolving Fund Program (ISRF) provides low-cost financing to public agencies for a wide variety of infrastructure projects. Funding is available from $50,000 to $25,000,000 with loan terms of up to 30 years. Preliminary applications are accepted continuously.

Website: http://www.ibank.ca.gov/ibank/programs/isrf

Transportation and Development Act (TDA). The Transportation Development Act (TDA) provides continuous funding through the Local Transportation Fund (LTF), and the State Transit Assistance Fund (STA) (see below for a description of each fund). The TDA funds a wide variety of transportation programs, including planning and program activities, pedestrian and bicycle facilities, community transit services, public transportation, and bus and rail projects. Providing certain conditions are met, counties with a population under 500,000 (according to the 1970 federal census) may also use the LTF for local streets and roads, construction and maintenance. The STA fund can only be used for transportation planning and mass transportation purposes.

Website: http://www.dot.ca.gov/drmt/sptda.html

Local Transportation Fund (LTF). LTF funds are intended for public transportation purposes that include planning, bicycle projects and pedestrian projects. Additionally, if certain conditions are met under Article 8, LTF can be used for the construction and maintenance of local streets and roads.

Every county in the state has an established LTF account. ¼ cent of the state sales tax revenue is deposited by the Board of Equalization into each county's LTF account according to the amount of sales tax that was collected in that county. The Regional Transportation Agency (RTPA) is then responsible for directly apportioning LTF funds to cities and counties within their jurisdiction, based on population.

- **Annual Total:** FY 2016-17 = $1,632,727,794
- **Funds Administered By:** Funds are distributed by the California State Board of Equalization but are passed through and administered by the RTPAs.

Website: http://www.boe.ca.gov/legdiv/localTaxAllocations.htm

California Office of Traffic Safety (OTS). This funding source can be used for roadway projects and pedestrian and bicycle safety projects. It can also be used for traffic calming projects and programs and safety and education programs. It is one of the few sources that funds support programs in addition to capital projects. For example, traffic safety events may be funded for elementary, middle, and high schools, and community groups to increase awareness among various age groups. To boost compliance with the law and decrease injuries, safety helmets can be properly fitted and distributed to children in need. Other programs target high-risk populations, the senior population, and areas with multicultural public education addressing safer driving, biking, and pedestrian behaviors. Grant applications for FFY 2019 are available in December 2017.

Website: http://www.ots.ca.gov/Grants/Pedestrian_and_Bicycle_Safety.asp

Solutions for Congested Corridors Program (SCCP). The SCCP was created under Road Repair and Accountability Act of 2017, SB 1, to fund projects designed to reduce congestion in highly traveled and highly congested corridors through performance improvements that balance transportation improvements, community impacts, and that provide environmental benefits. $250 million will be available annually and any unused balance or savings generated will be added to the available funding in the following cycle. The initial 2018 cycle intends to program four years of funding beginning with fiscal year 2017-2018 and ending with fiscal year 2020-2021. Following this program, subsequent cycles will program funding for three years, in 2020, 2022, and so on. Applications for the first cycle are due in February 2018. Funding is available for projects that make specific improvements and highly congested corridors through performance improvements that balance transportation improvements, community impacts, and that provide environmental benefits. These improvements may be on the state highway system, local streets, and roads, public transit facilities, bicycle and pedestrian facilities or required mitigation or restoration or some combination thereof. Potential projects eligible for funding under this program for Kettleman City may include:

- New or existing transit infrastructure improvements,
- Operational improvements such as interchange or ramp modifications, signals or intersection improvements, two-way left turn lanes, shoulder widening, and more,
- Safety improvements such as bikeways and crosswalk safety enhancements and more.
- Bicycle facilities and pedestrian facilities, and
- Many others. Check the website for more information.

Website: http://www.catc.ca.gov/programs/SB1.html

State Transportation Improvement Program (STIP). The STIP is a multi-year capital improvement program of transportation projects funded with both Federal and State monies. The available funding is divided into two programs, the Interregional Transportation Improvement Plan (ITIP) and the Regional Transportation Improvement Plan (RTIP). KCAG should nominate projects for inclusion in the STIP.

Website: http://www.catc.ca.gov/programs/stip.htm

Land and Water Conservation Fund Program. This program provides grants to plan, acquire, and develop recreation parks and facilities including bikeway and pedestrian trails. The

California Department of Parks and Recreation provides reimbursement grant funds of 50% of the total projects costs.

Website: http://www.parks.ca.gov/?page_id=21360

Mello-Roos Community Facilities District Act of 1982. This program allows a sponsoring agency to issue a special tax bond for a community facilities district to finance public facilities and services such as bicycle and pedestrian projects that could be included with any proposed public facility.

Website: http://www.treasurer.ca.gov/cdiac/reports/M-Roos/MR_guidelines.pdf

12.3 - Regional and Local Funding Options

San Joaquin Valley Air Pollution Control District (SJVAPCD) Bikeway Program. SJVAPCD's grant and incentives program includes a bicycle infrastructure component to assist with the development or expansion of a comprehensive bicycle transportation network. The program provides incentives for construction of Class I, Class II, and Class III bicycle facilities. The program serves to promote bicycling as a viable option of transportation for residents traveling short distances to school, work, and commercial sites. Applications are accepted on an ongoing basis as funds are available.

The purpose of this program is to assist with the development or expansion of a comprehensive bicycle transportation network. Residents of the San Joaquin Valley can utilize commuter bicycling as an alternative to daily vehicular travel. Therefore, the program serves to promote bicycling as a viable option of transportation for residents traveling short distances (less than five miles) to school, work and commercial sites. Funds are available for eligible projects that meet specific program criteria on a first-come, first-serve basis until the program funds are exhausted. Projects serving commuters, rather than recreational users are given higher priority for funding.

Website: http://valleyair.org/grants/

Kings County General Fund. Bicycle and pedestrian projects can be implemented in conjunction with another project including pavement resurfacing, new developments, and frontage development. Sidewalk repair and replacement is commonly paid for through the general fund, which is typically funded by property and sales tax revenues. This is consistent with the way many agencies consider the funding of street repairs. Generally, sidewalk maintenance is considered separately from road repair funding; in some cases, several sidewalk maintenance projects (e.g. typically sidewalk replacement) may be lumped together and included as a line item in the capital improvement program. Sidewalk repair and replacement projects often compete with other projects and funding obligations. Sidewalk repair and replacement programs should have the same priority as other types of street repairs and should not fall victim to budget cuts or shifting priorities.

Other Local Programs. Local agencies may implement other local programs to provide active transportation facilities, including "adopt-a-bikeway" and memorials. These programs require that private individuals or groups donate money, property, or time for the design, acquisition, and construction of the facilities.

California Conservation Corps (CCC). The program provides emergency assistance and public service conservation work for city, county, state, federal and non-profit organizations. Both urban and rural projects are eligible and are selected based on environmental and natural resource benefits and public use, and on-the-job training opportunities. Use of the CCC would be effective at reducing project costs. The Active Transportation Program encourages participation of the CCC and Local Conservation Corps.

Website: http://www.ccc.ca.gov

12.4 - Strategy Implementation Funding Matrix

Table 12-1 shows a Strategy Implementation Funding Matrix. It lists the individual projects and identifies the funding sources that would be available each project. Since the projects are only generally defined at this point, a more detailed analysis of funding source requirements should be conducted once a project is more specifically defined.

Table 12-1
Strategy Implementation Funding Matrix

		TRANSPORTATION IMPROVEMENT STRATEGIES								
		Milham and General Petroleum Avenue Intersection Improvements	25th Avenue North and Connector	Class I Bikeway and New Ped/Bike Bridge	Bernard Drive Intersection Improvements	I-5 Northbound Ramp Intersection Improvements	25th Avenue South	Developer-funded Truck Parking	Developer-funded Road Improvements	Business Pylon Sign
FUNDING SOURCE		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
FEDERAL	HSIP	X	X	X	X	X	X			
	STBG	X	X	X	X	X	X			
	TA			X						
	SSARP	X	X	X	X	X	X			

		TRANSPORTATION IMPROVEMENT STRATEGIES								
FUNDING SOURCE		1	2	3	4	5	6	7	8	9
FEDERAL	CMAQ	X	X	X		X				
	TIGER	X	X	X	X	X	X			
	RSTP		X	X						
STATE	ATP			X						
	SB 1	X	X	X	X	X	X			
	IBank	X	X	X	X	X	X			
	TDA			X						
	LTF			X						
	OTS	X	X	X	X	X	X			
	SCCP		X			X				
	STIP	X	X	X	X	X	X			
	Land & Water Fund			X						
	Mello-Roos							X	X	X
	SJVAPCD			X						
REGIONAL	County General Fund	X	X	X	X	X	X	X	X	X
	CCC			X						
	Developer Funds							X	X	X

APPENDIX A

Smart Growth SR-41 Corridor Improvement Plan

Traffic Technical Report

March 2018

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Smart Growth SR-41 Corridor Improvement Plan
Traffic Technical Report

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Table of Contents

Appendices

List of Tables

List of Figures

This Traffic Technical Report has been prepared for the purpose of analyzing traffic conditions related to the State Route (SR) 41 corridor in the unincorporated community of Kettleman City. The primary goal is to use information presented in this traffic analysis to develop a Smart Growth SR 41 Corridor Improvement Plan (Project) to address deficiencies along the SR 41 corridor in Kettleman City. The Study is a comprehensive, planning level document and does not include specific project site plans or land uses and does not represent an update to the Kettleman City Community Plan, Land Use Map, or land use entitlement. The intent of this analysis is to identify impacts to the roadway network by evaluating corridor deficiencies, identifying alternatives, and prioritizing proposed solutions based on a logical evaluation process. This Traffic Technical Report was made possible by a California Department of Transportation (Caltrans) Sustainable Transportation Planning Grant.

1.0 Introduction

1.1 Description of the Region/Project

Kettleman City is located 28 miles southwest of the City of Hanford and 54 miles south of the City of Fresno. Kettleman City is located on the west side of the San Joaquin Valley at the base of the Kettleman Hills, near the historic shoreline of what used to be Tulare Lake. Figures 1-1 and 1-2 show the location of the Project.

1.1.1 *Study Area*

The following intersections and roadway segments included in this analysis were determined based upon a review of the unincorporated community of Kettleman City and in consultation with Kings County staff and include:

Intersections

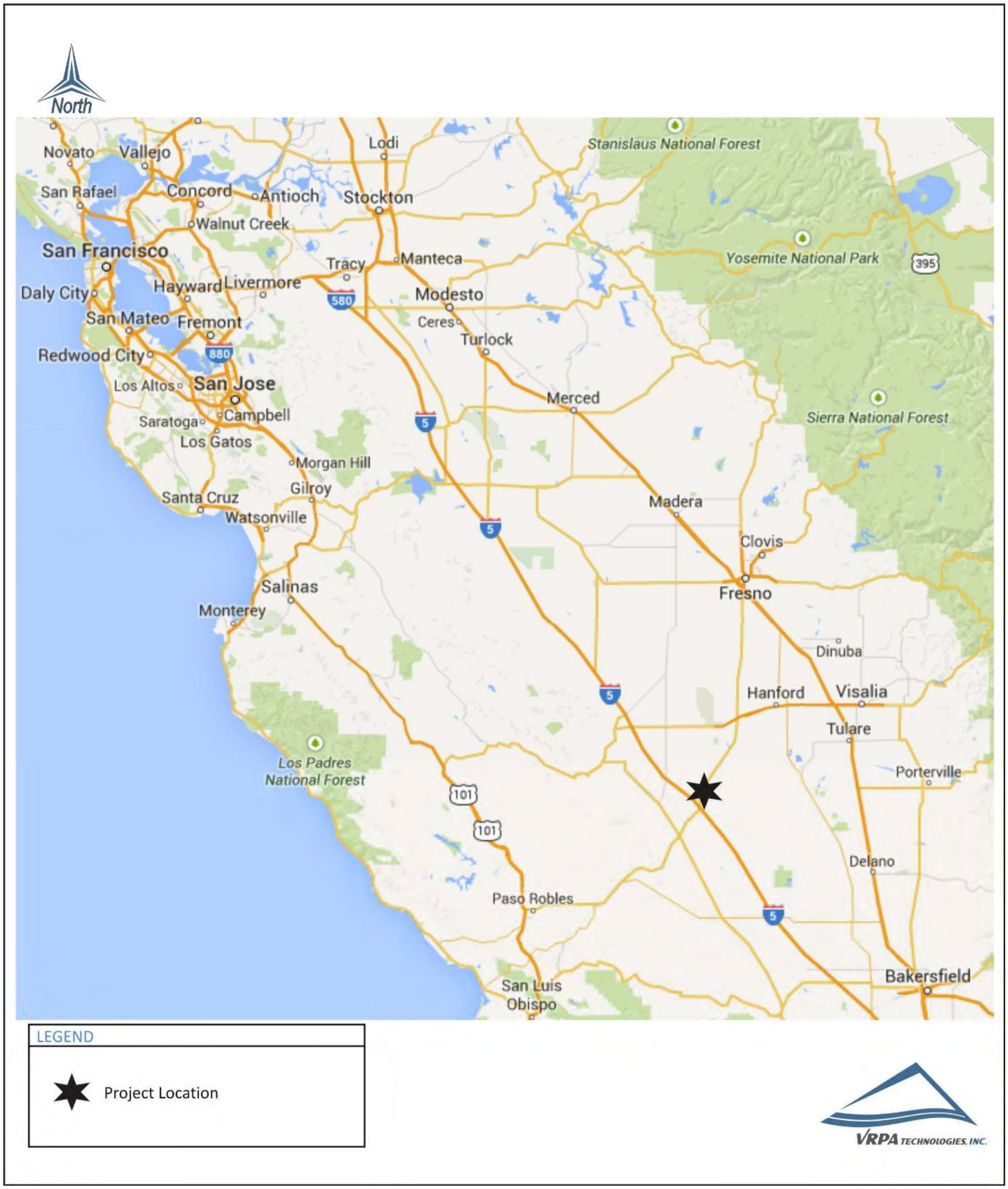
- ✓ SR-41 / Milham Avenue
- ✓ SR-41 / Standard Oil Avenue
- ✓ SR-41 / General Petroleum Avenue
- ✓ SR-41 / 25th Avenue
- ✓ SR-41 / Hubert Way
- ✓ SR-41 / Bernard Drive
- ✓ SR-41 / Ward Drive
- ✓ SR-41 / I-5 NB Ramps
- ✓ SR-41 / I-5 SB Ramps

Roadway Segments

- ✓ SR-41 between Milham Avenue to 25th Avenue
- ✓ SR-41 between 25th Avenue and Bernard Drive
- ✓ SR-41 between Bernard Drive and I-5 NB Ramps
- ✓ SR-41 between I-5 NB Ramps and I-5 SB Ramps

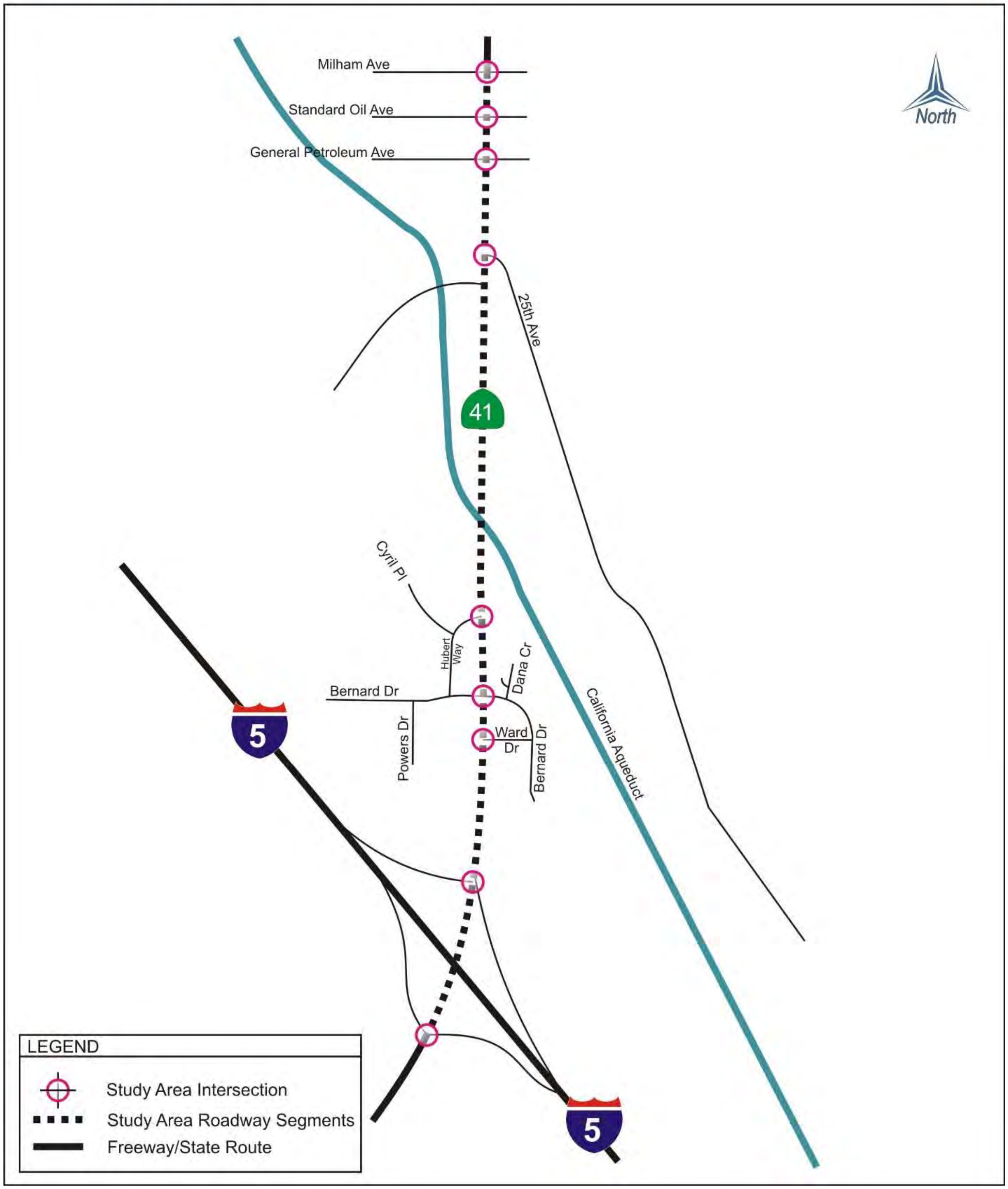
Smart Growth SR-41 Corridor Improvement Plan
Regional Location

Figure 1-1



Smart Growth SR-41 Corridor Improvement Plan
Project Study Area

Figure 1-2



1.1.2 *Study Scenarios*

The Traffic Technical Report completed for the Project includes level of service (LOS) analysis for the following traffic scenarios:

- ✓ Existing Conditions
- ✓ Cumulative Year 2040 Conditions

1.2 Methodology

When preparing a traffic analysis, guidelines set by affected agencies are followed. In analyzing street and intersection capacities the Level of Service (LOS) methodologies are applied. LOS standards are applied by transportation agencies to quantitatively assess a street and highway system's performance. In addition, safety concerns are analyzed to determine the need for appropriate mitigation resulting from increased traffic near sensitive uses, the need for dedicated ingress and egress access lanes to the project, and other evaluations such as the need for signalized intersections or other improvements.

1.2.1 *Intersection Analysis*

Intersection LOS analysis was conducted using the Synchro 9 software program. Synchro 9 supports the Highway Capacity Manual (HCM) 2010 and 2000 methodologies and is an acceptable program utilized by Kings County and Caltrans staff for assessment of traffic impacts. Levels of service can be determined for both signalized and unsignalized intersections.

Tables 1-1 and 1-2 indicate the ranges in the amounts of average delay for a vehicle at signalized and unsignalized intersections for the various levels of service ranging from LOS "A" to "F".

The signalized LOS standards applied to calculate intersection LOS are in accordance with the current edition of the Highway Capacity Manual (HCM). Intersection turning movement counts and roadway geometrics used to develop LOS calculations were obtained from field review findings and count data provided from the traffic count sources identified in Section 2.1.

When an unsignalized intersection does not meet acceptable LOS standards, the investigation of the need for an alternative intersection control is evaluated in accordance with Caltrans' Traffic Operations Deputy Directive 13-02. The California Manual on Uniform Traffic Control Devices for Streets and Highways (California MUTCD) dated November 7, 2014 introduces standards for determining the need for a traffic signal. The California MUTCD indicates that the satisfaction of one or more traffic signal warrants does not in itself require the installation of a traffic signal. In addition to the warrant analysis, an engineering study of the current or expected traffic conditions should be conducted to determine whether the installation of a traffic signal is justified. The California MUTCD Peak Hour Warrant (Warrant 3) was used to determine if a traffic signal is warranted at unsignalized intersections that fall below current LOS standards.

1.2.2 *Roadway Segment Analysis*

According to the HCM, LOS is categorized by two parameters of traffic: uninterrupted and interrupted flow. Uninterrupted flow facilities do not have fixed elements such as traffic signals that cause interruptions in traffic flow. Interrupted flow facilities do have fixed elements that cause an interruption in the flow of traffic, such as stop signs and signalized intersections along arterial roads. A roadway segment is defined as a stretch of roadway generally located between signalized or controlled intersections.

Segment LOS is important in order to understand whether the capacity of a roadway can accommodate future traffic volumes. Table 1-3 provides a definition of segment LOS. The performance criteria used for evaluating volumes and capacities on the road and highway system for this study were estimated using the HCM-Based HCS 2010 modeling program. The program determines the capacity of individual road and highway segments based on numerous roadway variables (design speed, passing opportunities, signalized intersections per mile, number of lanes, etc.). These variables were identified and applied to the modeling program.

1.3 Policies to Maintain Level of Service

An important goal is to maintain acceptable levels of service along the highway, street, and road network. To accomplish this, Kings County and Caltrans adopt minimum levels of service in an attempt to control congestion that may result as new development occurs. All of the study intersections and roadway segments fall under Caltrans' jurisdiction.

Caltrans identifies' a minimum LOS is C, except where the existing LOS is D or below, according to information specified in the Caltrans, "A Guide For Traffic Impact Studies". Based on guidance from Caltrans, the LOS for operating State highway facilities is based on Measures of Effectiveness (MOE) identified in the Highway Capacity Manual (HCM). Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS, the existing MOE should be maintained.

Table 1-1
Signalized Intersections
Level of Service Definitions
(2010 Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION	AVERAGE TOTAL DELAY (sec/veh)
A	Describes operations with very low delay. This level of service occurs when there is no conflicting traffic for a minor street.	**≤ 10.0**
B	Describes operations with moderately low delay. This level generally occurs with a small amount of conflicting traffic causing higher levels of average delay.	**> 10.0 - 20.0**
C	Describes operations with average delays. These higher delays may result from a moderate amount of minor street traffic. Queues begin to get longer.	**> 20.0 - 35.0**
D	Describes a crowded operation, with below average delays. At level D, the influence of congestion becomes more noticeable. Longer delays may result from shorter gaps on the mainline and an increase of minor street traffic. The queues of vehicles are increasing.	**> 35.0 - 55.0**
E	Describes operations at or near capacity. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor gaps for the minor street to cross and large queues.	**> 55.0 - 80.0**
F	Describes operations that are at the failure point. This level, considered to be unacceptable to most drivers, often occurs with over- saturation, that is, when arrival flow rates exceed the capacity of the intersection. Insufficient gaps of suitable size exist to allow minor traffic to cross the intersection safely.	**> 80.0**

Table 1-2
Unsignalized Intersections
Level of Service Definitions
(2010 Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION	AVERAGE TOTAL DELAY (sec/veh)
A	No delay for stop-controlled approaches.	0 - 10.0
B	Describes operations with minor delay.	> 10.0 - 15.0
C	Describes operations with moderate delays.	> 15.0 - 25.0
D	Describes operations with some delays.	> 25.0 - 35.0
E	Describes operations with high delays and long queues.	> 35.0 - 50.0
F	Describes operations with extreme congestion, with very high delays and long queues unacceptable to most drivers.	> 50.0

Table 1-3
Roadway Segment
Level of Service Definitions
(2010 Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION
A	Represents free flow. Individual vehicles are virtually unaffected by the presence of others in the traffic stream.
B	Is in the range of stable flow, but the presence of other vehicles in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.
C	Is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual vehicles becomes significantly affected by interactions with other vehicles in the traffic stream.
D	Is a crowded segment of roadway with a large number of vehicles restricting mobility and a stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
E	Represents operating conditions at or near the level capacity. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.
F	Is used to define forced or breakdown flow (stop-and-go gridlock). This condition exists when the amount of traffic approaches a point where the amount of traffic exceeds the amount that can travel to a destination. Operations within the queues are characterized by stop and go waves, and they are extremely unstable.

2.0 Existing Conditions

2.1 Existing Traffic Counts and Roadway Geometrics

The first step toward assessing circulation impacts is to assess existing traffic conditions. In consultation with Caltrans staff, it was determined that the highest peak of traffic occurs on Sundays in June and July. As a result, traffic counts were collected between 12-4pm on Sunday, June 28th, 2015 for study intersections along SR-41 between 25th Avenue and I-5 SB Ramps. Traffic counts were collected on Sunday, September 11th, 2016 for study intersections along SR-41 between Milham Avenue and General Petroleum Avenue. The traffic counts conducted in September were compared to counts for the month of June and were adjusted as necessary in consultation with Caltrans staff. The peak hour level of service (LOS) analysis in this study is based on the Sunday afternoon peak period versus typical weekday peak hours. Sunday peak hour turning movements were collected at each study intersection by National Data and Surveying Services and traffic count data worksheets are provided in Appendix A.

2.2 Affected Streets and Highways

Street and highway intersections and segments in the study area were analyzed to determine levels of service utilizing HCM-based methodologies described previously in Chapter 1. The study intersections and street and highway segments included in this traffic analysis are listed below.

Intersections

- ✓ SR-41 / Milham Avenue
- ✓ SR-41 / Standard Oil Avenue
- ✓ SR-41 / General Petroleum Avenue
- ✓ SR-41 / 25th Avenue
- ✓ SR-41 / Hubert Way
- ✓ SR-41 / Bernard Drive
- ✓ SR-41 / Ward Drive
- ✓ SR-41 / I-5 NB Ramps
- ✓ SR-41 / I-5 SB Ramps

Roadway Segments

- ✓ SR-41 between Milham Avenue and 25th Avenue
- ✓ SR-41 between 25th Avenue and Bernard Drive
- ✓ SR-41 between Bernard Drive and I-5 NB Ramps
- ✓ SR-41 between I-5 NB Ramps and I-5 SB Ramps

The existing lane geometry at study area intersections and segments is shown in Figure 2-1. Two (2) of the existing intersections are currently signalized, while seven (7) of the intersections are unsignalized. Figure 2-2 shows existing traffic volumes for the Sunday peak hour in the study area.

2.3 Level of Service

2.3.1 *Intersection Capacity Analysis*

All intersection LOS analyses were estimated using Synchro 9 Software. Various roadway geometrics, traffic volumes, and properties (peak hour factors, storage pocket length, etc.) were entered into the Synchro 9 Software program to accurately determine the travel delay and LOS for each study scenario. The intersection LOS and delays reported represent the 2010 HCM outputs. Synchro assumptions, listed below, show the various Synchro inputs and methodologies used in the analysis.

- ✓ **Lane Geometry**
  - Storage lengths for turn lanes for existing intersections were either measured in the field or obtained from aerial photos and rounded to the nearest 25 feet.

- ✓ **Traffic Conditions**
  - The peak hour factor used for Existing Conditions was determined from the existing counts.
  - Heavy vehicle percentages were applied as follows and are based on the HCM default, traffic counts, or Caltrans' parameters:
    - SR-41 – 15%
    - All other roadways – 3%

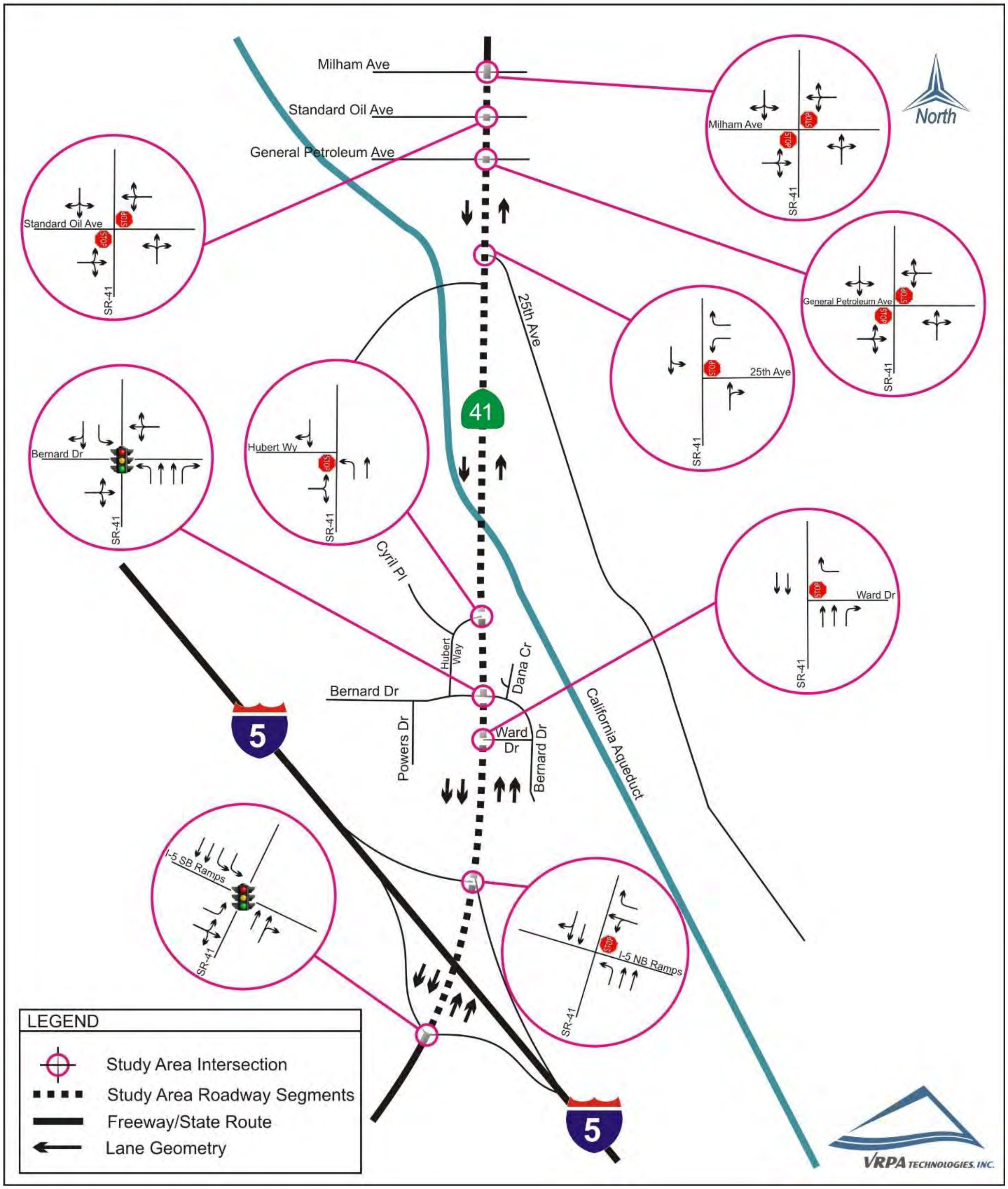
Results of the analysis show that two of the study area intersections (Bernard Drive at SR-41 and I-5 NB Ramps at SR-41) are currently operating below the minimum level of service during the Sunday peak hour. Table 2-1 shows the intersection LOS for the existing conditions at all of the study intersections listed above. Synchro 9 (HCM 2010) Worksheets are provided in Appendix B.

2.3.2 *Roadway Segment Capacity Analysis*

Results of the Sunday peak hour LOS segment analysis along the existing street and highway system are reflected in Table 2-2. Roadway segment analysis was based on the HCM-Based HCS 2010 modeling program. The program determines the capacity of individual road and highway segments based on numerous roadway variables (design speed, passing opportunities, signalized intersections per mile, number of lanes, etc.). These variables were identified and applied to the modeling program. Results of the analysis show that two of the study roadway segments (SR-41 between Milham Avenue and 25th Avenue and 25th Avenue and Bernard Drive) are currently operating below the minimum level of service during the Sunday peak hour.

Smart Growth SR-41 Corridor Improvement Plan
Existing Lane Geometry

Figure 2-1



Smart Growth SR-41 Corridor Improvement Plan
Existing Sunday Peak Hour Traffic

Figure 2-2

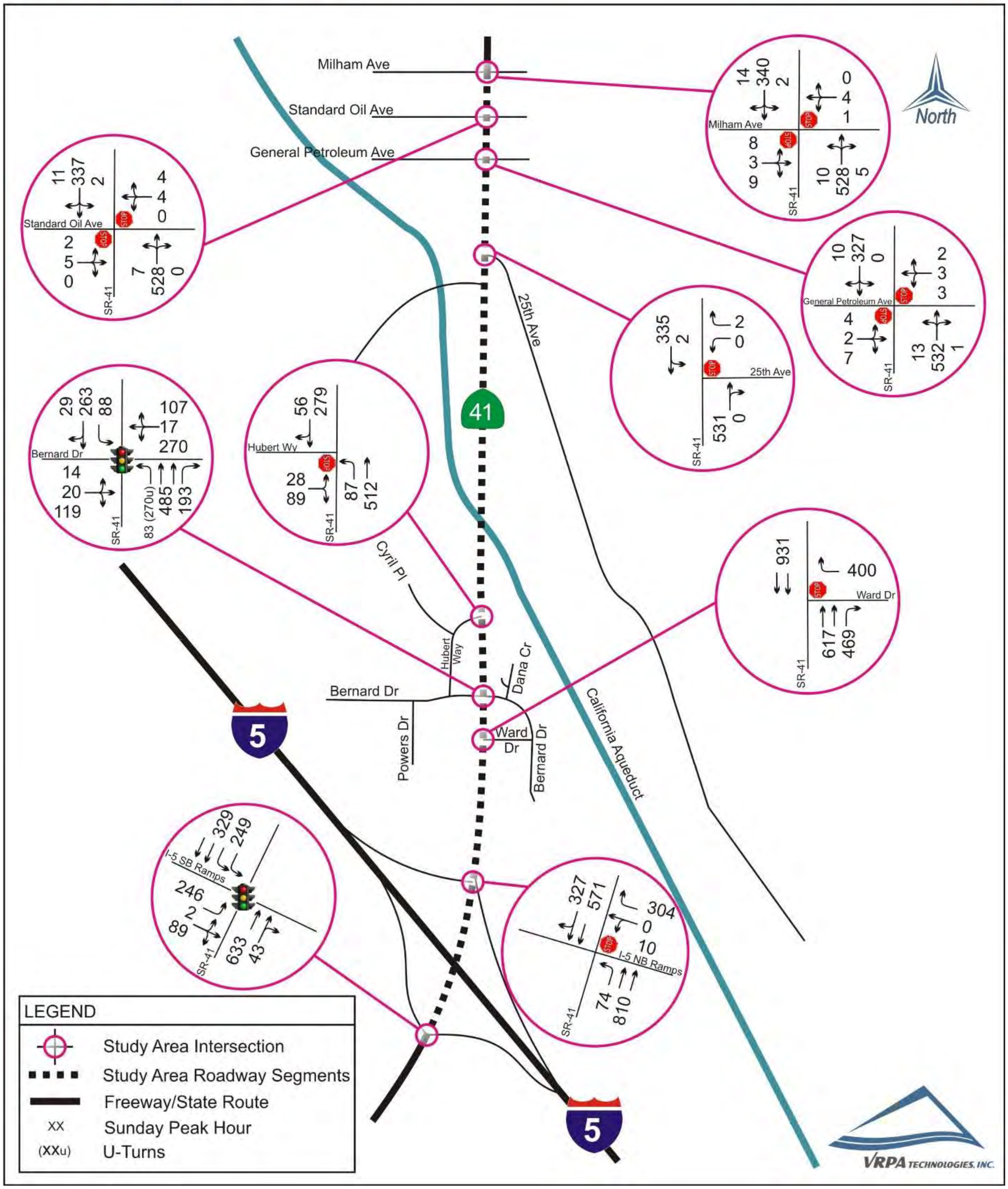


Table 2-1
Existing Intersection Operations

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	EXISTING CONDITIONS	
				DELAY	LOS
1. SR-41 / Milham Avenue	Two-Way Stop Sign	C	SUNDAY PM	20.7	C
2. SR-41 / Standard Oil Avenue	Two-Way Stop Sign	C	SUNDAY PM	20.8	C
3. SR-41 / General Petroleum Avenue	Two-Way Stop Sign	C	SUNDAY PM	18.9	C
4. SR-41 / 25th Avenue	One-Way Stop Sign	C	SUNDAY PM	12.1	B
5. SR-41 / Hubert Way	One-Way Stop Sign	C	SUNDAY PM	17.2	C
6. SR-41 / Bernard Drive	Traffic Signal	C	SUNDAY PM	**42.4**	**D** (1)
				42.9	**D** (2)
7. SR-41 / Ward Drive	One-Way Stop Sign	C	SUNDAY PM	22.4	C
8. SR-41 / I-5 NB Ramps	One-Way Stop Sign	C	SUNDAY PM	**24.2**	**D** (3)
				12.1	B (4)
9. SR-41 / I-5 SB Ramps	Traffic Signal	C	SUNDAY PM	22.5	C

DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded
For signalized intersections, delay results show the average for the entire intersection. For one-way stop controlled intersections, delay results show the delay for the worst movement
(1) HCM 2010 Methodologies ignore U-Turn Movements. U-Turn movements were evaluated with Left-Turn movements
(2) Synchro 9 result, which includes analysis of U-Turn movement
(3) 2010 HCM Delay associated with westbound left movements
(4) HCS 2010 Merge Analysis (I-5 NB Off-Ramp to SR-41 NB) - 12.1 value represents Density in terms of pc/mi/ln

Table 2-2
Existing Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	DIRECTION	TARGET LOS	PEAK HOUR	EXISTING CONDITIONS	
					VOLUME	LOS
SR-41						
Milham Avenue to 25th Avenue	1 lane	NB	C	SUNDAY PM	**533**	**D**
	1 lane	SB			**337**	**D**
25th Avenue to Bernard Drive	1 lane	NB	C	SUNDAY PM	**540**	**D**
	1 lane	SB			**335**	**D**
Bernard Drive to I-5 NB Ramps	2 lanes	NB	C	SUNDAY PM	1,086	B
	2 lanes	SB			931	B
I-5 NB Ramps to I-5 SB Ramps	2 lanes	NB	C	SUNDAY PM	884	B
	2 lanes	SB			581	A

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

2.4 Queuing Analysis

Table 2-3 provides a queue length summary for left and right turn lanes at study area intersections for the Existing scenario. Queuing analysis was completed using Section 400 of Caltrans' Highway Design Manual. The vehicular queue presented in Table 2-3 represents the approximate queue lengths for the respective lane movements.

Table 2-3
Existing Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		EXISTING CONDITIONS SUNDAY PM Queue
SR 41 / 25th Avenue	WB Left	25	0
	WB Right	25	2
SR 41 / Hubert Way	NB Left	225	73
SR 41 / Bernard Drive	NB Left	400	294
	NB Right	275	161
	SB Left	225	73
SR 41 / Ward Drive	NB Right	300	**391**
	WB Right	400	333
SR 41 / I-5 NB Ramps	NB Left	450	62
	WB Left	50	8
SR 41 / I-5 SB Ramps	SB Left	750	208
	EB Left	900	205
	EB Right	900	74

Queue is measured in feet / **BOLD** denotes storage length has been exceeded

2.5 SR-41 Collision Data

The Statewide Integrated Traffic Records System (SWITRS) and Transportation Injury Mapping System (TIMS) was used to evaluate traffic collisions along SR-41 in the unincorporated community of Kettleman City. SWITRS is a tool used by California Highway Patrol (CHP) and other Allied Agencies throughout California and includes various types of statistical reports and data. The database serves as a means to collect and process data gathered from a collision scene. TIMS has been established by the Safe Transportation Research and Education Center (SafeTREC) at the University of California, Berkeley to provide data and mapping analysis tools and information for traffic safety related research, policy and planning.

Information from the SWITRS/TIMS database shows that approximately 180 accidents (along SR-41) have occurred throughout the community of Kettleman City from 2007 until present day. This represents approximately 1.2% of the traffic accidents in all of Kings County over the same time period. The data also showed that 1.6% of all fatal collisions and 0.9% of all injury collisions in Kings County occurred throughout the community of Kettleman City. Table 2-4 provides a summary of the accidents reported in the community of Kettleman City. Unsafe speed was the primary collision factor for 28% of the accidents reported. Four (4) pedestrian related accidents have been reported over the past 10 years along the corridor. A graphical representation of traffic collisions throughout the community of Kettleman City over the past 10-years is provided in Figures 2-3a through 2-3c.

Table 2-4
SR-41 Traffic Accident Data (2007-2016)

TOTAL ACCIDENTS	FATAL ACCIDENTS	INJURY ACCIDENTS	PDO [1] ACCIDENTS	PEDESTRIAN / BICYCLE RELATED ACCIDENTS	PERSONS KILLED	PERSONS INJURED	PRIMARY COLLISION FACTOR (Top 3)			COLLISION TYPE (Top 3)		
							UNSAFE SPEED	R-0-W AUTO	IMPROPER TURN	REAR END	BROADSIDE	SIDESWIPE
159	3	44	112	4	3	68	28%	16%	14%	37%	24%	19%

1: PDO = Property Damage Only

Smart Growth SR-41 Corridor Improvement Plan
SR-41 Accident Data (2007-2016)

Figure 2-3a

LEGEND

Number of Accidents at Location*

* Approximate location

Smart Growth SR-41 Corridor Improvement Plan
SR-41 Accident Data (2007-2016)

Figure 2-3b

LEGEND

Number of Accidents at Location*

* Approximate location

VRPA TECHNOLOGIES, INC.

Smart Growth SR-41 Corridor Improvement Plan
SR-41 Accident Data (2007-2016)

Figure 2-3c

2.6 Public Transit and Active Transport Systems

The “Kings County Transit Development Plan” prepared by Kings County Association of Government (KCAG) in 2008 provides a comprehensive view of public transit operations in Kings County and is considered the “blueprint” for transit planning for the two public transit providers in Kings County. KCAG is updating the Transit Development Plan to provide a review of transit services to assess the efficiency and effectiveness of the services, to identify capital and operating needs based on data and public outreach, assist the transit operators with development of their comprehensive transit asset management plans required by MAP-21 (Moving Ahead for Progress in the 21st Century) regulations, and to develop a transit marketing plan to provide transit operators with updated strategies to improve service. This Transit Development Plan will cover a five-year period from FY 2014/2015 through FY 2018/2019 and will identify the present transit operations in Kings County, provided by both Kings Area Rural Transit and Corcoran Area Transit, and review the performance of the operators.

The largest provider of public transit services within Kings County is the Kings County Area Public Transit Agency (KCAPTA), which operates the Kings Area Rural Transit (KART). KART offers scheduled daily city bus service within the unincorporated community of Kettleman City. Route 12 (Hanford-Avenal) includes a total of seven (7) stops in Kettleman City along Milham Avenue, 3rd Street, General Petroleum Avenue, and Becky Pease Street. All KART bus routes begin and end at the KART Terminal located at 504 W. 7th Street across the railroad tracks from the Hanford Amtrak station. KART buses are wheelchair accessible and all full-size buses include bike racks.

Paratransit services are transportation services such as carpooling, vanpooling, taxi service, and dial-a-ride programs. The County supports reliable and efficient paratransit service by encouraging development of service systems that satisfy the transit needs of the elderly and physically handicapped.

2.7 Amtrak

The unincorporated community of Kettleman City is served by Amtrak’s Thruway Connecting Services, which offers a wide selection of destinations to communities without rail service. This Thruway service also provides connections to Amtrak trains. There is a curbside bus stop located along Hubert Way in front of the Carl’s Jr Restaurant. This bus stop is for pick up and/or drop off only and the purchasing of tickets or assistance is not available at this stop.

2.8 Bikeway and Pedestrian Facilities

Investment in bikeways and pedestrian facilities provides an environment-friendly transportation opportunity. Bicycling is considered an effective alternative mode of transportation that can help to improve air quality and reduce the number of vehicles traveling along existing highways, especially within the cities and unincorporated communities. While the numbers of cyclists are small in comparison to the amount of auto traffic, the size of Kettleman City means that most trips within the community can be comparable to using an automobile. Caltrans' SR-41 Transportation Concept Report, dated July 2013, indicates that bike use is permitted along SR-41 throughout the unincorporated community of Kettleman City. However, it should be noted that roadway shoulders along SR-41 are generally between 7-10 feet.

Bike lanes do not exist throughout the unincorporated community of Kettleman City even though Caltrans permits bike use along SR-41. Though sidewalk improvements have been recently incorporated in various parts of the community, more sidewalks and pedestrian improvements are needed to improve walkability throughout the entire community. There is a crosswalk at the intersection of SR-41 and Bernard Drive, on the north side of the intersection, that allows patrons to access retail development to the east and west of SR-41. A crosswalk also exits at the intersection of SR-41 and General Petroleum Avenue, which provides students access to Kettleman City Elementary School.

3.0 Traffic Impacts

This chapter provides an assessment of the anticipated traffic as it relates to the projected growth in the Kettleman City area and the impact of that traffic on the surrounding street system.

3.1 Cumulative Year 2040 Traffic Conditions

To assess the impacts of projected growth in the Kettleman City area, VRPA utilized the Kings County Association of Governments' (KCAG) Model Improvement Program (MIP) travel demand model and Caltrans data to determine future traffic forecasts for Year 2040 conditions. Caltrans recently requested that an annual growth rate of 1.21 percent be applied to assess future year conditions for a development project in the study area that was manually added to future year traffic for this study. The growth rate of 1.21 percent was applied to existing segment counts (derived from Sunday peak hour turning movement counts) gathered for the Project area. Existing Sunday peak hour turning movements and the roadway segment traffic forecasts (from the application of the 1.21 percent growth rate) was input in the TurnsW32 program and the program calculated Sunday peak hour turning movements. The TurnsW32 program derives forecast turning movements using an iterative approach, which alternately balances the inflows and outflows.

Traffic conditions resulting from the Cumulative Year 2040 scenario is shown in Figure 3-1. Figure 3-2 shows the anticipated traffic volumes at the study intersections with elimination of the northbound left U-turn sign at the SR-41 and Bernard Drive intersection.

No improvements to the roadway network were assumed for the Cumulative Year 2040 No Project and Cumulative Year 2040 Plus Project scenarios.

3.1.1 *Cumulative Year 2040 Intersection Capacity Analysis*

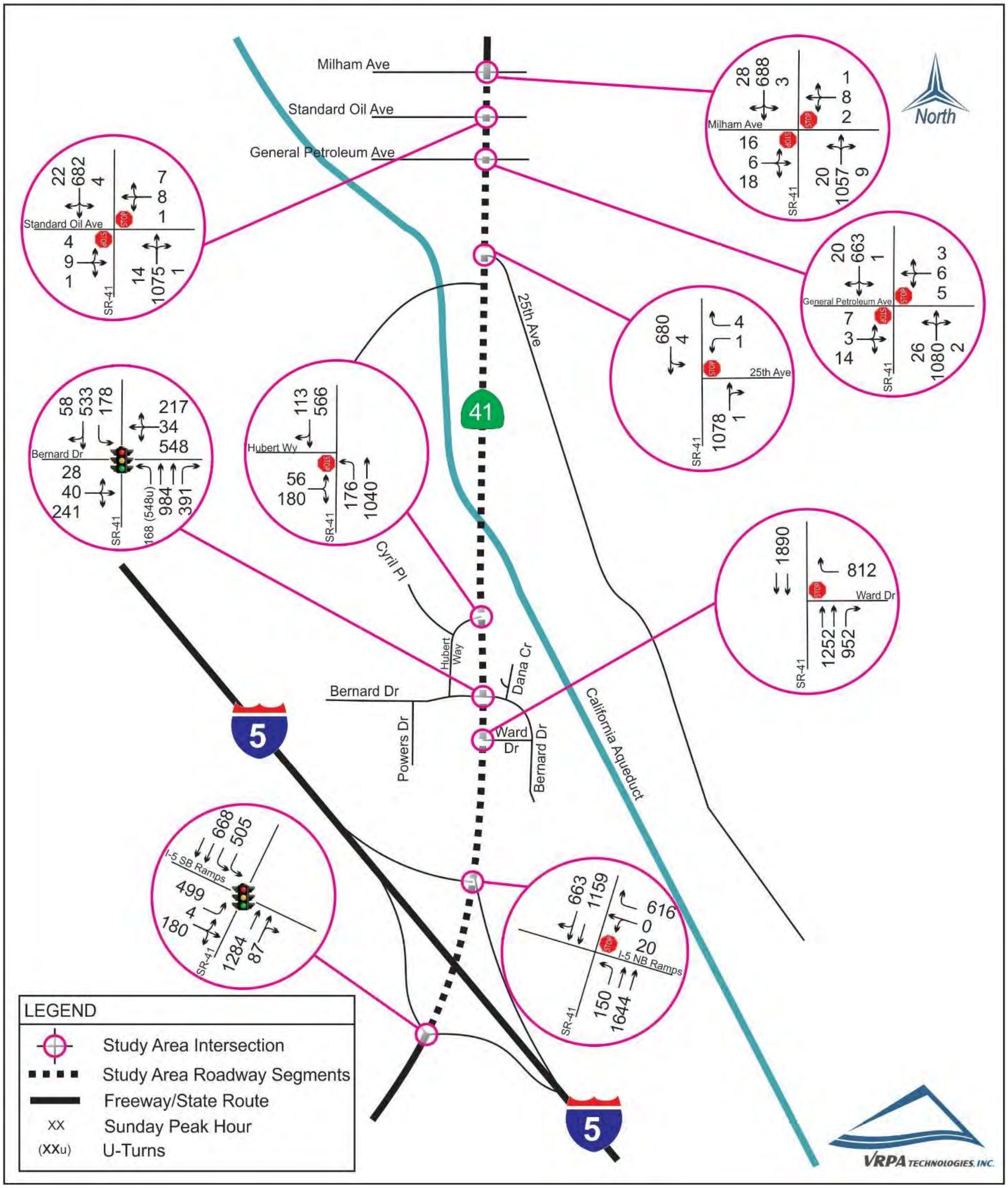
Table 3-1 shows intersections that are expected to fall short of desirable operating conditions for the Cumulative Year 2040 scenario. Potential roadway improvements are discussed in Section 3.1.4 below. Results of the analysis show that the all of the study intersections will fall below Caltrans' acceptable level of service standard.

3.1.2 *Cumulative Year 2040 Roadway Segment Capacity Analysis*

Table 3-2 shows roadway segments that are expected to fall short of desirable operating conditions for the Cumulative Year 2040 scenario. Results of the analysis show that three (3) of the study roadway segments will fall below Caltrans' acceptable levels of service standard. Potential roadway improvements are discussed in Section 3.1.4 below.

Smart Growth SR-41 Corridor Improvement Plan
Cumulative Year 2040 Sunday Peak Hour Traffic

Figure 3-1



Smart Growth SR-41 Corridor Improvement Plan
Cumulative Year 2040 Sunday Peak Hour Traffic (Prohibited U-Turns)

Figure 3-2

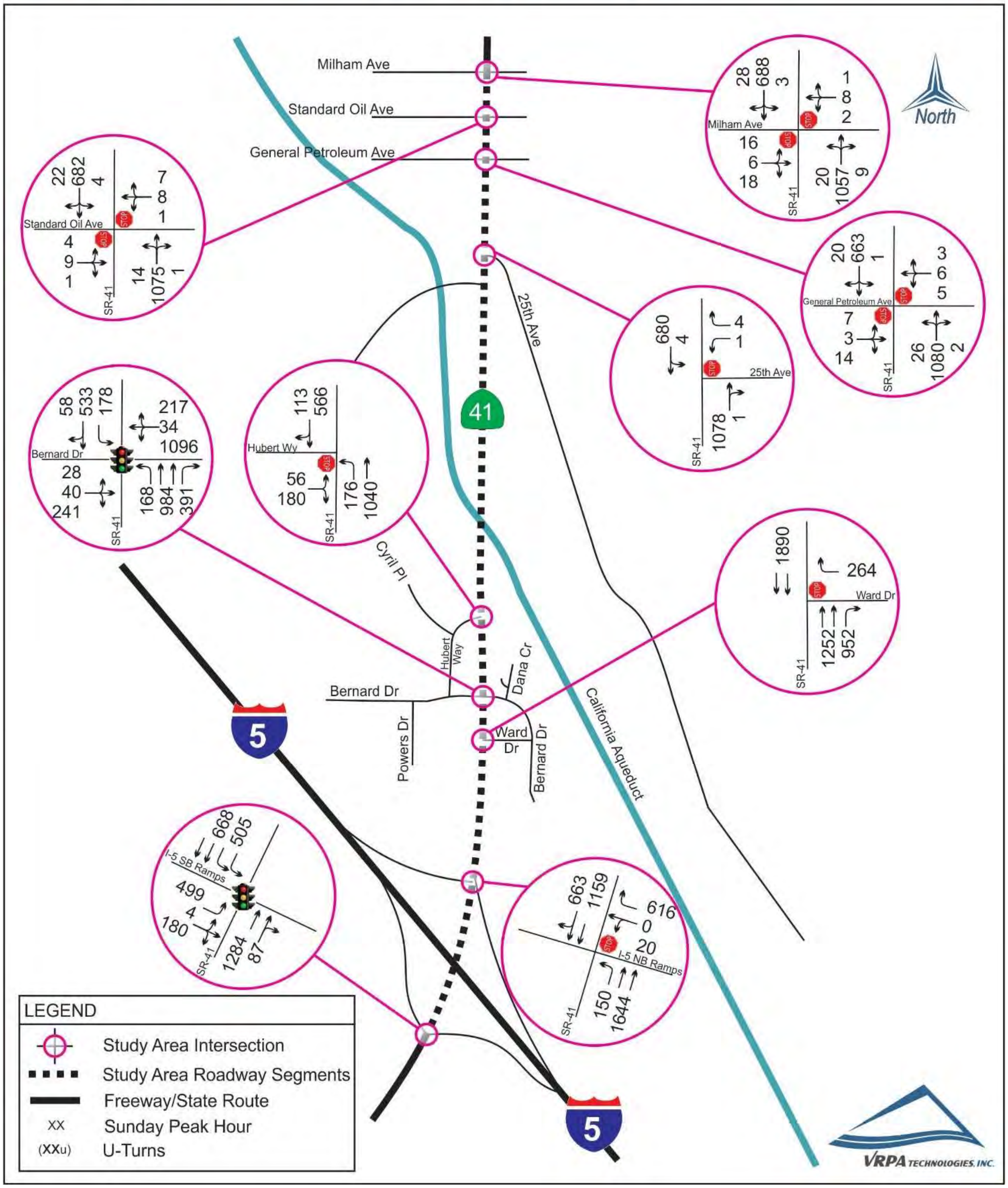


Table 3-1
Cumulative Year 2040 Intersection Operations

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	CUMULATIVE YEAR 2040 CONDITIONS	
				DELAY	LOS
1. SR-41 / Milham Avenue	Two-Way Stop Sign	C	SUNDAY PM	**118.3**	**F**
2. SR-41 / Standard Oil Avenue	Two-Way Stop Sign	C	SUNDAY PM	**96.0**	**F**
3. SR-41 / General Petroleum Avenue	Two-Way Stop Sign	C	SUNDAY PM	**91.7**	**F**
4. SR-41 / 25th Avenue	One-Way Stop Sign	C	SUNDAY PM	**55.8**	**F**
5. SR-41 / Hubert Way	One-Way Stop Sign	C	SUNDAY PM	**550.4**	**F**
6. SR-41 / Bernard Drive	Traffic Signal	D	SUNDAY PM	**309.7**	**F** (1)
				298.1	**F** (2)
				391.0	**F** (3)
7. SR-41 / Ward Drive	One-Way Stop Sign	C	SUNDAY PM	**596.1**	**F**
				35.7	**E** (3)
8. SR-41 / I-5 NB Ramps	One-Way Stop Sign	D	SUNDAY PM	**540.9**	**F** (4)
				22.6	C (5)
9. SR-41 / I-5 SB Ramps	Traffic Signal	C	SUNDAY PM	**80.5**	**F**

DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded
For signalized intersections, delay results show the average for the entire intersection. For one-way stop controlled intersections, delay results show the delay for the worst movement
(1) HCM 2010 Methodologies ignore U-Turn Movements. U-Turn movements were evaluated with Left-Turn movements
(2) Synchro 9 result, which includes analysis of U-Turn movement
(3) HCM 2010 Methodologies with prohibited NB U-turn at SR-41 and Bernard Avenue intersection
(4) 2010 HCM Delay associated with westbound left movements
(5) HCS 2010 Merge Analysis (I-5 NB Off-Ramp to SR-41 NB) - 16.5 value represents Density in terms of pc/mi/ln

Table 3-2
Cumulative Year 2040 Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	DIRECTION	TARGET LOS	PEAK HOUR	CUMULATIVE YEAR 2040 CONDITIONS	
					VOLUME	LOS
SR-41						
Milham Avenue to 25th Avenue	1 lane	NB	D	SUNDAY PM	**1,108**	**E**
	1 lane	SB			**708**	**E**
25th Avenue to Bernard Drive	1 lane	NB	D	SUNDAY PM	**1,229**	**E**
	1 lane	SB			**769**	**E**
Bernard Drive to I-5 NB Ramps	2 lanes	NB	C	SUNDAY PM	**2,260**	**D**
	2 lanes	SB			1,890	C
I-5 NB Ramps to I-5 SB Ramps	2 lanes	NB	C	SUNDAY PM	1,794	C
	2 lanes	SB			1,179	B

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

3.1.3 *Cumulative Year 2040 Queuing Analysis*

Table 3-3 provides a queue length summary for left and right turn lanes at the study intersections for the Cumulative Year 2040 scenario. Queuing analysis was completed using Section 400 of Caltrans' Highway Design Manual. The vehicular queue presented in Table 3-3 represents the approximate queue lengths for the respective lane movements. Results of the analysis show that the existing northbound left and right storage lengths at SR-41 and Bernard Drive and the existing northbound right storage length at SR-41 and Ward Drive will not be sufficient for Cumulative Year 2040 conditions. Results also show that existing westbound right storage length at SR-41 and Ward Drive will not be sufficient for Cumulative Year 2040 conditions.

Table 3-3
Cumulative Year 2040 Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		CUMULATIVE YEAR 2040 CONDITIONS	CUMULATIVE YEAR 2040 (Prohibited U-Turn) CONDITIONS
			SUNDAY PM Queue	SUNDAY PM Queue
SR 41 / 25th Avenue	WB Left	25	1	1
	WB Right	25	3	3
SR 41 / Hubert Way	NB Left	225	147	147
SR 41 / Bernard Drive	NB Left	400	**597**	140
	NB Right	275	**326**	**326**
	SB Left	225	148	148
SR 41 / Ward Drive	NB Right	300	**793**	**793**
	WB Right	400	**677**	220
SR 41 / I-5 NB Ramps	NB Left	450	125	125
	WB Left	50	17	17
SR 41 / I-5 SB Ramps	SB Left	750	421	421
	EB Left	900	416	416
	EB Right	900	150	150

Queue is measured in feet / **BOLD** denotes storage length has been exceeded

3.1.4 *Internal Circulation/Access*

Adequate access and internal circulation is a vital component to the various commercial developments located on the east and west of SR-41. Effective site access and circulation provides convenient, efficient, and safe methods of navigation for all users. As development increase in the study area, it is imperative that future traffic doesn't backup onto main circulation roadways such as SR-41.

As noted in Table 3-3 above, the northbound left storage length at SR-41 and Bernard Drive will not be sufficient for Cumulative Year 2040 conditions. Vehicles in the northbound left turning lane will block vehicles in the #1 lane along SR-41 under Cumulative Year 2040 conditions without remediation and level of service operations and efficiency along northbound SR-41 would decrease. Table 3-3 also shows that the northbound right storage length at SR-41 and Ward Drive will not be sufficient for Cumulative Year 2040 conditions. The projected queue under the Cumulative Year 2040 scenario is more than 300 feet greater than the exiting storage pocket length. Vehicles in the northbound right turning lane will block vehicles in the #2 lane along SR-41 without remediation.

Ward Drive is approximately 400 feet in length and resides east of SR-41 to Bernard Drive. Table 3-3 indicates that queuing at the westbound right turning movement at SR-41 and Ward Drive will exceed 550 feet which is well beyond the 400 feet roadway length. Thus, Bernard Drive would experience queuing to the north and south of the Bernard Drive at Ward Drive intersection. Access to Bernard Drive and Ward Drive from adjacent commercial driveways would be difficult and would likely cause queuing at the respective commercial driveways.

The eastbound and westbound approaches of Bernard Drive at SR-41 provide left, through, or right movements from a single lane. Queuing conditions at these approaches was determined using the Sunday peak hour volumes provided in Figure 3-1 and 3-2 and Section 400 of Caltrans' Highway Design Manual. Results of the analysis show that the eastbound movement along Bernard Drive would queue approximately 170 feet to Hubert Way. Results of the analysis also shows that the westbound movement along Bernard Drive would queue approximately 510 feet to just north of the Shell Gas Station Driveway. Access to Bernard Drive from adjacent commercial driveways (Mobil Gas Station / Dana Circle) would be difficult and would likely cause queuing at the respective commercial driveways. Prohibiting northbound left U-turns at the SR-41 and Bernard Drive intersection would decrease vehicular traffic at the westbound right turn at SR-41 and Ward Drive and increase westbound left turning movements at SR-41 and Bernard Drive. The westbound movement along Bernard Drive would queue approximately 860 feet to the In and Out Driveway along Bernard Drive. Internal access and circulation deficiencies would be exacerbated with the prohibition of the northbound left U-turn at the SR-41 and Bernard Drive intersection.

3.1.5 *Cumulative Year 2040 Improvements*

This section describes potential improvements to alleviate level of service deficiencies from projected growth in the Kettleman City area. Described below are potential improvements at study area intersections and segments for the Cumulative Year 2040 scenario that would, in most cases, result in acceptable levels of service.

INTERSECTIONS

- ✓ SR-41 at Milham Avenue
  No improvements recommended

The minor approaches of the intersection (Milham Avenue) are forecasted to operate at unacceptable LOS 'F' under the Cumulative Year 2040 scenario. This intersection does not meet the peak hour traffic signal warrant because the minor approach does not carry enough traffic to justify signalization. Installation of a four-way stop at this intersection would yield an unacceptable LOS 'F' with the northbound and southbound approaches experiencing LOS 'F' conditions. Section 3.2 below includes roadway alternatives along SR-41 that couple potentially address the level of service deficiency at this intersection.

- ✓ SR-41 at Standard Oil Avenue
  No improvements recommended

The eastbound approach (Standard Oil Avenue) of the intersection is forecasted to operate at unacceptable LOS 'F' under the Cumulative Year 2040 scenario. This intersection does not meet the peak hour traffic signal warrant because the minor approach does not carry enough traffic to justify signalization. Installation of a four-way stop at this intersection would yield an unacceptable LOS 'F' with the northbound and southbound approaches experiencing LOS 'F' conditions. As a result, no improvements are recommended.

- ✓ SR-41 at General Petroleum Avenue
  No improvements recommended

The westbound approach (General Petroleum Avenue) of the intersection is forecasted to operate at unacceptable LOS 'F' under the Cumulative Year 2040 scenario. This intersection does not meet the peak hour traffic signal warrant because the minor approach does not carry enough traffic to justify signalization. Installation of a four-way stop at this intersection would yield an unacceptable LOS 'F' with the northbound and southbound approaches experiencing LOS 'F' conditions. Section 3.2 below includes roadway alternatives along SR-41 that couple potentially address the level of service deficiency at this intersection.

- ✓ SR-41 at 25th Avenue
  No improvements recommended

The minor approach of the intersection (25th Avenue) is forecasted to operate at unacceptable LOS 'F' under the Cumulative Year 2040 scenario. This intersection does not meet the peak hour traffic signal warrant because the minor approach does not carry enough traffic to justify signalization. Installation of a four-way stop at this intersection would yield an unacceptable LOS 'F' with the northbound and southbound approaches experiencing LOS 'F' conditions. As a result, no improvements are recommended. It should be noted that the widening of SR-41 from 2 to 4 lanes as noted below would cause this intersection to yield an unacceptable LOS 'E'.

✓ <u>SR-41 at Hubert Way</u>

Recommended improvements to achieve acceptable levels of service:

- Cumulative Year 2040 scenario:
  - Eliminate eastbound left turning movement at the intersection

The minor approach of the intersection (Hubert Way) is forecasted to operate at unacceptable LOS 'F' under the Cumulative Year 2040 scenario. This intersection does not meet the peak hour traffic signal warrant because the minor approach does not carry enough traffic to justify signalization. Installation of a four-way stop at this intersection would yield an unacceptable LOS 'F' with the northbound and southbound approaches experiencing LOS 'F' conditions. However, elimination of the eastbound left turn at this intersection would yield acceptable LOS 'C' operations.

✓ <u>SR-41 at Bernard Drive</u>

Recommended improvements to achieve acceptable levels of service:

- Cumulative Year 2040 scenario:
  - Widen the northbound approach to 2 left turn lanes, 2 through lanes, and 1 right turn lane with overlap phasing (adding 1 left turn lane)
  - Widen the southbound approach to 1 left turn lane and 2 through lanes with a shared right (adding 1 through lane)
  - Widen the eastbound approach to 1 left-through lane and 2 right turn lanes (adding 2 right turn lanes)
  - Widen the westbound approach to 2 left turn lanes, 1 through lane, and 1 right turn lane (adding 2 left turn lanes and 1 right turn lane)

- Cumulative Year 2040 scenario (with Prohibited U-Turn):
  - Install northbound right overlap phasing
  - Widen the southbound approach to 1 left turn lane and 2 through lanes with a shared right (adding 1 through lane)
  - Widen the eastbound approach to 1 left-through lane and 1 right turn lane with overlap phasing (adding 1 right turn lane)
  - Widen the westbound approach to 3 left turn lanes and 1 through lane with a shared right (adding 3 left turn lanes)

The improvements identified above for the Cumulative Year 2040 scenario are sufficient to meet LOS 'D'. It should be noted that the intersection operates at LOS 'D' under existing conditions. As a result, the improvements identified above will meet Caltrans' acceptable LOS standard.

✓ <u>SR-41 at Ward Drive</u>

Recommended improvements to achieve acceptable levels of service:

- Cumulative Year 2040 scenario:

- Widen the westbound approach to 2 right turn lanes (adding 1 right turn lane)

The improvements identified above for the Cumulative Year 2040 scenario are not sufficient to meet Caltrans' LOS standard of 'C'. Installation of a traffic signal similar to the Nees Avenue at Audubon Drive intersection in Fresno, CA would yield acceptable LOS 'A' conditions at the intersection. However, a traffic signal at this location may not be feasible given the spacing of the Bernard Drive and Ward Drive intersections along SR-41.

The improvements identified above are sufficient to meet Caltrans' acceptable LOS standard of 'C' if northbound left U-turns at Bernard Drive were prohibited. It should be noted that dual right turns at a "Stop Control" intersection could pose safety issues.

✓ SR-41 at I-5 NB Ramps
Recommended improvements to achieve acceptable levels of service:
- Cumulative Year 2040 scenario:
    - Install Traffic Signal

The minor approach of the intersection (I-5 NB Off-Ramp) is forecasted to operate at unacceptable LOS 'F' under the Cumulative Year 2040 scenario. Though the intersection does not meet the peak hour traffic signal warrant due to the minor approach volume, a traffic signal is recommended to alleviate level of service deficiencies at the intersection. In addition, a traffic signal is recommended for safety reasons given the high levels of traffic during peak hour conditions and the mix of signalized and unsignalized intersections in the study area.

✓ SR-41 at I-5 SB Ramps
Recommended improvements to achieve acceptable levels of service:
- Cumulative Year 2040 scenario:
    - Widen the northbound approach to 2 through lanes and 1 right turn lane (adding 1 right turn lane)
    - Widen the eastbound approach to 1 left turn lane, 1 left-through lane, and 1 right turn lane (adding 1 right turn lane)

The improvements identified above for the Cumulative Year 2040 scenario will achieve LOS 'D' conditions. It should be noted that the intersection operates at LOS 'C' under existing conditions.

ROADWAY SEGMENTS

✓ SR-41
Recommended improvements to achieve acceptable levels of service:
- Cumulative Year 2040 scenario:
  Milham Avenue to 25th Avenue
    - Widen the northbound segment to 2 travel lanes (adding 1 travel lane)
    - Widen the southbound segment to 2 travel lanes (adding 1 travel lane)

25th Avenue to Bernard Drive

- Widen the northbound segment to 2 travel lanes (adding 1 travel lane)
- Widen the southbound segment to 2 travel lanes (adding 1 travel lane)

Bernard Drive to I-5 NB Ramps

- Widen the northbound segment to 3 travel lanes (adding 1 travel lane)

The improvements identified above for the Cumulative Year 2040 scenario are sufficient to meet Caltrans' acceptable LOS standard.

POST-IMPROVEMENT LEVEL OF SIGNIFICANCE

The level of service resulting from the improvements identified above is shown in Table 3-4 for study area intersections and Table 3-5 for roadway segments. The resulting Cumulative Year 2040 lane geometry is shown in Figures 3-3a and 3-3b.

In addition to the proposed improvements identified above, Table 3-6 identifies left turn and right turn pocket lengths required for the Cumulative Year 2040 scenario. The determination of the recommended storage length was determined by recommendations of storage lengths found in Chapter 400 of Caltrans' Highway Design Manual.

Table 3-4
Intersection Operations with Recommended Improvements

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	CUMULATIVE YEAR 2040 CONDITIONS WITH RECOMMENDED IMPROVEMENTS	
				DELAY	LOS
1. SR-41 / Milham Avenue	Two-Way Stop Sign	C	SUNDAY PM	**118.3**	**F**
2. SR-41 / Standard Oil Avenue	Two-Way Stop Sign	C	SUNDAY PM	**96.0**	**F**
3. SR-41 / General Petroleum Avenue	Two-Way Stop Sign	C	SUNDAY PM	**91.7**	**F**
4. SR-41 / 25th Avenue	One-Way Stop Sign	C	SUNDAY PM	**55.8**	**F**
5. SR-41 / Hubert Way	One-Way Stop Sign	C	SUNDAY PM	19.0	C
6. SR-41 / Bernard Drive	Traffic Signal	D	SUNDAY PM	54.9	D (1)
				44.5	D (2)
				52.9	D (3)
7. SR-41 / Ward Drive	One-Way Stop Sign	C	SUNDAY PM	**117.7**	**F**
8. SR-41 / I-5 NB Ramps	Traffic Signal	D	SUNDAY PM	32.9	C
9. SR-41 / I-5 SB Ramps	Traffic Signal	C	SUNDAY PM	**41.9**	**D**

DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded
For signalized intersections, delay results show the average for the entire intersection. For one-way stop controlled intersections, delay results show the delay for the worst movement
(1) HCM 2010 Methodologies ignore U-Turn Movements. U-Turn movements were evaluated with Left-Turn movements
(2) Synchro 9 result, which includes analysis of U-Turn movement
(3) HCM 2010 Methodologies with prohibited NB U-turn at SR-41 and Bernard Avenue intersection

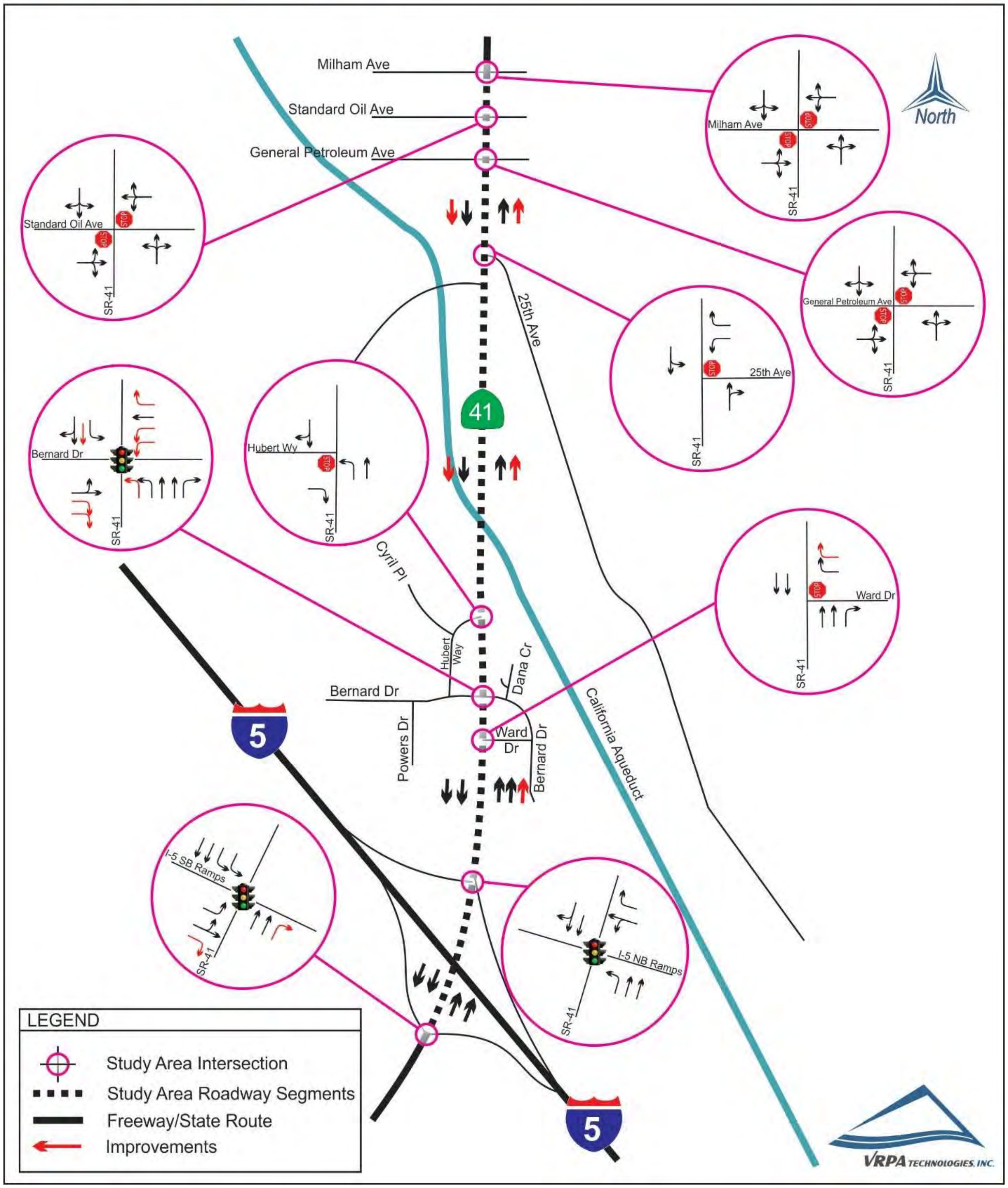
Table 3-5
Segment Operations with Recommended Improvements

STREET SEGMENT	SEGMENT DESCRIPTION	DIRECTION	TARGET LOS	PEAK HOUR	CUMULATIVE YEAR 2040 CONDITIONS	
					VOLUME	LOS
SR-41						
Milham Avenue to 25th Avenue	2 lanes	NB	D	SUNDAY PM	1,108	B
	2 lanes	SB			708	A
25th Avenue to Bernard Drive	2 lanes	NB	D	SUNDAY PM	1,229	B
	2 lanes	SB			769	A
Bernard Drive to I-5 NB Ramps	3 lanes	NB	C	SUNDAY PM	2,260	C
	2 lanes	SB			1,890	C

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

Smart Growth SR-41 Corridor Improvement Plan
Cumulative Year 2040 Lane Geometry

Figure 3-3a



Smart Growth SR-41 Corridor Improvement Plan
Cumulative Year 2040 Lane Geometry (Prohibited U-Turns)

Figure 3-3b

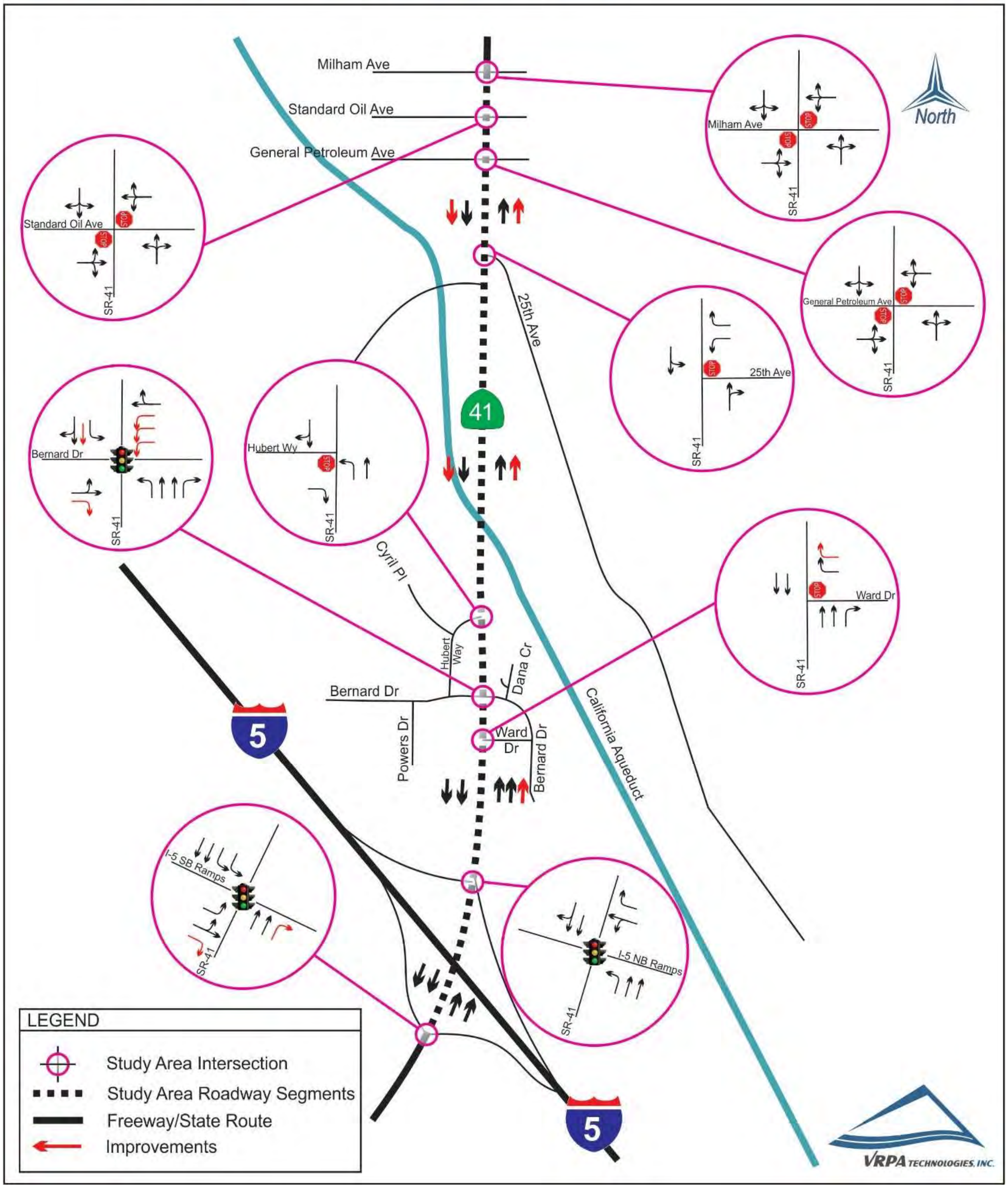


Table 3-6
Left and Right Turn Storage Requirements

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		CUMULATIVE YEAR 2040 STORAGE LENGTH (ft)	CUMULATIVE YEAR 2040 (Prohibited U-Turn) STORAGE LENGTH (ft)
SR 41 / 25th Avenue	WB Left	25	25	25
	WB Right	25	25	25
SR 41 / Hubert Way	NB Left	225	225	225
SR 41 / Bernard Drive	NB Left	400	**600**	400
	NB Right	275	275	275
	SB Left	225	225	225
	EB Right	--	**2 @ 100**	**200**
	WB Left	--	**2 @ 225**	**3 @ 300**
SR 41 / Ward Drive	NB Right	300	**700**	**700**
	WB Right	400	**400**	225
SR 41 / I-5 NB Ramps	NB Left	450	450	450
	WB Left	50	50	50
SR 41 / I-5 SB Ramps	SB Left	750	750	750
	EB Left	900	900	900
	EB Right	900	900	900

Queue is measured in feet / **BOLD** denotes storage length has been improved

3.2 Roadway Alternatives

Several roadway alternatives intended to alleviate roadway circulation deficiencies and increase safety along the SR-41 corridor were evaluated in the study area. Those roadway alternatives include:

- ✓ 25th Avenue Truck Bypass
- ✓ Evaluation of a four-way stop, roundabout, and traffic signal control at SR-41 and Milham Avenue and SR-41 and General Petroleum Avenue
- ✓ Hubert Way/Dana Circle Extension at SR-41
- ✓ Evaluation of roundabout at SR 41 and Bernard Drive
- ✓ Elimination of Ward Drive
- ✓ Reconfiguration of I-5 NB Off Ramp at SR-41

3.2.1 *25th Avenue Truck Bypass*

Truck traffic represents approximately 15% of total traffic along SR-41 in the study area based on recent traffic counts conducted by Caltrans. A truck bypass beginning at Edwards Avenue and SR-41 was considered for purposes of enhancing safety and/or stabilizing traffic flow along the SR-41 Corridor in Kettleman City. Figure 3-4 graphically displays the location of the truck bypass along with other major roadways in the vicinity of Kettleman city. It should be noted that Caltrans is not opposed to implementation of the 25th Avenue Truck Bypass.

Reducing truck trips along the SR-41 corridor between the community of Kettleman City and the I-5 interchange would improve intersection and roadway segment operations. Trucks headed to and from the north along SR-41 desiring access to the Con-way and FedEx freight facilities would bypass the Kettleman City community, thus enhancing safety in the area.

3.2.2 *Evaluation of a four-way stop, roundabout, and traffic signal control at SR-41 and Milham Avenue and SR-41 and General Petroleum Avenue*

Considering Cumulative Year 2040 volumes that were developed using the methodology presented in Section 3.1, the SR-41 and Milham Avenue and SR-41 and General Petroleum Avenue intersections were evaluated against three intersection control strategies, include all-way stop control, roundabout control, and signal control. The posted speed limit of 55 miles per hour (mph) along SR-41 (45 mph in residential are) and the lack of adequate pedestrian crossings makes it difficult for pedestrians to cross SR-41. The SR-41 and General Petroleum Avenue intersection is the optimal location for an alternative control strategy to reduce vehicle speed and assist pedestrians crossing SR-41. Figure 3-5 provides the lane geometry utilized for the analysis of the three intersection control strategies and Table 3-7 provides the results of the analysis.

Results of the analysis show that the signalized and roundabout intersection control strategies are the only strategies that provide LOS C or better operations for the Cumulative Year 2040

Sunday Peak Hour scenario. The all-way stop intersection control will yield an unacceptable LOS 'F' with the northbound and southbound approaches for both intersection experiencing LOS 'F' conditions. The all-way stop control typically provides a relatively safe form of control since it requires all traffic to stop at an intersection and resolve conflicts at low speeds. However, this is not the case when the all-way stop control cannot provide the necessary capacity to serve traffic demands. In these situations, the resulting queuing due to the capacity deficiency becomes a safety problem. In the case of the SR-41 and Milham Avenue and SR-41 and General Petroleum Avenue intersections, level of service F conditions are expected at the northbound and southbound approach. Due to the speed of traffic along SR-41, the queuing would be expected to be especially problematic for safety considerations.

3.2.3 *Hubert Way/Dana Circle Extension at SR-41*

Considering Cumulative Year 2040 volumes that were developed using the methodology presented in Section 3.1, the existing intersection of SR-41 and Hubert Way was evaluated with a connection to the east at Dana Circle (extension). Figure 3-6 provides the lane geometry and traffic volumes utilized for the analysis and Table 3-8 provides the results of the analysis.

Results of the analysis show that a full access intersection at SR-41 and Hubert Way-Dana Circle will yield an unacceptable LOS 'F' during the Sunday peak hour. This intersection does not meet the peak hour traffic signal warrant because the minor approach (left turn) does not carry enough traffic to justify signalization. It should be noted that the westbound approach volume is causing the LOS deficiency. Results of the analysis also show that the Dana Circle extension will not attract enough traffic to alleviate the level of service deficiency at SR-41 and Bernard Drive.

Results of the analysis show that a left/right-in and right-out access intersection at SR-41 and Hubert Way-Dana Circle will yield an acceptable LOS 'C' during the Sunday peak hour. However, results of the analysis also show that the Dana Circle extension will not attract enough traffic to alleviate the level of service deficiency at SR-41 and Bernard Drive.

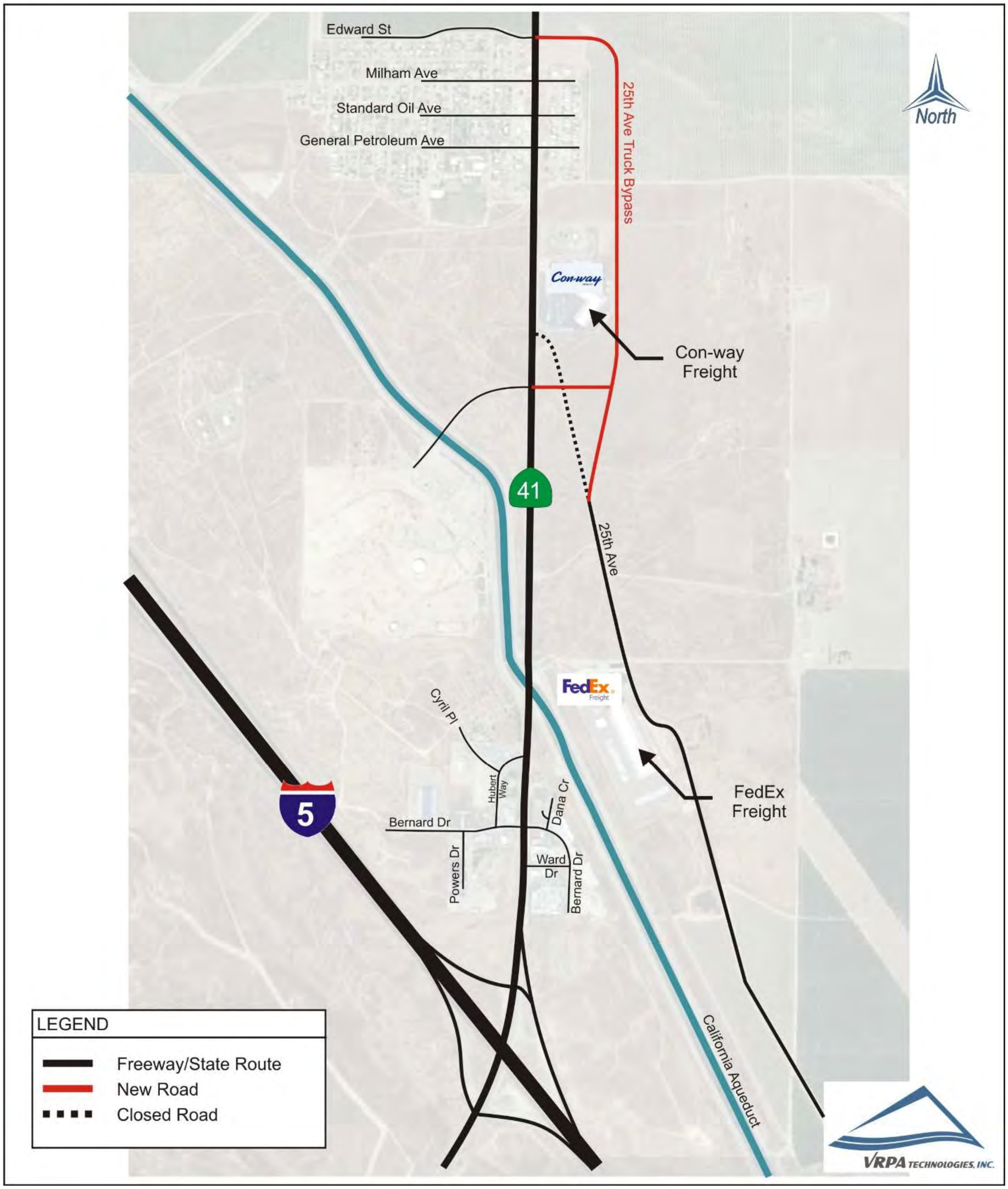
3.2.4 *Evaluation of roundabout at SR-41 and Bernard Drive*

Considering Cumulative Year 2040 volumes that were developed using the methodology presented in Section 3.1, the intersection of SR-41 and Bernard Drive was evaluated for the roundabout intersection control strategy. Figure 3-7 provides the lane geometry utilized for the analysis of the roundabout intersection control strategy and Table 3-9 provides the results of the analysis.

Results of the analysis show that the roundabout intersection control provides LOS 'F' operations for the Cumulative Year 2040 Sunday peak hour for the intersection of SR-41 and Bernard Drive. Considering Caltrans' LOS criteria, the is not anticipated to operate at acceptable levels of service considering the Cumulative Year 2040 volumes.

Smart Growth SR-41 Corridor Improvement Plan
25th Avenue Truck Bypass - Roadway Alternative

Figure 3-4



Smart Growth SR-41 Corridor Improvement Plan

Cumulative Year 2040 Sunday Peak Hour Traffic - SR-41 at Milham and General Petroleum Avenues Roadway Alternative

Figure 3-5

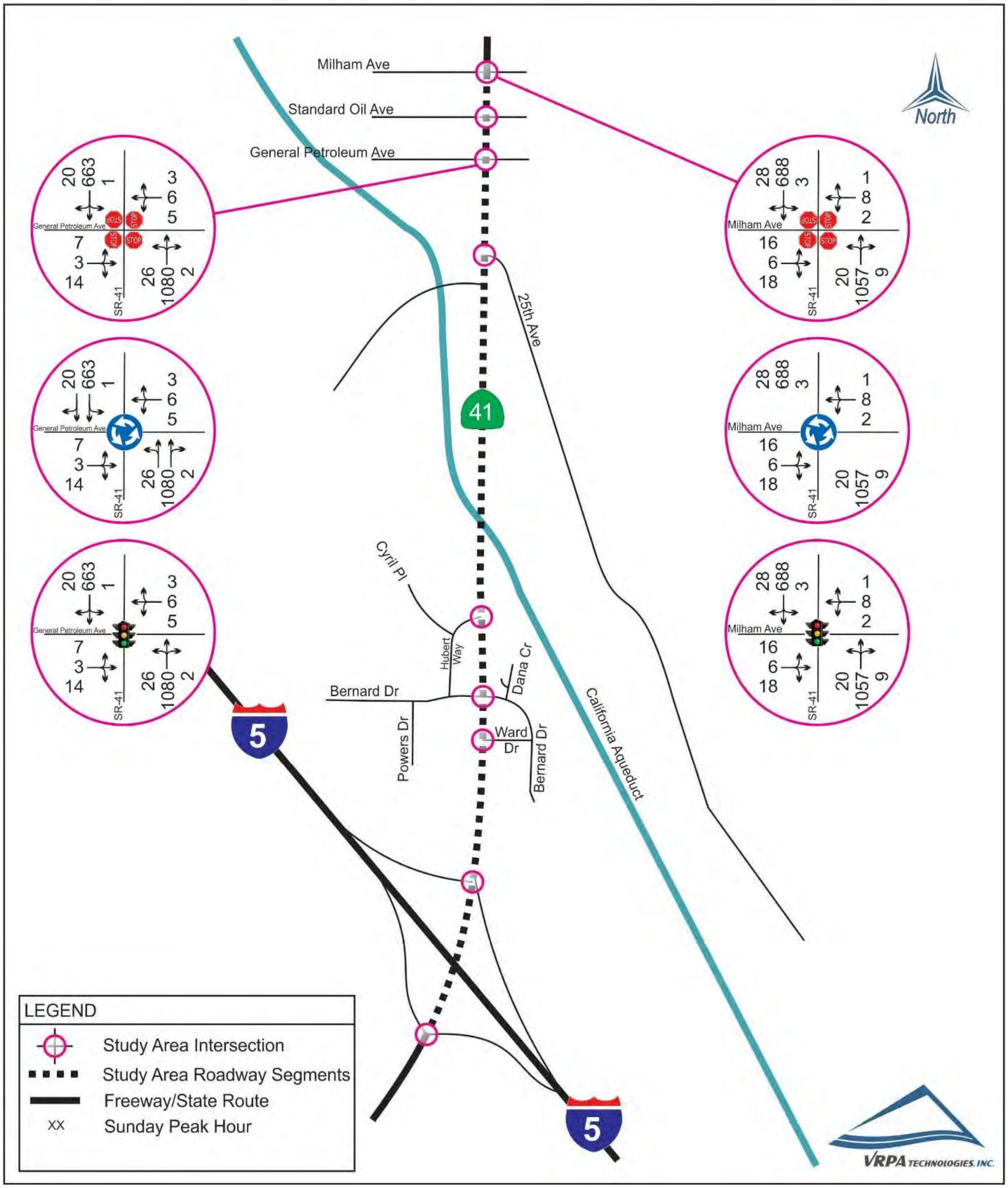


Table 3-7
SR-41 at Milham and General Petroleum Avenues Roadway Alternative

INTERSECTION	TARGET LOS	PEAK HOUR	CONTROL	CUMULATIVE YEAR 2040 CONDITIONS	
				DELAY	LOS
SR-41 / Milham Avenue	D	SUNDAY PM	Four-Way Stop	**234.0**	**F**
			Roundabout	8.9	A (1)
			Traffic Signal	5.1	A
SR-41 / General Petroleum Avenue	D	SUNDAY PM	Four-Way Stop	**233.0**	**F**
			Roundabout	8.9	A (1)
			Traffic Signal	5.1	A

DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded
(1) PTV Vistro Modeling Software

Smart Growth SR-41 Corridor Improvement Plan
Cumulative Year 2040 Sunday Peak Hour Traffic -Dana Circle Extension Roadway Alternative

Figure 3-6

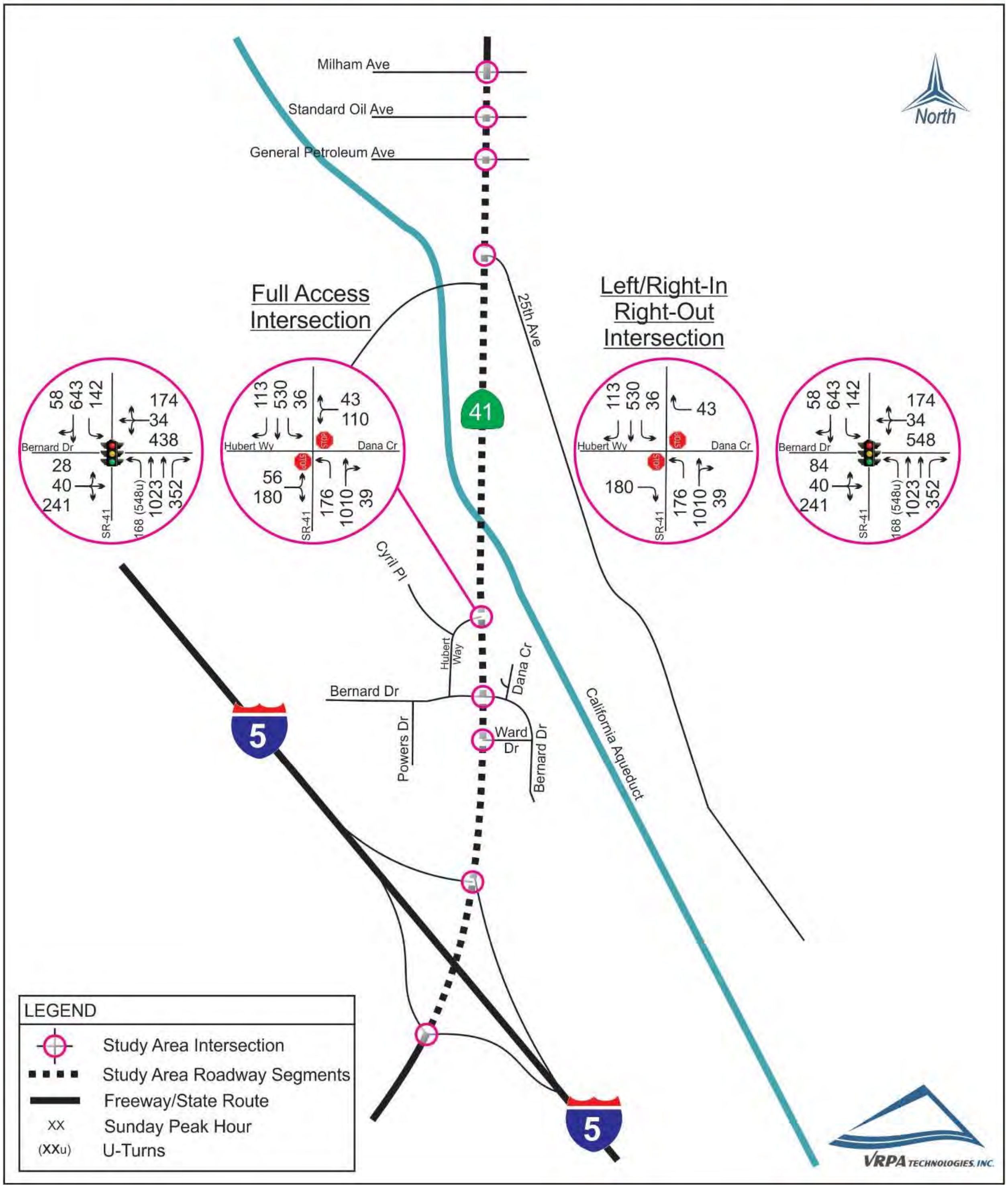


Table 3-8
Hubert Way/Dana Circle Extension at SR-41 Roadway Alternative

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	CUMULATIVE YEAR 2040 CONDITIONS	
				DELAY	LOS
SR-41 / Hubert Way-Dana Circle	Two-Way Stop Sign	C	SUNDAY PM	**3885.5**	**F (1)**
				22.7	C (2)
SR-41 / Bernard Drive	Traffic Signal	D	SUNDAY PM	**297.7**	**F (1)**
				334.9	**F (2)**

DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded
For signalized intersections, delay results show the average for the entire intersection. For one-way stop controlled intersections, delay results show the delay for the worst movement
(1) Full Access Intersection at Hubert Way and Dana Circle / Delay and LOS reflects WB approach
(2) Left/Right-In and Right-Out Intersection at Hubert Way and Dana Circle / Delay and LOS reflects WB approach

Smart Growth SR-41 Corridor Improvement Plan **Figure 3-7**

Cumulative Year 2040 Sunday Peak Hour Traffic - SR-41 at Bernard Drive Roundabout Roadway Alternative

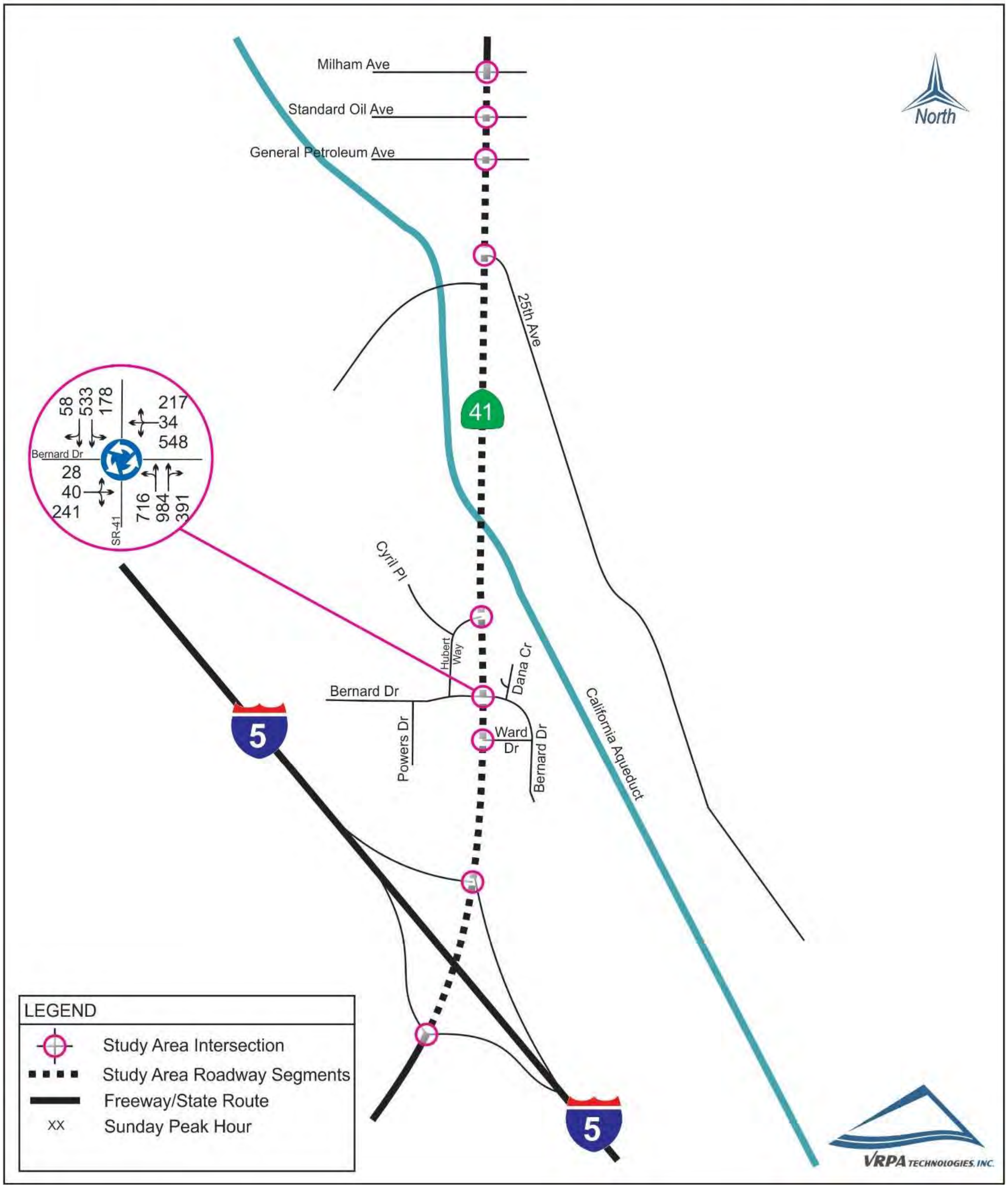


Table 3-9
SR-41 and Bernard Drive Roundabout Roadway Alternative

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	CUMULATIVE YEAR 2040 CONDITIONS	
				DELAY	LOS
SR-41 / Bernard Drive	Roundabout	D	SUNDAY PM	**574.1**	**F** (1)

DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded
(1) PTV Vistro Modeling Software

3.2.5 *Elimination of Ward Drive*

Considering Cumulative Year 2040 volumes that were developed using the methodology presented in Section 3.1, the intersection of SR-41 and Bernard Drive was evaluated assuming Ward Drive was reduced to right-in access only and that Ward Drive's connection to SR-41 was eliminated completely. Figure 3-8 provides the lane geometry and traffic volume utilized for the analysis and Table 3-10 provides the results of the analysis.

Results of the analysis show that the SR-41 and Bernard Drive intersection will operate at unacceptable LOS 'F' for the Cumulative Year 2040 Sunday peak hour. It should be noted that reducing Ward Drive to right-in access only or eliminating Ward Drive altogether will substantially degrade the level of service at the SR-41 and Bernard Drive intersection.

3.2.6 *Reconfiguration of I-5 NB Off Ramp at SR-41*

Considering Cumulative Year 2040 volumes that were developed using the methodology presented in Section 3.1, the intersection of SR-41 and I-5 NB Ramps was evaluated assuming the right turn movements at the off-ramp were controlled by a stop sign or traffic signal. The free right turning movement to SR-41 would be eliminated. Figure 3-9 provides the lane geometry and traffic volume utilized for the analysis and Table 3-11 provides the results of the analysis.

Results of the analysis show that the SR-41 and I-5 NB Ramps intersection will operate at unacceptable LOS 'F' for the Cumulative Year 2040 Sunday peak hour with the elimination of the free right turning movement. However, installation of a traffic signal would alleviate the level of service deficiency anticipated with the One-Way stop. The intersection is projected to operate at LOS 'D' with a traffic signal.

Smart Growth SR-41 Corridor Improvement Plan
Cumulative Year 2040 Sunday Peak Hour Traffic - Ward Drive Roadway Alternative

Figure 3-8

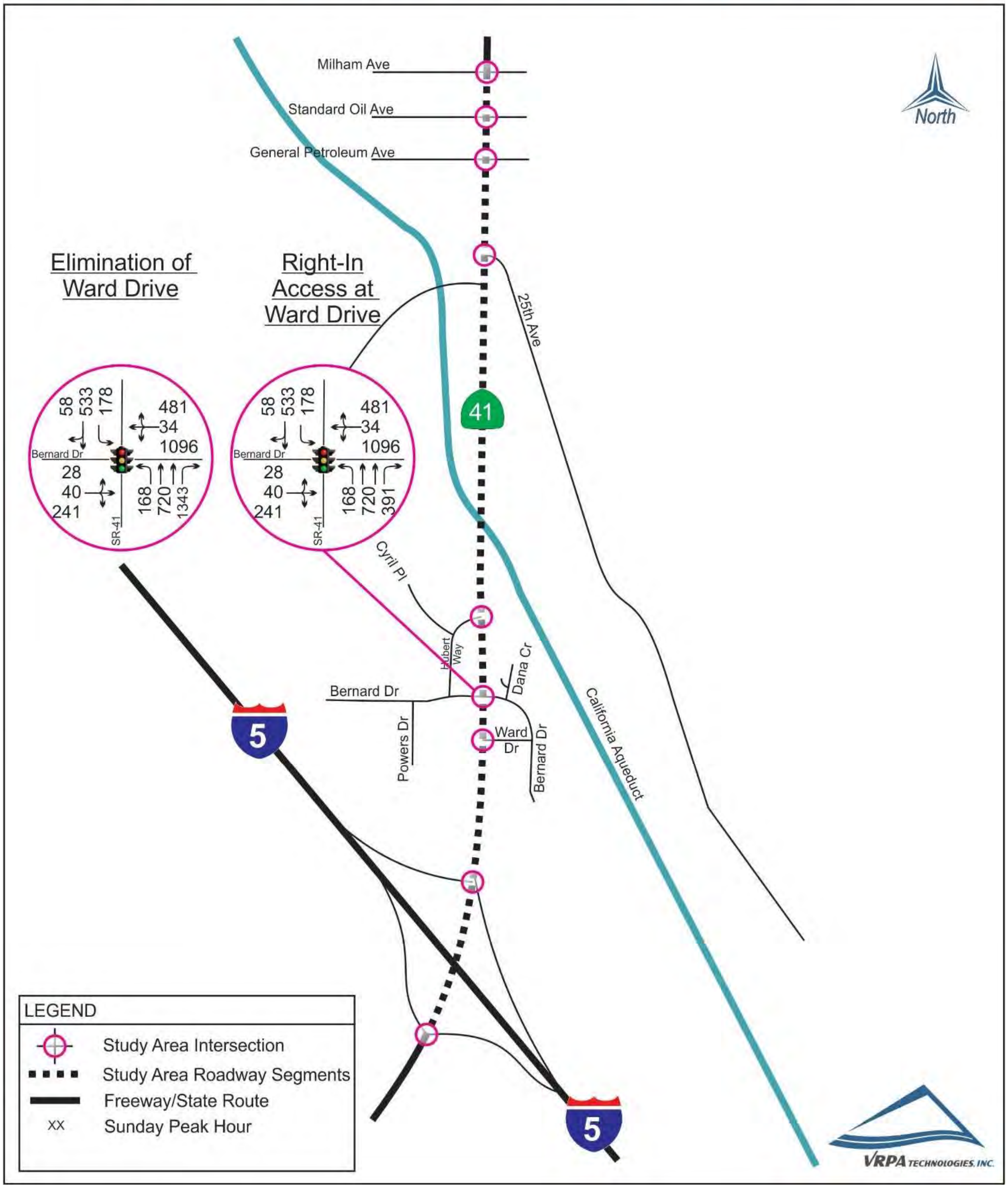


Table 3-10
Elimination of Ward Drive Roadway Alternative

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	CUMULATIVE YEAR 2040 CONDITIONS	
				DELAY	LOS
SR-41 / Bernard Drive	Traffic Signal	D	SUNDAY PM	**569.2**	**F (1)**
				783.4	**F (2)**

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized intersections, delay results show the average for the entire intersection. For one-way stop controlled intersections, delay results show the delay for the worst movement

(1) Right-In Access at Ward Drive

(2) Elimination of Ward Drive

Smart Growth SR-41 Corridor Improvement Plan
Cumulative Year 2040 Sunday Peak Hour Traffic - I-5 NB Off Ramp Roadway Alternative

Figure 3-9

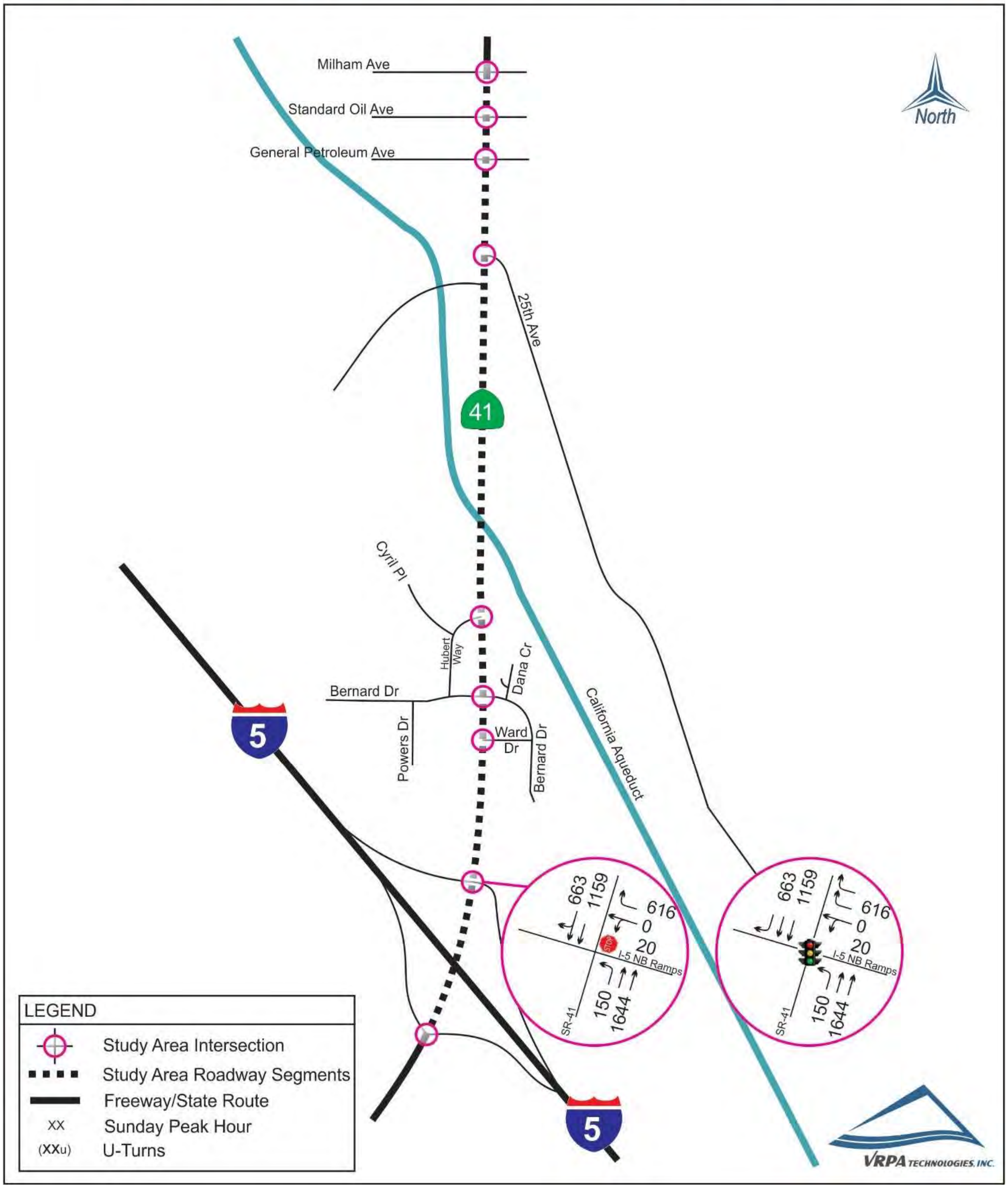


Table 3-11
Reconfiguration of I-5 NB Off Ramp Roadway Alternative

INTERSECTION	TARGET LOS	PEAK HOUR	CONTROL	CUMULATIVE YEAR 2040 CONDITIONS	
				DELAY	LOS
SR-41 / I-5 NB Ramps	D	SUNDAY PM	One-Way Stop Sign	**749.7**	**F**
			Traffic Signal	44.3	D

DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded
For signalized intersections, delay results show the average for the entire intersection. For one-way stop controlled intersections, delay results show the delay for the worst movement

APPENDIX A

Traffic Count Data Sheets

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-8128-001

City: Kettleman City

Day: Sunday

Date: 9/11/2016

NOON

NS/EW Streets:	SR-41			SR-41			Miham Ave			Miham Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
12:00 PM	3	110	0	0	67	1	3	0	1	1	1	1	188
12:15 PM	6	112	0	0	76	3	1	1	2	0	0	0	201
12:30 PM	4	85	1	1	85	3	2	2	2	1	0	0	186
12:45 PM	4	106	1	0	68	0	2	0	1	0	2	0	184
1:00 PM	2	124	0	0	71	2	2	1	1	0	0	1	204
1:15 PM	4	91	2	0	62	1	1	1	5	0	1	0	168
1:30 PM	12	111	0	0	59	2	0	1	3	0	2	1	191
1:45 PM	7	96	3	1	58	4	0	1	9	0	0	0	179
2:00 PM	1	110	0	3	73	2	2	1	4	0	1	1	198
2:15 PM	4	142	0	2	65	2	2	0	3	0	1	0	221
2:30 PM	6	104	0	0	58	4	0	4	4	0	0	0	180
2:45 PM	3	106	1	0	64	1	0	0	3	0	1	1	180
3:00 PM	1	130	0	1	52	4	1	0	2	0	1	0	192
3:15 PM	3	144	0	0	65	2	2	1	2	0	2	0	221
3:30 PM	1	141	3	1	62	4	4	2	4	0	0	0	222
3:45 PM	5	113	2	0	53	4	1	0	1	1	1	0	181

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	66	1825	13	9	1038	39	23	15	47	3	13	5	3096
APPROACH %'s :	3.47%	95.85%	0.68%	0.83%	95.58%	3.59%	27.06%	17.65%	55.29%	14.29%	61.90%	23.81%	
PEAK HR START TIME :	300 PM												TOTAL
PEAK HR VOL :	10	528	5	2	232	14	8	3	9	1	4	0	816
PEAK HR FACTOR :		0.923			0.925			0.500			0.625		0.919

CONTROL : 2-Way Stop(EB/SB)

UTURNS

NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
0	0	0	0
0	1	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

NB	SB	EB	WB
1	1	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-8128-002

City: Kettleman City

Day: Sunday

Date: 9/11/2016

NOON

NS/EW Streets:	SR-41			SR-41			Standard Oil Ave			Standard Oil Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
12:00 PM	0	112	1	0	68	1	2	1	1	0	0	0	186
12:15 PM	2	111	1	0	77	2	2	1	2	2	0	0	200
12:30 PM	0	88	0	1	86	2	0	0	0	0	2	1	180
12:45 PM	0	109	0	1	67	3	0	0	1	1	1	0	183
1:00 PM	1	126	0	1	72	1	1	0	1	0	2	0	205
1:15 PM	0	97	0	1	66	1	1	0	5	0	0	0	171
1:30 PM	0	121	0	2	58	3	0	0	1	0	0	0	185
1:45 PM	0	103	0	0	66	3	0	1	2	0	1	2	178
2:00 PM	1	116	0	1	72	2	0	0	0	1	0	3	196
2:15 PM	0	141	1	1	66	2	1	2	1	0	2	0	217
2:30 PM	2	116	0	1	58	3	1	2	1	0	2	0	186
2:45 PM	4	106	0	0	67	3	0	2	0	0	0	2	184
3:00 PM	2	135	0	0	53	1	0	0	0	0	0	0	191
3:15 PM	1	145	0	1	63	1	1	1	0	0	2	0	215
3:30 PM	0	142	0	1	62	6	1	2	0	0	2	2	218
3:45 PM	3	117	0	0	47	6	4	0	3	0	3	0	183

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	16	1885	3	11	1048	40	14	12	18	4	17	10	3078
APPROACH %'s :	0.84%	99.00%	0.16%	1.00%	95.36%	3.64%	31.82%	27.27%	40.91%	12.90%	54.84%	32.26%	
PEAK HR START TIME :	245 PM												TOTAL
PEAK HR VOL :	7	528	0	2	245	11	2	5	0	0	4	4	808
PEAK HR FACTOR :		0.916			0.921			0.583			0.500		0.927

UTURNS			
NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

CONTROL : 2-Way Stop(EB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-8128-003

City: Kettleman City

Day: Sunday

Date: 9/11/2016

NOON

NS/EW Streets:	SR-41			SR-41			General Petroleum Ave			General Petroleum Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
12:00 PM	5	114	0	0	71	0	0	0	5	1	1	0	197
12:15 PM	4	111	1	1	78	3	4	0	4	0	0	0	206
12:30 PM	1	87	0	1	85	1	2	0	0	0	1	0	178
12:45 PM	2	105	1	0	65	3	1	0	0	0	1	0	178
1:00 PM	1	128	0	0	74	1	0	1	2	0	1	0	208
1:15 PM	2	97	0	1	69	1	0	0	1	1	2	0	174
1:30 PM	4	118	0	1	56	2	3	2	1	0	2	1	190
1:45 PM	2	100	0	0	65	2	3	0	4	0	1	0	177
2:00 PM	6	116	2	0	71	1	1	1	3	0	0	0	201
2:15 PM	6	140	0	0	68	1	3	0	3	1	2	1	225
2:30 PM	3	118	0	0	57	3	0	0	4	1	2	0	188
2:45 PM	1	112	0	0	62	2	0	1	4	2	1	0	185
3:00 PM	7	137	1	0	50	4	2	1	1	0	0	0	203
3:15 PM	4	144	0	0	62	2	2	0	1	1	0	0	216
3:30 PM	1	139	0	0	61	2	0	0	1	0	2	2	208
3:45 PM	0	119	0	1	48	1	1	3	6	0	1	1	181
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	49	1885	5	5	1042	29	22	9	40	7	17	5	3115
APPROACH %'s :	2.53%	97.22%	0.26%	0.46%	96.84%	2.70%	30.99%	12.68%	56.34%	24.14%	58.62%	17.24%	
PEAK HR START TIME :	245 PM												TOTAL
PEAK HR VOL :	13	532	1	0	235	10	4	2	7	3	3	2	812
PEAK HR FACTOR :		0.922			0.957			0.650			0.500		0.940

UTURNS			
NB	SB	EB	WB
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	2	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
0	0	0	0
0	0	0	0
0	0	1	0
NB	SB	EB	WB
1	0	3	0

CONTROL : 2-Way Stop(EB/SB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-8128-004 | **Day:** Sunday

City: Kettleman City | **Date:** 9/11/2016

NOON

NS/EW Streets:	SR-41			SR-41			I-5 NB Ramps			I-5 NB Ramps				UTURNS			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND							
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB
LANES:	1	2	0	0	1.5	0.5	0	0	0	0	0.5	0.5					
12:00 PM	22	184	0	0	123	49	0	0	0	7	0	55	440	0	0	0	0
12:15 PM	14	140	0	0	91	39	0	0	0	1	0	46	331	0	0	0	0
12:30 PM	18	145	0	0	115	52	0	0	0	1	1	62	394	0	0	0	0
12:45 PM	24	145	0	0	106	48	0	0	0	2	2	64	391	0	0	0	0
1:00 PM	17	134	0	1	102	51	0	0	0	2	1	57	365	0	1	0	0
1:15 PM	26	154	0	0	111	63	0	0	0	2	0	55	411	0	0	0	0
1:30 PM	20	143	0	0	96	59	0	0	0	7	0	62	387	0	0	0	0
1:45 PM	17	145	0	0	115	57	0	0	0	3	2	37	376	0	0	0	0
2:00 PM	23	141	0	0	110	54	0	0	0	0	3	41	372	0	0	0	0
2:15 PM	18	181	0	0	128	50	0	0	0	1	1	47	426	0	0	0	0
2:30 PM	24	153	0	0	118	53	0	0	0	4	0	43	395	0	0	0	0
2:45 PM	13	152	0	0	93	39	0	0	0	1	0	39	337	0	0	0	0
3:00 PM	14	166	0	0	90	48	0	0	0	1	0	56	375	0	0	0	0
3:15 PM	14	195	0	0	91	47	0	0	0	2	1	70	420	0	0	0	0
3:30 PM	16	175	0	0	101	62	0	0	0	1	0	63	418	0	0	0	0
3:45 PM	15	138	0	0	85	73	0	0	0	3	0	61	375	0	0	0	0

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB
TOTAL VOLUMES :	295	2491	0	1	1675	844	0	0	0	38	11	858	6213	0	1	0	0
APPROACH %'s :	10.59%	89.41%	0.00%	0.04%	66.47%	33.49%	#DIV/0!	#DIV/0!	#DIV/0!	4.19%	1.21%	94.60%					

PEAK HR START TIME :	300 PM												TOTAL
PEAK HR VOL :	59	674	0	0	367	230	0	0	0	7	1	250	1588
PEAK HR FACTOR :		0.877			0.916			0.000			0.884		0.945

CONTROL : 1-Way Stop(WB)

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 16-8128-005

City: Kettleman City

Day: Sunday

Date: 9/11/2016

NOON

NS/EW Streets:	SR-41			SR-41			I-5 SB Ramps			I-5 SB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1.2	0.5	2	2	0	1.3	0.3	0.3	0	0	0	
12:00 PM	0	142	2	38	80	0	52	1	9	0	0	0	324
12:15 PM	0	111	4	34	70	0	42	0	9	0	0	0	270
12:30 PM	0	113	4	40	78	0	57	1	20	0	0	0	313
12:45 PM	0	121	6	46	56	0	46	0	14	0	0	0	289
1:00 PM	0	130	4	37	72	0	29	1	25	0	0	0	298
1:15 PM	0	125	8	37	68	0	42	0	12	0	0	0	292
1:30 PM	0	119	5	40	72	0	43	0	13	0	0	0	292
1:45 PM	0	117	4	50	59	0	46	1	22	0	0	0	299
2:00 PM	0	129	5	39	77	0	41	2	24	0	0	0	317
2:15 PM	0	165	5	44	77	0	45	0	21	0	0	0	357
2:30 PM	0	133	4	62	63	0	37	4	24	0	0	0	327
2:45 PM	0	122	7	40	55	0	48	0	21	0	0	0	293
3:00 PM	0	148	7	49	42	0	31	0	20	0	0	0	297
3:15 PM	0	163	7	44	44	0	41	0	9	0	0	0	308
3:30 PM	0	155	6	42	60	0	36	1	16	0	0	0	316
3:45 PM	0	114	3	45	49	0	38	1	20	0	0	0	270
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	2107	81	687	1022	0	674	12	279	0	0	0	4862
APPROACH %'s :	0.00%	96.30%	3.70%	40.20%	59.80%	0.00%	69.84%	1.24%	28.91%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	145 PM												TOTAL
PEAK HR VOL :	0	544	18	195	276	0	169	7	91	0	0	0	1300
PEAK HR FACTOR :		0.826			0.942			0.967			0.000		0.910

CONTROL : Signalized

UTURNS			
NB	SB	EB	WB
0	0	0	0
0	2	0	0
0	0	0	0
0	1	0	0
0	0	0	0
0	0	0	0
0	1	0	0
0	1	0	0
0	1	0	0
0	0	0	0
0	2	0	0
0	0	0	0
0	1	0	0
0	1	0	0
0	0	0	0
0	1	0	0
NB	SB	EB	WB
0	11	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-8077-001 **Day:** Sunday

City: Kettleman City **Date:** 6/28/2015

NOON

NS/EW Streets:	SR-41			SR-41			25th Ave			25th Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	1	1	
12:00 PM	0	73	0	0	106	0	0	0	0	0	0	1	180
12:15 PM	0	94	0	1	133	0	0	0	0	0	0	1	229
12:30 PM	0	102	0	3	120	0	0	0	0	0	0	0	225
12:45 PM	0	88	0	0	98	0	0	0	0	0	0	2	188
1:00 PM	0	93	0	2	79	0	0	0	0	1	0	2	177
1:15 PM	0	108	0	0	83	0	0	0	0	0	0	2	193
1:30 PM	0	114	1	0	100	0	0	0	0	0	0	0	215
1:45 PM	0	131	1	2	96	0	0	0	0	1	0	3	234

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	803	2	8	815	0	0	0	0	2	0	11	1641
APPROACH %'s :	0.00%	99.75%	0.25%	0.97%	99.03%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	15.38%	0.00%	84.62%	
PEAK HR START TIME :	1200 PM												TOTAL
PEAK HR VOL :	0	357	0	4	457	0	0	0	0	0	0	4	822
PEAK HR FACTOR :		0.875			0.860			0.000			0.500		0.897

CONTROL : 1-Way Stop (WB)

UTURNS			
NB	SB	EB	WB
0	0	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-8077-001 **Day:** Sunday

City: Kettleman City **Date:** 6/28/2015

PM

NS/EW Streets:	SR-41			SR-41			25th Ave			25th Ave			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	1	1	
2:00 PM	0	92	0	0	86	0	0	0	0	0	0	0	178
2:15 PM	0	121	0	1	96	0	0	0	0	0	0	0	218
2:30 PM	0	130	0	0	81	0	0	0	0	0	0	1	212
2:45 PM	0	144	0	1	86	0	0	0	0	0	0	1	232
3:00 PM	0	136	0	0	72	0	0	0	0	0	0	0	208
3:15 PM	0	128	1	1	78	0	0	0	0	1	0	0	209
3:30 PM	0	129	0	0	80	0	0	0	0	0	0	5	214
3:45 PM	0	145	1	1	66	0	0	0	0	0	0	2	215
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1025	2	4	645	0	0	0	0	1	0	9	1686
APPROACH %'s :	0.00%	99.81%	0.19%	0.62%	99.38%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	10.00%	0.00%	90.00%	
PEAK HR START TIME :	215 PM												TOTAL
PEAK HR VOL. :	0	531	0	2	335	0	0	0	0	0	0	2	870
PEAK HR FACTOR :		0.922			0.869			0.000			0.500		0.938

CONTROL : 1-Way Stop (WB)

UTURNS			
NB	SB	EB	WB
0	0	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-8077-002

City: Kettleman City

Day: Sunday

Date: 6/28/2015

NOON

NS/EW Streets:	SR-41			SR-41			Hubert Wy			Hubert Wy			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	0	1	0	0	1	0	0	0	0	
12:00 PM	10	69	0	0	86	12	7	0	17	0	0	0	201
12:15 PM	10	89	0	0	124	17	3	0	21	0	0	0	264
12:30 PM	17	95	0	0	111	17	6	0	24	0	0	0	270
12:45 PM	26	83	0	0	80	10	4	0	20	0	0	0	223
1:00 PM	29	86	0	0	73	11	11	0	22	0	0	0	232
1:15 PM	20	95	0	0	79	12	9	0	21	0	0	0	236
1:30 PM	25	118	0	0	78	17	7	0	20	0	0	0	265
1:45 PM	19	113	0	0	82	17	11	0	21	0	0	0	263

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	156	748	0	0	713	113	58	0	166	0	0	0	1954
APPROACH %'s :	17.26%	82.74%	0.00%	0.00%	86.32%	13.68%	25.89%	0.00%	74.11%	#DIV/0!	#DIV/0!	#DIV/0!	

PEAK HR START TIME :	100 PM												TOTAL
PEAK HR VOL :	93	412	0	0	312	57	38	0	84	0	0	0	996
PEAK HR FACTOR :		0.883			0.932			0.924			0.000		0.940

CONTROL : 1-Way Stop (EB)

UTURNS			
NB	SB	EB	WB
1	0	0	0
0	0	0	0
3	0	0	0
3	0	0	0
12	0	0	0
3	0	0	0
2	0	0	0
7	0	0	0

NB	SB	EB	WB
31	0	0	0

Intersection Turning Movement
Prepared by:
National Data & Surveying Services

Project ID: 15-8077-002

Day: Sunday

City: Kettleman City

Date: 6/28/2015

PM

NS/EW Streets:	SR-41			SR-41			Hubert Wy			Hubert Wy			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	0	1	0	0	1	0	0	0	0	
2:00 PM	13	88	0	0	82	10	4	0	22	0	0	0	219
2:15 PM	23	122	0	0	75	11	4	0	16	0	0	0	251
2:30 PM	19	128	0	0	71	20	5	0	19	0	0	0	262
2:45 PM	24	126	0	0	77	15	10	0	34	0	0	0	286
3:00 PM	21	136	0	0	56	10	9	0	20	0	0	0	252
3:15 PM	24	111	0	0	63	19	9	0	22	0	0	0	248
3:30 PM	10	132	0	0	67	10	3	0	22	0	0	0	244
3:45 PM	15	137	0	0	58	13	9	0	19	0	0	0	251
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	149	980	0	0	549	108	53	0	174	0	0	0	2013
APPROACH %'s :	13.20%	86.80%	0.00%	0.00%	83.56%	16.44%	23.35%	0.00%	76.65%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	215 PM												TOTAL
PEAK HR VOL :	87	512	0	0	279	56	28	0	89	0	0	0	1051
PEAK HR FACTOR :		0.954			0.910			0.665			0.000		0.919

CONTROL : 1-Way Stop (EB)

UTURNS			
NB	SB	EB	WB
0	0	0	0
2	0	0	0
3	0	0	0
2	0	0	0
4	0	0	0
4	0	0	0
0	0	0	0
3	0	0	0
NB	SB	EB	WB
18	0	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-8077-003

City: Kettleman City

Day: Sunday

Date: 6/28/2015

NOON

NS/EW Streets:	SR-41			SR-41			Bernard Dr			Bernard Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	1	1	0	0	1	0	0	1	0	
12:00 PM	74	69	33	27	76	4	1	3	15	68	2	7	379
12:15 PM	67	85	34	45	88	7	0	6	21	64	4	18	439
12:30 PM	79	88	44	44	97	2	4	3	19	82	2	17	481
12:45 PM	77	82	27	33	60	5	2	5	23	105	1	27	447
1:00 PM	85	92	38	24	86	2	0	3	27	83	2	21	463
1:15 PM	80	96	28	33	63	3	2	3	24	81	5	20	438
1:30 PM	86	112	52	31	69	4	3	2	18	62	7	27	473
1:45 PM	76	110	42	30	69	7	5	4	26	91	4	21	485

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	624	734	298	267	608	34	17	29	173	636	27	158	3605
APPROACH %'s :	37.68%	44.32%	18.00%	29.37%	66.89%	3.74%	7.76%	13.24%	79.00%	77.47%	3.29%	19.24%	

PEAK HR START TIME :	100 PM												TOTAL
PEAK HR VOL :	327	410	160	119	287	16	10	12	95	317	18	89	1859
PEAK HR FACTOR :		0.897			0.940			0.836			0.914		0.958

CONTROL : Signalized

UTURNS			
NB	SB	EB	WB
25	0	0	0
34	0	0	0
50	0	0	0
85	0	0	0
59	0	0	0
72	0	0	0
57	0	0	0
70	0	0	0

NB	SB	EB	WB
452	0	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-8077-003

Day: Sunday

City: Kettleman City

Date: 6/28/2015

PM

NS/EW Streets:	SR-41			SR-41			Bernard Dr			Bernard Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL 1	NT 2	NR 1	SL 1	ST 1	SR 0	EL 0	ET 1	ER 0	WL 0	WT 1	WR 0	TOTAL
2:00 PM	96	70	32	23	70	4	4	3	24	81	2	24	433
2:15 PM	80	123	46	23	66	9	0	4	37	61	4	26	479
2:30 PM	95	112	44	27	56	9	8	8	25	73	4	30	491
2:45 PM	84	127	57	21	78	8	4	3	27	63	7	20	499
3:00 PM	94	123	46	17	63	3	2	5	30	73	2	31	489
3:15 PM	86	117	48	28	67	4	2	1	31	57	4	32	477
3:30 PM	71	96	42	19	61	8	4	2	21	87	3	27	441
3:45 PM	84	114	39	19	65	3	4	7	22	80	3	37	477
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	690	882	354	177	526	48	28	33	217	575	29	227	3786
APPROACH %'s :	35.83%	45.79%	18.38%	23.57%	70.04%	6.39%	10.07%	11.87%	78.06%	69.19%	3.49%	27.32%	
PEAK HR START TIME :	215 PM												TOTAL
PEAK HR VOL :	353	485	193	88	263	29	14	20	119	270	17	107	1958
PEAK HR FACTOR :		0.962			0.888			0.933			0.921		0.981

CONTROL : Signalized

UTURNS			
NB	SB	EB	WB
70	0	0	0
57	0	0	0
73	0	0	0
64	0	0	0
76	0	0	0
70	0	0	0
52	0	0	0
60	0	0	0
NB	SB	EB	WB
522	0	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-8077-004

City: Kettleman City

Day: Sunday

Date: 6/28/2015

NOON

NS/EW Streets:	SR-41			SR-41			Ward Dr			Ward Dr			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	1	0	2	0	0	0	0	0	0	1	
12:00 PM	0	93	126	0	191	0	0	0	0	0	0	82	492
12:15 PM	0	123	125	0	200	0	0	0	0	0	0	66	514
12:30 PM	0	109	148	0	252	0	0	0	0	0	0	100	609
12:45 PM	0	99	139	0	265	0	0	0	0	0	0	89	592
1:00 PM	0	103	123	0	261	0	0	0	0	0	0	109	596
1:15 PM	0	112	110	0	252	0	0	0	0	0	0	93	567
1:30 PM	0	165	131	0	212	0	0	0	0	0	0	83	591
1:45 PM	0	140	136	0	247	0	0	0	0	0	0	90	613

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	944	1038	0	1880	0	0	0	0	0	0	712	4574
APPROACH %'s :	0.00%	47.63%	52.37%	0.00%	100.00%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.00%	100.00%	

PEAK HR START TIME :	100 PM												TOTAL
PEAK HR VOL. :	0	520	500	0	972	0	0	0	0	0	0	375	2367
PEAK HR FACTOR :		0.867			0.931			0.000			0.850		0.965

CONTROL : 1-Way Stop (WB)

UTURNS			
NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: 15-8077-004

City: Kettleman City

Day: Sunday

Date: 6/28/2015

PM

NS/EW Streets: SR-41 | SR-41 | Ward Dr | Ward Dr

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	1	0	2	0	0	0	0	0	0	1	
2:00 PM	0	113	107	0	246	0	0	0	0	0	0	113	579
2:15 PM	0	145	123	0	224	0	0	0	0	0	0	84	576
2:30 PM	0	143	113	0	228	0	0	0	0	0	0	110	594
2:45 PM	0	176	125	0	236	0	0	0	0	0	0	83	620
3:00 PM	0	144	129	0	236	0	0	0	0	0	0	114	623
3:15 PM	0	154	102	0	231	0	0	0	0	0	0	93	580
3:30 PM	0	148	136	0	207	0	0	0	0	0	0	80	571
3:45 PM	0	132	117	0	227	0	0	0	0	0	0	92	568

	UTURNS			
	NB	SB	EB	WB

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	1155	952	0	1835	0	0	0	0	0	0	769	4711
APPROACH %'s :	0.00%	54.82%	45.18%	0.00%	100.00%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.00%	100.00%	

NB	SB	EB	WB
0	0	0	0

PEAK HR START TIME :	230 PM												TOTAL
PEAK HR VOL :	0	617	469	0	931	0	0	0	0	0	0	400	2417
PEAK HR FACTOR :		0.902			0.986			0.000			0.877		0.970

CONTROL : 1-Way Stop (WB)

APPENDIX B

SYNCHRO 9 Worksheets

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	3	9	1	4	0	10	528	5	2	340	14
Future Vol, veh/h	8	3	9	1	4	0	10	528	5	2	340	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	63	63	63	92	92	92	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	16	6	18	2	6	0	11	574	5	2	366	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	979	978	373	987	983	577	381	0	0	579	0	0
Stage 1	377	377	-	598	598	-	-	-	-	-	-	-
Stage 2	602	601	-	389	385	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	228	249	671	225	248	514	1110	-	-	934	-	-
Stage 1	642	614	-	487	489	-	-	-	-	-	-	-
Stage 2	485	488	-	633	609	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	220	245	671	212	244	514	1110	-	-	934	-	-
Mov Cap-2 Maneuver	220	245	-	212	244	-	-	-	-	-	-	-
Stage 1	632	612	-	480	482	-	-	-	-	-	-	-
Stage 2	471	481	-	608	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	20.7	0.2	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1110	-	-	322	237	934	-	-
HCM Lane V/C Ratio	0.01	-	-	0.124	0.033	0.002	-	-
HCM Control Delay (s)	8.3	0	-	17.8	20.7	8.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	2	5	0	0	4	4	7	528	0	2	337	11
Future Vol, veh/h	2	5	0	0	4	4	7	528	0	2	337	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	50	50	50	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	3	9	0	0	8	8	8	574	0	2	366	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	974	966	372	970	972	574	378	0	0	574	0	0
Stage 1	377	377	-	589	589	-	-	-	-	-	-	-
Stage 2	597	589	-	381	383	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	230	254	672	232	251	516	1113	-	-	938	-	-
Stage 1	642	614	-	493	494	-	-	-	-	-	-	-
Stage 2	488	494	-	639	610	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	218	250	672	223	247	516	1113	-	-	938	-	-
Mov Cap-2 Maneuver	218	250	-	223	247	-	-	-	-	-	-	-
Stage 1	635	612	-	488	489	-	-	-	-	-	-	-
Stage 2	467	489	-	628	608	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.8	16.3	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1113	-	-	240	334	938	-	-
HCM Lane V/C Ratio	0.007	-	-	0.05	0.048	0.002	-	-
HCM Control Delay (s)	8.3	0	-	20.8	16.3	8.8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	4	2	7	3	3	2	13	532	1	0	327	10
Future Vol, veh/h	4	2	7	3	3	2	13	532	1	0	327	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	50	50	50	92	92	92	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	6	3	11	6	6	4	14	578	1	0	341	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	958	954	346	960	958	579	351	0	0	579	0	0
Stage 1	346	346	-	607	607	-	-	-	-	-	-	-
Stage 2	612	608	-	353	351	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	236	258	695	235	256	513	1139	-	-	934	-	-
Stage 1	668	634	-	482	485	-	-	-	-	-	-	-
Stage 2	479	484	-	662	630	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	227	253	695	226	251	513	1139	-	-	934	-	-
Mov Cap-2 Maneuver	227	253	-	226	251	-	-	-	-	-	-	-
Stage 1	656	634	-	473	476	-	-	-	-	-	-	-
Stage 2	461	475	-	649	630	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	18.9	0.2	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1139	-	-	365	275	934	-	-
HCM Lane V/C Ratio	0.012	-	-	0.055	0.058	-	-	-
HCM Control Delay (s)	8.2	0	-	15.4	18.9	0	-	-
HCM Lane LOS	A	A	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	2	531	0	2	335
Future Vol, veh/h	0	2	531	0	2	335
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	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	50	50	92	92	87	87
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	0	4	577	0	2	385

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	967	577	0	0	577	0
Stage 1	577	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.25	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.335	-
Pot Cap-1 Maneuver	281	514	-	-	935	-
Stage 1	560	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	280	514	-	-	935	-
Mov Cap-2 Maneuver	280	-	-	-	-	-
Stage 1	560	-	-	-	-	-
Stage 2	680	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	514	935	-
HCM Lane V/C Ratio	-	-	-	0.008	0.002	-
HCM Control Delay (s)	-	-	0	12.1	8.9	0
HCM Lane LOS	-	-	A	B	A	A
HCM 95th %tile Q(veh)	-	-	-	0	0	-

Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Vol, veh/h	28	89	87	512	279	56
Future Vol, veh/h	28	89	87	512	279	56
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	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	2	-
Peak Hour Factor	67	67	95	95	91	91
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	42	133	92	539	307	62

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1059	337	368	0	-	0
Stage 1	337	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.25	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	247	703	1122	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	227	703	1122	-	-	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	440	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	17.2		1.2		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1122	-	468	-	-
HCM Lane V/C Ratio	0.082	-	0.373	-	-
HCM Control Delay (s)	8.5	-	17.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.7	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	20	119	270	17	107	353	485	193	88	263	29
Future Volume (veh/h)	14	20	119	270	17	107	353	485	193	88	263	29
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	1800	1845	1800	1800	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	15	22	128	293	18	116	368	505	201	99	296	33
Adj No. of Lanes	0	1	0	0	1	0	1	2	1	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.96	0.96	0.96	0.89	0.89	0.89
Percent Heavy Veh, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	72	104	455	379	19	123	365	1244	527	120	337	38
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.24	0.40	0.40	0.08	0.23	0.23
Sat Flow, veh/h	80	297	1304	890	55	352	1491	3139	1330	1476	1446	161
Grp Volume(v), veh/h	165	0	0	427	0	0	368	505	201	99	0	329
Grp Sat Flow(s),veh/h/ln	1681	0	0	1297	0	0	1491	1570	1330	1476	0	1607
Q Serve(g_s), s	0.0	0.0	0.0	22.0	0.0	0.0	21.8	10.3	9.6	5.9	0.0	17.6
Cycle Q Clear(g_c), s	6.6	0.0	0.0	28.5	0.0	0.0	21.8	10.3	9.6	5.9	0.0	17.6
Prop In Lane	0.09		0.78	0.69		0.27	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	631	0	0	521	0	0	365	1244	527	120	0	375
V/C Ratio(X)	0.26	0.00	0.00	0.82	0.00	0.00	1.01	0.41	0.38	0.82	0.00	0.88
Avail Cap(c_a), veh/h	647	0	0	534	0	0	365	1244	527	209	0	375
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.0	0.0	0.0	28.4	0.0	0.0	33.7	19.3	19.1	40.3	0.0	32.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	9.6	0.0	0.0	49.5	1.0	2.1	12.8	0.0	23.9
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	3.0	0.0	0.0	11.6	0.0	0.0	13.9	4.6	3.8	2.8	0.0	10.3
LnGrp Delay(d),s/veh	21.2	0.0	0.0	38.0	0.0	0.0	83.2	20.3	21.2	53.1	0.0	56.8
LnGrp LOS	C			D			F	C	C	D		E
Approach Vol, veh/h		165			427			1074			428	
Approach Delay, s/veh		21.2			38.0			42.0			56.0	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.5	41.3		36.3	26.0	26.8		36.3
Change Period (Y+Rc), s	* 4.2	6.0		* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	* 13	30.0		* 32	* 22	20.8		* 32
Max Q Clear Time (g_c+I1), s	7.9	12.3		8.6	23.8	19.6		30.5
Green Ext Time (p_c), s	0.1	5.2		4.1	0.0	0.7		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	42.4
HCM 2010 LOS	D

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	14	20	119	270	17	107	270	83	485	193	88	263
Future Volume (vph)	14	20	119	270	17	107	270	83	485	193	88	263
Ideal Flow (vphpl)	1800	1900	1800	1800	1900	1800	1800	1800	1900	1800	1800	1900
Grade (%)		0%			0%				0%			2%
Storage Length (ft)	0		0	0		0		400		0	225	
Storage Lanes	0		0	0		0		1		1	1	
Taper Length (ft)	25			25				25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Frt		0.895			0.963					0.850		0.985
Flt Protected		0.995			0.967			0.950			0.950	
Satd. Flow (prot)	0	1643	0	0	1718	0	0	1616	3139	1330	1472	1611
Flt Permitted		0.950			0.685			0.950			0.950	
Satd. Flow (perm)	0	1568	0	0	1217	0	0	1616	3139	1330	1472	1611
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		128			23					201		6
Link Speed (mph)		35			35				50			50
Link Distance (ft)		315			263				377			684
Travel Time (s)		6.1			5.1				5.1			9.3
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.96	0.96	0.96	0.96	0.89	0.89
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	15%	15%	15%	15%	15%
Adj. Flow (vph)	15	22	128	293	18	116	281	86	505	201	99	296
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	165	0	0	427	0	0	367	505	201	99	329
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				12			12
Link Offset(ft)		0			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.07	1.00	1.07	1.07	1.00	1.07	1.07	1.07	1.00	1.07	1.09	1.01
Turning Speed (mph)	15		9	15		9	5	5		9	15	
Number of Detectors	1	2		1	2		1	1	2	1	1	2
Detector Template	Left	Thru		Left	Thru		Left	Left	Thru	Right	Left	Thru
Leading Detector (ft)	20	100		20	100		20	20	100	20	20	100
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94				94			94
Detector 2 Size(ft)		6			6				6			6
Detector 2 Type		Cl+Ex			Cl+Ex				Cl+Ex			Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0				0.0			0.0
Turn Type	Perm	NA		Perm	NA		Prot	Prot	NA	Perm	Prot	NA

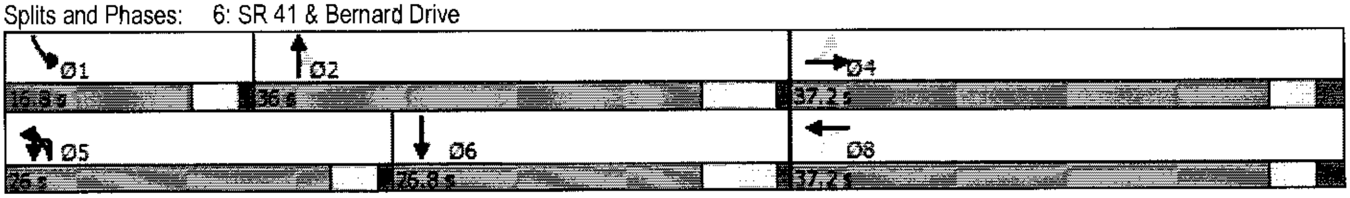
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	29
Future Volume (vph)	29
Ideal Flow (vphpl)	1800
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.89
Heavy Vehicles (%)	15%
Adj. Flow (vph)	33
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.09
Turning Speed (mph)	9
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8						2		
Detector Phase	4	4		8	8		5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	6.0	10.0	10.0	6.0	10.0
Minimum Split (s)	21.2	21.2		37.2	37.2		10.2	10.2	22.0	22.0	10.2	22.0
Total Split (s)	37.2	37.2		37.2	37.2		26.0	26.0	36.0	36.0	16.8	26.8
Total Split (%)	41.3%	41.3%		41.3%	41.3%		28.9%	28.9%	40.0%	40.0%	18.7%	29.8%
Maximum Green (s)	32.0	32.0		32.0	32.0		21.8	21.8	30.0	30.0	12.6	20.8
Yellow Time (s)	3.2	3.2		3.2	3.2		3.2	3.2	5.0	5.0	3.2	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.2			5.2			4.2	6.0	6.0	4.2	6.0
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	Max	Max	None	Max
Walk Time (s)				7.0	7.0							
Flash Dont Walk (s)				25.0	25.0							
Pedestrian Calls (#/hr)				10	10							
Act Effct Green (s)		31.2			31.2			21.5	34.1	34.1	10.4	20.8
Actuated g/C Ratio		0.35			0.35			0.24	0.38	0.38	0.12	0.23
v/c Ratio		0.26			0.97			0.94	0.42	0.32	0.58	0.86
Control Delay		7.3			64.4			68.1	23.1	4.8	50.5	56.3
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		7.3			64.4			68.1	23.1	4.8	50.5	56.3
LOS		A			E			E	C	A	D	E
Approach Delay		7.3			64.4				35.1			54.9
Approach LOS		A			E				D			D

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 88.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 42.9 Intersection LOS: D
Intersection Capacity Utilization 85.0% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 6: SR 41 & Bernard Drive



Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱		↑↑
Traffic Vol, veh/h	0	400	617	469	0	931
Future Vol, veh/h	0	400	617	469	0	931
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	-	300	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	88	88	90	90	99	99
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	0	455	686	521	0	940

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	343	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.96	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.33	-	-	-	-
Pot Cap-1 Maneuver	0	650	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	650	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	650	-
HCM Lane V/C Ratio	-	-	0.699	-
HCM Control Delay (s)	-	-	22.4	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	5.7	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰		↰	↑↑			↑↱	
Traffic Vol, veh/h	0	0	0	10	0	0	74	810	0	0	571	327
Future Vol, veh/h	0	0	0	10	0	0	74	810	0	0	571	327
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	450	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	92	92	92	98	98	98	93	93	93	96	96	96
Heavy Vehicles, %	3	3	3	15	3	3	15	15	15	15	15	15
Mvmt Flow	0	0	0	10	0	0	80	871	0	0	595	341

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1327	1965	-	935	0	-	-	-	0
Stage 1	1030	1030	-	-	-	-	-	-	-
Stage 2	297	935	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	-	4.4	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.65	4.03	-	2.35	-	-	-	-	-
Pot Cap-1 Maneuver	131	62	0	653	-	0	0	-	-
Stage 1	277	307	0	-	-	0	0	-	-
Stage 2	691	340	0	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	115	0	-	653	-	-	-	-	-
Mov Cap-2 Maneuver	198	0	-	-	-	-	-	-	-
Stage 1	243	0	-	-	-	-	-	-	-
Stage 2	691	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.2	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	653	-	198	-	-
HCM Lane V/C Ratio	0.122	-	0.052	-	-
HCM Control Delay (s)	11.3	-	24.2	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.4	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↱						↑↱		↰↰	↑↑	
Traffic Volume (veh/h)	246	2	89	0	0	0	0	633	43	249	329	0
Future Volume (veh/h)	246	2	89	0	0	0	0	633	43	249	329	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1748	1845	1800				0	1652	1800	1565	1652	0
Adj Flow Rate, veh/h	200	131	106				0	711	48	265	350	0
Adj No. of Lanes	1	1	0				0	2	0	2	2	0
Peak Hour Factor	0.84	0.84	0.84				0.89	0.89	0.89	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	15	15	15	15	0
Cap, veh/h	289	164	133				0	1419	96	344	2109	0
Arrive On Green	0.17	0.17	0.17				0.00	0.48	0.48	0.12	0.67	0.00
Sat Flow, veh/h	1664	945	765				0	3067	201	2892	3222	0
Grp Volume(v), veh/h	200	0	237				0	374	385	265	350	0
Grp Sat Flow(s),veh/h/ln	1664	0	1710				0	1570	1617	1446	1570	0
Q Serve(g_s), s	9.2	0.0	10.8				0.0	13.3	13.4	7.2	3.4	0.0
Cycle Q Clear(g_c), s	9.2	0.0	10.8				0.0	13.3	13.4	7.2	3.4	0.0
Prop In Lane	1.00		0.45				0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	289	0	297				0	746	769	344	2109	0
V/C Ratio(X)	0.69	0.00	0.80				0.00	0.50	0.50	0.77	0.17	0.00
Avail Cap(c_a), veh/h	464	0	477				0	746	769	558	2109	0
HCM Platoon Ratio	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				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.6	0.0	32.3				0.0	14.7	14.7	34.8	4.9	0.0
Incr Delay (d2), s/veh	3.0	0.0	4.9				0.0	2.4	2.3	3.7	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	5.5				0.0	6.2	6.4	3.0	1.5	0.0
LnGrp Delay(d),s/veh	34.6	0.0	37.2				0.0	17.1	17.0	38.5	5.1	0.0
LnGrp LOS	C		D					B	B	D	A	
Approach Vol, veh/h		437						759			615	
Approach Delay, s/veh		36.0						17.1			19.5	
Approach LOS		D						B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	16.0	45.0		20.4		61.0		
Change Period (Y+Rc), s	6.3	6.3		6.3		6.3		
Max Green Setting (Gmax), s	15.7	32.7		22.7		54.7		
Max Q Clear Time (g_c+I1), s	9.2	15.4		12.8		5.4		
Green Ext Time (p_c), s	0.5	5.9		1.3		7.6		

Intersection Summary	
HCM 2010 Ctrl Delay	22.5
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	16	6	18	2	8	1	20	1057	9	3	688	28
Future Vol, veh/h	16	6	18	2	8	1	20	1057	9	3	688	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	17	7	20	2	9	1	22	1149	10	3	748	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1972	1972	763	1980	1982	1154	778	0	0	1159	0	0
Stage 1	770	770	-	1197	1197	-	-	-	-	-	-	-
Stage 2	1202	1202	-	783	785	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	46	62	403	46	61	239	784	-	-	558	-	-
Stage 1	392	409	-	226	258	-	-	-	-	-	-	-
Stage 2	224	257	-	385	402	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	38	57	403	37	56	239	784	-	-	558	-	-
Mov Cap-2 Maneuver	38	57	-	37	56	-	-	-	-	-	-	-
Stage 1	361	405	-	208	238	-	-	-	-	-	-	-
Stage 2	198	237	-	357	398	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	118.3	87.8	0.2	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	784	-	-	70	55	558	-	-
HCM Lane V/C Ratio	0.028	-	-	0.621	0.217	0.006	-	-
HCM Control Delay (s)	9.7	0	-	118.3	87.8	11.5	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.7	0.7	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	4	9	1	1	8	7	14	1075	1	4	682	22
Future Vol, veh/h	4	9	1	1	8	7	14	1075	1	4	682	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	4	10	1	1	9	8	15	1168	1	4	741	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1970	1962	753	1966	1973	1169	765	0	0	1170	0	0
Stage 1	762	762	-	1199	1199	-	-	-	-	-	-	-
Stage 2	1208	1200	-	767	774	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	47	63	408	47	62	234	793	-	-	553	-	-
Stage 1	396	412	-	225	257	-	-	-	-	-	-	-
Stage 2	223	257	-	393	407	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	38	59	408	39	58	234	793	-	-	553	-	-
Mov Cap-2 Maneuver	38	59	-	39	58	-	-	-	-	-	-	-
Stage 1	375	407	-	213	243	-	-	-	-	-	-	-
Stage 2	197	243	-	378	402	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	96	59.5	0.1	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	793	-	-	54	83	553	-	-
HCM Lane V/C Ratio	0.019	-	-	0.282	0.21	0.008	-	-
HCM Control Delay (s)	9.6	0	-	96	59.5	11.6	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.7	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	7	3	14	5	6	3	26	1080	2	1	663	20
Future Vol, veh/h	7	3	14	5	6	3	26	1080	2	1	663	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	8	3	15	5	7	3	28	1174	2	1	721	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1970	1967	732	1975	1977	1175	742	0	0	1176	0	0
Stage 1	734	734	-	1232	1232	-	-	-	-	-	-	-
Stage 2	1236	1233	-	743	745	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	47	62	420	46	62	232	809	-	-	550	-	-
Stage 1	410	424	-	216	248	-	-	-	-	-	-	-
Stage 2	215	248	-	405	420	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	39	56	420	39	56	232	809	-	-	550	-	-
Mov Cap-2 Maneuver	39	56	-	39	56	-	-	-	-	-	-	-
Stage 1	369	423	-	194	223	-	-	-	-	-	-	-
Stage 2	185	223	-	386	419	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60.6	91.7	0.2	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	809	-	-	90	56	550	-	-
HCM Lane V/C Ratio	0.035	-	-	0.29	0.272	0.002	-	-
HCM Control Delay (s)	9.6	0	-	60.6	91.7	11.6	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.9	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	4	1078	1	4	680
Future Vol, veh/h	1	4	1078	1	4	680
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	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	1	4	1172	1	4	739

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1920	1172	0	0	1173	0
Stage 1	1172	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.25	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.335	-
Pot Cap-1 Maneuver	73	233	-	-	551	-
Stage 1	293	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	72	233	-	-	551	-
Mov Cap-2 Maneuver	72	-	-	-	-	-
Stage 1	293	-	-	-	-	-
Stage 2	460	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27.7	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	72	233	551	-
HCM Lane V/C Ratio	-	-	0.015	0.019	0.008	-
HCM Control Delay (s)	-	-	55.8	20.7	11.6	0
HCM Lane LOS	-	-	F	C	B	A
HCM 95th %tile Q(veh)	-	-	0	0.1	0	-

Intersection	
Int Delay, s/veh	61.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	56	180	176	1040	566	113
Future Vol, veh/h	56	180	176	1040	566	113
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	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	2	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	61	196	191	1130	615	123

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2190	677	738	0	-	0
Stage 1	677	-	-	-	-	-
Stage 2	1513	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.25	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	~ 50	451	812	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 38	451	812	-	-	-
Mov Cap-2 Maneuver	~ 38	-	-	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	153	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 550.4	1.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	812	-	126	-	-
HCM Lane V/C Ratio	0.236	-	2.036	-	-
HCM Control Delay (s)	10.8	-	$ 550.4	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.9	-	20.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↱	
Traffic Volume (veh/h)	28	40	241	548	34	217	716	984	391	178	533	58
Future Volume (veh/h)	28	40	241	548	34	217	716	984	391	178	533	58
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	1800	1845	1800	1800	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	30	43	262	596	37	236	778	1070	425	193	579	63
Adj No. of Lanes	0	1	0	0	1	0	1	2	1	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	77	118	580	341	18	115	358	957	406	199	290	32
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.24	0.30	0.30	0.14	0.20	0.20
Sat Flow, veh/h	102	272	1344	672	42	266	1491	3139	1330	1476	1450	158
Grp Volume(v), veh/h	335	0	0	869	0	0	778	1070	425	193	0	642
Grp Sat Flow(s),veh/h/ln	1718	0	0	980	0	0	1491	1570	1330	1476	0	1608
Q Serve(g_s), s	0.0	0.0	0.0	34.0	0.0	0.0	28.8	36.6	36.6	15.6	0.0	24.0
Cycle Q Clear(g_c), s	17.8	0.0	0.0	51.8	0.0	0.0	28.8	36.6	36.6	15.6	0.0	24.0
Prop In Lane	0.09		0.78	0.69		0.27	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	774	0	0	473	0	0	358	957	406	199	0	322
V/C Ratio(X)	0.43	0.00	0.00	1.84	0.00	0.00	2.17	1.12	1.05	0.97	0.00	2.00
Avail Cap(c_a), veh/h	774	0	0	473	0	0	358	957	406	199	0	322
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	0.0	40.1	0.0	0.0	45.6	41.7	41.7	51.6	0.0	48.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	384.2	0.0	0.0	537.7	67.0	57.6	54.6	0.0	459.4
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	8.0	0.0	0.0	66.2	0.0	0.0	65.3	24.7	19.9	9.4	0.0	51.7
LnGrp Delay(d),s/veh	24.8	0.0	0.0	424.3	0.0	0.0	583.3	108.7	99.3	106.2	0.0	507.4
LnGrp LOS	C			F			F	F	F	F		F
Approach Vol, veh/h		335			869			2273			835	
Approach Delay, s/veh		24.8			424.3			269.4			414.7	
Approach LOS		C			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.4	42.6		57.0	33.0	30.0		57.0
Change Period (Y+Rc), s	* 4.2	6.0		* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	* 16	36.6		* 52	* 29	24.0		* 52
Max Q Clear Time (g_c+I1), s	17.6	38.6		19.8	30.8	26.0		53.8
Green Ext Time (p_c), s	0.0	0.0		12.9	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	309.7
HCM 2010 LOS	F

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		✥			✥			↰	↑↑	↱	↰	↑↱
Traffic Volume (vph)	28	40	241	548	34	217	548	168	984	391	178	533
Future Volume (vph)	28	40	241	548	34	217	548	168	984	391	178	533
Ideal Flow (vphpl)	1800	1900	1800	1800	1900	1800	1800	1800	1900	1800	1800	1900
Grade (%)		0%			0%				0%			2%
Storage Length (ft)	0		0	0		0		400		0	225	
Storage Lanes	0		0	0		0		1		1	1	
Taper Length (ft)	25			25				25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Frt		0.894			0.963					0.850		0.985
Flt Protected		0.996			0.967			0.950			0.950	
Satd. Flow (prot)	0	1643	0	0	1718	0	0	1616	3139	1330	1472	1611
Flt Permitted		0.918			0.531			0.950			0.950	
Satd. Flow (perm)	0	1514	0	0	943	0	0	1616	3139	1330	1472	1611
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		30			20					358		4
Link Speed (mph)		35			35				50			50
Link Distance (ft)		315			263				377			684
Travel Time (s)		6.1			5.1				5.1			9.3
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
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	15%	15%	15%	15%	15%
Adj. Flow (vph)	30	43	262	596	37	236	596	183	1070	425	193	579
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	335	0	0	869	0	0	779	1070	425	193	642
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				12			12
Link Offset(ft)		0			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.07	1.00	1.07	1.07	1.00	1.07	1.07	1.07	1.00	1.07	1.09	1.01
Turning Speed (mph)	15		9	15		9	5	5		9	15	
Number of Detectors	1	2		1	2		1	1	2	1	1	2
Detector Template	Left	Thru		Left	Thru		Left	Left	Thru	Right	Left	Thru
Leading Detector (ft)	20	100		20	100		20	20	100	20	20	100
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94				94			94
Detector 2 Size(ft)		6			6				6			6
Detector 2 Type		Cl+Ex			Cl+Ex				Cl+Ex			Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0				0.0			0.0
Turn Type	Perm	NA		Perm	NA		Prot	Prot	NA	Perm	Prot	NA

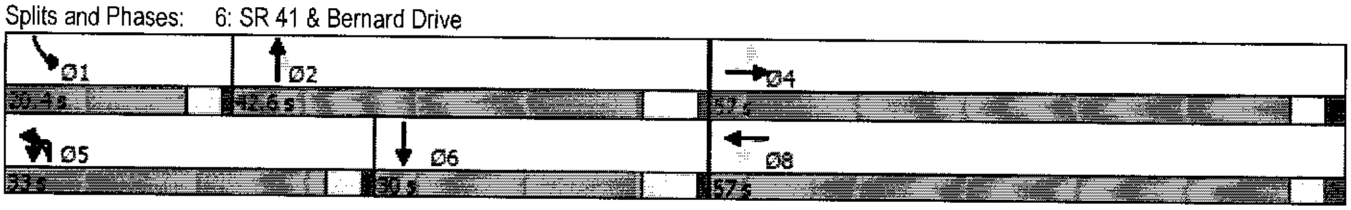
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	58
Future Volume (vph)	58
Ideal Flow (vphpl)	1800
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	15%
Adj. Flow (vph)	63
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.09
Turning Speed (mph)	9
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8						2		
Detector Phase	4	4		8	8		5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	6.0	10.0	10.0	6.0	10.0
Minimum Split (s)	21.2	21.2		37.2	37.2		10.2	10.2	22.0	22.0	10.2	22.0
Total Split (s)	57.0	57.0		57.0	57.0		33.0	33.0	42.6	42.6	20.4	30.0
Total Split (%)	47.5%	47.5%		47.5%	47.5%		27.5%	27.5%	35.5%	35.5%	17.0%	25.0%
Maximum Green (s)	51.8	51.8		51.8	51.8		28.8	28.8	36.6	36.6	16.2	24.0
Yellow Time (s)	3.2	3.2		3.2	3.2		3.2	3.2	5.0	5.0	3.2	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.2			5.2			4.2	6.0	6.0	4.2	6.0
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	Max	Max	None	Max
Walk Time (s)				7.0	7.0							
Flash Dont Walk (s)				25.0	25.0							
Pedestrian Calls (#/hr)				10	10							
Act Effct Green (s)		51.8			51.8			28.8	36.6	36.6	16.2	24.0
Actuated g/C Ratio		0.43			0.43			0.24	0.30	0.30	0.14	0.20
v/c Ratio		0.50			2.08			2.01	1.12	0.65	0.97	1.98
Control Delay		25.5			516.2			491.1	106.3	11.7	109.9	477.0
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		25.5			516.2			491.1	106.3	11.7	109.9	477.0
LOS		C			F			F	F	B	F	F
Approach Delay		25.5			516.2				220.4			392.2
Approach LOS		C			F				F			F

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 2.08
Intersection Signal Delay: 298.1 Intersection LOS: F
Intersection Capacity Utilization 154.5% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 6: SR 41 & Bernard Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↱	
Traffic Volume (veh/h)	28	40	241	1096	34	217	168	984	391	178	533	58
Future Volume (veh/h)	28	40	241	1096	34	217	168	984	391	178	533	58
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	1800	1845	1800	1800	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	30	43	262	1191	37	236	183	1070	425	193	579	63
Adj No. of Lanes	0	1	0	0	1	0	1	2	1	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	97	149	763	519	14	92	109	732	310	121	350	38
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.07	0.23	0.23	0.08	0.24	0.24
Sat Flow, veh/h	115	267	1371	835	26	165	1491	3139	1330	1476	1450	158
Grp Volume(v), veh/h	335	0	0	1464	0	0	183	1070	425	193	0	642
Grp Sat Flow(s),veh/h/ln	1753	0	0	1026	0	0	1491	1570	1330	1476	0	1608
Q Serve(g_s), s	0.0	0.0	0.0	52.9	0.0	0.0	8.8	28.0	28.0	9.8	0.0	29.0
Cycle Q Clear(g_c), s	13.9	0.0	0.0	66.8	0.0	0.0	8.8	28.0	28.0	9.8	0.0	29.0
Prop In Lane	0.09		0.78	0.81		0.16	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	1009	0	0	626	0	0	109	732	310	121	0	389
V/C Ratio(X)	0.33	0.00	0.00	2.34	0.00	0.00	1.67	1.46	1.37	1.60	0.00	1.65
Avail Cap(c_a), veh/h	1009	0	0	626	0	0	109	732	310	121	0	389
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	0.0	32.0	0.0	0.0	55.6	46.0	46.0	55.1	0.0	45.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	607.8	0.0	0.0	339.8	214.9	185.3	305.8	0.0	304.8
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	6.2	0.0	0.0	126.3	0.0	0.0	13.9	34.0	26.2	14.2	0.0	45.7
LnGrp Delay(d),s/veh	15.1	0.0	0.0	639.7	0.0	0.0	395.4	260.9	231.3	360.9	0.0	350.3
LnGrp LOS	B			F			F	F	F	F		F
Approach Vol, veh/h		335			1464			1678			835	
Approach Delay, s/veh		15.1			639.7			268.1			352.8	
Approach LOS		B			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	34.0		72.0	13.0	35.0		72.0
Change Period (Y+Rc), s	* 4.2	6.0		* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	* 9.8	28.0		* 67	* 8.8	29.0		* 67
Max Q Clear Time (g_c+I1), s	11.8	30.0		15.9	10.8	31.0		68.8
Green Ext Time (p_c), s	0.0	0.0		39.2	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	391.0
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	98.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱		↑↑
Traffic Vol, veh/h	0	812	1252	953	0	1890
Future Vol, veh/h	0	812	1252	953	0	1890
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	-	300	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	0	883	1361	1036	0	2054

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	680	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.96	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.33	-	-	-	-
Pot Cap-1 Maneuver	0	~ 391	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	~ 391	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 596.1	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	391	-
HCM Lane V/C Ratio	-	-	2.257	-
HCM Control Delay (s)	-	-	$ 596.1	-
HCM Lane LOS	-	-	F	-
HCM 95th %tile Q(veh)	-	-	66.4	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	264	1252	953	0	1890
Future Vol, veh/h	0	264	1252	953	0	1890
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	-	300	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	0	287	1361	1036	0	2054

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	680	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.96	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.33	-	-	-	-
Pot Cap-1 Maneuver	0	391	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	391	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	35.7	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	391	
HCM Lane V/C Ratio	-	-	0.734	-
HCM Control Delay (s)	-	-	35.7	-
HCM Lane LOS	-	-	E	-
HCM 95th %tile Q(veh)	-	-	5.7	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰		↰	↑↑			↑↱	
Traffic Vol, veh/h	0	0	0	20	0	0	150	1644	0	0	1159	663
Future Vol, veh/h	0	0	0	20	0	0	150	1644	0	0	1159	663
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	450	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	15	3	3	15	15	15	15	15	15
Mvmt Flow	0	0	0	22	0	0	163	1787	0	0	1260	721

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2743	4093	-	1980	0	-	-	-	0
Stage 1	2113	2113	-	-	-	-	-	-	-
Stage 2	630	1980	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	-	4.4	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.65	4.03	-	2.35	-	-	-	-	-
Pot Cap-1 Maneuver	~ 13	2	0	243	-	0	0	-	-
Stage 1	67	89	0	-	-	0	0	-	-
Stage 2	459	104	0	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	~ 4	0	-	243	-	-	-	-	-
Mov Cap-2 Maneuver	~ 19	0	-	-	-	-	-	-	-
Stage 1	22	0	-	-	-	-	-	-	-
Stage 2	459	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 540.9	3.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	243	-	19	-	-
HCM Lane V/C Ratio	0.671	-	1.144	-	-
HCM Control Delay (s)	45.6	-	$ 540.9	-	-
HCM Lane LOS	E	-	F	-	-
HCM 95th %tile Q(veh)	4.3	-	3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	✣						↑↱		↰↰	↑↑	
Traffic Volume (veh/h)	499	4	180	0	0	0	0	1284	87	505	668	0
Future Volume (veh/h)	499	4	180	0	0	0	0	1284	87	505	668	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1748	1845	1800				0	1652	1800	1565	1652	0
Adj Flow Rate, veh/h	371	243	196				0	1396	95	549	726	0
Adj No. of Lanes	1	1	0				0	2	0	2	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	15	15	15	15	0
Cap, veh/h	370	211	170				0	1335	91	499	2111	0
Arrive On Green	0.22	0.22	0.22				0.00	0.45	0.45	0.17	0.67	0.00
Sat Flow, veh/h	1664	947	763				0	3066	202	2892	3222	0
Grp Volume(v), veh/h	371	0	439				0	732	759	549	726	0
Grp Sat Flow(s),veh/h/ln	1664	0	1710				0	1570	1616	1446	1570	0
Q Serve(g_s), s	26.7	0.0	26.7				0.0	53.7	53.7	20.7	11.8	0.0
Cycle Q Clear(g_c), s	26.7	0.0	26.7				0.0	53.7	53.7	20.7	11.8	0.0
Prop In Lane	1.00		0.45				0.00		0.13	1.00		0.00
Lane Grp Cap(c), veh/h	370	0	380				0	702	723	499	2111	0
V/C Ratio(X)	1.00	0.00	1.15				0.00	1.04	1.05	1.10	0.34	0.00
Avail Cap(c_a), veh/h	370	0	380				0	702	723	499	2111	0
HCM Platoon Ratio	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				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.7	0.0	46.7				0.0	33.2	33.2	49.6	8.4	0.0
Incr Delay (d2), s/veh	47.2	0.0	95.1				0.0	45.5	47.0	70.6	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.1	0.0	22.6				0.0	32.1	33.4	13.1	5.2	0.0
LnGrp Delay(d),s/veh	93.9	0.0	141.7				0.0	78.7	80.2	120.2	8.8	0.0
LnGrp LOS	F		F					F	F	F	A	
Approach Vol, veh/h		810						1491			1275	
Approach Delay, s/veh		119.8						79.4			56.8	
Approach LOS		F						E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	27.0	60.0		33.0		87.0		
Change Period (Y+Rc), s	6.3	6.3		6.3		6.3		
Max Green Setting (Gmax), s	20.7	53.7		26.7		80.7		
Max Q Clear Time (g_c+I1), s	22.7	55.7		28.7		13.8		
Green Ext Time (p_c), s	0.0	0.0		0.0		26.5		

Intersection Summary	
HCM 2010 Ctrl Delay	80.5
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	180	176	1040	566	113
Future Vol, veh/h	0	180	176	1040	566	113
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	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	2	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	15	15	15	15
Mvmt Flow	0	196	191	1130	615	123

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	677	738	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	4.25	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	0	451	812	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	451	812	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19	1.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	812	-	451	-	-
HCM Lane V/C Ratio	0.236	-	0.434	-	-
HCM Control Delay (s)	10.8	-	19	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.9	-	2.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱↱	↰↰	↑	↱	↰↰	↑↑	↱	↰	↑↑↱	
Traffic Volume (veh/h)	28	40	241	548	34	217	716	984	391	178	533	58
Future Volume (veh/h)	28	40	241	548	34	217	716	984	391	178	533	58
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	1800	1845	1748	1748	1845	1748	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	30	43	262	596	37	236	778	1070	425	193	579	63
Adj No. of Lanes	0	1	2	2	1	1	2	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	99	125	314	643	650	524	827	1152	753	202	659	72
Arrive On Green	0.12	0.12	0.12	0.20	0.35	0.35	0.29	0.37	0.37	0.14	0.23	0.23
Sat Flow, veh/h	475	1041	2614	3229	1845	1485	2892	3139	1330	1476	2828	307
Grp Volume(v), veh/h	73	0	262	596	37	236	778	1070	425	193	318	324
Grp Sat Flow(s),veh/h/ln	1516	0	1307	1614	1845	1485	1446	1570	1330	1476	1554	1581
Q Serve(g_s), s	2.0	0.0	11.7	21.7	1.6	14.7	31.5	39.2	9.2	15.6	23.6	23.7
Cycle Q Clear(g_c), s	4.8	0.0	11.7	21.7	1.6	14.7	31.5	39.2	9.2	15.6	23.6	23.7
Prop In Lane	0.41		1.00	1.00		1.00	1.00		1.00	1.00		0.19
Lane Grp Cap(c), veh/h	224	0	314	643	650	524	827	1152	753	202	362	368
V/C Ratio(X)	0.33	0.00	0.83	0.93	0.06	0.45	0.94	0.93	0.56	0.96	0.88	0.88
Avail Cap(c_a), veh/h	244	0	349	652	680	548	864	1152	753	202	362	368
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	0.0	51.6	47.1	25.6	29.9	41.8	36.4	5.4	51.4	44.3	44.4
Incr Delay (d2), s/veh	0.8	0.0	14.7	19.4	0.0	0.6	17.5	14.1	3.0	50.6	24.6	24.7
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	4.9	11.4	0.8	6.1	14.5	19.2	4.4	9.2	12.6	12.9
LnGrp Delay(d),s/veh	49.2	0.0	66.3	66.5	25.7	30.5	59.3	50.5	8.5	102.0	68.9	69.1
LnGrp LOS	D		E	E	C	C	E	D	A	F	E	E
Approach Vol, veh/h		335			869			2273			835	
Approach Delay, s/veh		62.6			55.0			45.7			76.6	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	22.4	50.0	27.9	19.6	38.5	33.9		47.5
Change Period (Y+Rc), s	6.0	* 6	4.0	* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	16.4	* 44	24.2	* 16	* 36	24.6		* 44
Max Q Clear Time (g_c+I1), s	17.6	41.2	23.7	13.7	33.5	25.7		16.7
Green Ext Time (p_c), s	0.0	2.0	0.1	0.6	0.8	0.0		2.5

Intersection Summary	
HCM 2010 Ctrl Delay	54.9
HCM 2010 LOS	D

Notes

User approved ignoring U-Turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	28	40	241	548	34	217	548	168	984	391	178	533
Future Volume (vph)	28	40	241	548	34	217	548	168	984	391	178	533
Ideal Flow (vphpl)	1800	1900	1800	1800	1900	1800	1800	1800	1900	1800	1800	1900
Grade (%)		0%			0%				0%			2%
Storage Length (ft)	200		150	200		150		400		200	225	
Storage Lanes	0		2	2		1		2		1	1	
Taper Length (ft)	25			25				25			25	
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00	1.00	0.95	0.97	0.95	1.00	1.00	0.95
Frt			0.850			0.850				0.850		0.985
Flt Protected		0.980		0.950				0.950			0.950	
Satd. Flow (prot)	0	1808	2614	3221	1845	1485	0	3135	3139	1330	1472	3061
Flt Permitted		0.850		0.950				0.950			0.950	
Satd. Flow (perm)	0	1568	2614	3221	1845	1485	0	3135	3139	1330	1472	3061
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			156			236				425		9
Link Speed (mph)		35			35				50			50
Link Distance (ft)		315			263				377			684
Travel Time (s)		6.1			5.1				5.1			9.3
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
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	15%	15%	15%	15%	15%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	262	596	37	236	0	779	1070	425	193	642
Turn Type	Perm	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	pm+ov	Prot	NA
Protected Phases		4		3	8		5	5	2	3	1	6
Permitted Phases	4		4			8				2		
Minimum Initial (s)	8.0	8.0	8.0	4.0	8.0	8.0	6.0	6.0	10.0	4.0	6.0	10.0
Minimum Split (s)	21.2	21.2	21.2	8.0	37.2	37.2	10.2	10.2	22.0	8.0	10.2	22.0
Total Split (s)	21.2	21.2	21.2	28.2	49.4	49.4	40.0	40.0	50.0	28.2	20.6	30.6
Total Split (%)	17.7%	17.7%	17.7%	23.5%	41.2%	41.2%	33.3%	33.3%	41.7%	23.5%	17.2%	25.5%
Maximum Green (s)	16.0	16.0	16.0	24.2	44.2	44.2	35.8	35.8	44.0	24.2	16.4	24.6
Yellow Time (s)	3.2	3.2	3.2	3.5	3.2	3.2	3.2	3.2	5.0	3.5	3.2	5.0
All-Red Time (s)	2.0	2.0	2.0	0.5	2.0	2.0	1.0	1.0	1.0	0.5	1.0	1.0
Total Lost Time (s)		5.2	5.2	4.0	5.2	5.2		4.2	6.0	4.0	4.2	6.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	Max	None	None	Max
Walk Time (s)					7.0	7.0						
Flash Dont Walk (s)					25.0	25.0						
Pedestrian Calls (#/hr)					10	10						
Act Effct Green (s)		11.1	11.1	23.6	38.7	38.7		32.2	44.1	69.6	16.4	28.3
Actuated g/C Ratio		0.10	0.10	0.21	0.34	0.34		0.28	0.38	0.61	0.14	0.25
v/c Ratio		0.48	0.66	0.90	0.06	0.36		1.28dl	0.89	0.44	0.91	0.84
Control Delay		59.8	29.0	62.5	25.5	4.9		52.1	43.7	2.0	93.3	53.3
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		59.8	29.0	62.5	25.5	4.9		52.1	43.7	2.0	93.3	53.3
LOS		E	C	E	C	A		D	D	A	F	D
Approach Delay		35.7			45.3				38.8			62.5

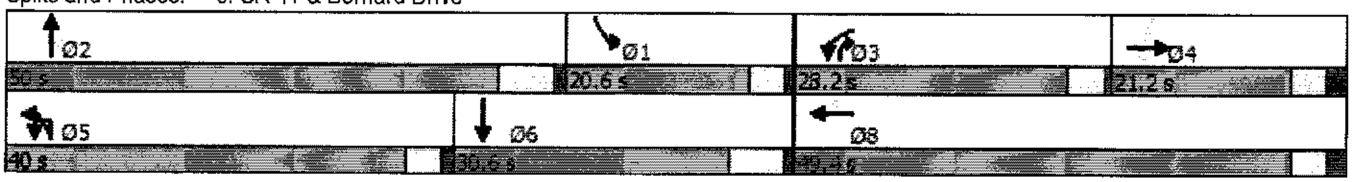
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	58
Future Volume (vph)	58
Ideal Flow (vphpl)	1800
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.92
Heavy Vehicles (%)	15%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Recall Mode	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Approach LOS		D			D				D			E

Intersection Summary	
Area Type:	Other

Cycle Length: 120
Actuated Cycle Length: 114.6
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 44.5   Intersection LOS: D
Intersection Capacity Utilization 80.7%   ICU Level of Service D
Analysis Period (min) 15
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: SR 41 & Bernard Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱	↰↰↰	↑↱		↰	↑↑	↱	↰	↑↑↱	
Traffic Volume (veh/h)	28	40	241	1096	34	217	168	984	391	178	533	58
Future Volume (veh/h)	28	40	241	1096	34	217	168	984	391	178	533	58
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	1800	1845	1748	1748	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	30	43	262	1191	37	236	183	1070	425	193	579	63
Adj No. of Lanes	0	1	1	3	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	87	103	366	1184	83	528	227	1089	797	203	896	97
Arrive On Green	0.09	0.09	0.09	0.25	0.38	0.38	0.15	0.35	0.35	0.14	0.32	0.32
Sat Flow, veh/h	448	1087	1485	4693	217	1384	1491	3139	1330	1476	2828	307
Grp Volume(v), veh/h	73	0	262	1191	0	273	183	1070	425	193	318	324
Grp Sat Flow(s),veh/h/ln	1535	0	1485	1564	0	1600	1491	1570	1330	1476	1554	1581
Q Serve(g_s), s	2.2	0.0	7.1	29.0	0.0	14.6	13.6	38.8	21.6	14.9	20.2	20.3
Cycle Q Clear(g_c), s	4.8	0.0	7.1	29.0	0.0	14.6	13.6	38.8	21.6	14.9	20.2	20.3
Prop In Lane	0.41		1.00	1.00		0.86	1.00		1.00	1.00		0.19
Lane Grp Cap(c), veh/h	189	0	366	1184	0	611	227	1089	797	203	492	501
V/C Ratio(X)	0.39	0.00	0.72	1.01	0.00	0.45	0.81	0.98	0.53	0.95	0.65	0.65
Avail Cap(c_a), veh/h	253	0	433	1184	0	682	249	1089	797	203	492	501
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	0.0	15.2	43.0	0.0	26.5	47.1	37.2	13.6	49.2	33.7	33.8
Incr Delay (d2), s/veh	1.3	0.0	4.5	27.6	0.0	0.5	16.3	23.4	2.5	49.3	6.4	6.4
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	2.3	0.0	4.2	15.5	0.0	6.5	6.7	20.3	8.5	8.8	9.5	9.7
LnGrp Delay(d),s/veh	50.4	0.0	19.8	70.5	0.0	27.0	63.4	60.5	16.1	98.5	40.1	40.1
LnGrp LOS	D		B	F		C	E	E	B	F	D	D
Approach Vol, veh/h		335			1464			1678			835	
Approach Delay, s/veh		26.5			62.4			49.6			53.6	
Approach LOS		C			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6		8
Phs Duration (G+Y+Rc), s	20.0	45.9	33.0	16.1	23.5	42.4		49.1
Change Period (Y+Rc), s	* 4.2	6.0	4.0	* 5.2	6.0	* 6		* 5.2
Max Green Setting (Gmax), s	* 16	39.8	29.0	* 16	19.2	* 36		* 49
Max Q Clear Time (g_c+I1), s	16.9	40.8	31.0	9.1	15.6	22.3		16.6
Green Ext Time (p_c), s	0.0	0.0	0.0	1.8	1.9	3.0		3.3

Intersection Summary	
HCM 2010 Ctrl Delay	52.9
HCM 2010 LOS	D

Notes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	812	1252	953	0	1890
Future Volume (Veh/h)	0	812	1252	953	0	1890
Sign Control	Stop		Free			Free
Grade	0%		0%			2%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	883	1361	1036	0	2054
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						377
pX, platoon unblocked	0.81					
vC, conflicting volume	2388	680			2397	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2244	680			2397	
tC, single (s)	6.9	7.0			4.4	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	100	0			100	
cM capacity (veh/h)	28	391			162	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	442	442	680	680	1036	1027	1027
Volume Left	0	0	0	0	0	0	0
Volume Right	442	442	0	0	1036	0	0
cSH	391	391	1700	1700	1700	1700	1700
Volume to Capacity	1.13	1.13	0.40	0.40	0.61	0.60	0.60
Queue Length 95th (ft)	410	410	0	0	0	0	0
Control Delay (s)	117.7	117.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F					
Approach Delay (s)	117.7		0.0			0.0	
Approach LOS	F						

Intersection Summary			
Average Delay	19.5		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱		↑↑
Traffic Volume (veh/h)	0	812	1252	953	0	1890
Future Volume (veh/h)	0	812	1252	953	0	1890
Number	3	18	2	12	1	6
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	0	1748	1652	1565	0	1636
Adj Flow Rate, veh/h	0	883	1361	1036	0	2054
Adj No. of Lanes	0	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	3	15	15	0	15
Cap, veh/h	0	0	2887	1224	0	2858
Arrive On Green	0.00	0.00	0.92	0.92	0.00	0.92
Sat Flow, veh/h	0		3222	1330	0	3271
Grp Volume(v), veh/h	0.0		1361	1036	0	2054
Grp Sat Flow(s),veh/h/ln			1570	1330	0	1554
Q Serve(g_s), s			3.1	14.1	0.0	7.8
Cycle Q Clear(g_c), s			3.1	14.1	0.0	7.8
Prop In Lane				1.00	0.00	
Lane Grp Cap(c), veh/h			2887	1224	0	2858
V/C Ratio(X)			0.47	0.85	0.00	0.72
Avail Cap(c_a), veh/h			2959	1254	0	2929
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh			0.3	0.7	0.0	0.5
Incr Delay (d2), s/veh			0.1	5.5	0.0	0.8
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln			1.2	17.1	0.0	2.9
LnGrp Delay(d),s/veh			0.4	6.2	0.0	1.3
LnGrp LOS			A	A		A
Approach Vol, veh/h			2397			2054
Approach Delay, s/veh			2.9			1.3
Approach LOS			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		
Phs Duration (G+Y+Rc), s		49.9				49.9		
Change Period (Y+Rc), s		4.0				4.0		
Max Green Setting (Gmax), s		47.0				47.0		
Max Q Clear Time (g_c+I1), s		16.1				9.8		
Green Ext Time (p_c), s		29.8				35.6		

Intersection Summary		
HCM 2010 Ctrl Delay		2.2
HCM 2010 LOS		A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱↱	↑↑	↱		↑↑
Traffic Volume (veh/h)	0	264	1252	953	0	1890
Future Volume (Veh/h)	0	264	1252	953	0	1890
Sign Control	Stop		Free			Free
Grade	0%		0%			2%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	287	1361	1036	0	2054
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						377
pX, platoon unblocked	0.83					
vC, conflicting volume	2388	680			2397	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2265	680			2397	
tC, single (s)	6.9	7.0			4.4	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	100	27			100	
cM capacity (veh/h)	28	391			162	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	144	144	680	680	1036	1027	1027
Volume Left	0	0	0	0	0	0	0
Volume Right	144	144	0	0	1036	0	0
cSH	391	391	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.40	0.40	0.61	0.60	0.60
Queue Length 95th (ft)	41	41	0	0	0	0	0
Control Delay (s)	19.5	19.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	C					
Approach Delay (s)	19.5		0.0			0.0	
Approach LOS	C						

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰		↰	↑↑			↑↱	
Traffic Volume (veh/h)	0	0	0	20	0	0	150	1644	0	0	1159	663
Future Volume (veh/h)	0	0	0	20	0	0	150	1644	0	0	1159	663
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1652	0	1565	1652	0	0	1636	1782
Adj Flow Rate, veh/h				22	0	0	163	1787	0	0	1260	721
Adj No. of Lanes				0	1	0	1	2	0	0	2	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	3	0	15	15	0	0	15	15
Cap, veh/h				2	0	0	208	2954	0	0	1467	766
Arrive On Green				0.00	0.00	0.00	0.14	0.94	0.00	0.00	0.74	0.74
Sat Flow, veh/h				1573	0	0	1491	3222	0	0	2058	1032
Grp Volume(v), veh/h				22	0	0	163	1787	0	0	965	1016
Grp Sat Flow(s),veh/h/ln				1573	0	0	1491	1570	0	0	1554	1454
Q Serve(g_s), s				0.1	0.0	0.0	7.2	5.3	0.0	0.0	28.6	40.5
Cycle Q Clear(g_c), s				0.1	0.0	0.0	7.2	5.3	0.0	0.0	28.6	40.5
Prop In Lane				1.00		0.00	1.00		0.00	0.00		0.71
Lane Grp Cap(c), veh/h				2	0	0	208	2954	0	0	1154	1079
V/C Ratio(X)				9.47	0.00	0.00	0.78	0.60	0.00	0.00	0.84	0.94
Avail Cap(c_a), veh/h				372	0	0	220	3059	0	0	1193	1116
HCM Platoon Ratio				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	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				33.9	0.0	0.0	28.2	0.3	0.0	0.0	5.9	7.5
Incr Delay (d2), s/veh				3990.4	0.0	0.0	16.0	0.3	0.0	0.0	5.2	14.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.2	0.0	0.0	3.9	1.9	0.0	0.0	13.5	19.9
LnGrp Delay(d),s/veh				4024.3	0.0	0.0	44.1	0.6	0.0	0.0	11.2	22.2
LnGrp LOS				F			D	A			B	C
Approach Vol, veh/h					22			1950			1981	
Approach Delay, s/veh					4024.2			4.2			16.8	
Approach LOS					F			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		67.7			13.5	54.3		0.0
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		66.0			10.0	52.0		16.0
Max Q Clear Time (g_c+I1), s		7.3			9.2	42.5		0.0
Green Ext Time (p_c), s		23.2			0.8	7.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱					↑↑	↱	↰↰	↑↑	
Traffic Volume (veh/h)	499	4	180	0	0	0	0	1284	87	505	668	0
Future Volume (veh/h)	499	4	180	0	0	0	0	1284	87	505	668	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1748	1845	1748				0	1652	1565	1565	1652	0
Adj Flow Rate, veh/h	545	0	196				0	1396	95	549	726	0
Adj No. of Lanes	2	0	1				0	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	15	15	15	15	0
Cap, veh/h	604	0	269				0	1428	605	571	2246	0
Arrive On Green	0.18	0.00	0.18				0.00	0.45	0.45	0.20	0.72	0.00
Sat Flow, veh/h	3329	0	1485				0	3222	1330	2892	3222	0
Grp Volume(v), veh/h	545	0	196				0	1396	95	549	726	0
Grp Sat Flow(s),veh/h/ln	1664	0	1485				0	1570	1330	1446	1570	0
Q Serve(g_s), s	16.0	0.0	12.4				0.0	43.6	4.2	18.8	8.5	0.0
Cycle Q Clear(g_c), s	16.0	0.0	12.4				0.0	43.6	4.2	18.8	8.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	604	0	269				0	1428	605	571	2246	0
V/C Ratio(X)	0.90	0.00	0.73				0.00	0.98	0.16	0.96	0.32	0.00
Avail Cap(c_a), veh/h	610	0	272				0	1428	605	571	2246	0
HCM Platoon Ratio	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				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.0	0.0	38.5				0.0	26.7	16.0	39.7	5.3	0.0
Incr Delay (d2), s/veh	16.7	0.0	9.3				0.0	19.0	0.6	28.2	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	5.8				0.0	22.6	1.6	9.7	3.7	0.0
LnGrp Delay(d),s/veh	56.6	0.0	47.8				0.0	45.7	16.5	67.9	5.6	0.0
LnGrp LOS	E		D					D	B	E	A	
Approach Vol, veh/h		741						1491			1275	
Approach Delay, s/veh		54.3						43.9			32.5	
Approach LOS		D						D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	26.0	51.7		22.1		77.7		
Change Period (Y+Rc), s	6.3	6.3		4.0		6.3		
Max Green Setting (Gmax), s	19.7	45.4		18.3		71.4		
Max Q Clear Time (g_c+I1), s	20.8	45.6		18.0		10.5		
Green Ext Time (p_c), s	0.0	0.0		0.1		26.3		

Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	6	18	2	8	1	20	1053	9	3	684	28
Future Vol, veh/h	16	6	18	2	8	1	20	1053	9	3	684	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	17	7	20	2	9	1	22	1145	10	3	743	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1963	1963	759	1971	1973	1149	774	0	0	1154	0	0
Stage 1	765	765	-	1193	1193	-	-	-	-	-	-	-
Stage 2	1198	1198	-	778	780	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	47	63	405	46	62	240	786	-	-	561	-	-
Stage 1	394	411	-	227	259	-	-	-	-	-	-	-
Stage 2	226	258	-	388	404	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	39	58	405	37	57	240	786	-	-	561	-	-
Mov Cap-2 Maneuver	39	58	-	37	57	-	-	-	-	-	-	-
Stage 1	363	407	-	209	239	-	-	-	-	-	-	-
Stage 2	200	238	-	360	400	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	112.6	87.8	0.2	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	786	-	-	72	55	561	-	-
HCM Lane V/C Ratio	0.028	-	-	0.604	0.217	0.006	-	-
HCM Control Delay (s)	9.7	0	-	112.6	87.8	11.5	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.6	0.7	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	4	9	1	1	8	7	14	1071	1	4	678	22
Future Vol, veh/h	4	9	1	1	8	7	14	1071	1	4	678	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	4	10	1	1	9	8	15	1164	1	4	737	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1961	1954	749	1958	1965	1165	761	0	0	1165	0	0
Stage 1	758	758	-	1195	1195	-	-	-	-	-	-	-
Stage 2	1203	1196	-	763	770	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	47	64	410	47	63	235	795	-	-	555	-	-
Stage 1	398	414	-	226	259	-	-	-	-	-	-	-
Stage 2	224	258	-	395	409	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	38	60	410	39	59	235	795	-	-	555	-	-
Mov Cap-2 Maneuver	38	60	-	39	59	-	-	-	-	-	-	-
Stage 1	377	409	-	214	245	-	-	-	-	-	-	-
Stage 2	198	244	-	380	404	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	96	58.7	0.1	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	795	-	-	54	84	555	-	-
HCM Lane V/C Ratio	0.019	-	-	0.282	0.207	0.008	-	-
HCM Control Delay (s)	9.6	0	-	96	58.7	11.5	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.7	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	7	3	14	5	6	3	26	1076	2	1	659	20
Future Vol, veh/h	7	3	14	5	6	3	26	1076	2	1	659	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	8	3	15	5	7	3	28	1170	2	1	716	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1961	1957	727	1966	1967	1171	738	0	0	1172	0	0
Stage 1	729	729	-	1227	1227	-	-	-	-	-	-	-
Stage 2	1232	1228	-	739	740	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.25	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.335	-	-
Pot Cap-1 Maneuver	47	63	422	47	62	233	812	-	-	552	-	-
Stage 1	413	427	-	217	250	-	-	-	-	-	-	-
Stage 2	216	249	-	408	422	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	39	57	422	40	56	233	812	-	-	552	-	-
Mov Cap-2 Maneuver	39	57	-	40	56	-	-	-	-	-	-	-
Stage 1	372	426	-	196	225	-	-	-	-	-	-	-
Stage 2	186	224	-	389	421	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60.6	89.7	0.2	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	812	-	-	90	57	552	-	-
HCM Lane V/C Ratio	0.035	-	-	0.29	0.267	0.002	-	-
HCM Control Delay (s)	9.6	0	-	60.6	89.7	11.5	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.9	0	-	-

Intersection	
Intersection Delay, s/veh	234
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	6	18	2	8	1	20	1057	9	3	688	28
Future Vol, veh/h	16	6	18	2	8	1	20	1057	9	3	688	28
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
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	17	7	20	2	9	1	22	1149	10	3	748	30
Number of Lanes	0	1	0	0	1	0	0	1	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	11.8	11.7	335.4	96.5
HCM LOS	B	B	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	40%	18%	0%
Vol Thru, %	97%	15%	73%	96%
Vol Right, %	1%	45%	9%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1086	40	11	719
LT Vol	20	16	2	3
Through Vol	1057	6	8	688
RT Vol	9	18	1	28
Lane Flow Rate	1180	43	12	782
Geometry Grp	1	1	1	1
Degree of Util (X)	1.699	0.084	0.024	1.12
Departure Headway (Hd)	5.354	8.06	8.473	5.845
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	685	447	425	625
Service Time	3.354	6.06	6.473	3.845
HCM Lane V/C Ratio	1.723	0.096	0.028	1.251
HCM Control Delay	335.4	11.8	11.7	96.5
HCM Lane LOS	F	B	B	F
HCM 95th-tile Q	65.3	0.3	0.1	21.4

Intersection	
Intersection Delay, s/veh	233
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	7	3	14	5	6	3	26	1080	2	1	663	20
Future Vol, veh/h	7	3	14	5	6	3	26	1080	2	1	663	20
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
Heavy Vehicles, %	3	3	3	3	3	3	15	15	15	15	15	15
Mvmt Flow	8	3	15	5	7	3	28	1174	2	1	721	22
Number of Lanes	0	1	0	0	1	0	0	1	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	11.3	11.5	341.6	69.4
HCM LOS	B	B	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	29%	36%	0%
Vol Thru, %	97%	12%	43%	97%
Vol Right, %	0%	58%	21%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1108	24	14	684
LT Vol	26	7	5	1
Through Vol	1080	3	6	663
RT Vol	2	14	3	20
Lane Flow Rate	1204	26	15	743
Geometry Grp	1	1	1	1
Degree of Util (X)	1.714	0.049	0.03	1.036
Departure Headway (Hd)	5.123	7.925	8.241	5.784
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	711	455	437	632
Service Time	3.215	5.925	6.241	3.784
HCM Lane V/C Ratio	1.693	0.057	0.034	1.176
HCM Control Delay	341.6	11.3	11.5	69.4
HCM Lane LOS	F	B	B	F
HCM 95th-tile Q	68.1	0.2	0.1	17

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	6	18	2	8	1	20	1057	9	3	688	28
Future Volume (veh/h)	16	6	18	2	8	1	20	1057	9	3	688	28
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	1900	1845	1900	1900	1845	1900	1900	1652	1900	1900	1652	1900
Adj Flow Rate, veh/h	17	7	20	2	9	1	22	1149	10	3	748	30
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	107	10	29	80	55	6	71	1327	11	60	1303	52
Arrive On Green	0.04	0.04	0.04	0.04	0.04	0.04	0.83	0.83	0.83	0.83	0.83	0.83
Sat Flow, veh/h	607	250	714	273	1370	149	12	1603	14	1	1574	63
Grp Volume(v), veh/h	44	0	0	12	0	0	1181	0	0	781	0	0
Grp Sat Flow(s),veh/h/ln	1571	0	0	1793	0	0	1629	0	0	1638	0	0
Q Serve(g_s), s	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.4	0.0	0.0	26.3	0.0	0.0	9.5	0.0	0.0
Prop In Lane	0.39		0.45	0.17		0.08	0.02		0.01	0.00		0.04
Lane Grp Cap(c), veh/h	146	0	0	142	0	0	1409	0	0	1416	0	0
V/C Ratio(X)	0.30	0.00	0.00	0.08	0.00	0.00	0.84	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	487	0	0	526	0	0	1827	0	0	1839	0	0
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.7	0.0	0.0	28.1	0.0	0.0	3.2	0.0	0.0	1.7	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.3	0.0	0.0	2.8	0.0	0.0	0.3	0.0	0.0
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	0.8	0.0	0.0	0.2	0.0	0.0	12.3	0.0	0.0	4.3	0.0	0.0
LnGrp Delay(d),s/veh	29.8	0.0	0.0	28.4	0.0	0.0	6.0	0.0	0.0	2.1	0.0	0.0
LnGrp LOS	C			C			A			A		
Approach Vol, veh/h		44			12			1181			781	
Approach Delay, s/veh		29.8			28.4			6.0			2.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		54.2		6.4		54.2		6.4
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		66.0		16.0		66.0		16.0
Max Q Clear Time (g_c+I1), s		28.3		3.7		11.5		2.4
Green Ext Time (p_c), s		21.9		0.1		26.4		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	5.1
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	3	14	5	6	3	26	1080	2	1	663	20
Future Volume (veh/h)	7	3	14	5	6	3	26	1080	2	1	663	20
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	1900	1845	1900	1900	1845	1900	1900	1652	1900	1900	1652	1900
Adj Flow Rate, veh/h	8	3	15	5	7	3	28	1174	2	1	721	22
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	94	6	30	98	26	11	75	1340	2	60	1331	41
Arrive On Green	0.03	0.03	0.03	0.03	0.03	0.03	0.84	0.84	0.84	0.84	0.84	0.84
Sat Flow, veh/h	493	185	924	567	794	340	17	1605	3	0	1594	49
Grp Volume(v), veh/h	26	0	0	15	0	0	1204	0	0	744	0	0
Grp Sat Flow(s),veh/h/ln	1602	0	0	1702	0	0	1625	0	0	1643	0	0
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	0.0	0.5	0.0	0.0	26.9	0.0	0.0	8.3	0.0	0.0
Prop In Lane	0.31		0.58	0.33		0.20	0.02		0.00	0.00		0.03
Lane Grp Cap(c), veh/h	130	0	0	135	0	0	1417	0	0	1431	0	0
V/C Ratio(X)	0.20	0.00	0.00	0.11	0.00	0.00	0.85	0.00	0.00	0.52	0.00	0.00
Avail Cap(c_a), veh/h	485	0	0	507	0	0	1823	0	0	1848	0	0
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	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	28.7	0.0	0.0	28.6	0.0	0.0	3.0	0.0	0.0	1.5	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.4	0.0	0.0	3.2	0.0	0.0	0.3	0.0	0.0
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	0.5	0.0	0.0	0.3	0.0	0.0	12.6	0.0	0.0	3.6	0.0	0.0
LnGrp Delay(d),s/veh	29.5	0.0	0.0	28.9	0.0	0.0	6.2	0.0	0.0	1.8	0.0	0.0
LnGrp LOS	C			C			A			A		
Approach Vol, veh/h		26			15			1204			744	
Approach Delay, s/veh		29.5			28.9			6.2			1.8	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		54.6		6.0		54.6		6.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		66.0		16.0		66.0		16.0
Max Q Clear Time (g_c+I1), s		28.9		2.9		10.3		2.5
Green Ext Time (p_c), s		21.7		0.1		26.6		0.1

Intersection Summary			
HCM 2010 Ctrl Delay			5.1
HCM 2010 LOS			A

Intersection	
Int Delay, s/veh	370

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	0	180	110	0	43	176	1010	39	36	530	113
Future Vol, veh/h	56	0	180	110	0	43	176	1010	39	36	530	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	225	-	-	100	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	3	3	15	15
Mvmt Flow	61	0	196	120	0	47	191	1098	42	39	576	123

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2179	2177	576	2254	2156	1119	576	0	0	1140	0	0
Stage 1	654	654	-	1502	1502	-	-	-	-	-	-	-
Stage 2	1525	1523	-	752	654	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.25	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.335	-	-	2.227	-	-
Pot Cap-1 Maneuver	~ 33	46	515	~ 29	47	250	936	-	-	609	-	-
Stage 1	454	462	-	151	184	-	-	-	-	-	-	-
Stage 2	147	179	-	401	462	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 22	34	515	~ 14	35	250	936	-	-	609	-	-
Mov Cap-2 Maneuver	~ 22	34	-	~ 14	35	-	-	-	-	-	-	-
Stage 1	361	432	-	120	146	-	-	-	-	-	-	-
Stage 2	95	142	-	233	432	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1067.3	$ 3885.5	1.4	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	936	-	-	82	19	609	-	-
HCM Lane V/C Ratio	0.204	-	-	3.128	8.753	0.064	-	-
HCM Control Delay (s)	9.8	-		$ 1067.3	$ 3885.5	11.3	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.8	-	-	25.6	21.3	0.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↱	
Traffic Volume (veh/h)	28	40	241	438	34	175	716	1023	352	142	643	58
Future Volume (veh/h)	28	40	241	438	34	175	716	1023	352	142	643	58
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	1800	1845	1800	1800	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	30	43	262	476	37	190	778	1112	383	154	699	63
Adj No. of Lanes	0	1	0	0	1	0	1	2	1	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	74	114	556	322	21	108	308	1120	475	148	370	33
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.21	0.36	0.36	0.10	0.25	0.25
Sat Flow, veh/h	100	274	1341	654	51	261	1491	3139	1330	1476	1479	133
Grp Volume(v), veh/h	335	0	0	703	0	0	778	1112	383	154	0	762
Grp Sat Flow(s),veh/h/ln	1714	0	0	966	0	0	1491	1570	1330	1476	0	1612
Q Serve(g_s), s	0.0	0.0	0.0	31.5	0.0	0.0	24.8	42.3	31.2	12.0	0.0	30.0
Cycle Q Clear(g_c), s	18.3	0.0	0.0	49.8	0.0	0.0	24.8	42.3	31.2	12.0	0.0	30.0
Prop In Lane	0.09		0.78	0.68		0.27	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	744	0	0	451	0	0	308	1120	475	148	0	403
V/C Ratio(X)	0.45	0.00	0.00	1.56	0.00	0.00	2.53	0.99	0.81	1.04	0.00	1.89
Avail Cap(c_a), veh/h	744	0	0	451	0	0	308	1120	475	148	0	403
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.9	0.0	0.0	41.1	0.0	0.0	47.6	38.5	34.9	54.0	0.0	45.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	262.0	0.0	0.0	696.0	25.3	13.7	86.1	0.0	410.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	0.0	0.0	47.7	0.0	0.0	69.7	22.3	13.3	8.4	0.0	59.2
LnGrp Delay(d),s/veh	26.3	0.0	0.0	303.1	0.0	0.0	743.6	63.8	48.6	140.3	0.0	455.1
LnGrp LOS	C			F			F	E	D	F		F
Approach Vol, veh/h		335			703			2273			916	
Approach Delay, s/veh		26.3			303.1			293.9			402.2	
Approach LOS		C			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.2	48.8		55.0	29.0	36.0		55.0
Change Period (Y+Rc), s	* 4.2	6.0		* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	* 12	42.8		* 50	* 25	30.0		* 50
Max Q Clear Time (g_c+I1), s	14.0	44.3		20.3	26.8	32.0		51.8
Green Ext Time (p_c), s	0.0	0.0		9.7	0.0	0.0		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		297.7
HCM 2010 LOS		F

Notes

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	180	0	0	43	176	1010	39	36	530	113
Future Vol, veh/h	0	0	180	0	0	43	176	1010	39	36	530	113
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	225	-	-	100	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	15	15	3	3	15	15
Mvmt Flow	0	0	196	0	0	47	191	1098	42	39	576	123

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	576	-	-	1119	576	0	0	1140	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.23	-	-	6.23	4.25	-	-	4.13	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.327	-	-	3.327	2.335	-	-	2.227	-	-
Pot Cap-1 Maneuver	0	0	515	0	0	250	936	-	-	609	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	515	-	-	250	936	-	-	609	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.2	22.7	1.4	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	936	-	-	515	250	609	-	-
HCM Lane V/C Ratio	0.204	-	-	0.38	0.187	0.064	-	-
HCM Control Delay (s)	9.8	-	-	16.2	22.7	11.3	-	-
HCM Lane LOS	A	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0.8	-	-	1.8	0.7	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↱	
Traffic Volume (veh/h)	84	40	241	548	34	174	716	1023	352	142	643	58
Future Volume (veh/h)	84	40	241	548	34	174	716	1023	352	142	643	58
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	1800	1845	1800	1800	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	91	43	262	596	37	189	778	1112	383	154	699	63
Adj No. of Lanes	0	1	0	0	1	0	1	2	1	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	187	102	492	363	19	99	283	1151	488	96	357	32
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.19	0.37	0.37	0.07	0.24	0.24
Sat Flow, veh/h	340	232	1119	708	44	224	1491	3139	1330	1476	1479	133
Grp Volume(v), veh/h	396	0	0	822	0	0	778	1112	383	154	0	762
Grp Sat Flow(s),veh/h/ln	1691	0	0	976	0	0	1491	1570	1330	1476	0	1612
Q Serve(g_s), s	0.0	0.0	0.0	32.1	0.0	0.0	22.8	41.7	30.7	7.8	0.0	29.0
Cycle Q Clear(g_c), s	20.7	0.0	0.0	52.8	0.0	0.0	22.8	41.7	30.7	7.8	0.0	29.0
Prop In Lane	0.23		0.66	0.73		0.23	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	781	0	0	481	0	0	283	1151	488	96	0	390
V/C Ratio(X)	0.51	0.00	0.00	1.71	0.00	0.00	2.75	0.97	0.79	1.61	0.00	1.96
Avail Cap(c_a), veh/h	781	0	0	481	0	0	283	1151	488	96	0	390
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.7	0.0	0.0	39.3	0.0	0.0	48.6	37.3	33.8	56.1	0.0	45.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	327.4	0.0	0.0	796.0	19.5	12.0	315.4	0.0	439.4
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	9.7	0.0	0.0	59.7	0.0	0.0	72.0	21.2	12.9	11.6	0.0	60.4
LnGrp Delay(d),s/veh	25.2	0.0	0.0	366.7	0.0	0.0	844.6	56.8	45.8	371.5	0.0	484.9
LnGrp LOS	C			F			F	E	D	F		F
Approach Vol, veh/h		396			822			2273			916	
Approach Delay, s/veh		25.2			366.7			324.6			465.8	
Approach LOS		C			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	50.0		58.0	27.0	35.0		58.0
Change Period (Y+Rc), s	* 4.2	6.0		* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	* 7.8	44.0		* 53	* 23	29.0		* 53
Max Q Clear Time (g_c+I1), s	9.8	43.7		22.7	24.8	31.0		54.8
Green Ext Time (p_c), s	0.0	0.3		12.5	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	334.9
HCM 2010 LOS	F

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↑	↱	↰	↱	
Traffic Volume (veh/h)	28	40	241	1096	34	481	168	720	391	178	533	58
Future Volume (veh/h)	28	40	241	1096	34	481	168	720	391	178	533	58
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	1800	1845	1800	1800	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	30	43	262	1191	37	523	183	783	425	193	579	63
Adj No. of Lanes	0	1	0	0	1	0	1	2	1	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	77	118	580	338	9	126	208	957	406	199	435	47
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.14	0.30	0.30	0.14	0.30	0.30
Sat Flow, veh/h	102	272	1343	667	21	293	1491	3139	1330	1476	1450	158
Grp Volume(v), veh/h	335	0	0	1751	0	0	183	783	425	193	0	642
Grp Sat Flow(s),veh/h/ln	1717	0	0	980	0	0	1491	1570	1330	1476	0	1608
Q Serve(g_s), s	0.0	0.0	0.0	34.0	0.0	0.0	14.4	27.7	36.6	15.6	0.0	36.0
Cycle Q Clear(g_c), s	17.8	0.0	0.0	51.8	0.0	0.0	14.4	27.7	36.6	15.6	0.0	36.0
Prop In Lane	0.09		0.78	0.68		0.30	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	774	0	0	474	0	0	208	957	406	199	0	483
V/C Ratio(X)	0.43	0.00	0.00	3.70	0.00	0.00	0.88	0.82	1.05	0.97	0.00	1.33
Avail Cap(c_a), veh/h	774	0	0	474	0	0	358	957	406	199	0	483
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	0.0	40.0	0.0	0.0	50.6	38.6	41.7	51.6	0.0	42.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	1218.9	0.0	0.0	12.0	7.7	57.6	54.6	0.0	162.2
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	8.0	0.0	0.0	176.0	0.0	0.0	6.6	13.0	19.9	9.4	0.0	37.7
LnGrp Delay(d),s/veh	24.8	0.0	0.0	1258.9	0.0	0.0	62.6	46.3	99.3	106.2	0.0	204.2
LnGrp LOS	C			F			E	D	F	F		F
Approach Vol, veh/h		335			1751			1391			835	
Approach Delay, s/veh		24.8			1258.9			64.7			181.5	
Approach LOS		C			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.4	42.6		57.0	21.0	42.0		57.0
Change Period (Y+Rc), s	* 4.2	6.0		* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	* 16	36.6		* 52	* 29	24.0		* 52
Max Q Clear Time (g_c+I1), s	17.6	38.6		19.8	16.4	38.0		53.8
Green Ext Time (p_c), s	0.0	0.0		31.1	0.4	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	569.2
HCM 2010 LOS	F

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↑	↱	↰	↱	
Traffic Volume (veh/h)	28	40	241	1096	34	481	168	720	1343	178	533	58
Future Volume (veh/h)	28	40	241	1096	34	481	168	720	1343	178	533	58
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	1800	1845	1800	1800	1845	1800	1565	1652	1565	1550	1636	1782
Adj Flow Rate, veh/h	30	43	262	1191	37	523	183	783	1460	193	579	63
Adj No. of Lanes	0	1	0	0	1	0	1	2	1	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, %	3	3	3	3	3	3	15	15	15	15	15	15
Cap, veh/h	77	118	580	338	9	126	208	957	406	199	435	47
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.14	0.30	0.30	0.14	0.30	0.30
Sat Flow, veh/h	102	272	1343	667	21	293	1491	3139	1330	1476	1450	158
Grp Volume(v), veh/h	335	0	0	1751	0	0	183	783	1460	193	0	642
Grp Sat Flow(s),veh/h/ln	1717	0	0	980	0	0	1491	1570	1330	1476	0	1608
Q Serve(g_s), s	0.0	0.0	0.0	34.0	0.0	0.0	14.4	27.7	36.6	15.6	0.0	36.0
Cycle Q Clear(g_c), s	17.8	0.0	0.0	51.8	0.0	0.0	14.4	27.7	36.6	15.6	0.0	36.0
Prop In Lane	0.09		0.78	0.68		0.30	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	774	0	0	474	0	0	208	957	406	199	0	483
V/C Ratio(X)	0.43	0.00	0.00	3.70	0.00	0.00	0.88	0.82	3.60	0.97	0.00	1.33
Avail Cap(c_a), veh/h	774	0	0	474	0	0	358	957	406	199	0	483
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	0.0	40.0	0.0	0.0	50.6	38.6	41.7	51.6	0.0	42.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	1218.9	0.0	0.0	12.0	7.7	1175.2	54.6	0.0	162.2
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	8.0	0.0	0.0	176.0	0.0	0.0	6.6	13.0	145.9	9.4	0.0	37.7
LnGrp Delay(d),s/veh	24.8	0.0	0.0	1258.9	0.0	0.0	62.6	46.3	1216.9	106.2	0.0	204.2
LnGrp LOS	C			F			E	D	F	F		F
Approach Vol, veh/h		335			1751			2426			835	
Approach Delay, s/veh		24.8			1258.9			752.0			181.5	
Approach LOS		C			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.4	42.6		57.0	21.0	42.0		57.0
Change Period (Y+Rc), s	* 4.2	6.0		* 5.2	* 4.2	6.0		* 5.2
Max Green Setting (Gmax), s	* 16	36.6		* 52	* 29	24.0		* 52
Max Q Clear Time (g_c+I1), s	17.6	38.6		19.8	16.4	38.0		53.8
Green Ext Time (p_c), s	0.0	0.0		31.1	0.4	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	783.4
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	112.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑↑			↑↱	
Traffic Vol, veh/h	0	0	0	20	0	616	150	1644	0	0	1159	663
Future Vol, veh/h	0	0	0	20	0	616	150	1644	0	0	1159	663
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	100	450	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	15	3	15	15	15	15	15	15	15
Mvmt Flow	0	0	0	22	0	670	163	1787	0	0	1260	721

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	2743	4093	893	1980	0	-	-	-	0
Stage 1	2113	2113	-	-	-	-	-	-	-
Stage 2	630	1980	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	7.2	4.4	-	-	-	-	-
Critical Hdwy Stg 1	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.65	4.03	3.45	2.35	-	-	-	-	-
Pot Cap-1 Maneuver	~ 13	2	~ 260	243	-	0	0	-	-
Stage 1	67	89	-	-	-	0	0	-	-
Stage 2	459	104	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	~ 4	0	~ 260	243	-	-	-	-	-
Mov Cap-2 Maneuver	~ 19	0	-	-	-	-	-	-	-
Stage 1	22	0	-	-	-	-	-	-	-
Stage 2	459	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 743.1	3.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (veh/h)	243	-	19	260	-	-
HCM Lane V/C Ratio	0.671	-	1.144	2.575	-	-
HCM Control Delay (s)	45.6	-	$ 540.9	$ 749.7	-	-
HCM Lane LOS	E	-	F	F	-	-
HCM 95th %tile Q(veh)	4.3	-	3	55.7	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	20	0	616	150	1644	0	0	1159	663
Future Volume (veh/h)	0	0	0	20	0	616	150	1644	0	0	1159	663
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1800	1652	1652	1565	1652	0	0	1636	1550
Adj Flow Rate, veh/h				22	0	670	163	1787	0	0	1260	721
Adj No. of Lanes				0	1	2	1	2	0	0	2	1
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				15	3	15	15	15	0	0	15	15
Cap, veh/h				466	0	733	131	1988	0	0	1585	672
Arrive On Green				0.30	0.00	0.30	0.09	0.63	0.00	0.00	0.51	0.51
Sat Flow, veh/h				1573	0	2472	1491	3222	0	0	3190	1317
Grp Volume(v), veh/h				22	0	670	163	1787	0	0	1260	721
Grp Sat Flow(s),veh/h/ln				1573	0	1236	1491	1570	0	0	1554	1317
Q Serve(g_s), s				1.1	0.0	29.8	10.0	55.1	0.0	0.0	38.0	58.0
Cycle Q Clear(g_c), s				1.1	0.0	29.8	10.0	55.1	0.0	0.0	38.0	58.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				466	0	733	131	1988	0	0	1585	672
V/C Ratio(X)				0.05	0.00	0.91	1.24	0.90	0.00	0.00	0.79	1.07
Avail Cap(c_a), veh/h				554	0	870	131	1988	0	0	1585	672
HCM Platoon Ratio				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	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				28.5	0.0	38.6	51.9	17.8	0.0	0.0	22.9	27.9
Incr Delay (d2), s/veh				0.0	0.0	12.7	158.1	6.0	0.0	0.0	2.9	56.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.5	0.0	11.4	9.8	25.2	0.0	0.0	16.9	31.4
LnGrp Delay(d),s/veh				28.6	0.0	51.3	209.9	23.7	0.0	0.0	25.8	83.8
LnGrp LOS				C		D	F	C			C	F
Approach Vol, veh/h					692			1950			1981	
Approach Delay, s/veh					50.6			39.3			47.0	
Approach LOS					D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		76.0			14.0	62.0		37.7
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		72.0			10.0	58.0		40.0
Max Q Clear Time (g_c+I1), s		57.1			12.0	60.0		31.8
Green Ext Time (p_c), s		14.2			0.0	0.0		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	44.3
HCM 2010 LOS	D

APPENDIX C

HCS 2010 Worksheets

HCS 2010: Freeway Merge and Diverge Segments Release 6.1

Phone: Fax:
E-mail:

Merge Analysis

Analyst: VRPA Technologies, Inc.
Agency/Co.:
Date performed: 10/19/2016
Analysis time period: Sunday Peak
Freeway/Dir of Travel: SR-41 / Northbound
Junction: I-5 NB Off Ramp
Jurisdiction:
Analysis Year: 2016
Description: Existing Conditions

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	810	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	304	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	810		304			vph
Peak-hour factor, PHF	0.93		0.98			
Peak 15-min volume, v15	218		78			v
Trucks and buses	15		15			%
Recreational vehicles	0		1			%
Terrain type:	Level		Grade			
Grade		%	-1.00	%		%
Length		mi	0.35	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.930	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	936	334	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 936 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1270	4500	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 936		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1270	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 12.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.290

Space mean speed in ramp influence area, S_R = 51.2 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 51.2 mph

HCS 2010: Two-Lane Highways Release 6.1

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	NB SR-41
From/To	Miham Avenue to 25th Avenue
Jurisdiction	
Analysis Year	2016
Description	Existing Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	20	%
Up/down	-	%	Access point density	7	/mi

Analysis direction volume, Vd	533	veh/h
Opposing direction volume, Vo	337	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.3	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.985		0.957	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	588	pc/h	383	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.8	mi/h
Free-flow speed, FFSd	53.3	mi/h
Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATSd	44.5	mi/h
Percent Free Flow Speed, PFFS	83.5	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		0.985	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	579	pc/h	372	pc/h
Base percent time-spent-following,(note-4) BPTSFd	54.1	%		
Adjustment for no-passing zones, fnp	25.3			
Percent time-spent-following, PTSFd	69.5	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.35	
Peak 15-min vehicle-miles of travel, VMT15	145	veh-mi
Peak-hour vehicle-miles of travel, VMT60	533	veh-mi
Peak 15-min total travel time, TT15	3.3	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2807	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	44.5	mi/h
Percent time-spent-following, PTSFd (from above)	69.5	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	579.3
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	5.21
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.1

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	SB SR-41
From/To	Miham Avenue to 25th Avenue
Jurisdiction	
Analysis Year	2016
Description	Existing Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	7	/mi

Analysis direction volume, Vd	337	veh/h
Opposing direction volume, Vo	533	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.957		0.985	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	383	pc/h	588	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.8	mi/h
Free-flow speed, FFSd	53.3	mi/h
Adjustment for no-passing zones, fnp	2.0	mi/h
Average travel speed, ATSd	43.8	mi/h
Percent Free Flow Speed, PFFS	82.2	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.985		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	372	pc/h	579	pc/h
Base percent time-spent-following,(note-4) BPTSFd	43.5	%		
Adjustment for no-passing zones, fnp	37.1			
Percent time-spent-following, PTSFd	58.0	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.35	
Peak 15-min vehicle-miles of travel, VMT15	92	veh-mi
Peak-hour vehicle-miles of travel, VMT60	337	veh-mi
Peak 15-min total travel time, TT15	2.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2807	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	43.8	mi/h
Percent time-spent-following, PTSFd (from above)	58.0	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	366.3
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.98
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.1

Phone:
Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	NB SR-41
From/To	25th Avenue to Bernard Drive
Jurisdiction	
Analysis Year	2016
Description	Existing Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	4	/mi

Analysis direction volume, Vd	540	veh/h
Opposing direction volume, Vo	335	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		2.0	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.905		0.870	
Grade adj. factor,(note-1) fg	0.97		0.87	
Directional flow rate,(note-2) vi	669	pc/h	481	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.0	mi/h
Free-flow speed, FFSd	54.0	mi/h
Adjustment for no-passing zones, fnp	1.9	mi/h
Average travel speed, ATSd	43.2	mi/h
Percent Free Flow Speed, PFFS	79.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.2	1.6
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.971	0.917
Grade adjustment factor,(note-1) fg	0.97	0.88
Directional flow rate,(note-2) vi	623 pc/h	451 pc/h

Base percent time-spent-following,(note-4) BPTSFd	58.0	%
Adjustment for no-passing zones, fnp	30.6	
Percent time-spent-following, PTSFd	75.8	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.41	
Peak 15-min vehicle-miles of travel, VMT15	147	veh-mi
Peak-hour vehicle-miles of travel, VMT60	540	veh-mi
Peak 15-min total travel time, TT15	3.4	veh-h
Capacity from ATS, CdATS	1627	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2796	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	43.2	mi/h
Percent time-spent-following, PTSFd (from above)	75.8	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	587.0
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	5.22
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.1

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	SB SR-41
From/To	25th Avenue to Bernard Drive
Jurisdiction	
Analysis Year	2016
Description	Existing Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.91	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	42	%
Up/down	-	%	Access point density	4	/mi

Analysis direction volume, Vd 335 veh/h
Opposing direction volume, Vo 540 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	2.0		1.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.870		0.905	
Grade adj. factor,(note-1) fg	0.88		0.97	
Directional flow rate,(note-2) vi	481	pc/h	676	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.0	mi/h
Free-flow speed, FFSd	54.0	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSd	44.1	mi/h
Percent Free Flow Speed, PFFS	81.6	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.6		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.917		0.971	
Grade adjustment factor,(note-1) fg	0.88		0.97	
Directional flow rate,(note-2) vi	456	pc/h	630	pc/h
Base percent time-spent-following,(note-4) BPTSFd	50.0	%		
Adjustment for no-passing zones, fnp	27.6			
Percent time-spent-following, PTSFd	61.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.42	
Peak 15-min vehicle-miles of travel, VMT15	92	veh-mi
Peak-hour vehicle-miles of travel, VMT60	335	veh-mi
Peak 15-min total travel time, TT15	2.1	veh-h
Capacity from ATS, CdATS	1627	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2784	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	44.1	mi/h
Percent time-spent-following, PTSFd (from above)	61.6	
Level of service, LOSd (from above)	D	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	368.1
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	4.98
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Multilane Highways Release 6.1

Phone:
E-mail:
Fax:

OPERATIONAL ANALYSIS

Analyst:	VRPA Technologies, Inc
Agency/Co:	Kettleman City
Date:	10/19/2016
Analysis Period:	Sunday Peak Hour
Highway:	SR-41
From/To:	Bernard Drive and I-5 NB Ramps
Jurisdiction:	
Analysis Year:	2016
Project ID:	Existing Conditions

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	50.0	mph	50.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	50.0	mph	50.0	mph

VOLUME

Direction	1		2	
Volume, V	1086	vph	931	vph
Peak-hour factor, PHF	0.96		0.96	
Peak 15-minute volume, v15	283		242	
Trucks and buses	15	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Rolling	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.816		0.816	
Flow rate, vp	692	pcphpl	593	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	692	pcphpl	593	pcphpl
Free-flow speed, FFS	50.0	mph	50.0	mph
Avg. passenger-car travel speed, S	50.0	mph	50.0	mph
Level of service, LOS	B		B	
Density, D	13.8	pc/mi/ln	11.9	pc/mi/ln

___________________________ Bicycle Level of Service ___________________________

Posted speed limit, Sp		55
Percent of segment with occupied on-highway parking	0	0
Pavement rating, P	3	3
Flow rate in outside lane, vOL	565.6	484.9
Effective width of outside lane, We	24.00	24.00
Effective speed factor, St	4.79	4.79
Bicycle LOS Score, BLOS	7.44	7.36
Bicycle LOS	F	F

Overall results are not computed when free-flow speed is less than 45 mph.

HCS 2010: Multilane Highways Release 6.1

Phone:
E-mail:
Fax:

OPERATIONAL ANALYSIS

Analyst: VRPA Technologies, Inc
Agency/Co: Kettleman City
Date: 10/19/2016
Analysis Period: Sunday Peak Hour
Highway: SR-41
From/To: I-5 NB Ramps and I-5 SB Ramps
Jurisdiction:
Analysis Year: 2016
Project ID: Existing Conditions

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	50.0	mph	50.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	50.0	mph	50.0	mph

VOLUME

Direction	1		2	
Volume, V	884	vph	581	vph
Peak-hour factor, PHF	0.93		0.94	
Peak 15-minute volume, v15	238		155	
Trucks and buses	15	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Rolling	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.816		0.816	
Flow rate, vp	582	pcphpl	378	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	582	pcphpl	378	pcphpl
Free-flow speed, FFS	50.0	mph	50.0	mph
Avg. passenger-car travel speed, S	50.0	mph	50.0	mph
Level of service, LOS	B		A	
Density, D	11.6	pc/mi/ln	7.6	pc/mi/ln

Bicycle Level of Service

Posted speed limit, Sp		55
Percent of segment with occupied on-highway parking	0	0
Pavement rating, P	3	3
Flow rate in outside lane, vOL	475.3	309.0
Effective width of outside lane, We	24.00	24.00
Effective speed factor, St	4.79	4.79
Bicycle LOS Score, BLOS	7.35	7.13
Bicycle LOS	F	F

Overall results are not computed when free-flow speed is less than 45 mph.

HCS 2010: Freeway Merge and Diverge Segments Release 6.1

Phone: Fax:
E-mail:

______________________________Merge Analysis______________________________

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	10/19/2016
Analysis time period:	Sunday Peak
Freeway/Dir of Travel:	SR-41 / Northbound
Junction:	I-5 NB Off Ramp
Jurisdiction:	
Analysis Year:	2040

Description: Cumulative Year 2040 Conditions

______________________________Freeway Data______________________________

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1644	vph

______________________________On Ramp Data______________________________

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	616	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

______________________Adjacent Ramp Data (if one exists)______________________

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

__________________Conversion to pc/h Under Base Conditions__________________

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1644		616			vph
Peak-hour factor, PHF	0.92		0.92			
Peak 15-min volume, v15	447		167			v
Trucks and buses	15		15			%
Recreational vehicles	0		1			%
Terrain type:	Level		Grade			
Grade		%	-1.00	%		%
Length		mi	0.35	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

```
Heavy vehicle adjustment, fHV            0.930        0.929
Driver population factor, fP             1.00         1.00
Flow rate, vp                            1921         721                  pcph

________________________Estimation of V12 Merge Areas________________________

                  L  =             (Equation 13-6 or 13-7)
                   EQ
                  P  =     1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  1921   pc/h
                   12   F   FM

______________________________Capacity Checks________________________________

                              Actual          Maximum          LOS F?
     v                        2642            4500             No
      FO
     v  or v                  0     pc/h      (Equation 13-14 or 13-17)
      3     av34
Is   v  or v       > 2700 pc/h?               No
      3     av34
Is   v  or v       > 1.5 v  /2                No
      3     av34          12
If yes, v    = 1921                        (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

_______________________Flow Entering Merge Influence Area_____________________
                         Actual          Max Desirable           Violation?
     v                   2642            4600                    No
      R12
________________Level of Service Determination (if not F)____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   22.6    pc/mi/ln
          R                   R            12             A
Level of service for ramp-freeway junction areas of influence  C

____________________________Speed Estimation_________________________________

Intermediate speed variable,                 M  = 0.331
                                              S
Space mean speed in ramp influence area,     S  = 50.7    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 50.7    mph
_____________________________________________________________________________
```

HCS 2010: Two-Lane Highways Release 6.1

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	NB SR-41
From/To	Miham Avenue to 25th Avenue
Jurisdiction	
Analysis Year	2040
Description	Cumulative Year 2040 Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	20	%
Up/down	-	%	Access point density	7	/mi

Analysis direction volume, Vd 1108 veh/h
Opposing direction volume, Vo 708 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	1.000		0.985	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1204	pc/h	781	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.8	mi/h
Free-flow speed, FFSd	53.3	mi/h
Adjustment for no-passing zones, fnp	0.5	mi/h
Average travel speed, ATSd	37.4	mi/h
Percent Free Flow Speed, PFFS	70.1	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.0	1.0
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1204 pc/h	770 pc/h

Base percent time-spent-following,(note-4) BPTSFd	80.8	%
Adjustment for no-passing zones, fnp	13.3	
Percent time-spent-following, PTSFd	88.9	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.71	
Peak 15-min vehicle-miles of travel, VMT15	301	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1108	veh-mi
Peak 15-min total travel time, TT15	8.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2802	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	37.4	mi/h
Percent time-spent-following, PTSFd (from above)	88.9	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane, ATSpl	23.2	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.60	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	0.00	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane, PTSFpl	259.2	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	F	
Peak 15-min total travel time, TT15	13.0	veh-h

Bicycle Level of Service

Posted speed limit, Sp	
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1204.3
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	5.58
Bicycle LOS	F

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.1

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	SB SR-41
From/To	Miham Avenue to 25th Avenue
Jurisdiction	
Analysis Year	2040
Description	Cumulative Year 2040 Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	7	/mi

Analysis direction volume, Vd 708 veh/h
Opposing direction volume, Vo 1108 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.1		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.985		1.000	
Grade adj. factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	781	pc/h	1204	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.8	mi/h
Free-flow speed, FFSd	53.3	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSd	36.8	mi/h
Percent Free Flow Speed, PFFS	69.2	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	770	pc/h	1204	pc/h

Base percent time-spent-following,(note-4) BPTSFd	72.7	%
Adjustment for no-passing zones, fnp	17.4	
Percent time-spent-following, PTSFd	79.5	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.71	
Peak 15-min vehicle-miles of travel, VMT15	192	veh-mi
Peak-hour vehicle-miles of travel, VMT60	708	veh-mi
Peak 15-min total travel time, TT15	5.2	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2802	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	36.8	mi/h
Percent time-spent-following, PTSFd (from above)	79.5	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	769.6
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	5.35
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.1

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	NB SR-41
From/To	25th Avenue to Bernard Drive
Jurisdiction	
Analysis Year	2040
Description	Cumulative Year 2040 Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	55	%
Up/down	-	%	Access point density	4	/mi

Analysis direction volume, Vd 1229 veh/h
Opposing direction volume, Vo 769 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.3		1.4	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.957		0.943	
Grade adj. factor,(note-1) fg	1.00		0.99	
Directional flow rate,(note-2) vi	1396	pc/h	895	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.0	mi/h
Free-flow speed, FFSd	54.0	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATSd	35.4	mi/h
Percent Free Flow Speed, PFFS	65.5	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	1336	pc/h	836	pc/h
Base percent time-spent-following,(note-4) BPTSFd	84.0	%		
Adjustment for no-passing zones, fnp	14.0			
Percent time-spent-following, PTSFd	92.6	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.86	
Peak 15-min vehicle-miles of travel, VMT15	334	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1229	veh-mi
Peak 15-min total travel time, TT15	9.4	veh-h
Capacity from ATS, CdATS	1627	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2669	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.4	mi/h
Percent time-spent-following, PTSFd (from above)	92.6	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1335.9
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	5.63
Bicycle LOS	F

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Two-Lane Highways Release 6.1

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	VRPA Technologies, Inc.
Agency/Co.	Kettleman City
Date Performed	10/19/2016
Analysis Time Period	Sunday Peak Hour
Highway	SB SR-41
From/To	25th Avenue to Bernard Drive
Jurisdiction	
Analysis Year	2040
Description	Cumulative Year 2040 Conditions

Input Data

Highway class	Class 1		Peak hour factor, PHF	0.92	
Shoulder width	10.0	ft	% Trucks and buses	15	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	42	%
Up/down	-	%	Access point density	4	/mi

Analysis direction volume, Vd 769 veh/h
Opposing direction volume, Vo 1229 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.4		1.3	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.943		0.957	
Grade adj. factor,(note-1) fg	0.99		1.00	
Directional flow rate,(note-2) vi	895	pc/h	1396	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	55.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	1.0	mi/h
Free-flow speed, FFSd	54.0	mi/h
Adjustment for no-passing zones, fnp	0.6	mi/h
Average travel speed, ATSd	35.6	mi/h
Percent Free Flow Speed, PFFS	66.0	%

Percent Time-Spent-Following

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor,(note-1) fg	1.00		1.00	
Directional flow rate,(note-2) vi	836	pc/h	1336	pc/h

Base percent time-spent-following,(note-4) BPTSFd	76.3	%
Adjustment for no-passing zones, fnp	13.9	
Percent time-spent-following, PTSFd	81.7	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.86	
Peak 15-min vehicle-miles of travel, VMT15	209	veh-mi
Peak-hour vehicle-miles of travel, VMT60	769	veh-mi
Peak 15-min total travel time, TT15	5.9	veh-h
Capacity from ATS, CdATS	1627	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	2669	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	35.6	mi/h
Percent time-spent-following, PTSFd (from above)	81.7	
Level of service, LOSd (from above)	E	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	-	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	835.9
Effective width of outside lane, We	32.00
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	5.40
Bicycle LOS	E

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS 2010: Multilane Highways Release 6.1

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	VRPA Technologies, Inc
Agency/Co:	Kettleman City
Date:	10/19/2016
Analysis Period:	Sunday Peak Hour
Highway:	SR-41
From/To:	Bernard Drive and I-5 NB Ramps
Jurisdiction:	
Analysis Year:	2040
Project ID:	Cumulative Year 2040 Conditions

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	50.0	mph	50.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	50.0	mph	50.0	mph

VOLUME

Direction	1		2	
Volume, V	2260	vph	1890	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	614		514	
Trucks and buses	15	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Rolling	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.816		0.816	
Flow rate, vp	1504	pcphpl	1258	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1504	pcphpl	1258	pcphpl
Free-flow speed, FFS	50.0	mph	50.0	mph
Avg. passenger-car travel speed, S	49.6	mph	50.0	mph
Level of service, LOS	D		C	
Density, D	30.3	pc/mi/ln	25.2	pc/mi/ln

Bicycle Level of Service

Posted speed limit, Sp	55	55
Percent of segment with occupied on-highway parking	0	0
Pavement rating, P	3	3
Flow rate in outside lane, vOL	1228.3	1027.2
Effective width of outside lane, We	24.00	24.00
Effective speed factor, St	4.79	4.79
Bicycle LOS Score, BLOS	7.83	7.74
Bicycle LOS	F	F

Overall results are not computed when free-flow speed is less than 45 mph.

HCS 2010: Multilane Highways Release 6.1

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	VRPA Technologies, Inc
Agency/Co:	Kettleman City
Date:	10/19/2016
Analysis Period:	Sunday Peak Hour
Highway:	SR-41
From/To:	I-5 NB Ramps and I-5 SB Ramps
Jurisdiction:	
Analysis Year:	2040
Project ID:	Cumulative Year 2040 Conditions

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	50.0	mph	50.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	50.0	mph	50.0	mph

VOLUME

Direction	1		2	
Volume, V	1794	vph	1179	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	487		320	
Trucks and buses	15	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Rolling	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.816		0.816	
Flow rate, vp	1194	pcphpl	784	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1194	pcphpl	784	pcphpl
Free-flow speed, FFS	50.0	mph	50.0	mph
Avg. passenger-car travel speed, S	50.0	mph	50.0	mph
Level of service, LOS	C		B	
Density, D	23.9	pc/mi/ln	15.7	pc/mi/ln

Bicycle Level of Service

Posted speed limit, Sp	55	55
Percent of segment with occupied on-highway parking	0	0
Pavement rating, P	3	3
Flow rate in outside lane, vOL	975.0	640.8
Effective width of outside lane, We	24.00	24.00
Effective speed factor, St	4.79	4.79
Bicycle LOS Score, BLOS	7.71	7.50
Bicycle LOS	F	F

Overall results are not computed when free-flow speed is less than 45 mph.

HCS 2010: Multilane Highways Release 6.1

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	VRPA Technologies, Inc
Agency/Co:	Kettleman City
Date:	10/19/2016
Analysis Period:	Sunday Peak Hour
Highway:	SR-41
From/To:	Miham Avenue and 25th Avenue
Jurisdiction:	
Analysis Year:	2040
Project ID:	Cumulative Year 2040 Mitigation

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	50.0	mph	50.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	50.0	mph	50.0	mph

VOLUME

Direction	1		2	
Volume, V	1108	vph	708	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	301		192	
Trucks and buses	15	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Rolling	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.816		0.816	
Flow rate, vp	737	pcphpl	471	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	737	pcphpl	471	pcphpl
Free-flow speed, FFS	50.0	mph	50.0	mph
Avg. passenger-car travel speed, S	50.0	mph	50.0	mph
Level of service, LOS	B		A	
Density, D	14.7	pc/mi/ln	9.4	pc/mi/ln

Bicycle Level of Service

Posted speed limit, Sp	55	55
Percent of segment with occupied on-highway parking	0	0
Pavement rating, P	3	3
Flow rate in outside lane, vOL	602.2	384.8
Effective width of outside lane, We	24.00	24.00
Effective speed factor, St	4.79	4.79
Bicycle LOS Score, BLOS	7.47	7.24
Bicycle LOS	F	F

Overall results are not computed when free-flow speed is less than 45 mph.

HCS 2010: Multilane Highways Release 6.1

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	VRPA Technologies, Inc
Agency/Co:	Kettleman City
Date:	10/19/2016
Analysis Period:	Sunday Peak Hour
Highway:	SR-41
From/To:	25th Avenue and Bernard Drive
Jurisdiction:	
Analysis Year:	2040
Project ID:	Cumulative Year 2040 Mitigation

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	50.0	mph	50.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	50.0	mph	50.0	mph

VOLUME

Direction	1		2	
Volume, V	1229	vph	769	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	334		209	
Trucks and buses	15	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Rolling	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.816		0.816	
Flow rate, vp	818	pcphpl	511	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	818	pcphpl	511	pcphpl
Free-flow speed, FFS	50.0	mph	50.0	mph
Avg. passenger-car travel speed, S	50.0	mph	50.0	mph
Level of service, LOS	B		A	
Density, D	16.4	pc/mi/ln	10.2	pc/mi/ln

Bicycle Level of Service

Posted speed limit, Sp	55	55
Percent of segment with occupied on-highway parking	0	0
Pavement rating, P	3	3
Flow rate in outside lane, vOL	667.9	417.9
Effective width of outside lane, We	24.00	24.00
Effective speed factor, St	4.79	4.79
Bicycle LOS Score, BLOS	7.52	7.29
Bicycle LOS	F	F

Overall results are not computed when free-flow speed is less than 45 mph.

HCS 2010: Multilane Highways Release 6.1

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	VRPA Technologies, Inc
Agency/Co:	Kettleman City
Date:	10/19/2016
Analysis Period:	Sunday Peak Hour
Highway:	SR-41
From/To:	Bernard Drive and I-5 NB Ramps
Jurisdiction:	
Analysis Year:	2040
Project ID:	Cumulative Year 2040 Mitigation

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	50.0	mph	50.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	50.0	mph	50.0	mph

VOLUME

Direction	1		2	
Volume, V	2260	vph	1890	vph
Peak-hour factor, PHF	0.92		0.92	
Peak 15-minute volume, v15	614		514	
Trucks and buses	15	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Rolling		Rolling	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	3		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.816		0.816	
Flow rate, vp	1003	pcphpl	1258	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	1003	pcphpl	1258	pcphpl
Free-flow speed, FFS	50.0	mph	50.0	mph
Avg. passenger-car travel speed, S	50.0	mph	50.0	mph
Level of service, LOS	C		C	
Density, D	20.1	pc/mi/ln	25.2	pc/mi/ln

Bicycle Level of Service

Posted speed limit, Sp		55
Percent of segment with occupied on-highway parking	0	0
Pavement rating, P	3	3
Flow rate in outside lane, vOL	818.8	1027.2
Effective width of outside lane, We	24.00	24.00
Effective speed factor, St	4.79	4.79
Bicycle LOS Score, BLOS	7.83	7.74
Bicycle LOS	F	F

Overall results are not computed when free-flow speed is less than 45 mph.

APPENDIX D

PTV Vistro Roundabout Worksheets

Vistro File: C:\...\Roundabout Analysis Milham Avenue and SR-41.vistro

Report File: C:\...\Milham Ave and SR-41.pdf

Scenario 8: 1: CY 2040 Sunday PM

3/5/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SR-41 and Milham Ave	Roundabout	HCM	WBT		8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

Generated with PTV VISTRO
Version 3.00-05

Intersection Level Of Service Report
#1: SR-41 and Milham Ave

Control Type:	Roundabout	Delay (sec / veh):	8.9
Analysis Method:	HCM	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	SR-41			SR-41			Milham Ave			Milham Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	SR-41			SR-41			Milham Ave			Milham Ave		
Base Volume Input [veh/h]	20	1057	9	3	688	28	16	6	18	2	8	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	1057	9	3	688	28	16	6	18	2	8	1
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	287	2	1	187	8	4	2	5	1	2	0
Total Analysis Volume [veh/h]	22	1149	10	3	748	30	17	7	20	2	9	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	28			34			768			1212		
Exiting Flow Rate [veh/h]	10			32			765			1189		
Demand Flow Rate [veh/h]	20	1057	9	3	688	28	16	6	18	2	8	1
Adjusted Demand Flow Rate [veh/h]	22	1149	10	3	748	30	17	7	20	2	9	1

Lanes

Overwrite Calculated Critical Headway	no	no	no	no	no	no
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	no	no	no	no	no	no
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1130.00	1130.00	1130.00	1130.00	1130.00	1130.00
B (coefficient)	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	567	639	375	423	45	13
Capacity of Entry and Bypass Lanes [veh/h]	1100	1100	1093	1093	525	337
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1078	1078	1072	1072	514	330
X, volume / capacity	0.52	0.58	0.34	0.39	0.09	0.04

Movement, Approach, & Intersection Results

Lane LOS	A	B	A	A	A	B
95th-Percentile Queue Length [veh]	3.04	3.89	1.54	1.85	0.28	0.11
95th-Percentile Queue Length [ft]	76.10	97.21	38.43	46.20	6.99	2.82
Approach Delay [s/veh]	10.13		7.12		8.09	11.51
Approach LOS	B		A		A	B
Intersection Delay [s/veh]	8.93					
Intersection LOS	A					

Vistro File: C:\...\Roundabout Analysis General Petroleum Avenue and SR-41.vistro

Scenario 8: 1: CY 2040 Sunday PM

Report File: C:\...\General Petroleum Ave and SR-41.pdf

3/5/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SR-41 and General Petroleum Ave	Roundabout	HCM	WBT		8.9	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

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Version 3.00-05

Intersection Level Of Service Report
#1: SR-41 and General Petroleum Ave

Control Type:	Roundabout	Delay (sec / veh):	8.9
Analysis Method:	HCM	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	SR-41			SR-41			General Petroleum Ave			General Petroleum Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	SR-41			SR-41			General Petroleum Ave			General Petroleum Ave		
Base Volume Input [veh/h]	26	1080	2	1	663	20	7	3	14	5	6	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	1080	2	1	663	20	7	3	14	5	6	3
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	293	1	0	180	5	2	1	4	1	2	1
Total Analysis Volume [veh/h]	28	1174	2	1	721	22	8	3	15	5	7	3
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	12			41			742			1234		
Exiting Flow Rate [veh/h]	4			36			741			1206		
Demand Flow Rate [veh/h]	26	1080	2	1	663	20	7	3	14	5	6	3
Adjusted Demand Flow Rate [veh/h]	28	1174	2	1	721	22	8	3	15	5	7	3

Lanes

Overwrite Calculated Critical Headway	no	no	no	no	no	no
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	no	no	no	no	no	no
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1130.00	1130.00	1130.00	1130.00	1130.00	1130.00
B (coefficient)	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	578	651	357	403	27	16
Capacity of Entry and Bypass Lanes [veh/h]	1117	1117	1085	1085	539	329
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1095	1095	1064	1064	528	323
X, volume / capacity	0.52	0.58	0.33	0.37	0.05	0.05

Movement, Approach, & Intersection Results

Lane LOS	A	B	A	A	A	B
95th-Percentile Queue Length [veh]	3.07	3.93	1.45	1.73	0.16	0.15
95th-Percentile Queue Length [ft]	76.74	98.14	36.15	43.29	3.88	3.65
Approach Delay [s/veh]	10.06		6.96		7.42	11.94
Approach LOS	B		A		A	B
Intersection Delay [s/veh]	8.88					
Intersection LOS	A					

Vistro File: C:\...\Roundabout Analysis Bernard Drive and SR-41.vistro
Report File: C:\...\Bernard Drive and SR-41.pdf

Scenario 8: 1: CY 2040 Sunday PM
3/5/2018

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SR-41 and Bernard Drive	Roundabout	HCM	WBL		574.1	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

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Version 3.00-05

Intersection Level Of Service Report
#1: SR-41 and Bernard Drive

Control Type:	Roundabout	Delay (sec / veh):	574.1
Analysis Method:	HCM	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	SR-41			SR-41			Bernard Drive			Bernard Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	SR-41			SR-41			Bernard Drive			Bernard Drive		
Base Volume Input [veh/h]	716	984	391	178	533	58	28	40	241	548	34	217
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	716	984	391	178	533	58	28	40	241	548	34	217
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	195	267	106	48	145	16	8	11	65	149	9	59
Total Analysis Volume [veh/h]	778	1070	425	193	579	63	30	43	262	596	37	236
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	271			1439			1395			1916		
Exiting Flow Rate [veh/h]	241			831			1199			1122		
Demand Flow Rate [veh/h]	716	984	391	178	533	58	28	40	241	548	34	217
Adjusted Demand Flow Rate [veh/h]	778	1070	425	193	579	63	30	43	262	596	37	236

Lanes

Overwrite Calculated Critical Headway	no	no	no	no	no	no
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	no	no	no	no	no	no
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1130.00	1130.00	1130.00	1130.00	1130.00	1130.00
B (coefficient)	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	1090	1229	401	452	342	887
Capacity of Entry and Bypass Lanes [veh/h]	862	862	268	268	280	167
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	845	845	263	263	275	164
X, volume / capacity	1.26	1.43	1.49	1.68	1.22	5.33

Movement, Approach, & Intersection Results

Lane LOS	F	F	F	F	F	F
95th-Percentile Queue Length [veh]	38.40	53.46	22.70	28.34	15.61	91.78
95th-Percentile Queue Length [ft]	959.96	1336.57	567.58	708.48	390.33	2294.57
Approach Delay [s/veh]	182.37		319.53		166.07	2000.88
Approach LOS	F		F		F	F
Intersection Delay [s/veh]	574.15					
Intersection LOS	F					

APPENDIX B

STRUCTURE TYPE SELECTION MEMO

PROJECT IDENTIFICATION					DATE	
Kettleman City Hwy 41 over CA Aqueduct					February 23, 2018	
DIST	CO	RTE	PM	EA	CONSULTANT	
6	Kings	CR	17.0		**Quincy Engineering, Inc.**	
BRIDGES NAME(S)					BR NO (S)	CONSTRUCTION COST
Kettleman City Hwy 41 over CA Aqueduct						
Alt. 1 – Widen Existing Hwy 41 Bridge					45C0088	$2,000,000
Alt. 2 – One Span Prefabricated Steel Truss Pedestrian Bridge (Preferred Alternative)						$1,580,000
Alt. 3 – Two Span Prefabricated Steel Truss Pedestrian Bridge						$1,230,000

Brief Project Description:

The existing bridge, built in 1967, is a two-span reinforced concrete box girder bridge approximately 224 feet long and 34 feet wide. The bridge is supported by diaphragm abutments on concrete piles and a concrete pier wall on concrete piles at pier 2. The bridge was widened in 1988 to a total bridge width of 45.5 feet with a single precast I-girder on each side of the bridge. Although the bridge superstructure was widened, the widening did not include foundation work at the center pier as the top of the pier wall was widened to support the precast girders.

The existing bridge consists of two 12' lanes and two 9'-3" shoulders but does not provide a facility for pedestrians to cross the bridge. The County of Kings proposes to provide a pedestrian crossing as a part of the Smart Growth SR41 Corridor Improvement Plan in the unincorporated community of Kettleman City.

Bridge Alternatives:

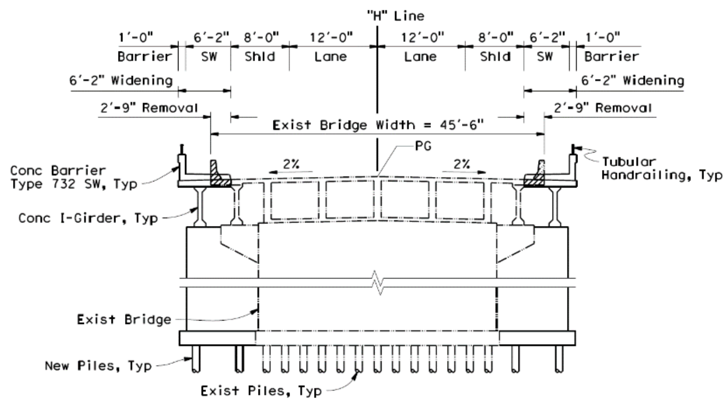
Three bridge alternatives, as described below, have been considered to provide a pedestrian crossing.

- **Alternative 1: Widen Existing Hwy 41 Bridge**

  This alternative widens the existing bridge with a precast concrete girder on each side of the bridge to provide a sidewalk. This alternative requires widening of the existing center pier as well as the abutments. New piles will be required to meet current design standards.

  Advantages:
  - Lowest environmental impact

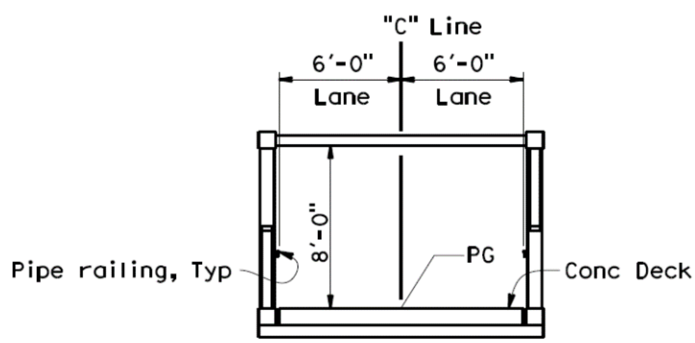
  Disadvantages:
  - Requires modification to the existing concrete channel lining. This includes installing a diversion system to pass the flow of the aqueduct during construction and saw-cutting the existing concrete lining to allow placement of new piles at both the abutments and the pier.
  - Highest cost of all alternatives
  - Requires Staging/Traffic Control during construction of the widening



- **Alternative 2: Single-Span, Prefabricated Steel Truss Pedestrian Bridge (Preferred Alternative)**

  This alternative consists of constructing a separate pedestrian bridge, just east of the existing vehicular bridge. A steel prefabricated truss is selected for its long spanning capabilities and avoidance of falsework for the superstructure. The proposed bridge will span perpendicular to the CA Aqueduct to reduce the bridge length. This alternative will not require a center pier and therefore reduces impacts to the aqueduct.

  Advantages:
  - Does not require Staging/Traffic Control of vehicular traffic on Highway 41 during construction
  - Lower environmental and hydraulic impact as it does not require a center support



Disadvantages:

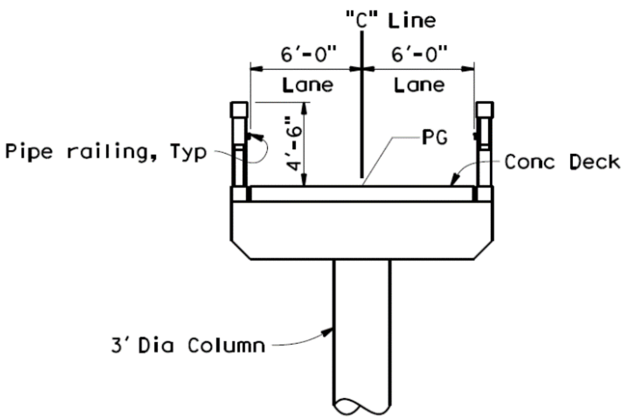
- Higher environmental impact compared to the widening alternative due to a separate alignment next to the existing vehicular bridge
- Requires large cranes to erect the single span, prefabricated steel truss compared to two-span alternatives
- Higher cost compared to two-span prefabricated truss alternative

- **Alternative 3: Two-Span, Prefabricated Steel Truss Pedestrian Bridge**

This alternative is similar to Alternative 2 except it will consist of a two-span bridge with a center support.

Advantages:

- Does not require Staging/Traffic Control of vehicular traffic on Highway 41 during construction
- Lowest cost of all alternatives



Disadvantages:

- Requires center pier in the channel and modifications to the channel lining
- Highest environmental impact as it is on a separate alignment and requires a center pier in the channel
- Requires a fairly large crane to erect the prefabricated steel trusses

<u>Traffic Impacts:</u>

Alternative 1 can be constructed in stages to keep the road open at all times. Traffic can be shifted closer to one side of the bridge to provide adequate room to widen the opposite side of the bridge. Alternatives 2 and 3 do not impact the existing bridge. The new pedestrian bridges can be constructed without impacting the flow of traffic on Highway 41.

<u>Alignment and Profile:</u>

Alternative 1 does not change the existing alignment or profile as it is a bridge widening. Alignment 2 and 3 have the same alignment and profile, which consists of providing a channel crossing perpendicular to the CA Aqueduct. Spanning perpendicular across the aqueduct allows for a shorter bridge length. The proposed profile of Alternative 2 and 3 will be similar to that of the existing vehicular bridge. A hydraulic study will confirm that the proposed profile will meet hydraulic clearance requirements.

Foundations Considered:

The existing bridge is supported by 16" diameter, Cast-in-Drilled Hole (CIDH), 45 Ton, concrete piles as per As-Built drawings from 1967. Therefore, spread footings are anticipated to be infeasible and pile foundations are proposed for all three alternatives. Additional geotechnical borings have not yet been drilled, but 24” and 36” CIDH piles are anticipated since 24" diameter is the minimum size for piles when pouring concrete under slurry. Drilling operations will first require saw-cutting the existing concrete lining at locations of the proposed piles. Inspection tubes are anticipated due to the likelihood of encountering water in the drilled holes. Upon completion of the pile operation, the concrete lining will be reconstructed.

24” CIDH piles are anticipated at the center pier and abutments for Alternative 1. Alternative 2 is anticipated to consist of 2 rows of three 24” CIDH piles at the abutments to accommodate the higher loads of a single span structure. Alternative 3 is anticipated to have 1 single row of three 24” CIDH piles at the abutments and a 36” CIDH pile at the center pier. Geotechnical borings, a geotechnical report including foundation recommendations will be required for final design of the bridge.

Hydraulics:

A hydraulic study has not yet been conducted but the existing bridge profile is expected to meet hydraulic clearance requirements over the CA Aqueduct. Alternative 1 consists of widening the existing bridge and is expected to clear hydraulic requirements. Alternatives 2 and 3 consist of a steel Through-Truss where the truss elements are above the deck. Therefore, Alternatives 2 and 3 are expected to meet hydraulic clearance requirements. A hydraulic study will be required to ensure that the proposed alternatives will meet the hydraulic clearance requirements.

Right-of-Way:

The existing bridge currently resides on land owned by the California Aqueduct operated and maintained by the Department of Water Resources. All three alternatives are expected stay within the limits of the land owned by the California Aqueduct. However, Alternatives 2 and 3 have impacts much larger than Alternative 1 since it consists of a new bridge on a different alignment. Right-of-way and easement needs will be confirmed after environmental clearance.

Recommendation:

Quincy recommends the Single-Span Prefabricated Steel Truss (Alternative 2) due to this alternative's avoidance of channel impacts, reduced costs, and avoidance of impact on vehicular traffic during construction.

QK PROJECT MANAGER	Matt Hamilton
QUINCY PROJECT MANAGER	Lance Schrey
QUINCY PROJECT ENGINEER	Andy Chou

Attachments

Attachment 1 – Bridge Advanced Planning Studies
Attachment 2 – Construction Cost Data

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
6	KIN	41	17.0		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

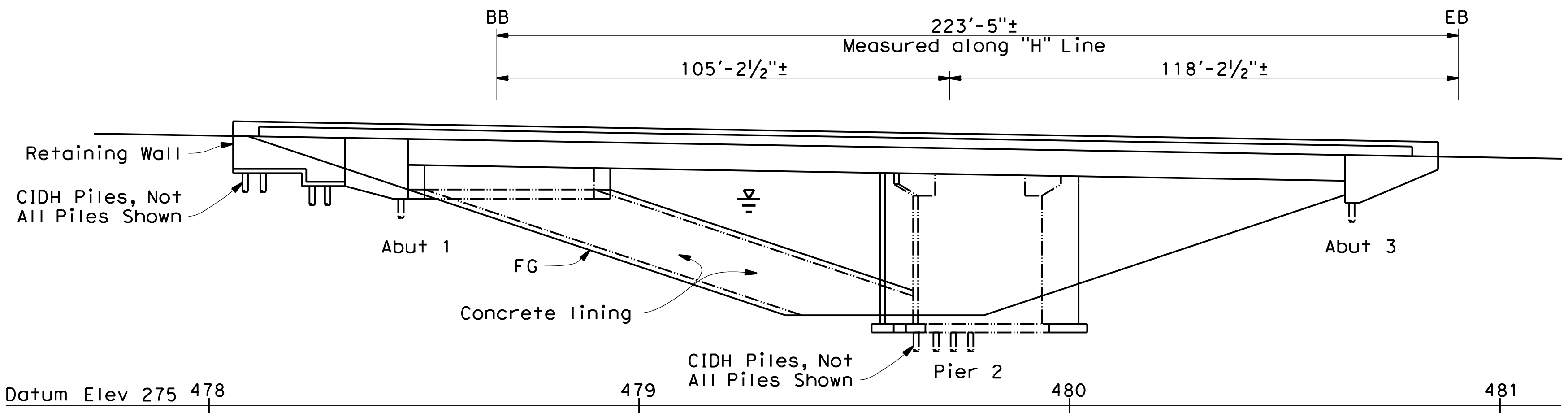
REGISTERED PROFESSIONAL ENGINEER
Lance A. Schrey
No. 48550
Exp. 06/30/18
CIVIL
STATE OF CALIFORNIA

The Identity or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

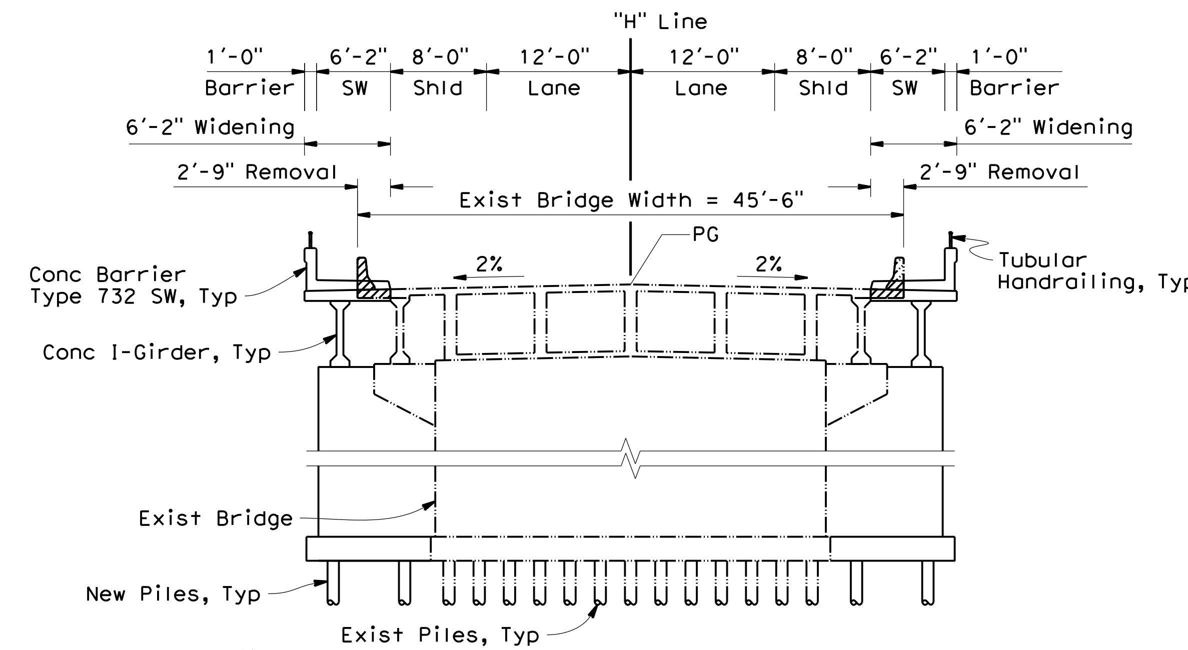
QUINCY ENGINEERING, INC
11017 Cobblerock Drive, Suite 100
Rancho Cordova, CA 95670

KINGS COUNTY PUBLIC AUTHORITY
1400 W Lacey Blvd
Hanford, CA 93230

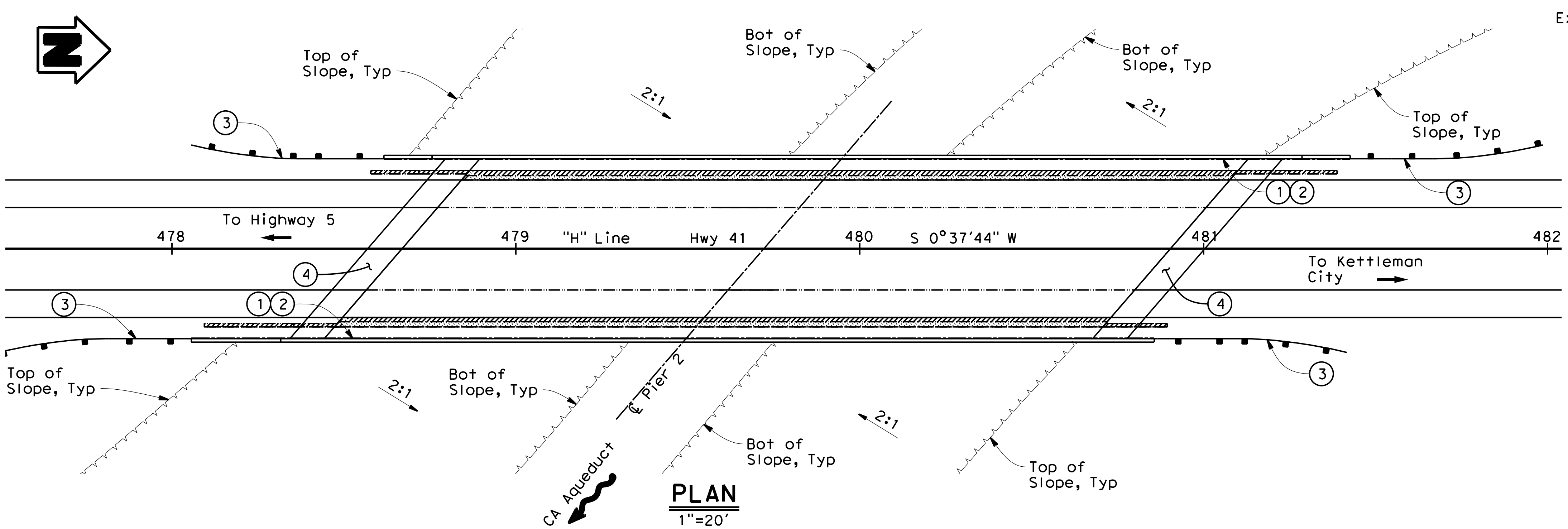
PROFILE GRADE
No Scale



ELEVATION
1"=20'



TYPICAL SECTION
1/8" = 1'-0"



PLAN
1"=20'

Notes:

1. Paint Bridge "Br No. 45-0088"
2. Paint "California Aqueduct Bridge"
3. MGS, See Road Plans
4. Structure Approach Slab Type EQ(10)

⇨ Indicates direction of travel

Indicates direction of flow

Ordinary High Water Mark Elev = 313'

— - — Denotes Existing Bridge

Denotes Existing Bridge to be removed

DESIGN OVERSIGHT	DESIGN	BY H. Chou	CHECKED L. Schrey	LOAD & RESISTANCE FACTOR DESIGN		LIVE LOADING: HL93 and PERMIT DESIGN VEHICLE
	DETAILS	BY H. Chou	CHECKED L. Schrey	LAYOUT	BY H. Chou	CHECKED L. Schrey
SIGN OFF DATE	QUANTITIES	BY	CHECKED	SPECIFICATIONS	BY	PLANS AND SPECS COMPARED

PREPARED FOR THE COUNTY OF KINGS DEPARTMENT PUBLIC WORKS

Lance Schrey
PROJECT ENGINEER

BRIDGE NO. 45-0088
POST MILES 17.0

KETTLEMAN CITY BRIDGE
GENERAL PLAN

DESIGN GENERAL PLAN SHEET (ENGLISH) (REV.03/14/12)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 0000
PROJECT NUMBER & PHASE: 0413000100 CONTRACT NO.: 04-4H1601

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES | SHEET X | OF X

FILE => S:\Client\Quad Knopf\001-210 Kettleman City Bridge\CAD\001210 - APS - Alt1 - Widen.dgn

USERNAME => andyc DATE PLOTTED => 1/8/2018 TIME PLOTTED => 11:44:19 AM

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
6	KIN	41	17.0		

REGISTERED CIVIL ENGINEER DATE

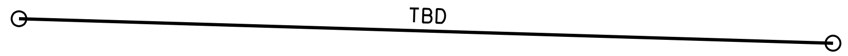
PLANS APPROVAL DATE

Lance A. Schrey No. 48550 Exp. 06/30/18 CIVIL REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

The Identity or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

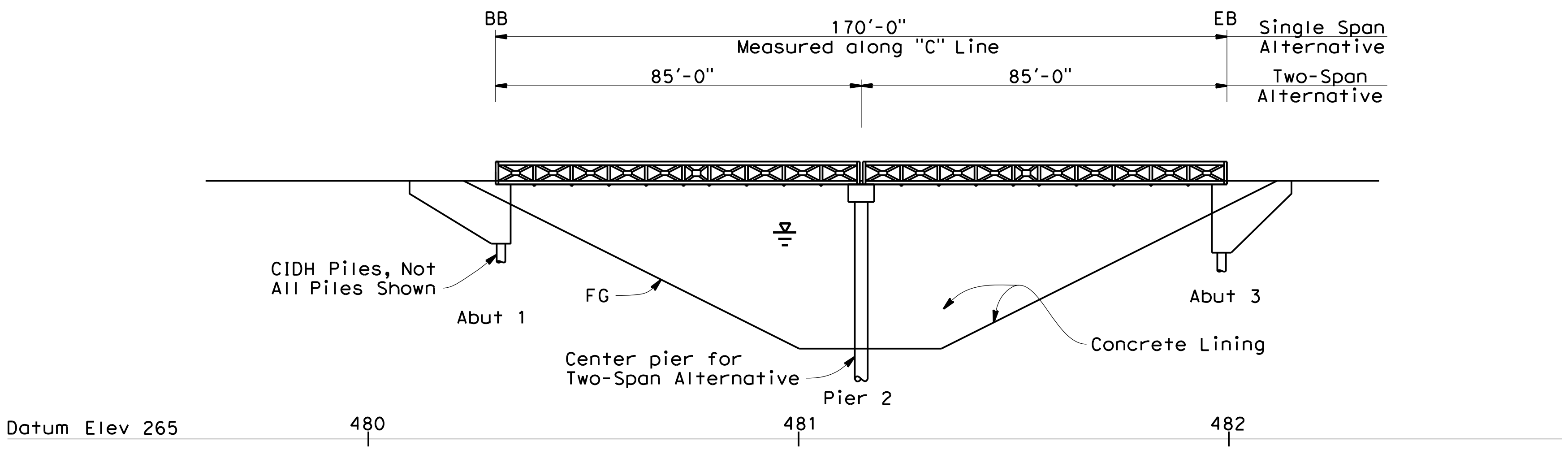
QUINCY ENGINEERING, INC
11017 Cobblerock Drive, Suite 100
Rancho Cordova, CA 95670

KINGS COUNTY PUBLIC AUTHORITY
1400 W Lacey Blvd
Hanford, CA 93230



PROFILE GRADE

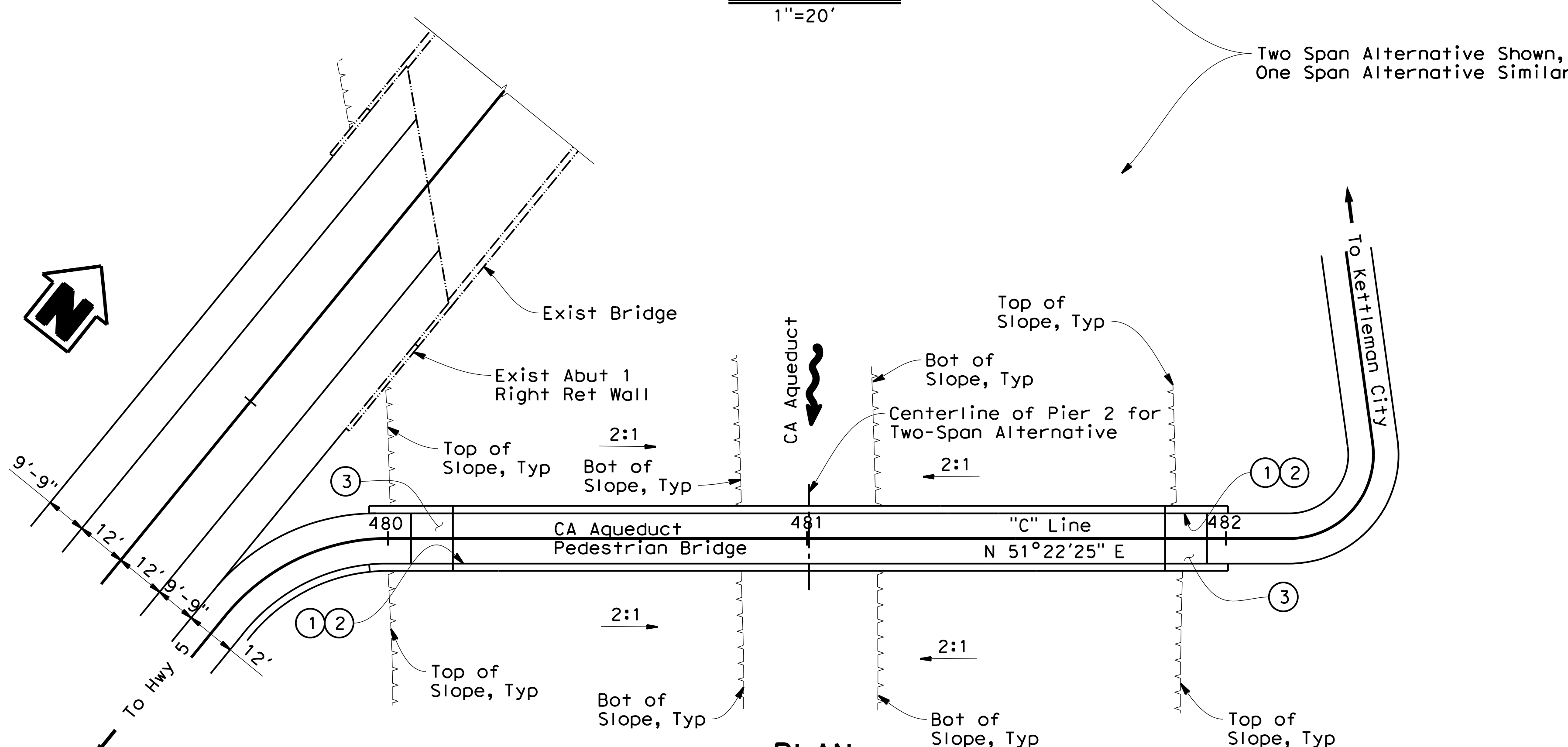
No Scale



ELEVATION

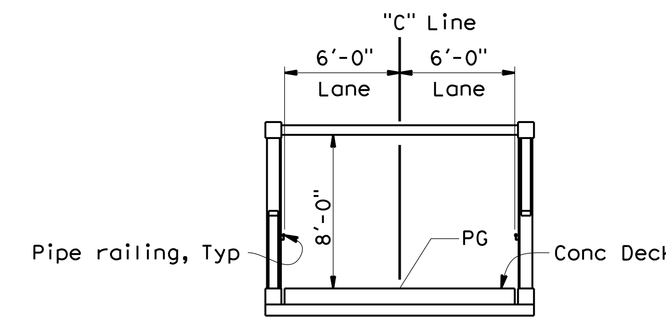
1"=20'

Two Span Alternative Shown, One Span Alternative Similar

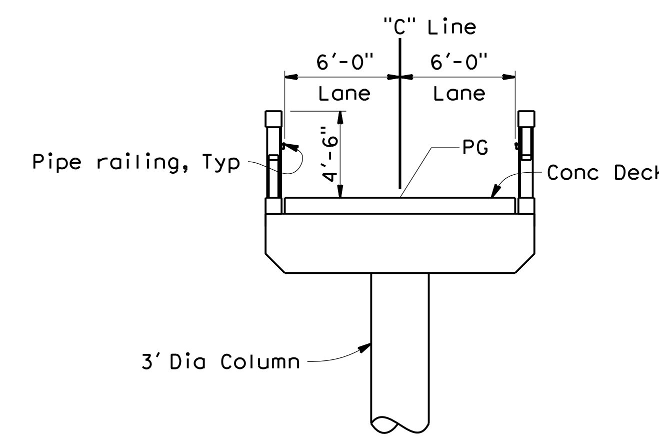


PLAN

1"=20'



SINGLE SPAN ALTERNATIVE



TWO SPAN ALTERNATIVE

TYPICAL SECTION

1" = 5'

Notes:

1. Paint Bridge "Br No. xx-xx"
2. Paint "California Aqueduct Pedestrian Bridge"
3. Structure Approach Slab Type EQ(10)

⇨ Indicates direction of travel

Indicates direction of flow

Ordinary High Water Mark Elev = 313'

—·—·— Denotes Existing Bridge

DESIGN OVERSIGHT	DESIGN	BY H. Chou	CHECKED L. Schrey	LOAD & RESISTANCE FACTOR DESIGN		LIVE LOADING: HL93 and PERMIT DESIGN VEHICLE
SIGN OFF DATE	DETAILS	BY H. Chou	CHECKED L. Schrey	LAYOUT	BY H. Chou	CHECKED L. Schrey
	QUANTITIES	BY	CHECKED	SPECIFICATIONS	BY	PLANS AND SPECS COMPARED

PREPARED FOR THE COUNTY OF KINGS DEPARTMENT PUBLIC WORKS

Lance Schrey
PROJECT ENGINEER

BRIDGE NO. 45-XXXX
POST MILES 17.0

KETTLEMAN CITY BRIDGE
GENERAL PLAN

DESIGN GENERAL PLAN SHEET (ENGLISH) (REV.03/14/12)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 0000
PROJECT NUMBER & PHASE: 0413000100 CONTRACT NO.: 04-4H1601

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES | SHEET X | OF X

FILE => S:\Client\Quad Knopf\001-210 Kettleman City Bridge\CAD\001210 - APS - Alt2 - New Bridge.dgn

USERNAME => anayc DATE PLOTTED => 1/8/2018 TIME PLOTTED => 9:43:57 AM

Department of Transportation

GENERAL PLAN ESTIMATE

Bridge	*Kettleman City*	Br.No.					
Type	*Conc I Girder Widening*	District		Co.		Rte.	P.M.
Length	*223.5* Width *12.32*	Area	*2754* sq.ft.				
Design Section		Quantities by:	*H. Chou*	Date	*01/03/18*	Estimate No.	*1*
Project Includes:	structures	Quant. Checked by:		Date		Price by:	*LAS*
		CU / EA				Cost Index	

	Contract Items	Unit	Quantity	Price	Amount
1	STRUCTURE EXCAVATION (BRIDGE)	CY	94	$250.00	$23,509.26
2	STRUCTURE EXCAVATION (RETAINING WALL)	CY	120	$150.00	$18,000.00
3	STRUCTURE BACKFILL (BRIDGE)	CY	54	$250.00	$13,597.22
4	STRUCTURE BACKFILL (RETAINING WALL)	CY	77	$150.00	$11,481.50
5	24" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	1,135	$200.00	$227,024.00
6	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	13	$750.00	$10,000.00
7	STRUCTURAL CONCRETE, BRIDGE	CY	325	$1,100.00	$357,542.98
8	STRUCTURAL CONCRETE, BRIDGE (POLYMER FIBER)	CY	111	$1,250.00	$138,168.72
9	STRUCTURAL CONCRETE, RETAINING WALL	CY	34	$900.00	$30,800.53
10	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE EQ)	CY	30	$1,300.00	$38,518.52
11	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (100'-110')	EA	2	$50,000.00	$100,000.00
12	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (110'-120')	EA	2	$52,000.00	$104,000.00
13	ERECT PRECAST PRESTRESSED CONCRETE GIRDER	EA	4	$8,000.00	$32,000.00
14	JOINT SEAL (MR 2")	LF	25	$125.00	$3,083.30
15	BAR REINFORCING STEEL (BRIDGE)	LB	103,527	$1.25	$129,409.00
16	BAR REINFORCING STEEL (RETAINING WALL)	LB	5,182	$1.25	$6,477.50
17	REMOVE RETAINING WALL (LF)	LF	119	$300.00	$35,700.00
18	BRIDGE REMOVAL	LS	1	$25,000.00	$25,000.00
19	TUBULAR HANDRAILING	LF	561	$120.00	$67,300.80
20	CONCRETE BARRIER (TYPE 732SW)	LF	561	$250.00	$140,210.00

SUBTOTAL	$1,511,823
MOBILIZATION (*10* %)	$151,182
SUBTOTAL BRIDGE ITEMS	$1,663,006
CONTINGENCIES (*20* %)	$332,601.13
BRIDGE TOTAL (*$724.75* /SF)	$1,995,607
BRIDGE REMOVAL (Conting. incl.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	$1,995,607
FOR BUDGET PURPOSES - SAY	**$2,000,000**

Department of Transportation

GENERAL PLAN ESTIMATE

Bridge *Kettleman City* Br.No. ______

Type *One Span Pre-Fab Truss* District ______ Co. ______ Rte. ______ P.M. ______

Length *170* Width *12* Area *2040* sq.ft.

Design Section ______ Quantities by: *H. Chou* Date *01/03/18* Estimate No. *1*

Project Includes: ______ structures Quant. Checked by: ______ Date ______ Price by: *LAS*

CU / EA ______ Cost Index ______

	Contract Items	Unit	Quantity	Price	Amount
1	STRUCTURE EXCAVATION (BRIDGE)	CY	169	$250.00	$42,269.63
2	STRUCTURE BACKFILL (BRIDGE)	CY	95	$250.00	$23,762.96
3	24" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	960	$200.00	$192,000.00
4	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	36	$1,000.00	$35,555.56
5	STRUCTURAL CONCRETE, BRIDGE	CY	90	$1,200.00	$108,444.44
6	STRUCTURAL CONCRETE, BRIDGE (POLYMER FIBER)	CY	63	$1,200.00	$75,555.56
7	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE EQ)	CY	9	$1,300.00	$11,715.41
8	JOINT SEAL (MR 2")	LF	24	$125.00	$3,041.65
9	BAR REINFORCING STEEL (BRIDGE)	LB	48,462	$1.25	$60,577.56
10	FURNISH PREFABRICATED STRUCTURAL STEEL (BRIDGE)	LS	1	$350,000.00	$350,000.00
11	ERECT PREFABRICATED STRUCTURAL STEEL (BRIDGE)	LS	1	$200,000.00	$200,000.00
12	CHAIN LINK RAILING	LF	340	$135.00	$45,900.00
13	PIPE HANDRAILING	LF	340	$135.00	$45,900.00

SUBTOTAL	$1,194,723
MOBILIZATION (_____ %) *10* %)	$119,472
SUBTOTAL BRIDGE ITEMS	$1,314,195
CONTINGENCIES (_____ %) *20* %)	$262,839.01
BRIDGE TOTAL (_______, *$773.06* /SF)	$1,577,034
BRIDGE REMOVAL (Conting. incl.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	$1,577,034
FOR BUDGET PURPOSES - SAY	**$1,580,000**

Comments:

Department of Transportation

GENERAL PLAN ESTIMATE

Bridge	*Kettleman City*		Br.No.				
Type	*Two Span Pre-Fab Truss*	District		Co.		Rte.	P.M.
Length	*170* Width *12*	Area	*2040*	sq.ft.			
Design Section		Quantities by:	*H. Chou*	Date	*01/03/18*	Estimate No.	*1*
Project Includes:	structures	Quant. Checked by:		Date		Price by:	*LAS*
		CU / EA				Cost Index	

	Contract Items	Unit	Quantity	Price	Amount
1	STRUCTURE EXCAVATION (BRIDGE)	CY	169	$250.00	$42,269.63
2	STRUCTURE BACKFILL (BRIDGE)	CY	95	$250.00	$23,762.96
3	24" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	480	$200.00	$96,000.00
4	36" CAST-IN-DRILLED-HOLE CONCRETE PILING	LF	79	$500.00	$39,500.00
5	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	36	$100.00	$3,555.56
6	STRUCTURAL CONCRETE, BRIDGE	CY	103	$1,200.00	$123,377.78
7	STRUCTURAL CONCRETE, BRIDGE (POLYMER FIBER)	CY	63	$1,200.00	$75,555.56
8	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE EQ)	CY	9	$1,300.00	$11,715.41
9	JOINT SEAL (MR 2")	LF	24	$125.00	$3,041.65
10	BAR REINFORCING STEEL (BRIDGE)	LB	39,635	$1.25	$49,543.95
11	FURNISH PREFABRICATED STRUCTURAL STEEL (BRIDGE)	LS	1	$225,000.00	$225,000.00
12	ERECT PREFABRICATED STRUCTURAL STEEL (BRIDGE)	LS	1	$150,000.00	$150,000.00
13	CHAIN LINK RAILING	LF	340	$135.00	$45,900.00
14	PIPE HANDRAILING	LF	340	$135.00	$45,900.00

SUBTOTAL	$935,122
MOBILIZATION (_ *10* %)	$93,512
SUBTOTAL BRIDGE ITEMS	$1,028,635
CONTINGENCIES (_____ *20* %)	$205,726.95
BRIDGE TOTAL (*$605.08* /SF)	$1,234,362
BRIDGE REMOVAL (Conting. incl.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	$1,234,362
FOR BUDGET PURPOSES - SAY	**$1,230,000**

Comments:

COUNTY OF KINGS
BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM
March 20, 2018

SUBMITTED BY: **County Counsel – Colleen Carlson/Diane Walker Freeman**
Community Development Agency – Greg Gatzka/Darren Verdegaal/Chuck Kinney
Health Department – Edward Hill/Jeff Taber

SUBJECT: **STUDY SESSION FOR LOCAL AGENCY MANAGEMENT PLAN FOR ONSITE WASTEWATER TREATMENT SYSTEMS**

SUMMARY:

Overview:
An amended Local Agency Management Plan requires approval from the Board of Supervisors prior to final submission to the Regional Water Board.

Recommendation:
Study Session – Information only.

Fiscal Impact:
None.

BACKGROUND:
In 2012, the State Water Resources Control Board ("State Water Board") adopted a policy for onsite wastewater treatment systems ("OWTS," a.k.a. septic systems), which acts as a conditional waiver of waste discharge requirements under the Porter-Cologne Water Quality Control Act ("Porter-Cologne Act"). Under Tier II of the State Water Board's OWTS policy, a county may adopt a Local Agency Management Plan ("LAMP") that allows for implementation of a local OWTS program in lieu of the standards prescribed by the OWTS policy. A LAMP will not qualify as a Tier II alternative until it has been approved by the Regional Water Board. On May 10, 2016, this Board adopted a LAMP which was timely submitted for approval. Since that time, County staff

(Cont'd)

BOARD ACTION : APPROVED AS RECOMMENDED: _________ OTHER: ________

I hereby certify that the above order was passed and adopted

on ________________________, 2018.

CATHERINE VENTURELLA, Clerk of the Board

By ___________________________________, Deputy.

have responded to comments from Regional Water Board staff by drafting proposed amendments to the LAMP.

The Porter-Cologne Act regulates discharges of effluent and other pollutants into the waters of the state. Under the Act, pollution from identifiable "point sources" is regulated and subject to "waste discharge requirements" imposed by regional water boards. More generalized sources of pollution, or "nonpoint sources," may also be subject to waste discharge requirements, but are more commonly regulated through conditional waivers pursuant to Water Code section 13269, under which either the State Water Board or a regional water quality board exempts some broad category of activity from waste discharge requirements if individuals engaged in that activity follow practices required under the waiver.

On June 19, 2012, the State Water Board adopted an OWTS policy ("Policy"), which provides a conditional waiver under section 13269 for the operation of OWTS with a projected flow of less than 10,000 gallons per day. The Policy includes five "tiers" under which OWTS may operate. Tier 0 includes standards for existing OWTS. Tier I applies to new and replacement OWTS. Under Tier II, a city or county may, by adopting a LAMP, develop its own OWTS program to use in lieu of Tier I. Tier III applies for OWTS in the vicinity of identified impaired waters. Currently, Tier III does not apply in Kings County. Finally, Tier IV governs OWTS that are in need of "corrective action." Each regional water quality board was required to adopt the Policy by May 13, 2014. Thereafter, an agency wishing to develop a LAMP has until May 13, 2016, to submit one for approval to the regional water board. All cities and counties that permit OWTS are required to begin implementing the Policy by May 13, 2018.

Tier I requires engineering of OWTS on a case-by-case basis. Currently, Kings County requires such engineering in the part of the county where perched water is common. Otherwise, OWTS are permitted, provided they comply with the California Building Standards Code and meet certain setbacks, leach line and leaching area size requirements, and other guidelines. The goal of the proposed LAMP is to continue the County's current OWTS program except where the Policy imposes more stringent standards on the County. It should be noted that Kings County does not have high concentrations of OWTS because most of the County's population is concentrated in communities with access to sewers, and the County's General Plan policies focus new urban development to existing communities with sewer access. Additionally, most of Kings County is located on a flat, alluvial plain, which is well suited for OWTS.

In a subsequent meeting, it will be recommended that your Board approve the proposed LAMP in its amended form and direct staff to submit it for final approval by the RWQCB and file a CEQA Notice of Exemption. Approval of the LAMP is exempt from CEQA pursuant to Public Resources Code; section 21080, subdivision (b)(15) and title 14, section 15251(g) of the California Code of Regulations, because the LAMP implements a regulation under a certified regulatory program. Because the LAMP is intended to protect the environment and preserves existing baselines except where state law requires more stringent standards, the LAMP is also exempt under Title 14, sections 15061(b)(3) and 15308. A copy of the amended plan is attached for reference.

County of Kings, California
Local Agency Management Program
for
Onsite Wastewater Treatment Systems ("OWTS")

Pursuant to the State Water Quality Control Board's OWTS Policy (6/19/12)
Approved by the Kings County Board of Supervisors, April 5, 2016

TABLE OF CONTENTS

PURPOSE

This Local Agency Onsite Wastewater Treatment System ("OWTS") Management Program ("LAMP") is proposed by the County of Kings to serve as a Tier 2 management program under the State Water Resources Control Board's OWTS Policy ("State Water Board Policy").

The LAMP is designed to incorporate Kings County's ("County") existing OWTS standards, except where the State Water Board Policy requires more stringent standards, protect groundwater sources and surface water bodies from contamination through the proper design, placement, installation, maintenance, and assessment of individual OWTS. These standards are adequately protective of the environment because the County's existing standards are generally more stringent than those outlined in Tier 1 of the State Water Board Policy, and as described below in the "Environmental Setting" section, the County lacks unique environmental conditions that warrant more rigorous standards.

ENVIRONMENTAL SETTING

GROUNDWATER DEPTHS: Kings County spans over parts of five different water sub-basins. According to 2010 groundwater level monitoring data from the Department of Water Resources, groundwater depths in Kings County for the Kings River Basin unconfined aquifer range from 100 to 200 feet. Water levels are deeper in the Westside Basin, ranging from approximately 200 to 320 feet, which is roughly consistent with levels in the Pleasant Valley Basin to the south and west. Levels in the Kaweah Basin in the east-central part of the County range from 50 to 200 feet, which is consistent with levels in the Tulare Lake Sub-basin that covers most of Kings County. Accordingly, groundwater levels are sufficiently deep throughout the County to comply with depth requirements shown on Table 2 of Tier 1 of the State Water Board Policy. An exception applies in the vicinity of the Kings River and old Tulare Lakebed, where perched water is common. Consequently, in those areas the County's existing standards call for OWTS to be engineered on a case by case basis, and this LAMP will continue to require such engineering.

SOILS: The soils throughout Kings County have been mapped by the U.S. Soil Conservation Service, and the following types of soils exist in the County:[1]

1. Northeast Alluvial Fans. The alluvial fan surfaces in the northeastern portion of the County are mantled with very deep, well-drained, saline-alkali soils that include sandy loams and fine sandy loams. The permeability of these soils is moderately slow to very slow, and runoff is usually very slow and the erosion potential is slight.
2. Low Alluvial Fans and Basin Rim. Soils in the transition zone between the Northeast Alluvial Fans and Tulare Lake Basin and Basin Rim typically include loam, clay loam,

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[1] See Appendix 1, which is also contained at Figure 4.6-2 of the Programmatic EIR for the *2035 Kings County General Plan*.

sandy clay loam surface soils and clay, or silt loam subsurfaces. The permeability is moderate to very slow and runoff is slow or very slow.

3. Tulare Lake Basin and Basin Rim. This region of the County is characterized as having areas of perched, shallow groundwater, and soils here are typically somewhat poorly drained to poorly drained. Engineering is required for OWTS within this area.

4. Southwestern Valleys. These soils typically include loam and sandy loam. They are deeply developed on alluvium and are well drained to moderately well drained. The permeability is moderately slow to moderately rapid. Runoff and erosion hazard are moderate.

5. Southwest Uplands (Including Kettleman and Kreyenhagen Hills and the Diablo Range). These soils have severe limitations for agriculture and building development. The soils are developed within colluvium on sedimentary bedrock and are shallow and well-drained to excessively well drained. Erosion hazard is high, and the area is used primarily for rangeland and wildlife habitat.

TOPOGRAPHY: Located within the San Joaquin Valley, most of Kings County is virtually flat. An exception exists in the southwest corner of the County, which includes the Kettleman Hills and portions of the Diablo Range and Kreyenhagen Hills. This area is sparsely populated and used primarily as grazing land. Consequently, OWTS exist here at low densities, and due to soil conditions, special rules requiring larger leaching areas and leaching fields apply. Additionally, pursuant to the State Water Board Policy, OWTS are prohibited in any terrain with a 30 percent slope or greater without a slope stability report approved by a registered professional. High slope areas within the Coast Rangers are also included in the Natural Resource Conservation Overlay Zone described in section 1007 of the Kings County Development Code. New structures within the zone require conditional use permits, and environmental review under the California Environmental Quality Act will therefore be required for most new construction projects in the overlay zone. This will allow for an additional layer of review with respect to any impacts resulting from new OWTS.

DEMOGRAPHICS: The average population density for the County, including for urbanized areas, is 110 persons per square mile, which is less than half of the statewide average of 246 persons per square mile. In 2010, the population of Kings County was 152,982. Out of those individuals, 100,278 lived in the County’s four cities, all of which have access to sanitary sewers. An additional 18,538 individuals were housed in prisons, and 7,799 were housed on federal territories outside of the County’s jurisdiction. Of the remaining 26,267 persons, 8,633 lived in the County’s four unincorporated communities, all of which have access to sanitary sewers through community services districts, public utilities districts or, in the case of Home Garden, from the neighboring city of Hanford. Some of the remaining 17,734 individuals live in urban fringe areas or County islands. Approximately 1,500 such individuals are already connected to city sanitary sewers, and other parcels in fringe areas and County islands are likely in the near future to be annexed and provided access to municipal sewers. The remaining residents typically live in sparsely populated areas where OWTS exist at low densities. The California

Department of Finance estimates that by 2050, the County's population will increase to 240,599. However, most of these new residents will reside in incorporated or newly incorporated areas. Land Use Policy E1.1 of the *2035 Kings County General Plan* requires that all new urban growth within the unincorporated areas of the County must be contiguous to existing cities and annexed.

SPECIAL WATER BODIES: There are no impaired water bodies located in Kings County shown in Attachment 2 to the State Water Board Policy and subject to Tier 3 of that policy.
The Kings River and Cross Creek run through Kings County. Much of the length of these streams is empty for a large part of the year, particularly during current drought conditions. Land along both water bodies is included within the Natural Resource Conservation Overlay Zone described in section 1007 of the Kings County Development Code. New structures within the zone require conditional use permits, and environmental review under the California Environmental Quality Act will therefore be required for most new construction projects in the overlay zone. This will allow for an additional layer of review with respect to any impacts resulting from new OWTS.

ADDITIONAL CONSIDERATIONS: Because the vast majority of all County residents live in settled areas with municipal services, there are no geographic areas in the County that are known to have a concentration of existing OWTS predating any adopted standard of design and construction, including cesspools. Similarly, there are no geographic areas known to have concentrations of existing OWTS located within setbacks. There also are no known areas of fractured bedrock in Kings County. Most of the County is located along the San Joaquin Valley floor, which is an alluvial plain that has been described as a "trough filled with marine sediments overlain by continental sediments, in some places thousands of feet deep."[2]
Because OWTS exist in Kings County at low densities, it is believed that there is sufficient room for OWTS expansion in most if not all unincorporated areas of the County in the case of failure. Currently there is no concern in Kings County for susceptibility to hydraulic mounding or organic or nitrogen loading based on the most current sanitary survey. The soils in the south San Joaquin Valley and foothills are loamy sands and clays derived from shale, sandstone sediments, and some igneous rock, and leachfield suitability ranges from excellent to moderate. The only known areas of potential nitrogen loading in Kings County are its dairies, which are required by the State Water Board to comply with best management practices to mitigate such loading. New dairies are also subject to best management practices contained in the Dairy Element of the County's General Plan. For urban fringe areas near Hanford with high OWTS densities are addressed in the *Areas of Special Consideration* on pages 31-34. Also, specified under *Areas of Special Consideration*, page 32, under the County's existing General Plan the minimum lot size within agricultural zone districts is 10 acres, and under land use policy E.1.1 of the 2035 Kings County General Plan, it specifies that any new urbanized areas around existing cities and communities must be annexed before any development will be allowed.

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2 See Devin Galloway and Francis S. Riley, "San Joaquin Valley, California: Largest human alteration of the Earth's surface," U.S. Geological Survey, 1999. Note also that the "Soil Survey of Kings County California," prepared by the United States Department of Agriculture – Soil Conservation Service, documents the soil types located within Kings County, and makes no reference to bedrock within the County.

DEFINITIONS:

“Alternative Wastewater Treatment System” means an on-site wastewater dispersal field that consists of components other than a conventional or supplemental treatment system.

“California Regional Water Quality Control Board” means the California State agency responsible for ensuring the protection of state waters, both surface and groundwater.

"Cesspool" means an excavation into the earth without watertight walls or bottom and used for reception of human waste in its raw state.

"Community sewage system" means any sewage disposal system operated and maintained by any municipality, district, public or private corporation serving a community or part thereof.

"Construction" means construction, repair, alteration, addition, modification or relocation of a sewage disposal system.

“Conventional On-site Wastewater Treatment System” means an on-site wastewater treatment system composed of a septic tank and a dispersal field that uses leach lines, seepage pits, or other authorized methods approved by Kings County Community Development (KCCD) and Kings County Department of Public Health, Division of Environmental Health Services (KCEHS) and does not include Alternative On-site Wastewater Treatment Systems.

“Dispersal Field” means a location used for discharge of liquid sewage effluent. Standard dispersal fields include, but are not limited to, leach lines and seepage pits.

“Effluent” means the partially treated wastewater discharge from an On-site Wastewater Treatment System.

“Expansion area” means the amount of dedicated space equal in size to an existing or proposed OWTS that is capable of supporting an OWTS and will replace the primary OWTS when necessary.

“Groundwater” means water located below the land surface in the saturated zone of the soil or rock. Groundwater includes perched water tables, shallow water tables, and zones that are seasonally or permanently saturated.

"Lot" means a portion of land separated from other portions by description as on a subdivision map, record of survey map, or by metes and bounds, or the purpose of sale, lease, or separate use, and having frontage on an approved street.

“LAMP” is an acronym for a “Local Area Management Program” used for implementation of the Tier 2 standards in the State Water Resources Control Board’s Policy for Siting, Design, Operation and Management of On-site Wastewater Treatment Systems.

“Leach line” means a subsurface soil absorption wastewater dispersal system installed in a trench usually consisting of a perforated distribution pipe placed over gravel or other media and backfilled with native material.

“NSF” means the National Sanitation Foundation or NSF International, a not-for-profit, non- governmental organization that develops health and safety standards and performs product certification.

“On-site Wastewater Treatment Systems (OWTS)” means a system composed of a septic tank and a dispersal field and related equipment and appurtenances. On-site Wastewater Treatment Systems are also referred to as septic systems, on-site sewage disposal systems, individual sewage disposal systems or private sewage disposal systems and may include alternative and supplemental treatment systems.

“Percolation Test” means a subsurface test conducted to measure the absorption rate of water in soil strata. The test is conducted after initial presaturation and is usually expressed as minutes per inch (MPI).

"Permit" means a permit issued by the division for any purpose pertaining to OWTS.

"Privy" means a structure over a pit or vault used as a toilet and designed to receive human waste matter.

“Qualified Contractor” means a contractor holding a license that is current and active from the Contractors State License Board (CSLB) for Plumbing (C-36), Sanitation System (C-42), or General Engineering Contractor (A). A contractor holding a license as a General Building Contractor (B) shall be considered a qualified contractor when constructing, modifying, or abandoning an On-site Wastewater Treatment System as part of a larger construction project involving a new structure or major addition to an existing structure.

“Qualified Professional” means an individual certified by the State of California as a Professional Engineer, Professional Geologist, or Registered Environmental Health Specialist who has accepted responsibility for the design of the OWTS. The Qualified Professional will have affixed his/her signature and stamp to the system plans and plan proposal. Dependent on work performed, soil scientists certified by the Soil Science Society of America are considered as qualified professionals.

“Registered Pumper” is a firm or person that pumps and/or hauls septage or wastewater from chemical toilets and has been issued a permit by the Department of Public Health, Division of Environmental Health Services (KCEHS).

“Repair” means any action that modifies/replaces the existing dispersal system or replaces an existing septic tank.

"Seepage pit" means an excavation, typically cylindrical in shape and filled with rock, constructed for the purpose of disposing of sewage effluent from a septic tank or treatment tank.

"Septic tank" means a water tight receptacle which receives the discharge of a drainage system or a part thereof, which is designed and constructed to retain solids, digest organic matter through a period of retention and bacterial action and allows the liquids to discharge into the soil.

"Sewage" means any and all waste substance, liquid, semisolid or solid as associated with human habitation or which contains or may be contaminated with human or animal excrement, wastes, offal or any feculent matter. Industrial wastewater shall not be considered as sewage.

"Supplemental Treatment System" means an OWTS that utilizes engineered designs and/or technology to treat effluent to reduce one or more constituents of concern in wastewater. It may also be referred to as an Advanced Treatment System or Enhanced Treatment System. Examples include, but are not limited to, sand filters, textile filters and aerobic treatment units but do not include composting or incinerating toilets.

APPLICABILITY OF THIS LAMP

All new and replacement OWTS in the unincorporated areas of the County must comply with this policy or else receive a permit directly from the Central Valley Regional Water Quality Control Board ("RWQCB"). Existing OWTS within the County not operated under a permit from the RWQCB shall operate under Tier 0 of the State Water Board Policy. Tier 4 of the State Water Board Policy shall apply to OWTS requiring corrective action.

STATEMENT OF RESPONSIBILITIES AND DUTIES

STATEMENT OF OWNER RESPONSIBILITIES AND DUTIES

1. All new, replacement, or existing OWTS within an area that is subject to a Basin Plan prohibition of discharges from OWTS must comply with the prohibition. If the prohibition authorizes discharges under specified conditions, the discharge must comply with those conditions and the applicable provisions of the State Water Board Policy.

2. Owners of OWTS shall adhere to the requirements prescribed in any other applicable County policy, ordinance, or permitting condition.

3. To receive coverage under this LAMP, OWTS shall accept and treat only flows from domestic wastewater. In addition, OWTS that accept high-strength wastewater from commercial food service buildings are covered if the wastewater does not exceed 900 mg/L Biochemical Oxygen Demand ("BOD") and there is a properly sized and functioning oil/grease interceptor (a.k.a., grease trap).

4. Owners of OWTS shall maintain their OWTS in good working condition including inspections and pumping of solids as necessary to maintain proper function and assure adequate treatment.

STATEMENT OF COUNTY RESPONSIBILITIES AND DUTIES

1. The County shall report annually to the RWQCB. The annual report shall include the following information, organized in a tabular spreadsheet format, and summarize whether further action is warranted to protect water quality or public health:

    a. The number and location of complaints pertaining to OWTS operation and maintenance, and identification of those complaints that were investigated and how they were resolved;

    b. Identification of the applications and registrations issued as part of the local septic tank cleaning registration program pursuant to Health and Safety Code section 117400;

    c. The number, location, and description of permits issued for new and replacement OWTS;

d. Identification of the tier of the State Water Board Policy pursuant to which each of the above permits was issued; and

e. Information concerning the status of Nos. 3 and 4 below.

2. The County shall retain permanent records of all permitting actions and make those records available within ten working days of any written demand for review by the RWQCB. The records for each permit shall reference the tier of the State Water Board Policy under which the permit was issued. The county building official will scan OWTS permits into the existing permanent electronic record for building permits, and will make those documents available for inspection by the state and regional boards upon request.

3. The County shall maintain records of the number, location, and description of permits issued for OWTS where a variance is granted.

4. The County's Environmental Health Department (KCEHS) routinely monitors small public water systems operating under the authority of domestic water supply permits issued by the state Department of Public Health. These systems are located throughout the County, particularly in areas with large numbers and/or high densities of OWTS. The following data are obtained through such monitoring, which are recorded in the County's Geotracker database (Geotracker GAMA-secure), and can be made available to the state: well location and depth; screening depth; screening intervals; pumping volume; soil types; depth to bedrock; sample date; and analysis of bacteria, total dissolved solids, sodium, chloride, and nitrogen series, including organic nitrogen, ammonia, and nitrite. In time, these data may be coordinated and supplemented with data obtained through salt and nutrient management programs, including the Salt and Nutrient Management Plan, local implementation of the Sustainable Groundwater Management Act, and the State Water Board's Groundwater Assessment Program. If these data, or information obtained because of complaints, OWTS failures, or inspections of wells or OWTS, reveal a concern with OWTS in a particular area of the County, the Environmental Health Department will notify the county building official promptly in writing. The building official will take appropriate action, which may include taking voluntary samples from shallower, domestic wells in that area, or mandatory, random samples if legally possible. Also urban and rural areas of special consideration will be taken into account. See the *Areas of Special Consideration* section identified in this LAMP on page 32.

5. Annual Status Reports will be due annually on February 1, beginning one year after Regional Board approval of this LAMP.

6. Every fifth year, the County shall submit an evaluation of the water quality assessment program described in No. 4 above, as well as an assessment of whether water quality is being impacted by OWTS. The evaluation should also identify any changes in this LAMP that will be undertaken to address impacts from OWTS.

7. Until such time as the RWQCB shall require otherwise, all groundwater data submitted by the County to the RWQCB shall be submitted in EDF format for inclusion in Geotracker, and surface water monitoring shall be submitted in CEDEN in a SWAMP comparable format.

8. The County shall notify the owner of a public well or water intake and the State Water Resources Control Board, Division of Drinking Water (DDW) as soon as practicable, but within not more than 72 hours, upon discovery of a failing OWTS within setbacks prescribed in this LAMP between OWTS and public well or water intake. Initial contacts will be via phone and email using available contact information. The County will follow up with the owner in writing as promptly as possible including any information that by law or in good faith should provide. In an emergency situation, prompt contact with well users will be made with the assistance of County public safety personnel, if necessary.

<u>GENERAL OVERVIEW OF OWTS</u>

<u>STANDARDS FOR NEW OR REPLACEMENT OWTS</u>

1. Building permits shall be required for all OWTS subject to this LAMP.

2. The document attached hereto as Appendix 2 describes basic design criteria for OWTS in Kings County. Those criteria are based upon the County's pre-existing OWTS policy, as amended to reflect requirements in the State Water Board Policy regarding setbacks between OWTS and public wells or water intakes.

3. Except where other standards prescribed by this LAMP are more protective of the environment, all new or replacement OWTS shall comply fully with regulations for private sewage disposal systems prescribed in the most recent adoption of the California Plumbing Code. Also see *Standards for New or Replacement OWTS*, page 13, #8 and *Additional Components*, page 16, #1, of this LAMP which requires County Health Officer approval for engineered and large OWTS systems.

4. In areas identified in Figure B of Appendix 2, page 26, as requiring engineering, engineered plans are required. A Professional Engineer (P.E.) would be required to assess those areas identified, it should also be stated that the Tulare Lakebed is sparsely populated. The design of these plans shall comport with this LAMP, including the standards included in Appendix 2 insofar as those standards are applicable, Standards for New or Replacement OWTS which requires engineered plans in areas with shallow or perched groundwater, and the standards described in Tier 1 of the State Water Board Policy. Engineered plans shall also comport, to the extent consistent with this LAMP and the State Water Board Policy, with the United States Environmental Protection Agency's "Manual for Septic Tank Practice," and the most recently adopted edition of the California Plumbing Code.

5. OWTS shall be designed in such a manner to accommodate all setbacks, described herein and in Appendix 2, as well as leaching areas required by Appendix 2. In addition to prescribed leaching areas, a “fail safe” area equal in size to the leaching area shall be required.

6. Areas that are within the minimum distances which are necessary to protect water quality shall not be used for waste disposal. The following areas also are considered unsuitable for the location of disposal systems or expansion areas:
   a. Areas within any easement which is dedicated for surface or subsurface improvement;

   b. Paved areas;

   c. Areas not owned or controlled by property owners unless any such area is dedicated for waste disposal purposes; and

   d. Areas occupied or to be occupied by structures.

7. Soil depth below the bottom of the dispersal system to groundwater or bedrock shall in no case be less than five feet, nor less than ten feet below a seepage pit.

8. The standards attached as Appendix 2, page 26 to this LAMP are intended primarily for use with single family residences. Very few larger institutions in Kings County are on OWTS, and the County’s General Plan policies to protect agricultural land uses direct future development to urban areas, so that new large-scale OWTS will be rare. Land uses requiring OWTS with capacity greater than 1,200 gallon shall be designed in a manner substantially consistent with the standards stated in this LAMP to the extent practicable, and plans for such systems shall require approval by the County Health Officer. In evaluating proposed septic systems, the health officer shall use the rubric attached to this policy as Appendix 3. Approval shall be based upon the professional judgment of the health officer, with appropriate consideration given to available scientific data, anecdotal information obtained from files, and the results of any surveys and interviews.

9. For percolation testing, this LAMP will adopt and amend Section H-4.0, H-13, and H-14 of the 2013 California Plumbing Code, or most current available. Percolation tests shall be performed by a **Qualified Professional** (defined on page 8 in the definitions section of this plan) and shall be acceptable to Kings County Community Development and the Department of Public Health’s Environmental Health Services Division and performed as set forth in the Manual of Septic Tank Practice, U.S. Environmental Protection Agency (U.S. EPA) or as approved by KCCD Agency. A minimum of 3 percolation tests in each primary and reserve area (total minimum of 6) and at least one deep boring or test pits dug by a backhoe or excavator shall be conducted. The percolation test holes shall be spaced uniformly in the undisturbed soil horizons proposed for the dispersal field(s). Percolation tests shall only be conducted under saturated soil conditions. Deep borings,

backhoe excavations, and percolation tests are used to demonstrate that the dispersal site is located in an area of uniform soil, and that no conditions exist which could adversely affect the performance of the system or result in groundwater degradation.

PROHIBITIONS STATED IN THE STATE WATER BOARD POLICY

The following are not allowed under this LAMP:

1. Cesspools of any kind or size.

2. OWTS receiving a projected flow of over 10,000 gallons per day.

3. OWTS that utilize any form of effluent disposal that discharges on or above the post installation ground surface such as sprinklers, exposed drip lines, free-surface wetlands, or a pond.

4. Slopes greater than 30 percent without a slope stability report approved by a registered professional.

5. Decreased leaching areas for IAPMO certified dispersal systems using a multiplier less than 0.70.

6. OWTS utilizing supplemental treatment. Supplemental treatment may be allowed subject to a variance with appropriate provision for periodic monitoring and inspection. Any such variance shall be consistent with all requirements of the State Water Board Policy and all applicable state and federal laws.

7. OWTS dedicated to receiving significant amounts of wastes dumped from RV holding tanks.

8. Installation of new or replacement OWTS where public sewer is available. The public sewer may be considered as not available where such public sewer or any building or exterior drainage facility connected thereto is located more than 200 feet from any proposed building or exterior drainage facility on any lot or premises that abuts and is served by such public sewer. Unless required by the California Plumbing Code or other law, this provision does not apply to replacement OWTS where the connection fees and construction cost are greater than twice the total cost of the replacement OWTS if the health officer makes findings that the discharge from the OWTS will not affect groundwater or surface water to a degree that makes it unfit for drinking or other uses.

9. Except as provided in Nos. 10 and 11 below, new or replacement OWTS with minimum horizontal setbacks less than any of the following:

    a. 150 feet from any public water well where the depth of the effluent dispersal system does not exceed 10 feet.

b. 200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet.

c. Where the effluent dispersal system is within 600 feet of a public water well and exceeds 20 feet in depth, the horizontal setback shall be sufficient to achieve a two-year time of travel for microbiological contaminants. This setback shall be determined by a qualified professional, and in no case shall the setback be less than 200 feet.

d. Where the effluent dispersal system is within 1,200 feet from a public water system's surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 400 feet from the high water mark of the reservoir, lake or flowing water body.

e. Where the effluent dispersal system is locate more than 1,200 feet but less than 2,500 feet from a public water system's surface water intake point, within the catchment area of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 200 feet from the high water mark of the reservoir, lake or flowing water body.

10. For replacement OWTS that do not meet the above horizontal separation requirements, the replacement OWTS shall meet the horizontal separation to the greatest extent practicable. In such cases, the replacement OWTS shall use supplemental treatment for pathogens that provides sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L, and that further achieves an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters. Effluent from supplemental treatment components designed to reduce nitrogen shall be certified by NSF, or other approved third party tester, to meet a 50 percent reduction in total nitrogen when comparing the 30-day average influent to the 30-day average effluent. Supplemental treatment shall not be necessary if the public health officer makes finding that: (1) there is no indication that the previous system is, due to its location, affecting the public water source, (2) there is limited potential that the replacement system could impact the water source based on topography, soil depth, soil texture, and groundwater separation.

11. For new OWTS installed on parcels of record existing as of May 13, 2013, that cannot meet the above horizontal separation requirements, the OWTS shall meet the horizontal separation to the greatest extent practicable and shall utilize supplemental treatment for pathogens that provides sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L, and that further achieves an effluent fecal coliform bacteria

concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters. Effluent from supplemental treatment components designed to reduce nitrogen shall be certified by NSF, or other approved third party tester, to meet a 50 percent reduction in total nitrogen when comparing the 30-day average influent to the 30-day average effluent.

<u>ADDITIONAL COMPONENTS</u>

1. A variance from any guideline set forth in this LAMP shall be granted by the County building official only with the written concurrence of the public health officer. Any variance thus approved shall ensure substantial compliance with all guidelines set forth herein to the greatest extent practicable, and in no event shall any variance authorize the use or installation of a cesspool or of an OWTS where a public sewer is available. See the *Standards for New or Replacement OWTS*, on page 13, #8, which requires County Health Officer approval for engineered and large OWTS systems.

2. Within one year of the effective date of this LAMP, the Kings County Community Development Agency and Public Health Department shall work cooperatively to develop a plan for public education and outreach which shall, at a minimum, call for making available on the County's internet site informational materials to inform OWTS owners about how to locate, operate, and maintain their OWTS as well as any Water Board order (e.g., Basin Plan prohibitions) regarding OWTS restrictions within the County. The education and/or outreach program shall also include procedures to ensure that alternative onsite system owners are provided an informational maintenance or replacement document by the system designer or installer. This document shall cite homeowner procedures to ensure maintenance, repair, or replacement of all critical items within 48 hours following failure.

3. The State Water Board's OWTS Policy requires an assessment of existing and proposed disposal locations for septage, the volume of septage anticipated, and whether adequate capacity is available. Septage from OWTS in Kings County is brought to the City of Hanford's Wastewater Treatment Plant, which has a current capacity of 8 million gallons per day (mgd). Average daily flow to the plant from all sources is 5 mgd. The city's master plan also identifies expansion of the plant in the future to accommodate anticipated growth. Because future population growth in the County is being directed to urban areas that will be connected to local sewer systems, the volume of septage from OWTS is not anticipated to grow in the future. Therefore, adequate capacity exists to receive additional septage from the unincorporated area of the County.

4. Whenever a permit is sought for an OWTS to be installed on a parcel located within any County island, or any exterior boundary of which is 200 feet or less from a city, public utility district, or community services district, the County building official will contact the adjacent city or district to determine whether the parcel is within 200 feet of any public sewer or any building or exterior drainage facility connected thereto.

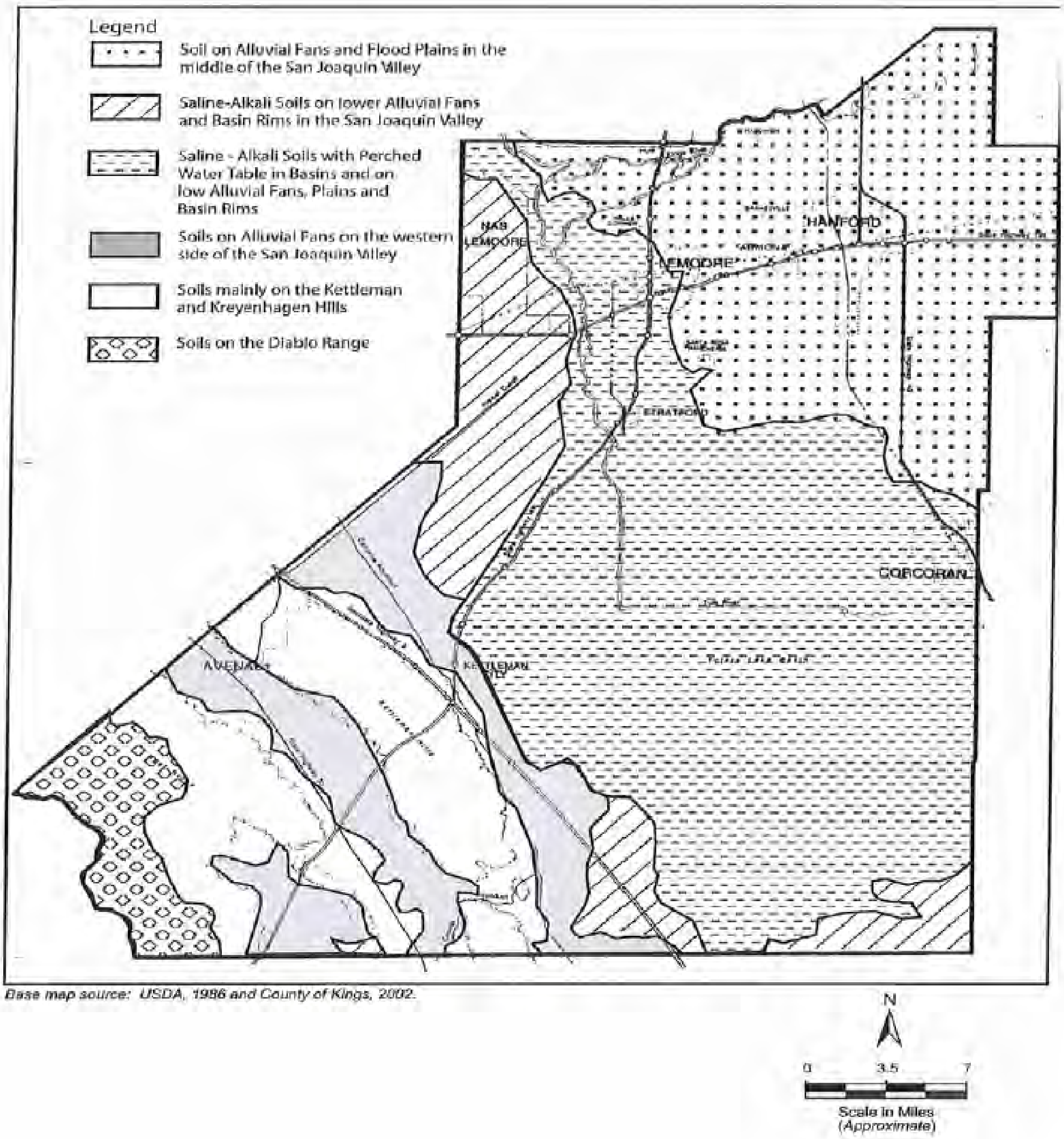
5. Before issuing an installation or repair permit for an OWTS in the vicinity of Avenal or Kettleman City or any additional future communities that will rely on surface water, the County building official shall consult Geotracker or a similar GIS mapping system to determine whether the proposed location for the OWTS is within 1,200 feet of an intake point for a surface water treatment plan for drinking water, is in the drainage area catchment in which the intake point is located, and is located such that it may impact water quality at the intake point such as upstream of the intake point for a flowing water body. If the OWTS will be so situated, before issuing any permit, the owner of the affected public water system shall be contacted in writing, and will be given a reasonable opportunity to comment on the issuance of a permit.

6. Before issuing an installation or repair permit for an OWTS in the vicinity of any public well within the County, the County building official shall consult Geotracker or a similar GIS mapping system to determine whether the proposed location for the OWTS is within the sanitary setback for the well. If the OWTS will be so situated, before issuing any permit, the owner of the affected public water system shall be contacted in writing, and will be given a reasonable opportunity to comment on the issuance of a permit.

CEQA EXEMPTION

This LAMP and activities carried out pursuant to, except for site-specific significant impacts relating to activities for which a discretionary permit is required, are exempt from compliance with the California Environmental Quality Act. (See Pub. Res. Code, § 21080, subd. (b)(15); Cal. Admin. Code, tit. 14, § 15251, subd. (g).)

APPENDIX 1: FIGURE 4.6-2 OF THE PROGRAM EIR FOR THE 2035 KINGS COUNTY GENERAL PLAN



Base map source: USDA, 1986 and County of Kings, 2002.

APPENDIX 2: KINGS COUNTY OWTS DESIGN CRITERIA

Location of Sewage Disposal System

Minimum Horizontal Distance In Clear From:	**Building Sewer**	**Septic Tank**	**Disposal Field**	**Seepage Pit**
Building or Structure[1]	2'	5'	8'	8'
Property Line Adjoining Private Property	Clear	5'	5'	8'
Property Line When Wells Are Used[10,11]	-	25'	50'	75'
Water Supply Wells	50'[2]	50'[11]	100'	150'
Streams[5]	50'	50'	100'	100'
Drainage Course or Ephemeral Streams[6]	-	25'	50'	50'
Seepage Pits	-	5'	5'	12'
Disposal Field	-	5'	4'[3]	5'
Domestic Water Line	1'[4]	5'	5'	5'
Distribution Box	-	-	5'	5'
Public Water Well[12]	-	150'	150'	150'
Cut or Fill Bank	-	10'	4h	4h
Lakes or Reservoirs[8]	-	50'	200'	200'
Swimming Pools[9]	-	10'	2h	4h

Note: When disposal fields and/or seepage pits are installed in sloping ground the minimum horizontal distance between any part of the leaching system and the ground surface shall be fifteen (15) feet.

1. Including porches and steps whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, covered walks, covered driveways and similar structures or appurtenances.
2. All non-metallic drainage piping shall clear domestic water supply wells by a minimum of fifty (50) feet. This may be reduced to not less than twenty-five (25) feet when approved metallic piping is installed. Where special hazards are involved, the distance shall be increased as may be directed by the Health Officer or the Administrative Authority.
3. Plus two (2) feet for each additional foot of depth in excess of one (1) foot below the bottom of the drain line. (See CPC, Appendix H)
4. See CPC Section 720.0
5. As measured from the line which defines the limit of a ten year frequency.
6. As measured from the edge of the channel.
7. Distance in feet equals four (4) times the vertical height of the cut of fill bank. Distance is measured from the top of edge of the bank.
8. As measured from the high water line.
9. Distance from the lip of the pool. h=depth of pool nearest disposal field or seepage pit.
10. When minimum distance between waste disposal and wells cannot be measured.
11. Unless specific Engineered Design for development is approved with subdivision/parcel map, then 5'.
12. 150 feet from any public water well where the depth of the effluent dispersal system does not exceed 10 feet.
    a. 200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet.
    b. Where the effluent dispersal system is within 600 feet of a public water well and exceeds 20 feet in depth, the horizontal setback shall be sufficient to achieve a two-year time of travel for microbiological contaminants. This setback shall be determined by a qualified professional, and in no case shall the setback be less than 200 feet.
    c. Where the effluent dispersal system is within 1,200 feet from a public water system’s surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake

point for flowing water bodies, the dispersal system shall be no less than 400 feet from the high water mark of the reservoir, lake or flowing water body.

d. Where the effluent dispersal system is located more than 1,200 feet but less than 2,500 feet from a public water system's surface water intake point, within the catchment area of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 200 feet from the high water mark of the reservoir, lake or flowing water body.

LEACH LINE REQUIREMENTS

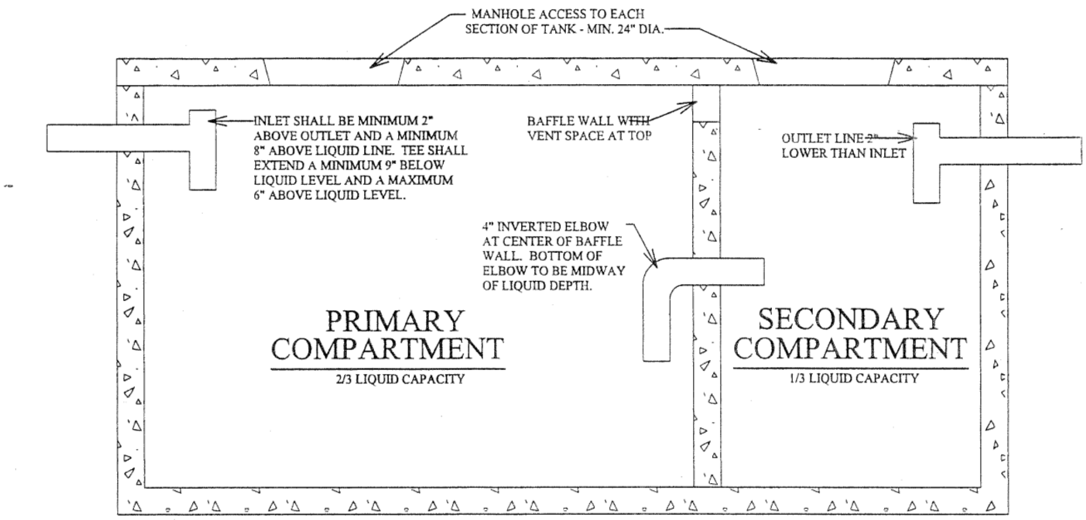
40 Square Feet Leaching per 100 Gallons Septic				
GALLONS	TOTAL SQUARE FEET	LEACH LINES	CHAMBERS	EZflow
750	300	1 - 3' Wide x 100' Length	1 - 3' Wide x 70' Length	1 - 3' Wide x 70' Length
		2 - 3' Wide x 50' Length	2 - 3' Wide x 35' Length	2 - 3' Wide x 35' Length
1000	400	2 - 3' Wide x 67' Length	1 - 3' Wide x 94' Length	1 - 3' Wide x 94' Length
		3 - 3' Wide x 45' Length	2 - 3' Wide x 48' Length	2 - 3' Wide x 48' Length
1200	480	2 - 3' Wide x 80' Length	2 - 3' Wide x 56' Length	2 - 3' Wide x 56' Length
		3 - 3' Wide x 54' Length	3 - 3' Wide x 38' Length	3 - 3' Wide x 38' Length
60 Square Feet Leaching per 100 Gallons Septic				
GALLONS	TOTAL SQUARE FEET	LEACH LINES	CHAMBERS	EZflow
750	450	2 - 3' Wide x 75' Length	2 - 3' Wide x 53' Length	2 - 3' Wide x 53' Length
		3 - 3' Wide x 50' Length	3 - 3' Wide x 35' Length	3 - 3' Wide x 35' Length
1000	600	2 - 3' Wide x 100' Length	2 - 3' Wide x 70' Length	2 - 3' Wide x 70' Length
		3 - 3' Wide x 67' Length	3 - 3' Wide x 47' Length	3 - 3' Wide x 47' Length
		4 - 3' Wide x 50' Length	3 - 3' Wide x 33' Length	3 - 3' Wide x 33' Length
1200	720	3 - 3' Wide x 80' Length	2 - 3' Wide x 84' Length	2 - 3' Wide x 84' Length
		4 - 3' Wide x 60' Length	3 - 3' Wide x 56' Length	3 - 3' Wide x 56' Length
90 Square Feet Leaching per 100 Gallons Septic				
GALLONS	TOTAL SQUARE FEET	LEACH LINES	CHAMBERS	EZflow
750	675	3 - 3' Wide x 75' Length	2 - 3' Wide x 79' Length	2 - 3' Wide x 79' Length
		4 - 3' Wide x 57' Length	3 - 3' Wide x 54' Length	3 - 3' Wide x 54' Length
		5 - 3' Wide x 45' Length	4 - 3' Wide x 40' Length	4 - 3' Wide x 40' Length
1000	900	3 - 3' Wide x 100' Length	1 - 3' Wide x 94' Length	3 - 3' Wide x 70' Length
		4 - 3' Wide x 75" Length	4 - 3' Wide x 53' Length	4 - 3' Wide x 53' Length
		5 - 3' Wide x 60' Length	5 - 3' Wide x 42' Length	5 - 3' Wide x 42' Length

1200	1080	4 - 3' Wide x 90' Length	3 - 3' Wide x 84' Length	3 - 3' Wide x 84' Length
		5 - 3' Wide x 72' Length	4 - 3' Wide x 63' Length	4 - 3' Wide x 63' Length
		6 - 3' Wide x 60' Length	5 - 3' Wide x 51' Length	5 - 3' Wide x 51' Length

Notes:

1. No single leach line shall exceed 100 feet in length.
2. Where more than one line is needed, they should be equal in length and direction.
3. Leach lines shall be laid level. Where multiple lines are used, a distribution box shall be utilized with the outlets being 1 inch lower than the inlet.
4. Leach lines are to be a minimum of 3 feet in width with 1 foot of rock below the leach pipe. Only where restricted by limited area for proper installation shall consideration of extra rock and trench depth be given to gain amount of leach area required.
5. Gravelless products must be IAPMO certified.
    a. Approved chamber models for use with this sizing chart are: Arc 36, Quick4 Standard, and Quick4 Plus Standard.
    b. Approved EZflow model for use with this sizing chart is 1203H-GEO.

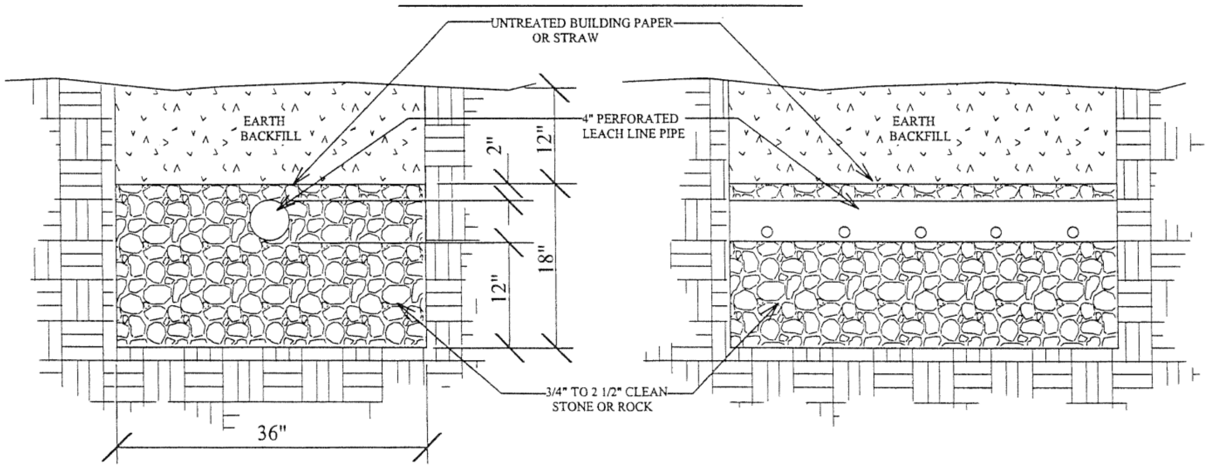
SEPTIC TANK DETAILS



MINIMUM SIZE SEPTIC TANK

NUMBER OF		MINIMUM SIZE TANK	INSIDE DIMENSIONS			THICKNESS OF CONCRETE				REBAR
BEDROOMS	FIXTURE UNITS	GALLONS	LENGTH	WIDTH	DEPTH	SIDES	ENDS	FLOOR	TOP	TOP
1 OR 2	15	750	8' - 0"	3' - 6"	5' - 0"	5"	5"	5"	4"	#4 @9" O.C.
3 OR 4	20	1000	10' - 0"	3' - 6"	5' - 0"	5"	5"	5"	4"	#4 @9" O.C.
5 OR 6	25	1200	12' - 0"	3' - 6"	5' - 0"	5"	5"	5"	4"	#4 @9" O.C.

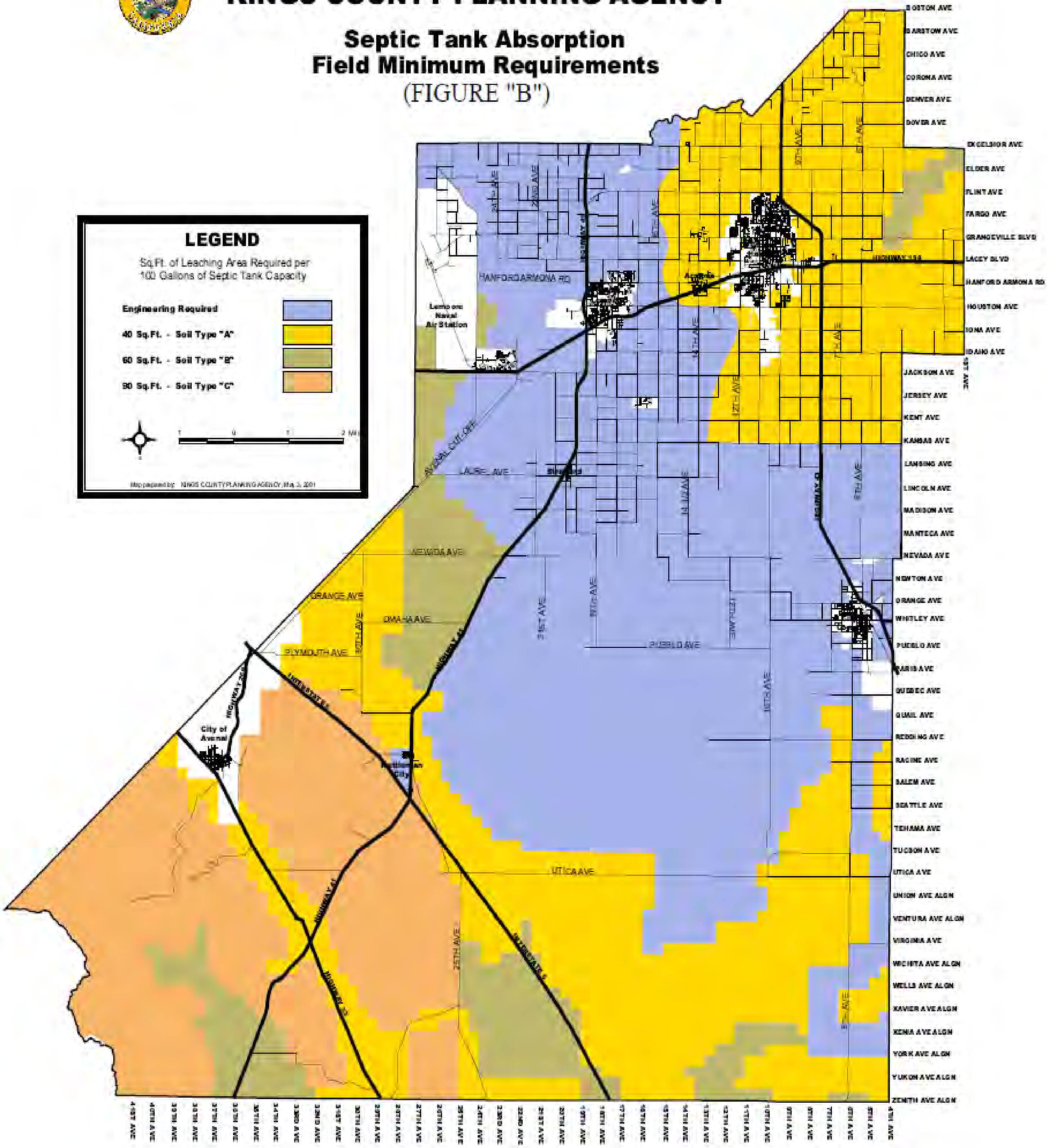
LEACH LINE DETAILS



KINGS COUNTY PLANNING AGENCY

Septic Tank Absorption Field Minimum Requirements

(FIGURE "B")



APPENDIX 3: COUNTY HEALTH OFFICER RUBRIC FOR APPROVAL OF LARGE OWTS

RUBRIC FOR APPROVAL OF LARGE OWTS

Instructions: *For each of the items below, identify whether the proposed OWTS meets public health standards, will meet public health standards with the incorporation of appropriate mitigation, or will not meet standards. A proposed system that meets OWTS standards in all areas of evaluation shall be approved either conditionally or unconditionally, depending upon the necessity of mitigation.*

Note: *Proposed OWTS designed to receive in excess of 10,000 gallons per day require approval of the Central Valley Regional Water Quality Control Board, and are beyond the County's jurisdiction.*

1. Is the size of the proposed OWTS sufficient to meet the demands of the facility that will be served by it?

   - ☐ Yes. (Attach justification.)
   - ☐ Yes, with the incorporation of the following mitigation: ______________________________
     ____
     ____
   - ☐ No.

2. Will the proposed OWTS comply with the setback requirements set forth in Appendix 2 of the County's OWTS Policy?

   - ☐ Yes.
   - ☐ Yes, subject to a variance with the following mitigation incorporated: __________________
     ____
     ____
   - ☐ No.

3. Is the proposed OWTS engineered in compliance with all applicable state and local regulations so that it will be suitably located with an appropriately sized leachfield and application rates adequately protective of public health?

   - ☐ Yes. (Attach justification.)
   - ☐ Yes, with the incorporation of the following mitigation: ______________________________
     ____
     ____
   - ☐ No.

4. Is the parcel selected for the OWTS appropriate?

   - ☐ Yes. (See criteria on attached page for justification.)
   - ☐ Yes, with the incorporation of the following mitigation: ______________________________
     ____
     ____
   - ☐ No.

Factors to Consider in Determining the Suitability of a Parcel for Proposed OWTS

Assessment Factors	Criteria for a Finding of Suitability	Criteria Suggesting the Need for Mitigation	Criteria Justifying Denial of Application
Geology, Soils, and Groundwater Constraints	There is no evidence of serious inherent geologic, soil, or groundwater constraints.	A fair argument can be made that the proposed site may have geologic, soil, or groundwater constraints, but any such concern can be assuaged through appropriate mitigation.	The site is unsuitable for the proposed OWTS system because it has unmitigable geologic, soil, or groundwater conditions that are atypical for the County.
Lot Size and Density of Nearby Systems	The median lot size within one-half mile of each next adjacent parcel is in excess of one acre.	The median lot size within one-half mile of each next adjacent parcel is one-half to one acre.	The median lot size within one-half mile of each next adjacent parcel is less than one-half acre.
Total Number of Septic Systems	There are fewer than 50 parcels served by septic systems within one-quarter mile of each next adjacent parcel, and the site is not surrounded by an urban area with sewer connections.	There are between 50 and 100 parcels served by septic systems within one-quarter mile of each next adjacent parcel, and the site is not surrounded by an urban area with sewer connections.	There are more than 100 parcels served by septic systems within one-quarter mile of each next adjacent parcel, or the site is surrounded by an urban area with sewer connections.
Evidence of Cumulative Water Quality Impacts	No serious water quality impacts implicating septic systems have been documented in the vicinity of the proposed OWTS, except for fully remediated past impacts.	Water quality analysis results within the vicinity of the proposed OWTS are suggestive of possible impacts from OWTS, and mitigation is appropriate to prevent any further environmental degradation.	Water quality impacts have been documented in the vicinity of the proposed OWTS, which cause or threaten to cause exceedance of water quality criteria, and the proposed OWTS cannot be designed in such a manner to avoid further environmental degradation.
Past Incidents	The applicant has no history in Kings County of violations of OWTS regulations, and there is no history of incidents involving OWTS on the proposed site.	The applicant has a history in Kings County of violations of OWTS regulations, which have all been remedied; and/or there have been past incidents involving OWTS on the proposed site that can be avoided in the future if the proposed OWTS is designed properly.	The applicant for the OWTS has a history in Kings County of unremedied violations OWTS regulations; and/or there have been past incidents involving OWTS on the proposed site that could not have been avoided through the exercise of due care, and that are likely to be repeated if a new or replacement OTWS is constructed onsite.

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Areas of Special Consideration

Areas of Special Consideration

As an additional component of the County's water quality assessment program, the Deputy Health Director for Environmental Health Services and County Building Official will meet at least annually prior to submitting reports required under Paragraph 9.3.3 of the State Water Board Policy, to discuss water quality test results, variances, complaints, reports of OWTS failure, and permits issued in those areas identified in the attached map as Rural Areas of Special Consideration and Urban Fringe Areas of Special Consideration. During that meeting, the two officials will determine whether a finding may be *made,* based upon the evidence, that the County's LAMP is functioning effectively. This finding will be supported by a brief substantiating paragraph to be included with any report submitted under Paragraph 9.3.3. If the evidence does not support the required finding, a "qualified professional," as that term is defined in the State Water Board Policy, who may be an employee of the County, shall be engaged to submit recommendations to the Board of Supervisors for amending the County's LAMP.

Attached as **Figure 1** is a map identifying Rural Areas of Special Consideration. These areas were identified by doing the following: (1) identifying those parcels within the County's jurisdiction in agricultural zoned districts that are less than the required 10 acre minimum under the County's existing General Plan and Development *Code,* and which are not also located in that area of the County for which engineering of OWTS is required under this LAMP and under Land Use Policy El.l *of* the *2035 Kings County General Plan*; (2) plotting out the approximate locations of most of the regulated public water systems located within the County's jurisdiction; and (3) identifying areas of sparse population based on locations within the County for which no ZIP code is assigned by the U.S. Postal Service. Using this data, two areas of the County were identified as having higher than average potential concentrations of OWTS in areas for which engineering is not required. The boundaries of those areas were designed with reference to the locations of nearby public water systems that will provide useful data to County officials about the effectiveness of this LAMP.

Attached as Figure 2, is a map identifying Urban Fringe Areas of Special Consideration, page 34. There are 1,256 non-agricultural parcels for which engineering is not required for OWTS systems, and that are located within the jurisdiction of the County, i.e., not within a city, special district providing sewer service, or federal reserve. Nearly all of those parcels are located within the County islands and urban fringe areas in and around the City of Hanford. Over 400 residential parcels in this area are connected to city sewers. Those areas identified on the map that are immediately or closely adjacent to the City of Hanford and not connected to sewers that are highlighted in green are deemed to have higher than average concentrations of non-engineered OWTS, and merit special consideration to determine the effectiveness of this LAMP. It should be noted, that under Land Use Policy El.l *of* the *2035 Kings County General Plan,* any new urbanized areas that may develop within the area covered by the map and around other existing cities and communities must be annexed before any development will be allowed. This policy will prevent new urbanized areas with high concentrations of OWTS from being created in Kings County.

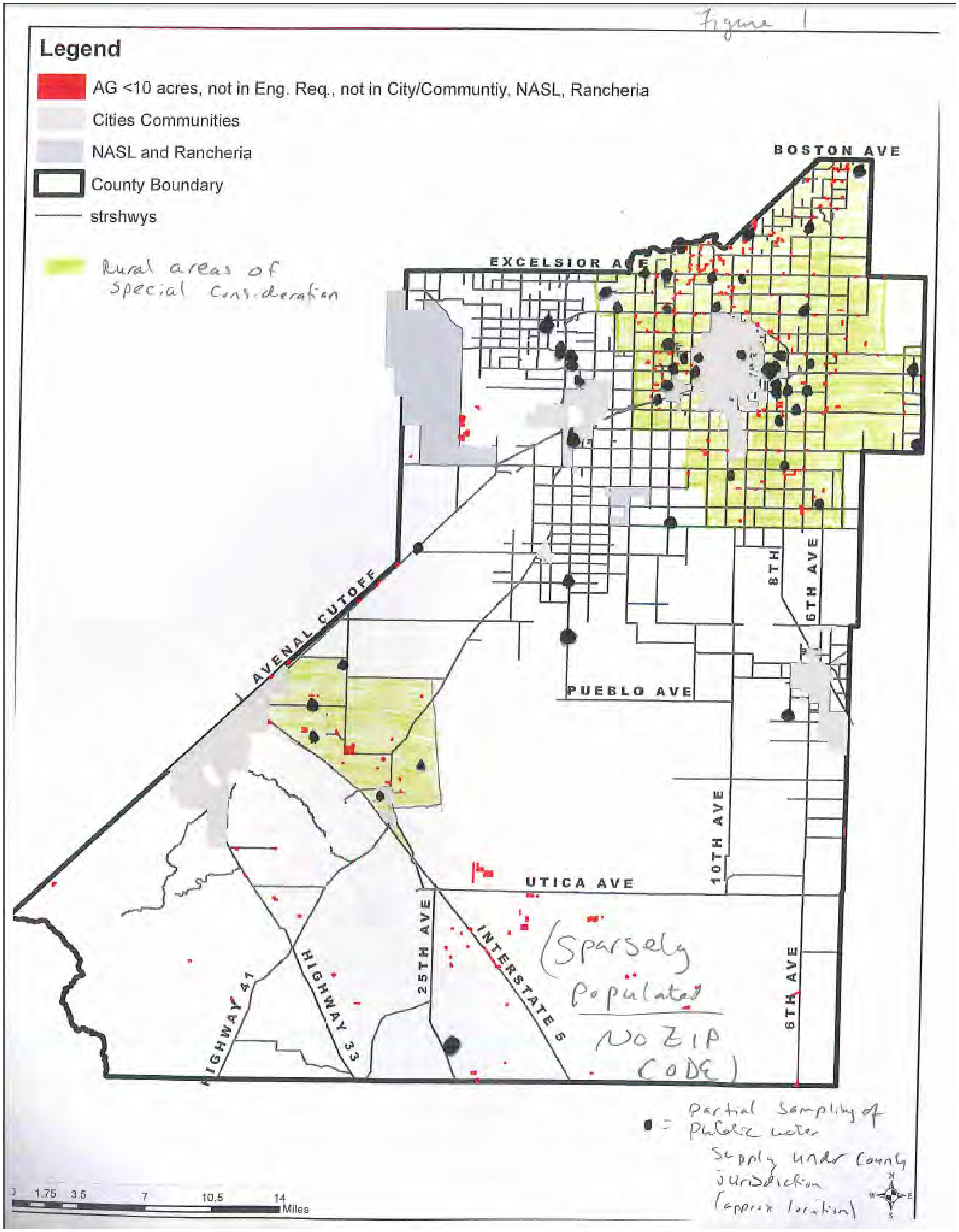


Figure 1
Legend
AG <10 acres, not in Eng. Req., not in City/Communtiy, NASL, Rancheria
Cities Communities
NASL and Rancheria
County Boundary
strshwys
Rural areas of special consideration
BOSTON AVE
EXCELSIOR AVE
AVENAL CUTOFF
8TH
6TH AVE
PUEBLO AVE
10TH AVE
UTICA AVE
25TH AVE
HIGHWAY 41
HIGHWAY 33
INTERSTATE 5
6TH AVE
(Sparsely populated NO ZIP CODE)
● = Partial sampling of Public water supply under County jurisdiction (approx location)
0 1.75 3.5 7 10.5 14
Miles

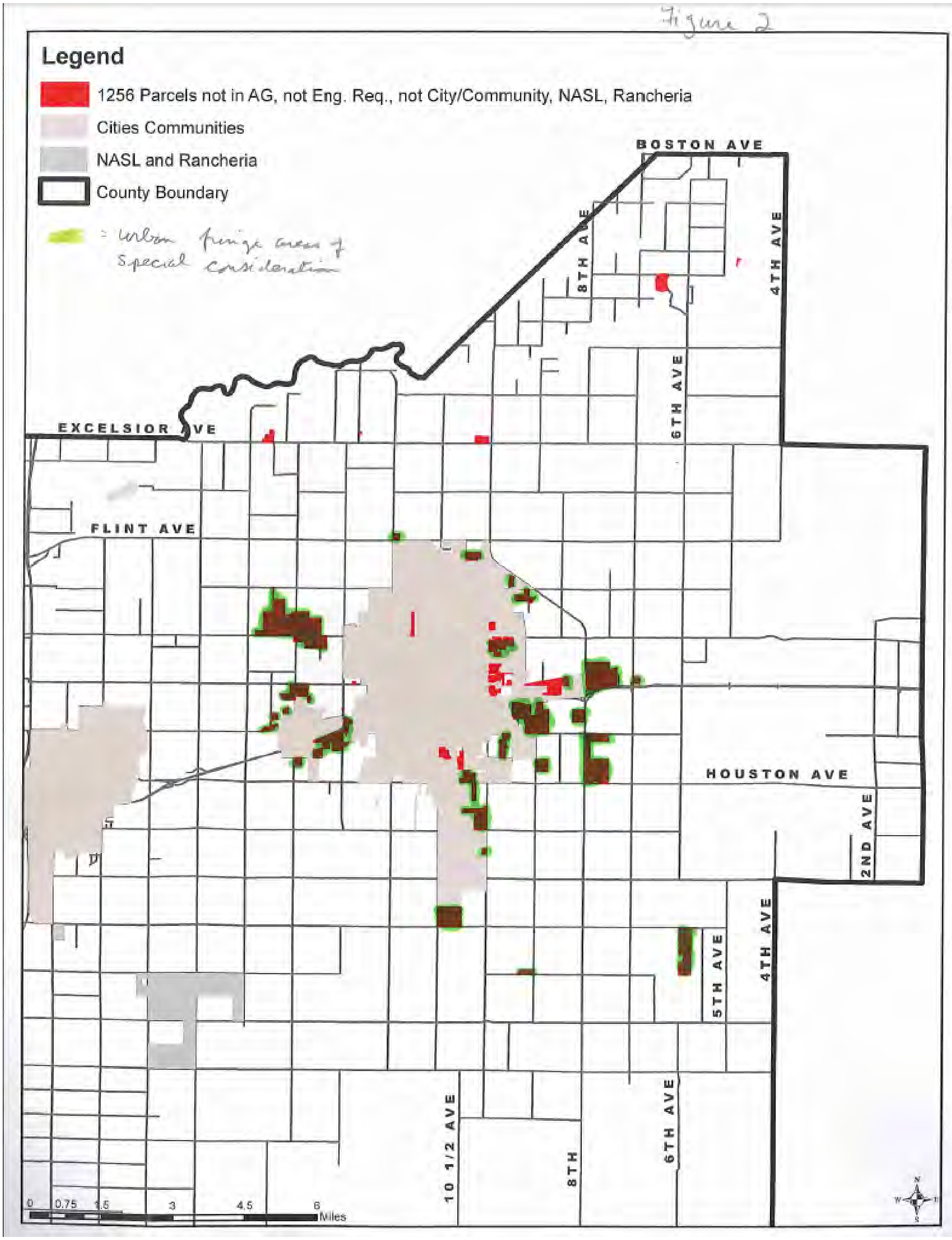


Figure 2
Legend
1256 Parcels not in AG, not Eng. Req., not City/Community, NASL, Rancheria
Cities Communities
NASL and Rancheria
County Boundary
= Urban fringe areas of Special consideration
BOSTON AVE
8TH AVE
4TH AVE
6TH AVE
EXCELSIOR AVE
FLINT AVE
HOUSTON AVE
2ND AVE
4TH AVE
5TH AVE
10 1/2 AVE
8TH
6TH AVE
0 0.75 1.5 3 4.5 6
Miles

Areas of Potential Concern

Areas of Potential Concern

As an additional component of the County's water quality assessment program, the Deputy Health Director for Environmental Health Services and County Building Official will also meet at least annually prior to submitting reports required under Paragraph 9.3.3 of the State Water Board Policy, to discuss water quality test results, variances, complaints, reports of OWTS failure, and permits issued in those areas identified as Areas of Potential Concern. During that meeting, the two officials will determine whether a finding may be made, based upon the evidence, that the County's LAMP is functioning effectively for those areas. This finding will be supported by a brief substantiating paragraph to be included with any report submitted under Paragraph 9.3.3. If the evidence does not support the required finding, a "qualified professional," as that term is defined in the State Water Board Policy, who may be an employee of the County, shall be engaged to submit recommendations to the Board of Supervisors for amending the County's LAMP.

The Environmental Setting section of this LAMP on pages 4-6, addresses the areas of potential concern as well as Appedix 1. It should also be noted that under Land Use Policy E1.1 of the *2035 Kings County General Plan*, any new urbanized areas that may develop within the area covered by the map and around other existing cities and communities must be annexed before any development will be allowed. This policy will prevent new urbanized areas with high concentrations of OWTS from being created in Kings County.

California Regional Water Quality Control Board-Central Valley Region Orders:

1) **75-071**
2) **77-20**
3) **77-224**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 75-071

REVISION AND AMENDMENT OF WATER QUALITY CONTROL PLAN (INTERIM)
BY THE ADDITION OF A PROHIBITION OF WASTE DISCHARGE FROM
SEPTIC TANKS OR CESSPOOLS WITHIN
KETTLEMAN CITY COUNTY SERVICE AREA NO. I
KINGS COUNTY

The California Regional Water Quality Control Board, Central Valley Region, finds:

1. The Board adopted, on 15 June 1971, a Water Quality Control Plan (Interim), Basins 5A, B, C and D (hereafter "Interim Plan").

2. The Interim Plan contains areas where waste discharge from septic tanks and cesspools is prohibited.

3. On 21 March 1975 in the City Hall Council Chambers, 2326 Fresno Street, Fresno, after due public notice, the regional board conducted a public hearing at which evidence was received concerning the discharge from failing septic tanks and cesspools in Kettleman City County Service Area No. 1.

4. Kettleman City is an isolated, unincorporated community located generally in the northeastern portion of Kings County north of the intersection of Highways 41 and I-5 and the California Aqueduct. The community occupies portions of Sections 18, 19, and 30, T22S, R19E MDB&M.

5. A November 1974 sanitary survey of 91% of the developed lots in the Service Area by the Kings County Health Department indicated that failing individual systems were observed in 18%; another 12% exhibited signs of failures and surfacing sewage was found in 5% of the residences surveyed. The Health Department has concluded that a community sewage disposal system would prevent further deterioration of the environment and improve local health condition. Therefore the County has imposed a building ban to prevent the expansion of existing individual disposal systems or the addition of new ones.

6. Continued use of existing individual waste disposal systems or the installation of new systems will increase the threat to public health.

IT IS HEREBY ORDERED THAT:

1. The discharge of waste within the Kettleman City County Service Area No. 1, Kings County from leaching or percolation systems installed after approval of this amendment by the State Water Resources Control Board is prohibited. An exemption to this prohibition may be granted after presentation by the proposed discharger of geologic and hydrologic evidence that leaching system disposal will not, individually or collectively, result in a pollution or nuisance.

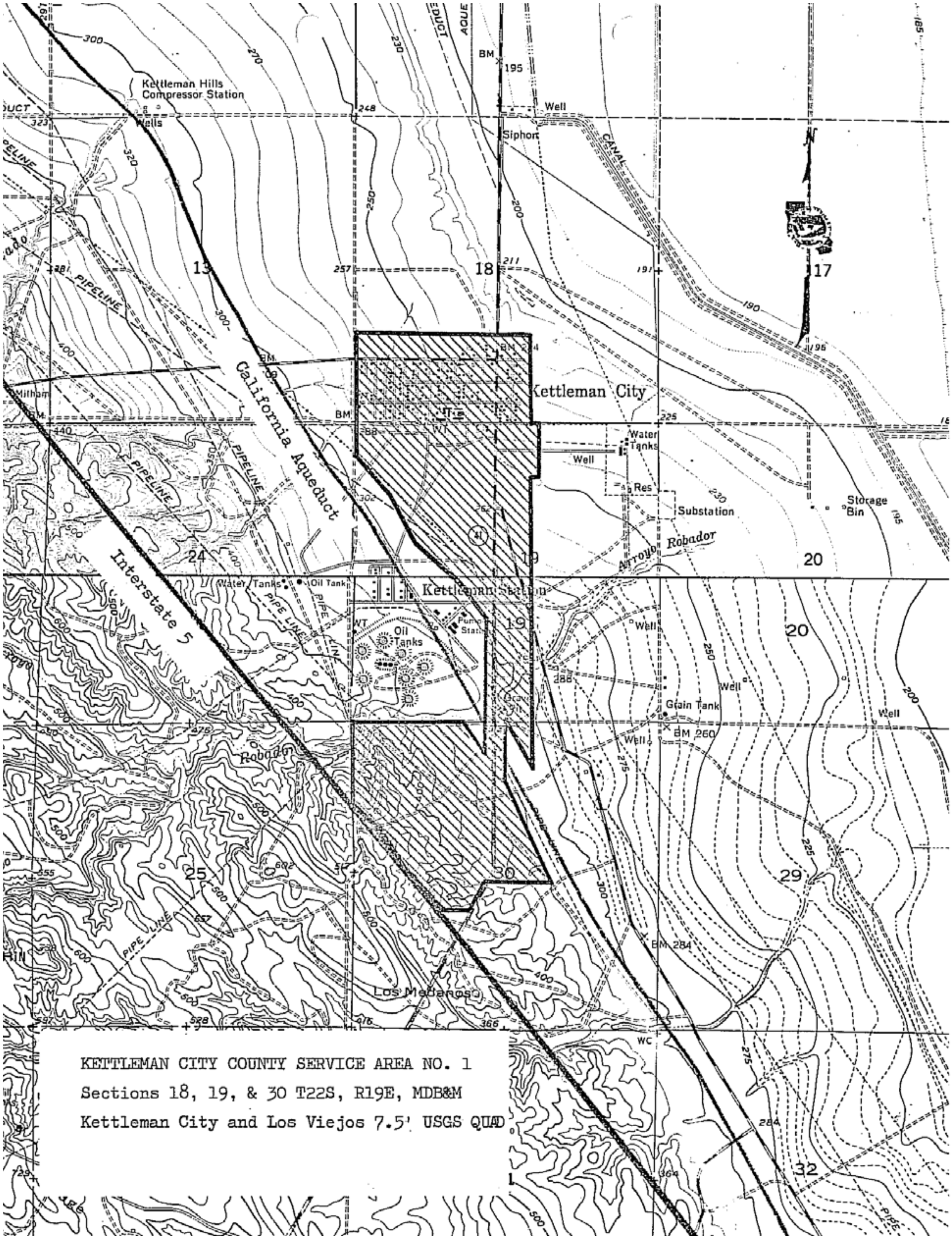
2. The discharge of waste within the Kettleman City County Service Area No. 1, Kings County from leaching or percolation systems is prohibited after 1 January 1979. An exemption to this prohibition may be granted whenever the regional board finds that the continued operation of septic tanks, cesspools, or other means of disposal in a particular area will not, individually or collectively, directly, or indirectly, adversely affect water quality.

3. Chapter VI of the Interim Plan is revised by the addition of this prohibition, upon approval of the State Water Resources Control Board.

I, JAMES A. ROBERTSON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 21 March 1975.

James A. Robertson
JAMES A. ROBERTSON
Executive Officer

Amended 3/21/75



KETTLEMAN CITY COUNTY SERVICE AREA NO. 1
Sections 18, 19, & 30 T22S, R19E, MDB&M
Kettleman City and Los Viejos 7.5' USGS QUAD

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 77-20

REVISION AND AMENDMENT OF WATER QUALITY CONTROL PLAN BY THE
ADDITION OF A PROHIBITION OF WASTE DISCHARGE FROM
SEPTIC TANKS OR CESSPOOLS WITHIN
HOME GARDEN COMMUNITY SERVICES DISTRICT
KINGS COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereinafter Board), finds:

1. The Board adopted a Water Quality Control Plan for the Tulare Lake Basin 5D (hereinafter Basin Plan).

2. The Basin Plan states that the Regional Board will consider adoption of a ban on new septic systems and will require elimination of existing systems in areas where the systems contaminate underlying groundwater or where a substantial percentage of existing systems fail annually.

3. On 25 February 1977, at the Visalia City Hall Council Chambers, 707 West Acequia Street, Visalia, after due public notice, the Board conducted a public hearing at which evidence was received concerning the discharge from failing septic tanks in the Home Garden Community Services District.

4. Home Gardens is an unincorporated area contiguous to the City of Hanford with a population of 1,750 (1970 Census). The area is generally located in the northern portion of Kings County and occupies the southern portions of Section 1, T19S, R21E and Section 6, T19S, R22E, MDB&M. The area is delineated on the attached map.

5. Home Gardens has a long history of failing septic tank systems. The Comprehensive Water and Sewer Plan for Kings County of 1971 placed Home Gardens first on its priority list for sewer projects.

6. A sewage disposal system survey of the Home Garden area was conducted by the Kings County Health Department during June and July of 1975. The survey showed that out of 368 developed parcels surveyed, 15, or 4% of the individual disposal systems had surfacing sewage; and another 124, or 34% exhibited one or more signs of failure. A combined failure rate of 38%, or 139 out of 368 systems was reported.

7. The Kings County Health Department concludes that serious public health hazards are being created in the Home Garden area as a result of the use of individual sewage disposal systems and recommends that the Home Garden area be served by a community sewage system and that the Board prohibit discharges from individual sewage disposal systems in the area.

8. Continued operation of existing waste disposal systems, and installation of new septic tank disposal systems will prolong the threat to public health.

9. Flow from this collection system would not be a significant additional load on the City of Hanford plant. Construction of the collection system would mitigate and improve environmental conditions. Construction of the collection system would be implementation of the Basin Plan.

IT IS HEREBY ORDERED THAT:

1. In order to achieve water quality objectives, protect present and future beneficial water uses, protect public health and prevent nuisance, discharge of waste from new individual waste disposal systems[1/] is prohibited forthwith and discharge of waste from existing individual disposal systems is prohibited after 1 January 1981 in the area described as follows:

   Home Garden Community Services District

2. The Board may grant an exemption to the prohibition for (1) new individual disposal systems after presentation of geologic and hydrologic evidence by the proposed discharger that such system(s) will not individually or collectively result in a pollution or nuisance, and (2) existing individual disposal systems if it finds that the continued operation of such system(s) in a particular area will not, individually or collectively, directly or indirectly, affect water quality adversely.

3. Chapter V of the Basin Plan is revised by the addition of this prohibition, upon approval of the State Water Resources Control Board.

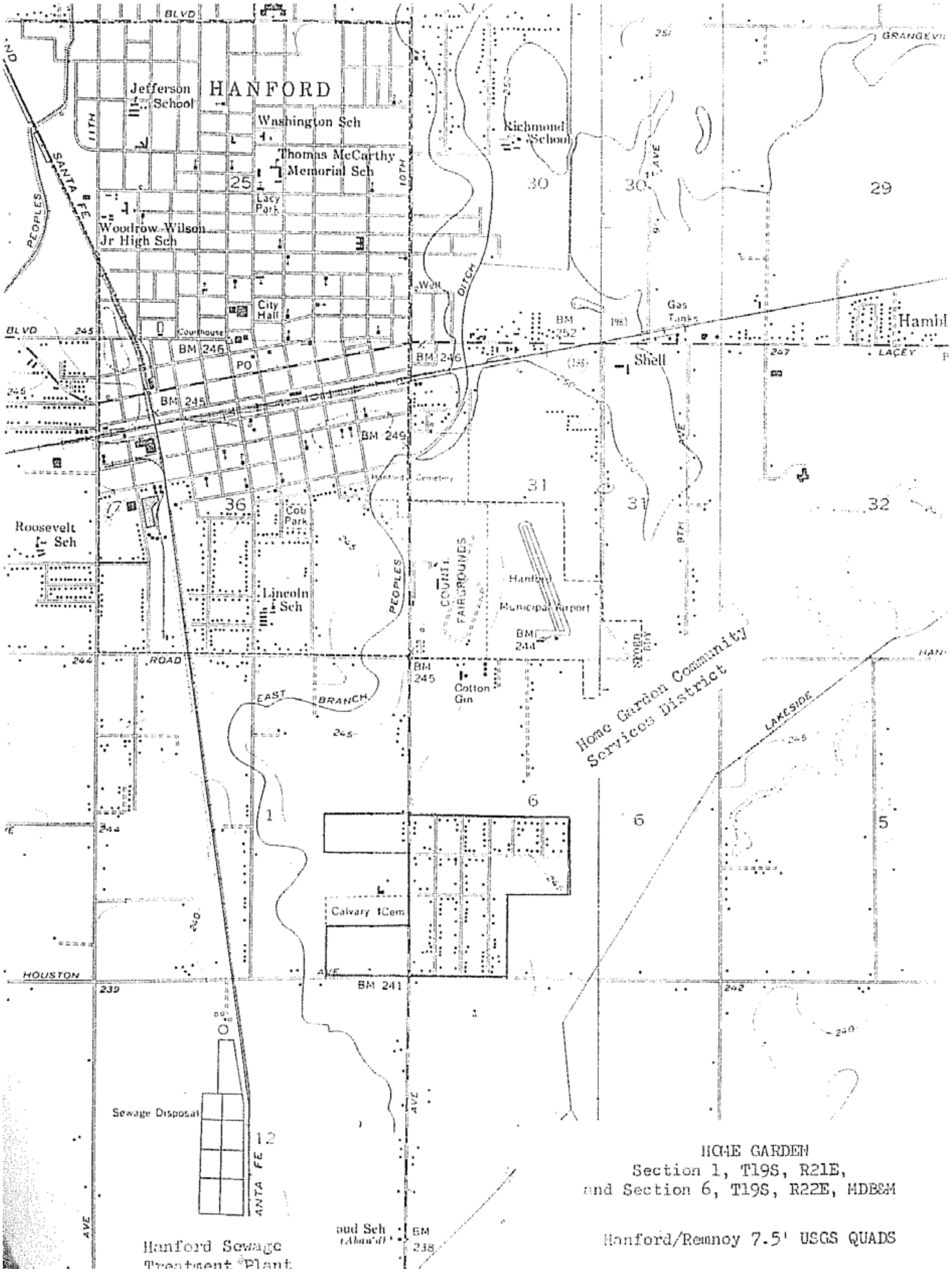
I, JAMES A. ROBERTSON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on FEB 25 1977.

JA Robertson

JAMES A. ROBERTSON, Executive Officer

1/ Individual waste disposal system means any waste disposal system designed and constructed to provide for collection, storage or disposal of liquid wastes from five or fewer commercial or family dwelling units.

LRG/ic 01/24/77



HOME GARDEN
Section 1, T19S, R21E,
and Section 6, T19S, R22E, MDB&M

Hanford/Remnoy 7.5' USGS QUADS

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 77-224

REVISION AND AMENDMENT OF WATER QUALITY CONTROL PLAN
BY THE ADDITION OF A PROHIBITION OF
WASTE DISCHARGE FROM SEPTIC TANKS OR
CESSPOOLS WITHIN THE CORCORAN FRINGE AREA
KINGS COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereinafter Board), finds:

1. The Corcoran Fringe Area includes unincorporated community areas around the City of Corcoran as well as areas within the Corcoran city limits. The Corcoran Fringe Area has a population of about 2,000 persons, is generally located in the east central portion of Kings County, is in T21S, R21E, MDB&M, and specifically designates the four sub-areas shown on the attached map.

2. During July and August of 1975 the Kings County Health Department conducted a sewage disposal system survey of 987 parcels, 633 of which were developed, within the Corcoran Fringe Area. The survey found signs of sewage system failures in 299 (45%) of the sewage systems surveyed. Observed failures included 214 instances (32%) of laundry waste being discharged onto the ground; 22 instances (3%) of sewage surfacing onto the ground; 38 instances (6%) of excessive pumping frequency (defined as more than once a year); 37 instances (6%) of septic tanks or cesspools uncovered; and 38 instances (6%) of septic tanks or cesspools caving in.

3. The Kings County Health Department investigated 354 vacant lots during their disposal system survey and found that 183 (52%) were too small for development, because of inadequate separation between wells, property lines, and future sewage disposal systems.

4. The Kings County Health Department collected 310 water samples during their disposal system survey; 78 (26%) of these samples were found to be positive for coliform bacteria, and fecal coliform were present in 35 (11%) of the positive samples. Since completion of the survey, a water system has been completed that will serve many of the residents within the Corcoran Fringe Area.

5. The Kings County Health Department has concluded that sewage disposal conditions within the Corcoran Fringe Area are creating a severe community health hazard that requires immediate attention and should include the cessation of subsurface sewage disposal applications.

6. Beneficial uses of local groundwaters include domestic and agricultural use. Depth to groundwater ranges from less than 10 to over 50 feet, with the shallow water tables found in the southwest portions of the area.

7. Soils in the Corcoran Fringe Area pose moderate to severe limitations for septic tank leaching systems. Results of 24 percolation tests conducted within the fringe areas indicate a mean percolation rate of 343 minutes per inch.

8. The Board adopted a Water Quality Control Plan for Tulare Lake Basin 5D (hereinafter "Basin Plan"), on 25 July 1975.

9. The Basin Plan states that the Regional Board will consider a ban on new septic tank systems and will require the elimination of existing systems in areas where the systems contaminate the underlying groundwater or where a substantial percentage of existing systems fail annually. Each area will be considered on a case by case basis.

10. On 22 July 1977, after due notice, the Regional Board conducted a public hearing at which evidence was received concerning the discharge from failing septic tanks in the Corcoran Fringe Area.

11. Continued operation of the existing waste disposal systems and installation of new septic tank disposal systems will increase the threat to public health and degrade the quality of local groundwaters.

12. The County of Kings has prepared a final Environmental Impact Report in accordance with the California Environmental Quality Act (Public Resources Code, Section 2100 et seq).

13. The EIR discussed a project which has a basic objective to eliminate existing or potential public health hazards created by the use of septic tanks and pit privies in the Corcoran Fringe Area.

14. The project as approved by the County of Kings may have the following significant effects on the environment:

    a. Possible displacement of 90 acres of agricultural land for a new treatment facility.

    b. Odors from the treatment facilities.

    c. Provision of a wastewater collection and treatment facility will permit further urbanized development in the Corcoran Fringe on vacant lots and in existing residential areas.

    d. The City of Corcoran will have to expand the capacity of their waste treatment facility in order to provide for treatment of wastes collected in the Corcoran Fringe Area.

    e. Wastewater treatment will require the consumption of additional electrical energy.

15. Installation and operation of sewage collection and treatment facilities in accord with waste discharge requirements adopted and implemented by the Regional Board will abate and mitigate public health hazards and nuisance conditions in Corcoran Fringe Area. Other significant affects on the environment identified as Findings 14a and 14c are within the responsibility and jurisdiction of other public agencies and corrective measures should be implemented by such other agencies. Findings 14d and 14e are unavoidable adverse environmental effects and it is infeasible to mitigate or avoid those conditions.

IT IS HEREBY ORDERED that:

1. In order to achieve water quality objectives, protect present and future beneficial water uses, protect public health and prevent nuisance, discharge of waste from new individual waste disposal systems 1/ is prohibited forthwith and the discharge of waste from existing individual disposal systems is prohibited after 1 July 1981 in the area described as:

    Corcoran Fringe Area, which is comprised of the four sub-areas shown on the attached map.

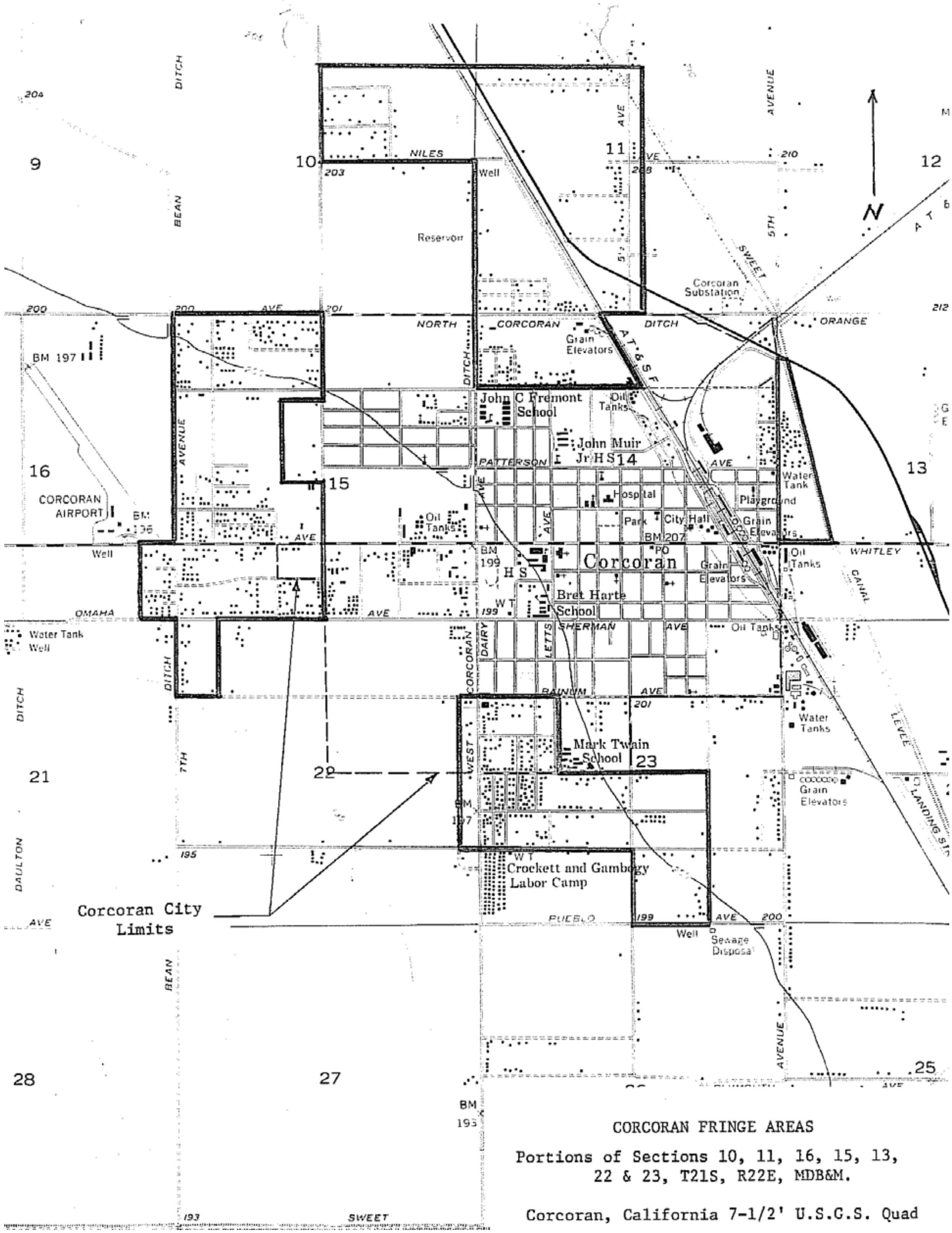
2. The Board may grant an exemption to the prohibition for (1) new individual disposal systems after presentation of geologic and hydrologic evidence by the proposed discharger that such system(s) will not individually or collectively result in a pollution or nuisance, and (2) existing individual disposal systems if it finds that the continued operation of such system(s) in a particular area will not, individually or collectively, directly or indirectly, affect water quality adversely.

3. Chapter V of the Basin Plan is revised by the addition of this prohibition, upon approval of the State Water Resources Control Board.

I, JAMES A. ROBERTSON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 22 July 1977.

J A Robertson
JAMES A. ROBERTSON, Executive Officer

1/ Individual waste disposal systems means any waste disposal system designed and constructed to provide for collection, storage or disposal of liquid wastes from five or fewer commercial or family dwelling units.



CORCORAN FRINGE AREAS

Portions of Sections 10, 11, 16, 15, 13,
22 & 23, T21S, R22E, MDB&M.

Corcoran, California 7-1/2' U.S.G.S. Quad

III. SUMMARY:

Kings County OWTS standards are protective of public health and environment and meet the POLICY's OWTS Tier 2 standards and the Basin Plan policies of the applicable California Regional Water Quality Control Boards by:

- Addressing areas vulnerable to OWTS Pollution;
- Identifying limiting conditions during site evaluations;
- Requiring site evaluations to be performed by licensed/registered consultants;
- Requiring septic designs to be performed by Certified Engineering Geologist, Registered Environmental Health Specialist, or a Professional Civil Engineer;
- Requiring enhanced protection by the use of advanced treatment and denitrification units;
- Responding to complaints of failing OWTS;
- Requiring failing OWTS to be destroyed, repaired, or replaced under permit;
- Addressing shallow soils, poor drained soils, and fractured bedrock if applicable;
- Addressing high OWTS density by requiring increased lot size and specifying the use of a hydrological study of the cumulative impact of a proposed subdivision;
- An established operation and maintenance program that requires permitting, annual maintenance, routine inspections, and triennial maintenance by a service provider;
- Not allowing cesspools and seepage pits;

A. References

- *Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems*, State Water Resource Control Board, June 19, 2012
- *Onsite Wastewater Treatment System Policy, Draft Substitute Environmental Document*, State Water Resources Control Board, June 6, 2012
- *Environmental Engineering and Sanitation*, Joseph Salvato, 4th Edition
- *Design Manual --- Onsite Wastewater Treatment and Disposal Systems*, United State Environmental Protection Agency, October 1980
- *Onsite Wastewater Treatment Systems Manual*, United States Environmental Protection Agency, February 2002
- http://water.epa.gov/infrastructure/septic/manuals.cfm

Notice of Exemption

TO: ☐ Office of Planning and Research

For U.S. Mail	*Street Address*
P.O Box 3044, Room 113	1400 Tenth St.
Sacramento, CA 95812-3044	Sacramento, CA 95814

☒ County Clerk
County of Kings
Kings County Government Center
Hanford, California 93230

FROM: Health Department, attn.: J. Taber
Kings County Government Center
Hanford, CA 93230

Date Received For Filing

ORIGINAL
FILED
MAY 12 2016
KRISTINE LEE
KINGS COUNTY CLERK

PROJECT TITLE: Local Agency Management Plan for Onsite Wastewater Treatment Systems

PROJECT LOCATION - Specific: All unincorporated areas of Kings County, CA, except Community Services Districts, federal reserves, Public Utilities Districts, and parcels in urban fringe areas connected to sanitary sewers

PROJECT LOCATION – N/A

PROJECT LOCATION - County: Kings

DESCRIPTION OF PROJECT: On May 10, 2016, the Board of Supervisors approved a revised Local Agency Management Plan ("LAMP") for submission to, and approval by, the Central Valley Water Quality Control Board, pursuant to Tier II of the State Water Resources Control Board's Policy for Onsite Wasterwater Treatment Systems. Previously the Board approved a LAMP on April 5, 2016, for which an NOE was filed.

NAME OF PUBLIC AGENCY APPROVING PROJECT: Board of Supervisors, County of Kings

NAME,ADDRESS, & PHONE NUMBER OF PERSON OR AGENCY CARRYING OUT PROJECT: County of Kings, attn.: Clerk of the Board of Supervisors, Kings County Government Center, 1400 W. Lacey Boulevard, Hanford, CA 93230, ph. 559-852-2362.

EXEMPT STATUS: (*check one*)

- ☐ Ministerial (Section 21080(b)(1); 15268);
- ☐ Declared Emergency (Section 21080(b)(4); 15269(a));
- ☐ Emergency Project (Section 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number: 14 CCR §§ 15061(b)(3), 15308
- ☒ Statutory Exemptions. State code number: Pub. Res. Code, § 21080, subd. (b)(15), 14 CCR § 15251(g)

REASONS WHY PROJECT IS EXEMPT: The LAMP implements a regulation under a certified regulatory program, is intended to protect the environment, and preserves existing baselines except where state law requires more stringent standards.

CONTACT PERSON: Jeff Taber

TELEPHONE NUMBER:
(559) 852-2620

/s/ Jeff Taber
Signature
Title: Deputy Dir. Pub. Health, Envt. Health
Date: May 12, 2016