DRAFT
ENVIRONMENTAL IMPACT REPORT
VOLUME II- TECHNICAL APPENDICES

# CITY OF BAKERSFIELD WASTEWATER TREATMENT PLANT No. 3 EXPANSION (CUP# 05-0669)

**SCH NO. 2006041012**

Lead Agency:

**CITY OF BAKERSFIELD**
1715 Chester Avenue
Bakersfield, CA 93301
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October 2006

QK 050257

# 15.0 APPENDICES

# 15.1 INITIAL STUDY/NOTICE OF PREPARATION

# INITIAL STUDY / ENVIRONMENTAL CHECKLIST

For

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The City of Bakersfield
Wastewater Treatment Plant #3 Expansion & Upgrade

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**LEAD AGENCY**:

www.ci.bakersfield.ca.us

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March 30, 2006

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# 1.0 INTRODUCTION

Following preliminary review of the proposed Project, the City of Bakersfield (City) has determined that the proposed Wastewater Treatment Plant (WWTP) No. 3 Expansion Project is subject to the guidelines and regulations of the California Environmental Quality Act (CEQA) and the City Environmental Guidelines. This Initial Study addresses the direct, indirect, and cumulative environmental effects associated with the WWTP No. 3 Expansion Project as proposed.

## 1.1 STATUTORY AUTHORITY AND REQUIREMENTS

In accordance with CEQA (Public Resources Code Section 210000 – 21178.1), this Initial Study has been prepared to analyze the proposed Project in order to identify any potential significant impacts upon the environment that would result from construction and implementation of the Project. In accordance with Section 15063 of the State CEQA Guidelines, this Initial Study is a preliminary analysis prepared by the Lead Agency, the City, in consultation with other jurisdictional agencies, to determine whether a Negative Declaration or Environmental Impact Report (EIR) would be required for the proposed WWTP No. 3 Expansion Project. The purpose of this Initial Study is to inform the City decision-makers, affected agencies, and the public of potential environmental impacts associated with construction and implementation of the proposed Project.

Following completion of the Initial Study, the City will make a formal determination as to whether the Project may or may not have significant unmitigable environmental impacts. A determination that a Project may have less than significant effects would result in the preparation of a Negative Declaration. A determination that a Project may have significant impacts on the environment would require the preparation of an EIR to further evaluate issues identified in this Initial Study. Based upon the potential significant environmental effects associated with the proposed Project, the City will require preparation of an EIR to further evaluate issues identified in this Initial Study. Therefore, this Initial Study and Notice of Preparation (NOP) serve as part of the scoping process to determine the appropriate environmental analysis for the proposed Project.

This Initial Study and NOP will undergo a 30-day public review period. During this review, comments by the public and responsible agencies on the Project relative to environmental issues are to be submitted to the City. The City will review and consider all comments as a part of the Project's environmental analysis, using the comments to further determine the necessary environmental document, as required in Section 15082 of the CEQA Guidelines. The comments received with regard to this Initial Study and NOP will be included in the Project environmental document, for consideration by the City.

## 1.2 CONSULTATION

As soon as the Lead Agency has determined that an Initial Study would be required for the Project, the Lead Agency is directed to consult informally with all Responsible Agencies and Trustee Agencies that are responsible for resources affected by the Project, in order to obtain the recommendations of those agencies on the environmental documentation to be prepared for the Project. Following the City's receipt of any written comments from those agencies, the City would consider any recommendations of those agencies in the formulation of the City's preliminary findings. Following preparation of this Initial Study, the City would initiate formal consultation with these and other governmental agencies as required under CEQA and its implementing guidelines.

## 1.3 INCORPORATION BY REFERENCE

The following references were utilized during preparation of this Initial Study. These documents are available for review at the City of Bakersfield Planning Department located at 1715 Chester Avenue, Bakersfield, California 93301.

- Draft Supplemental Environmental Impact Report (DSEIR) titled "Modified Interstate Disposal Site, Wastewater Treatment Plant Three" prepared by Quad Consultants, May 1984.

- Final Supplemental Environmental Impact Report (FSEIR) titled “Modified Interstate Disposal Site, Wastewater Treatment Plant Three” prepared by Quad Consultants, July 1984.

- City of Bakersfield - Resolution No. 48-84 – A resolution of the Council of the City of Bakersfield making findings, certifying the Final Supplemental Environmental Impact Report for a Modified Interstate Disposal Site for Wastewater Treatment Plant No. 3, and approving project, 18 July, 1984.

- Final Environmental Impact Report titled “Wastewater Treatment Plant Improvements” prepared by Quad Consultants, July 1987.

- Metropolitan Bakersfield General Plan, December 2002.

- Metropolitan Bakersfield General Plan Environmental Impact Report, (June 26, 2002).

- Metropolitan Bakersfield Habitat Conservation Plan, April 1994.

- Implementation/Management Agreement by and among the United States Fish and Wildlife Service, California Department of Fish and Game, City of Bakersfield and County of Kern.

For the purposes of this Initial Study the I-5 Reclamation Site authorized effluent disposal area (See Figure 2), is not a component of the proposed project. The approximately 4,700 acre area was environmentally evaluated in a 1984 environmental impact report (EIR) (referenced above) and is not a subject of this Initial Study. Environmental impacts associated with this area are considered sufficiently addressed, pursuant to applicable legal standards, by the 1984 EIR. There is no significant new information or changed circumstances that would require further analysis. This reclamation discharge area has been utilized by the City for approximately the last 20 years and the effluent disposal practices have not significantly changed since the City of Bakersfield’s adoption of Resolution No. 48-84 on July 1984 which certified the Final Supplemental Environmental Impact Report (FSEIR) in accordance with the California Environmental Quality Act (Public Resource Code, Section 21000, et seq.) As noted in the project description below, the proposed project anticipates that approximately 14 mgd of treated effluent will be transported via pipeline to the I-5 Reclamation Site. Initially, the 1984 EIR evaluated a discharge volume of 6.5 mgd at the onset of discharge operations at the I-5 Reclamation Site. The City of Bakersfield’s review of the 1984 EIR concluded that there would be no significant impacts on ground water quality from the disposal of treated effluent from WWTP No. 3. The Regional Water Quality Control Board (RWQCB) subsequently authorized an initial discharge rate of 6.0 mgd in WDR Order No. 85-103. In its review of the EIR, the RWQCB concurred that there would be no significant impacts on water quality. Then, in 1987 a subsequent EIR evaluated the expansion of WWTP No. 3 from 8 mgd to 16 mgd phased over two 4 mgd increments. The 1987 EIR, although not inclusive of the I-5 Reclamation Site, included a brief discussion regarding the total disposal capacity of 20.0 mgd for the effluent disposal site. The proposed phased expansion project did not alter the type or degree of treatment utilized at the time or the method of effluent disposal. The RWQCB, in WDR No. 88-187, subsequently authorized a 30-day average and peak daily discharge limit for the I-5 Reclamation Site of 14.0 mgd and 20.0 mgd, respectively. In WDR 88-187, the RWQCB and the City of Bakersfield found that the reclamation project as approved by the City would not have a significant effect on water quality. In WDR 5-01-105, the RWQCB found that the City of Bakersfield certified the final environmental impact reports for the WWTP No. 3 expansions in accordance with CEQA. The RWQCB also previously found the expansion projects would not have a significant effect on water quality with mitigating conditions adopted in waste discharge and water reclamation requirements. With the expansion and proposed upgrade and improved treatment of wastewater effluent from WWTP No. 3, the advanced secondary treatment effluent will be of higher quality than the current secondary treatment effluent quality. Consequently, any impacts to groundwater would be less than the previously assessed impacts associated with current practices. Future use of this area including the authorized discharge volume is not anticipated to change from the current practices, therefore, no further environmental analysis is required. The effluent disposal area is included in the Project Description below as a discussion of general background and setting information.

# 2.0 PROJECT DESCRIPTION

1. **Project** *(Title & No.)*: City of Bakersfield Wastewater Treatment Plant #3 Expansion & Upgrade

2. **Lead Agency** *(name and address)*: City of Bakersfield Planning Department
1715 Chester Avenue
Bakersfield, CA 93301

3. **Contact Person** *(name, title, phone)*: Marc Gauthier, Principal Planner
(661) 326 - 3786

4. **Project Location:** 8101 Ashe Road, Bakersfield , CA 93313
Section 33, Township 30 South, Range 27 East.

5. **Applicant** *(name and address)*: City of Bakersfield, Public Works Department
Wastewater Division
8101 Ashe Road, Bakersfield, CA 93313

6. **General Plan Designation:** P: Public Facilities

7. **Zoning:** A: Agriculture

8. **Description of Project:**

The City of Bakersfield, Department of Public Works, Wastewater Division is responsible for providing treatment of all residential, commercial and industrial wastewater within the incorporated Bakersfield metropolitan area. There are enclaves of unincorporated areas located on the periphery of the City, which are served by Special Districts such as the Kern Sanitation Authority and the North of the River Sanitary District. Wastewater Treatment Plant No. 3, which is located in the southwestern sector of the City, was constructed to provide wastewater treatment service to the western half of the City (See Figure 1). A second wastewater treatment plant, Plant No. 2, treats wastewater from the eastern half of the City. The line of demarcation between the two service areas is State Highway 99 (See Figure 2).

The proposed project is the expansion and upgrade of Wastewater Treatment Plant No. 3 due to the rapid development of residential and commercial properties on the west side of the city during the past 5 years and the expected continuation of this high growth for the next ten years or more. The current wastewater flow into Treatment Plant No. 3 is over 15 million gallons per day (mgd). Since the design capacity of Plant No. 3 is 16 mgd, the continued growth of the City will soon push the wastewater flow into Treatment Plant No. 3 to its nominal design treatment capacity. The project is proposed to proceed at this time to avoid overload of the existing treatment plant facilities as planned growth in the service area occurs.

The existing facilities at Wastewater Treatment Plant No. 3 provide primary and secondary treatment of incoming wastewater (See Figure 3). The secondary treated effluent flows via pipeline to the I-5 Reclamation Site where it is used as crop irrigation water and is spread on the farmland (See Figure 2). The wastewater solids, which are extracted from the wastewater using biological and physical processes, are further treated in the anaerobic digesters, spread and dewatered on sludge drying beds, transported to the City's Wastewater Treatment Plant No. 2 farm operation, and spread as fertilizer for non-food crops on the farmland.

The current secondary treatment system consists of the following facilities and processes:

1. Preliminary Treatment

   a. Wastewater passes through bar screens that trap and remove large and non-organic materials. The materials removed during this process are sent to a sanitary landfill. Wastewater then flows into grit chambers where the heaviest materials, such as egg shells, coffee grounds and sand, settle out. The materials removed from the grit chamber are sent to the Mt. Vernon Green Waste Recycling Facility for use in compost.

2. Chemical Addition

   a. Recently, ferric chloride and polymers have been added on a trial basis to the incoming wastewater to enhance solids and BOD removal in the primary system. Polymers will also be added to the wastewater to enhance the primary settling process. Chemical addition has been added to the plant treatment processes to enhance primary sedimentation and increase the plant treatment capacity.

3. Odor Control

   a. Foul air containing hydrogen sulfide and other odiferous compounds are removed through air ducts and forced through a wetted, synthetic media, chamber. The current odor control system does not provide odor control for all treatment facilities and has been only marginally successful in removing odors.

4. Primary Treatment

   a. Next, the wastewater is pumped to primary clarifiers where liquids and solids are separated. The heavier solids settle and are scraped off the bottom, and the lighter material is skimmed off the top of the basins. The materials that are removed are sent to solids processing facilities. As noted, the recent addition of chemical treatment of the raw wastewater at the headworks improves settling of the solids resulting in advanced primary treated wastewater effluent. The partially treated wastewater, which flows over the primary clarifier's weirs, is pumped to secondary treatment facilities.

5. Secondary Treatment

   a. Primary treated wastewater is conveyed to trickling filters. The trickling filter tanks hold plastic media, which facilitate the growth of microorganisms on the surface of the media. The microorganisms consume the remaining suspended and soluble organic solids. The wastewater is then pumped into secondary clarifiers where the sludge settles out. Most of it is scraped off the bottom and returned to the trickling filters to regenerate this process, while the excess is sent to the solids handling facilities for further biological treatment and reduction.

6. Effluent Disposal

   a. The treated effluent is transported via pipeline to an agricultural area identified as the I-5 Reclamation Site. The effluent is then spread over the ground as crop irrigation water.

7. Solids Processing

   a. Solids removed in the primary and secondary treatment processes are pumped into anaerobic digesters where they undergo natural decomposition for 20-25 days. Half the solids convert to a gas mostly made up of methane, which is sent to energy recovery facilities. The remaining solids are pumped to sludge drying beds for dewatering to a 50 percent solid material (with a cake-like consistency) called biosolids. The biosolids are sent to the Plant No. 2 farm for direct land application as a soil amendment.

8. Energy Recovery

   a. The methane gas derived from the digesters is used to power engine-generator units that produce the electricity used as an energy source to operate the treatment plant.

The proposed expansion and upgrade of Wastewater Treatment Plant No. 3 will result in a more sophisticated treatment plant, which will remove over 95% of the primary wastewater constituents of BOD and suspended solids utilizing advanced secondary treatment. The plant processes will be designed to meet the upgraded

Waste Discharge Requirements set by the Central Valley Regional Wastewater Quality Control Board. The upgraded Waste Discharge Requirements are scheduled to go into effect April 2010. In addition, the City plans to build a modular tertiary treatment facility to handle up to 2 million gallons per day for reuse on nearby land applications and onsite Plant wash and make-up water. The tertiary effluent will be treated to meet the State of California Title 22 Recycled Water requirements for non-restricted recreational use. The Title 22 tertiary effluent will meet stringent public health turbidity and disinfection standards. This reclaimed water may be used for irrigation of public and private land, industrial water supply, or any unrestricted recreational use such as boating fishing, and swimming. The conceptual future service area for Wastewater Treatment Plant No. 3 is provided in Figure 5.

The expanded and upgraded treatment plant will contain the following facilities and processes:

1. Influent Conveyance

   a. A portion of the influent will be conveyed to the plant from a lift station located on the northwestern corner of the Plant property. The conveyance lines will be upgraded to handle all wastewater influent coming from the west side of the city. The remainder of the flow comes to the plant via gravity.

2. Preliminary Treatment

   a. Wastewater will flow into a new headworks facility with large influent pumps designed to lift the wastewater through the remaining treatment processes by gravity flow. The raw wastewater will pass through improved bar screens that will trap and remove large and non-organic materials. It will then flow into a vortex grit removal system where the heaviest materials, such as egg shells, coffee grounds and sand, settle out. The materials removed in the preliminary treatment system will be ground up and washed prior to transport to a sanitary landfill.

3. Chemical Addition

   a. Ferric chloride will be added to the incoming wastewater to help reduce hydrogen sulfide and control odors as in the current treatment process. Chemical coagulants will also be added to the wastewater to enhance the primary settling process.

4. Odor Control

   a. Foul air containing hydrogen sulfide will be removed through air ducts and forced through a natural bio-filter bed made up of several forms of synthetic media. Separate odor control facilities will serve the headworks, the primary clarifiers, the trickling filters, and the solids handling facilities.

5. Primary Treatment

   a. Following preliminary treatment, the wastewater flows to primary clarifiers where the liquids and solids are separated. As in the current plant, the heavier solids settle and will be scraped off the bottom, and the lighter material will be skimmed off the top of the basins. The materials that are removed will be sent to solids processing facilities. Adding coagulants to raw wastewater improves settling of the solids resulting in advanced primary treated wastewater effluent. The primary treated effluent will then flow to the secondary treatment facilities.

6. Advanced Secondary Treatment

   a. Primary treated effluent will be conveyed to renovated trickling filters. The trickling filters contain plastic media, which facilitates the growth of microorganisms on the surface of the media. The microorganisms consume most of the soluble organic solids.

   b. The effluent from the trickling filters will be conveyed to rectangular aeration basins where air will be injected into the basins using fine bubble air diffusers, which will be located at the bottom of the basins.

The diffused air and remaining wastewater solids contained in the primary treated effluent will be consumed as food by microorganisms, which are contained in the aeration basins. This process is called activated sludge. The activated sludge will be followed by both anoxic and aerobic treatment zones to provide removal of both BOD and nitrogen from the wastewater stream.

c. The aerated effluent flows over the weirs to the secondary clarifiers where the activated sludge settles out. Most of it is scraped off the bottom and returned to the aeration basins to regenerate this process, while the excess is sent to solids processing.

7. Tertiary Filters

   a. Up to 2 mgd of secondary effluent from the secondary clarifiers will flow to dual media filters that filter the water for removal of fine particulate matter. Next, the filtered water will be disinfected using sodium hypochlorite or ultraviolet radiation.

8. Solids Processing

   a. Solids removed in the primary and secondary treatment processes are pumped into anaerobic digesters where they undergo natural decomposition for 20-25 days. While in the digesters, the methane gas is maintained at low pressure of less than 12 inches of water column. Half the solids convert to a gas mostly made up of methane, which is sent to on site energy recovery facilities. The remaining solids are pumped to dewatering facilities to achieve a 25 percent solid material (with a cake-like consistency) called biosolids. The biosolids are transported for direct land application as a soil amendment at the Plant No. 2 farm.

9. Energy Recovery

   a. The methane gas derived from the digesters is used to power engine-generator units that produce the electricity used as the primary energy source to operate the treatment plant. Depending on the engine-generator manufacturer, the methane gas may need to be stored in a pressurized tank. If required, storage would take place in an above-ground steel vessel at a pressure of 55 to 60 psi. Any remaining methane gas that is not used by the engine-generators would be burned in a waste gas flare approved by the San Joaquin Valley APCD.

10. Water Recycling and Reuse

   a. Tertiary treated wastewater will be conveyed to a storage basin where the water will be retained for use as recycled water for various nearby land applications.

11. Effluent Disposal

   a. Treated effluent is transported to an agricultural area called I-5 Reclamation Site. Up to fourteen (14) mgd of treated effluent will be spread over the ground as crop irrigation water.

   b. Remaining advanced secondary treated effluent, 16 mgd up to 18 mgd, will be piped to ponds onsite for seepage into the ground by percolation. The design percolation rate for the effluent is 3 inches per day, requiring the conversion of the existing storage ponds into percolation ponds and the construction of approximately 180 acres of additional ponds (See Figure 4). Soils studies to confirm the proposed design percolation rates and sizes of the new ponds are currently underway. The results should be available by May 2006.

   c. As noted, up to two (2) mgd of advanced secondary treated wastewater will be sent to the tertiary facility for further treatment and highly treated effluent will be used for landscape irrigation water.

12. Solids Disposal

a. The dewatered sludge will be trucked to City owned farmland at Wastewater Treatment Plant No. 2 and spread on the ground for use as a fertilizer for non-food corps. The proposed method of sludge disposal is the same as the current sludge disposal process. In addition, solids collected in bar screens will continue to be sent to a sanitary landfill and grit from the grit chambers will continue to be transported to the Mt Vernon Recycling Facility for composting.

b. The treated and dewatered sludge will be categorized as Class B sludge.

c. The City owned farmland is located within 10 miles of Plant No. 3.

In addition to the upgraded, renovated, and expanded wastewater treatment facilities, the project will include the following:

a. A new operations, administration, and regional laboratory building to be located adjacent to McCutchen Road, which will be improved from a dirt road to a new major arterial roadway per City standards.

b. A new shop and equipment maintenance building will be constructed to replace the existing facilities.

c. The existing operations building will be renovated to accommodate the Plant maintenance staff.

d. The southern half of the new major arterial roadway, McCutchen Road, will be constructed as part of the project.

e. Upgraded paved interior roadways to provide improved circulation will be developed for use by the Plant operations and maintenance staff.

f. Acceleration and deceleration lanes may be constructed as necessary in the future to provide safety for ingress and egress to and from the Plant for the sludge hauling trucks and other major vehicles accessing the Plant, although, such improvements will not be undertaken until traffic volumes increase that such mitigations are needed.

g. Landscaping will be incorporated into the project to provide visual screening and mask the Treatment Plant from the future anticipated commercial and residential areas, which will be constructed adjacent to the Plant on McCutchen Road, Ashe Road and Gosford Road.

h. Four new emergency back up generators approved by the San Joaquin Valley APCD will be installed to provide electrical power to the treatment plant during power outages.

9. **Environmental Setting:**

The Project site, approximately 350 acres, is currently used for wastewater treatment purposes (See Figure 4). The General Plan Land Use designation is P (Public Facilities) and its zoning is A (Agriculture). Currently, the majority of the surrounding land consists of agricultural land uses, but a mixture of residential, commercial, and industrial uses have been approved by the Bakersfield City Council and upon LAFCO approval of their annexation into the City of Bakersfield, agricultural uses will likely cease. Oil production sites are located approximately two miles to the west of the project site. Two industrial sites are located immediately to the west along McCutchen Road. The Union Pacific/Sunset Railroad run parallel to Progress Road intersecting with McCutchen Road approximately one half mile to the west of the project site.

## TABLE 1

### PROJECT SITE AND SURROUNDING LAND USES

| Direction | Existing Land Use* |
|---|---|
| Project Site | Sewage Treatment |
| North | Current Agriculture- Proposed Residential Uses |
| East | Current Agriculture- Proposed Commercial and Residential Uses |
| West | Current Agriculture- Proposed Residential, Commercial, Agricultural, and Industrial Uses |
| South | Rural Residential and Agricultural Uses |

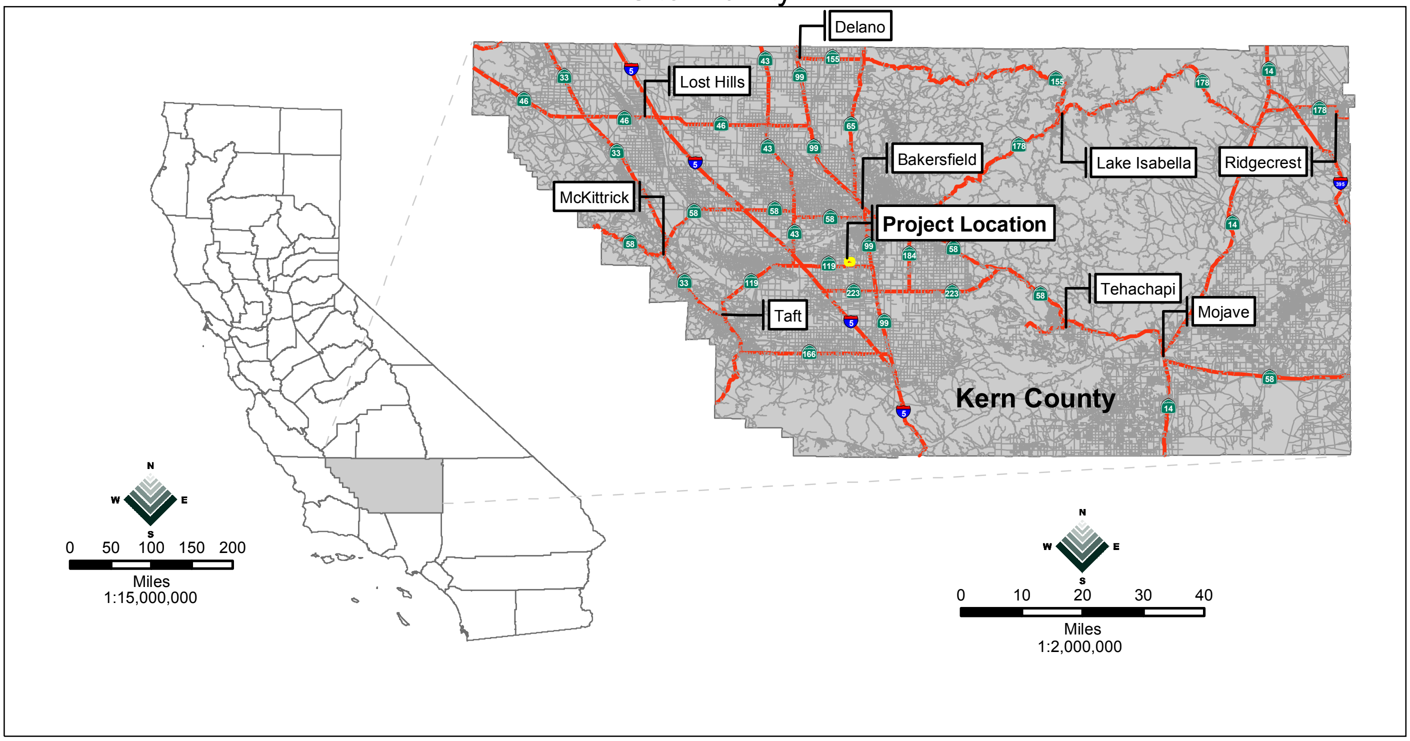
*proposed uses have been approved by the City of Bakersfield City Council and have completed or are awaiting LAFCO annexation approval. Upon LAFCO approval, the projects will be fully approved General Plan Amendments and Zone Changes.

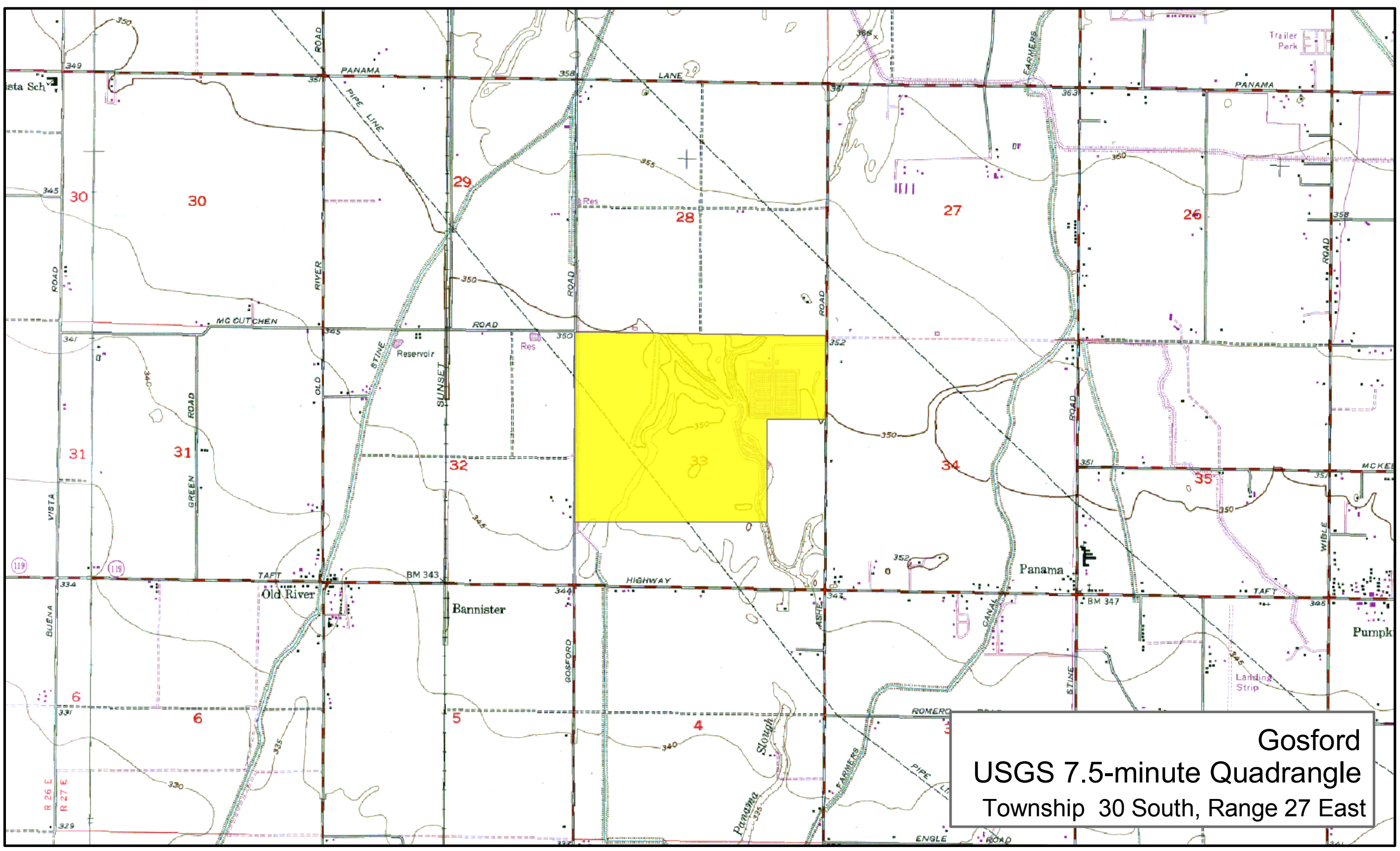
10. **Other public agencies whose approval is anticipated to be required**

- Central Valley Regional Water Quality Control Board, Waste Discharge Requirements
- San Joaquin Valley Air Pollution Control District, Authorities to Construct and Permits to Operate

# WWTP No. 3 - Expansion & Upgrade

Site Vicinity




0 2,500 5,000

Feet

1:48,000

Project Area

Quad Knopf

Figure 1

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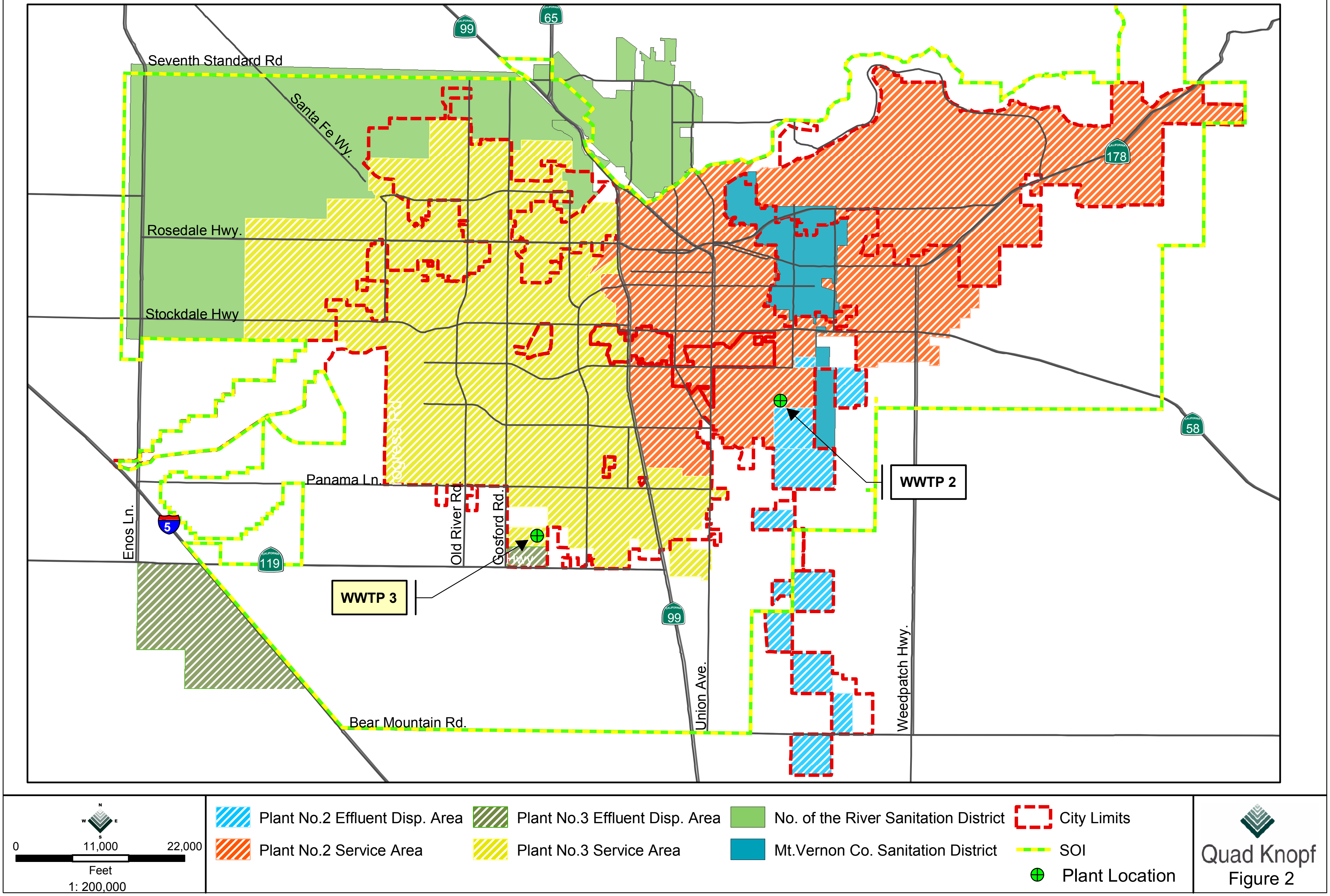
# WWTP No. 3 - Expansion & Upgrade

## Plant No. 2 And Plant No. 3 Sewer Service Area




Quad Knopf

Figure 2

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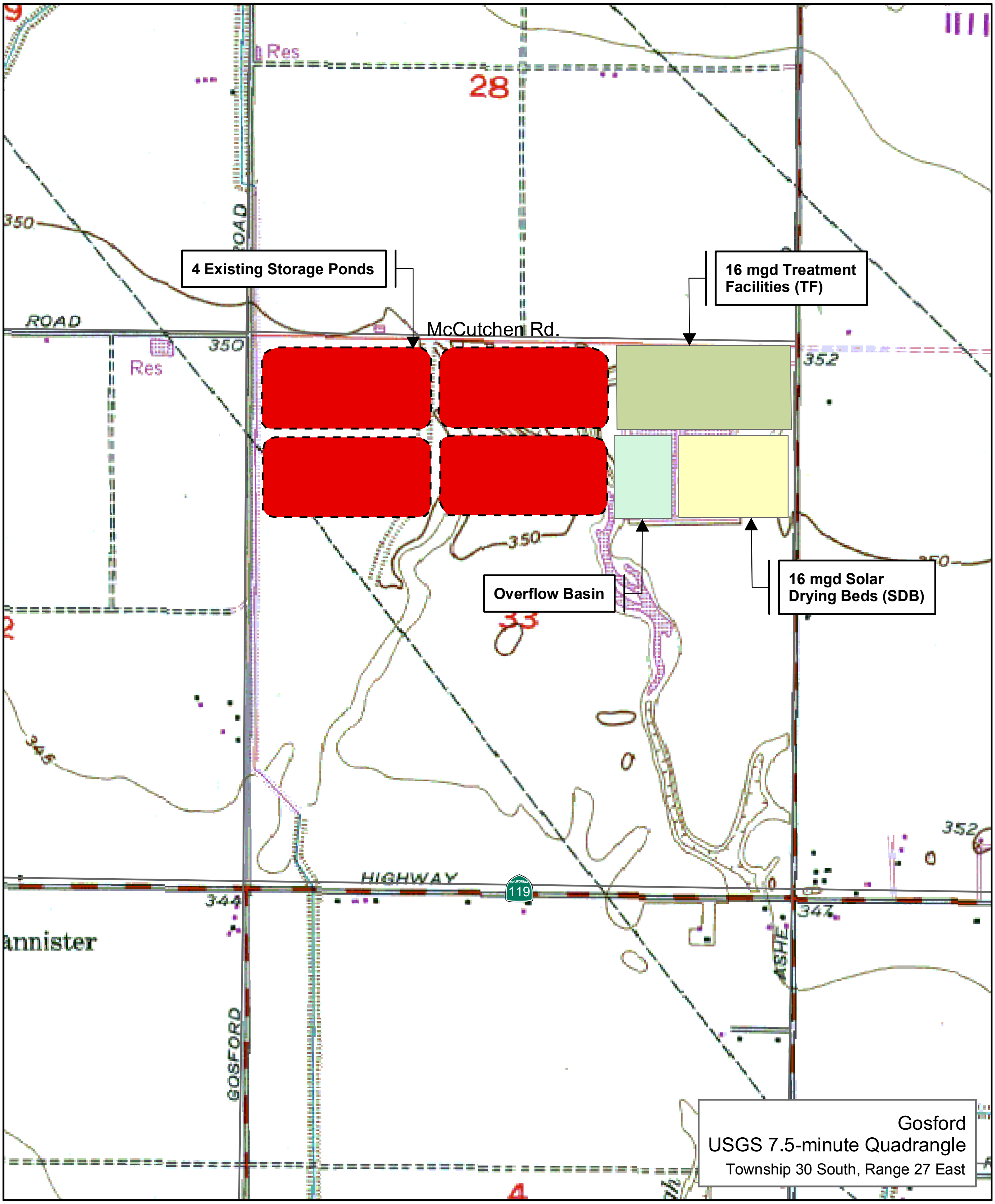
# WWTP No. 3 - Expansion & Upgrade

Existing 16 mgd WWTP No. 3 Project Area




0 450 900 1,800

Feet

1:16,000

| | |
|---|---|
| 4 Storage Ponds | 16 mgd SDB |
| 16 mgd TF | Overflow Basin |

Quad Knopf

Figure 3

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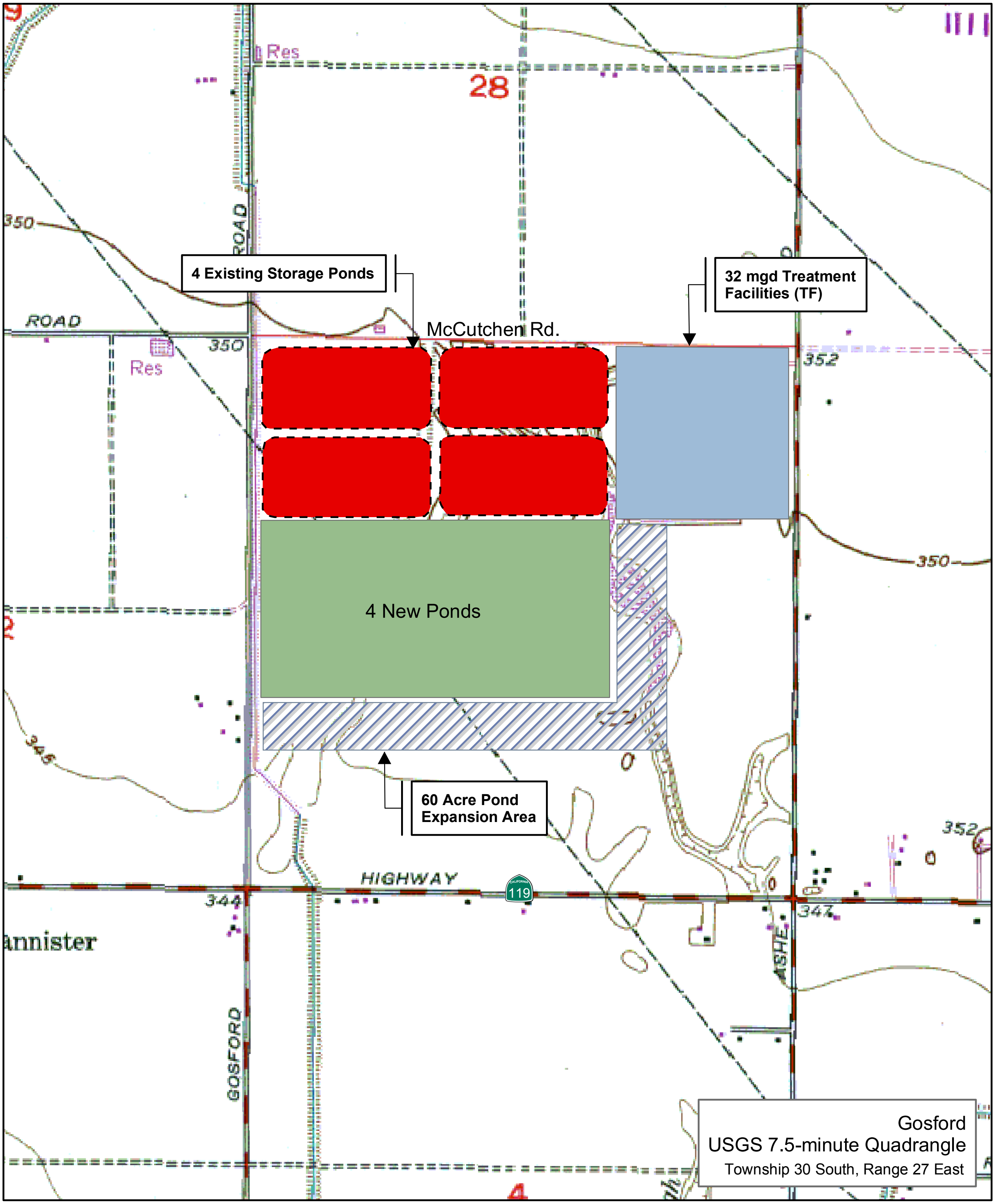
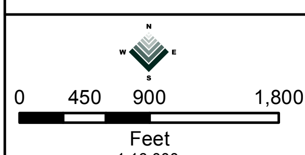
# WWTP No. 3 - Expansion & Upgrade

Proposed 32 mgd WWTP No. 3 Project Area




| | | | |
|---|---|---|---|
| | 4 Storage Ponds | | 4 New Ponds |
| | 32 mgd Treatment Facilities | | 60 Acre Pond Expansion Area |

Quad Knopf

Figure 4

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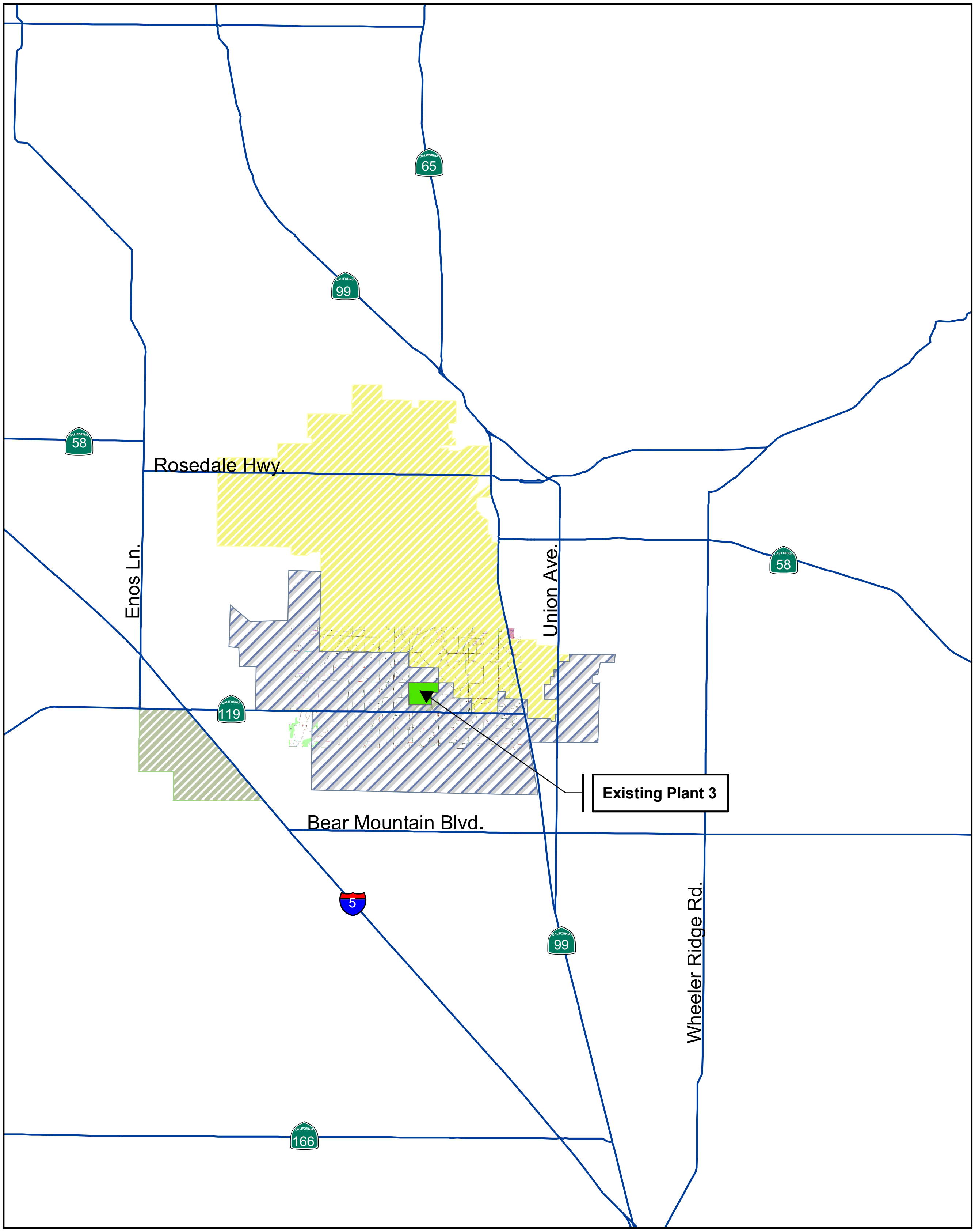
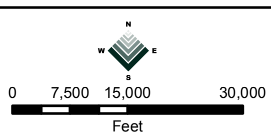
# WWTP No. 3 - Expansion & Upgrade

Future Plant No.3 Service Area




Plant No. 3 Service Area

Future Plant No. 3 Service Area

Plant No. 3 Effluent Disp. Area

Project Area

Quad Knopf

Figure 5

050257

# 3.0 INITIAL STUDY CHECKLIST

## 3.1 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages:

| | | |
|---|---|---|
| ☐ Aesthetics | ☐ Agricultural Resources | ☒ Air Quality |
| ☒ Biological Resources | ☒ Cultural Resources | ☒ Geology / Soils |
| ☒ Hazards & Hazardous Materials | ☒ Hydrology / Water Quality | ☐ Land Use / Planning |
| ☐ Mineral Resources | ☐ Noise | ☒ Population / Housing |
| ☐ Public Services | ☐ Recreation | ☒ Transportation / Traffic |
| ☐ Utilities / Service Systems | ☒ Mandatory Findings of Significance | |

## 3.2 ENVIRONMENTAL DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project **could** not have a significant effect on the environment, and a **negative declaration** will be prepared.

☐ I find that although the proposed project **could** have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **mitigated negative declaration** will be prepared.

☒ I find that the proposed project **may** have a significant effect on the environment, and an **environmental impact report** is required.

☐ I find that the proposed project **may** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect has been (1) adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) addressed by mitigation measures based on the earlier analysis as described on the attached sheets. An **environmental impact report** is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project **could** have a significant effect on the environment, because all potentially significant effects have been (1) analyzed adequately in an earlier **environmental impact report or negative declaration** pursuant to applicable legal standards, and (2) avoided or mitigated pursuant to that earlier **environmental impact report or negative declaration**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Marc Gauthier
*Signature*

March 30, 2006
*Date*

Marc Gauthier/Principal Planner
*Printed name*

## 3.3 EVALUATION OF ENVIRONMENTAL IMPACTS:

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

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

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

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

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

    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c) Mitigation Measures. For effects that are “Less than Significant with Mitigation Measures Incorporated,” describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

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

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

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

9) The explanation of each issue should identify:
    a) The significance criteria or threshold, if any, used to evaluate each question; and
    b) The mitigation measure identified, if any, to reduce the impact to less than significant.

| Environmental Issue | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **1. AESTHETICS:** Would the project; | | | | |
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☐ | ☒ |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcrops, and historic buildings within a state scenic highway? | ☐ | ☐ | ☐ | ☒ |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings? | ☐ | ☐ | ☒ | ☐ |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☒ | ☐ | ☐ |
| **2. AGRICULTURE RESOURCES:** | | | | |
| In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project; | | | | |
| a) Convert prime farmland, unique farmland, or farmland of statewide importance (farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☒ |
| c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use? | ☐ | ☐ | ☒ | ☐ |
| **3. AIR QUALITY:** | | | | |
| Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project; | | | | |
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☒ | ☐ | ☐ | ☐ |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? | ☒ | ☐ | ☐ | ☐ |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | ☒ | ☐ | ☐ | ☐ |
| d) Expose sensitive receptors to substantial pollutant concentrations? | ☒ | ☐ | ☐ | ☐ |
| e) Create objectionable odors affecting a substantial number of people? | ☒ | ☐ | ☐ | ☐ |
| **4. BIOLOGICAL RESOURCES:** Would the project; | | | | |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | ☒ | ☐ | ☐ | ☐ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service? | ☐ | ☐ | ☒ | ☐ |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☒ | ☐ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with an established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☒ | ☐ | ☐ | ☐ |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☒ | ☐ |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☒ | ☐ |
| **5 CULTURAL RESOURCES:** Would the project; | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? | ☒ | ☐ | ☐ | ☐ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ☒ | ☐ | ☐ | ☐ |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ☒ | ☐ |
| d) Disturb any human remains, including those interred outside of formal cemeteries? | ☒ | ☐ | ☐ | ☐ |

| Environmental Issue | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **<u>6. GEOLOGY AND SOILS</u>:** Would the project; | | | | |
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (refer to Division of Mines & Geology Special Publication No.42) | ☐ | ☐ | ☒ | ☐ |
| ii. Strong seismic ground shaking? | ☐ | ☐ | ☒ | ☐ |
| iii. Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☒ | ☐ |
| iv. Landslides? | ☐ | ☐ | ☒ | ☐ |
| b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☒ | ☐ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☒ | ☐ |
| d) Be located on expansive soil, as defined in the city's most recently adopted Uniform Building Code, creating substantial risks to life or property? | ☐ | ☐ | ☒ | ☐ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | ☐ | ☐ | ☒ | ☐ |
| **<u>7. HAZARDS AND HAZARDOUS MATERIALS</u>:** Would the project; | | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☒ | ☐ | ☐ | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous material into the environment? | ☐ | ☒ | ☐ | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☒ | ☐ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☐ | ☒ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☐ | ☐ | ☒ |
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☐ | ☐ | ☒ |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☒ | ☐ |
| h) Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are intermixed with wild lands? | ☐ | ☐ | ☐ | ☒ |
| **<u>8. HYDROLOGY AND WATER QUALITY</u>:** Would the project; | | | | |
| a) Violate any water quality standards or waste discharge requirements? | ☒ | ☐ | ☐ | ☐ |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? | ☒ | ☐ | ☐ | ☐ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | ☐ | ☐ | ☐ | ☒ |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | ☐ | ☐ | ☐ | ☒ |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff? | ☐ | ☒ | ☐ | ☐ |
| f) Otherwise, substantially degrade water quality? | ☒ | ☐ | ☐ | ☐ |
| g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | ☐ | ☐ | ☐ | ☒ |
| h) Place within a 100-year flood hazard area, structures which would impede or redirect flood flows? | ☐ | ☐ | ☐ | ☒ |
| i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ☒ |
| j) Inundation by seiche, tsunami, or mud flow? | ☐ | ☐ | ☐ | ☒ |

| Environmental Issue | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **9. LAND USE AND PLANNING:** Would the project; | | | | |
| a) Physically divide an established community? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☐ | ☒ |
| c) Conflict with any applicable habitat conservation plan or natural community conservation plan? | ☐ | ☐ | ☒ | ☐ |
| **10. MINERAL RESOURCES:** Would the project; | | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☒ | ☐ |
| b) Result in the loss of availability of a locally-important mineral resource recovery site that is delineated in a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☒ | ☐ |
| **11. NOISE:** Would the project result in; | | | | |
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☒ | ☐ | ☐ |
| b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels? | ☐ | ☐ | ☒ | ☐ |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☒ | ☐ | ☐ |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☒ | ☐ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |
| **12. POPULATION AND HOUSING:** Would the project; | | | | |
| a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes & businesses) or indirectly (e.g., through extension of roads or other infrastructure)? | ☒ | ☐ | ☐ | ☐ |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| **13. PUBLIC SERVICES:** | | | | |
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services; | | | | |
| i. Fire protection? | ☐ | ☐ | ☐ | ☒ |
| ii. Police protection? | ☐ | ☐ | ☒ | ☐ |
| iii. Schools? | ☐ | ☐ | ☐ | ☒ |
| iv. Parks? | ☐ | ☐ | ☐ | ☒ |
| v. Other public facilities? | ☐ | ☐ | ☐ | ☒ |
| **14. RECREATION:** Would the project: | | | | |
| a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | ☒ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ☒ |

| Environmental Issue | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **<u>15. TRANSPORTATION/TRAFFIC</u>:** Would the project; | | | | |
| a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)? | ☒ | ☐ | ☐ | ☐ |
| b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways? | ☒ | ☐ | ☐ | ☐ |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? | ☐ | ☐ | ☐ | ☒ |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☒ | ☐ | ☐ | ☐ |
| e) Result in inadequate emergency access? | ☐ | ☐ | ☒ | ☐ |
| f) Result in inadequate parking capacity? | ☐ | ☐ | ☒ | ☐ |
| g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)? | ☐ | ☐ | ☒ | ☐ |
| **<u>16. UTILITIES AND SERVICE SYSTEMS</u>:** Would the project; | | | | |
| a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? | ☐ | ☐ | ☒ | ☐ |
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☐ | ☒ |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? | ☐ | ☐ | ☒ | ☐ |
| e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☐ | ☒ |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | ☐ | ☐ | ☒ | ☐ |
| g) Comply with federal, state, and local statutes and regulations related to solid waste? | ☐ | ☐ | ☒ | ☐ |
| **<u>17. MANDATORY FINDINGS OF SIGNIFICANCE</u>:** | | | | |
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☒ | ☐ | ☐ | ☐ |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | ☒ | ☐ | ☐ | ☐ |
| c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☒ | ☐ | ☐ | ☐ |

# 4.0 ENVIRONMENTAL ANALYSIS

## 4.1 AESTHETICS

a. **No Impact.** The project site is located within an area having slopes from 0 - 5 %. The area is comprised of the existing 16 mgd treatment plant facilities and vacant land, and is bordered by current agricultural land uses, which are slated for residential/commercial development in the near future. The area is not regarded or designated within the Metropolitan Bakersfield Plan as visually important or "scenic". Furthermore, development of the project would not block or preclude views to any area containing important or what would be considered visually appealing landforms. Therefore, no scenic vistas will be impacted by construction of this project.

b. **No Impact**. The project does not include the removal of trees, the destruction of rock outcroppings or degradation of any historic building. The project is not adjacent to or near any state highway which is designated as or eligible to be listed as "scenic" on the California Department of Transportation (Caltrans) State Scenic Highway Program (Caltrans, 2005, January 28).

c. **Less Than Significant Impact**. Landscaping will be incorporated into the project to provide visual screening of the Treatment Plant from the future anticipated commercial and residential development. Such landscaping will be constructed adjacent to the plant on McCutchen Road, Ashe Road and Gosford Road to alleviate any impacts associated with degradation of existing visual character or quality of the site and its surroundings.

d. **Less Than Significant Impact With Mitigation Incorporation**. Light from this project will not substantially affect views in this area either at night or in the daytime as the light generated is typical of urban development, and will likely include less light and glare than that associated with residential subdivision standards. Furthermore, development standards, as required by the City's zoning ordinance, will require shielded lighting to avoid direction off the project site to adjacent areas. This issue will be discussed in the Environmental Impact Report

## 4.2 AGRICULTURE RESOURCES

a. **Less Than Significant Impact**. According to the Metropolitan Bakersfield General Plan (2002), the project site is designated as Prime Agricultural Farmland, although, all agricultural production on the property ceased in 2002 when the City terminated the discharge of American Yeast Company waste water. The land has remained fallow since. Further, the project site was excluded from Agricultural Preserve Number 10 and has been designated for public use for many years. Therefore, it has never been considered by the City as prime farmland to be kept in perpetuity. Moreover, the project site per its CUP (which amended the General Plan) has a land use designation of Public Facilities which under the City of Bakersfield General Plan is considered an urban use. Therefore, the project site is considered an area designated for urban rather than agricultural use, and is not required to undergo any agricultural land conversion studies.

   In addition, agricultural impacts to "Prime Farmland" were considered significant in the MBGP EIR (2002), which included the project site, and a Statement of Overriding Considerations adopted by the City Council (Resolution 222-02). Therefore, any such impacts associated with agricultural impacts on the project site have already been addressed in a previous environmental document, and no further environmental analysis is required.

b. **No Impact**. The subject site has a land use designation of Public Facilities, a Zoning designation of agriculture and contains the current treatment plant and vacant land. The subject site is not in Williamson Act. The City of Bakersfield currently has a Conditional Use Permit (CUP) to operate the Wastewater Treatment Plant. The expansion of the plant will remain in compliance with its CUP. Therefore, the project will not conflict with its zoning nor any Williamson Act contracts.

c. **Less Than Significant Impact**. The project area has historically been a wastewater treatment plant and was considered as such during the completion of the MBGP in 2002. There are no special attributes of this project site, related to location or nature that will cause or could result in the conversion of farmland to non-agricultural use. Further, the current wastewater treatment plant once located far from development is now surrounded by City Council approved General Plan Amendment/Zone Change, and Annexation projects which will allow the development of residential, commercial, and industrial uses in the project's immediate vicinity. These projects have already undergone environmental review and the environmental impacts, which include agricultural land conversion, have been adequately addressed. Upon LAFCO approval of the annexation of these properties into the City, the Treatment Plant will be required to serve these projects. In addition, future development projects will also undergo independent environmental reviews to assess their impacts, including agricultural land conversion pursuant to General Plan Policies. Therefore, the Treatment Plant expansion is a logical extension of existing urban development and will therefore not be the cause of or involve other changes in the existing environment which could result in conversion of farmland to non-agricultural uses.

## 4.3. AIR QUALITY

a. **Potentially Significant Impact**. The San Joaquin Valley Air Pollution Control District (SJVAPCD) encourages local jurisdictions to design all developments in ways that reduce air pollution. This project is subject to the full range of local ordinances, and SJVAPCD regulations which ensure compliance with air quality strategies and plans. Although such safeguards are in place, impacts may still occur. Any such impacts will be discussed in the project's Environmental Impact Report.

b. **Potentially Significant Impact**. See response to 4.3.a.

c. **Potentially Significant Impact**. See response to 4.3.a

d. **Potentially Significant Impact**. Sensitive receptors include schools, residences, daycare centers, medical facilities, recreational facilities, and other facilities that tend to house or provide services for young children, elderly people, or people with existing respiratory health problems. Construction activities associated with the project in addition to possible operational emissions have the potential to emit substantial pollutant concentrations. No such sensitive receptors are currently located in the immediate project area, but due to the project's location near future residential and commercial development, the project could have significant impacts and will be further discussed and examined in the project's Environmental Impact Report.

e. **Potentially Significant Impact**. The nature of a wastewater treatment plant lends itself to objectionable odors. Although the project will meet all requirements and mitigations regarding the suppression of objectionable odors and will include enhanced odor control design measures such as synthetic media chambers, there is a possibility of objectionable odors affecting a substantial number of people within the surrounding approved and proposed residential areas. Therefore, the impact is considered potentially significant and will be further reviewed in the project's Environmental Impact Report.

## 4.4 BIOLOGICAL RESOURCES

a. **Potentially Significant Impact**. The proposed project site could be the potential habitat for Species of Concern in the Metropolitan Bakersfield area (listed as Federally endangered and as threatened by the State). Further analysis is required and any potentially significant impact(s) will be fully analyzed and discussed in the EIR.

   The project is subject to the terms of the Metropolitan Bakersfield Habitat Conservation Plan and associated Section 10(a)(1)(b) and Section 2081 permits issued to the City of Bakersfield by the United States Fish and Wildlife Service and California Department of Fish and Game, respectively, and Incidental Take Permit PRT-786634 and associated Implementation/Management Agreement by and among the United States Fish and Wildlife Service, California Department of Fish and Game, City of Bakersfield and County of Kern. Terms of these permits require applicants for all development projects within the plan area to pay habitat mitigation fees, excavate known kit fox dens, and notify agencies prior to grading in areas of known dens.

b. **Less Than Significant Impact.** This project is not located within or adjacent to the Kern River riparian habitat area, but is within the Metropolitan Bakersfield Habitat Conservation Plan (HCP) area. This plan, in agreement with the California Department of Fish and Game and the United States Fish and Wildlife Service, includes ordinance requirements for all development projects in the HCP area. Impacts would be less than significant.

c. **Less Than Significant Impact.** There are no wetlands adjacent to or near the project site and no federally protected wetlands occur on-site. However, the Branch 2 Canal runs along the western boundary (Gosford Road) of the project area. This section of the Canal is piped and no impacts are expected. However, the National Wetlands Inventory (NWI) Map for the Gosford USGS 7.5-Minute Quadrangle identifies four areas located within the 16 mgd Wastewater Treatment Plant No. 3 area, Section 33, Township 30 South, Range 27 East. One is classified as palustrine unconsolidated bottom artificially flooded excavated (PUBKx), which corresponds to the location of the 4 existing storage ponds. The second area is also classified as PUBKx and corresponds to the location of the existing sludge solar drying beds. The third area is classified as palustrine unconsolidated shore artificially flooded excavated (PUSKx) and corresponds to the historic Panama Slough channel that traversed the eastern half of Section 33. No evidence of the historical channel remains. The existing 16 mgd facilities and non food agricultural crop production altered this area, and this topographic feature has been eliminated. The fourth area, also classified as PUBKx is related to the prior discharge of the American Yeast Company (AYC). From 1983 to 2002, the AYC discharged wastewater effluent for non-food crop production to an approximately 400-acre area, located south of the four existing storage ponds. With the cessation of the effluent discharge and elimination of agricultural production, the two conditions which were the cause of this area, have been removed. Based on the above information, no wetlands meeting the United States Army Corps of Engineers (USACE) 1987 criteria exists on-site; therefore, impacts to federally protected wetlands will be less than significant.

d. **Potentially Significant Impact.** The project is not within the Kern River flood plain (noted as a wildlife corridor in the Metropolitan Bakersfield Habitat Conservation Plan), or along a canal which has been identified by the United States Fish and Wildlife Service as a corridor for native resident wildlife species. However, a portion of the project area consists of vacant land that could be used by migratory bird species, and the project site has the potential to be used by the San Joaquin Kit fox, which is listed as a Federally Endangered species. A biological resources evaluation will be prepared for the project, which will include an evaluation of the site's potential to provide habitat for migrating or nesting birds, native resident or wildlife nursery sites. Any identified impacts will be fully evaluated in the EIR.

e. **Less Than Significant Impact**. The Metropolitan Bakersfield Habitat Conservation Plan (County of Kern 1994) has been adopted as a policy tool to implement the MBHCP through collection of a development impact fee (City of Bakersfield and County of Kern 2002) and also is implemented by Ordinance 15.78.020 of the City of Bakersfield Municipal Code (City of Bakersfield 2002). The plan addresses biological impacts within the Metropolitan Bakersfield General Plan Area. The MBHCP does not eliminate the need to consider endangered species under CEQA, but has established programmatic mitigation for project impacts on such species. The project will pay the appropriate fee specified by the MBHCP. The proposed project will be required to comply with this plan and, therefore, will not be in conflict with either local biological policy or ordinance. Less than significant impacts are identified.

f. **Less Than Significant Impact.** As discussed above, the project is subject to terms of the MBHCP along with Section 10 (a)(1)(b) and Section 2081 permits issued to the City by the U.S. Fish and Wildlife Service and California State Department of Fish and Game (County of Kern 1994). The MBHCP is a joint program of the City of Bakersfield and Kern County that was undertaken to assist urban development applicants in complying with State and federal endangered species laws. Terms of the MBHCP require all applicants for all development projects within the plan area to pay habitat mitigation fees and notify agencies prior to grading. The proposed project will comply with the MBHCP. As such, impacts would be less than significant.

## 4.5. CULTURAL RESOURCES

a. **Potentially Significant Impact**. There are several structures located on-site related to the wastewater treatment plant operations. None of the buildings or structures are older than fifty years of age and are therefore ineligible for historical status. Nonetheless, there still remains the potential for historical resources to remain on site or within the immediate vicinity. Therefore, a study to determine the extent of any potential historical resources located on-site will be completed, and the study's findings reported and discussed in the project's Environmental Impact Report.

b. **Potentially Significant Impact**. A records search and on-site survey will be conducted to determine if any archaeological sites have been inventoried or identified on the site. Results and discussion of this study will be included in the project's Environmental Impact Report.

c. **Less Than Significant Impact**. The project site is not located in or near the Shark Tooth Mountain bone bed, which is the only unique paleontological resource identified in the Metropolitan Bakersfield area. In addition, topography of the site is relatively flat and therefore, construction of the project will not destroy any unique geologic structures because excavation is not expected to incorporate deep cuts within a sensitive paleontological area. Moreover, the MBGP EIR indicated that the Metropolitan Bakersfield area, including the project site, are immediately underlain by sediments and rocks of quaternary age. Geologic records for Metropolitan Bakersfield indicate that the area is underlain by recent alluvial deposits at all depths that are likely to be reached by excavations associated with development. The MBGP EIR indicated that these alluvial deposits appear to be too young to contain significant fossil remains. Therefore, the proposed project is not expected to impact paleontological or unique geologic resources.

d. **Potentially Significant Impact**. There are no known formal cemeteries in the project vicinity. A cultural resources assessment will be prepared to determine if any remains are interred outside of formal cemeteries. Results and discussion of this assessment will be included in the project's Environmental Impact Report.

## 4.6 GEOLOGY AND SOILS

a.i. **Less Than Significant Impact**. Bakersfield and the San Joaquin Valley are within a seismically active area. According to the Metropolitan Bakersfield General Plan, which uses the Alquist-Priolo Earthquake Fault Zoning map as its base, major active fault systems border the southern portion of the San Joaquin Valley. Among these major active fault systems are the San Andreas, Breckenridge-Kern County, Garlock, Pond Poso, and White Wolf faults. There are numerous additional smaller faults suspected to occur within the Bakersfield area which may or may not be active. The active faults have a maximum credible Richter magnitude that ranges from 6.0 (Breckenridge -Kern Canyon) to 8.3 (San Andreas). Potential seismic hazards in the planning area involve strong ground shaking, fault rupture, liquefaction, and landslides.

Future structures proposed on the project site are required by state law and City ordinance to be constructed in accordance with the Uniform Building Code (UBC)(seismic zone 4), which has the most stringent seismic construction requirements in the United States), and to adhere to all modern earthquake construction standards, including those relating to soil characteristics. This will ensure that all seismically related hazards remain less than significant.

a.ii. **Less Than Significant Impact**. See answer to 4.6.a.i.

a.iii. **Less Than Significant Impact**. Liquefaction potential is a combination of unconsolidated soil type, high ground water, and high potential seismic activity. According to the MBGP (2002), areas of high ground water are not present in the southwest portion of Metropolitan Bakersfield. Therefore, this project site does not demonstrate all three attributes necessary to have a significant liquefaction potential. See also the answer to 4.6.a.i. and 4.6.b.

a.iv. **Less Than Significant Impact**. Because of the relatively flat topography of the project site, landslides are not considered to be a potentially significant geologic hazard.

b. **Less Than Significant Impact**. The soil types prevalent on the proposed site are listed in the California Soil Resource Lab Online Soil Survey. Based on this soil survey, the project site includes four different soil types; Kimberlina Fine Sandy Loam, Cajon Sandy Loam, Pits and Dumps, and Water. Two of these classifications define non-usable soils. The characteristics of these soil types are as follows:

**TABLE 2**

**SOIL CHARACTERISTICS**

| Soil Type | Characteristics |
|---|---|
| Kimberlina Fine Sandy Loam | Saline-Alkali, 0 to 2 percent slopes, Farmland of statewide importance, available water storage of 5 cm, maximum flood frequency-rare, well drained, Not hydric |
| Cajon Sandy Loam | Overblown, 1 to 2 percent slopes, Prime Farmland if irrigated, available water storage of 8.75 cm, Maximum flood frequency-rare, Somewhat excessively drained, Not hydric. |
| Pits and Dumps | Not Prime Farmland, available water storage of 0cm, Maximum flood Frequency-rare, and Not hydric |
| Water | Not Prime Farmland, available water storage of 0cm, Not hydric |

*Source: California Soil Resource, UC Davis, 2006*

The majority of the soil on the Project site is classified as belonging to the Kimberlina fine sandy loam and the Cajon Sandy Loam. Both soils are well drained, alluvial fan deposits. Due to these characteristics and the relatively flat terrain, implementation of the project will not result in significant erosion, displacement of soils, soil expansion problems, or limit the use of septic systems, although, clearing and grading for construction may expose soils to short-term wind and water erosion. Implementation of erosion control measures as required by the City, adherence to all requirements set forth in the National Pollutant Discharge Elimination System (NPDES) permit for construction activities, adherence to applicable building codes in accordance with the Uniform Building Code as well as City ordinances and standards should reduce any impacts to less than significant levels.

c. **Less Than Significant Impact**. See answers to 4.6.a.i, 4.6.a.ii, and 4.6.b. In addition, the Seismic Hazard Atlas Maps of Kern County (KernCOG) do not indicate that the project area is subject to subsidence, liquefaction or other unique geological hazards.

d. **Less Than Significant Impact**. According to the Metropolitan Bakersfield General Plan EIR (2002)(p.4.7-27) the Metropolitan Bakersfield area is not known to be comprised of soils with a high potential for soil expansion. Compliance with the policies of the General Plan, City and County Development Codes, and the UBC would reduce potential impacts to less than significant levels. See also answer to 4.6.b.

e. **Less Than Significant Impact**. The project site does not include the creation of septic tanks.

## 4.7 HAZARDS AND HAZARDOUS MATERIALS

a. **Potentially Significant Impact.** As explained in the project description, the proposed project is an expansion and upgrade of the City of Bakersfield's Wastewater Treatment Plant No. 3 The current facilities provide a treatment capacity of 16 mgd. The expanded and upgraded treatment plant will provide liquid stream and solid stream treatment capability for an average daily flow capacity of 32 mgd. Most of the year, up to 14 mgd of the advanced secondary treated effluent will be transported to the I-5 Reclamation Site through a 42-inch outfall line and spread over the ground as crop irrigation water, which is the current practice. During periods of wet weather, Plant 3 will temporarily store any excess effluent, not accepted by the I-5 Reclamation Site, in on-site ponds as is the current practice. The remaining 16-18 mgd of advanced secondary treated effluent will be held in storage ponds on-site and percolated on-site.

Up to 2 mgd of secondary treated wastewater will be sent to the tertiary facility for further treatment and highly treated effluent will be used for landscape irrigation water. Dewatered sludge will be transported in trucks to the City-owned farm associated with Wastewater Treatment Plant No. 2, where it will be spread as fertilizer for non-food crops on the farmland, as is the current practice. The treated and dewatered sludge will be categorized as Class B sludge.

Operation of the wastewater treatment plant does not generally require the use or storage of any acutely hazardous materials. Therefore, the risk of accidental explosion or release of a substantial volume of hazardous substances is very unlikely. Additionally, the project will be constructed and operated with strict adherence to all emergency response plan requirements set forth by the City and Kern County. However, hazardous substances typically used for construction such as the proposed project (e.g. paints, solvents, and cleaners) would be transported and used on-site. Also, grading and construction activities would require the transport, storage, use, and/or disposal of hazardous materials such as fuels and lubricants for the fueling/servicing of construction equipment. Additionally, because of the duration of the project, substances may also be stored in temporary storage tanks/sheds that would be located on-site. Although these types of materials are not acutely hazardous, they are classified as hazardous materials and create the potential for accidental spillage, which could expose workers and future residents in the vicinity of the project site. The transport, storage, use, and/or disposal of hazardous materials during the construction process present a potentially significant impact; the potential for hazardous materials to affect the public and/or the environment during construction will be analyzed in the EIR.

As part of the project, a new laboratory will be built in which small amounts of reagents and testing materials/chemicals will be utilized to perform necessary water quality and solids analyses. As a result, the on-site laboratory may generate small amounts of potentially hazardous laboratory wastes. These potentially hazardous waste streams may present a potentially significant impact; the potential for hazardous materials to affect the public and/or the environment will be analyzed in the EIR.

b. **Less Than Significant Impact With Mitigation Incorporation.** See answer to 4.7.a. As discussed above, some non-acute hazardous substances may be used during construction and operation of the project. However, the risk of accidental release or explosion, which creates a hazardous condition to the public, is unlikely. Although hazardous materials such as pesticides likely have been used on adjacent agricultural land(s); the project site is surrounded by City approved future residential and commercial development which will eliminate or restrict any future use of pesticides on these adjacent lands. Less than significant impacts would occur.

As explained in the project description, solids removed in the primary and secondary treatment processes are pumped into anaerobic digesters where they undergo natural decomposition for 20-25 days. While in the digesters, the methane gas is maintained at low pressure of less than 12 inches of water column. Half the solids convert to a gas mostly made up of methane, which is sent to on site energy recovery facilities. The remaining solids are pumped to dewatering facilities to achieve a 25 percent solid material (with a cake-like consistency) called biosolids. The biosolids are transported to Plant No.2 for direct land application as a soil amendment. The methane gas derived from the digesters will be used to power engine-generator units that produce the electricity used as the primary energy source to operate the treatment plant. Depending on the engine-generator manufacturer, the methane gas may need to be stored in a pressurized tank. If required, storage would take place in an above-ground steel vessel at a pressure of 55 to 60 psi. Any remaining methane gas that is not used by the engine-generators would be burned in a waste gas flare approved by the San Joaquin Valley APCD.

The methane gas will be scrubbed prior to storage and subsequent use as fuel for the cogeneration engines. Explosive gas storage in a low pressure above ground steel vessel will be subject to standard engineering design, controls, and safety features. These issues will be further evaluated and analyzed in the EIR.

c. **Less Than Significant Impact.** No existing or proposed schools are located within one-quarter mile of the proposed project site. Less than significant impacts are anticipated in this regard.

d. **No Impact.** The project in not located on any site catalogued on the most recent hazardous materials list compiled pursuant to Government Code Section 65962.5. No impact is identified.

e. **No Impact.** The proposed project is not located within an airport land use plan or within 2 miles of a public use airport. The project is not located within any area subject to the land use restrictions of the adopted

1996 Kern County Airport Land Use Compatibility Plan which covers all of Kern County (County of Kern, Planning Department, 1996). The closest airports to the project location are the Bakersfield Municipal Airport and the Meadows Field Airport approximately 5.5 miles to the northeast and 9.8 miles to the north, respectively. Therefore, the project would not result in a safety hazard from airports for people residing or working in the project area. No impact is identified.

f. **No Impact**. The project is not located within 5,000 feet of the runway of any private airstrip. Therefore, the project would not result in a safety hazard for people residing or working in the project area. The adopted 1996 Kern County Airport Land Use Compatibility Plan uses this 5,000 foot distance as the maximum for land use considerations. No impact is identified.

g. **Less Than Significant Impact.** The proposed project will not interfere with any local or regional emergency response or evacuation plans because the project will not result in a substantial alteration to the adjacent and area circulation system. However, note that as part of the project, the south half of McCutchen Road from the centerline will be improved from a dirt road to a new major arterial roadway per City standards. Acceleration and deceleration lanes may be constructed as necessary in the future to provide safety for ingress and egress to and from the Plant for the sludge hauling trucks and other major vehicles accessing the Plant. Such improvements will not be undertaken until traffic volumes increase such that mitigations are needed. Due to existing minor traffic volumes along Ashe Road, there is no need for traffic mitigation, although as Ashe Road develops, and the plant reaches full-capacity, mitigation may be required. At such a time the City of Bakersfield will consider possible construction of acceleration and deceleration lanes on Ashe road to provide safety for ingress an egress to and from the Plant for the sludge hauling trucks and other major vehicles accessing the Plant. The proposed project is consistent with the adopted City of Bakersfield Hazardous Materials Area Plan (January 1997). This plan identifies responsibilities and provides coordination of emergency response at the local level in response to a hazardous materials incident. Less than significant impact is identified.

h. **No Impact.** This project is not located adjacent to a wild land area nor is it within the area covered by the Hillside Development Zone (HD), which has standards required by the City of Bakersfield Fire Department to address the issue of wild land fires and urban development. The project site consists of the existing 16 mgd wastewater treatment plant and vacant land which is surrounded by agricultural land that has been approved by the City for future residential and commercial development. None of these land uses is considered susceptible to wildland fire, and no areas containing flammable brush, grass, or trees exist within close proximity to the project site. No impacts are identified.

## 4.8 HYDROLOGY AND WATER QUALITY

a. **Potentially Significant Impact.** Currently, the Facility is operated under a Waste Discharge Permit (Order No. R5-2003-0161) issued by the Central Valley Regional Water Quality Control Board which includes a requirement to meet future treatment standards by April 15, 2010. Hence, the project is proposed to proceed at this time to avoid overload of the existing treatment facilities as planned growth in the service area occurs and to comply with the requirements of the WDR. The Discharge Permit (WDR) governs such items as the quantity of wastewater that may be treated by the plant, the operation of the infiltration basins, and also establishes requirements for testing, monitoring and reporting of facility discharge. A report, "2005 Summary of Groundwater Conditions in the Vicinity of the City of Bakersfield WWTF No. 3," was prepared by Kenneth D. Schmidt and Associates on January 27, 2006. A total of 9 monitoring wells are located throughout the project area. Nitrate-nitrogen concentrations were less than the Maximum Contaminant Level (MCL) in all samples from the monitoring wells with the exception of one monitoring well. Concentrations of total dissolved solids (TDS), chloride, bicarbonate, and manganese concentrations in the vicinity appear to be decreasing. High manganese concentrations were present in shallow groundwater upgradient of the WWTP and in some downgradient monitor wells. Also, a number of parameters, such as trihalomethanes, coliform, phosphate, nitrate-nitrogen, ammonia-nitrogen, and iron were either non-detected or present at very low concentrations during all of the sampling rounds. A hydrogeologic evaluation will be completed for the proposed expansion and upgrade of WWTP No. 3. The report will, in addition to a discussion on existing conditions, include a determination of water level rises, changes in groundwater flow directions, and changes in groundwater quality due to the proposed project. The result of this evaluation, including any proposed mitigation measures, will be included in the EIR.

b. **Potentially Significant Impact.** The Wastewater Treatment Plant No. 3 is located on the Kern River alluvial fan within the Tulare Lake Hydrologic Basin, South Valley Floor Hydrologic Unit, Kern Delta Hydrologic Area (No. 557.10), as depicted on interagency hydrologic maps prepared by the California Department of Water Resources in August 1986. As noted above, 9 monitoring wells have been installed at and in the vicinity of Wastewater Treatment Plant No. 3. Depth to water in these wells has ranged from about 125 to 160 feet in recent years. Water-level elevations for the monitoring wells have generally indicated an easterly direction of groundwater flow beneath the north part of the Wastewater Treatment Facility, and a southeasterly to southerly direction beneath the use area. Depth to water has been fairly stable during the past few years (Source: 2005 Summary of Groundwater Conditions in the Vicinity of Bakersfield WWTF No. 3, prepared by Kenneth D. Schmidt and Associates, January 27, 2006). As noted above, a hydrogeologic evaluation analysis will be completed for the project area, and any identified impact(s) will be discussed and analyzed in the EIR.

c. **No Impact**. There are no streams or rivers on the project site. Existing drainage patterns will not be significantly altered. All development within the City of Bakersfield is required by ordinance to comply with an approved drainage plan (for every project) which avoids on-site and off-site flooding, erosion and siltation problems. The Wastewater Treatment Plant No. 3 has a nearly constant slope of approximately 10 feet per mile from north-northeast to south-southwest. One of the ancient Panama Slough channels runs northwest to southeast across the eastern half of Section 33. Under natural conditions, surface runoff from Section 33 would drain into the old Panama Slough channel into Sections 4 and 5 and continue to the southwest. Roads, ditches, and canal like levees limit and alter surface flow, but general drainage is towards the Buena Vista Lake bed, the southern terminus of the Kern River, about nine miles southwest of Section 33 (WDR Order No. R5-2003-0161).

d. **No Impact.** See answer to 4.8 c.

e. **Less Than Significant Impact with Mitigation Incorporation.** See answer to 4.8.c. The discharger currently retains all storm water on site and is therefore not required to develop and implement an Industrial Storm Water Pollution Prevention Plan (SWPP). The expansion project will be designed to also retain all storm water on site during its operation. However, the discharger would be required to develop and implement a Construction SWPP during construction activities in order to be covered under the General Permit for Discharges of Storm Water Associated with Construction Activity. With the development and implementation of a SWPP, less than significant impacts are expected.

f. **Potentially Significant Impact**. See answer to 4.8 a. and 4.8 c. City of Bakersfield water wells, may be located within approximately 1/2 mile of the proposed project, may be impacted by wastewater effluent from on-site percolation. The presence of bio-pharmaceuticals and biologically persistent chemicals that can potentially migrate towards and impact the water quality of these domestic water wells will be subject to further analysis and will be evaluated and discussed in the EIR.

g. **No Impact.** The project does not involve the construction of housing (Refer to Project Description). No impact is identified.

h. **No Impact.** The project is not located within a 100-year or 500-year flood hazard area as mapped by the Federal Emergency Management Agency (FEMA) (FEMA 2004). Therefore, high risk flood (from topographic, drainage characteristics, distance from major rivers, etc.) does not occur on the project site. No impact is identified.

i. **No Impact.** The proposed project is not located within the Lake Isabella dam failure inundation area or the 100-year Flood Zone (City of Bakersfield and County of Kern 2002). Therefore, no impacts have been identified.

j. **No Impact.** The project site is not located near any significantly sized body of water and is, therefore, not susceptible to a seiche or tsunami. The site is not located at the foot of any significant topographical feature with the potential to be subject to a mud flow. No impact is noted.

## 4.9 LAND USE AND PLANNING

a. **Less Than Significant Impact**. The project is in response to a rapidly developing southwest Bakersfield. The current wastewater treatment plant once located far from development is now surrounded by City Council approved General Plan Amendment/Zone Change, and Annexation projects which will allow the development of residential, commercial, and industrial uses in the project's immediate vicinity. These projects have already undergone environmental review and the environmental impacts have been adequately addressed. Upon LAFCO approval of the annexation of these properties into the City, the Treatment Plant will be required to serve these projects. Therefore, its expansion is a logical extension of existing urban development that does not physically divide, but rather helps support the Metropolitan Bakersfield Plan Area.

**TABLE 3**

**LAND USE/ZONING OF ADJACENT PROPERTIES**

| LOCATION | LAND USE DESIGNATION | ZONE DISTRICT | EXISTING LAND USE |
|---|---|---|---|
| **NORTH** | Low Density Residential | One-Family Dwelling | Agriculture |
| **SOUTH** | Rural Residential | Exclusive Agriculture and Estate Residential | Agriculture and Estate Residential |
| **EAST** | Low Density Residential and General Commercial | One-Family Dwelling, Neighborhood Commercial | Agriculture |
| **WEST** | Low Density Residential, Commercial, Light Industrial, and Intensive Agriculture | One-Family Dwelling, Limited Multi Family Dwelling, Neighborhood and Regional Commercial, Light Manufacturing, and Agriculture | Industrial and Agriculture |

b. **No Impact**. The subject site has a land use designation of "P" (Public Facilities) and a zoning designation of "A" (Agriculture). The subject site is not in Williamson Act. The City of Bakersfield currently has a Conditional Use Permit (CUP) to operate the Wastewater Treatment Plant. The expansion of the plant will remain in compliance with its CUP. Therefore, the project will not conflict with its zoning or general plan designation. Further, the Metropolitan Bakersfield General Plan states in its Land Use Element (Page II-14, Policy 53) that the City wants to "Ensure that land use and infrastructure development are coordinated." The MBGP goes on to state in its Public Services Element (page X-9) that its goals for public services are to "1. ensure the provision of adequate sewer service to serve the needs of existing and planned development in the planning area. […] 3. Provide trunk sewer availability to and treatment/disposal capacity for all metropolitan urban areas, to enable cessation or prevention of the use of septic tanks […]." Expansion of the wastewater treatment plant attempts to fulfill these General Plan Goals and Policies. Therefore, there are no identified conflicts or inconsistencies with said policies or zoning regulations.

c. **Less Than Significant Impact**. See answers to 4.4.a., 4.4.e., and 4.4.f

## 4.10 MINERAL RESOURCES

a. **Less than Significant Impact**. The principal mineral resources extracted within the Metropolitan Bakersfield area are oil, natural gas, sand, and gravel. There are 14 oil fields in the Metropolitan Bakersfield planning area. Areas used for sand and gravel extraction are concentrated primarily along the floodplain and alluvial fan of the Kern River. Because the project's location is distanced from any alluvial fans and the Kern River, it is very unlikely that the project would contain sand and gravel that would be considered a valuable commodity; hence impacts to this resource are considered less than significant. Further, the project is not located within a state designated oil field or within an area of other important mineral resources. As indicated in both the 2010 and 2020 Metropolitan Bakersfield General Plan (1990, 2002), the Project site is not located within a Mineral Resource area, nor is it located within an area designated as Mineral Petroleum (R-MP). Therefore, impacts to oil and gas are considered less than significant.

2. **Less than Significant Impact**. See answer to 4.10.a.

## 4.11 NOISE

a. **Less Than Significant Impact with Mitigation Incorporation**. The Noise Element of the MBGP provides noise standards that should be adhered to in new development construction and operations within the City (City of Bakersfield and County of Kern 2002). Adherence to these City standards should help in the mitigation of noise impacts on-site, although noise impacts from new emergency back up generators as well as new aeration basin blowers may exceed noise standards and will need to be mitigated. Such mitigations including enclosure and engineering controls will be discussed as part of the Environmental Impact Report for this project.

b. **Less Than Significant Impact**. The proposed project would not be expected to result in exposure of persons to or generation of excessive ground-borne vibration or ground-born noise levels. No sources of substantial ground-borne noise, such as pile driving, are proposed as part of the project. Standard construction activities, such as grading, excavation, and site preparation, are not expected to generate significant vibration or ground-borne noise.

c. **Less Than Significant Impact with Mitigation Incorporation**. Construction of the project site will include addition of four new emergency back up generators and new aeration basin blowers, all of which will be on the interior of the plant as well be enclosed and be baffled to reduce noise impacts. Noise levels may still increase permanent ambient noise levels in the project vicinity. Therefore, further mitigation measures will be analyzed as part of this project's Environmental Impact Report. See also response to 4.11.a, above.

d. **Less Than Significant Impact with Mitigation Incorporation**. See response to 4.11.a and 4.1.c. above.

e. **No Impact**. The proposed project is not located within a landuse plan or 2 miles of a public use airport (MBGP, 2002) nor is it subject to the land use restrictions of the adopted 1996 Kern County Airport Land Use Compatibility Plan which covers all of Kern County. Therefore, the project would not have the potential to expose people to excessive noise generated by aircraft or airport operations.

f. **No Impact**. This project is not located within the vicinity (5,000 feet) of any private airstrip and therefore would not expose people residing or working in the project area to excessive noise levels.

## 4.12 POPULATION AND HOUSING

a. **Potentially Significant Impact**. The expansion of the treatment plant is in response to a rapidly developing southwest Bakersfield. The Metropolitan Bakersfield plan area had a population of 402,100 in 2001 (MBGP, 2002, page II-5) and has estimated its expected population in 2020 at 520,500 people (MBGP, 2002). According to the most recent population projections, the Metropolitan Bakersfield plan area as of 2006 already had 456,600 residents. At such a rate the Metro area will reach these original projections of 520,500 people by the year 2012 (Kern EDC, 2003) rather than the predicted 2020 date. Therefore, the City as a public utility provider must plan ahead in order to preclude any public utility shortfall in the future. Therefore, the City of Bakersfield has proposed this plant expansion at this time to avoid overload of the existing treatment plant facilities as planned growth in the service area occurs.

Further, in looking at just the current development picture, the project is ringed by City approved General Plan Amendment/Zone Change/Annexation projects. Upon LAFCO approval of their annexation applications, these residential, commercial, and industrial developments will rely on the proposed treatment plant expansion to serve their projects. These projects have already undergone environmental review and their environmental impacts have been adequately addressed. Further, any future projects located in the project vicinity will be required to complete environmental reviews as well as require service from the Treatment Plant.

The existing plant is in a situation where current demand is peaking near its capacity and City Council approved development is relying upon the future service that the expansion project will provide by late 2009. Expansion of the City's wastewater treatment facilities must be responsive to the timing of and increased growth rates being experienced in the Metropolitan Bakersfield plan area. The expansion project has been in the initial planning stage now for several years in response to the increased development activity. The typical planning horizon for a major wastewater treatment plant upgrade is approximately 7 years from commencement of planning to activation of the new facilities. The expansion of the treatment plant from an existing 8 mgd facility to a 12 mgd facility, followed by a 16 mgd facility, and ultimately to 32 mgd facility was envisioned in 1987 as growth demands increase in west Bakersfield (City of Bakersfield FEIR Wastewater Plant Improvements, 1987, page 3-18). The expansion of the plant from its current 16 mgd capacity to 32 mgd capacity presents the most cost effective approach to the project, because the additional 16 mgd facilities would mirror the existing plant and components. Additionally, if the treatment plant were only expanded to a 24 mgd capacity, planning to construct the next plant upgrade to the ultimate 32 mgd capacity would have to commence immediately upon completion of a smaller upgrade of 24 mgd capacity. Therefore, in order to provide service to existing, recently approved and future development projects, the City of Bakersfield needs to expand the plant as proposed.

Moreover, the Metropolitan Bakersfield General Plan states in its Land Use Element (Page II-14, Policy 53) that the City wants to "Ensure that land use and infrastructure development are coordinated." The adjacent approved development projects have already undergone General Plan Amendments which evaluated the population growth and new home construction impacts of each project. In this light, the subject project, therefore, is not the cause of but rather a result of the existing urban development pattern, and is a logical extension of existing urban development, but due to the uncertainty of the magnitude of any growth inducing impacts that doubling the plant capacity may cause, further analysis will be conducted as part of the Environmental Impact Report.

b. **No Impact**. The project site does not contain any existing housing nor will it create any additional housing. Therefore, it will not displace any housing or people, necessitating construction of replacement housing elsewhere or displacement of individuals. Further, the project is required to be consistent with the Metropolitan Bakersfield General Plan and the City of Bakersfield Zoning Ordinance. There are no identified conflicts or inconsistencies with said policies or zoning regulations.

c. **No Impact**. See answer to 4.12.b, above.

## 4.13 PUBLIC SERVICES

a.i. **No Impact**. The proposed project will not create any other services or structures that would require any fire protection services beyond those already provided.

a.ii **Less Than Significant Impact**. The proposed project will likely cause the treatment plant to increase the number of staff, although the degree to which staff would be increased is predicted at, approximately, a total of 30 employees at full capacity; an increase of only 11 people. This increase in possible police protection requirements is considered less than significant.

a.iii. **No Impact**. The proposed project will not create households or facilities requiring school services.

a.iv. **No Impact**. The proposed project will not require the provision of park services.

a.v. **No Impact**. Due to the nature of the project, no other public facilities should be affected by this project. Moreover, the Metropolitan Bakersfield General Plan states in its Land Use Element (Page II-14, Policy 53) that the City wants to "Ensure that land use and infrastructure development are coordinated." The MBGP goes on to state in its Public Services Element (page X-9) that its goals for public services are to "1. Ensure the provision of adequate sewer service to serve the needs of existing and planned development in the planning area. […] 3. Provide trunk sewer availability to and treatment/disposal capacity for all metropolitan urban areas, to enable cessation or prevention of the use of septic tanks

[…].” Expansion of the wastewater treatment plant attempts to fulfill these General Plan Goals and Policies.

## 4.14 RECREATION

a. **No Impact**. The project proposes no increase in population for the area and would, therefore, not result in an impact upon the quality or quantity of existing recreational opportunities or create a substantial need for new parks or recreational facilities. Additionally, the project will not include the creation of any recreational facilities.

b. **No Impact**. See response to 4.14.a.

## 4.15 TRANSPORTATION AND TRAFFIC

a. **Potentially Significant Impact**. Future development of the proposed project may increase vehicular and truck traffic in the project vicinity. Currently, once a year, dried sludge is transported to the City-owned farm at Treatment Plant No. 2. This operation is conducted over the course of a week at a rate of approximately 21 truck trips per day, for a total of approximately 150 truck trips. The City expects at start-up of the new facilities, to transport sludge to the Treatment Plant No. 2 farm at rate of approximately 1-2 truck trips per day. The City then expects upon project build out at full capacity that truck traffic will be approximately 4-5 truck trips per day. These impacts to roadways and intersections resulting from increased traffic volumes and modified circulation patterns require further analysis to determine the level of any possible impacts. Note, that as part of the project, the south half of McCutchen Road from the centerline will be improved from a dirt road to a new major arterial roadway per City standards. Due to existing minor traffic volumes along Ashe Road, there is no need for traffic mitigation, although as Ashe Road develops, and the plant reaches full-capacity, mitigation may be required. At such a time the City of Bakersfield will consider possible construction of acceleration and deceleration lanes on Ashe road to provide safety for ingress an egress to and from the Plant for the sludge hauling trucks and other major vehicles accessing the Plant. Impacts will be addressed as part of the project’s Environmental Impact Report.

b. **Potentially Significant Impact**. See answer to 4.15.a.

c. **No Impact**. The proposed project is not located within an airport land use plan or within the vicinity of any public or private airstrips. The closest airports to the project location are the Bakersfield Municipal Airport and Meadows Field Airport, approximately 5.5 miles to the northeast and 9.8 miles to the north, respectively. Additionally, because the project would not contain any high-rise structures, it does not have the potential to affect air traffic patterns.

d. **Potentially Significant Impact**. Specific circulation patterns and roadways for the proposed project would incorporate all applicable civil engineering and City Fire Department standards, which would help ensure that hazardous design features or inadequate emergency access to the site or other areas surrounding the project would not occur. However, additional turning movements associated with site ingress and egress could increase traffic hazards. Detailed analysis is required and will be conducted and discussed as part of the project’s Environmental Impact Report.

e. **Less Than Significant Impact**. The proposed project would be required to comply with all emergency access requirements adopted by City, County, Regional, and State agencies. Site access requirements are set forth in the City of Bakersfield Municipal Code. These requirements and all others required to be included in the project design will be verified by the appropriate agency prior to project approval.

f. **Less Than Significant Impact**. The zoning ordinance requires that parking appropriate to each type of land use be provided. The project will adhere to all parking requirements. Therefore, no significant parking impacts have been identified for this project.

g. **Less than Significant Impact**. The project is not anticipated to be inconsistent with any policies or programs supporting alternative transportation and shall by ordinance be required to pay transportation impact fees which in part are used to support mass transit (acquisition of buses for GET). The proposed project would not involve any change in the location of bus routes, stops, or other facilities used for alternative transit. As a result, no significant impacts are anticipated.

## 4.16 UTILITIES AND SERVICE SYSTEMS

a. **Less Than Significant Impact**. The project is proposed to proceed at this time to avoid overload of the existing treatment plant facilities as planned growth in the service area occurs. The proposed project is also in response to the requirement of WDR Order No. R5-2003-0161 to meet future treatment standards by April 15, 2010. Expansion and enhanced secondary treatment as well as other design features listed in the project description will keep the plant in compliance with wastewater treatment requirements of the RWQCB and therefore, is not considered a significant impact.

b. **No Impact**. The proposed project is the expansion of existing wastewater treatment facilities, and all environmental impacts associated will such have either been addressed in previous sections in this IS/NOP or will be studied as part of the Environmental Impact Report.

c. **Less Than Significant Impact**. The proposed project is a wastewater treatment facility. The City will adhere to all city, county, state, and federal requirements pertaining to storm water. The wastewater treatment plant already retains its on-site storm water on the premises and will continue to accept any increased run-off that may result from future operation of the plant. Further, the plant will continue to operate in conformance with its existing Waste Discharge Requirements (WDR) as set forth by the California Regional Water Quality Control Board (CRWQCB) in Order No. R-5-2003-0161 as may be amended for the treatment plant expansion.

d. **Less Than Significant Impact**. Currently, the wastewater treatment plant uses on-site well water for its few on-site needs, but will require additional water beyond that available through the groundwater well. The facility also utilizes some of the treated effluent for wash water where it is appropriate to do so. The treatment plant plans on acquiring water service through the City of Bakersfield Water Resources Department to provide additional volumes of wash water and general internal maintenance water for the facility as demand increases in future years. All needed water for onsite uses would be minimal and would not constitute a significant impact.

e. **No Impact**. The proposed project is an expansion of a wastewater treatment plant which provides treatment services to western Bakersfield. The proposed project is in response to increased need for wastewater treatment capacity due to continued development within western Bakersfield.

f. **Less Than Significant Impact**. Currently, approximately, 5 cubic yards of grit per day are removed from the treatment facility and transported to the Mt. Vernon Green Waste Facility for use in compost. Expansion of the plant will result in an estimated 10 cubic yards of grit per day to be transported to the Green Waste Facility upon project build out. Currently, approximately two truck loads a week of debris from the screenings, equaling approximately 5 cubic yards, are transported to the Bena Landfill for disposal. Expansion of the plant will result in an estimated 10 cubic yards a week at project build out. In addition, a minimal amount of office waste will continue to be transported to the Bena Landfill, which as indicated in the Metropolitan Bakersfield General Plan (2002), has a total of 70 million cubic yards of capacity and a projected lifespan of 65-75 years. Moreover, as indicated in the MBGP (2002), which included the project area, the Bena Landfill has adequate capacity to serve the planning area, and therefore, will have the capacity to serve the proposed expansion of the WWTP#3. Compared to the 4,500 tons daily limit that the Bena Landfill is permitted for, the anticipated waste volumes from the proposed project are insignificant. No adverse impacts to landfill operations or substantial increases in solid waste at the landfill should occur.

g. **Less Than Significant Impact**. The project will comply with all local, state, and federal requirements for integrated waste management, biosolids management, and solid waste disposal such as, but not limited to, the City of Bakersfield Municipal Code Section 8.32. Further, all biosolids transported from the site to city owned farmland located at Treatment Plant No. 2 will continue to comply with the Waste Discharge Requirements and the Biosolids Management Plan as approved by the Regional Water Quality Control and adopted by the City of Bakersfield. Moreover, all issues associated with the land application of biosolids from Wastewater Treatment Plant No. 3 were addressed in previous Waste Discharge Requirements, General Orders, and City Biosolids Management Plans (City of Bakersfield Biosolids

Management Plan, 2001 & 2002). Therefore, the impact of any increase in the transportation and land application of solids from Wastewater Treatment Plant #3 would not violate any federal, state, and local statutes and regulations related to solid waste.

## 4.17 MANDATORY FINDINGS OF SIGNIFICANCE

a. **Potentially Significant Impact**. The project is subject to the terms of the Metropolitan Bakersfield Habitat Conservation Plan and associated Section 10 (a)(1)(b) and Section 2081 permits issued to the City of Bakersfield by the United States Fish and Wildlife Service and the California State Department of Fish and Game, respectively. Terms of the permit require applicants for all development projects within the plan area to pay habitat mitigation fees, excavate known kit fox dens, and notify agencies prior to grading. However, other biological resource issues as indicated in previous sections of this Initial Study require assessment. Furthermore, as indicated in previous sections of this Initial Study, potentially significant impacts may occur for historical and cultural resources. Therefore an EIR is needed to address these potentially significant impacts.

b. **Potentially Significant Impact**. A review of cumulative impacts for each issue area that has been identified as potentially significant will be required pursuant to Section 15130 of CEQA.

c. **Potentially Significant Impact**. As stated in various sections of this Initial Study, the proposed project has the potential to have significant impacts. The project's Environmental Impacts Report will include a review of existing conditions, project impacts, and feasible mitigation measures to help reduce impacts to a less than significant level.

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# 15.2 INITIAL STUDY/NOTICE OF PREPARATION COMMENTS

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

**Notice of Preparation**

RECEIVED
APR 10 2006 MG
CITY OF BAKERSFIELD
PLANNING DEPARTMENT

April 4, 2006

To: Reviewing Agencies

Re: City of Bakersfield Wastewater Treatment Plant #3 Expansion & Upgrade
SCH# 2006041012

Attached for your review and comment is the Notice of Preparation (NOP) for the City of Bakersfield Wastewater Treatment Plant #3 Expansion & Upgrade draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

**Marc Gauthier**
**City of Bakersfield**
**1715 Chester Avenue**
**Bakersfield, CA 93301**

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Godierma for:
Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

# Document Details Report
# State Clearinghouse Data Base

***SCH#*** 2006041012
***Project Title*** City of Bakersfield Wastewater Treatment Plant #3 Expansion & Upgrade
***Lead Agency*** Bakersfield, City of

---

***Type*** **NOP** Notice of Preparation

***Description*** The proposed project consists of expanding the Plant's treatment capacity to 32 million gallons per day (mgd), upgrading the Plant operations to advanced secondary treatment nitrogen removal and the possibility of up to 2 mgd of tertiary treatment, adding mechanical dewatering to the solids handling operations, adding on-site percolation, upgrading the co-generation power capabilities of the Plant, constructing new buildings to house administration, operations, laboratory, and maintenance activities, and supporting facilities.

---

## Lead Agency Contact

***Name*** Marc Gauthier
***Agency*** City of Bakersfield
***Phone*** (661) 326-3786 ***Fax***
***email***
***Address*** 1715 Chester Avenue
***City*** Bakersfield ***State*** CA ***Zip*** 93301

---

## Project Location

***County*** Kern
***City*** Bakersfield
***Region***
***Cross Streets***
***Parcel No.*** 532-010-01& 532-010-07
***Township*** 30S ***Range*** 27E ***Section*** 33 ***Base***

---

## Proximity to:

***Highways***
***Airports***
***Railways***
***Waterways***
***Schools***
***Land Use*** GPD: Public Facilities
Z: Agriculture
PLU: Wastewater Treatment Plant

---

***Project Issues*** Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife; Landuse; Cumulative Effects

---

***Reviewing Agencies*** Resources Agency; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Game, Region 4; Department of Health Services; Native American Heritage Commission; California Highway Patrol; Caltrans, District 6; State Water Resources Control Board, Clean Water Program; State Water Resources Control Board, Division of Water Quality; Department of Toxic Substances Control; Regional Water Quality Control Bd., Region 5 (Fresno)

---

***Date Received*** 04/03/2006 ***Start of Review*** 04/03/2006 ***End of Review*** 05/02/2006

Note: Blanks in data fields result from insufficient information provided by lead agency.

## NOP Distribution List

OAG

County: Kern

SCH# 2006041012

### Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  David Johnson
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Gerald R. Zimmerman
- [ ] **Dept. of Conservation**
  Roseanne Taylor
- [ ] **California Energy Commission**
  Roger Johnson
- [ ] **Dept. of Forestry & Fire Protection**
  Allen Robertson
- [x] **Office of Historic Preservation**
  Wayne Donaldson
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **Reclamation Board**
  DeeDee Jones
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
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  Resources Agency
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- [ ] **Depart. of Fish & Game**
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  Environmental Services Division
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- [ ] **Fish & Game Region 2**
  Banky Curtis
- [ ] **Fish & Game Region 3**
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- [x] **Fish & Game Region 4**
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- [ ] **Fish & Game Region 5**
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- [ ] **Fish & Game Region 6**
  Gabrina Gatchel
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  Tammy Allen
  Inyo/Mono, Habitat Conservation Program
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### Other Departments

- [ ] **Food & Agriculture**
  Steve Shaffer
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  Public School Construction
- [ ] **Dept. of General Services**
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  Environmental Services Section
- [x] **Dept. of Health Services**
  Veronica Ramertz
  Dept. of Health/Drinking Water

### Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Debby Eddy
- [ ] **Office of Emergency Services**
  Dennis Castrillo
- [ ] **Governor's Office of Planning & Research**
  State Clearinghouse
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Ken Lewis
- [ ] **State Lands Commission**
  Jean Sarino
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

### Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- [ ] **Caltrans - Planning**
  Terri Pencovic
- [x] **California Highway Patrol**
  John Olejnik
  Office of Special Projects
- [ ] **Housing & Community Development**
  Lisa Nichols
  Housing Policy Division

### Dept. of Transportation

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  Marc Birnbaum
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  Cheryl J. Powell
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  Dan Kopulsky
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Mario Orso
- [ ] **Caltrans, District 12**
  Bob Joseph

### Cal EPA

**Air Resources Board**

- [ ] Airport Projects
  Jim Lerner
  - [ ] Transportation Projects
    Kurt Karperos
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    Mike Tollstrup
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  Jim Hockenberry
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- [x] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
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  Steven Herrera
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- [x] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**

### Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
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  Central Coast Region (3)
- [ ] **RWQCB 4**
  Jonathan Bishop
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  Central Valley Region (5)
  - [x] **RWQCB 5F**
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    Redding Branch Office
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  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)
- [ ] **Other** ____________

Last Updated on 08/10/05

Dan Skopec
*Acting Secretary*

# California Regional Water Quality Control Board
## Central Valley Region
**Robert Schneider, Chair**

**Fresno Branch Office**
1685 E Street, Fresno, California 93706
(559) 445-5116 • Fax (559) 445-5910
http://www.waterboards.ca.gov/centralvalley

Arnold
Schwarzenegger
*Governor*

Mr. Marc Gauthier, Principal Planner
City of Bakersfield
1715 Chester Avenue
Bakersfield, CA 93301

RECEIVED
MAY 3 2006 M3
CITY OF BAKERSFIELD
PLANNING DEPARTMENT

2 May 2006

**NOTICE OF PREPARATION, BAKERSFIELD WASTEWATER TREATMENT PLANT No. 3, (SCH# 2006041012), KERN COUNTY**

Regional Board staff reviewed the 4 April 2006 Notice of Preparation (NOP) for the draft Environmental Impact Report (EIR) for the City of Bakersfield Wastewater Treatment Plant (WWTP) No. 3 Expansion and Upgrade. The NOP specifies that the WWTP capacity will be doubled to 32 million gallons per day (mgd) and upgraded, with treatment for nitrogen removal, mechanical dewatering of biosolids, co-generation, and new buildings for administrative offices, operations, laboratory and maintenance. The WWTP expansion may also include tertiary treatment for up to 2 mgd meeting Title 22 requirements for Disinfected Tertiary Recycled Water. Possible reclamation uses include irrigation, industrial water supply, boating, fishing and swimming. The WWTP is regulated by Waste Discharge Requirements Order No. 5-01-105, and Special Order R5-2003-0161 modifying Order No. 5-01-105.

Provisions F.11, F.12, and F.13 of WDRs Order No. 5-01-105 prescribe deadlines by which the Discharger must submit technical reports that set forth a schedule for completing a systematic and comprehensive evaluation of each waste treatment and control component of WWTP No. 3. The purpose of the evaluation is to assess the extent to which the Discharger practices and implements best practicable treatment control (BPTC) to minimize the degradation of receiving water quality. Special Order R5-2003-0161 delayed the implementation date for Provision Nos. F.12 and F.13 and the date of compliance with Discharge Specification B.3 from 15 April 2005 to 15 April 2010 to facilitate a single capital improvement project. The EIR needs to incorporate the BPTC analysis into the planning and scheduling of the WWTP expansion and upgrade.

Should you have any questions concerning this matter, please contact Edward Balch at (559) 445-5548.

DOUGLAS K. PATTESON
Senior Water Resources Control Engineer
RCE No. 55985

cc State Clearing House, Sacramento

R:\Staff\BalchE\final\jeb Bakersfield WWTP#3 NOP EIR.doc

San Joaquin Valley
Air Pollution Control District

# Fax Transmittal

1990 E. Gettysburg Avenue
Fresno, California 93726-0244
Phone (559) 230-6000
Fax (559) 230-6061

**Date :** May 01, 2006

**To :** Marc Gauthier **Fax Number :** 9 1 661 852 2136

**From :** Georgie Stewart **Number of pages (includes cover sheet):** 6

**Description :**

NOP of DEIR City of Bakersfield Wastewater Treatment Plant #3 Expansion & Upgrade

District Reference # C20060764

- [ ] Per Your Request
- [ ] Per Our Conversation
- [ ] Take Appropriate Action
- [ ] Please Answer
- [ ] For Your Information
- [ ] For Your Approval
- [ ] Review & Comment
- [ ] Review & Return
- [x] Original transmittal will follow via mail

**Remarks / Response :**

San Joaquin Valley
Air Pollution Control District

May 1, 2006

Reference No. C20060764

City of Bakersfield
Planning Department
Attn: Marc Gauthier, Principal Planner
1715 Chester Ave
Bakersfield, CA 93301

Subject: Notice of Preparation of a Draft Environmental Impact Report for City of Bakersfield Wastewater Treatment Plant #3 Expansion and Upgrade

Dear Mr. Gauthier:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the project referenced above and offers the following comments:

The entire San Joaquin Valley Air Basin is designated non-attainment for ozone and particulate matter (PM10 and PM2.5). This project will contribute to the overall decline in air quality due to construction activities in preparation of the site, and ongoing traffic and other operational emissions. Based on the information provided by the City of Bakersfield, this project may potentially generate significant air emissions.

The District recommends using the URBEMIS 2002 Version 8.7 program to calculate project area and operational emissions and to identify mitigation measures that reduce impacts. URBEMIS can be downloaded from www.urbemis.com or the South Coast Air Quality Management District's website at http://www.aqmd.gov/ceqa/urbemis.html. If the analysis reveals that the emissions generated by this project will exceed the District's thresholds, this project may significantly impact the ambient air quality if not sufficiently mitigated. The City of Bakersfield, or its consultant, is encouraged to consult with District staff for assistance in determining appropriate methodology and model inputs. Questions regarding URBEMIS should be directed to the District's CEQA staff at (559) 230-5800.

This project will be subject to District permitting requirements and additional permits for Wastewater Treatment Plant #3 will be required. For assistance regarding permitting, please contact Mr. Spencer Hammond at the District's Bakersfield office at (661) 326-6957.

**The District recommends that the air quality section of the EIR have four main components:**

1. **A description of the regulatory environment and existing air quality conditions impacting the area.** This section should be concise and contain information that is pertinent to analysis of the project. The District has several sources of information available to assist with the existing air quality and regulatory environment section of the EIR. The District's *Guide for Assessing and Mitigating Air Quality Impacts, 2002 Revision* (GAMAQI) contains discussions regarding the

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4800 Enterprise Way
Modesto, CA 95356-8718
(209) 557-6400 • FAX (209) 557-6475

Central Region Office
1990 East Gettysburg Avenue
Fresno, CA 93726-0244
(559) 230-6000 • FAX (559) 230-6061
www.valleyair.org

Southern Region Office
2700 M Street, Suite 275
Bakersfield, CA 93301-2373
(661) 326-6900 • FAX (661) 326-6985

existing air quality conditions and trends of the San Joaquin Valley Air Basin, including those pollutants of particular concern: ozone, PM10, and carbon monoxide. In addition, it provides an overview of the regulatory environment governing air quality at the federal, state, and regional levels. The GAMAQI provides air monitoring data and other relevant information for PM-10 and other pollutants. The most recent air quality data for the District is Available at the California Air Resources Board (ARB) website at http://www.arb.ca.gov/html/aqe&m.htm. The air quality section of EPA's Region 9 (which includes information on the San Joaquin Valley Air Basin) can be found at http://www.epa.gov/region09/air/index.html. Additionally, this section should also contain a discussion regarding growth projections that Kern County provided to the District (through the Kern County Council of Governments) for inclusion in the Ozone and PM10 Attainment Plans and any impacts this project will have on Federal Conformity for Kern County and the San Joaquin Valley Air Basin. Lastly, this section should clearly describe the air pollution regulatory authority of the District and ARB for the various emission sources at the City of Bakersfield Wastewater Treatment Plant No. 3.

2. **Estimates of existing emissions and projected pollutant emissions related to the increase in project source emissions and vehicle use, along with an analysis of the effects of these increases.** The EIR should include the methodology, model assumptions, inputs and results for pollutant emissions. The cumulative impact analyses should consider current existing and planned development both within the project area and in surrounding areas. The EIR needs to address the short-term and long term local and regional adverse air quality impacts associated with the operation of construction equipment (reactive organic gases, nitrogen oxides, carbon monoxide, and PM10) and emission generated from stationary and mobile sources. The EIR should identify the components and phases of the project. The EIR should provide emissions projections for the project at the build out of each phase (including ongoing emissions from each previous phase). URBEMIS 2002 v8.7 may be used to quantify these emissions.

**Hazardous Air Pollutants (HAPs)**- The air analysis should discuss District regulations for identifying and reducing HAPs and should describe how the City of Bakersfield would address future projects with sensitive receptors near existing HAP sources and the siting of new HAP sources in the plan area. Potential HAPs sources include project equipment, operations, and vehicles (the Air Resources Board (ARB) has designated diesel particulate emissions as a toxic air contaminant). On page 43 of the District's *Guide for Assessing and Mitigating Air Quality Impacts, 2002 Revision* (GAMAQI), the District addresses and defines sensitive receptors with respect to CEQA. If the project is near sensitive receptors and HAPs are a concern, the City of Bakersfield, or its consultant, should perform a Health Risk Assessment (HRA). HRA guidelines promulgated by the California Office of Environmental Health Hazard Assessment (OEHHA) and OEHHA toxicity criteria must be used. The District recommends use of the latest version of the Hot Spots Analysis and Reporting Program (HARP) released by the Air Resources Board for a health risk assessment because it is the only software that is compliant with the OEHHA guidelines. An HRA should include a discussion of the toxic risk associated with the proposed project, including project equipment, operations, and vehicles. The GAMAQI defines the significance levels for toxic impacts as a cancer risk greater than 10 in a million and/or a hazard index (HI) of 1.0 or greater for chronic non-carcinogenic or acute risks. The City of Bakersfield, or its consultant, should contact the District to review the proposed modeling approach before modeling begins. For more information on hazardous air pollutants (HAPs) analyses, please contact Mr. Leland Villalvazo, Supervising Air Quality Specialist, at (559) 230-6000 or hramodeler@valleyair.org.

**Odor Analysis**- The proposed project should be analyzed to see if it is considered near a location of sensitive receptors (current and future residential and commercial development) and if odor is a concern. The procedure outlined in the "Guide for Assessing and Mitigating Air Quality Impacts" (GAMAQI) includes the following:

- Identify the location of sensitive receptors (including residences).

- Compare the distance to the nearest sensitive receptor to the distances in Table 4.2 of the GAMAQI. If the sensitive receptors are further away than the distances given in Table 4.2, no further analysis is required. The results should be documented in the EIR.
- Obtain any odor complaints against the facility or similar facilities from the local District office and the county's environmental health department.
- Review the complaints to determine the location of complainants relative to the facility.
- Identify any sensitive receptors at similar distances.
- Determine if emissions of odoriferous compounds will increase or decrease with implementation of the project.
- Draw any reasonable conclusions as to the probability that the project will generate odor complaints based on this analysis of complaint history.

Note that the emission of odiferous compounds should be mitigated as much as feasible if it is anticipated that the project will have a significant impact. For more information on odor impact analyses, please contact Mr. Leland Villalvazo, Supervising Air Quality Specialist, at (559) 230-6000, or hramodeler@valleyair.org.

In the event the City of Bakersfield's Wastewater Treatment Plant No. 3 creates a public nuisance (Rule 4102), it could be in violation and be subject to District enforcement action. Therefore, despite the City of Bakersfield's Wastewater Treatment Plant No. 3 preceding proposed new residential and commercial development, it could be subject to potential nuisance violations

3. **Identify and discuss all existing District regulations that apply to the project.** The EIR should identify and discuss all existing District regulations that apply to the project. It would be appropriate to discuss proposed rules that are being developed that would apply to the proposed project. Current rules and regulations are available on the District's website at http://www.valleyair.org/rules/1ruleslist.htm. District rules and regulations are periodically revised, and new regulations are promulgated. The District strongly advises the City of Delano to contact the District for any rule updates and new rules when the project development begins. Current District rules and regulations applicable to the proposed project are requirements.

Based on the information provided, the proposed project will be subject to the following District rules. The following items are rules that have been adopted by the District to reduce emissions throughout the San Joaquin Valley, and are required. This project may be subject to additional District Rules not enumerated below. To identify additional rules or regulations that apply to this project, or for further information, the applicant is strongly encouraged to contact the District's Small Business Assistance Office at (661) 326-6969. Current District rules can be found at http://www.valleyair.org/rules/1ruleslist.htm.

Regulation VIII (Fugitive PM10 Prohibitions) Rules 8011-8061 are designed to reduce PM10 emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, landfill operations, etc. The District's compliance assistance bulletin for construction sites can be found at http://www.valleyair.org/busind/comply/PM10/Reg%20VIII%20CAB.pdf.

If a non-residential project is 5.0 or more acres in area or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days, a Dust Control Plan must be submitted as specified in Section 6.3.1 of Rule 8021. Construction activities shall not commence until the District has approved the Dust Control Plan. A template of the District's Dust Control Plan is available at http://www.valleyair.org/busind/comply/PM10/forms/DCP-Form%20-%2012-01-2005.doc.

Rule 2010 (Permits Required) This rule requires any person constructing, altering, replacing or operating any source operation, which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate.

Rule 3135 (Dust Control Plan Fee) This rule requires the applicant to submit a fee in addition to a Dust Control Plan. The purpose of this fee is to recover the District's cost for reviewing these plans and conducting compliance inspections. More information on the fee is available at http://www.valleyair.org/rules/currntrules/Rule%203135%201005.pdf.

Rule 3180 (Administrative Fees for Indirect Source Review) This rule requires the applicant to submit a fee in addition to an Indirect Source Review Application. The purpose of this fee is to recover the District's cost for the review and management of these applications. More information on the fee is available on the District website at http://www.valleyair.org/rules/currntrules/Rule 3180 1205.pdf

Rule 4002 (National Emission Standards for Hazardous Air Pollutants) In the event that any portion of an existing building will be renovated, partially demolished or removed, the project will be subject to District Rule 4002. Prior to any demolition activity, an asbestos survey of existing structures on the project site may be required to identify the presence of any asbestos containing building material (ACBM). Any identified ACBM having the potential for disturbance must be removed by a certified asbestos contractor in accordance with CAL-OSHA requirements. If you have any questions concerning asbestos related requirements, please contact Mr. Sherman Yount at (661) 326-6933 or contact CAL-OSHA at (559) 454-1295. The District's Asbestos Requirements Bulletin can be found online at http://valleyair.org/busind/comply/asbestosbultn.htm.

Rule 4102 (Nuisance) This rule applies to any source operation that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and be subject to District enforcement action. Wastewater treatment plants have been identified by the district as facilities that have been known to cause odor.

Rule 4601 (Architectural Coatings) This rule limits volatile organic compounds from architectural coatings by specifying architectural coatings storage, clean up and labeling requirements.

Rule 4702 (Internal Combustion Engines – Phase 2) This rule applies to any internal combustion engine with a rated brake horsepower greater than 50 horsepower (for example, a standby generator fueled by diesel).

Rule 9510 (Indirect Source Review) This rule was adopted to reduce the impacts of growth in emissions from all new development in the San Joaquin Valley. Rule 9510 requires applicants subject to the rule to provide information that enables the District to quantify construction, area and operational PM10 and NOx emissions, and potentially mitigate a portion of those emissions. An application must be filed with the District no later than concurrent with application with a local agency for the final discretionary approval. For more information and instruction, please contact the District's ISR staff by phone at (559) 230-5800 or by email at ISR@valleyair.org.

4. **Identify and discuss all feasible measures that will reduce air quality impacts generated by the project.** "Feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors: (California Code of Regulations (CCR § 15364)). The California Environmental Quality Act (CEQA) requires that EIRs "describe measures which could minimize significant adverse impacts" (CCR §15126(c)). Additionally, the CCR requires that "a public agency should not approve a project as proposed if there are feasible alternatives or mitigation measures that would substantially lessen any significant effects that the project would have on the environment " (CCR § 15021(a)(2)). For each potential adverse impact, mitigation measures should be identified to reduce impacts below air quality threshold levels of significance. Therefore, the EIR should identify which mitigation measures will be included in the project, and how each mitigation measure will be implemented. The reduction of air quality impacts from implementation of mitigation measures should be quantified to the extent possible. If a measure

cannot be quantified a qualitative discussion should be provided explaining the benefits of the proposed mitigation measure. The EIR should discuss how project design modifications could reduce project impacts.

Mitigation measures are emission reduction measures beyond those required in Section 3. The section should identify which mitigation measures will be included in the project, and how each mitigation measure will be implemented. Site design, equipment alternatives, construction and operational measures that would reduce emissions should be identified. The reduction of air quality impacts from implementation of mitigation measures should be quantified when possible. Mitigation measures must be included in the EIR that reduce the emissions of reactive organic gases, nitrogen oxides, and PM10 to the fullest extent possible. Site design and building construction measures that would reduce air quality impacts should be included.

District staff is available to meet with you and/or the applicant to further discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call me at (559) 230-5800 or Mr. Dave Mitchell, Planning Manager, at (559) 230-5807 and provide the reference number at the top of the first page of this letter.

Sincerely,

Georgia Stewart

Georgia A Stewart
Air Quality Specialist
Central Region

*C: file*

April 11,2006
2114 Costa Del Sol
Pismo Beach, CA 93449

RECEIVED
APR 13 2006
CITY OF BAKERSFIELD
PLANNING DEPARTMENT

Marc Gauthier
City of Bakersfield
Planning Department
1715 Chester Avenue
Bakersfield, CA 93301

RE: Waste Water Treatment Plant #3 Ashe Road

My name is Genevieve Myers. I own 20 acres at 8846 Ashe Road. I had a small house on the property with a domestic well. (Domestic wells are shallow wells)

The City sewage plant percolated on property across the street from my little house and the water in the well turned yellow and had a lot of bacteria.

When I rented the house I told the renters that they could not drink or cook with the water. I thought the liability was too much, but before I demolished the house I had asked the City to supply me with water since the City has contaminated my well. They said "NO". I still believe the City should supply me with water.

All wells in the area that have a domestic well have yellow water. If you allow percolation at that location on Ashe Road all of the deep wells will be contaminated soon.

Why do you think the water was piped across Hwy 5 for farming?

I say "NO" percolation.

Sincerely,

Genevieve Myers

Genevieve Myers

SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL Company

RECEIVED

APR 14 2006

CITY OF BAKERSFIELD
PLANNING DEPARTMENT

April 11, 2006

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

Attention: Planning Department

Subject: Project: Wastewater Treatment Plant #3 Expansion & Upgrade

Please be advised that the division of the property shown on Project: Wastewater Treatment Plant #3 Expansion & Upgrade will not unreasonably interfere with the free and complete exercise of any easements and/or facilities held by Southern California Edison Company within the boundaries of said map.

This letter should not be construed as a subordination of the Company's rights, title and interest in and to said easement(s), nor should this letter be construed as a waiver of any of the provisions contained in said easement(s) or a waiver of costs for relocation of any affected facilities.

In the event that the development requires relocation of facilities, on the subject property, which facilities exist by right of easement or otherwise, the owner/developer will be requested to bear the cost of such relocation and provide Edison with suitable replacement rights. Such costs and replacement rights are required prior to the performance of the relocation.

If you have any questions, or need additional information in connection with the subject subdivision, please contact me at (714) 934-0808.

Steven D. Lowry
Title and Real Estate Services
Corporate Real Estate Department

cc: Daniel C. Pearson, RP&A

14799 Chestnut Street
Westminster, CA 92683

**ROADS DEPARTMENT**
**CRAIG M. POPE, P.E., Director**
2700 "M" STREET, SUITE 400
BAKERSFIELD, CA 93301-2370
Phone: (661) 862-8850
FAX: (661) 862-8851
Toll Free: (800) 552-5376 Option 5
TTY Relay: (800)735-2929
E-Mail: *roads@co.kern.ca.us*

**RESOURCE MANAGEMENT AGENCY**
**DAVID PRICE III, RMA DIRECTOR**
Community Development Program Department
Engineering & Surveying Services Department
Environmental Health Services Department
Planning Department
Roads Department

April 4, 2006

RECEIVED
APR 7 2006 MG
CITY OF BAKERSFIELD
PLANNING DEPARTMENT

City of Bakersfield
Planning Department
1715 Chester Avenue
Bakersfield, Ca 93301

Ref.: 8-4.2 WWTP #3 Expansion EIR

Attn.: Mr. Marc Gauthier, Principal Planner

Subject: Draft Environmental Impact Report for Wastewater Treatment Plant # 3 Expansion and Upgrade.

Dear Mr. Gauthier,

The notice of preparation shows that there is potentially a significant impact on traffic with the increase in trucks entering and exiting the site. We therefore would like to know if a traffic study has been performed to assess the impacts to the roadways and intersections. If a study has been done we would like to receive a copy for our review on comments. If you have any questions please call me at (661) 862-8881.

Sincerely,

Brian R. Blacklock

Brian R. Blacklock
Engineer I

STATE OF CALIFORNIA, RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

# DEPARTMENT OF CONSERVATION

OIL, GAS AND GEOTHERMAL RESOURCES

801 K STREET • MS 20-20 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 445-9686 • FAX 916 / 323-0424 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

RECEIVED
APR - 5 2006 MG
CITY OF BAKERSFIELD
PLANNING DEPARTMENT

April 3, 2006

Mr. Marc Gauthier
Bakersfield City Planning Department
1715 Chester Ave.
Bakersfield, CA 93301

Subject: Wastewater Treatment Plant #3
Portion of Sec. 33 T30S R26E MDB&M

Dear Mr. Gauthier:

The Department of Conservation's Division of Oil, Gas, and Geothermal Resources (Division) has reviewed the proposed project. The Division supervises the drilling, maintenance, and abandonment of oil, gas, and geothermal wells in California. The Division offers the following comments for your consideration.

The proposed project is located beyond the administrative boundary of the any oilfield. Presently, there is one plugged and abandoned well within the project boundaries. The specific well is as follows:

| Operator | Lease/Well | Approximate Location |
|---|---|---|
| SWEPI | "KCL" 71-33 | Fr. NE Cor 330' S & 990' W |

This well will need to be exposed for inspection, leakage testing, and GPS location prior to construction. Remedial operations may be required. The Division recommends that the well location, as determined, be recorded on all future maps related to this project with a 10-foot no-build radius. Also, a legible copy of the final project map should be submitted to the Division.

The Division recommends that no structure be built over or in proximity to an abandoned well location. Section 3208.1 of the Public Resources Code authorizes the State Oil and Gas Supervisor to order the reabandonment of a previously abandoned well when construction of any structure over or in the proximity of a well could result in a hazard. The cost of reabandonment operations is the responsibility of the owner or developer of the project upon which the structure will be located. If a well requiring reabandonment is on an adjacent property and near the common property line, the

Division recommends that the structure be set back sufficiently to allow future access to the well.

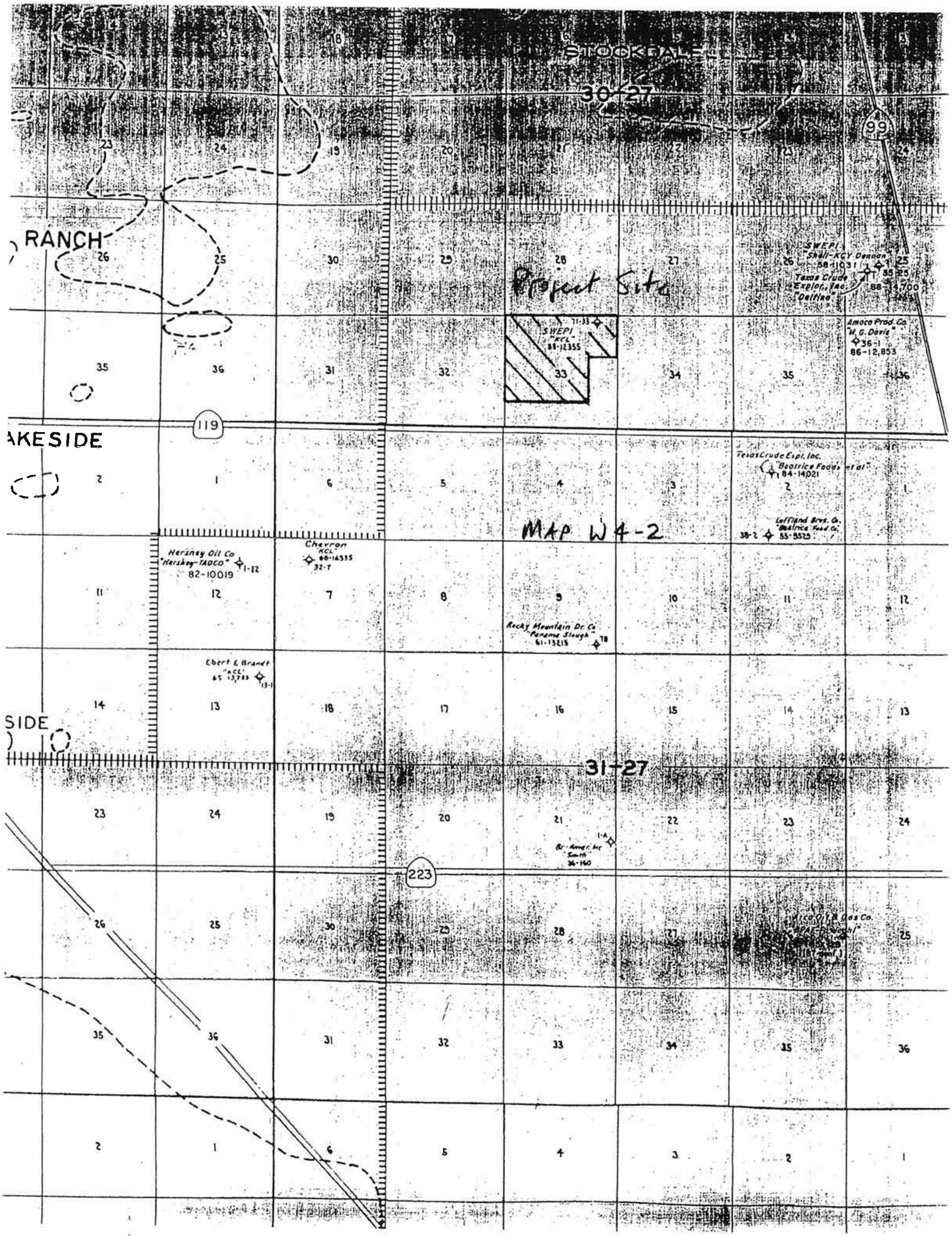
Regardless, if any other abandoned or unrecorded wells are uncovered or damaged during excavation or grading, remedial plugging operations may be required. This office must be contacted to obtain information on the requirements for and approval to perform remedial operations.

Thank you for the opportunity to comment on this project. If you have any questions, please call Tom Giallonardo at the Bakersfield district office: 4800 Stockdale Highway, Suite 417, Bakersfield, CA 93309; phone (661) 334-3663.

Sincerely,

Daniel J. Tuttle

Daniel J. Tuttle
Senior Oil and Gas Engineer



STOCKDALE
30-27
99
RANCH
Project Site
SWEPI
"Shell-KCY Dennan"
58-11031
Texas Crude
Explor., Inc.
"Delfino"
88-14,700
SWEPI
"KCL"
71-33
Amoco Prod. Co.
"M. G. Davis"
36-1
86-12,853
119
AKESIDE
TexasCrude Expl. Inc.
"Beatrice Foods et al"
84-14021
Leffland Bros. Co.
"Beatrice Food Co."
38-2
55-5529
MAP W4-2
Hersney Oil Co
"Hershey-TADCO"
1-12
82-10019
Chevron
"KCL"
32-7
Rocky Mountain Dr. Co
"Panama Slough"
61-13215
Ebert E Brandt
"KCL"
13-1
SIDE
31-27
223

# 15.3 AIR QUALITY ANALYSIS SUPPORTING DOCUMENTATION

IMPACT SCIENCES, INC.
3256 Penryn Road
Loomis, California 95650
Tel. 916.652.6300• Fax 916.652.5335

# LETTER OF TRANSMITTAL

JOB No. 735-02 DATE 9/6/06 VIA

U.S. Mail ☐
Overnight ☐
Priority Overnight ☐
Courier ☐

JOB NAME Bakersfield WWTP

## recipient

TO Quad Knopf
5080 California Avenue, Suite 400
Bakersfield, CA 93309

ATTENTION Mike Phillips

## description

Air Quality section for Draft EIR for WWTP No. 3 Expansion

## comments

Enclosed are (1) the air quality section for the Draft EIR, (2) list of references, and (3) technical appendices including emission calculations for construction, the WWTP operations, and associated mobile sources.

## sender

FROM David Deckman

# 15.3a URBEMIS2002 Output For Construction Scenarios

# Site Grading

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\Site Grading 083106.urb
Project Name: Bakersfield WWTP Site Grading
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

| *** 2007 *** | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day,unmitigated) | 7.65 | 46.78 | 65.92 | 0.00 | 11.80 | 1.80 | 10.00 |
| TOTALS (lbs/day, mitigated) | 7.65 | 46.78 | 65.92 | 0.00 | 6.80 | 1.80 | 5.00 |

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\Site Grading 083106.urb
Project Name: Bakersfield WWTP Site Grading
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: April, 2007
Construction Duration: 2
Total Land Use Area to be Developed: 20 acres
Maximum Acreage Disturbed Per Day: 1 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2007*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 10.00 | - | 10.00 |
| Off-Road Diesel | 7.58 | 46.70 | 64.45 | - | 1.80 | 1.80 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.07 | 0.08 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 7.65 | 46.78 | 65.92 | 0.00 | 11.80 | 1.80 | 10.00 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.00 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Asphalt On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Max lbs/day all phases | 7.65 | 46.78 | 65.92 | 0.00 | 11.80 | 1.80 | 10.00 |

Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Apr '07
Phase 2 Duration: 2 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 1 | Off Highway Trucks | 300 | 0.490 | 8.0 |
| 1 | Rubber Tired Loaders | 165 | 0.465 | 8.0 |
| 1 | Scrapers | 313 | 0.660 | 8.0 |

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2007*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 5.00 | - | 5.00 |
| Off-Road Diesel | 7.58 | 46.70 | 64.45 | - | 1.80 | 1.80 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.07 | 0.08 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 7.65 | 46.78 | 65.92 | 0.00 | 6.80 | 1.80 | 5.00 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.00 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Asphalt On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Max lbs/day all phases | 7.65 | 46.78 | 65.92 | 0.00 | 6.80 | 1.80 | 5.00 |

Construction-Related Mitigation Measures

Phase 2: Soil Disturbance: Regulation VIII
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 50%)
Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Apr '07
Phase 2 Duration: 2 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 1 | Off Highway Trucks | 300 | 0.490 | 8.0 |
| 1 | Rubber Tired Loaders | 165 | 0.465 | 8.0 |
| 1 | Scrapers | 313 | 0.660 | 8.0 |

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Regulation VIII
has been changed from off to on.

# Construction of Percolation Ponds

09/01/2006 3:58 PM

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\Bakersfield WWTP - Pond Grading (Using HCCD Data).urb
Project Name: Bakersfield WWTP - Pond Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

| *** 2007 *** | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day,unmitigated) | 27.18 | 170.65 | 230.87 | 0.00 | 526.29 | 6.71 | 519.58 |
| TOTALS (lbs/day, mitigated) | 27.18 | 170.65 | 230.87 | 0.00 | 266.51 | 6.71 | 259.80 |

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\Bakersfield WWTP - Pond Grading (Using HCCD Data).urb
Project Name: Bakersfield WWTP - Pond Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: June, 2007
Construction Duration: 2
Total Land Use Area to be Developed: 147 acres
Maximum Acreage Disturbed Per Day: 3.34 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2007*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 519.57 | - | 519.57 |
| Off-Road Diesel | 26.95 | 170.37 | 225.74 | - | 6.70 | 6.70 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.23 | 0.28 | 5.13 | 0.00 | 0.02 | 0.01 | 0.01 |
| Maximum lbs/day | 27.18 | 170.65 | 230.87 | 0.00 | 526.29 | 6.71 | 519.58 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.00 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Asphalt On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Max lbs/day all phases | 27.18 | 170.65 | 230.87 | 0.00 | 526.29 | 6.71 | 519.58 |

Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 2 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 1 | Crawler Tractors | 300 | 0.575 | 8.0 |
| 1 | Off Highway Trucks | 300 | 0.490 | 8.0 |
| 5 | Rubber Tired Loaders | 165 | 0.465 | 8.0 |
| 4 | Scrapers | 313 | 0.660 | 8.0 |

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2007*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 259.79 | - | 259.79 |
| Off-Road Diesel | 26.95 | 170.37 | 225.74 | - | 6.70 | 6.70 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.23 | 0.28 | 5.13 | 0.00 | 0.02 | 0.01 | 0.01 |
| Maximum lbs/day | 27.18 | 170.65 | 230.87 | 0.00 | 266.51 | 6.71 | 259.80 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.00 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Asphalt On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Max lbs/day all phases | 27.18 | 170.65 | 230.87 | 0.00 | 266.51 | 6.71 | 259.80 |

Construction-Related Mitigation Measures

Phase 2: Soil Disturbance: Regulation VIII
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 50%)
Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 2 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 1 | Crawler Tractors | 300 | 0.575 | 8.0 |
| 1 | Off Highway Trucks | 300 | 0.490 | 8.0 |
| 5 | Rubber Tired Loaders | 165 | 0.465 | 8.0 |
| 4 | Scrapers | 313 | 0.660 | 8.0 |

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Site Grading Fugitive Dust Option changed from Level 1 to Level 2
Phase 2 mitigation measure Soil Disturbance: Regulation VIII
has been changed from off to on.

# Demolition of Asphalt Paving

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\Desktop\Bakersfield WWTP - AC Demo (Using HCCD Data).urb
Project Name: Bakersfield WWTP Asphalt Demo
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

| *** 2007 *** | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day,unmitigated) | 5.56 | 34.98 | 47.18 | 0.00 | 3.87 | 1.27 | 2.60 |

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\Desktop\Bakersfield WWTP - AC Demo (Using HCCD Data).urb
Project Name: Bakersfield WWTP Asphalt Demo
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: April, 2007
Construction Duration: 1.18
Total Land Use Area to be Developed: 0 acres
Maximum Acreage Disturbed Per Day: 0 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2007*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 2.59 | - | 2.59 |
| Off-Road Diesel | 5.39 | 33.35 | 45.36 | - | 1.23 | 1.23 | 0.00 |
| On-Road Diesel | 0.10 | 1.55 | 0.35 | 0.00 | 0.05 | 0.04 | 0.01 |
| Worker Trips | 0.07 | 0.08 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 5.56 | 34.98 | 47.18 | 0.00 | 3.87 | 1.27 | 2.60 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.00 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Asphalt On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Max lbs/day all phases | 5.56 | 34.98 | 47.18 | 0.00 | 3.87 | 1.27 | 2.60 |

Phase 3 - Building Construction Assumptions: Phase Turned OFF
Start Month/Year for Phase 1: Apr '07
Phase 1 Duration: 1.18 months
Building Volume Total (cubic feet): 160339.000248
Building Volume Daily (cubic feet): 6168.761704
On-Road Truck Travel (VMT): 71.82
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 1 | Off Highway Trucks | 417 | 0.490 | 8.0 |
| 1 | Rubber Tired Loaders | 170 | 0.465 | 8.0 |
| 1 | Tractor/Loaders/Backhoes | 48 | 0.465 | 8.0 |

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Demolition Truck Hauling Miles/Round Trip changed from 30 to 6.3
Phase 1 mitigation measure Off-Road Diesel Exhaust: Regulation VIII
has been changed from off to on.

# On-Site Paving

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\On-Site AC Paving.urb
Project Name: Bakersfield On-Site AC Paving
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

| *** 2009 *** | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day,unmitigated) | 7.26 | 42.22 | 59.31 | 0.00 | 1.34 | 1.33 | 0.01 |

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\On-Site AC Paving.urb
Project Name: Bakersfield On-Site AC Paving
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: September, 2009
Construction Duration: 0.41
Total Land Use Area to be Developed: 0 acres
Maximum Acreage Disturbed Per Day: 0 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2009*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.29 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 6.87 | 41.38 | 57.85 | - | 1.31 | 1.31 | 0.00 |
| Asphalt On-Road Diesel | 0.05 | 0.77 | 0.18 | 0.00 | 0.02 | 0.02 | 0.00 |
| Asphalt Worker Trips | 0.04 | 0.07 | 1.28 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 7.26 | 42.22 | 59.31 | 0.00 | 1.34 | 1.33 | 0.01 |
| Max lbs/day all phases | 7.26 | 42.22 | 59.31 | 0.00 | 1.34 | 1.33 | 0.01 |

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Sep '09
Phase 3 Duration: 0.41 months
SubPhase Building Turned OFF
SubPhase Architectural Coatings Turned OFF
Start Month/Year for SubPhase Asphalt: Sep '09
SubPhase Asphalt Duration: 0.41 months
Acres to be Paved: 1.01
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 1 | Off Highway Trucks | 417 | 0.490 | 8.0 |
| 1 | Pavers | 132 | 0.590 | 8.0 |
| 1 | Paving Equipment | 111 | 0.530 | 8.0 |
| 1 | Rollers | 114 | 0.430 | 8.0 |

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths

# Off-Site Paving

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\Off-Site AC Paving.urb
Project Name: Bakersfield Off-Site AC Paving
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

| | | | | | PM10 | PM10 | PM10 |
|---|---|---|---|---|---|---|---|
| *** 2009 *** | ROG | NOx | CO | SO2 | TOTAL | EXHAUST | DUST |
| TOTALS (lbs/day,unmitigated) | 13.68 | 69.82 | 91.63 | 0.02 | 2.16 | 2.14 | 0.02 |

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\glu\My Documents\aqBakersfield WWTP\Construction URBEMIS\Off-Site AC Paving.urb
Project Name: Bakersfield Off-Site AC Paving
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: August, 2009
Construction Duration: 0.45
Total Land Use Area to be Developed: 0 acres
Maximum Acreage Disturbed Per Day: 0 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2009*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 2.71 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 10.47 | 62.66 | 88.46 | - | 1.95 | 1.95 | 0.00 |
| Asphalt On-Road Diesel | 0.45 | 7.08 | 1.65 | 0.02 | 0.20 | 0.19 | 0.01 |
| Asphalt Worker Trips | 0.05 | 0.09 | 1.53 | 0.00 | 0.01 | 0.00 | 0.01 |
| Maximum lbs/day | 13.68 | 69.82 | 91.63 | 0.02 | 2.16 | 2.14 | 0.02 |
| Max lbs/day all phases | 13.68 | 69.82 | 91.63 | 0.02 | 2.16 | 2.14 | 0.02 |

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Aug '09
Phase 3 Duration: .45 months
SubPhase Building Turned OFF
SubPhase Architectural Coatings Turned OFF
Start Month/Year for SubPhase Asphalt: Aug '09
SubPhase Asphalt Duration: 0.45 months
Acres to be Paved: 10.24
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 2 | Off Highway Trucks | 417 | 0.490 | 8.0 |
| 1 | Pavers | 132 | 0.590 | 8.0 |
| 1 | Paving Equipment | 111 | 0.530 | 8.0 |
| 1 | Rollers | 114 | 0.430 | 8.0 |

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths

# Construction of Wastewater Processes

URBEMIS 2002 For Windows 8.7.0

File Name: <Not Saved>
Project Name: Bakersfield Processes Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

| *** 2008 *** | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day,unmitigated) | 10.56 | 72.78 | 83.36 | 0.00 | 2.93 | 2.93 | 0.00 |

| *** 2009 *** | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| TOTALS (lbs/day,unmitigated) | 10.56 | 69.52 | 85.51 | 0.00 | 2.69 | 2.69 | 0.00 |

URBEMIS 2002 For Windows 8.7.0

File Name: <Not Saved>
Project Name: Bakersfield Processes Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: September, 2008
Construction Duration: 14
Total Land Use Area to be Developed: 0 acres
Maximum Acreage Disturbed Per Day: 0 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

| Source | ROG | NOx | CO | SO2 | PM10 TOTAL | PM10 EXHAUST | PM10 DUST |
|---|---|---|---|---|---|---|---|
| *** 2008*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 10.56 | 72.78 | 83.36 | - | 2.93 | 2.93 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.00 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Asphalt On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 10.56 | 72.78 | 83.36 | 0.00 | 2.93 | 2.93 | 0.00 |
| Max lbs/day all phases | 10.56 | 72.78 | 83.36 | 0.00 | 2.93 | 2.93 | 0.00 |
| *** 2009*** | | | | | | | |
| Phase 1 - Demolition Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 2 - Site Grading Emissions | | | | | | | |
| Fugitive Dust | - | - | - | - | 0.00 | - | 0.00 |
| Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Phase 3 - Building Construction | | | | | | | |
| Bldg Const Off-Road Diesel | 10.56 | 69.52 | 85.51 | - | 2.69 | 2.69 | 0.00 |
| Bldg Const Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Arch Coatings Off-Gas | 0.00 | - | - | - | - | - | - |
| Arch Coatings Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Off-Gas | 0.00 | - | - | - | - | - | - |
| Asphalt Off-Road Diesel | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 |
| Asphalt On-Road Diesel | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asphalt Worker Trips | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maximum lbs/day | 10.56 | 69.52 | 85.51 | 0.00 | 2.69 | 2.69 | 0.00 |
| Max lbs/day all phases | 10.56 | 69.52 | 85.51 | 0.00 | 2.69 | 2.69 | 0.00 |

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Sep '08
Phase 3 Duration: 14 months
Start Month/Year for SubPhase Building: Sep '08
SubPhase Building Duration: 14 months
Off-Road Equipment

| No. | Type | Horsepower | Load Factor | Hours/Day |
|---|---|---|---|---|
| 2 | Cranes | 190 | 0.430 | 8.0 |
| 1 | Other Equipment | 190 | 0.620 | 8.0 |
| 1 | Rubber Tired Dozers | 352 | 0.590 | 8.0 |
| 3 | Tractor/Loaders/Backhoes | 79 | 0.465 | 8.0 |

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths

# 15.3b Motor Vehicle Emissions Calculations

**2006 Bakersfield Wastewater Treatment Plant No. 3 (Existing)**
**Motor Vehicle Emissions**

| Category | | Units | | ROG | NOx | CO | SOx | PM10 |
|---|---|---|---|---|---|---|---|---|
| Sludge Trucks | Vehicle Class | | HHDT | | | | | |
| | Round Trips/Day | | 21 | | | | | |
| | One-Way Trip Length | miles | 13.6 | | | | | |
| | Emission Factor | g/mi | | 1.026 | 15.810 | 7.054 | 0.191 | 0.306 |
| | Annual Emissions | lbs/day | | 1.29 | 19.91 | 8.88 | 0.24 | 0.38 |
| | | tons/yr | | 0.005 | 0.070 | 0.031 | 0.001 | 0.001 |
| Screening Trucks to Landfill/Grit Trucks to Recycling Facility | Vehicle Class | | MHDT | | | | | |
| | Round Trips/Day | | 1 | | | | | |
| | One-Way Trip Length | miles | 18.7 | | | | | |
| | Emission Factor | g/mi | | 1.153 | 9.756 | 13.256 | 0.111 | 0.265 |
| | Annual Emissions | lbs/day | | 0.10 | 0.80 | 1.09 | 0.01 | 0.02 |
| | | tons/yr | | 0.007 | 0.063 | 0.085 | 0.001 | 0.002 |
| Employee Vehicles | Vehicle Class | | LDA/LHDT | | | | | |
| | Round Trips/Day | | 15 | | | | | |
| | One-Way Trip Length | miles | 10.8 | | | | | |
| | Emission Factor | g/mi | | 0.314 | 0.621 | 6.334 | 0.004 | 0.016 |
| | Annual Emissions | lb/day | | 0.22 | 0.44 | 4.52 | 0.00 | 0.01 |
| | | tons/yr | | 0.041 | 0.081 | 0.826 | 0.001 | 0.002 |
| Total | Daily Emissions | lbs/day | | 1.61 | 21.16 | 14.50 | 0.25 | 0.42 |
| | | tons/yr | | 0.053 | 0.213 | 0.942 | 0.002 | 0.005 |

Notes:
Emission factors were derived using EMFAC2002 for 2006, Kern County (San Joaquin Valley Air Basin).

**2006 EMFAC2002 Results**
**San Joaquin Valley Air Basin - Kern County**

Reactive Organic Gases

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 8194 | 3713 | 2774 | 6487 | 14681 | 435 | 1027 |
| ROG | tons/day | 2.184 | 1.664 | 1.237 | 2.901 | 5.085 | 0.553 | 1.162 |
| | g/mi | 0.24 | 0.41 | 0.40 | 0.41 | 0.31 | 1.15 | 1.03 |

Oxides of Nitrogen

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 8194 | 3713 | 2774 | 6487 | 14681 | 435 | 1027 |
| NOx | tons/day | 3.998 | 3.110 | 2.946 | 6.056 | 10.054 | 4.678 | 17.898 |
| | g/mi | 0.44 | 0.76 | 0.96 | 0.85 | 0.62 | 9.76 | 15.81 |

Carbon Monoxide

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 8194 | 3713 | 2774 | 6487 | 14681 | 435 | 1027 |
| CO | tons/day | 42.947 | 34.839 | 24.711 | 59.550 | 102.497 | 6.356 | 7.986 |
| | g/mi | 4.75 | 8.51 | 8.08 | 8.33 | 6.33 | 13.26 | 7.05 |

Sulfur Oxides

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 8194 | 3713 | 2774 | 6487 | 14681 | 435 | 1027 |
| SOx | tons/day | 0.034 | 0.022 | 0.015 | 0.037 | 0.071 | 0.053 | 0.216 |
| | g/mi | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.11 | 0.19 |

PM10

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 8194 | 3713 | 2774 | 6487 | 14681 | 435 | 1027 |
| PM10 | tons/day | 0.111 | 0.061 | 0.081 | 0.142 | 0.253 | 0.127 | 0.346 |
| | g/mi | 0.012 | 0.01 | 0.03 | 0.02 | 0.016 | 0.26 | 0.31 |

**Truck Trips Per Day at WWTP#3 during Full Build-Out 2010**

| | Build-out (trucks/day) | Days of the week |
|---|---|---|
| Sludge | 8-10 | M-F |
| Screenings to Landfill | 4 | M-F |
| Grit to Recycling Facility | 4 | M-F |
| Septage | 8 | M-F |
| Grease | 12 | M-F (just a few on the weekends) |
| **Total** | **38** | |

| Destination from WWTP3 | One-way Distance |
|---|---|
| WWTP 2 | 13.6 |
| Bena Landfill | 25.2 |
| Mt. Vernon Green Waste | 12.2 |
| Multiple Locations | 20 |
| Multiple Locations | 20 |

**Car Trips Per Day at WWTP#3**

| | Build-out (cars/day) | Days of the week |
|---|---|---|
| Operational (Commuting) | 30 | M-F (weekends will be 1-2 employees per day) |
| **Total** | **30** | |

**2010 Bakersfield Wastewater Treatment Plant No. 3 (Full Build-Out)**
**Motor Vehicle Emissions**

| Category | | Units | | ROG | NOx | CO | SOx | PM10 |
|---|---|---|---|---|---|---|---|---|
| Sludge Trucks | Vehicle Class | | HHDT | | | | | |
| | Round Trips/Day | | 10 | | | | | |
| | One-Way Trip Length | miles | 13.6 | | | | | |
| | Emission Factor | g/mi | | 0.722 | 10.758 | 4.771 | 0.021 | 0.202 |
| | Annual Emissions | lbs/day | | 0.43 | 6.45 | 2.86 | 0.01 | 0.12 |
| | | tons/yr | | 0.079 | 1.177 | 0.522 | 0.002 | 0.022 |
| Screening Trucks to Landfill | Vehicle Class | | MHDT | | | | | |
| | Round Trips/Day | | 4 | | | | | |
| | One-Way Trip Length | miles | 25.2 | | | | | |
| | Emission Factor | g/mi | | 0.759 | 6.871 | 8.910 | 0.014 | 0.205 |
| | Annual Emissions | lbs/day | | 0.34 | 3.05 | 3.96 | 0.01 | 0.09 |
| | | tons/yr | | 0.062 | 0.557 | 0.723 | 0.001 | 0.017 |
| Grit Trucks to Recycling Facility | Vehicle Class | | MHDT | | | | | |
| | Round Trips/Day | | 4 | | | | | |
| | One-Way Trip Length | miles | 12.2 | | | | | |
| | Emission Factor | g/mi | | 0.759 | 6.871 | 8.910 | 0.014 | 0.205 |
| | Annual Emissions | lbs/day | | 0.16 | 1.48 | 1.92 | 0.00 | 0.04 |
| | | tons/yr | | 0.030 | 0.270 | 0.350 | 0.001 | 0.008 |
| Septage Trucks | Vehicle Class | | HHDT | | | | | |
| | Round Trips/Day | | 8 | | | | | |
| | One-Way Trip Length | miles | 20 | | | | | |
| | Emission Factor | g/mi | | 0.722 | 10.758 | 4.771 | 0.021 | 0.202 |
| | Annual Emissions | lbs/day | | 0.51 | 7.59 | 3.37 | 0.01 | 0.14 |
| | | tons/yr | | 0.093 | 1.385 | 0.614 | 0.003 | 0.026 |
| Grease Trucks | Vehicle Class | | MHDT | | | | | |
| | Round Trips/Day | | 12 | | | | | |
| | One-Way Trip Length | miles | 20 | | | | | |
| | Emission Factor | g/mi | | 0.759 | 6.871 | 8.910 | 0.014 | 0.205 |
| | Annual Emissions | lb/day | | 0.80 | 7.27 | 9.43 | 0.02 | 0.22 |
| | | tons/yr | | 0.147 | 1.327 | 1.721 | 0.003 | 0.040 |
| Employee Vehicles | Vehicle Class | | LDA/LHDT | | | | | |
| | Round Trips/Day | | 30 | | | | | |
| | One-Way Trip Length | miles | 10.8 | | | | | |
| | Emission Factor | g/mi | | 0.187 | 0.397 | 4.151 | 0.004 | 0.016 |
| | Annual Emissions | lb/day | | 0.27 | 0.57 | 5.93 | 0.01 | 0.02 |
| | | tons/yr | | 0.049 | 0.103 | 1.082 | 0.001 | 0.004 |
| Total | Daily Emissions | lbs/day | | 2.51 | 26.41 | 27.46 | 0.06 | 0.64 |
| | | tons/yr | | 0.459 | 4.820 | 5.012 | 0.010 | 0.116 |

Notes:
Emission factors were derived using EMFAC2002 for 2010, Kern County (San Joaquin Valley Air Basin).

**2010 EMFAC2002 Results**
**San Joaquin Valley Air Basin - Kern County**

Reactive Organic Gases

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 9319 | 4257 | 3130 | 7387 | 16706 | 509 | 1226 |
| ROG | tons/day | 1.412 | 1.110 | 0.922 | 2.032 | 3.444 | 0.426 | 0.976 |
| | g/mi | 0.14 | 0.24 | 0.27 | 0.25 | 0.19 | 0.76 | 0.72 |

Oxides of Nitrogen

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 9319 | 4257 | 3130 | 7387 | 16706 | 509 | 1226 |
| NOx | tons/day | 2.774 | 2.231 | 2.305 | 4.536 | 7.310 | 3.855 | 14.539 |
| | g/mi | 0.27 | 0.48 | 0.67 | 0.56 | 0.40 | 6.87 | 10.76 |

Carbon Monoxide

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 9319 | 4257 | 3130 | 7387 | 16706 | 509 | 1226 |
| CO | tons/day | 31.267 | 25.405 | 19.769 | 45.174 | 76.441 | 4.999 | 6.448 |
| | g/mi | 3.04 | 5.41 | 5.73 | 5.55 | 4.15 | 8.91 | 4.77 |

Sulfur Oxides

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 9319 | 4257 | 3130 | 7387 | 16706 | 509 | 1226 |
| SOx | tons/day | 0.037 | 0.021 | 0.016 | 0.037 | 0.074 | 0.008 | 0.028 |
| | g/mi | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 |

PM10

| | | Light-Duty Autos | Light Duty Trucks 1 | Light-Duty Trucks 2 | Light-Duty Trucks | Light-Duty Autos and Trucks | Medium HD Diesel Trucks | Heavy HD Diesel Trucks |
|---|---|---|---|---|---|---|---|---|
| VMT | 1000 mi/day | 9319 | 4257 | 3130 | 7387 | 16706 | 509 | 1226 |
| PM10 | tons/day | 0.125 | 0.065 | 0.096 | 0.161 | 0.286 | 0.115 | 0.273 |
| | g/mi | 0.012 | 0.01 | 0.03 | 0.02 | 0.016 | 0.20 | 0.20 |

# 15.3c Section 7- General Calculations

# SECTION 7

# GENERAL CALCULATIONS

Emissions of NOx, CO, VOC, PM10, SOx and TAC will occur during the operation of the dual fuel heaters, diesel engines, digester gas flare, digester gas engines and the various wastewater treatment processes. The methodology that was utilized to calculate these emissions is presented below.

## 7.1 CRITERIA POLLUTANTS

This section presents the emissions and the estimation methodology for criteria pollutants – NOx, CO, VOC, PM10 and SOx, that will occur during the operation of Plant 3. The emissions have been developed for the post modification total flow of 32 mgd. A summary of the total criteria pollutant emissions from all sources is shown in Table 7-1. Emissions from individual source groups are discussed below.

### *7.1.1 Wastewater Operations*

The BWTP consists of preliminary/primary, biological, and post-biological treatment systems as well as a solids handling facility. Table 7-2 presents the process units at the expanded BWTP. In order to control the emissions of volatile organic compounds (VOCs) from the expanded BWTP, emissions from the significant VOC emitting process units will be controlled using two biofilters. Table 7-2 also provides the details of process units which will be controlled for VOC emissions and the expected VOC controlled efficiencies.

The South Coast Air Quality Management District (SCAQMD) adopted Rule 1179, Publicly Owned Treatment Works (POTWs) Operations on June 7, 1991. The Rule required POTWs with design capacities equal to or greater than 10 mgd to submit VOC emission inventories. The Rule allowed the pooling of resources among POTWs to prepare the required information.

Twelve participating agencies formed a collective program known as Joint Emissions Inventory Program (JEIP). These 12 participating agencies operated a total of 22 facilities located in the South Coast Air Basin under the jurisdiction of the SCAQMD, with capacities greater than 10 mgd. Table 7-3 provides a list of the 12 participating agencies.

The SCAQMD Rule 1179 Emission Inventory Report (EIR) was submitted to the SCAQMD in October 1993. The JEIP emission inventories covered 43 processes used at the 22 POTWs. In order to facilitate analysis of basin wide emission results, unit processes were combined into the following process groups:

- Preliminary/Primary Treatment
- Biological Treatment
- Post-biological Treatment
- Solids Handling
- Combustion

The EIR provided overall JEIP POTW emission inventory by unit process, arranged according to process group. The EIR also provided following information for each unit process:

- Number of POTWs with this process in operation
- Basinwide flow entering facilities using this unit process
- Annual VOC emissions
- Annual VOC emissions per mgd (flow) into the facility
- Range of annual VOC emissions per mgd

Table 7-4 presents the VOC emission factors for various unit processes. It should be noted that the emission factors represent uncontrolled VOC emissions (personal communication with Gaurang Rawal, SCAQMD on July 11, 2006). Table 7-5 presents the details of unit processes at the expanded BWTP and corresponding unit processes in the SCAQMD Rule 1179 EIR. The emissions of VOCs from various process units at the expanded BWTP were estimated by multiplying the emission factors from Table 7-4 (in lb/yr/mgd) with the design flow rate of 32 mgd.

Table 7-6 presents the estimated VOC emissions from various process units at the expanded BWTP. This table also presents the total VOC emissions from all the process units (non-combustion sources) at the BWTP.

As shown in Table 7-6, the total annual VOC emissions from the expanded BWTP will be 9.6 tons. Additional details of VOC emission calculations are provided in Appendix A.

### *7.1.2 Digester Gas Engines*

Table 7-7 presents the estimated criteria pollutant emissions from the two digester gas engines. The emission estimates for NOx, CO, and VOC are based on BACT guidelines (in g/bhp-hr) of the SJVAPCD for digester gas engines (Guideline 3.3.13). Since the final selection of manufacturer of the engines has not been yet made, emission factors provided by the engine manufacturer were not available. However, the selected engines will meet the published guidelines. The PM10 emission estimate is based on a source test of the digester gas performed at the Inland Empire Utility Agency. Finally, the SOx emission estimate is based on a fuel sulfur limit of 20 ppmv, which would result in emissions per unit of less than 2 lb/day. The SOx BACT sulfur requirement of 99% control (for dry absorption of H2S from fuel gas) from Guideline 3.3.13 would not apply. Based on operational experience with the Sulfatreat system at Plant 2, the 20 ppmv limit is expected to be met easily.

The detailed emission calculations and references are provided in Appendix A.

### *7.1.3 Dual Fuel Heaters*

Table 7-8 presents the estimated criteria pollutant emissions from the dual fuel process heaters. As described previously in Section __, the heaters will be primarily fired with natural gas. Digester gas will be used only during the downtime of the digester gas engines, when the gas is routed to the heaters. Therefore, emission estimates from the process heaters have been developed with natural gas emission factors.

The largest of the process heaters will be 1.53 MMBtu/hr, so all process heaters will be in the Rule 4308 range of 0.075 MMBtu/hr to 2.0 MMBtu/hr, and will be subject to the requirements of Rule 4308. NOx BACT limits from Guideline 1.1.1 will not apply because emissions from each heater will not exceed 2 lb/day. Therefore, 0.036 lb NOx/MMBtu will be the applicable limit from Table 1 of Rule 4308. Since emissions from the largest heater (1.53 MMBtu/hr x 0.036 lb/MMBtu x 24 hr/day = 1.3 lb/day) will be less than 2 lb/day, the emissions from all other heaters individually will not exceed 2 lb/day. Therefore, low NOx burners will not be required for any of the eight heaters designed for this plant.

Table 1 in Rule 4308 specifies a CO limit of 400 ppm at 3% O2. The F-factor method for natural gas (8710 dscf/MMBtu) was utilized to estimate the lb CO/hr emissions with the 8.48 MMBtu/hr combined rating of all eight heaters. The emission estimates for VOC, PM10 and SOx are also based on lb/MMscf emission factors from Table 1.4-1 from AP-42.

The detailed emission calculations and references are provided in Appendix A.

### *7.1.4 Emergency Flare*

Table 7-9 presents the estimated criteria pollutant emissions from the emergency flare. The emission estimates for NOx, CO, VOC and PM10 are based on BACT guideline 1.4.4A (in lb/MMBtu) of the SJVAPCD for a municipal flare. The limits from Guideline 1.4.4A were utilized to determine emissions in the absence of data from the manufacturer. As shown, emissions will exceed 2 lb/day over a 24-hour emergency period, so the flare will be subject to BACT requirements.

It should be noted that the limits from Guideline 1.4.4A were used only for the purposes of calculating emissions, and will not be BACT requirements that will be applicable. The applicable BACT requirements will be those from Guideline 1.4.4.

In case of an emergency, untreated digester gas will be routed to the flare. Therefore, emissions for SOx were calculated for a sulfur concentration of 1000 ppm that was measured during a source test of untreated digester gas.

The detailed emission calculations and references are provided in Appendix A.

### *7.1.5 Emergency Diesel Engines*

Table 7-10 presents the estimated criteria pollutant emissions from the emergency diesel engines. The emission estimates for NOx, CO, VOC and PM10 are based on U.S.EPA Nonroad Regulations. The air blower building engine is a Tier 3 engine, while all others are Tier 2 engines. In the Nonroad Regulations, the g/bhp-hr limit for NOx and HC is specified as a combined NOx + HC limit. Individual NOx and HC limits were determined from "Exhaust and Crankcase Emission Factors for Nonroard Engine Modeling Compression-Ignition, EPA420-P-04-009, April 2004."

For SO2, a fuel sulfur limit of 500 ppmw for Low Sulfur diesel was utilized to calculate emissions with the gal/hr usage. Since the manufacturer of the engine has not been finalized, gal/hr fuel usage of Caterpillar engines were used.

The detailed emission calculations and references are provided in Appendix A.

## 7.2 TAC EMISSIONS

The California Air Resources Board has identified a list of 244 substances as toxic air contaminants (TAC), which includes the 188 hazardous air pollutants (HAPs) that have been identified by the U.S.EPA. This section presents the emissions and the estimation methodology for TAC/HAP that will occur during the operation of Plant 3.

Emissions from the wastewater, flare and digester gas engines were quantified utilizing a spreadsheet that was provided by the SJVAPCD. To quantify emissions from wastewater, this spreadsheet requires the plant influent mgd as an input. Inputs of 32 mgd and 8760 hours of operation were utilized. Based on the influent mgd, influent rates (lb/year) of individual TAC are estimated based on programmed influent concentrations. Emissions for each TAC are then calculated for primary treatment, secondary treatment and sludge drying.

For the flares and digester gas engines, the spreadsheet requires the MMCFH and the hours of operation to be input. For the flares, the MMSCFH and 200 hours were utilized with “external” source emission factors, while for the digester gas engines, the total MMSCFH for both engines and 8760 annual hours were used with “internal” source emission factors.

To estimate TAC emissions from the heaters and diesel engines, another spreadsheet provided by the SJVAPCD was utilized that is based on Ventura County APCD emission factors. For the heaters, the combined MMSCFH for eight heaters and 8760 hours were utilized with “external” source emission factors, while for the diesel engines, the total 1000 gal/hr for five engines and 200 annual hours were used with “internal” source emission factors.

The summary of Plant 3 TAC emissions are presented in Table 7-11.

**Table 7-1**
**Summary Of Plant 3 Criteria Pollutant Emissions**

| Pollutant | Wastewater TPY | DG Engines TPY | Heaters TPY | Flare TPY | Diesel Engines TPY | Total TPY |
|---|---|---|---|---|---|---|
| VOC | 9.64 | 7.80 | 0.22 | 0.12 | 0.50 | 18.28 |
| NOx | | 18.66 | 1.36 | 0.11 | 7.46 | 27.59 |
| CO | | 77.61 | 11.17 | 0.25 | 4.46 | 93.49 |
| PM10 | | 1.40 | 0.26 | 0.03 | 0.26 | 1.95 |
| SOx | | 1.05 | 0.00 | 0.51 | 0.14 | 1.70 |

## Table 7-2
## Details of the Process Units at the Expanded Bakersfield Wastewater Treatment Plant

| Unit Process | Number of Units | Volatile Organic Compounds<br><br>Control Efficiency (%) |
|---|---|---|
| ***Preliminary/Primary Treatment*** | | |
| Headworks-Ducted | 1 | 90 |
| Septage and Grease Receiving Facility | 1 | 90 |
| Grit Chambers – Pista Type | 2 | 90 |
| Primary Clarifiers | 8 | 90 |
| Trickling Filter Recirculation Station | 1 | 90 |
| Trickling Filter By-pass Structure | 1 | 90 |
| Flow Distribution and Junction Boxes | 4 | 90 |
| | | |
| ***Biological Treatment*** | | |
| Activated Sludge – Diffused Air | 8 | No Control |
| Trickling Filters | 4 | No Control |
| | | |
| ***Post-Biological Treatment*** | | |
| Secondary Clarifiers | 4 | No Control |
| Final Effluent Percolation Ponds | 10 | No Control |
| ***Solids Handling*** | | |
| Dissolved Air Flotation Units | 2 | 90 |
| Sludge Digestion – Anaerobic | 8 | No Control |
| Sludge Dewatering - Centrifuges | 3 | No Control |
| Sludge Cake Handling – Conveyor Belts | 1 lot | 90 |
| Sludge Cake Truck Loading Operations | 1 lot | 90 |

## Table 7-3
## List of Participating Agencies in the Development of SCAQMD Rule 1179 VOC Emission Inventory Report

| Participating Agencies |
|---|
| County Sanitation Districts of Los Angeles County |
| City of Los Angeles Bureau of Sanitation |
| County Sanitation Districts of Orange County |
| Chino Basin Municipal Water District |
| City of Riverside Department of Public Works |
| City of San Bernardino Water Department |
| Las Virgenes Municipal Water District |
| South East Regional Reclamation Authority |
| Aliso Water Management Agency |
| Eastern Municipal Water District |
| City of Palm Springs |
| Irvine Ranch Water District |

## Table 7- 4
## VOC Emissions Summary by JEIP Unit Process

| Unit Process | No. of Plants with Process | Total Liquid Flow (mgd) | Flow-Related Average VOC Emissions (lb/yr/mgd) |
|---|---|---|---|
| ***Preliminary/Primary Treatment*** | | | |
| Headworks-Ducted | 8 | 902 | 86.37 |
| Septage Dumping Facility | 2 | 334 | 0.29 |
| Grit Removal – Non-aerated | 1 | 16 | 0.60 |
| Primary Sedimentation | 12 | 953 | 36.69 |
| Flow Equalization – Primary Effluent | 2 | 17 | 106.96 |
| ***Biological Treatment*** | | | |
| Activated Sludge – Diffused Air | 18 | 537 | 185.75 |
| Trickling Filters | 4 | 49 | 111.70 |
| ***Post-Biological Treatment*** | | | |
| Secondary Clarifiers | 25 | 999 | 12.29 |
| Final Effluent Evaporation Ponds | 3 | 25 | 523.56 |
| ***Solids Handling*** | | | |
| Dissolved Air Flotation | 11 | 683 | 12.28 |
| Sludge Digestion - Anaerobic | 13 | 1018 | 0.04 |
| Sludge Dewatering - Centrifuges | 3 | 650 | 6.65 |
| Sludge Cake Handling – Conveyor Belts | 9 | 815 | 0.03 |
| Sludge Cake Truck Loading Operations | 8 | 755 | 1.73 |

## Table 7- 5
## Details of Unit Processes at the Expanded Bakersfield Wastewater Treatment Plant and Corresponding Unit Processes in the SCAQMD Rule 1179 Emission Inventory Report

| Bakersfield Unit Process | SCAQMD Rule 1179 Unit Process | VOC Control Efficiency |
|---|---|---|
| ***Preliminary/Primary Treatment*** | ***Preliminary/Primary Treatment*** | |
| Headworks-Ducted | Headworks-Ducted | 90 percent |
| Septage and Grease Receiving Facility | Septage Dumping Facility | 90 percent |
| Grit Chambers – Pista Type | Grit Chambers – Non-aerated | 90 percent |
| Primary Clarifiers | Primary Sedimentation | 90 percent |
| Trickling Filter Recirculation Station, Trickling Filter By-pass Structure, and Flow Distribution and Junction Boxes | Flow Equalization – Primary Effluent | 90 percent |
| ***Biological Treatment*** | ***Biological Treatment*** | |
| Activated Sludge – Diffused Air | Activated Sludge – Diffused Air | No Control |
| Trickling Filters | Trickling Filters | No Control |
| ***Post-Biological Treatment*** | ***Post-Biological Treatment*** | |
| Secondary Clarifiers | Secondary Clarifiers | No Control |
| Final Effluent Percolation Ponds | Final Effluent Evaporation Ponds | No Control |
| ***Solids Handling*** | ***Solids Handling*** | |
| Dissolved Air Flotation Units | Dissolved Air Flotation Units | 90 percent |
| Sludge Digestion – Anaerobic | Sludge Digestion, Anaerobic, Fixed Covers | No Control |
| Sludge Dewatering - Centrifuges | Sludge Dewatering - Centrifuges | No Control |
| Sludge Cake Handling – Conveyor Belts | Sludge Cake Handling – Conveyor Belts | 90 percent |
| Sludge Cake Truck Loading Operations | Sludge Cake Truck Loading Operations | 90 percent |

**Table 7-6**
**Estimated VOC Annual Emissions from Various BWTP Process Units**

| Process Unit | Annual VOC Emissions, lb/yr |
|---|---|
| ***Preliminary/Primary Treatment*** | |
| Headworks-Ducted | 276.4 |
| Septage and Grease Receiving Facility | 0.9 |
| Grit Chambers, Pista Type | 1.9 |
| Primary Clarifiers | 117.4 |
| Trickling Filter Recirculation Station, Trickling Filter By-pass Structure, and Flow Distribution and Junction Boxes | 342.3 |
| ***Sub-Total (lbs/yr)*** | ***738.9*** |
| ***Biological Treatment*** | |
| Activated Sludge – Diffused Air | 5944.0 |
| Trickling Filters | 3574.4 |
| ***Sub-Total (lbs/yr)*** | ***9,518.4*** |
| | |
| ***Post-Biological Treatment*** | |
| Activated Sludge – Diffused Air | 393.3 |
| Trickling Filters | 8377.0 |
| ***Sub-Total (lbs/yr*** | ***8,770.3*** |
| ***Solids Handling*** | |
| Dissolved Air Flotation Units | 39.3 |
| Sludge Digestion - Anaerobic | 1.3 |
| Sludge Dewatering - Centrifuges | 212.8 |
| Sludge Cake Handling – Conveyor Belts | 0.1 |
| Sludge Cake Truck Loading Operations | 5.5 |
| ***Sub-Total (lbs/yr)*** | 259.0 |
| **Total Emissions from the BWTP, lbs/yr** | ***19,286.6*** |
| **Total Emissions from the BWTP, tons/yr** | **9.6** |

**Table 7-7**
**Digester Gas Engine Emissions**

| Pollutant | Emission Factor g/hp-hr | Hourly Max Emissions lb/hr | Daily Emissions lb/day | Annual Emissions TPY |
|---|---|---|---|---|
| NOx | 0.600 | 4.26 | 102.24 | 18.66 |
| CO | 2.500 | 17.72 | 425.28 | 77.61 |
| VOC | 0.250 | 1.78 | 42.72 | 7.80 |
| PM10 | 0.046 | 0.32 | 7.68 | 1.40 |
| SO2 | 0.034 | 0.24 | 5.76 | 1.05 |

**Table 7-8**
**Dual Fuel Heater Emissions**

| Pollutant | Emission Factor | Units | Emissions | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | TPY |
| NOx | 0.036 | lb/MMBtu | 0.31 | 7.44 | 1.36 |
| CO | 0.30 | lb/MMBtu | 2.55 | 61.20 | 11.17 |
| VOC | 5.5 | lb/MMscf | 0.05 | 1.20 | 0.22 |
| PM10 | 7.6 | lb/MMscf | 0.06 | 1.44 | 0.26 |
| SO2 | 0.6 | lb/MMscf | 0.00 | 0.00 | 0.00 |

**Table 7-9**
**Emergency Flare Emissions**

| Pollutant | Emission Factor lb/MMBtu | Emissions | | |
|---|---|---|---|---|
| | | lb/hr | lb/day | TPY |
| NOx | 0.067 | 1.11 | 26.64 | 0.11 |
| CO | 0.150 | 2.48 | 59.52 | 0.25 |
| VOC | 0.070 | 1.16 | 27.84 | 0.12 |
| PM10 | 0.020 | 0.33 | 7.92 | 0.03 |
| $SO_2$ | 0.307 | 5.07 | 121.58 | 0.507 |

## Table 7-10
## Emergency Diesel Engine Emissions

| BHP | Emission Factor, g/bhp-hr | | | | Emissions, lb/hr | | | | | Emissions, TPY | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOx | HC | CO | PM | NOx | HC | CO | PM | SO2 | NOx | HC | CO | PM | SO2 |
| 1072.8 | 4.5 | 0.3 | 2.6 | 0.15 | 10.6 | 0.7 | 6.1 | 0.4 | 0.2 | 1.1 | 0.1 | 0.6 | 0.0 | 0.02 |
| 3017.3 | 4.5 | 0.3 | 2.6 | 0.15 | 29.9 | 2.0 | 17.3 | 1.0 | 0.6 | 3.0 | 0.2 | 1.7 | 0.1 | 0.06 |
| 1341.0 | 4.5 | 0.3 | 2.6 | 0.15 | 13.3 | 0.9 | 7.7 | 0.4 | 0.2 | 1.3 | 0.1 | 0.8 | 0.0 | 0.02 |
| 670.5 | 2.8 | 0.2 | 2.6 | 0.15 | 4.1 | 0.3 | 3.8 | 0.2 | 0.1 | 0.4 | 0.0 | 0.4 | 0.0 | 0.01 |
| 1676.3 | 4.5 | 0.3 | 2.6 | 0.15 | 16.6 | 1.1 | 9.6 | 0.6 | 0.3 | 1.7 | 0.1 | 1.0 | 0.1 | 0.03 |
| Total emissions | | | | | | | | | | 7.5 | 0.5 | 4.5 | 0.3 | 0.1 |

## Table 7-11
## Summary Of Plant 3 TAC Emissions

| Pollutant | CAS No | Wastewater TPY | DGE's TPY | Heaters TPY | Flare TPY | Diesel Engines TPY | Total TPY |
|---|---|---|---|---|---|---|---|
| Ammonia | 7664417 | 3.4234 | 0.0045 | - | 0.0000 | - | 3.428 |
| Acetaldehyde | 75070 | - | - | 0.0001 | - | 0.0313 | 0.031 |
| Acrolein | 107028 | - | - | 0.0001 | - | 0.0014 | 0.001 |
| Arsenic | 7440382 | - | - | - | - | 0.0001 | 0.000 |
| Benzene | 71432 | 0.0079 | 0.0016 | 0.0003 | 0.0000 | 0.0074 | 0.017 |
| Beryllium | 7440417 | - | - | - | - | 0.0000 | 0.000 |
| 1,3-Butadiene | 106-99-0 | - | - | - | - | 0.0087 | 0.009 |
| Cadmium | 7440439 | - | - | - | - | 0.0001 | 0.000 |
| Chloroform | 67663 | 0.1146 | - | - | - | - | 0.115 |
| Chlorobenzene | 108907 | - | 0.0004 | - | 0.0000 | 0.0000 | 0.000 |
| Copper | 7440508 | - | - | - | - | 0.0002 | 0.000 |
| !,4,Dichlorobenzene | 106467 | 0.0650 | - | - | - | - | 0.065 |
| Dioxins | 123911 | - | - | - | - | 0.0000 | 0.000 |
| Ethyl Benzene | 100414 | 0.0307 | 0.0047 | 0.0003 | 0.0001 | 0.0004 | 0.036 |
| Formaldehyde | 50000 | - | 0.0927 | 0.0006 | 0.0044 | 0.0689 | 0.167 |
| Furans | | - | - | - | - | 0.0000 | 0.000 |
| Hexane | 110543 | - | - | 0.0002 | - | 0.0011 | 0.001 |
| Hex Chrome | 18540299 | - | - | - | - | 0.0000 | 0.000 |
| Hydrogen Chloride | 7647010 | - | 0.5251 | - | 0.0000 | 0.0074 | 0.533 |
| Hydrogen Sulfide | 7783064 | 0.7038 | 0.1061 | - | 0.0035 | - | 0.813 |
| Lead | 7439921 | - | - | - | - | 0.0003 | 0.000 |

## Table 7-11 (contd)
## Summary Of Plant 3 TAC Emissions

| Pollutant | CAS No | Wastewater TPY | DGE's TPY | Heaters TPY | Flare TPY | Diesel Engines TPY | Total TPY |
|---|---|---|---|---|---|---|---|
| Manganese | 7439965 | - | - | - | - | 0.0001 | 0.000 |
| Mercury | 7439976 | - | - | - | - | 0.0001 | 0.000 |
| Methyl Chloroform | 71556 | - | 0.0008 | - | 0.0000 | - | 0.001 |
| Methylene Chloride | 75092 | 0.1090 | 0.0158 | - | 0.0003 | - | 0.125 |
| Naphthalene | 91203 | - | - | - | - | 0.0008 | 0.001 |
| Nickel | 7440020 | - | - | - | - | 0.0002 | 0.000 |
| PAH's | | - | - | - | - | 0.0014 | 0.001 |
| Perchloroethylene | 127184 | - | 0.0000 | - | 0.0000 | - | 0.000 |
| Phenol | 108952 | 0.0334 | - | - | - | - | 0.033 |
| Propylene | 115071 | - | - | 0.0252 | - | - | 0.025 |
| Selenium | 7782492 | - | - | - | - | 0.0001 | 0.000 |
| Styrene | 100425 | 0.0683 | - | - | - | - | 0.068 |
| Toluene | 108883 | 0.0669 | 0.0017 | 0.0013 | 0.0000 | 0.0042 | 0.074 |
| Total Chrome | | - | - | - | - | 0.0000 | 0.000 |
| 1,1,1,Trichoroethane | 71556 | 0.0370 | - | - | - | - | 0.037 |
| Trichloroethylene | 79061 | 0.0360 | 0.0000 | - | 0.0000 | - | 0.036 |
| Vinyl Chloride | 75014 | - | 0.0012 | - | 0.0000 | - | 0.001 |
| Vinylidene Chloride | 75354 | - | 0.0001 | - | 0.0000 | - | 0.000 |
| Xylene | 1210 | 0.0800 | 0.0209 | 0.0009 | 0.0002 | 0.0017 | 0.104 |
| Zinc | 7440666 | - | - | - | - | 0.0009 | 0.001 |
| Total, TPY | | | | | | | 5.726 |

# Appendix A

## City of Bakersfield, Plant 3
## Criteria Pollutant Emissions
## Digester Gas Power Generator

**Process Description:** Power Generator
**No. of Devices:** 2
**Process Equipment Description:** 1607.1 bhp Caterpillar (or equivalent) Engine
**Fuel Type:** Digester Gas
**Process Units:** hp

**Control Equipment:** None
**Estimation Method:** Emission Factors
**Criteria Max Hourly Emis. Est. Equation:** P x EF x 0.002205
**Criteria Yearly Emis. Est. Equation:** H x hourly emission

| Parameter Symbols/Names | Values | |
|---|---|---|
| **EF = Emission factor** | See Below | g/hp-hr |
| **P = Engine horse power** | 1607 | hp |
| **H = Annual hours of operation** | 8760 | hrs/yr |

**Note: 0.002205 factor is for converting emissions from g to lb.**

| Criteria Species Name | Emission Factor (g/hp-hr) | Hourly Max Emissions (lb/hr) | Annual Emissions (lb/yr) | Annual Emissions (tpy) |
|---|---|---|---|---|
| **NOx** | **0.6** | **4.26** | **37,318** | **18.66** |
| **CO** | **2.5** | **17.72** | **155,227** | **77.61** |
| **VOC** | **0.3** | **1.78** | **15,593** | **7.80** |
| **$PM_{10}$** | **0.046** | **0.32** | **2,803** | **1.40** |
| **$SO_2$** | **0.0196** | **0.14** | **1,226** | **0.61** |

## Appendix A

## City of Bakersfield, Plant 3
## Development of Criteria Pollutant Emission Factors
## Digester Gas Power Generator

**Input Data**

| | | Value | Units | Reference |
|---|---|---|---|---|
| a. Brake specific fuel consumption at 100% load (BSFC) | | 7099.0 | Btu/hp-hr | 1 |
| b. Engine horse power | | 1607.1 | bhp | 2 |
| c. Digester gas heating value | | 550 | Btu/scf | 3 |
| d. NOx emission factor | | 0.6 | g/hp-hr | 4 |
| e. VOC emission factor (non-methane) | | 0.3 | g/hp-hr | 4 |
| f. CO emission factor | | 2.5 | g/hp-hr | 4 |
| g. $PM_{10}$ emission factor (source test) | | 0.005 | gr/dscf | 5 |
| h. Fuel sulfur content (H2S) | | 20 | ppmv | 6 |
| i. Actual stack flow rate - wet (at 943$^o$F) | | 10,291 | acfm | 1 |
| j. Exhaust temperature corresponding to ACFM, $T_{ACFM}$ | | 943 | $^o$F | 1 |
| | (943 + 460) | 1403 | $^o$R | ---- |
| k. Stack exhaust temperature (after heat recovery),$T_{CG}$ | | 370 | $^o$F | 1 |
| | (370 + 460) | 830 | $^o$R | ---- |
| l. Standard temperature | | 60 | $^o$F | ---- |
| | (60 + 460) | 520 | $^o$R | ---- |
| m. Stack inside diameter | | 16.0 | inch | 7 |
| n. Stack height | | 42.30 | feet | 7 |

**<u>Calculate Stack Exhaust Flow Rate (SCFM)</u>**

$$\text{Stack exhaust flow rate, scfm} = \text{Stack exhaust flow rate (acfm)} \times \frac{\text{Standard temp } (^oR)}{\text{Exhaust temp, } T_{ACFM}\ (^oR)}$$

$^oR = {}^oF + 460$

$K = [(^oF - 32) / 1.8] + 273.15$

Stack exhaust flow rate (scfm) = 10291 x (520/1403) = 3814 scfm

**Calculate $PM_{10}$ Emission Factor**

$PM_{10}$ source test rate (Waukesha June 7 & 9, 2000 test result) 0.005 gr/dscf

$PM_{10}$ emissions (g/hr) = PM emission rate (gr/dscf) x exhaust flow rate (scfm) x 60 (min/hr) x 0.0648 (g/gr)

**Note: Since moisture content in Caterpillar engine exhaust is not available, it is conservatively assumed for calculating $PM_{10}$ emission factor that dscfm is equal to scfm.**

PM10 emissions (g/hr) = 0.005 x 3814 x 60 x 0.0648 74.144 g/hr

| Pollutant | Source Test Result (gr/dscf) | $PM_{10}$ Emissions (g/hr) | Engine Horse Power bhp | $PM_{10}$ Emission Factor (g/hp-hr) |
|---|---|---|---|---|
| $PM_{10}$ | 0.005 | 74.144 | 1607 | 0.046 |

**Calculate $SO_2$ Emission Factor**

$SO_2$ emission factor (lb/mmcf) = Fuel sulfur content (ppm) x $10^6$ cf x $SO_2$ MW (lbs/lb-mole) / [$10^6$ x 379 (cf/lb-mole)]

SO2 emission factor (lb/mmcf) = 20 (ppm) x 1000000 cf x 64 (lbs/lb-mole) / [1000000 x 379 (cf/lb-mole)]

$SO_2$ emission factor (lb/mmcf) = 3.38 lb/mmcf

$SO_2$ emission factor (lbs/mmBtu) = $SO_2$ emission factor (lbs/mmcf) / Fuel heating value (Btu/cf)

SO2 emission factor (lbs/mmBtu) = 3.38 (lbs/mmcf) / 550 (Btu/cf) 0.0061 lb/mmBtu

$SO_2$ emission factor (g/hp-hr) = $SO_2$ emission factor (lbs/mmBtu) x Fuel consumption rate (Btu/hp-hr) x 453.59 (g/lb)

SO2 emission factor (g/hp-hr) = 0.0061 (lbs/mmBtu) x 7099 (Btu/hp-hr) x 453.59 (g/lb)/1,000,000

| Pollutant | Molecular Weight (lb/lb-mole) | Fuel Sulfur Content (ppm) | Emission Factor (lbs/mmcf) | Emission Factor (lb/mmBtu) | $SO_2$ Emission Factor (g/hp-hr) |
|---|---|---|---|---|---|
| $SO_2$ | 64 | 20 | 3.38 | 0.0061 | 0.0196 |

**Calculate Stack Exit Velocity (ft/sec) for 1 Engine in Operation**

| | | |
|---|---|---|
| Stack inside diameter (ft) = Stack inside diameter (inch) / 12 | 1.33 | ft |
| Stack height = | 42.30 | ft |
| Stack temp. (K) = [(Stack temp. ($^oF$) - 32) x (5/9)] + 273.15 | 460.9 | K |

Stack exit velocity (ft/sec): stack gas flow at 350 $^oF$ / [(dia/2) x (dia/2) x 3.141 x 60]

| Stack gas flow at 350$^o$F | Stack inside diameter (ft) | Stack exit velocity (ft/sec) | Stack exit velocity (m/sec) | Stack inside diameter (m) | Stack height (ft) | Stack height (m) |
|---|---|---|---|---|---|---|
| 6088 | 1.33 | 73.03 | 22.26 | 0.41 | 42.30 | 12.89 |

**Note: Stack gas flow was calculated as follows: Stack gas flow at 943$^o$F x 830/1403 i.e. (10,291 x 830/1,403 = 6,088)**

References

1. Engine specifications.
2. Calculated from bhp of G3608 model multiplied by the ratio of the ekW rating
3. Parsons Technical Memorandum 15 (TM-15), April 8, 2005, Page 24
4. Current SJVAPCD BACT guidelines for digester gas engines, Guideline 3.3.13
5. Obtained from compliance source test for Inland Empire Utilities Agency, June 7 and 9, 2000
6. Parsons Technical Memorandum 15 (TM-15), April 8, 2005, Page 16
7. Obtained from Voytek Muszynski, 07-18-06

# Appendix A

## EMISSIONS FROM DUAL FUEL PROCESS HEATERS

### Input Data

| | | Value | Units | References |
|---|---|---|---|---|
| a. | Fuel Type | Natural/Digester Gas | --- | 1 |
| b. | Heaters for Digesters 1 and 2 (0.75 MMBtu/hr each) | 1.5 | MMBtu/hr HHV | 2 |
| c. | Heaters for Digesters 3 to 6 (1.53 MMBtu/hr each) | 6.12 | MMBtu/hr HHV | 2 |
| d. | Heaters for Digesters 7 and 8 (0.432 MMBtu/hr each) | 0.864 | MMBtu/hr HHV | 2 |
| e. | Load | 100% | percent | Assumed |
| f. | Natural Gas Higher Heating Value, HHV | 1,020 | Btu/scf | 3 |
| g. | Hours of operation | 24 | hrs/day | 4 |
| | | 7 | days/week | 4 |
| | | 52.143 | weeks/year | 4 |

**Calculate Emissions from all Heaters in Terms of HHV**

| Pollutant | Emission Factor | Units | Emissions | | |
|---|---|---|---|---|---|
| | | | lb/hr | lb/day | TPY |
| NOx | 0.036 | lb/MMBtu[5] | 0.31 | 7.44 | 1.36 |
| CO | 400 | ppm[6] | 2.55 | 61.20 | 11.17 |
| VOC | 5.5 | lb/MMscf[7] | 0.05 | 1.20 | 0.22 |
| PM10 | 7.6 | lb/MMscf[7,8] | 0.06 | 1.44 | 0.26 |
| SO2 | 0.6 | lb/MMscf[7] | 0.00 | 0.00 | 0.00 |

**Example calculation**

NOx lb/hr emission = 0.31 lb/hr
[0.036 lb/MMBtu x (1.5 + 6.12 + 0.864) MMBtu/hr]

NOx lb/day emission = 7.44 lb/day
[0.31 lb/hr x 24 hours/day]

NOx ton/year emission = 1.36 TPY
[0.31 lb/hr x 8760 hr/year x 1/2000 ton/lb]

## References

1. Heaters will be fired primarily with natural gas. Digester gas may be used during downtime of the cogen engines
2. Provided by Vamsi Seeta, 05-22-06 email
3. Obtained from footnote to Table 1.4-1 of AP-42
4. Heaters will be continuously operated
5. On an individual heater basis, BACT will not be required. Limit from Table 1.0, Rule 4308 was used
6. Obtained from Table 1, Rule 4308. lb CO/hr estimated with natural gas F-factor method
7. Emission factors from AP 42, Tables 1.4-1 and 1.4-2
8. Total PM factor can be used to estimate PM10, PM2.5 or PM1 per footnote to Table 1.4-2

# Appendix A
# EMISSIONS FROM DIGESTER GAS FLARE

## Input Data

| | | Value | Units | References |
|---|---|---|---|---|
| a. | Fuel Type | Digester Gas | --- | 1 |
| b. | Flare rating | 16.5 | MMBtu/hr HHV | 1 |
| c. | Hours of operation | 200 | hrs/year | 2 |

**Calculate Emissions from all Heaters in Terms of HHV**

| Pollutant | Emission Factor | Emissions | | |
|---|---|---|---|---|
| | lb/MMBtu | lb/hr | lb/day | TPY |
| NOx[3] | 0.067 | 1.11 | 26.64 | 0.11 |
| CO[3] | 0.150 | 2.48 | 59.52 | 0.25 |
| VOC[3] | 0.070 | 1.16 | 27.84 | 0.12 |
| PM10[3] | 0.020 | 0.33 | 7.92 | 0.03 |
| $SO_2$[4] | 0.307 | 5.07 | 121.58 | 0.507 |

**Example calculation**

-

| | | |
|---|---|---|
| NOx lb/hr emission = | 1.11 | lb/hr |
| NOx ton/year emission = [1.11 lb/hr x 200 hr/year x 1/2000 ton/lb] | 0.11 | TPY |

## References

1. Provided by John Zink per Parsons design
2. Emergency operation hours as defined in Rule 4311
3. Obtained from SJVAPCD flare BACT Guideline 1.4.4A
4. Calculated for 1000 ppm sulfur in unpurified digester gas (Bakersfield source test 08-16-2004), and digester gas heat value of 550 Btu/scf

# Appendix A

## EMISSIONS FROM EMERGENCY DIESEL ENGINES

**Input Data**

a. Fuel Type — Diesel
b. Fuel Density — 7.1 lb/gal
c. Sulfur content — 500.0 ppmw
d. Annual hours of operation: — 200 hours
e. Engine description

| | kW | bhp | Type[1] | gal/hr[2] |
|---|---|---|---|---|
| Existing plant engine | 800.0 | 1072.8 | Tier 2 | 45.7 |
| Proposed air blower building engine | 2250.0 | 3017.3 | Tier 2 | 165 |
| Proposed aeration basin engine | 1000.0 | 1341 | Tier 2 | 70.7 |
| Proposed air blower building engine | 500.0 | 670.5 | Tier 3 | 29.6 |
| Proposed headworks engine | 1250.0 | 1676.3 | Tier 2 | 88.2 |

**Emission calculations**

| bhp | Emission Factor, g/bhp-hr[3] | | | | Emissions, lb/hr | | | | | Emissions, TPY[5] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOx | HC | CO | PM | NOx | HC | CO | PM | SO2[4] | NOx | HC | CO | PM | SO2 |
| 1072.8 | 4.5 | 0.3 | 2.6 | 0.15 | 10.6 | 0.7 | 6.1 | 0.4 | 0.2 | 1.1 | 0.1 | 0.6 | 0.0 | 0.02 |
| 3017.3 | 4.5 | 0.3 | 2.6 | 0.15 | 29.9 | 2.0 | 17.3 | 1.0 | 0.6 | 3.0 | 0.2 | 1.7 | 0.1 | 0.06 |
| 1341.0 | 4.5 | 0.3 | 2.6 | 0.15 | 13.3 | 0.9 | 7.7 | 0.4 | 0.2 | 1.3 | 0.1 | 0.8 | 0.0 | 0.02 |
| 670.5 | 2.8 | 0.2 | 2.6 | 0.15 | 4.1 | 0.3 | 3.8 | 0.2 | 0.1 | 0.4 | 0.0 | 0.4 | 0.0 | 0.01 |
| 1676.3 | 4.5 | 0.3 | 2.6 | 0.15 | 16.6 | 1.1 | 9.6 | 0.6 | 0.3 | 1.7 | 0.1 | 1.0 | 0.1 | 0.03 |
| Total emissions | | | | | | | | | | 7.5 | 0.5 | 4.5 | 0.3 | 0.1 |

1. U.S.EPA Nonroad regulations
2. Manufacturer data, see Voyek Muszynski email, 07-20-06
3. Obtained from U.S.EPA Nonroad regulations. HC data obtained from "Exhaust and Crankcase Emission Factors for Nonroard Engine Modeling Compression-Ignition, EPA420-P-04-009, April 2004."
4. Based on 500 ppmw sulfur content of Low Sulfur Diesel fuel
5. Based on 200 hours of annual emergency operations

## Appendix A

**Emission Factors are from Basin Wide Emissions Summary by JEIP Unit Process**

**(Table 1-7, SCAQMD Report), Volume 1, October 1993**

| | | |
|---|---|---|
| **Flow Rate for the Future Bakersfield Wastewater Treatment Plant** | **32** | **mgd** |
| **Treated effluent to I-5 Reclamation Site** | **14** | **mgd** |
| **Treated effluent to Tertiary Treatment Plant** | **2** | **mgd** |
| **Net treated effluent to Percolation Ponds** | **16** | **mgd** |

| **Unit Process (Future Facility)** | | **Uncontrolled Emission Factor lb/yr/mgd** | **Control Factor percent** | **VOC Emissions lb/yr** |
|---|---|---|---|---|
| ***Preliminary/Primary Treatment*** | | | | |
| | Headworks-Ducted | 86.37 | 90 | 276.4 |
| | Septage and Grease Receiving Facility | 0.29 | 90 | 0.9 |
| | Grit Chambers (Removal) Pista Type | 0.6 | 90 | 1.9 |
| | Primary Sedimentation (Clarifier) | 36.69 | 90 | 117.4 |
| | Flow Equalization-Primary Effluent | 106.96 | 90 | 342.3 |
| | | **Sub Total** | | 738.9 |
| ***Biological*** | | | | |
| | Activated Sludge - Diffused Air | 185.75 | 0 | 5944.0 |
| | Trickling Filters | 111.70 | 0 | 3574.4 |
| | | **Sub Total** | | 9518.4 |
| ***Post-Biological*** | | | | |
| | Secondary Clarifiers | 12.29 | 0 | 393.3 |
| | Final Effluent Evaporation Ponds | 523.56 | 0 | 8377.0 |
| | | **Sub Total** | | 8770.3 |

**Emission Factors are from Basin Wide Emissions Summary by JEIP Unit Process**
**(Table 1-7, SCAQMD Report), Volume 1, October 1993**

***Solids Handling***

| | | | |
|---|---|---|---|
| Dissolved Air Flotation Units | 12.28 | 90 | 39.3 |
| Sludge Digestion (anaerobic) | 0.04 | 0 | 1.3 |
| Sludge Dewatering - Centrifuges | 6.65 | 0 | 212.8 |
| Sludge Cake Handling (Conveyor Belts) | 0.03 | 90 | 0.1 |
| Sludge Cake Truck Loading Operations | 1.73 | 90 | 5.5 |
| | **Sub Total** | | 259.0 |
| | | **Total** | 19286.6 |
| | ***Total*** | ***tons/yr*** | ***9.6*** |

# 15.3d Section 7 – Supplemental Calculations

## Appendix A

**Emission Factors are from Basin Wide Emissions Summary by JEIP Unit Process**
**(Revised Emissions for Enhanced Odor Control Alternative)**

**(Table 1-7, SCAQMD Report), Volume 1, October 1993**

| | | |
|---|---|---|
| **Flow Rate for the Future Bakersfield Wastewater Treatment Plant** | **32** | **mgd** |
| **Treated effluent to I-5 Reclamation Site for Irrigation** | **14** | **mgd** |
| **Treated effluent to Tertiary Treatment Plant** | **2** | **mgd** |
| **Net treated effluent to Percolation Ponds** | **16** | **mgd** |

| **Unit Process (Future Facility)** | | **Uncontrolled Emission Factor lb/yr/mgd** | **Control Factor percent** | **VOC Emissions lb/yr** |
|---|---|---|---|---|
| ***Preliminary/Primary Treatment*** | | | | |
| | Headworks-Ducted | 86.37 | 90 | 276.4 |
| | Septage and Grease Receiving Facility | 0.29 | 90 | 0.9 |
| | Grit Chambers (Removal) Pista Type | 0.6 | 90 | 1.9 |
| | Primary Sedimentation (Clarifier) | 36.69 | 90 | 117.4 |
| | Flow Equalization-Primary Effluent | 106.96 | 90 | 342.3 |
| | | **Sub Total** | | 738.9 |
| ***Biological*** | | | | |
| | Activated Sludge - Diffused Air | 185.75 | 90 | 594.4 |
| | | **Sub Total** | | 594.4 |
| ***Post-Biological*** | | | | |
| | Secondary Clarifiers | 12.29 | 0 | 393.3 |
| | Final Effluent Evaporation Ponds | 523.56 | 0 | 8377.0 |
| | | **Sub Total** | | 8770.3 |

**Emission Factors are from Basin Wide Emissions Summary by JEIP Unit Process**
**(Table 1-7, SCAQMD Report), Volume 1, October 1993**

***Solids Handling***

| | | | | |
|---|---|---|---|---|
| | Dissolved Air Flotation Units | 12.28 | 90 | 39.3 |
| | Sludge Digestion (anaerobic) | 0.04 | 0 | 1.3 |
| | Sludge Dewatering - Centrifuges | 6.65 | 0 | 212.8 |
| | Sludge Cake Handling (Conveyor Belts) | 0.03 | 90 | 0.1 |
| | Sludge Cake Truck Loading Operations | 1.73 | 90 | 5.5 |
| | | **Sub Total** | | 259.0 |
| | | | **Total** | 10362.6 |
| | | ***Total*** | ***tons/yr*** | ***5.2*** |

# 15.4 RECONNAISSANCE LEVEL BIOLOGICAL REPORT

# BIOLOGICAL SURVEY
# For
# CITY OF BAKERSIELD
# WASTEWATER TREATMENT PLANT #3
# EXPANSION PROJECT

**Prepared for:**

**City of Bakersfield**

**Prepared by:**


**Quad Knopf, Inc.**
**5001 California Avenue, Suite 230**
**Bakersfield, CA 93309**
**(661) 616-2600**

**July 10, 2006**

Quad Knopf

# Tables , Figures and Photoplates

Quad Knopf, Inc. conducted a reconnaissance-level biological survey at the request of the City of Bakersfield Public Works Department for approximately 350 acres in Bakersfield, Kern County, California. The project site is currently situated north of Highway 119 and west of Ashe Road. More specifically, the site is in Section 33, Township 30 South, Range 27 East, Mount Diablo Base & Meridian (Figure 1&2). The proposed project area occurs within the Metropolitan Bakersfield General Plan area and is therefore covered under the Metropolitan Bakersfield Habitat Conservation Plan (MBHCP) (City of Bakersfield and County of Kern 1991).

The proposed project is the expansion and upgrade of Wastewater Treatment Plant No. 3 due to the rapid development of residential and commercial properties on the west side of the city during the past 5 years and the expected continuation of this high growth for the next ten years or more. The current wastewater flow into Treatment Plant No. 3 is over 15 million gallons per day (mgd). Since the design capacity of Plant No. 3 is 16 mgd, the continued growth of the City will soon push the wastewater flow into Treatment Plant No. 3 to its nominal design treatment capacity. The project is proposed to proceed at this time to avoid overload of the existing treatment plant facilities as planned growth in the service area occurs.

The General Plan Land Use designation for the project area is P (Public Facilities) and its zoning is A (Agriculture). Currently, agriculture is the primary land use surrounding the wastewater facility with a small parcel of rural residential to the south. The proposed project expansion will occur to the south of the existing facility, which has historically been used for sludge drying beds and agriculture. The area to the south of the sludge drying beds is currently occupied by species associated with non-native grasslands.

Quad Knopf, Inc. Environmental Scientist, Paul Rosebush, conducted the biological field survey of the proposed project area and a 200-foot buffer zone on April 19, 2006. The surveys consisted of walking transects, spaced at 50-foot intervals, over the entire site and buffer zone. Plant and animal species were recorded and photographs were taken to illustrate current site conditions (Photoplate 3 & 4). An additional survey at the southeast corner of Highway 119 and Ashe Road and was conducted on May 22, 2006, for the treatment plants proposed low pressure gas line (Figure 1).

Prior to conducting the field survey, a query of the California Department of Fish and Game Natural Diversity Data Base (CNDDB) (CDFG 2006) was conducted for the Gosford, Conner, Millux, Oil Center, Lamont, Weed Patch, Oildale, Rosedale, and Stevens USGS 7.5-minute quadrangles. A review of literature and the CNDDB query indicated that twenty-five special-status animal species, sixteen special-status plant species, and five vegetation communities of concern have been reported for these quadrangles (Figure 3). In addition to these reviews, a query of the California Native Plant Society's Electronic Inventory (CNPS 2006) was conducted for the same quadrangles to provide information on additional plant species of concern that have the potential to occur on the property and surrounding vicinity. This review resulted in one additional plant species. Table 1 lists the results of these reviews and the potential for these species to be present on the property.

## Table 1
## Special-Status Species Reported by the California Natural Diversity Database and Online Inventory of Rare and Endangered Plants of California on the Gosford and Eight Surrounding USGS 7.5-Minute Quadrangles

| Species | Habitat | Status | Potential Occurrence in Project Area |
|---|---|---|---|
| **Animals** | | | |
| *Agelaius tricolor* (Tricolored blackbird) | Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the (nesting) colony. | CSC, MBTA | Low. No habitat present. Birds would not be expected to forage on site. Nearest CNDDB sighting is approximately 10 miles northwest of the project site. No individuals observed during survey. |
| *Ammospermophilus nelsoni* (San Joaquin antelope squirrel) | Occurs in the western San Joaquin Valley on dry, sparsely vegetated loam soils at elevations of 200 to 1,200 feet. The species digs burrows or uses kangaroo rat burrows and requires widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes. | CT, CSC, MBHCP | Low. No habitat present. Nearest CNDDB sighting is approximately 8 miles southwest of the project site. No individuals or signs of San Joaquin antelope squirrel were observed during survey. |
| *Anniella pulchra pulchra* (Silvery legless lizard) | Sandy or loose loamy soils under sparse vegetation; soils with high moisture content preferred. | CSC | Absent. No habitat present on site. No Individuals observed during survey. |
| *Ardea alba* (great egret) | Open water in savannas, along creeks and streams, mud flats, shoreline coves, inland lakes, ponds, and marshland. | MBTA | Absent. No habitat present on site. No individuals observed during survey. |
| *Athene cunicularia* (Burrowing owl) | Occurs in open, dry grasslands, deserts, and ruderal areas along ditch levees. Requires burrows for refuge and subterranean nesting; frequently utilize California ground squirrel burrows. | CSC, MBTA | Occurs. Several ground squirrel, cottontail and black-tail jackrabbit burrows were identified in and adjacent to project area; Two burrowing owls were observed on the project site. (white wash, tracks, pellets, prey remains etc.) were also observed on site. In addition, the nearest CNDDB record is approximately 1.5-miles northwest of the project. |

| | | | |
|---|---|---|---|
| *Buteo swainsoni*<br>(Swainson's hawk) | Nests in riparian corridors and oak savannah or other areas with large tree(s) and alfalfa, grain fields or grasslands nearby. | CT<br>MBTA | Low. No habitat is present on site. The nearest CNDDB sighting is approximately 5-miles north of the project site. No Swainson's hawks or nests were observed during survey. However, they could potentially forage on site. |
| *Charadrius alexandrinus nivosus*<br>(Western snowy plover) | Short grasslands and plowed fields of the Central Valley from Sutter and Yuba counties southward. It is also found in foothill valleys west of the San Joaquin Valley, and in Imperial Valley. | FT, CSC,<br>MBTA | Low. Habitat is present and CNDDB records indicate the nearest sighting to be approximately 10-miles west of the project site. No individuals were observed during survey. However, they could potentially forage on site. |
| *Coccyzus americanus occidentalis*<br>(Western yellow-billed cuckoo) | Woodlands near streams, rivers or lakes. | FCS, CE | Absent. Habitat does not occur, CNDDB records indicate the nearest sighting to be approximately 10-miles west of the project site. No individual were observed during survey. |
| *Danaus plexippus*<br>(Monarch butterfly) | Winter-roosts in wind-protected tree groves (Eucalyptus, Monterey Pine, Cypress), with nectar and water sources nearby. | --- | Low. Habitat is present. Records occur within a 10-mile radius of the project site. No individuals were observed during survey. |
| *Dendrocygna bicolor*<br>Fulvous whistling duck | Rice fields, freshwater marshes, wet meadows, and lagoons. | CSC,<br>MBTA | Absent. No habitat present on site. No individuals observed during surveys. |
| *Desmocerus californicus dimorphus*<br>(Valley elderberry longhorn beetle) | Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). | FT | Absent. No habitat present on site. No individuals observed on the project site. |
| *Dipodomys ingens*<br>(Giant kangaroo rat) | Saltbush scrub and sink scrub communities in the Tulare Lake Basin of the southern San Joaquin Valley. Requires soft friable soils, which escape seasonal flooding where it will dig burrows in elevated soil mounds at the base of shrubs. | FE, CE | Absent. Habitat does not occur on site. CNDDB records indicate the nearest sighting to be approximately 6-miles from the project. No individual were observed during the survey. |
| *Dipodomys nitratoides nitratoides*<br>(Tipton kangaroo rat) | Saltbush scrub and sink scrub communities in the Tulare Lake Basin of the southern San Joaquin Valley. Requires soft friable soils, which escape seasonal flooding where it will dig burrows in elevated soil mounds at the base of shrubs. | FE, CE | Absent. Habitat does not occur on site. CNDDB records indicate the nearest sighting to be approximately 6-miles from the project. No individual were observed during the survey |
| *Egretta thula*<br>(snowy egret) | Open water in savannas, along creeks and streams, mud flats, shore line coves, inland lakes and | MBTA | Absent. No habitat present on site. No individuals observed during survey. |

| | | | |
|---|---|---|---|
| | marshland. | | |
| *Emys* (=*Clemmys*) *marmorata pallida*<br>(Southwestern pond turtle) | Requires basking sites such as logs, vegetation mats, or open mud banks in permanent or nearly permanent bodies of water; below 6,000 ft. elevation. | FSC, CSC | Absent. No habitat present on site. No individuals observed during survey. |
| *Gambelia sila*<br>(Blunt-nosed leopard lizard) | Inhabits sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief, and seeks cover in mammal burrows, under shrubs or structures in semiarid grasslands, alkali flats, and washes. | FE, CE | Low. No habitat present on site. The CNDDB reported 2 historical records, one approximately 5 miles west of the project area, and one approximately 5.5 miles northwest of the project site. The site has been historically used for agricultural practices. |
| *Helminthoglypta callistoderma*<br>(Kern shoulderband) | Collected from dead vegetation along the water's edge, this species is known only from Kern and Tulare Counties, along the lower Kern River Canyon. | FSC | Absent. No habitat present on site. |
| *Onychomys torridus tularensis*<br>(Tulare grasshopper mouse) | Occurs in hot, arid valleys and scrub deserts in the southern San Joaquin Valley. Diet almost exclusively composed of arthropods, therefore requires an abundant supply of insects. | CSC | Low. No habitat present on project site. A historic record exists for the species approximately 10 miles west of the project area; however, the site has been historically disturbed by agriculture. |
| *Perognathus inornatus inornatus*<br>(San Joaquin pocket mouse) | Generally found in grasslands and blue oak savannas; needs friable soils. | --- | Low. One occurrence is reported approximately 7.5-miles northwest of the project area. The species may potentially occur in grassland areas. |

| | | | |
|---|---|---|---|
| *Plegadis chihi* (White faced ibis) | Common breeder in freshwater marsh habitats along the length of the state, but is not known to breed regularly anywhere in California. However, nesting has recently been confirmed in the Central Valley, indicating that the range of this species may be expanding into previously occupied areas. | FSC, CSC | Absent. No habitat present on site. Nearest CNDDB sighting is approximately 10 miles southwest of the project site. |
| *Sorex ornatus relictus* (Buena Vista Lake shrew) | Preferred habitat includes marshes and riparian areas of the Buena Vista and Tulare Lake basins. | FE, CSC | Absent. No habitat present on site. Nearest CNDDB sighting is approximately 10 miles southwest of the project site. No individuals observed during survey. |
| *Spea (=Scaphiopus) hammondii* (Western spadefoot | Vernal pools and other wet areas within grasslands. | CSC | Absent. No vernal pools present on site. Nearest CNDDB sighting approximately 5 miles northwest of the project site. No individuals observed during survey. |
| *Taxidea taxus* (American badger) | Abundant in drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Needs sufficient food source of burrowing rodents, friable soils, and open, uncultivated grounds. | CSC | Moderate. Open areas within the project area and its vicinity may potentially support an adequate prey base. Although no individuals were observed, |
| *Vulpes macrotis mutica* (San Joaquin kit fox) | Chenopod scrub, grasslands, open areas with scattered shrubby vegetations; sometimes forage in agricultural areas. Requires loose-textured sandy soils for burrowing, and suitable prey base. | FE, CT, MBHCP | High. Project area occurs in the known range of the species, and open grassland areas may support an adequate prey base. Also may potentially forage in agricultural areas. According to the MBHCP Known Dens Map the nearest known kit fox den occurs approximately 1.5 miles to the north in Section 27. No active dens, individuals or sign of activity were identified during the field survey. Several larger burrows were observed that could serve as potential refuge for the species. |
| *Xanthocephalus xanthocephalus* (Yellow-headed blackbird) | Fresh emergent wetland with dense vegetation and deep water, often along borders of lakes or ponds. Forages in emergent wetland and moist, open areas, especially cropland and muddy shores of lacustrine habitat. | MBTA | Absent. No habitat present on site and no individuals observed during survey. |
| **Plants** | | | |

| | | | |
|---|---|---|---|
| *Atriplex cordulata* (Heartscale) | In saline or alkaline soils within chenopod scrub, meadows and seeps, and sandy soils in valley and foothill grasslands. | 1B | Absent. No habitat present. No individuals or their remnants were observed on site. Site has been historically used for agricultural practices. |
| *Atriplex tularensis* (Bakersfield smallscale) | Chenopod scrub, alkali meadow, historically with saltgrass, or in valley sink scrub. | CE, 1B, MBHCP | Absent. No habitat present on site. No individuals or their remnants were observed during survey. Site has been historically used for agricultural practices. |
| *Calochortus striatus* (Alkali mariposa lily) | Alkaline meadows and ephemeral washes in chaparral, chenopod scrubs desert scrubs, and meadows. 225-5,250 ft. | 1B | Absent. No habitat present on site. No individuals or their remnants were observed during survey. Site has been historically used for agricultural practices. |
| *Caulanthus californicus* (California jewel-flower) | Sandy soils within chenopod scrub, pinyon and juniper woodland, and grasslands. | FE, CE, 1B MBHCP | Low. Historic occurrences are reported within a 10-mile radius of the project site; however no individuals or their remnants were identified within the area surveyed. Site has been historically used for agricultural practices. |
| *Delphinium recurvatum* (Recurved larkspur) | On alkaline soils in chenopod scrub, valley and foothill grassland, and cismontane woodland habitats; often in valley saltbush or valley chenopod scrub. | 1B, MBHCP | Low. Historical occurrences are reported approximately 6 miles west of the project area. No individuals or remnants were identified during the biological survey. Site has been historically used for agricultural practices. |
| *Lasthenia glabrata ssp. Coulteri* (Coulter's goldfields) | Usually on alkaline soils in playas, sinks and grasslands. Coastal salt marshes, playas, vernal pools. | FE, 1B | Absent. No CNDDB records occur within 10 miles of the project site. No individuals or remnants were observed during survey. Site has been historically used for agricultural practices. |
| *Layia leucopappa* (Comanche Point layia) | Chenopod scrub, valley and foothill grasslands. Endemic to Kern County. | 1B | Absent. No CNDDB records occur within 10 miles of the project site. No individuals or remnants were observed during survey. Site has been historically used for agricultural practices. |
| *Mimulus pictus* (Calico monkeyflower) | Broadleafed upland forest, cismontane woodland, in bare ground around gooseberry bushes or around granitic outcrops. | 1B | Absent. No habitat present on site. Site has been historically used for agricultural practices. |
| *Monardella linoides* ssp. *oblonga* (Flax-like monardella) | Lower and upper montane coniferous forest, and pinyon juniper woodland. | 1B | Absent. No habitat present on site. Site has been historically used for agricultural practices. |
| *Monolopia congdonii* | Chenopod scrub, and sandy soils | FE, 1B, | Low. No habitat present, |

| | | | |
|---|---|---|---|
| (San Joaquin woollythreads) | within valley and foothill grasslands. Endemic to San Joaquin Valley. | MBHCP | nearest CNDDB sighting is approximately 7 miles north of the project site. No individuals or their remnants were observed during surveys. Site has been historically used for agricultural practices. |
| *Navarretia setiloba* (Piute Mountains navarretia) | Occurs on (red) clay soils or on gravelly loam in cismontane woodland, pinyon-juniper woodland, and valley and foothill grasslands. | 1B | Absent. No habitat occurs on site. No CNDDB sightings are reported within 10 miles of the project site and no individuals or remnants observed during surveys. Site has been historically used for agricultural practices. |
| *Opuntia basilaris* var. *treleasei* (Bakersfield cactus) | Chenopod scrub, valley and foothill grasslands, cismontane woodland; on coarse or cobbly well-drained granitic sand, low hills and flats within grassland. Endemic to Kern County. | FE, CE, 1B MBHCP | Low. One occurrence reported within a 10-mile radius of the project area; however, no individuals were identified in the project area or its vicinity. Site has been historically used for agricultural practices. |
| *Pterygoneurum californicum* (California chalk-moss) | Chenopod scrub, alkali playas, valley and foothill grasslands; growing on alkali soil. | 1B | Low. No habitat is present on site and one CNDDB record is shown approximately 1.5 miles northwest of the project site. No individuals or remnants were observed during survey. Site has been historically used for agricultural practices. |
| *Stylocline citroleum* (Oil neststraw) | Chenopod scrub, coastal scrub, on flats, and in clay soils in oil producing areas. | 1B | Absent. No habitat on site. No individuals or their remnants were observed during the field survey. Site has been historically used for agricultural practices. |
| *Stylocline masonii* (Mason's neststraw) | Sandy soils within chenopod scrub, and pinyon and juniper woodlands. | 1B | Absent. No habitat on site. No individuals or their remnants were observed during the field survey. Site has been historically used for agricultural practices. |
| *Tortula californica* (California screw moss) | Chenopod scrub, valley and foothill grasslands; on sandy soil. | 1B | Low. No habitat present, no individuals or their remnants were observed during the biological survey. No CNDDB records indicated within 10 miles of the project site. Site has been historically used for agricultural practices. |
| **Natural Vegetation Communities of Concern** | | | |
| Great Valley Cottonwood Riparian Forest | | | Absent. |
| Great Valley Mesquite Scrub | | | Absent |

| | | | |
|---|---|---|---|
| Valley Sacaton Grassland | | | Absent |
| Valley Saltbush Scrub | | | Absent |
| Valley Sink Scrub | | | Absent |

Sources:

California Department of Fish and Game. 2005. California Natural Diversity Data Base, California Department of Fish and Game, Sacramento, CA.

CNPS. 2005. Online Inventory of Rare and Endangered Plants of California. California Native Plant Society. Sacramento, CA.

Abbreviations:

FE Federal Endangered Species
FT Federal Threatened Species
FSC Federal Species of Concern
MBTA Species Protected Under the Auspices of the Migratory Bird Treaty Act
CE California Endangered Species
CT California Threatened Species
CSC California Department of Fish and Game Species of Special Concern
1B California Native Plant Society List 1B Species-Plants Categorized as Rare, Threatened, or Endangered in California and elsewhere
2 California Native Plant Society List 2 Species- Plants Categorized as Rare, threatened, or endangered in California, but more common elsewhere.
MBHCP Species provided incidental take authorization under the Metropolitan Bakersfield Habitat Conservation Plan
--- No listing

The "potential for occurrence" ranking is based on the following criteria:

- Absent. Species was not observed during focused surveys conducted at an appropriate time for identification of the species or species is restricted to habitats that do not occur within the proposed project.
- Low. No records exist of the species occurring within the proposed project or its immediate vicinity and/or habitats needed to support the species are of poor quality.
- Moderate. Either a historical record exists of the species within the immediate vicinity of the proposed project (approximately 10 miles) or the habitat requirements associated with the species occur within the proposed project.
- High. Both a historical record exists of the species within the proposed project and its immediate vicinity (approximately 10 miles) and the habitat requirements associated with the species occur within the proposed project.
- Occurs. Species or their sign was observed within the proposed project at the time of the survey.

Several bird species protected under the auspices of the Migratory Bird Treaty Act (MBTA) of 1918 (MBTA: 16 U.S.C. 703-711, Supp. I, 1989) were observed during the field survey; however, no nests or nesting birds were identified. A list of all plants and animals observed during the field survey is provided as Table 2. Numerous small mammal burrows, ranging from 3.0 inches to 13.0 inches in diameter were observed throughout the project area. Several ground squirrels were observed to occupy the majority of these burrows.

**Table 2. List of Animal and Plant Species Observed During the Field Survey**

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| **Animals** | |
| *Athene cunicularia* | Burrowing owl |
| *Buteo jamaciensis* | Red-tailed hawk |
| *Canis familiaris** | Domestic dog* |
| *Charadrius vociferus* | Killdeer |
| *Corvus corax* | Common raven |
| *Lanius ludovicianus* | Loggerhead shrike |
| *Lepus californicus** | Black-tailed jackrabbit* |
| *Mimus polyglottos* | Northern mockingbird |
| *Petrochelidon pyrrhonota* | Cliff swallows |
| *Spermophilus beecheyi* | California ground squirrel |
| *Sylvilagus auduboni** | Desert cottontail* |
| *Tyrannus verticalis* | Western kingbird |
| *Zenaida macroura* | Mourning dove |
| | |
| **Plants** | |
| *Amaranthus sp.* | Amaranth |
| *Aveena fatua* | Wild oat |
| *Brassica nigra* | Black mustard |
| *Bromus madritensis* ssp. *rubens* | Red brome |
| *Chenopodium album* | Lamb's quarters |
| *Cynodon dactylon* | Bermuda grass |
| *Digitaria sanguinalis* | Crabgrass |
| *Erodium cicutarium* | Redstem filaree |
| *Hordeum murinum* ssp. *glaucum* | Barley |
| *Lactuca serriola* | Prickly lettuce |
| *Malva parviflora* | Cheeseweed |
| *Salsola tragus* | Tumbleweed |
| *Sisymbrium irio* | London Rocket |
| *Sorghum halepense* | Johnsongrass |
| *Tribulus terrestris* | Puncture vine |

*Indicates that only sign (scat, tracks, etc.) of this species was observed, no individuals were observed.
Source: Quad Knopf, Inc. biological field survey conducted on April 19, 2006.

No listed plant species or their remnants were observed during the reconnaissance-level biological survey. The species listed above in Table 1 with a "low" potential for occurrence are ranked based on the nearest CNDDB record, within a ten-mile radius of the project. Because of intense historic agricultural practices, no habitat typically associated with special-status plants occurs within the project area.

No individuals or sign of blunt-nosed leopard lizard (*Gambelia sila*) were observed during the field survey; however, formal CDFG protocol-level surveys to confirm species presence were not conducted. Relatively few small, rodent-sized, mammal burrows suitable for refuge by the blunt-nosed leopard lizard were identified; however, numerous larger burrows were observed in areas supporting non-native grassland vegetation. Although the project area may support an adequate prey base (arthropods), the density of non-native grasses makes the site less favorable for foraging.

Because of past intense agricultural practices, blunt nosed leopard lizard habitat does not exist on the project site. As indicated in Figure 3, there are two historical records of blunt-nosed leopard lizard observations reported by the CNDDB. The nearest reported occurrence is approximately 10 miles west of the project area. The second occurrence reported by the CNDDB is approximately 12 miles northeast of the project area.

No individuals or sign (scat, tracks, prey remains, etc.) of San Joaquin kit fox (*Vulpes macrotis mutica*) were identified in the project area or buffer zone during the field survey. According to the MBHCP Known Kit Fox Dens Map (2004), the nearest den location is approximately 1.5 miles to the northeast in Section 27. No active dens or sign of occupancy was identified within the project area, or the area surveyed; however, the relatively undisturbed non-native grassland habitat may provide foraging habitat for San Joaquin kit fox.

Two western burrowing owls (*Athene cunicularia*) were observed on the project site. Whitewash, pellets and prey remains were observed near several burrows, which appeared to be occupied by these individuals (Photoplates 3&4). The burrowing owl is afforded protection under the MBTA and State Fish and Game Code as a bird of prey. The CDFG has developed a protocol for passively relocating burrowing owls during the non-nesting season; therefore, if any burrowing owls are occupying the property prior to construction, it may be possible to mitigate for impacts to the owls by passive relocation during the non-nesting season. The nesting season occurs from February 1 through August 31. A qualified biologist or ornithologist will conduct pre-construction surveys for burrowing owls during the non-breeding season. If burrowing owls are still detected on site during the non-breeding season they shall be passively relocated by placing one-way doors in the burrows and leaving them in place for a minimum of three days. Once it has been determined the owls have vacated the site, the burrows can be collapsed and ground disturbance can proceed.

Two loggerhead shrikes were observed individually in separate areas of the project site. Individuals were observed in flight and perched on a brush pile. This species nests in stout, dense shrubs or trees. Although, this species is not listed on the CNDDB, it is considered a species of special concern by the CDFG. Eucalyptus trees occur along the property boundary to the north, these trees could potentially provide nesting opportunities for the shrike.

The City of Bakersfield and Kern County developed the Metropolitan Bakersfield Habitat Conservation Plan (MBHCP) to acquire permits that would allow for the incidental take of federally and state listed species included in the MBHCP area. The permits acquired include a permit under Section 10 (a) (1)(B), hereafter referred to as a 10(a) permit, of the Federal Endangered Species Act (Incidental Take Permit PRT-786634) and a permit under Section 2081 (CESA 9322) of the California Endangered Species Act, as well as the associated Implementation/Management Agreement. The MBHCP is designed to offset impacts resulting from the incidental take of listed species and the loss of habitat incurred through the authorization of otherwise lawful activities. The goal of the MBHCP is to acquire, preserve, and enhance native habitats that support special status species while allowing development to proceed as set forth in the *Metropolitan Bakersfield General Plan.*

The proposed project area is located within the Bakersfield Metropolitan General Plan Area of the Metropolitan Bakersfield Habitat Conservation Plan (City of Bakersfield and County of Kern 1991);

therefore, the collection of one-time mitigation fees is required, payable to either the City or County at the time building permits are issued. Within the City of Bakersfield limits, the MBHCP is implemented by Section 15.78 of the Bakersfield Municipal Code. Development impact fees, including the MBHCP fee, are calculated at $1,240 per gross acre. Upon payment of the mitigation fee and receipt of City or County Project approval, the development permit applicant would be allowed the "incidental take" of special status species in accordance with State and Federal Endangered species laws. Collected mitigation fees are deposited into a trust fund, administered by the Implementation Trust, which is composed of representatives from the City of Bakersfield and Kern County Trustees, United States Fish and Wildlife Service, and the California Department of Fish and Game, and members of the public as advisors. Mitigation fees provide for the acquisition and/or enhancement of natural lands and restorable lands for the purpose of creating preserves, and the MBHCP provides for reduction of take within the developed areas through relocation or displacement of individuals in areas affected by development.

Compliance with the MBHCP and implementation of the additional mitigation measures will reduce potential direct, indirect, and cumulative biological impacts on special status species to a level of less than significant. Since the project area is located within the known range of the San Joaquin kit fox, burrows or dens with entrances greater than 4.0 inches in diameter may serve as potential refuge for the species, and should be monitored according to the CDFG Region 4 Protocols. Pre-activity surveys for burrowing owl should be completed in an attempt to identify individuals or active burrows that still occur in the project area. Compliance with the CDFG passive relocation protocol during the non-nesting season will avoid any significant impacts to burrowing owls.

Sincerely,

Paul D. Rosebush
Environmental Scientist

5001 California Avenue, Ste 230 • Bakersfield, CA 93309 • (661) 616-2600 • Fax (661) 616-5970

# References


California Department of Fish and Game. 2005. California Natural Diversity Data Base, California Department of Fish and Game, Sacramento, CA.

California Department of Fish and Game. 1995. Staff Report on Burrowing Owl Mitigation.

California Native Plant Society (CNPS). 2005. Inventory of Rare and Endangered Plants (online edition, v6-05c). California Native Plant Society. Sacramento, CA. Accessed on Jul. 27:9:47, 2005 from http://www.cnps.org/inventory.

City of Bakersfield, County of Kern. 1994. Metropolitan Bakersfield Habitat Conservation Plan.

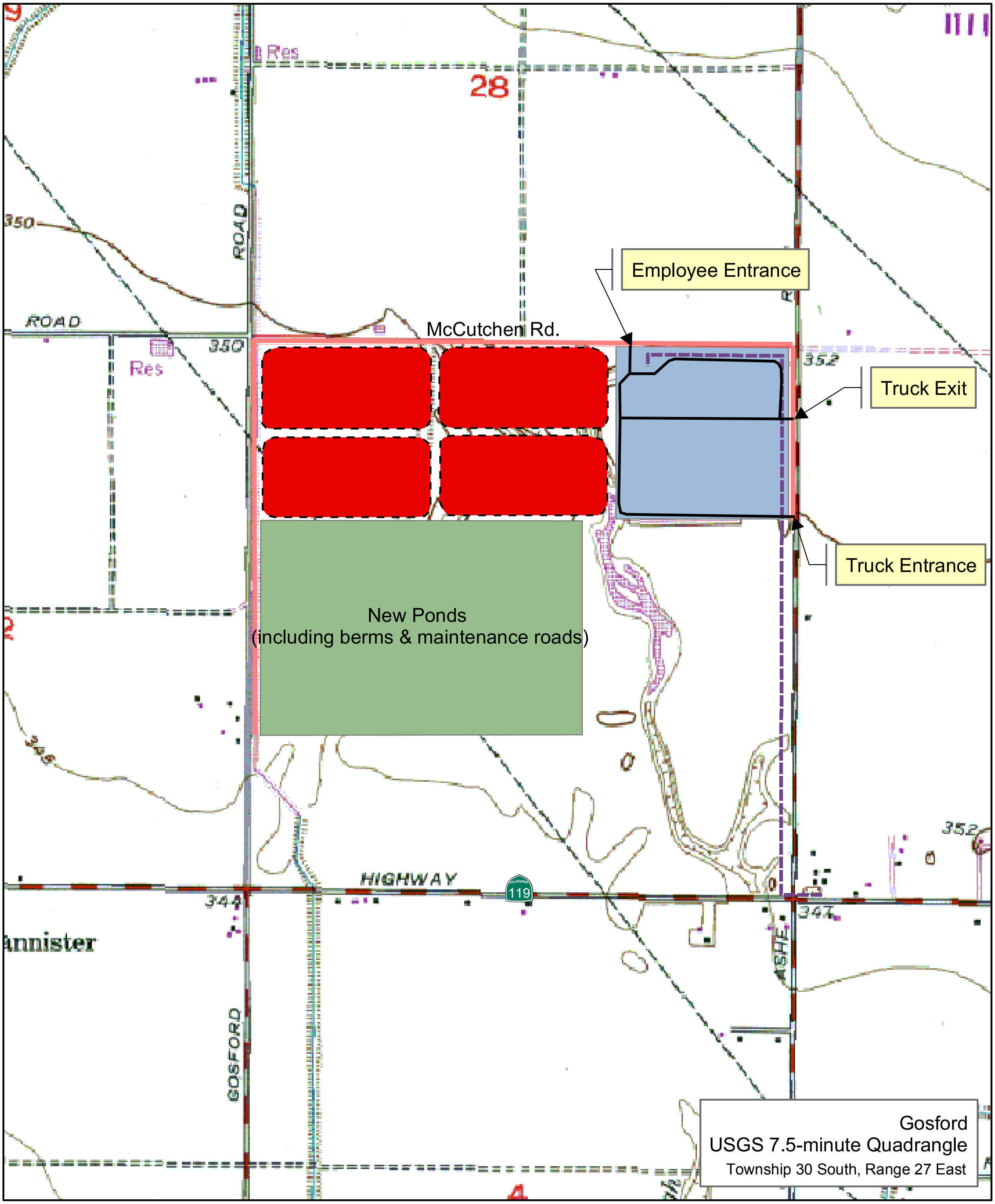
City of Bakersfield and County of Kern. 1991. Metropolitan Bakersfield Habitat Conservation Plan and Final Environmental Impact Report.

Holland, Robert F. 1986. State of California, The Resource Agency, Department of Fish and Game. Preliminary Descriptions of the Terrestrial Natural Vegetation Communities of California.

United States Fish and Wildlife Service. 2005 (On-line). Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in Kern County and/or the Oil Center and eight surrounding USGS 7.5 Minute Quad Database Last Updated: June 20, 2005. Document Number: 050727121613. Sacramento Fish and Wildlife Office. **http://sacramento.fws.gov/es/spp_list.htm**

# WWTP No. 3 - Expansion & Upgrade

Proposed 32 mgd WWTP No. 3 Project Area




0 480 960 1,920

Feet

1:16,000

Percolation Ponds

32 mgd Treatment Facilities

New Ponds

Internal Ciculation

Road Improvements

Low Pressure Gas Line

Quad Knopf

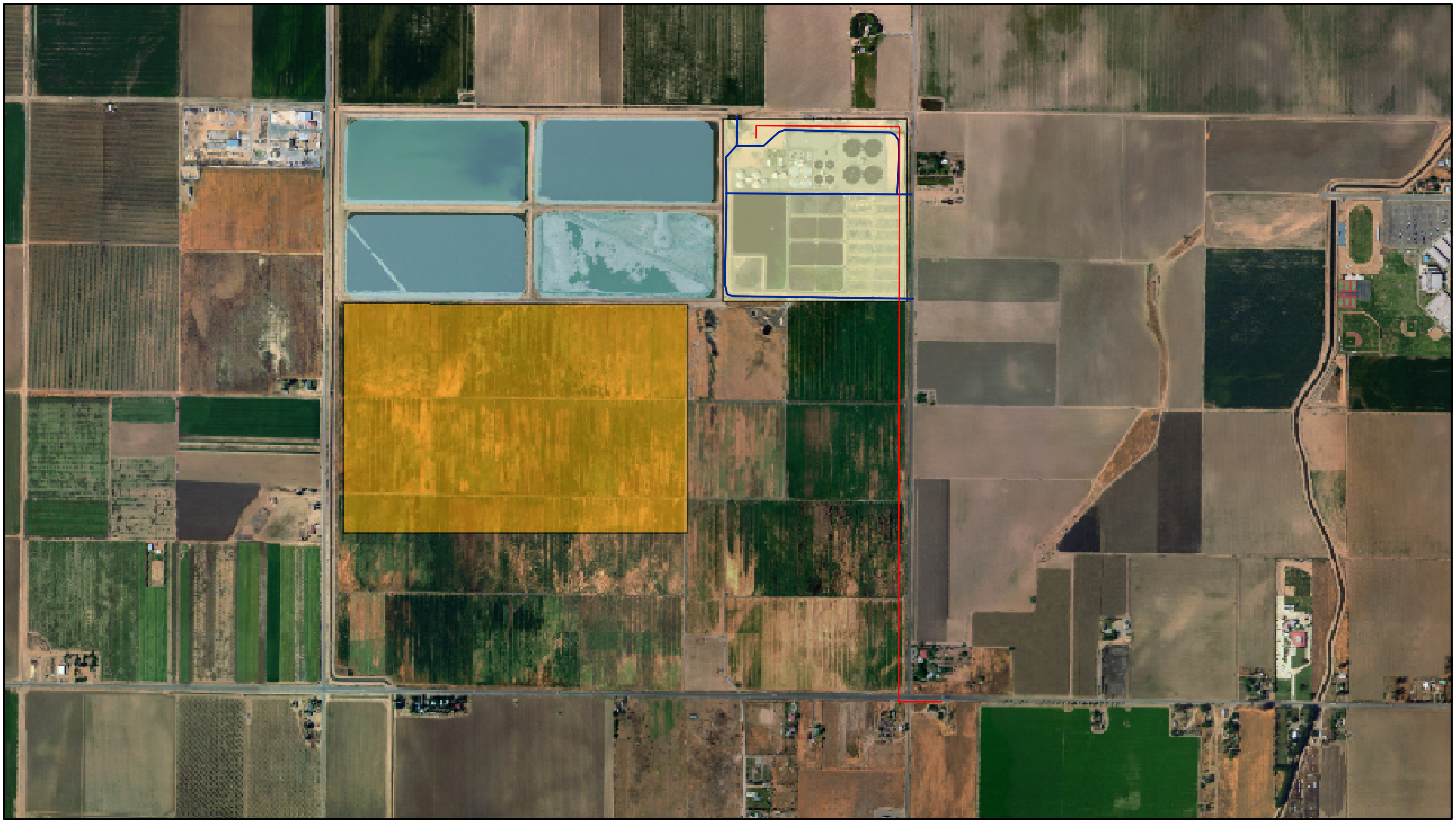
Figure 1

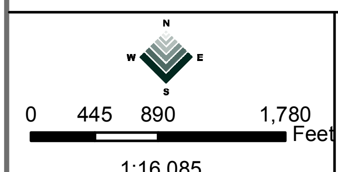
Printed on 6/13/06

QK 050257

# WWTP No. 3 - Expansion & Upgrade

## Aerial Location Map






New Pond Area

Future 32 mgd Treatment Facilities

Percolation Ponds

Internal Ciculation

Low Pressure Gas Line

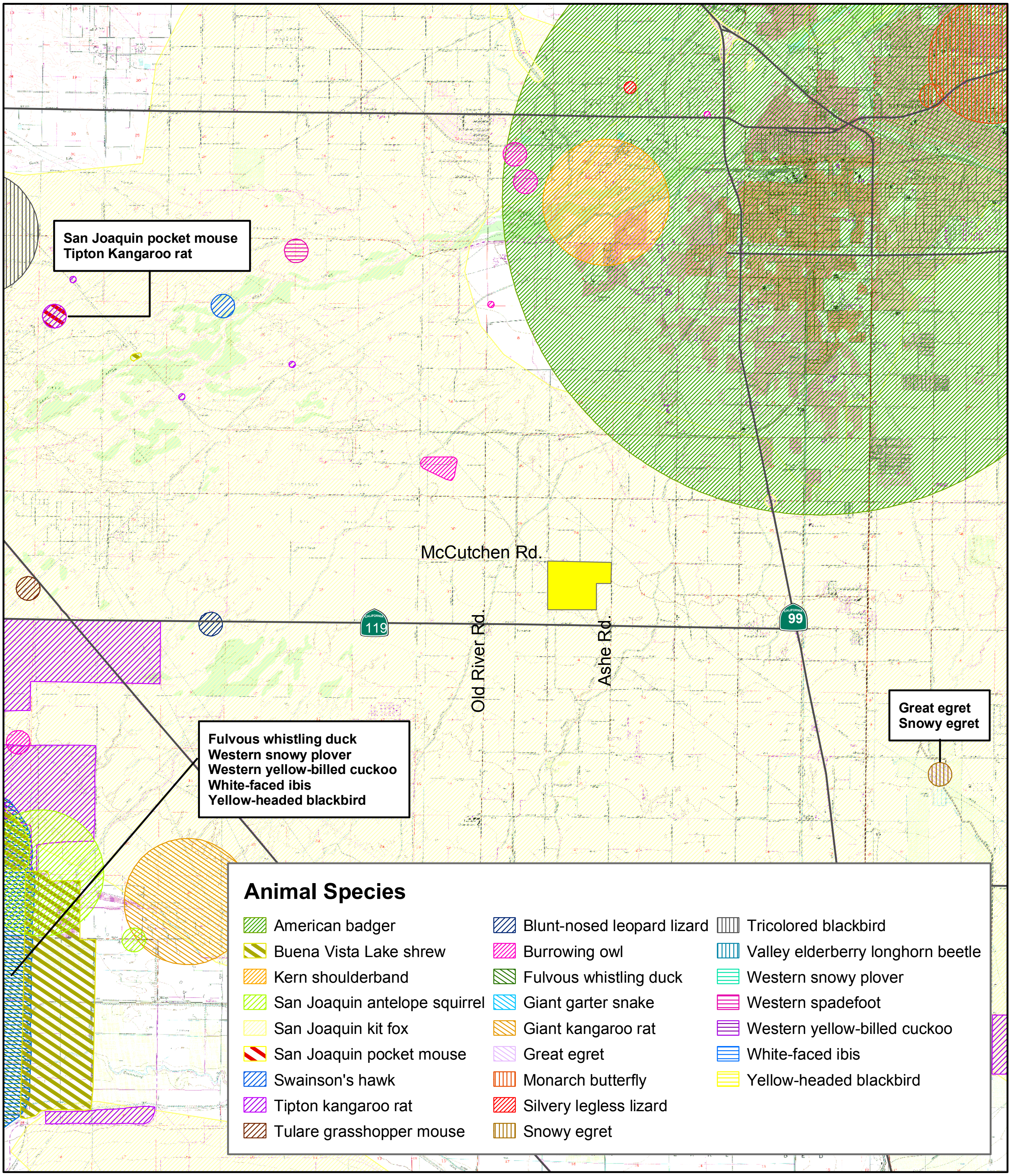
Quad Knopf

Figure 2

050257

# WWTP No. 3 - Expansion & Upgrade

CNDDB Animal Observations




0 7,000 14,000
Feet
1:120,000

Project Area

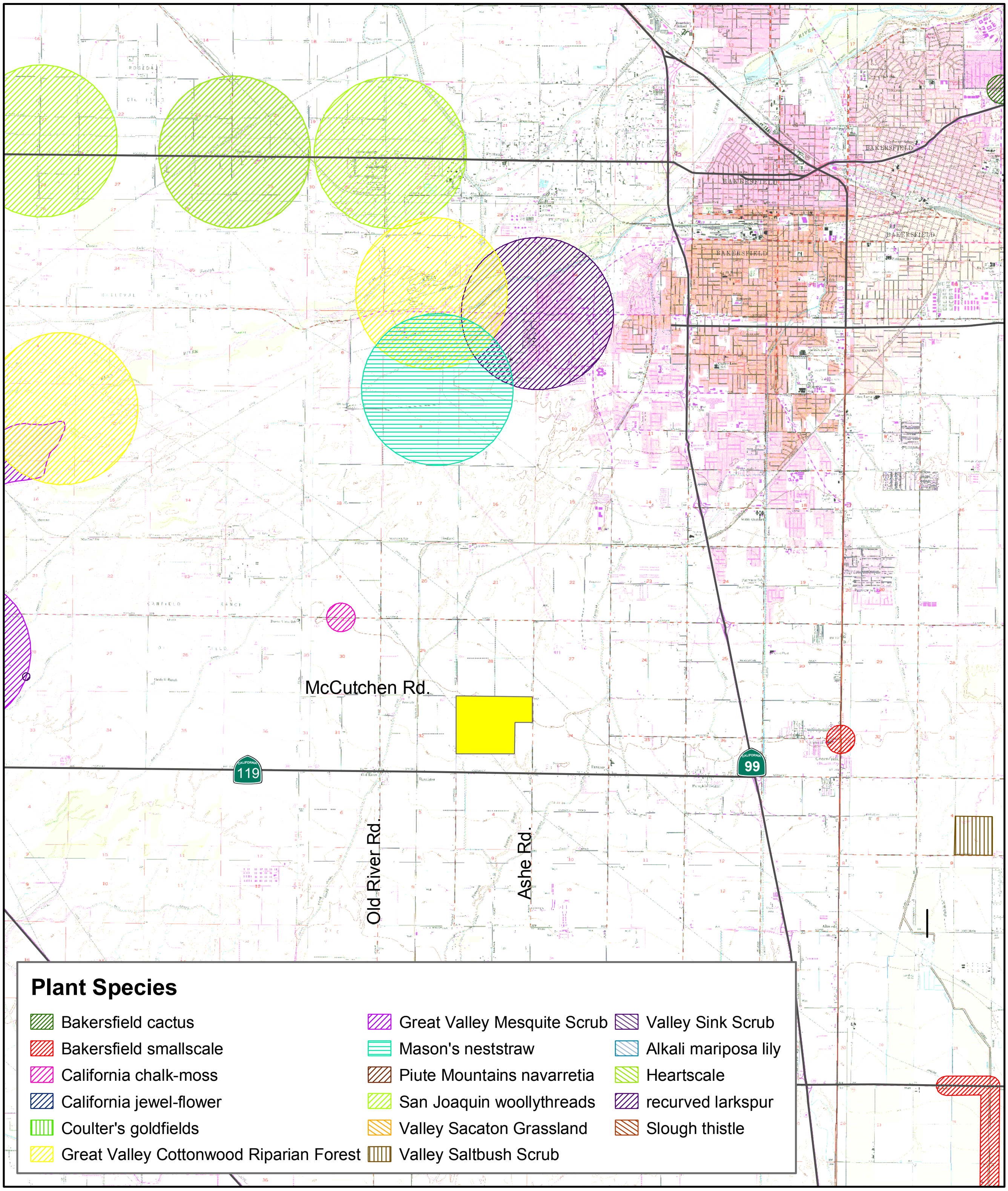
Quad Knopf

Figure 3

050257

# WWTP No. 3 - Expansion & Upgrade

## CNDDB Plant Observations




N W E S

0 6,500 13,000

Feet

1:120,000

Project Area

Quad Knopf

Figure 4

050257

Southwest corner of project site, facing north.

Southwest corner of project site, facing east.

Northwest corner of project site, facing south

Northwest corner of project site, facing east.

Northeast corner of project site, facing south.

Northeast corner of project site, facing west.

Southeast corner of project site, facing north

Southeast corner of project site, facing west.

One of two loggerhead shrikes observed during survey.

Burrowing owl observed near the northeast corner of the project site.

Second burrowing owl observed near the middle of the project site.

Second burrowing owl observed near the middle of the project site.

Burrowing owl burrow located near the southeast corner of the project site

Burrowing owl burrow located near the southeast corner of the project site.

Low pressure gas line location at the southeast corner of Highway 119 and Ashe Road. Facing east.

Low pressure gas line location at the southeast corner of Highway 119 and Ashe Road. Facing west.

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825


August 29, 2006

Document Number: 060829120057

Paul D. Rosebush
Quad Knopf Inc.
5080 California Avenue
Suite 230
Bakersfield, CA 93309

Subject: Species List for Wastewater Treatment Plant #3

Dear: Mr. Rosebush

We are sending this official species list in response to your August 29, 2006 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be November 27, 2006.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found at www.fws.gov/sacramento/es/branches.htm.

Endangered Species Division

Federal Endangered and Threatened Species that Occur in
or may be Affected by Projects in the Counties and/or
U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 060829120057

Database Last Updated: August 10, 2006

**Species of Concern** - The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. See www.fws.gov/sacramento/es/spp_concern.htm for more information and links to these sensitive species lists.

**Red-Legged Frog Critical Habitat** - The Service has designated final critical habitat for the California red-legged frog. The designation became final on May 15, 2006. See our map index.

# WEED PATCH (214B)

## Listed Species

### *Invertebrates*

*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

### *Fish*

*Hypomesus transpacificus*
delta smelt (T)

### *Amphibians*

*Rana aurora draytonii*
California red-legged frog (T)

### *Reptiles*

*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

### *Birds*

*Empidonax traillii extimus*
southwestern willow flycatcher (E)

*Gymnogyps californianus*
California condor (E)

*Haliaeetus leucocephalus*
bald eagle (T)

### *Mammals*

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

# CONNER (215A)

## Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*
*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*
*Dipodomys ingens*
giant kangaroo rat (E)

*Sorex ornatus relictus*
Buena Vista Lake shrew (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

# MILLUX (215B)

## Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*

*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*
*Dipodomys ingens*
giant kangaroo rat (E)

*Sorex ornatus relictus*
Buena Vista Lake shrew (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

# OIL CENTER (239B)

## Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*
*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*

giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*
*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

*Plants*
*Opuntia treleasei*
Bakersfield cactus (E)

# LAMONT (239C)

## Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*
*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*
*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Vulpes macrotis mutica*

San Joaquin kit fox (E)

# OILDALE (240A)

## Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*
*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*
*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

# ROSEDALE (240B)

## Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*
*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*
*Dipodomys ingens*
giant kangaroo rat (E)

*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

# STEVENS (240C)

## Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*
*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*
*Dipodomys ingens*
giant kangaroo rat (E)

*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Sorex ornatus relictus*
Buena Vista Lake shrew (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

*Plants*
*Monolopia congdonii (=Lembertia congdonii)*
San Joaquin woolly-threads (E)

## GOSFORD (240D)

### Listed Species

*Invertebrates*
*Branchinecta lynchi*
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Fish*
*Hypomesus transpacificus*
delta smelt (T)

*Amphibians*
*Rana aurora draytonii*
California red-legged frog (T)

*Reptiles*
*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

*Birds*
*Haliaeetus leucocephalus*
bald eagle (T)

*Mammals*

*Dipodomys ingens*
giant kangaroo rat (E)

*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Sorex ornatus relictus*
Buena Vista Lake shrew (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

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# County Lists

## Kern County

### Listed Species

*Invertebrates*

*Branchinecta conservatio*
Conservancy fairy shrimp (E)

*Branchinecta longiantenna*
Critical habitat, longhorn fairy shrimp (X)
longhorn fairy shrimp (E)

*Branchinecta lynchi*
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Euproserpinus euterpe*
Kern primrose sphinx moth (T)

*Amphibians*

*Ambystoma californiense*
California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

*Rana aurora draytonii*
California red-legged frog (T)
Critical habitat, California red-legged frog (X)

*Reptiles*

*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

## *Birds*

*Empidonax traillii extimus*
Critical habitat, southwestern willow flycatcher (X)
southwestern willow flycatcher (E)

*Gymnogyps californianus*
California condor (E)
Critical habitat, California condor (X)

*Haliaeetus leucocephalus*
bald eagle (T)

*Vireo bellii pusillus*
Least Bell's vireo (E)

## *Mammals*

*Dipodomys ingens*
giant kangaroo rat (E)

*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Ovis canadensis californiana*
Sierra Nevada (=California) bighorn sheep (E)

*Sorex ornatus relictus*
Buena Vista Lake shrew (E)
Critical habitat, Buena Vista Lake shrew (X)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

## *Plants*

*Caulanthus californicus*
California jewelflower (E)

*Eremalche kernensis*
Kern mallow (E)

*Monolopia congdonii (=Lembertia congdonii)*
San Joaquin woolly-threads (E)

*Opuntia treleasei*
Bakersfield cactus (E)

*Pseudobahia peirsonii*
San Joaquin adobe sunburst (T)

*Sidalcea keckii*
Critical habitat, Keck's checker-mallow (X)

Keck's checker-mallow (=checkerbloom) (E)

## Proposed Species

*Amphibians*

*Rana aurora draytonii*

Critical habitat, California red-legged frog (PX)

## Candidate Species

*Amphibians*

*Rana muscosa*

mountain yellow-legged frog (C)

*Birds*

*Coccyzus americanus occidentalis*

Western yellow-billed cuckoo (C)

*Mammals*

*Martes pennanti*

fisher (C)

**Key:**

(E) *Endangered* - Listed as being in danger of extinction.
(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
*Critical Habitat* - Area essential to the conservation of a species.
(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
(C) *Candidate* - Candidate to become a proposed species.
(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
(X) *Critical Habitat* designated for this species

# Important Information About Your Species List

## How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

## Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the nine surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

## Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

## Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

## Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

## Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal

Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our critical habitat page for maps.

## Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

## Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

## Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be November 27, 2006.

# 15.5 CULTURAL RESOURCES SURVEY

Cultural Resources Consultants

# CULTURAL RESOURCES INVENTORY FOR CUP 05-0669 WASTEWATER TREATMENT PLANT #3 EXPANSION AND UPGRADE EIR

**Submitted to:**

Michael Phillips
Quad Knopf Incorporated
5001 California Ave., Suite 230
Bakersfield, CA 93309

**Prepared by:**

Thomas L. Jackson, Ph.D.,
Mary M. O'Neill, B.A.
Pacific Legacy, Inc.
1525 Seabright Avenue
Santa Cruz, CA 95062

July 2006

## TABLE OF CONTENTS



## LIST OF FIGURES



## APPENDIX

# 1.0 INTRODUCTION

The existing facilities at Wastewater Treatment Plant No. 3 (WWTP3) provide primary and secondary treatment of incoming wastewater. Located on the site are four storage ponds, and the treatment plant, which includes clarifiers, solids processing facilities, trickling filters, digesters, sludge drying beds, and methane recovery facilities. On-site there are two sets of sludge drying beds, comprising approximately 11 acres each, which are used to support current wastewater treatment operations. A third set of sludge drying beds of approximately the same size are being developed to support wastewater treatment operations due to increased inflows.

The project site is currently being used either for wastewater treatment purposes or is vacant land. The General Plan Land Use designation is P (Public Facilities) and the zoning is A (Agriculture). The Branch Two canal runs down the western edge of the property and is owned and operated by the Kern Delta Water District.

Improvements to the existing WWTP3 will include, among other things, constructing new ponds on approximately 180 acres south of existing percolation ponds, construction of a low pressure gas line south from the existing treatment facilities, paralleling Ashe Road, and making improvements to portions of Ashe, Gosford, and McCutchen roads.

The current archaeological survey was conducted to identify and assess if cultural resources might be affected by proposed WWTP3 development activities associated with construction of new percolation ponds, roads improvements and building a new gas line. No prehistoric or historic cultural resources were discovered during the field survey.

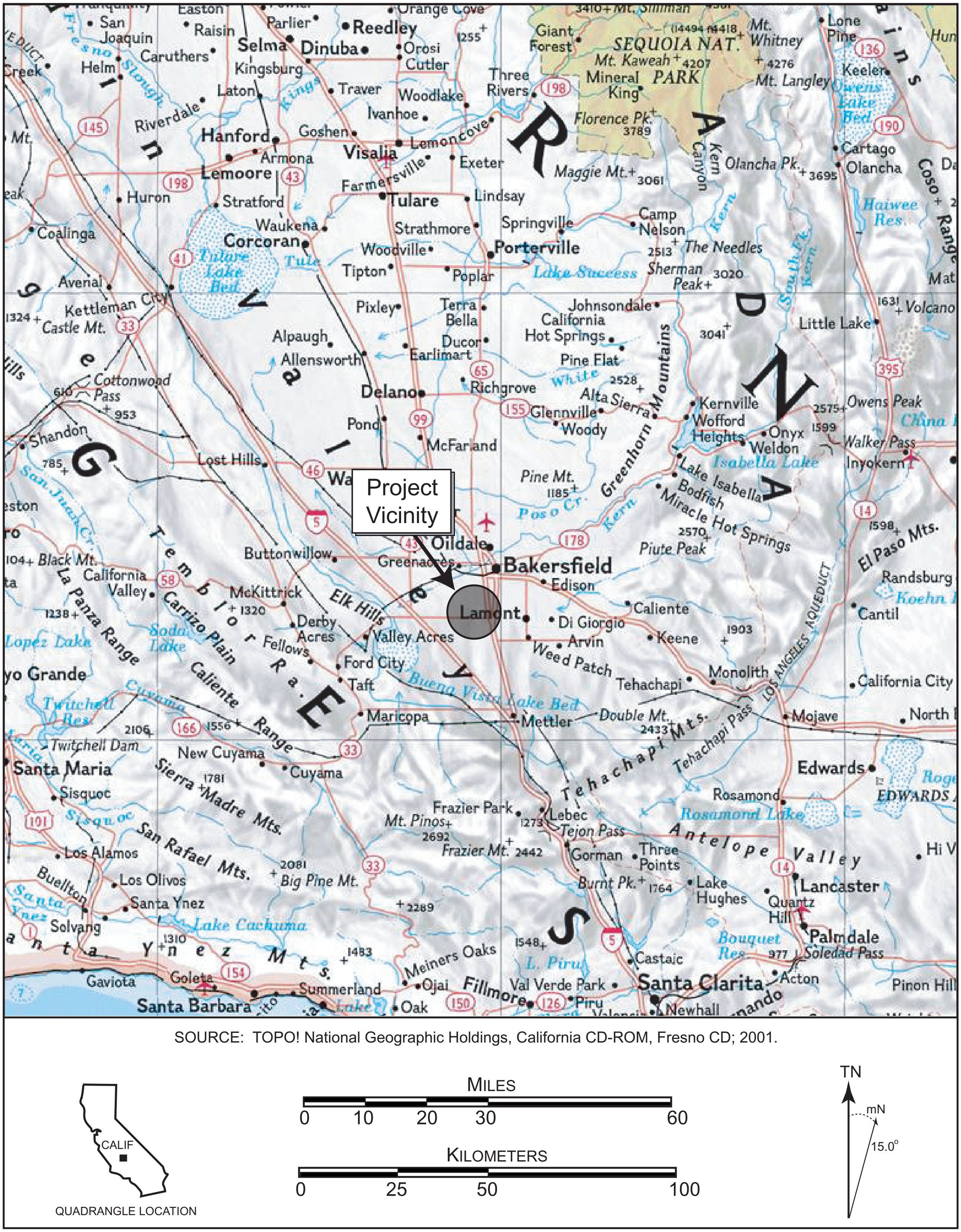
## 1.1 PROJECT LOCATION

The project site is located within the southwest portion of the City of Bakersfield, Kern County, California (Figures 1 and 2). The project address is 8101 Ashe Road, Bakersfield, Calfiornia, 93313. The Project site, approximately 350 acres, is located in Section 33 of Township 30 South, Range 27 East, MDB&M and is bounded on the north by McCutchen Road, on the south by Taft Highway, the east by Ashe Road, and the west by Gosford Road. The project area is on the Gosford, CA 7.5′ USGS topographic quadrangle sheet, Kern County.

## 1.2 REGULATORY SETTING

This report evaluates the potential impacts of proposed WWTP3 improvements on prehistoric and historic cultural resources within the project area with respect to guidelines set forth under the California Environmental Quality Act (CEQA).

A basis for defining the significance of historical resources under CEQA is found at Public Resources Code (PRC) 5024.1, Title 14 CCR Section 4850.3. A California Register of Historical Resources is established, "to identify the state's historical resources and indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change." Historical resources may be listed in the California Register if they meet the eligibility




SOURCE: TOPO! National Geographic Holdings, California CD-ROM, Fresno CD; 2001.

Figure 1. Vicinity Map for the Wastewater Treatment Plant #3 Expansion and Ugrade EIR Project.

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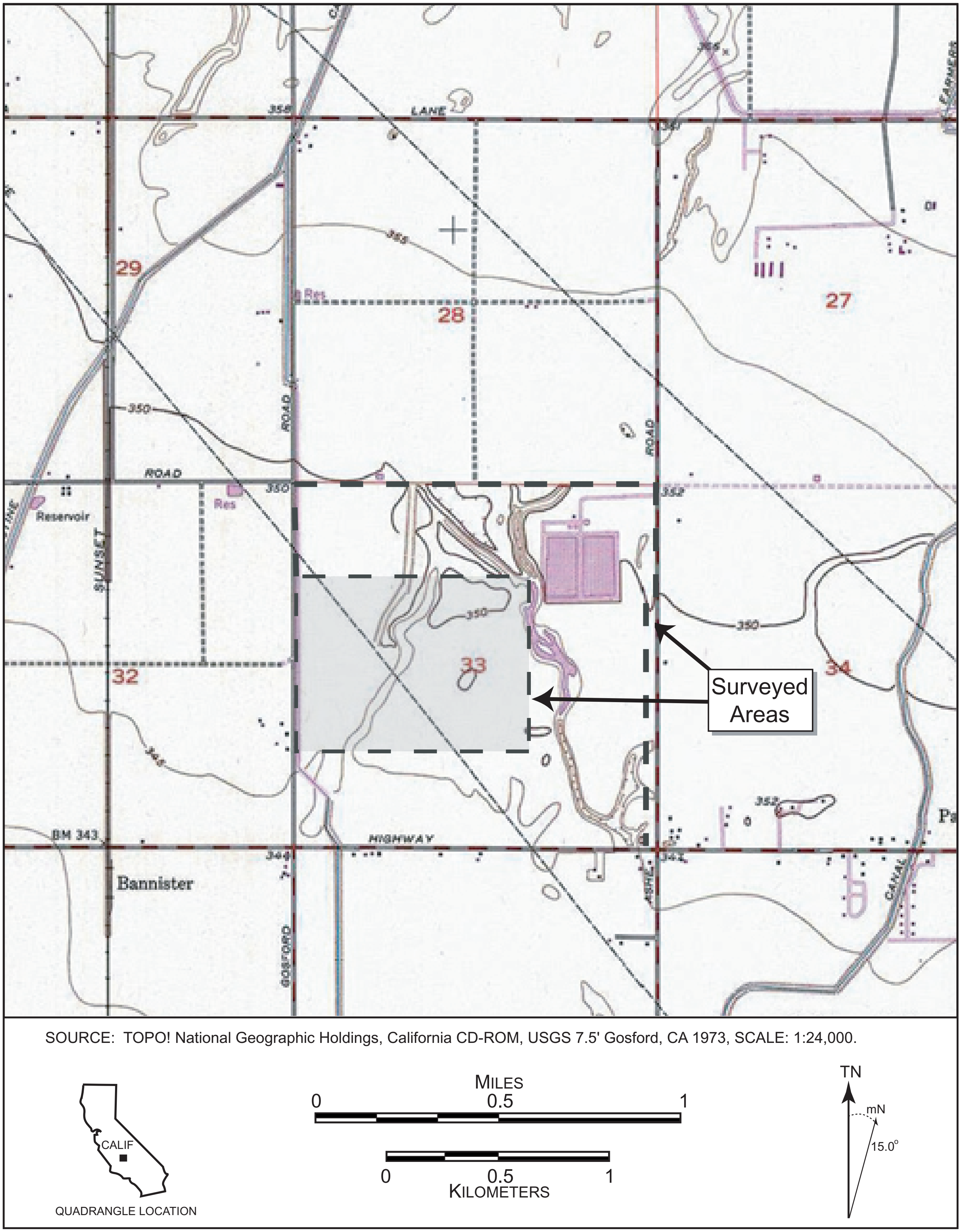


Figure 2. Surveyed Areas for the Wastewater Treatment Plant #3 Expansion and Ugrade EIR Project.

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criteria for listing in the California Register as defined at PRC 5024.1, Title 14 CCR Section 4850.3. According to CEQA Guidelines Section 15064.5(a) (3), "Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource has integrity and meets at least one of the criteria for listing in the California Register of Historic Resources as follows:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California's history or the United States; or

2. It is associated with lives of persons important to local, California, or national history; or

3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values; or

4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation."

Integrity, as defined for the California Register, is "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance" (California Office of Historic Preservation 2006:2). This means that a historic resource must keep enough of its historic character or appearance to be recognizable as historic. In addition, that historic character must reflect the era in which the resource was historically important.

Integrity is assessed in terms of retention of location, design, setting, materials, workmanship, feeling, and association. For instance, if a resource has never been moved from its original location, then it maintains its integrity of location. To maintain integrity, a resource must possess at least some of the integrity aspects. The more integrity aspects that a resource retains, the better its integrity is. A historic resource can have lost sufficient integrity to be ineligible for listing in the National Register of Historic Places and still be eligible on a California Register level. In fact, a resource may have lost its historic character and still have integrity on a California Register level, if it has the potential to yield significant scientific or historic information or specific data (California Office of Historic Preservation 2006:2).

A project with an effect that may cause a substantial adverse change in the significance of an historical resource is considered to have a significant adverse impact on the environment (CEQA Guidelines Section 15064.5[4][b]). A substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired (CEQA Guidelines Section 15064.5[4][b][1]).

## 2.0 SETTING

WWTP3 is located on the south western edge of Bakersfield in Kern County, California. Elevation is approximately 350 feet above mean sea level (amsl). Topography is low rolling hills and creek drainages of the southern San Joaquin Valley. The major drainage nearest to the parcel is the Kern River to the north. A former slough channel crosses through the eastern one-third of Section 33. The native vegetation setting for the parcel is the California Prairie belt of the Great Valley (Küchler 1977); open, flat grasslands punctuated by river and creek drainages with San Joaquin saltbush (*Atriplex polycarpa*). The surrounding area is gradually being developed with residential housing tracts.

## 3.0 HISTORICAL CONTEXT

### 3.1 ETHNOGRAPHIC BACKGROUND

At the arrival of Spanish explorers, the San Joaquin Valley and adjacent foothills of the Coast Ranges and Sierra Nevada were occupied by Yokuts, an ethno-linguistic group of more than 40 autonomous, linguistically and culturally related tribelets. Yokuts languages have been grouped into the Penutian family of languages (Silverstein 1978). A substantial body of ethnographic literature documents Yokuts lifeways (e.g., Gayton 1948; Kroeber 1925; Kunkel 1962; Latta 1999; Wallace 1978).

Ethnographic sources identify the Yowlumne (Yauelmani) Yokuts, who resided from present-day Bakersfield south to Tejón Ranch and the Hometwoli or Halaumne tribelet in the area between and to the north of Buena Vista and Kern Lakes (Kroeber 1925 and Latta 1999, respectively). A Yowlumne village, Woilu, is located on the old channels of the Kern River and within the city limits of Bakersfield, near the project area. Kuyo, another Yowlumne village is located on Old River Slough (Stine Canal). One of the main Halaumne villages was Halau, near the confluence of Old River and Kern Slough (Kroeber 1925 and Latta 1999, respectively).

Yokuts villages were typically located on elevated ground overlooking a slough or lake. Dwellings were of two general types: a small, oval structure housing a single family, a series of which were arranged in a linear pattern and covered with a long continuous awning of brush wood; and a larger linear structure, housing up to ten families. Both were constructed of tule mats lain over support poles. Other structures at Yokuts villages included sunshades, windbreaks and granaries.

The Southern Valley Yokuts practiced a mixed subsistence economy based primarily on fish, waterfowl, freshwater mussels, seeds and roots, with a much smaller emphasis on terrestrial game such as tule elk, deer, and antelope. Fish were harvested in nets dropped from tule rafts, in baskets, by spearing, by trapping in weirs, or by poisoning. Smaller game, particularly rabbits and hares, were taken in communal drives; larger game such as elk and pronghorn were sometimes shot from blinds. Smaller game and fowl were taken in snares. Waterfowl were also taken from blinds and rafts, often using decoys (Latta 1999:143).

Important vegetal resources for Yokuts subsistence included tule and cattail roots, grass nuts (*Cyperus* sp.), cattail blossoms, and various seeds and bulbs. Tule provided the raw material for a wide variety of items that comprised the native toolkit. This was partly of necessity since other raw materials were often in short supply. Basketry was a highly developed craft. Finished baskets took many forms, including cooking vessels, necked water bottles, flat winnowing trays and conical burdens baskets. Tules were also used to construct canoe-shaped balsas or rafts, which were propelled by means of long poles.

Projectile points and knives were commonly manufactured from locally available chert, and more rarely from obsidian imported from Eastern Sierra sources. Locally available natural tar or asphaltum was used both for hafting projectile points and waterproofing basketry.

Trade with neighboring groups was active. Locally obtained asphaltum, steatite, and tanned animal skins were exchanged for obsidian and salt from the Mojave Desert and the western Great Basin (Latta 1999:63-66). One deposit of steatite is located on Santiago Creek, west of San Emigdio. Obsidian was also transported to the coast as a trade article. Beads made of marine shells (e.g., *Olivella* and *Tresus*), probably mostly from the Santa Barbara Channel area, were employed as a medium of exchange and as decorative items.

## 3.2 SPANISH EXPLORATIONS

One Spanish colonial expedition traveled near the project area in Southern San Joaquin Valley. In April 1776, a Franciscan friar, Father Francisco Garcés, and his expedition traveled north from San Gabriel across the mountains east of the Ridge Route and came down into the San Joaquin Valley along Tejón Creek. On May 1, 1776, he crossed the Kern River about eight miles east of Bakersfield and traveled as far north as the White River. On his return southward, Father Garcés visited a Native American village near present day Bakersfield (Hoover, et al. 1966:124).

Native American populations in the region were severely reduced by European diseases introduced by Spanish missionaries and explorers. By 1833 major epidemics had swept through the region leaving Native American populations at perhaps less than 75% of their pre-contact numbers (Wallace 1978: 460). During the historic period Native Americans were indentured laborers on farms and ranches and sent to live on the Tule River Indian Reservation in the American period (Wallace 1978).

## 3.3 AMERICAN ERA HISTORIC BACKGROUND

During the American period, one of the important early outposts in the southern San Joaquin Valley was Fort Tejón. Fort Tejón was established in 1854 next to Grapevine Creek in the Tejón Pass area. It was the headquarters for the United States Army’s First Dragoons who kept order in the southern valley area until 1864 when the post was abandoned (Hoover et al. 1966:126).

Colonel Thomas Baker and his family established Bakersfield in 1863 when they moved south from Visalia. The small settlement was originally called “Kern Island” because it was located among the sloughs of the Kern River. By 1870, Bakersfield had a population of 600 and was incorporated three years later. In 1874, Bakersfield became the county seat for Kern County (Hoover et al. 1966:132).

Oil was first discovered and refined in 1866 in the southern San Joaquin Valley near McKittrick at the foot of the Temblor Range (Hoover, et al. 1966:133). This was the first discovery in the famous McKittrick Oil Field on the southwestern side of the San Joaquin Valley. In 1899, oil was also discovered to the northeast of Bakersfield in the Kern River Oil Field, which led to the towns of Oil City, Oil Center and Oildale (Hoover, et al. 1966:134). The oil discovery brought wealth and prominence to Bakersfield and the surrounding region.

## 4.0 METHODS

### 4.1 ARCHIVAL RESEARCH

Prior to fieldwork, an in-house record and information search was conducted on April 21, 2006 at the Southern San Joaquin Valley Information Center of the California Historical Resources Inventory System at California State University, Bakersfield (Record Search #06-191) for known archaeological sites within ½ mile radius of the project area. Sources consulted include:

- Southern San Joaquin Valley Information Center site and study base maps;
- National Register of Historic Places (*Directory of Determinations of Eligibility*, California Office of Historic Preservation, Volumes I and II, 1990);
- Office of Historic Preservation Computer Listing 1990 and updates);
- *California Historic Resources Inventory* (State of California 1976);
- *California Historical Landmarks* (State of California 1990);
- *California Points of Historical Interest* listing (May 1992).

In addition, a request was submitted to the California Native American Heritage Commission to consult their Sacred Lands Files in order to identify other culturally significant properties. In a letter dated May 18, 2006 the Commission reported that no sacred lands were known to the Commission within the project area (see Appendix A).

No prehistoric or historic archaeological sites or Native American cultural resources have been recorded within the project area.

Four (4) cultural resources (P-15-5980, P-15-5981, P-15-5982, and P-15-11138) have been previously recorded within ½ mile of the project area. In addition to the recorded resources, there have been sixteen (16) prior cultural resource surveys conducted within a ½ mile of the project area.

There are no cultural resources within the project area listed in the National Register of Historic Places, the California Register, California Points of Historical Interest, California Inventory of Historic Resources or the California State Historic Landmarks.

### 4.2 SURVEY METHODS

An archaeological reconnaissance was conducted by Mary O'Neill and Diana Vallera-Rickerson on May 10, 2006. Ms. O'Neill. B.A. has 10 years of California cultural resource management experience. Ms. Vallera-Rickerson, B.A. has one year of California cultural resource management experience. All work was conducted under the supervision of Thomas L. Jackson, Ph.D. Dr. Jackson has over 30 years experience in California cultural resource management.

A pedestrian survey of the project area was methodically conducted by walking 15 meter wide transects through the entire area. All exposed soils were inspected for the presence of cultural resources. Soils are loose, grey-brown loamy sand/silt. Vegetation cover did not impede archaeological reconnaissance as ground surface visibility ranged from 25% to 50% across the survey areas for the new percolation ponds and gas line. Survey was facilitated by ample rodent disturbance that allowed examination of tunnel backdirt piles. Additionally, many 6′x10′ trenches had been excavated in the area of the new percolation ponds allowing examination of soil profiles up to 7′ deep. Survey along Ashe, Gosford and McCutchen roads was inhibited by existing road shoulder coverings.

Archaeological survey for the low pressure gas line and roads improvements was completed on July 20, 2006 by Kelly Larsen, M.A. The area surveyed for the gas line is a corridor 15 meters wide. Survey conditions were consistent with those for the rest of the areas surveyed. No cultural resources were found along the gas line route. Road shoulders along road segments to be improved were examined. Not cultural resources were found.

## 5.0 SURVEY RESULTS

During the reconnaissance survey, no prehistoric or historic resources were encountered. Scattered modern trash, asphalt fragments, dirt roads, and possible grading in some areas of the parcel were noted. An old wagon is present on the property but is not considered a historical resource.

## 6.0 RECOMMENDATIONS

The project area does not appear to be archaeologically sensitive. Because there are no indications that cultural resources exist in the project area, further archaeological work is not recommended. If archaeological remains are discovered in the course of construction activities, construction should be halted and the potential resource evaluated by a qualified archaeologist. The archaeologist will recommend appropriate mitigation measures.

If human remains are encountered during construction or any other phase of development, work in the area of the discovery must be halted, the Kern County coroner notified, and the provisions of Public Resources Code 5097.98-99, Health and Safety Code 7050.5 carried out. If the remains are determined to be Native American, then the Native American Heritage Commission (NAHC) will be notified within 24 hours as required by Public Resources Code 5097. The NAHC will notify designated Most Likely Descendants who will provide recommendations for the treatment of the remains within 24 hours. The NAHC will mediate any disputes regarding treatment of remains.

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## Appendix A: Native American Heritage Commission Letter

STATE OF CALIFORNIA — Arnold Schwarzenegger *Governor*

**NATIVE AMERICAN HERITAGE COMMISSION**
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390
Web Site www.nahc.ca.gov

May 18, 2006

Deborah Sterling
Pacific Legacy
1525 Seabright Avenue
Santa Cruz, CA 95062

Sent by Fax: 831-423-0587
Number of Pages: 3

RE: **Proposed Project # 932-33 Waste Water Treatment Plant No. 3, Expansion and Upgrade, Gosford quadrangle, Kern County**

Dear Ms. Sterling:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4040.

Sincerely,

Caren Lee

for Rob Wood
Environmental Specialist III

# 15.6 GROUNDWATER RESOURCES EVALUATION

# 15.6a Kenneth D. Schmidt and Associates Hydrogeological Evaluation

# GROUNDWATER CONDITIONS IN THE VICINITY OF CITY OF BAKERSFIELD WWTF NO. 3

prepared for
Quad Knopf
Bakersfield, California

by
Kenneth D. Schmidt and Associates
Groundwater Quality Consultants
Bakersfield, California

July 2006

KENNETH D. SCHMIDT AND ASSOCIATES
GROUNDWATER QUALITY CONSULTANTS
3701 PEGASUS DRIVE, SUITE 112
BAKERSFIELD, CALIFORNIA 93308
TELEPHONE (661) 392-1630

July 24, 2006

Mr. Mike Phillips
Quad Knopf
5001 California Ave.
Suite 230
Bakersfield, CA 93309

Re: City of Bakersfield
WWTF No. 3

Dear Mike:

Submitted herewith is our report on groundwater conditions in the vicinity of City of Bakersfield WWTF No. 3.

Sincerely Yours,

Kenneth D. Schmidt
Geologist No. 1578
Certified Hydrologist
No. 176

KDS/pe

cc: Art Chianello
City of Bakersfield

REGISTERED GEOLOGIST • KENNETH D. SCHMIDT NO. 1578 • STATE OF CALIFORNIA

REGISTERED GEOLOGIST • KENNETH D. SCHMIDT NO. 176 CERTIFIED HYDROGEOLOGIST • STATE OF CALIFORNIA

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GROUNDWATER CONDITIONS IN THE VICINITY
OF CITY OF BAKERSFIELD WWTF NO. 3

## INTRODUCTION

City of Bakersfield (COB) Wastewater Treatment Plant No. 3 (WWTF) processes about 16 mgd of sewage to the secondary level. The WWTF and adjoining lands are located in Section 33 of T30S/R27E, between McCutchen Road and Taft Highway and Gosford and Ashe Roads. Most of the WWTF effluent is sent to the I-5 Reclamation Site. During winter months, when the irrigation demand is less, the effluent is sent to four on-site storage ponds. During October 2005-January 2006, a total of 1,132 million gallons or about 3,470 acre-feet was discharged to the 120-acre ponded area.

KDSA (2001) prepared a report on groundwater conditions in the vicinity of WWTF No. 3. At that time, a routine monitoring program was being conducted by the City for about one dozen private domestic wells in the vicinity of the WWTF. In late November-December, 2002, the first eight monitor wells were installed at or near the WWTF No. 3 (KDSA, 2003). In October 2004, the ninth monitor well was installed just west of the WWTF (KDSA, 2004).

For about two decades, some of the WWTF No. 3 effluent was mixed with industrial wastewater from a plant that produced baker's yeast and was recycled on the 400 acres of City property immediately south of the treatment facilities. The yeast plant was owned and operated by the American Yeast Company (AYC) and the 400 acres was termed the "Use Area". The discharge of WWTF No. 3 effluent and yeast plant wastewater to the Use Area was regulated by two orders adopted by the Regional Board on January 28, 1983: Waste Discharge Requirements Order No. 83-016 and Wastewater Reclamation Requirements Order No. 83-017. AYC began its discharge of industrial wastewater to the Use Area in 1983 and discontinued its discharge at the end of 2002.

For this evaluation, a study area was selected that extends from Harris Road on the north to Houghton Road on the south, and from Green Road on the west to Akers on the east. Figure 1 shows the location of the WWTF, the WWTF monitor wells, and public supply wells in the study area. The COB plans to construct a 16 mgd expansion to WWTF No. 3. About half of the effluent (up to 16 mgd) would continue to be sent to the Green Acres Farm. Most of the remaining effluent would be percolated at the existing ponds and new ponds to be developed in the area south of the exiting ponds.

## EXISTING CONDITIONS

### Subsurface Geologic Conditions

General subsurface geologic conditions in the vicinity of WWTF No. 3 were discussed by KDSA (2001). As part of the present evaluation, two subsurface geologic cross sections were developed (Figure 1). Cross Section A-A' (Figure 2) extends from near Engel and

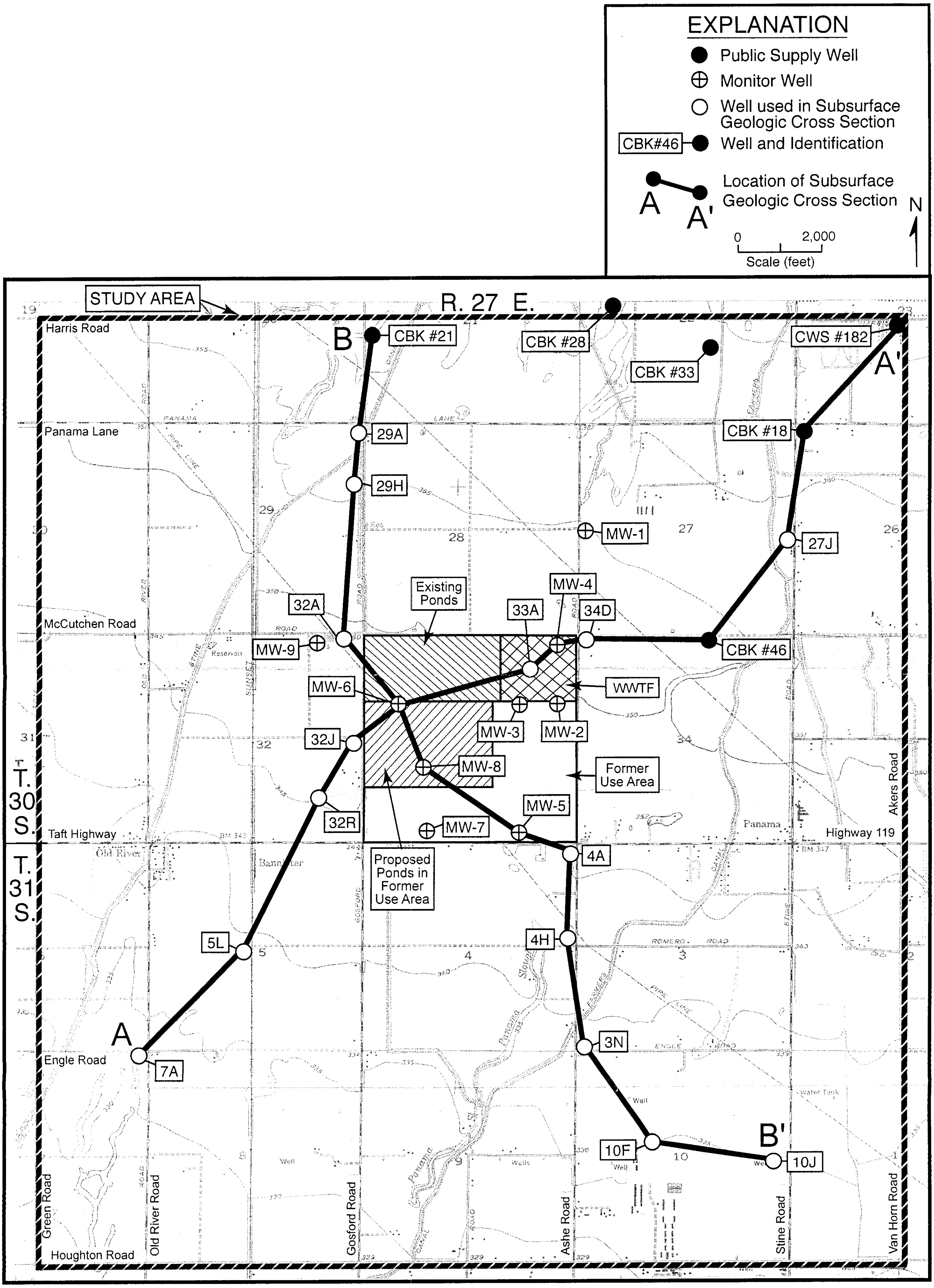


FIGURE 1 - LOCATION OF WWTF, MONITOR WELLS, PUBLIC SUPPLY WELLS, AND SUBSURFACE GEOLOGIC CROSS SECTIONS

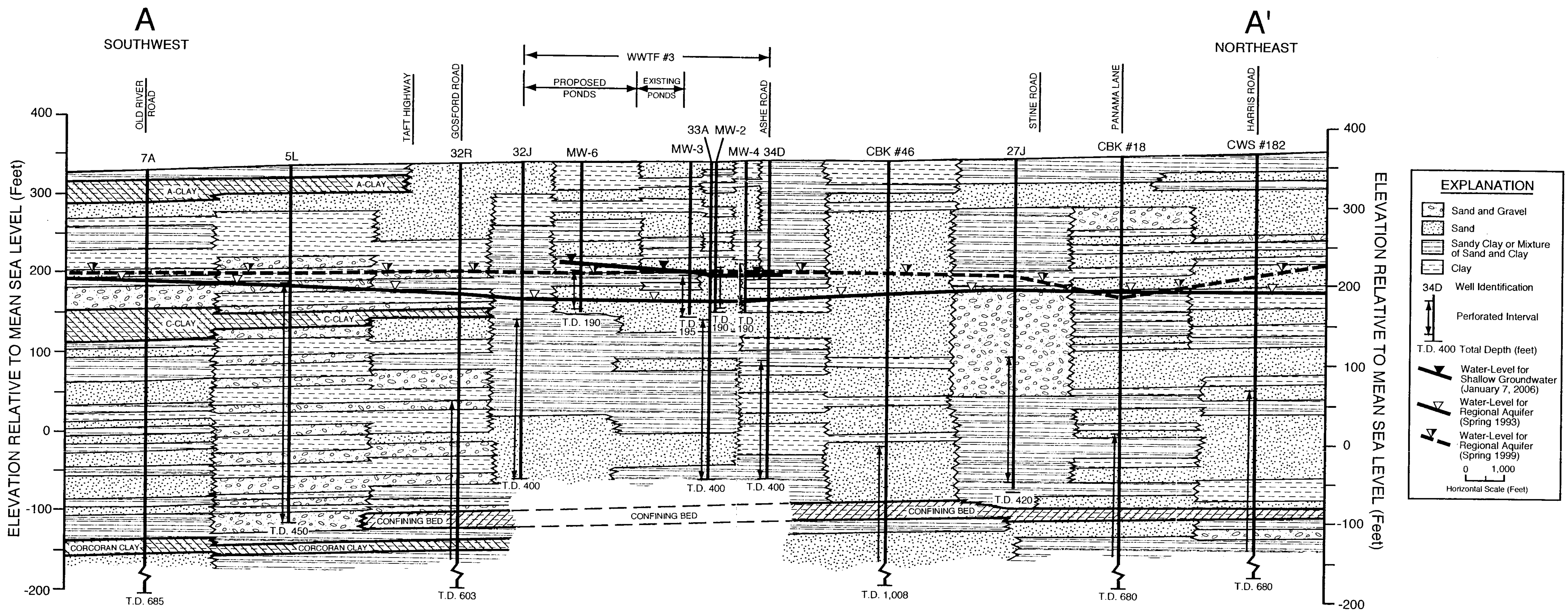


FIGURE 2 - SUBSURFACE GEOLOGIC CROSS SECTION A- A'

Old River Roads on the southwest, through the WWTF to the northeast, near Harris and Akers Roads. Cross Section B-B' (Figure 3) extends from near Harris and Gosford Roads on the north to the south, through the WWTF, to the southeast near Stine Road, about half a mile north of Houghton Road. The cross sections were developed to assess the nature of deposits above a depth of about 500 feet.

Cross Section A-A' (Figure 2) shows that one aquifer is indicated above a depth of about 400 feet beneath the WWTF and to the northeast. Coarse-grained strata are predominant and there are no significant confining beds above a depth 400 feet. A widespread confining layer is indicated along this cross section, generally between about 400 and 500 feet in depth. Southwest of the WWTF, this bed may be equivalent to the Corcoran Clay, a regional clay layer in parts of the San Joaquin Valley. Two other confining beds are indicated southwest of the WWTF. The shallowest is blue and within the upper 50 feet and is termed herein the A-clay. This clay is associated with the former lake bed and shallow groundwater beneath irrigated lands. The northeast edge of the A-clay appears to be near Taft Highway along this section. A third confining bed, herein termed the C-clay because of its distinctive blue color and depth below land surface, is also indicated in the same geographic area at a depth of about 170 to 210 feet. In the area southwest of

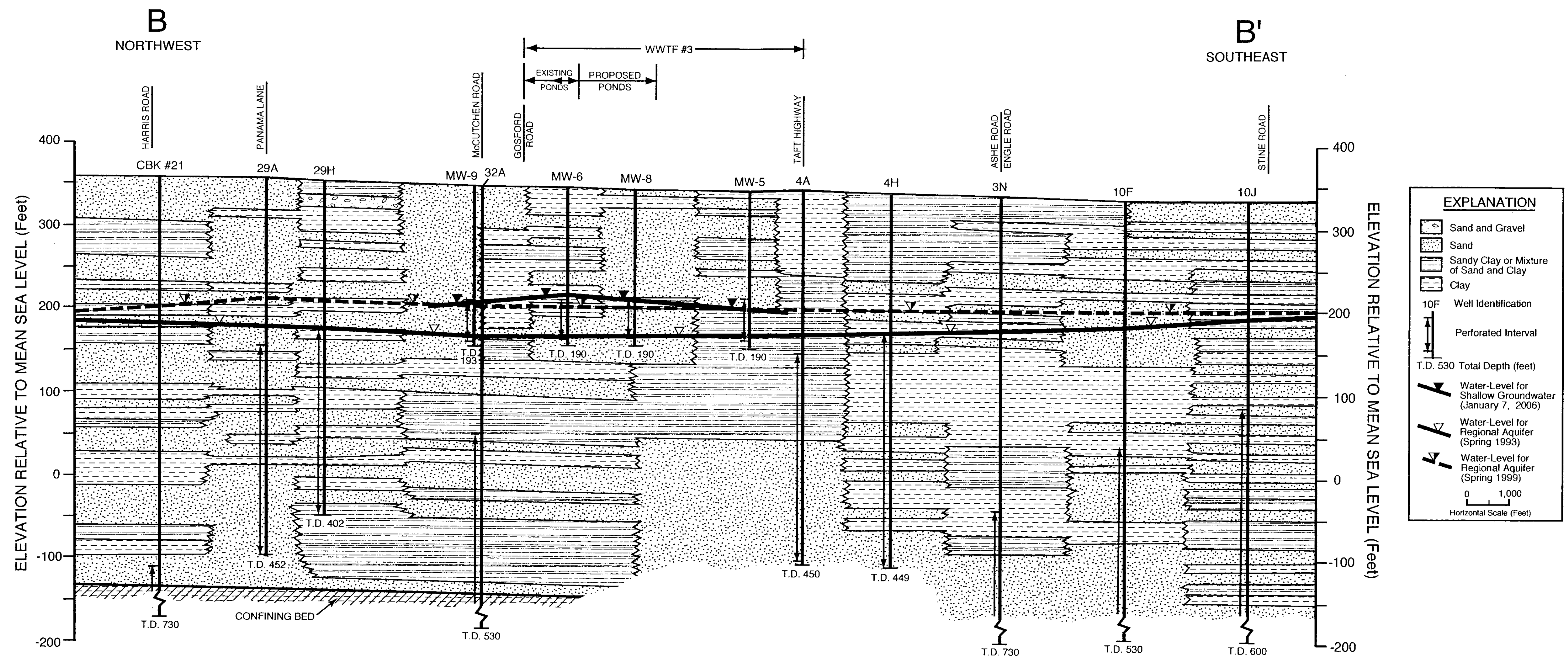


FIGURE 3 - SUBSURFACE GEOLOGIC CROSS SECTION B- B'

the WWTF, two aquifers are indicated above the Corcoran Clay, one above and one below the C-clay.

Cross Section B-B′ (Figure 3) also indicates a deep confining bed beneath and northwest of the WWTF, the top of which is almost 500 feet deep. No other significant confining beds are indicated along this section, except southeast of Taft Highway, where a thick clay layer (more than 100 feet thick) is indicated at the approximate depth of the C-clay. The alluvial deposits beneath and north of the WWTF are indicated to be primarily coarse-grained, whereas southeast of the WWTF they are indicated to primarily be fine-grained. The coarse-grained deposits are associated with the Kern River Fan, and the fine-grained deposits are southeast of this fan, where lakebed deposits are predominant.

## Types and Locations of Wells

Figure 1 shows the locations of the nine monitor wells at the WWTF. Table 1 show construction data for these wells, which range in cased depth from 172 to 192 feet. These wells generally tap the uppermost saturated deposits beneath the WWTF and vicinity. Figure 1 also shows the locations of five COB public supply wells and one California Water Service public supply well in the study area. Table 2 provides information for these wells. These public supply wells are located east of Gosford Road and near or north of McCutchen Road, and range in cased depth from 560 to 710 feet. The

TABLE 1-CONSTRUCTION DATA FOR WWTF MONITOR WELLS

| Well No. | Date Drilled | Drilled Depth (feet) | Cased Depth (feet) | Perforated Interval (feet) | Annular Seal (feet) |
|---|---|---|---|---|---|
| MW-1 | 11/22/02 | 180 | 172 | 122-172 | 0-111 |
| MW-2 | 11/21/02 | 190 | 185 | 135-185 | 0-124 |
| MW-3 | 11/21/02 | 195 | 192 | 142-192 | 0-128 |
| MW-4 | 11/22/02 | 190 | 180 | 130-180 | 0-118 |
| MW-5 | 11/25/02 | 190 | 180 | 130-180 | 0-120 |
| MW-6 | 11/26/02 | 190 | 185 | 135-185 | 0-120 |
| MW-7 | 11/27/02 | 181 | 181 | 131-181 | 0-120 |
| MW-8 | 12/02/02 | 190 | 178 | 128-178 | 0-120 |
| MW-9 | 10/15/04 | 193 | 188 | 139-188 | 0-138 |

Wells constructed by Bradley & Sons of Del Rey by the direct rotary method. Each well has a 5-inch diameter Schedule 40 PVC casing.

TABLE 2-CONSTRUCTION DATA FOR PUBLIC SUPPLY WELLS

| Well No. | Date | Depth Drilled (ft) | Casing Diameter (in) | Depth Cased (ft) | Perforated Interval (ft) | Annular Seal (ft) |
|---|---|---|---|---|---|---|
| CBK-21 | 12/11/86 | 730 | 16 | 710 | 470-710 | 0-260 |
| CBK-28 | 3/16/92 | 739 | 16 | 710 | 425-710 | 0-400 |
| CBK-33 | 11/16/94 | 730 | 16 | 700 | 380-680 | 0-370 |
| CWS-182 | 4/15/80 | 680 | 16 | 668 | 300-648 | 0-50 |
| CBK-18 | 11/21/87 | 671 | 16 | 650 | 350-650 | 0-290 |
| CBK-46 | 7/29/05 | 1,008 | 16 | 560 | 360-540 | 0-333 |

hole for recently constructed CBK-46 was drilled to a depth of 1,008 feet to investigate deeper subsurface conditions. However, the cased depth of the completed well was considerably shallower, so that the well would produce water of acceptable quality. The tops of the perforations in the public supply wells with records range from 300 to 470 feet in depth. Except for CWS-182, the tops of the perforations are 350 feet or greater.

There are numerous private domestic wells in the study area, and most of these range from about 200 to 350 feet in depth. A review of water well drillers reports for the vicinity indicates that private domestic wells have been drilled progressively deeper during the past several decades. This is attributed to the water-level decline that occurred in the vicinity between about 1950 and the early 1990's (discussed later). By the late 1950's, domestic wells were normally drilled to about 180 to 200 feet in depth. The tops of the perforations in these well ranged from about 120 to 150 feet. Domestic wells drilled during the 1960's through the present have usually ranged from about 250 to 350 feet deep.

There are numerous irrigation wells in the rural part of the study area, and they have also been drilled progressively deeper. By the late 1950's and 1960's, most irrigation wells were being drilled to depths of at least 300 to 450 feet. The tops of the perforations in most of these wells ranged from about 150 to 200 feet deep. By the 1970's, most irrigation wells were being drilled to depths of 450 to 600 feet, and the tops of the perforations were from 200 to 250 feet deep. Records indicate that few irrigation wells have been drilled in the vicinity of the WWTF since the 1970's. The depth interval tapped by the most active irrigation wells in the area is between about 200 and 500 feet in depth.

## Water Levels

### Shallow

Figure 4 shows a representative recent water-level elevation and direction of groundwater flow map for the shallow groundwater, tapped by the WWTF monitor wells. Water-level elevations ranged from 203 to 220 feet above mean sea level in January 2006. A mound was present beneath the effluent holding ponds. The direction of groundwater flow beneath the Use Area has been to the south or southeast.

### Deep

As part of this evaluation, two water-level maps were prepared, based on supply well measurements. Figure 5 shows water-level elevation contours for Spring 1993, representative of drought conditions. Water-level elevations exceeded 195 feet above mean sea near the northeast corner and east edge of the study area. A depression cone was present beneath the central part of the study

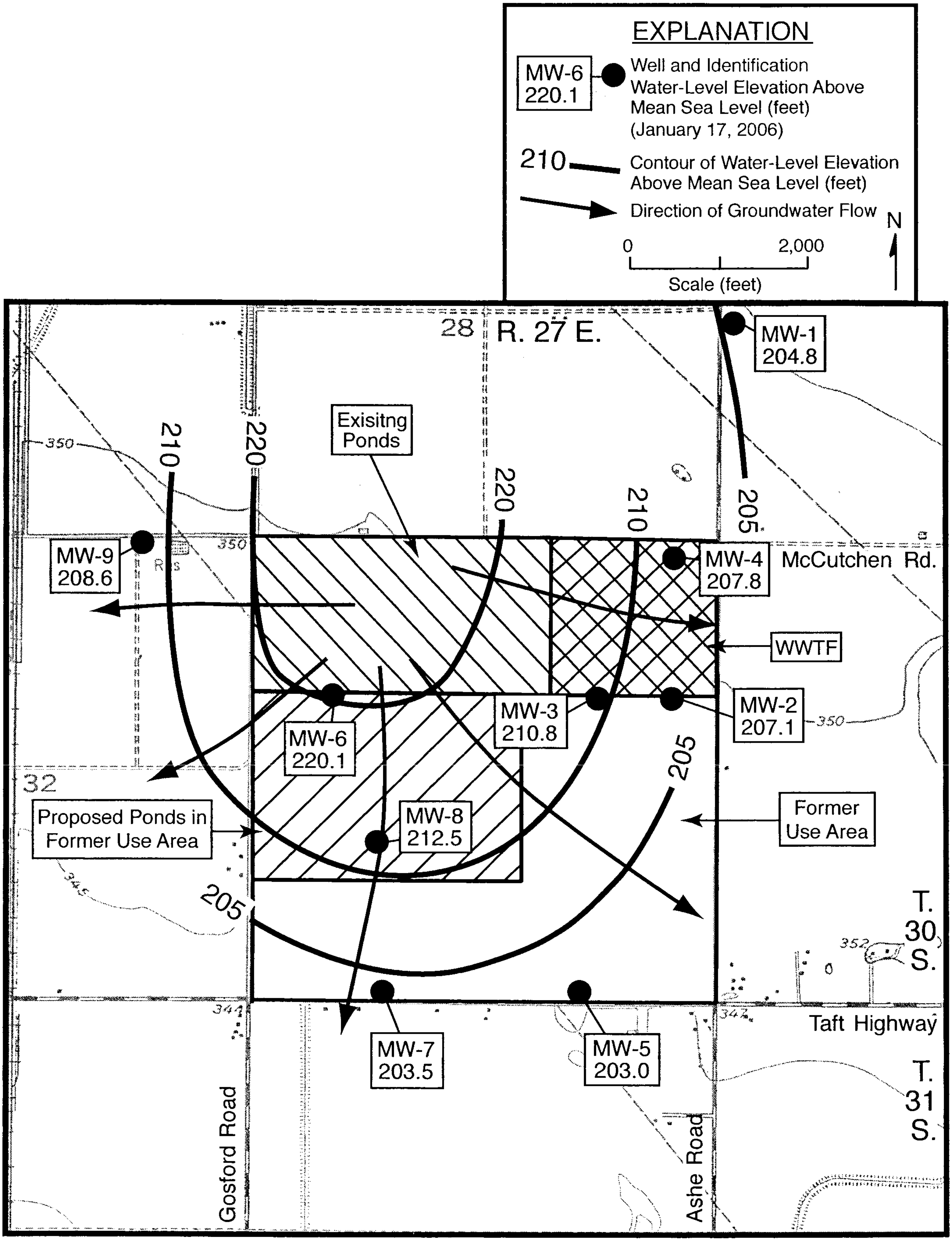


FIGURE 4 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR SHALLOW GROUNDWATER (JANUARY 2006)

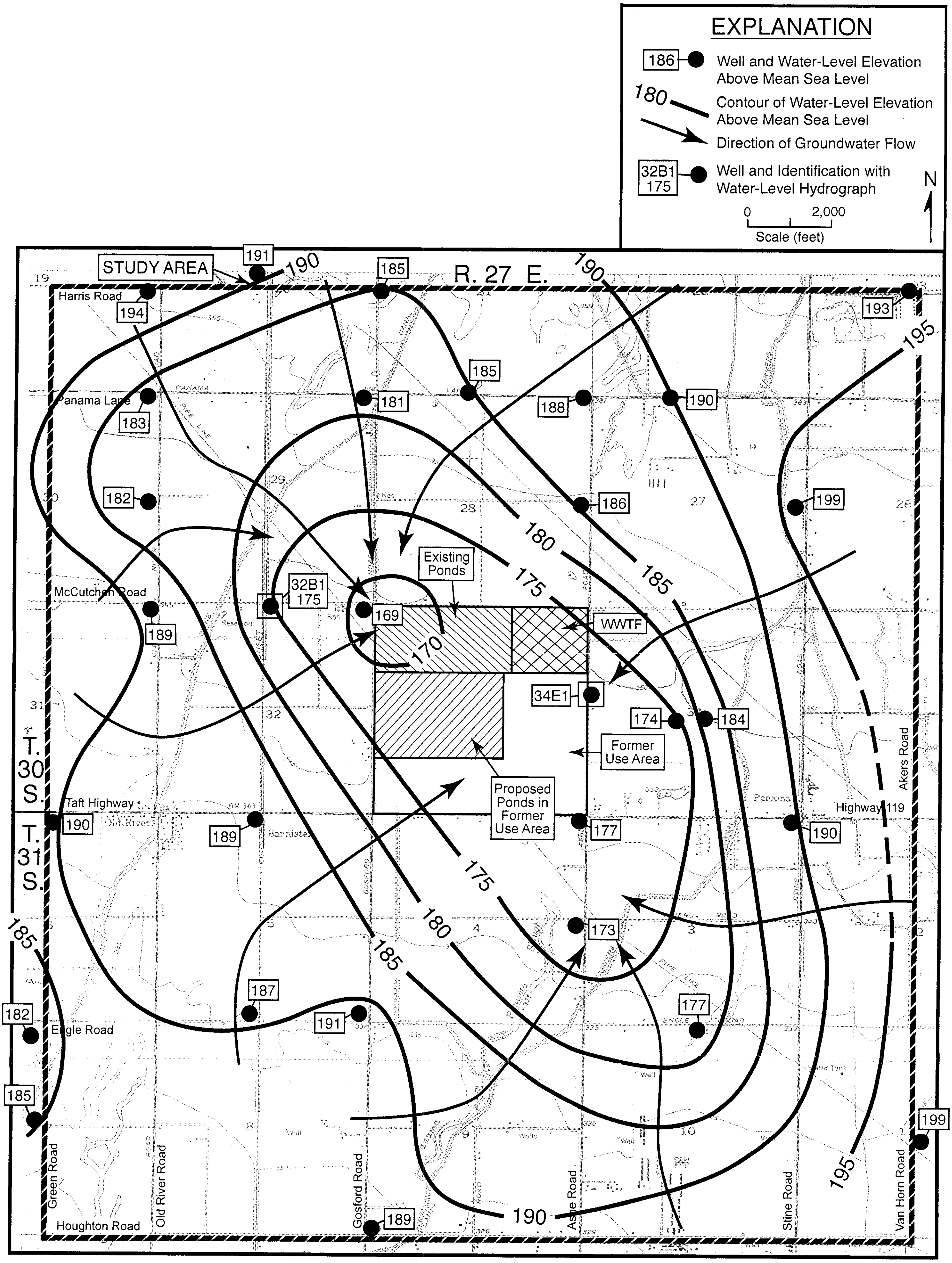


FIGURE 5 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR REGIONAL AQUIFER (SPRING 1993)

area. The depression is indicated to be primarily due to pumping of irrigation wells in the area between Old River and Stine Roads and Panama Lane and Engle Road.

Figure 6 shows water-level elevation contours and the direction of groundwater flow for the regional aquifer in Spring 1999, representative of wet conditions. Water-level plots on the two subsurface cross sections (Figure 2 and 3) indicate that the regional water levels during wet periods are almost the same as those for the shallow groundwater tapped by the WWTF monitor wells. Water-level elevations in the regional aquifer were highest (greater than 220 feet above mean sea level) beneath the northwest corner of the study area. This is indicated to be associated with large-scale intentional recharge associated with Kern Fan Water-Banking projects to the northwest. The lowest water-level elevations were in the southwest part of the study area (less than 200 feet). Beneath most of the west half of the study area there was usually an easterly and southerly component of groundwater flow. Water-level elevations in strata below a depth of about 300 feet were essentially at the same elevations as those that have been determined for the shallowest groundwater beneath the WWTF since late 2002.

Time Trends

Figure 7 shows water-level hydrographs for 2002-2006 for the

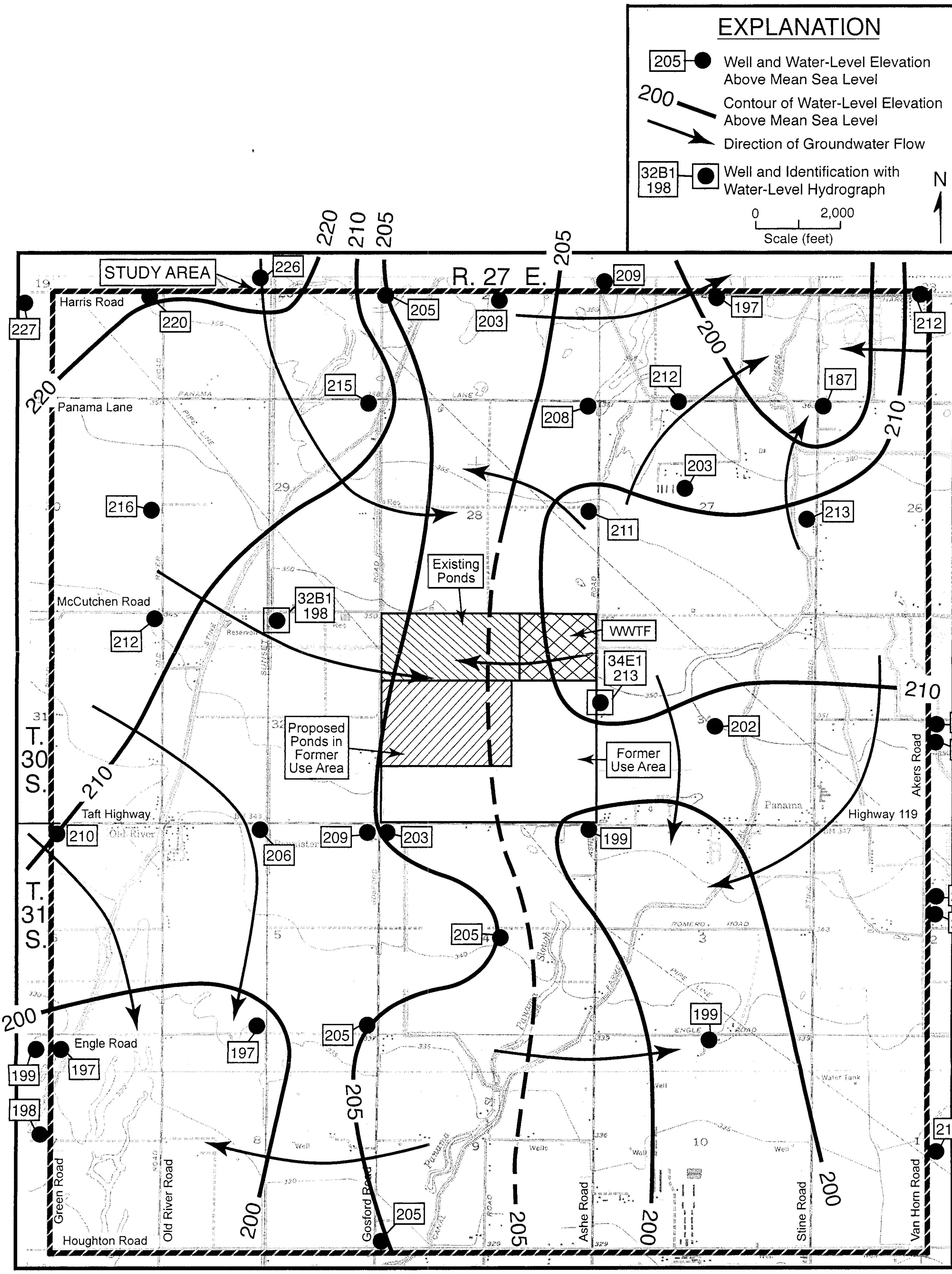


FIGURE 6 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR REGIONAL AQUIFER (SPRING 1999)

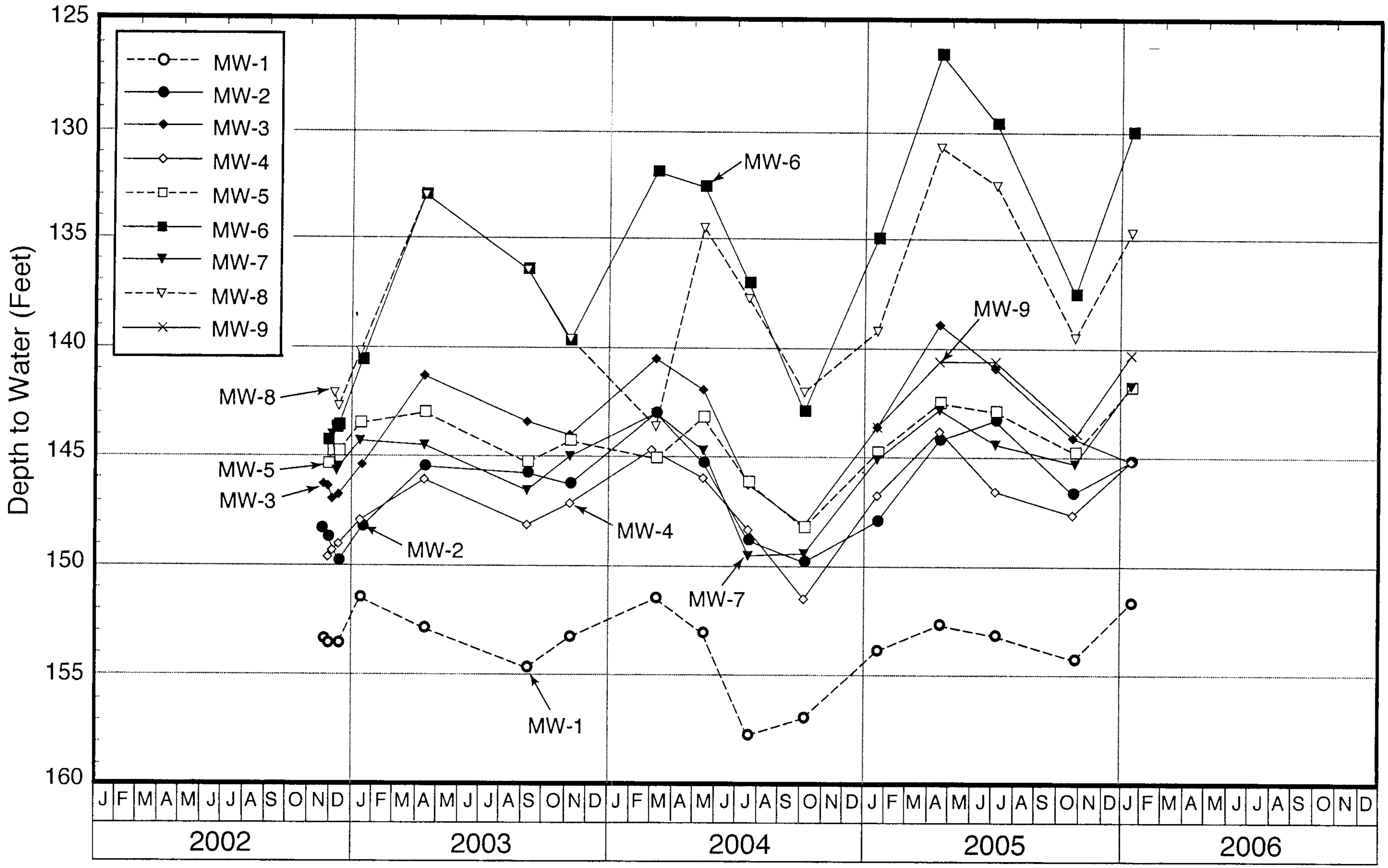


FIGURE 7 - WATER-LEVEL HYDROGRAPHS FOR MONITOR WELLS

WWTF monitor wells. Overall, these hydrographs indicate stable or rising water levels for the period of record. Seasonal variations are present, with the shallowest levels in the spring and the deepest levels in the fall. Substantial recharge was done in 2005 for water banking projects on the Kern Fan, and may have influenced water levels in these wells.

Water-level hydrographs were prepared for two wells in the vicinity with long-term records (Figure 8). Well T30S/R27E-32B1 is located about one-half mile west of the WWTF, and records for this well extend from 1955 to the present. Well T30S/R27E-34E1 is located immediately east of the WWTF, and records for this well extend from 1965 to the present. These hydrographs show the significant water-level declines of the 1950's, 1960's, and 1970's. Water levels rose following the 1976-77 drought through the late 1980's, then declined during 1991-94. During 1995-99, water levels rose, associated with large-scale recharge at the Kern Fan water banking projects.

## Aquifer Characteristics

The results of an aquifer test for WWTF MW-2 are representative of shallow coarse-grained strata beneath the WWTF. Results of an aquifer test for new CBK-46 are also available. This well is located about half a mile east of the WWTF and taps strata between 360 and 540 feet in depth. Table 3 summarizes the results of these

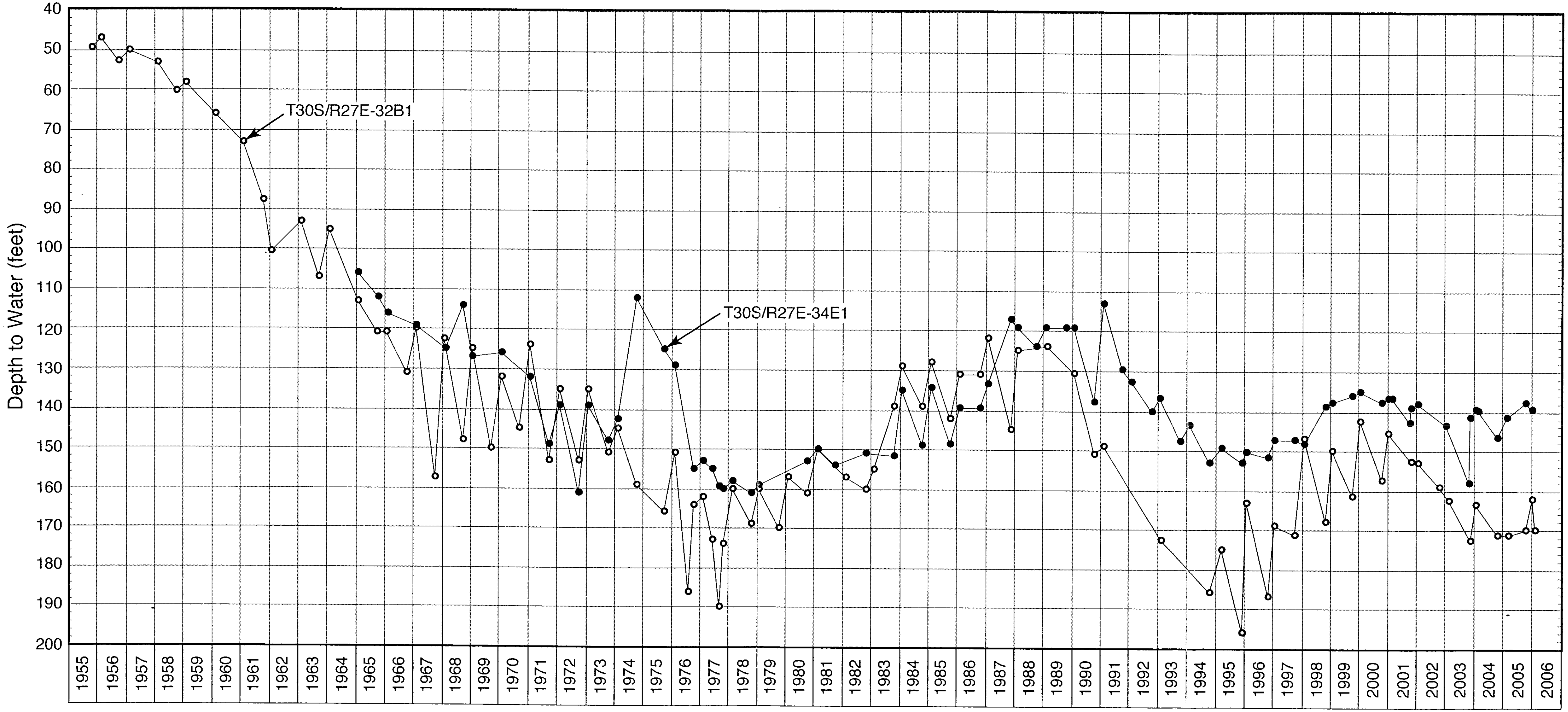


FIGURE 8 - LONG-TERM WATER-LEVEL HYDROGRAPHS FOR WELLS TAPPING REGIONAL AQUIFER

TABLE 3-SUMMARY OF AQUIFER TEST RESULTS

| Well | Perforated Interval (ft) | Date | Pumping Rate (gpm) | Drawdown (feet) | Specific Capacity (gpm/ft) | Transmissivity (gpd/ft) | Hydraulic Conductivity (gpd/sq ft) |
|---|---|---|---|---|---|---|---|
| MW-2 | 135-185 | 12/12/02 | 44 | 3.1 | 14.2 | 77,000 | 1,800 |
| CBK-46 | 360-540 | 09/13/05 | 1,105 | 19.2 | 57.5 | 195,000 | 1,300 |

Pumping for the MW-2 test was conducted by Bradley and Sons of Del Rey and for CBK-46 by Bakersfield Well & Pump Co. of Bakersfield.

two tests. Transmissivity for strata above about 190 feet in depth was 77,000 gpd per foot. A mounding evaluation (described later) was conducted for winter percolation from the existing effluent ponds. This indicated a transmissivity of 76,000 gpd per foot, in excellent agreement with this value. Transmissivity for strata between 360 and 540 feet in depth east of the WWTF was 195,000 gpd per foot. The hydraulic conductivity of the coarse-grained deposits tapped by the two wells ranged from about 1,300 to 1,800 gpd per foot, typical of such deposits.

## Sources of Recharge and Discharge

In the regional sense, major sources of recharge to groundwater are seepage from unlined canals and Kern River streamflow and water-banking projects along the Kern River. Recharged water moves away from these projects and canals and toward the WWTF. Important sources of local recharge include seepage from KDWD irrigation canals, deep percolation of applied irrigation water in the KDWD, and percolation of effluent from the holding ponds. Groundwater discharge is primarily by pumping of wells and groundwater outflow to adjoining areas, where more groundwater is pumped.

## Groundwater Quality

### Monitor Wells

Quarterly and annual reports on the results of monitor well sampling have been provided to the California Regional Water Quality Control Board, Central Valley Region. Table 4 shows results for the January 2006 monitoring round. TDS concentrations ranged from 380 to 1,100 mg/l. The highest TDS concentrations (900 to 1,100 mg/l) were in water from MW-5 and MW-7, located in the former Use Area, where mixed AYC wastewater and effluent were discharged. TDS concentrations in water from the other monitor wells ranged from 380 to 610 mg/l. The lowest concentration was in water from MW-3. Chloride concentrations ranged from 43 to 240 mg/l. The highest concentrations (180 to 240 mg/l) were in water from MW-5 and MW-7. The lowest chloride concentration (43 mg/l) was in water from MW-9. Nitrate-nitrogen concentrations ranged from 0.7 to 12 mg/l. The highest nitrate-nitrogen concentration was in water from MW-6, and the lowest was in water from MW-5. Nitrate-nitrogen concentrations in groundwater downgradient of the effluent storage ponds were generally in the range of 3 to 6 mg/l, below the MCL of 10 mg/l. Total organic carbon (TOC) concentrations ranged from less than 1.0 to 10 mg/l. Except for MW-5, TOC concentrations were 1.7 mg/l or less. Manganese concentrations ranged from less than 0.01 to 5.7 mg/l. Except for MW-5, manganese concentrations were 0.33 mg/l or less. Manganese concentrations in water from MW-5 and MW-8 exceeded the recommended MCL of 0.05 mg/l. Water from MW-5 has had a noticeable yellow color. The relatively high cal-

TABLE 4 - CHEMICAL QUALITY OF WATER FROM MONITOR WELLS

| Constituent (mg/l) | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 |
|---|---|---|---|---|---|
| Calcium | 110 | 92 | 62 | 91 | 190 |
| Magnesium | 19 | 15 | 11 | 12 | 34 |
| Sodium | 44 | 72 | 77 | 55 | 170 |
| Potassium | 3 | 3 | 2 | 2 | 5 |
| Carbonate | <3 | <3 | <3 | <3 | <6 |
| Bicarbonate | 290 | 340 | 260 | 260 | 680 |
| Sulfate | 120 | 56 | 51 | 67 | 130 |
| Chloride | 63 | 76 | 76 | 63 | 240 |
| Nitrate-Nitrogen | 5.1 | 5.9 | 2.6 | 6.6 | 0.7 |
| Nitrite-Nitrogen | <0.02 | <0.02 | <0.02 | <0.02 | 0.03 |
| Ammonia-Nitrogen | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Total Kjeldahl Nitrogen | 0.2 | 0.3 | 0.3 | 0.2 | 2.1 |
| Total Nitrogen | 5.3 | 6.2 | 2.9 | 6.8 | 2.9 |
| Total Phosphate | <0.2 | <0.2 | <0.2 | 0.2 | <0.2 |
| Boron | 0.2 | 0.4 | 0.3 | 0.3 | 0.5 |
| pH | 7.8 | 8.0 | 7.8 | 8.2 | 7.7 |
| Electrical Conductivity (micromhos/cm @ 25°C) | 870 | 870 | 740 | 760 | 1,800 |
| Total Dissolved Solids (@ 180°C) | 580 | 520 | 380 | 480 | 1,100 |
| Iron | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Manganese | 0.026 | <0.01 | <0.01 | <0.01 | 5.7 |
| Total Organic Carbon | <1.0 | <1.0 | 1.7 | <1.0 | 10 |
| Temperature (°F) | 65 | 66 | 63 | 65 | 69 |
| Date | 1/17/06 | 1/17/06 | 1/17/06 | 1/17/06 | 1/17/06 |
| Perforated Interval (feet) | 122-172 | 135-185 | 142-192 | 130-180 | 130-180 |



Continued:

TABLE 4 - CHEMICAL QUALITY OF WATER FROM MONITOR WELLS
(Continued:)

| Constituent (mg/l) | MW-6 | MW-7 | MW-8 | MW-9 |
|---|---|---|---|---|
| Calcium | 74 | 170 | 67 | 79 |
| Magnesium | 13 | 22 | 12 | 13 |
| Sodium | 110 | 80 | 87 | 48 |
| Potassium | 3 | 3 | 3 | 2 |
| Carbonate | <3 | <3 | <3 | <3 |
| Bicarbonate | 330 | 390 | 290 | 280 |
| Sulfate | 72 | 110 | 51 | 59 |
| Chloride | 83 | 180 | 86 | 43 |
| Nitrate-Nitrogen | 12 | 8.9 | 2.6 | 7.0 |
| Nitrite-Nitrogen | <0.02 | <0.02 | <0.02 | <0.02 |
| Ammonia Nitrogen | <0.02 | <0.02 | <0.02 | <0.02 |
| Total Kjeldahl Nitrogen | 0.3 | 0.8 | 0.4 | <0.2 |
| Total Nitrogen | 12 | 9.7 | 3.0 | 7.2 |
| Total Phosphate | <0.2 | <0.2 | 0.4 | <0.2 |
| Boron | 0.4 | 0.4 | 0.4 | 0.3 |
| pH | 7.9 | 7.6 | 7.2 | 8.0 |
| Electrical Conductivity (micromhos/cm @ 25°C) | 960 | 1,300 | 820 | 700 |
| Total Dissolved Solids (@ 180°C) | 610 | 900 | 490 | 440 |
| Iron | <0.05 | <0.05 | <0.05 | <0.05 |
| Manganese | <0.01 | 0.030 | 0.33 | 0.029 |
| Total Organic Carbon | <1.0 | 1.7 | 1.1 | <1.0 |
| Temperature (°F) | 64 | 66 | 64 | 66 |
| Date | 1/17/06 | 1/17/06 | 1/17/06 | 1/17/06 |
| Perforated Interval (feet) | 135-185 | 131-181 | 128-178 | 139-188 |

Samples analyzed by BC Laboratories, Inc. of Bakersfield.

cium, sodium, bicarbonate, chloride, Kjeldahl nitrogen, TOC, and TDS concentrations in water from this well and the color are associated with the former disposal of mixed effluent and AYC wastewater in the former Use Area. Figure 9 shows concentrations of key constituents in water from the monitor wells.

Public Supply Wells

Table 5 provides the results of analyses of water from six public supply wells in the study area. All of these wells tap strata below a depth of 300 feet. TDS concentrations in water from these wells ranged from 160 to 194 mg/l. The waters were of the calcium or calcium-sodium bicarbonate type. Nitrate-nitrogen concentrations ranged from 0.7 to 2.0 mg/l, well below the MCL. Concentrations of iron and manganese in water from these wells were not detectable. Arsenic concentrations ranged from 0.003 to 0.01 mg/l, below the new MCL of 0.01 mg/l, except for CBK-33. Alpha activities were 3 picocuries per liter or less, well below the MCL of 15 picocuries per liter.

Private Domestic Wells

Table 6 contains the results of analyses of water from seven private domestic wells within about half a mile of the WWTF that were sampled in 2001 by BSK Associates on behalf of the City. Depths of these wells ranged from 150 to 400 feet, and many tapped

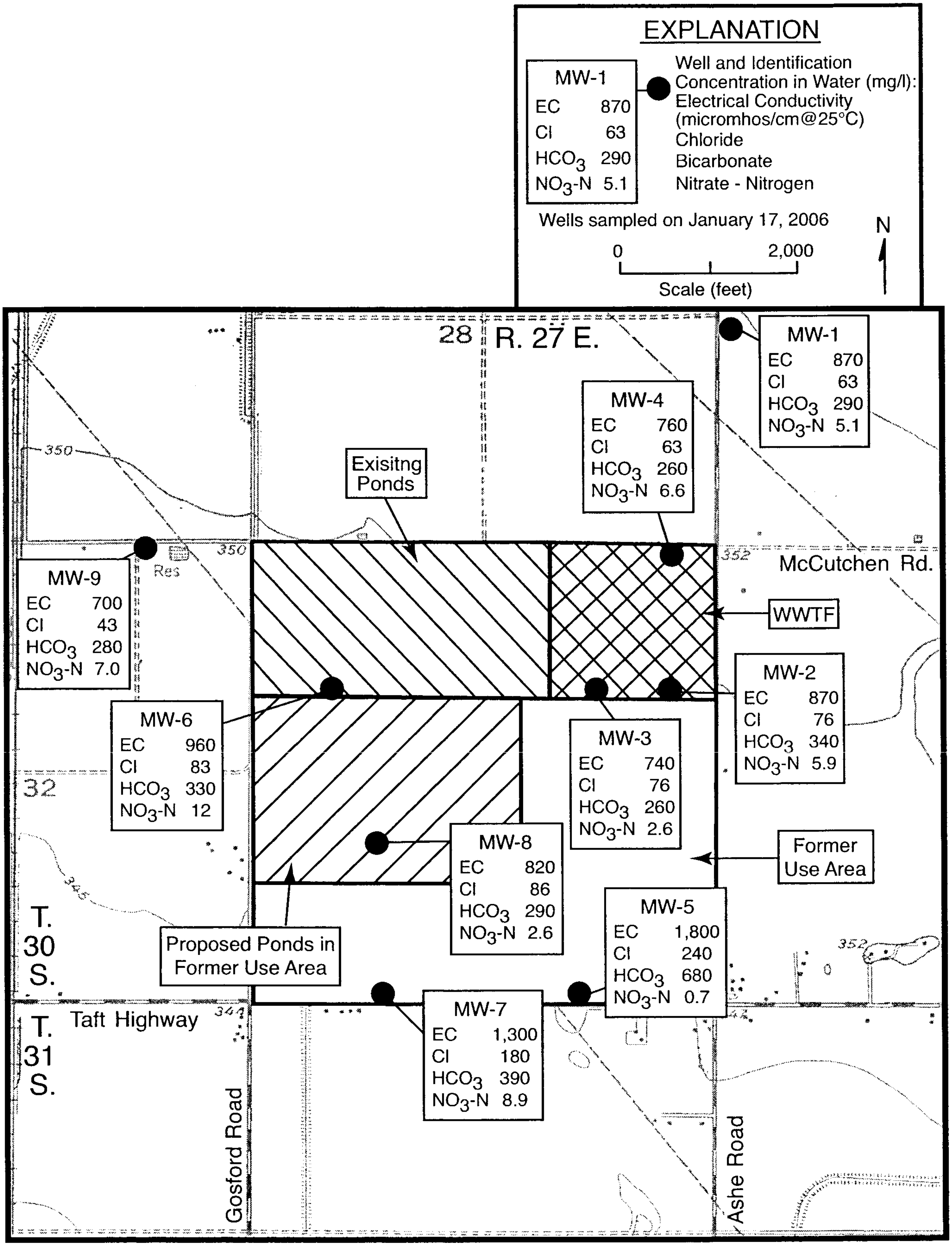


FIGURE 9 - CHEMICAL QUALITY OF WATER FROM MONITOR WELLS

TABLE 5-CHEMICAL QUALITY OF WATER FROM PUBLIC SUPPLY WELLS

| | City of Bakersfield | | | | | Cal Water Service Co. |
|---|---|---|---|---|---|---|
| Constituent (mg/l) | CBK-18 | CBK-21 | CBK-28 | CBK-33 | CBK-46 | CWS-182 |
| Calcium | 29 | 37 | 31 | 30 | 31 | 35 |
| Magnesium | 4 | 3 | 3 | 4 | 4 | 5 |
| Sodium | 22 | 18 | 22 | 19 | 22 | 18 |
| Potassium | 2 | 2 | 3 | 3 | <2 | 3 |
| Carbonate | <3 | 1 | 3 | 1 | <1 | 1 |
| Bicarbonate | 122 | 132 | 155 | 127 | 120 | 129 |
| Sulfate | 25 | 18 | 16 | 17 | 22 | 24 |
| Chloride | 16 | 10 | 9 | 9 | 12 | 11 |
| Nitrate-Nitrogen | 2.1 | 2.3 | 0.7 | 0.7 | 0.7 | 2.0 |
| Fluoride | 0.2 | 0.1 | 0.1 | | 0.1 | 0.2 |
| Total Phosphate | - | <0.1 | <0.01 | 0.04 | - | <0.01 |
| Boron | 0.1 | - | - | - | 0.2 | - |
| pH | 8.3 | 8.1 | 8.2 | 7.9 | 8.2 | 8.1 |
| Electrical Conductivity (micromhos/cm @ 25°C) | 314 | 277 | 260 | 257 | 280 | 293 |
| Total Dissolved Solids (@ 180°C) | 160 | 179 | 168 | 166 | 180 | 194 |
| Iron | <0.05 | <0.05 | <0.05 | <0.05 | <0.1 | <0.05 |
| Manganese | <0.01 | <0.01 | <0.01 | <0.01 | <0.02 | <0.01 |
| Arsenic | 0.003 | <0.02 | 0.003 | 0.01 | 0.008 | 0.005 |
| Alpha Activity (pCi/l) | 3 | 2 | 2 | 1 | 3 | 2 |
| Date | 7/21/99 | 3/3/99 | 10/27/98 | 11/3/97 | 9/13/05 | 4/28/98 |
| Perforated Interval (feet) | 350-650 | 470-710 | 425-710 | 380-680 | 360-540 | 300-648 |

TABLE 6-CHEMICAL QUALITY OF WATER FROM PRIVATE DOMESTIC WELLS

| | T30S/R27E | | | |
|---|---|---|---|---|
| Constituent (mg/l) | 28R | 29H | 33A | 33H |
| Calcium | 53 | 71 | 58 | 79 |
| Magnesium | 8 | 14 | 11 | 15 |
| Sodium | 34 | 36 | 93 | 63 |
| Potassium | 3 | 3 | 4 | 4 |
| Carbonate | <3 | <3 | <6 | <6 |
| Bicarbonate | 192 | 229 | 318 | 239 |
| Sulfate | 42 | 45 | 39 | 51 |
| Chloride | 22 | 14 | 61 | 68 |
| Nitrate-Nitrogen | 3.0 | 9.2 | 11 | 11 |
| Total Kjeldahl Nitrogen | <0.2 | <0.2 | 0.5 | 0.2 |
| Total Nitrogen | 3.0 | 9.2 | 11 | 11 |
| Total Phosphate | <0.05 | <0.05 | <0.05 | <0.05 |
| Boron | 0.2 | 0.2 | 0.4 | 0.3 |
| pH | 7.7 | 7.5 | 7.0 | 7.5 |
| Electrical Conductivity (micromhos/cm @ 25°C) | 460 | 560 | 755 | 790 |
| Total Dissolved Solids (@ 180°C) | 300 | 368 | 433 | 493 |
| Iron | <0.05 | <0.05 | <0.05 | <0.05 |
| Manganese | <0.01 | <0.01 | <0.01 | 0.17 |
| Arsenic | 0.0023 | 0.0048 | <0.001 | <0.001 |
| Total Organic Carbon | <1.0 | <1.0 | 1.7 | 1.3 |
| Date | 7/13/01 | 7/13/01 | 7/13/01 | 7/13/01 |
| Perforated Interval (feet) | 120-150 | 180-402 | 200-400 | - |



Continued:

TABLE 6-CHEMICAL QUALITY OF WATER FROM PRIVATE DOMESTIC WELLS
(Continued:)

| | T30S/R27E | | T31S/R27E |
|---|---|---|---|
| Constituent (mg/l) | 34A | 34N | 5A |
| Calcium | 23 | 190 | 120 |
| Magnesium | 4 | 28 | 18 |
| Sodium | 17 | 95 | 61 |
| Potassium | 2 | 7 | 3 |
| Carbonate | <3 | <12 | <12 |
| Bicarbonate | 99 | 492 | 342 |
| Sulfate | 12 | 121 | 92 |
| Chloride | 4 | 179 | 87 |
| Nitrate-Nitrogen | 0.9 | 3.0 | 3.4 |
| Total Kjeldahl Nitrogen | <0.2 | <0.2 | 0.3 |
| Total Nitrogen | 0.9 | 3.0 | 3.7 |
| Total Phosphate | <0.05 | <0.05 | <0.05 |
| Boron | <0.1 | 0.5 | 0.3 |
| pH | 7.8 | 7.2 | 7.7 |
| Electrical Conductivity (micromhos/cm @ 25°C) | 209 | 1,460 | 916 |
| Total Dissolved Solids (@ 180°C) | 130 | 915 | 577 |
| Iron | <0.05 | <0.05 | <0.05 |
| Manganese | <0.01 | <0.01 | <0.01 |
| Arsenic | 0.0074 | 0.0020 | 0.0021 |
| Total Organic Carbon | <1.1 | 16 | 1.5 |
| Date | 7/13/01 | 7/13/01 | 4/9/01 |
| Perforated Interval (feet) | - | 150-300 | 155-215 |

Chemical analyses by BSK & Associates.

relatively shallow groundwater. TDS concentrations ranged from 130 to 915 mg/l. The lowest TDS concentration was in water from Well T30S/R27E-34A, located near the Farmers Canal. The highest TDS concentration was in water from Well T30S/RE27E-34N (in an area just east of the former Use Area for mixed AYC wastewater disposal). Except for this well, TDS concentrations were less than 600 mg/l. Chloride concentrations in water from these wells ranged from 4 to 179 mg/l. The lowest chloride concentrations was in water from Well 34A and the highest in water from Well 34N. Except for Well 34N, chloride concentrations were less about than 90 mg/l. The lowest bicarbonate concentration was in water from Well 34A and the highest was in water from Well 34N. Except for Well 34N, bicarbonate concentrations were less than 350 mg/l. Nitrate-nitrogen concentrations ranged from less than 0.2 to 11 mg/l. The highest nitrate-nitrogen concentrations (9.2 to 11 mg/l) were water from Wells 29H, 33A, and 33H, and the lowest (0.9 mg/l) was in water from Well 34A. Iron and arsenic concentrations in water from these wells were low and well below the respective MCLs. Manganese concentrations were non-detectable except in water from Well 33H (0.17 mg/l, exceeding the MCL). Total organic carbon concentrations ranged from less than 1 to 16 mg/l. The highest TOC concentration was in water from Well 34N. The chemical quality of water from this well and the proximity and downgradient location from the former Use Area indicate that it was affected by former AYC wastewater discharge. Figure 10 shows concentrations of key constituents in water from the public supply and domestic wells.

## HISTORICAL IMPACTS OF WWTF NO. 3 OPERATIONS ON GROUNDWATER CONDITIONS

### Water Levels

Figure 4 shows the mound beneath the effluent holding ponds on January 17, 2006. A total of 940.9 million gallons of effluent was sent to the ponds during October through December 2005. The average amount of water was thus 10.21 mgd, or about 31.3 acre feet per day. Darcy's Law was used to determine aquifer transmissivity, based on the water-level elevations. The average water-level slope away from the ponds was about 28 feet per mile and the width of the flow was about 26,500 feet (the 205-foot contour and projection). Using Darcy's Law,

$$Q = TIL,$$

where T: transmissivity (gpd per foot)

I: hydraulic gradient (feet per mile)

L: width of flow (miles).

The transmissivity was calculated to be 76,000 gpd per foot, in excellent agreement with pump test results for MW-2. A water-level rise of about 16 to 18 feet was indicated by the water-level elevation at MW-6, compared to elevations at more distant monitor wells. The results of this evaluation indicated that most of the

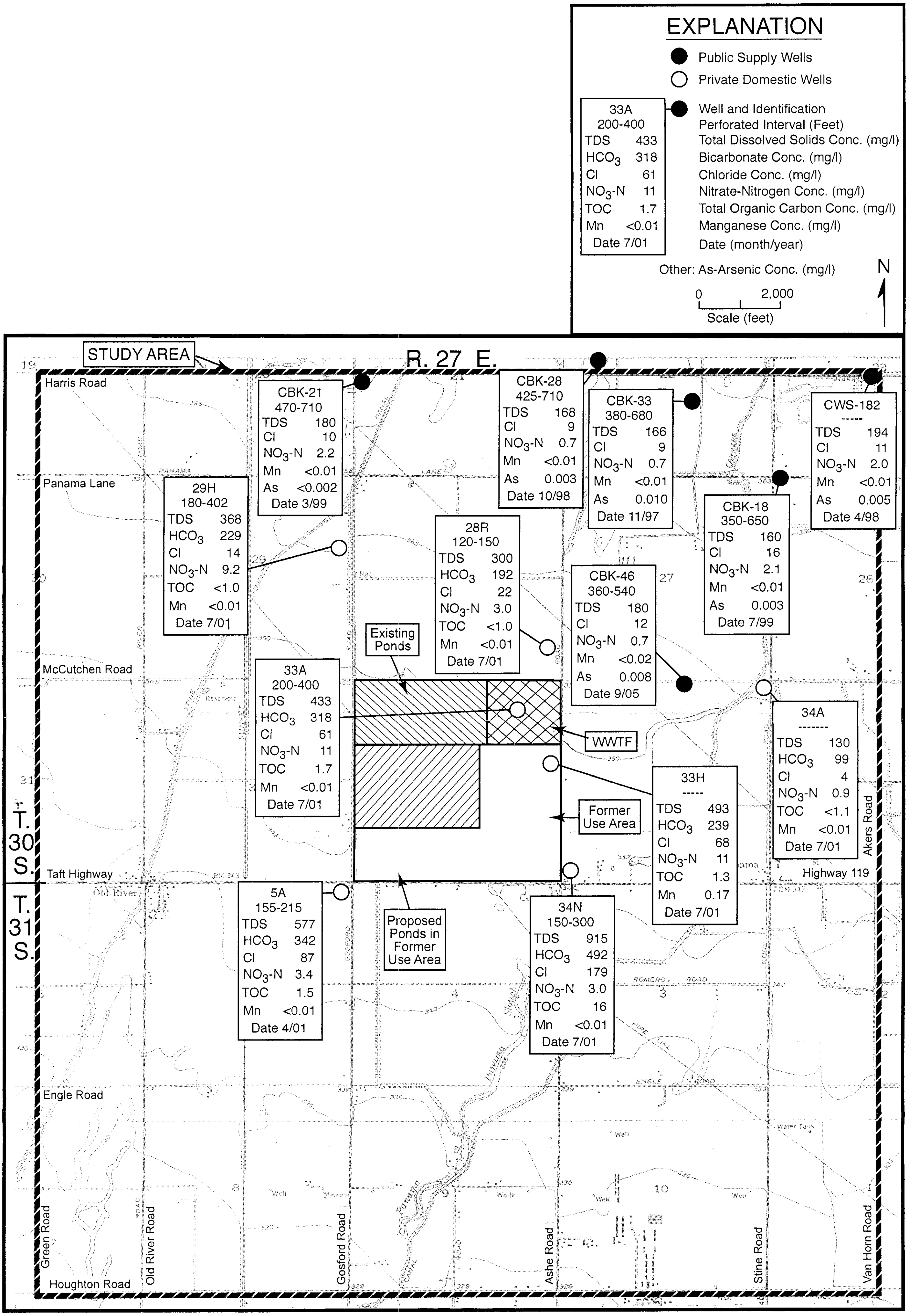


FIGURE 10 - CHEMICAL QUALITY OF WATER FROM PUBLIC SUPPLY AND PRIVATE DOMESTIC WELLS

percolated effluent moves laterally away from the storage ponds above a depth of about 200 feet (i.e., in the interval tapped by the WWTF monitor wells).

## Groundwater Quality

The chemical quality of shallow groundwater was affected by the former disposal of mixed AYC wastewater. Records indicate that the ATC wastewater was normally mixed with from three to eight times as much WWTF effluent. Affected wells include MW-5, MW-7, and off-site domestic Well T30S/R27E-34N. The quality of water from MW-5 is characterized by high calcium, sodium, chloride, bicarbonate, and TOC concentrations, and a yellow color. Another private domestic well formerly used east of the former Use Area (at 8846 Ashe Road) reportedly also produced yellow water.

WWTF effluent percolation has affected the quality of shallow groundwater, as documented primarily by chemical analyses of water from MW-2 and MW-3. Chloride concentrations have ranged from about 75 to 80 mg/l, above background concentrations (about 35 to 60 mg/l) in water from MW-1 and MW-9. Nitrate-nitrogen concentrations in water from MW-2 and MW-3 have usually ranged from about 2 to 7 mg/l, similar to concentrations in water from MW-1 and MW-9. TOC concentrations in water from MW-2 have usually been 1.0 mg/l or less. TOC concentrations in water from MW-3 have usually been 1.6 mg/l or less. These TOC concentrations have been only slightly greater than these in water from MW-1 and MW-9. Overall, there has been little apparent influence on shallow groundwater quality due to percolation from the effluent holding ponds. This is because of the excellent chemical quality of the effluent.

## WWTF EFFLUENT

### Projected Amounts

The amount of effluent to eventually be percolated at the Ashe Road WWTF is 16 mgd, or about 18,000 acre-feet per year. The City indicates that the new ponds would not be constructed until late 2009, and may not be operational until 2012. The rate of percolation is expected to gradually increase until full capacity is reached in 2025. A nitrogen removal process is to be added at the WWTF, and only dentrified effluent would be percolated. Kleinfelder (2006) evaluated infiltration rates at the existing ponds and in the proposed expansion area. The existing storage ponds would be used as percolation ponds and up to about 120 acres of new ponds would be developed. The design effluent infiltration rate is about 0.25 foot per day. About 2 mgd is to be treated to the tertiary level for direct non-potable reuse in the vicinity. The remaining effluent would be sent to the I-5 Reclamation site.

### Water Quality

Carollo Engineers summarized the chemical quality of effluent from WWTF No. 3 based on sampling in 2004, as part of the BPTC program. The average TDS of the effluent was about 450 mg/l. The average total nitrogen concentration was about 18 mg/l, and most of this was in the ammonia form. Concentrations of iron, manganese, and metals in the Title 22 drinking water standards were low, below the respective MCLs. Alpha activities were less than 2 picocuries per liter, well below the MCL. Numerous trace organics were also determined in the effluent and were generally not detectable or were below significant levels.

## POTENTIAL IMPACTS OF EXPANDED EFFLUENT PERCOLATION

### Water Levels

Bouwer's (1979) approach was used to estimate the maximum mound buildup for the expanded percolation. The existing four ponds with an effective infiltration area of about 120 acres, and the new ponded area to the south, with an effective ponded area of about 120 acres were used in the evaluation. An average infiltration rate of 0.25 foot per day was used.

The equation for the rise of the mound in unconfined aquifers below rectangular percolation basins (Bouwer, 1978) is:

$$h-H = \frac{vt}{4f}\{F[(W/2+x)n,\ (L/2+y)n]$$

$$+ F[(W/2+x)n,\ (L/2-y)n]$$

$$+ F[(W/2-x)n,\ (L/2+y)n]$$

$$+ F[(W/2-x)n,\ (L/2-y)n]\},$$

where $h$ = height of water table above impermeable layer.

$H$ = original height of water table above impermeable layer.

$v$ = infiltration rate

$t$ = time since start of infiltration

$f$ = fillable porosity

$W$ = width of recharge basin (in x direction)

$L$ = length of recharge basin (in y direction)

$n$ = $(4tT/f)^{-1/2}$

$T$ = transmissivity

$F(\alpha,\beta)$ = Functional relation derived from appropriate tables.

The transmissivity is 10,160 square feet per day. The fillable porosity is assumed to be 0.20. For the rectangular percolation area, L is 3,600 feet and W is 2,900 feet.

Using these values, for one year of infiltration n is calculated to be $1.16 \times 10^{-4}$. At the center of the basin, x=0 and y=0. Thus $\alpha=(W/2)n=(2{,}900/2)(1.16 \times 10^{-4})=0.168$. $\beta=(L/2)n=(3{,}6000/2)(1.16 \times 10^{-4})=0.209$. From the appropriate tables, $F(\alpha,\beta) = 0.157$. For one year of infiltration at this rate,

$$h-H = \frac{(0.25 \text{ ft/day})\ (365 \text{ days})}{4(0.20)}(4)(0.157)=72 \text{ feet.}$$

The mound buildup at the center of the ponded area would thus be about four times greater than the existing one during winter percolation. Water levels would still be below a depth of about 90 feet beneath the center of the ponded area after one year of percolation.

## Groundwater Quality

Because the effluent is of excellent chemical quality, the overall impacts of the expanded percolation on groundwater quality would be minimal. The quality of water produced from public supply should not be significantly affected, as they produce water from below a depth of about 300 feet and most are located fairly distant from the WWTF No. 3 ponds.

The chemical quality of water from shallow monitor wells downgradient of the existing ponds is indicative of the influence of effluent percolation. Information for MW-2 and MW-3 in Table 4 can be compared to that for representative private domestic wells in the vicinity in Table 6. In Table 6, the analyses of water from Wells T30S/R27E-28R, 29H, 33A, and 33H are considered representative of background conditions. TDS concentrations in water from these downgradient monitor wells have usually been in the range of about 500 to 600 mg/l, compared to about 300 to 500 mg/l TDS in water from the referenced private wells. Nitrate-nitrogen concentrations in water from downgradient monitor wells have usually ranged from about 2 to 7 mg/l, compared to 3 to 11 mg/l in water from the private domestic wells. Of the total nitrogen in the effluent, it is projected that more than seventy percent would be lost due to denitrification. Total organic carbon (TOC) concentrations in water from the downgradient monitor wells have usually ranged from less than 1 to about 2 mg/l, which is the same range as concentrations in water from representative private domestic wells in the area.

## Former AYC Wastewater Influenced Area

The chemical constituents in the soils in the former AYC wastewater disposal area were determined by Kleinfelder (2005). Kenneth D. Schmidt and Associates interpreted these results, and prepared a letter report to the City on April 21, 2006. The major issue evaluated was whether or not high levels of some constituents could be present in these soils, and be leached to the groundwater if percolation ponds were developed and used in this area. Of the parameters evaluated, pH was found to most indicative of an influence of AYC wastewater disposal. Low to moderate ammonia-nitrogen and lower pH values were found in soils in the eastern half of the former Use Area, compared to background values. KDSA recommended that percolation be conducted only in the west half of the former Use Area, unless some of the soils in the east half could be excavated prior to percolation.

Degraded groundwater is indicated to be present beneath the east part of the former Use Area, and lands adjacent to the former

Use Area to the east and south. The exact extent of this degraded groundwater has not been determined. Figure 11 shows locations of private domestic wells adjacent to or downgradient of the former Use Area, based on a field survey by KDSA in late June 2006. The expanded percolation project will have two primary impacts on groundwater quality in the area influenced by former AYC wastewater. On the short-term, this recharge will cause the degraded groundwater to migrate farther to the southeast from beneath the easterly part of the former Use Area. However, over the long-term, this percolation would mix with and greatly reduce concentrations of constituents at elevated concentrations, such as bicarbonate and chloride, in this degraded groundwater.

Monitoring results for MW-5 for bicarbonate and chloride have shown significant decreases in concentration since disposal of AYC wastewater ceased. Bicarbonate concentrations in water from this well decreased from about 850 mg/l in early 2004 to 640 mg/l in April 2006. Chloride concentrations decreased from about 320 mg/l in early 2003 to about 210 mg/l in April 2006. At this rate of decrease, concentrations of these constituents could be near background levels within about three to five years. However, experience indicates that a much longer time would be required. There are 21 private domestic wells within about half a mile and downgradient of the former Use Area. About ten of these are within

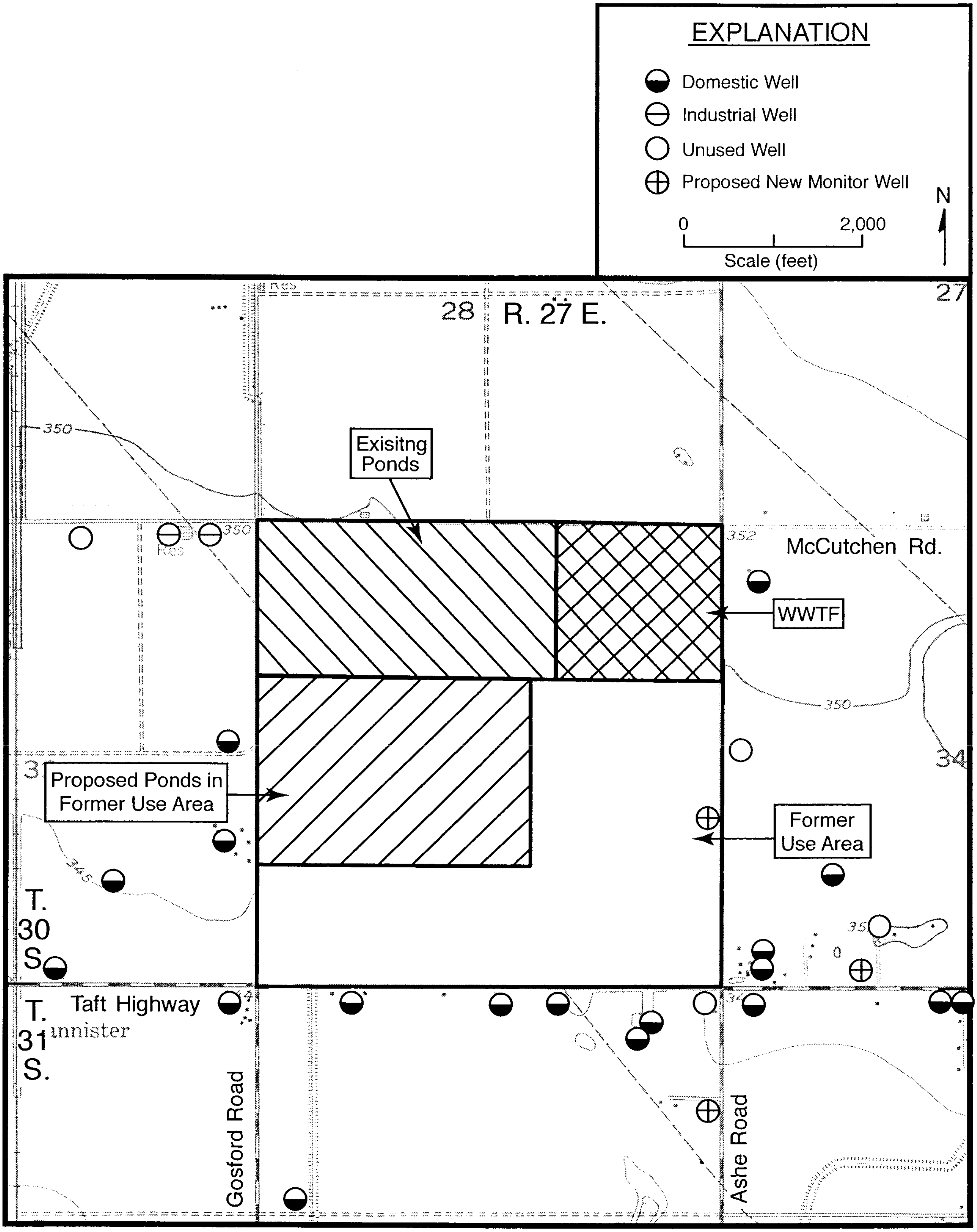


FIGURE 11 - LOCATION OF PRIVATE DOMESTIC WELLS WITHIN ONE-HALF MILE OF WWTF NO. 3

one quarter mile of the former AYC wastewater disposal area. Chemical analyses of water from most of these wells aren't known to be available.

An important factor is that percolation pond construction won't be complete until late 2009. The City of Bakersfield projects that expanded percolation would probably not occur until about 2012. The City projects that the full amount of percolation won't occur until about 2025. Urbanization is projected to occur relatively rapidly in the area east and south of the WWTF. Most private domestic wells will likely no longer be in use within the next five to ten years.

## MITIGATING MEASURES

In order to develop a better understanding of the extent of the degraded groundwater due to former disposal of AYC wastewater, additional monitor wells should be installed in the area to the east and south of the east part of the former Use Area. Figure 11 shows approximate locations of three new monitor wells. One would be along or near the Ashe Road right-of-way about a quarter mile south of the Taft Highway. Another would be along or near the Taft Highway right-of-way about a quarter mile east of Ashe Road. The third new monitor well would be located on City property along the east edge of the former Use Area, midway between the north and south boundaries of this area.

These wells would be added to the quarterly monitoring program. In addition, any private well downgradient and within a quarter mile of the east half of the former Use Area would be monitored on a semi-annual basis, if the owners request such monitoring. Because the area is urbanizing, such monitoring would cease when the wells are no longer in use. In addition, if the well water quality is indicated to be degraded by AYC wastewater, an alternative source of potable water would be made available.

REFERENCES

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Kleinfelder, 2005, "Report of Analytical Results, Bakersfield Wastewater Treatment Plant 3, South of McCutchen and Gosford Roads, Bakersfield, California", prepared for Parsons, 5p.

Kleinfelder, 2006, "Infiltration Evaluation, WWTP No. 3 Effluent Ponds, Bakersfield, California", prepare for Parsons, 10p.

# 15.6b Kenneth D. Schmidt Letter Report

KENNETH D. SCHMIDT AND ASSOCIATES
GROUNDWATER QUALITY CONSULTANTS
3701 PEGASUS DRIVE, SUITE 112
BAKERSFIELD, CALIFORNIA 93308
TELEPHONE (661) 392-1630

April 21, 2006

Mr. Art Chianello
Wastewater Manager
City of Bakersfield
8101 Ashe Road
Bakersfield, CA 93313

Re: Soil Sampling in 400-Acre
Area, WWTF No. 3

Dear Art:

Following is my report on the interpretation of the results of soil sampling in the 400-acre wastewater irrigation area. Twenty soil borings were done in this area to a depth of about 20 feet. Three additional borings were done to obtain background information. Soil samples were collected at three depth intervals (4 feet, 10 feet, and 20 feet) at each boring for analyses of selected chemical constituents. Kleinfelder did the borings, arranged for the analyses, and prepared a report on the results on November 8, 2005.

Geologic logs indicate that sand is predominant above a depth of 20 feet in the 400-acre area, with sandy silt present in one or more layers at some sites. The soil samples were analyzed for electrical conductivity, total dissolved solids (TDS), pH, chloride, nitrogen forms, and total organic carbon (TOC). Envirochem, Inc. of Pamona conducted the analyses, except for total Kjeldahl nitrogen (TKN) and TOC, which were done by APCL Lab of Chino. One to one dilutions with distilled water were made prior to the soil sample analyses.

Of all the parameters analyzed, pH values are most indicative of an influence of the former AYC wastewater, which was mixed with WWTF effluent and used for irrigation in the 400-acre area. This wastewater was slightly acidic. In the four-foot deep samples, pH values ranging from 5.1 to 6.0 were found at three borings (E14, E16, and E18). At the 10-foot depth, pH values ranging from 4.5 to 5.8 were found at three borings (E12, E14, and E16). At the 20-

foot depth, pH values ranging from 6.0 to 6.2 were found at E1 and E20. The pH values were usually greater than 7 in the remaining samples. The borings with relatively low pH values (less than 6.5) were essentially in the easterly half of the 400-acre area. While the relatively lower pH values in the soil apparently trace where there is an influence of former irrigation with AYC wastewater, pH values in downgradient groundwater (i.e. MW-5) do not indicate a low pH. This indicates that the low pH water was buffered in the vadose zone and did not cause a low pH in the groundwater.

A chloride concentration of 131 mg/l was found at the four-foot depth at E10. A chloride concentration of 93 mg/l was found at the four-foot depth at E2, which was a background site. A chloride concentration of 89 mg/l was found at the 10-foot depth at E19. These are the only samples that had chloride concentrations above 50 mg/l. Two of these are in the area influenced by former irrigation with AYC wastewater.

Nitrate-nitrogen concentrations ranging from 9.6 to 13 mg/l were found at the four-foot depth at E1, E21, and E23. The latter two of these borings were at background sites. No other had high nitrate-nitrogen concentrations were found in the remaining samples.

Ammonia-nitrogen concentrations ranged from 0.7 to 21 mg/l at the four-foot depth at four borings (E14, E16, E17, and E18). At the 10-foot depth, an ammonia-nitrogen concentration of 4.3 mg/l was found at E16. At the 20-foot depth, an ammonia-nitrogen concentration of 2.2 mg/l was found at E14 and E16. All of these borings were in the eastern half of the 400-acre area. Ammonia-nitrogen concentrations in the other samples were not detectable.

The only total Kjeldahl nitrogen concentrations that appear to possibly be above background values were at a depth of 20 feet in three borings (E1, E15, and E16).

TDS concentrations and electrical conductivities were generally not higher in the samples from the 400-acre area than in the background samples. TOC concentrations in background samples ranged from 167 to 2,740 mg/l, and were greater than 930 mg/l in two of these. At the four-foot depth, a TOC concentration of 3,610 mg/l was found at E19. No other TOC values in samples from the borings in the 400-acre area appear to exceed background values.

However, TOC concentrations in many samples (both on and off-site) were relatively high.

In summary, evidence of an influence of the former irrigation with AYC wastewater was found at the following borings: E1, E10, E12, E14, E15, E16, E17, E18, E19, and E20. Except for E1, the borings were all in the eastern half of the 400-acre area. The concentrations of the tested chemical constituents in soil samples above a depth of about 20 feet do not appear high enough to pose a threat to groundwater if effluent is percolated, except possibly for TOC. It is recommended that the new percolation ponds either be developed in the west half of the 400-acre area, or further studies be undertaken in the eastern half of this area. An alternative would be to excavate the uppermost deposits in the eastern half of the area to a depth in the range of 12 to 17 feet. Further soil sampling and analyses would be needed to determine this depth more precisely. Also, if the relatively high TOC concentrations determined for the soil borings are shown to not be representative, this could make such excavation unnecessary.

Please call me if you have any questions.

Sincerely yours,

Ken Schmidt

Kenneth D. Schmidt

KDS:rb

# 15.6c Regional Water Quality Control Board Letter Review of Proposed Percolation Ponds

Linda S. Adams
*Secretary for Environmental Protection*

# California Regional Water Quality Control Board
## Central Valley Region
**Robert Schneider, Chair**

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**Arnold Schwarzenegger**
*Governor*

31 July 2006

Mr. Art Chianello, Wastewater Manager
Bakersfield Public Works Department
Wastewater Division
8101 Ashe Road
Bakersfield, CA 93313

**PROPOSED PERCOLATION PONDS, BAKERSFIELD WASTEWATER TREATMENT PLANT (WWTP) NO. 3, SOUTHEAST OF MCCUTCHEN AND GOSFORD ROADS, BAKERSFIELD**

Enclosed is a staff memorandum regarding the 8 November 2005 Report of Analytical Results prepared by Kleinfelder and the 21 April 2006 Soil Sampling in 400-Acre Area letter prepared by Kenneth D. Schmidt & Associates regarding the construction of proposed percolation ponds at the Bakersfield WWTP No. 3 in Kern County.

The results indicate some impact to both soil and groundwater appears to have occurred from past usage of the property. Kenneth D. Schmidt & Associates recommends either additional investigation or excavation of near surface soil, and placement of the percolation ponds on the western portion of the 400-acre parcel. Regional Water Board staff concurs with these recommendations and has the following observations and comments regarding soil and groundwater conditions at and near the 400-acre area proposed for the percolation ponds.

- Elevated TOC concentrations (greater than 2,000 mg/kg) are not limited to the eastern part of the proposed expansion area. The 4-foot samples collected from borings E1 and E2 (northwest), E9 and E10 (central), and E5 and E8 (southwest) range from 2,420 in E10 to 3,510 mg/kg in E2. Removal of soil to a depth of no less than 5 feet bgs would likely remove soils with elevated TOC concentrations.

- Elevated TKN concentrations (greater than 200 mg/kg) were reported in samples collected at 4 feet from borings E1, E2, E9, E10, and E16 along the northern boundary of the proposed expansion area. Additionally, elevated TKN concentrations were observed in samples collected at 20 feet from borings E1 and E3 located in the northwest portion, borings E15 and E16 located in the northeast portion, and borings E9 and E13 along the southern boundary. Removal of soil to a depth of no less than 5 feet bgs would likely remove the majority soils with elevated TKN concentrations. Additional soil sampling would be required to assess the concentrations once the soils have been excavated to the desired depth.

- Additional monitoring wells are required on the west and east sides of the proposed expansion area to properly monitor groundwater quality in the vicinity of the proposed expansion area.

By **15 September 2006**, please submit a construction work plan for the proposed ponds, including specifications for soil removal and reuse, or additional or additional soil sampling to minimize potential impacts from soil with elevated concentrations of waste constituents.

By **15 September 2006,** please submit a work plan for additional groundwater monitoring wells to monitor groundwater quality in the vicinity of the proposed expansion area.

Should you have any questions regarding these matters, please contact Jeff Pyle at (559) 445-5145.

DOUGLAS K. PATTESON
Senior Water Resource Control Engineer
RCE No. 55985

Enclosure(s)

cc: Paul Skager, Parsons, Pasadena
Ken Schmidt, Ken Schmidt and Associates,

JSP/R\Staff\Jpyle\Bakersfield WWTP rep rev letter

Linda S. Adams
*Secretary for Environmental Protection*

# California Regional Water Quality Control Board
## Central Valley Region
**Robert Schneider, Chair**

**Fresno Branch Office**
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http://www.waterboards.ca.gov/centralvalley

**Arnold Schwarzenegger**
*Governor*

**TO:** Doug Patteson DKP
Senior Engineer
Fresno

**FROM:** Jeff Pyle
Engineering Geologist
Fresno

**DATE:** 31 July 2006

**SIGNATURE:** Jeff S Pyle

**SUBJECT:** PROPOSED PERCOLATION PONDS, BAKERSFIELD WASTEWATER TREATMENT PLANT NO. 3, SOUTHEAST OF MCCUTCHEN AND GOSFORD ROADS, BAKERSFIELD, KERN COUNTY

I have reviewed reports regarding the results of soil sampling conducted to asses soil conditions on ~400 acres of land located generally south of the Bakersfield Wastewater Treatment Plant No. 3 (WWTP No. 3). Reports reviewed included an 8 November 2005 *Report of Analytical Results* prepared by Kleinfelder and a 21 April 2006 *Soil Sampling in 400-Acre* review letter prepared by Kenneth D. Schmidt and Associates (Schmidt). I also reviewed a 27 January 2006 2005 *Groundwater Summary* report prepared by Schmidt for the City of Bakersfield, WWTP No. 3. Background information was provided by Mr. Paul Skager of Parsons. To gain further knowledge of any potential impact to groundwater, I reviewed monthly self-monitoring reports prepared for WWTP No. 3 and information included in Waste Discharge Requirements Order No. R5-2003-0161.

The purpose of the Kleinfelder report was to assess soil conditions in a 400-acre parcel (proposed percolation pond expansion area) immediately south of the Bakersfield WWTP No. 3. Historically, process wastewater from the manufacturing plant for the American Yeast Company (AYC) was discharged within the proposed expansion area. The process wastewater was mixed with effluent and discharged intermittently from 1983 until 2002.

To assess soil conditions, Kleinfelder advanced 20 borings (E1 through E20) on the 400-acre parcel. The borings were set on a grid (5 borings trending east – west and 4 borings trending north – south) and spaced generally about 1000 feet apart. The exception is the western four borings which are ~ 1,750 feet from the next row to the east. Three borings (E21 – E23) were located just off the proposed expansion area to the northeast, northwest and southeast, respectively, and were intended to serve as background concentration borings. Boring logs depict the near surface soils as consisting of predominantly permeable poorly graded sands and silty sands. Lesser amounts of sandy and clayey silts were encountered in about half of the borings. Boring logs were included as Appendix A.

Soil samples were collected at depths of 4, 10, and 20 feet below the ground surface (bgs). All samples were analyzed for pH, chloride, total organic carbon (TOC), total dissolved solids

(TDS), specific conductance (EC), ammonia ($NH_3$), nitrate as nitrogen ($NO_3$ as N), total kjeldahl nitrogen (TKN), and nitrite ($NO_2$). Laboratory analytical data was included as Appendix B. The data was presented in tables with no conclusions or recommendations with regards to any impact to soil.

The April 2006 Schmidt report is an interpretation of the analytical results obtained during the Kleinfelder investigation. Schmidt states that pH values are the most indicative of an impact from the former AYC yeast plant process wastewater. Low pH values were reported at depths of 4 and 10 feet in borings E12, E14, E16, and E18. The Schmidt report indicates that while the process water has affected soil in the area around these borings, it has not translated into a groundwater impact in that area as the pH values in nearby groundwater monitoring well MW5 are typical of the other monitoring wells. The report reviews the other inorganic constituents that were analyzed noting chloride, $NO_3$, TKN, and TOC concentrations above background concentrations in soil. The report uses concentrations observed in the background borings to assess potential impact.

In a summary paragraph, the Schmidt report indicates evidence of the yeast plant process water was found in borings E1, E10, E12, and E14 through E20. The report notes that all of the borings were located in the eastern portion of the proposed expansion area with the exception of boring E1. It recommends that the proposed percolation ponds be located in the western portion of the proposed expansion area or that additional studies be conducted in the eastern half. Excavating the upper 12 to 17 feet of the eastern half of the proposed expansion area is noted as an alternative to not using the eastern half. The report concludes that the concentrations in the top 20 feet do not pose a threat to groundwater if effluent is percolated except for possibly TOC.

The January 2006 Groundwater Summary report prepared by Schmidt indicates a groundwater monitoring network consisting of nine groundwater monitoring wells and six piezometers is present at the WWTP. The wells monitor the unconfined groundwater table and the piezometers monitor an intermittent perched zone. The depth to groundwater in the wells ranges from about 135 to 155 feet bgs. The direction of groundwater flow is variable due to mounding beneath the effluent holding ponds. Schmidt depicts flow directions to the west, south and east. A northern component is likely present but there are no wells north/northwest of the ponds to assess the groundwater elevations in that direction. The flow direction without pond influence appears to be to the southeast. MW-9 was installed west of the plant to serve as a background water quality well.

Two wells, MW1 and MW4, are located northeast and east of the WWTP. Three wells, MW2, MW3, and MW6, are located along the southern boundary of the WWTP and the northern boundary of the proposed expansion area. Two wells, MW5 and MW7, are located south of the WWTP along the southern boundary of the proposed expansion area. Well MW8 is located south of the WWTP near the center of the proposed expansion area, while well MW9 is located west of the effluent holding ponds. Due to the mounding, all of the wells except MW-1 appear to have a downgradient component of groundwater flow with respect to the WWTP. There are no wells along the west and east of the proposed expansion area.

Analytical results for samples collected from the monitoring wells indicate some impact from the WWTP. MW9 appears to have little to no impact and is located upgradient compared to the regional groundwater flow. MW6 has elevated nitrate as nitrogen concentrations and exceeded the MCL of 10 mg/L in the three of the four samples collected in 2005. Chloride, EC, and sodium are slightly elevated when compared to MW9 or MW1. MW7 is similar to MW6, but has lower nitrate as N concentrations, but higher EC, sodium, chloride, and calcium concentrations. Interestingly, well MW-5 has the worst water quality of the wells and is furthest from the WWTP along the southern boundary of the proposed expansion area. About the only constituent that is not higher than the other wells is nitrate as N. The well sits on the downgradient edge of the effluent disposal area and the likely cause of the poor water quality is the disposal from the WWTP of effluent blended with the wastewater from the former AYC plant.

Of the six piezometers, four (2, 5, 6, and 8) contained water in 2005. Piezometers 2 and 5 are located north and south of the effluent holding ponds respectively, and they both had water in all four 2005 monitoring events. Piezometer 6 is located at the southeast corner of the effluent holding ponds and contained water during just one 2005 monitoring event. Piezometer 8 is located at the southwestern corner of the proposed expansion area and contained water twice in 2005.

The January 2005 Schmidt report indicates impacts from effluent in all but piezometer 8. High nitrate as nitrogen concentrations are observed in piezometer 2, but the report indicates that may be from an offsite source to the north and cites the lower results in piezometer 5, which Schmidt notes is directly downgradient of the effluent storage ponds. Due to the perched groundwater conditions, mounding caused by the ponds, and the location of the piezometer directly adjacent the effluent storage ponds, I find it unlikely that the source is offsite. Perched and discontinuous groundwater bodies do not necessarily have the same gradient or direction of flow as the regional aquifer.

I reviewed self monitoring reports from January 2005 through March 2006 to evaluate the current quality of the effluent. WWTP No. 3 generally meets all established limits. The monthly average for biochemical oxygen demand (BOD) typically has exceeded the monthly average of 40 milligrams per liter (mg/L), but not by much and has been below the limit in three of the last four monitoring events. Effluent is also analyzed for carbonaceous BOD (CBOD) and those results typically meet the monthly average limit of 35 mg/L. Nitrate as N concentrations in effluent are low ranging from < 0.5 to 2.3 mg/L in 2005 and early 2006. If the results of the expanded plant are similar to current operations, the impact to groundwater from constituents left in soil by historical discharge of effluent blended with wastewater from the former AYC plant should be minimal.

Based on my review of the Kleinfelder report, the two Schmidt reports, and the self monitoring reports, I have the following comments:

- Using 4-foot sample data from borings E21, E22, and E23 as background data likely overestimates background concentrations. Almost every result from boring E21 significantly exceeds the averages from the proposed expansion area. Most of the results from boring E22 are typical with the exception of the TKN result that is higher than any recorded in the 4-foot samples from the proposed expansion area. Most of the results from E23 are typical with the exception of the EC and nitrate as N results. Either the results indicate the extreme spatial variation in soil concentrations in this area, or they indicate impact from previous activities. Boring E21 is located about 1,500 feet north of the proposed expansion area near the entrance of the WTTP. The relatively high concentrations in these samples likely represent past activities at the WWTP.

- Elevated TOC concentrations (greater than 2,000 mg/kg) are not limited to the eastern part of the proposed expansion area. The 4-foot samples collected from borings E1 and E2 (northwest), E9 and E10 (central), and E5 and E8 (southwest) range from 2,420 in E10 to 3,510 mg/kg in E2.

- Elevated TKN concentrations (greater than 200 mg/kg) were reported in samples collected at 4 feet from borings E1, E2, E9, E10, and E16 along the northern boundary of the proposed expansion area. Additionally, elevated TKN concentrations were observed in samples collected at 20 feet from borings E1 and E3 located in the northwest portion, borings E15 and E16 located in the northeast portion, and borings E9 and E13 along the southern boundary.

- The April 2006 Schmidt report noted that pH values in groundwater monitoring well MW-5 were typical of other wells indicating the low pH caused by process water had not translated into low pH in downgradient well MW5. However, the data contained in the January 2006 Schmidt report indicates nearly every other constituent (metals [Ni, Cu, Cr, and Ba], sodium, manganese, magnesium, chloride, calcium, TOC, EC, and TDS) has concentrations significantly higher than those reported for the other monitoring wells that comprise the monitoring well network. Well MW7 located about 2,000 feet to the west also has some constituents that are elevated when compared to other wells. Both wells are on the downgradient edge of the proposed expansion area. It would appear the process water applied to the disposal area degraded groundwater near well MW-5.

- Additional monitoring wells are required on the west and east sides of the proposed expansion area to properly monitor groundwater quality in the vicinity of the proposed expansion area.

Based on the analytical results I concur with the April 2006 Schmidt report that soil at the site was impacted by previous discharge, most notably from the surface to 4-foot bgs. The relatively permeable nature of the near surface deposits, high permeability rates, and previous groundwater quality information make it nearly certain that effluent will reach the groundwater table.

The recommendations of the April 2006 Schmidt report of further investigation or removal of the upper deposits are valid recommendations. Placement of the ponds on the western side of the parcel is also a valid recommendation. Should the Schmidt recommendations be adopted, I would recommend additional testing along the northern portion of the 400-acre parcel to further assess TOC and TKN concentration in areas where elevated levels were reported and removal of the upper five to ten feet (based on analytical results) of soil. My understanding from a phone conversation with Mr. Paul Skager of Parsons is that the City wishes to use the western portion of the proposed expansion area and is planning on ponds at least 10 feet deep, so removing the upper soils would not change the design of the percolation ponds. If additional soil sampling and analysis is conducted, it should not be limited to just the eastern side of the proposed expansion area, but in the northern and southwestern sectors as well. Should the quality of the effluent remain similar to current conditions and effluent nitrate as N and BOD concentrations are low, it would appear discharge to the ponds would cause minimal impact to groundwater quality in the area. Additional groundwater monitoring wells are necessary to adequately monitor groundwater quality around the WWTP and discharge area.

# 15.7 TRAFFIC STUDY

Project No: 257-17

# TRAFFIC STUDY

**FOR CITY OF BAKERSFIELD**
**WASTE WATER TREATMENT PLANT #3**
**EXPANSION & UPGRADE**
**AT ASHE ROAD AND MCCUTCHEN ROAD**
**BAKERSFIELD, CALIFORNIA**

**Prepared for:**
**QUAD KNOPF**

**August 2006**

**Prepared by:**

RUETTGERS & SCHULER
CIVIL ENGINEERS


**1800 30TH STREET, SUITE 260**
**BAKERSFIELD, CA 93301**


John D. Schuler

John D. Schuler, RCE 51825

REGISTERED PROFESSIONAL ENGINEER
JOHN D. SCHULER
No. C 51825
EXP. 6-30-06
CIVIL
STATE OF CALIFORNIA

# TABLE OF CONTENTS

## INTRODUCTION

### A. Land Use, Site and Study Area Boundaries

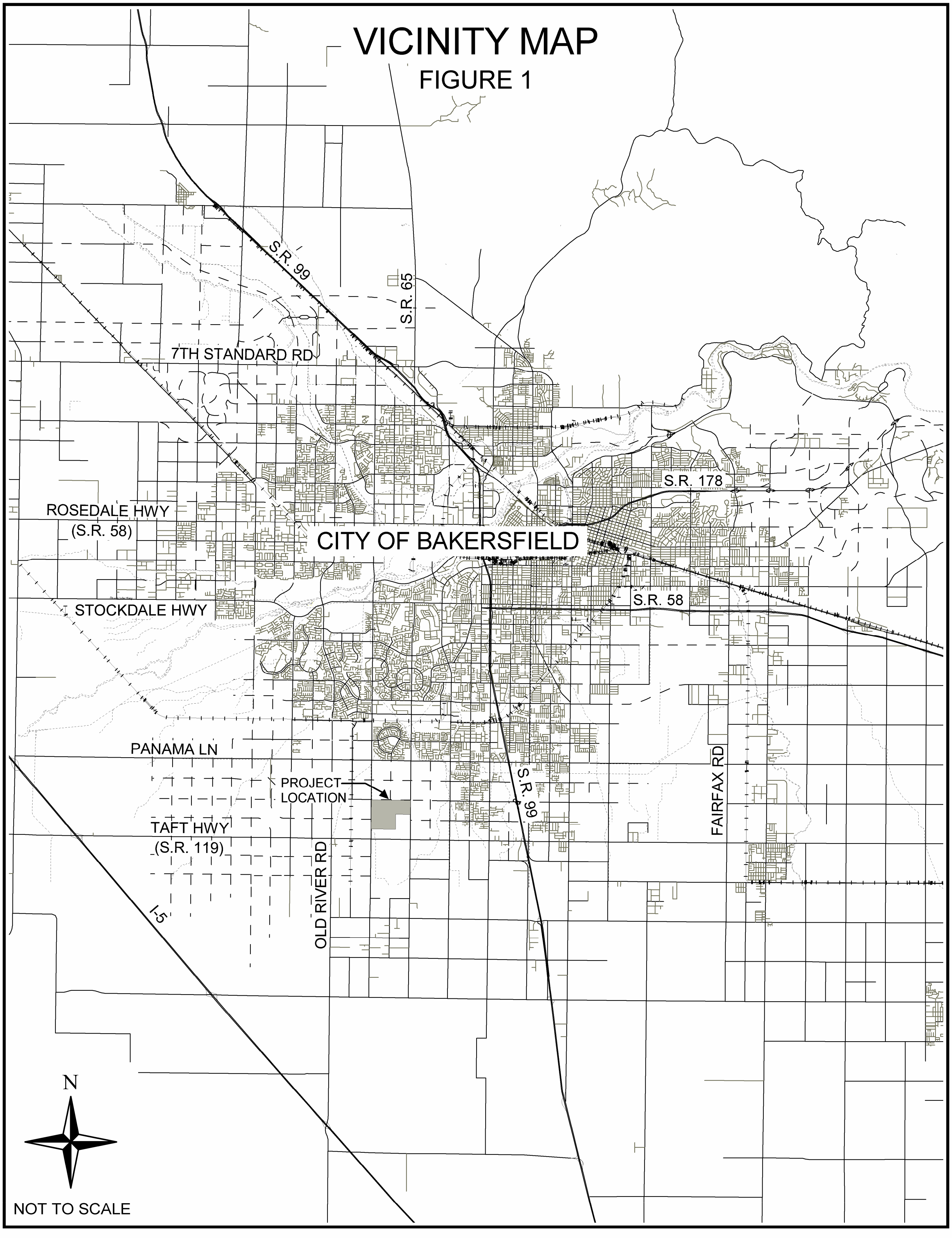
The purpose of this study is to evaluate the potential traffic impacts of a proposed expansion of the waste water treatment plant currently located in the southwest quadrant of the intersection of Ashe Road and McCutchen Road in southwestern metropolitan Bakersfield. The project site lies within the City of Bakersfield in Section 33, Township 30 South, Range 27 East, MDB&M. A vicinity map is presented in Figure 1 and a location map is presented in Figure 2.

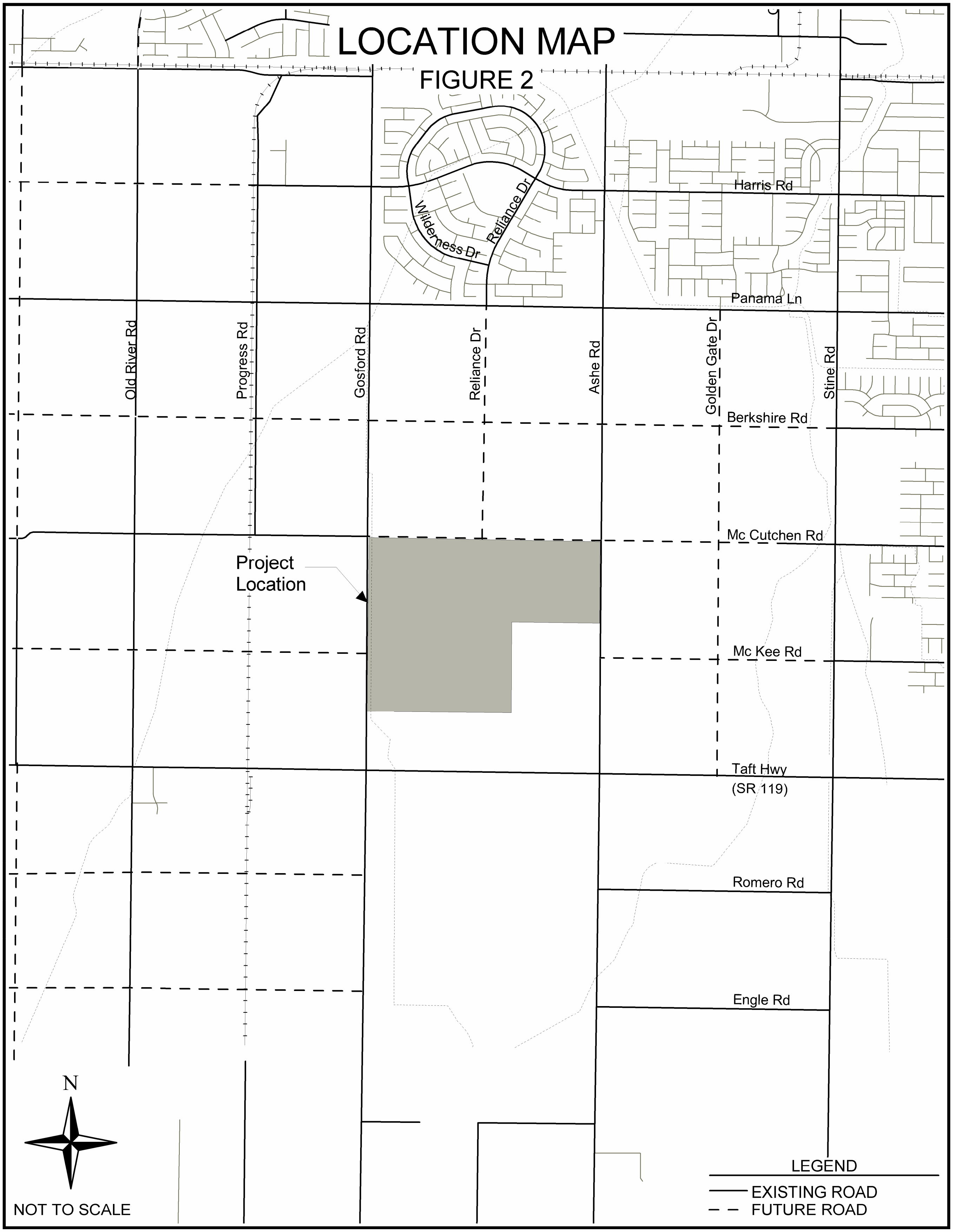
The wastewater treatment plant (WWTP) currently houses four storage ponds and has a capacity of 16 million gallons per day (mgd) for its treatment facility. The expansion will provide double the capacity with additional storage ponds and a total of 32 mgd of treatment. The facility currently provides wastewater treatment service for the western half of Bakersfield which contributes 15 mgd of wastewater. As western Bakersfield experiences rapid growth in development of residential and commercial property, the need for an expansion of the existing facilities has become apparent. It is anticipated that the expansion would be complete and operational in the year 2010.

A total of four intersections (three existing – one signalized and two unsignalized – and one future) are included in the study. The study intersections are shown in Figures 3 through 7. It is anticipated that access to the project will be provided along McCutchen Road for employees and Ashe Road for trucks.

### B. Existing And Future Uses in Vicinity of the Site

The project site lies in an area of mixed resource, residential, commercial and industrial land uses. The properties that lay immediately to the north, south, east and west of the project site are currently being used for agricultural purposes with the exception of Golden Empire Concrete and Structure pre-cast which are located on the southwest corner of Gosford Road and McCutchen Road. Oil production land uses lie to the west and southwest. Estate and rural residential areas are located east and southeast of the project and higher density residential land uses exist generally north and east of Panama Lane and Stine Road, respectively. Commercial land uses are located primarily along major transportation corridors including Taft Highway, Panama Lane, Gosford Road and Ashe Road. Industrial developments exist to the north and northeast along Ashe Road, State Route 99, and the Buttonwillow and Sunset Branches of the Union Pacific Railroad.


VICINITY MAP
FIGURE 1
S.R. 99
S.R. 65
7TH STANDARD RD
S.R. 178
ROSEDALE HWY
(S.R. 58)
CITY OF BAKERSFIELD
S.R. 58
STOCKDALE HWY
PANAMA LN
PROJECT
LOCATION
S.R. 99
FAIRFAX RD
TAFT HWY
(S.R. 119)
OLD RIVER RD
I-5
N
NOT TO SCALE


LOCATION MAP
FIGURE 2
Harris Rd
Wilderness Dr
Reliance Dr
Panama Ln
Old River Rd
Progress Rd
Gosford Rd
Reliance Dr
Ashe Rd
Golden Gate Dr
Stine Rd
Berkshire Rd
Mc Cutchen Rd
Project Location
Mc Kee Rd
Taft Hwy
(SR 119)
Romero Rd
Engle Rd
N
NOT TO SCALE
LEGEND
EXISTING ROAD
FUTURE ROAD

Much of the land currently used for the agricultural purposes within the project vicinity are designated as residential, commercial and related land uses. The City of Bakersfield is currently processing GPA/ZC applications for numerous residential and/or commercial developments in the southern and western Bakersfield areas. Old River Ranch, which was approved in 2005, is the largest development near the project. As currently planned, Old River Ranch will include a total of approximately 7,000 residential dwelling units and approximately 875,000 square feet of commercial retail and office space at build-out, and is generally bound by Panama Lane and Berkshire Road on the north, Taft Highway on the south, Old River Road on the east and Buena Vista Road on the west.

### C. Existing and Proposed Streets and Intersections

*Ashe Road* is designated as an arterial and currently operates as a two-lane rural road south of Panama Lane and as a fully improved arterial north of Panama Lane. Within the study area, Ashe Road provides access to residential, industrial, and commercial areas north of Panama Lane and agricultural areas south of Panama Lane.

*Gosford Road* is designated as an arterial and provides access to agricultural, residential, commercial and industrial land uses within the study area. It currently exists as a two-lane rural road south of Panama Lane and at various stages of widening and improvement adjacent to development from Panama Lane to District Boulevard. Gosford Road operates as a six-lane facility north of District Boulevard and continues north of Stockdale Highway as Coffee Road. Gosford Road/Coffee Road is one of three arterials which cross the Kern River west of State Route 99, and therefore, serves as a major north-south corridor in the western metropolitan Bakersfield area.

*McCutchen Road* extends west from Gosford Road to Buena Vista Road midway between McKee Road and Berkshire Road along the westerly extension of the Hosking Avenue alignment. It is designated as an arterial and currently exists as a two-lane rural road providing access to agricultural areas. Based on current and anticipated future development within the study area, it was assumed for the purposes of this study that a westerly extension of McCutchen Road from Buena Vista Road would be completed by the year 2030 in accordance with the General Plan.

*State Route 119 (Taft Highway)* extends east from the City of Taft, interchanges with Interstate 5 and runs through the southern metropolitan Bakersfield area. It is designated as an expressway west of State Route 99 and as an arterial east of State Route 99. Within the project vicinity, it exists as a two-lane roadway with paved shoulders and provides access to agricultural, commercial and residential land uses.

## PROJECT TRIP GENERATION AND DESIGN HOUR VOLUMES

The trip generation and design hour volumes shown in Table 1 were calculated based an estimation of anticipated daily employee vehicle and truck traffic. The anticipated daily trips were provided by the City of Bakersfield. The hours operation for employee and truck traffic for the plant are from 7:00 AM to 3:30 PM. The peak hour for the plant and adjacent street traffic will correspond in morning, however the plant would generate little to no traffic in the PM peak hour. Therefore the AM peak hour was analyzed.

**Table 1**
**Project Trip Generation**

| | Daily Trips | AM Peak Hour Trips | |
|---|---|---|---|
| WWTP Trip Type | ADT | In Trips | Out Trips |
| Passenger Cars (Employees) | 30 | 15 | 3 |
| Trucks | 38 | 13 | 7 |

## TRIP DISTRIBUTION AND ASSIGNMENT

The project trip distribution and assignment assumptions in Table 2 represent the most logically traveled routes for traffic accessing the proposed project. These assumptions were used to distribute project traffic on the existing street system, as shown in Figure 4. Project traffic distribution was estimated based on a review of potential employee trips and truck trips to and from existing and future land uses.

**Table 2**
**Project Trip Distribution and Assignment**

| Direction | Percentage | Description |
|---|---|---|
| North | 30 | Ashe Road and Gosford Road |
| East | 50 | McCutchen Road and Taft Highway (SR 119) |
| South | 10 | Ashe Road and Gosford Road |
| West | 10 | McCutchen Road and Taft Highway (SR 119) |

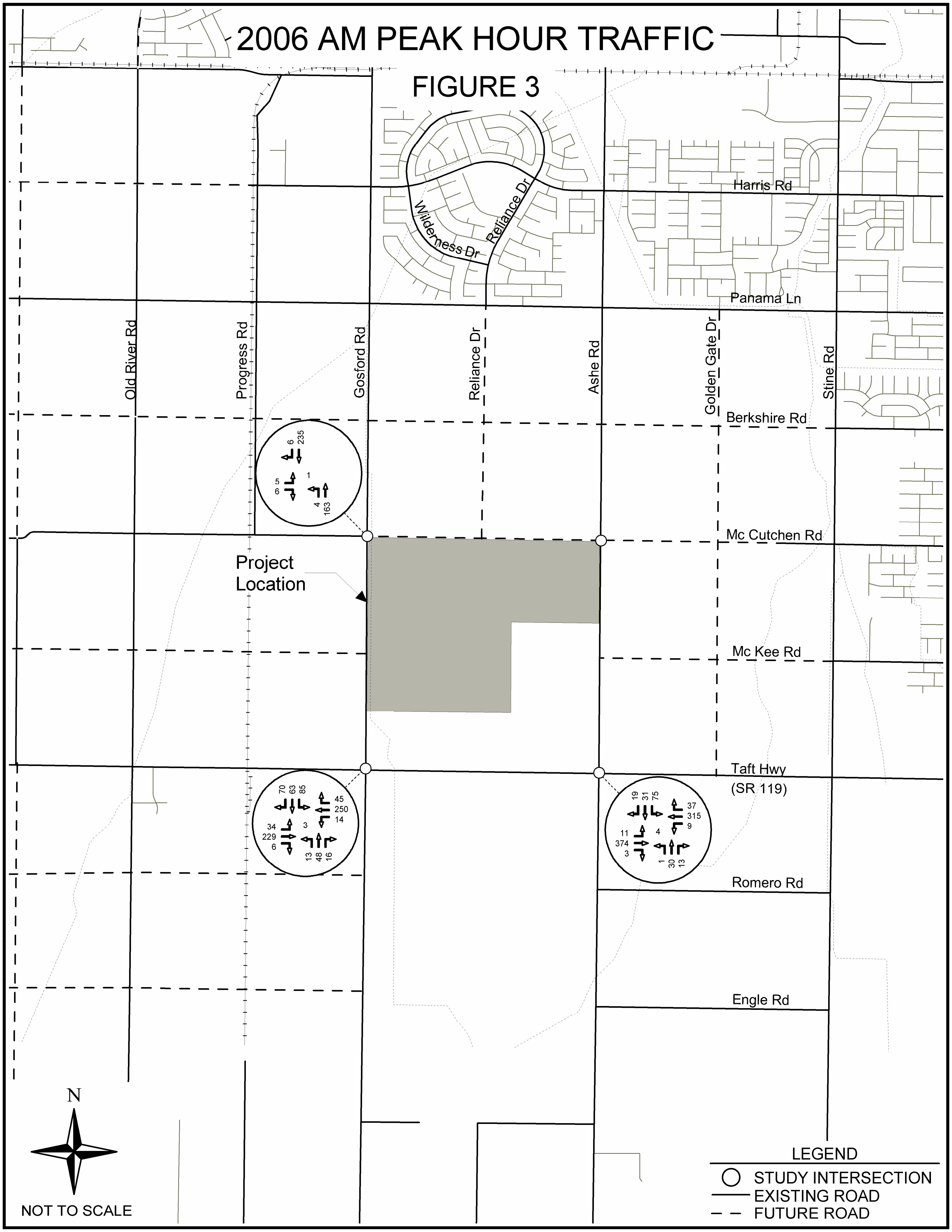
## EXISTING AND FUTURE TRAFFIC

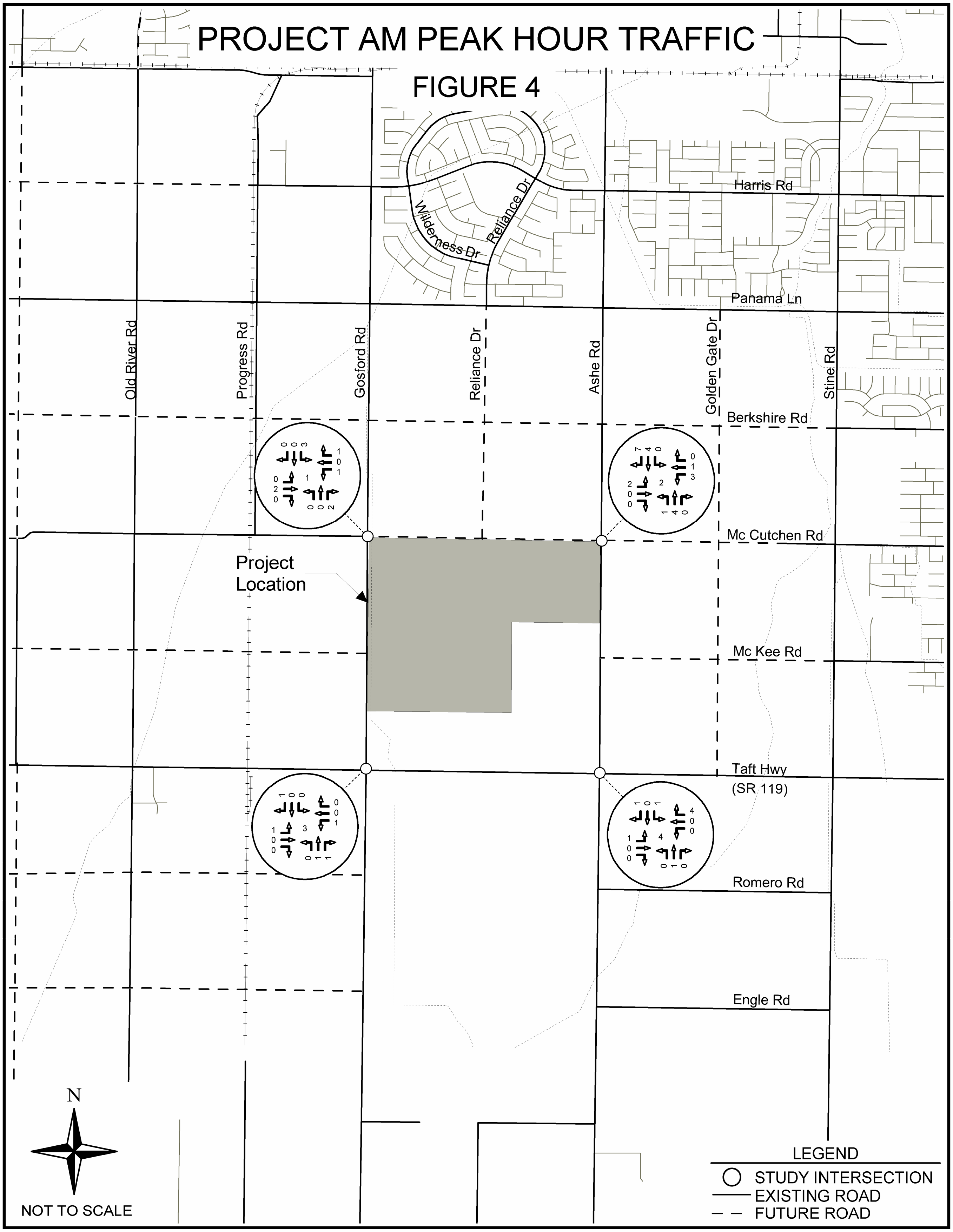
Existing peak hour turning movement volumes were field measured in the months of May and June 2006. Traffic counts for the AM peak hour were obtained at all existing study intersections. Existing peak hour volumes are shown in Figure 3.

Traffic volumes generated by the project were assigned to the study intersections and are shown in Figure 4. The criteria for analyzing LOS at an intersection is a minimum of 50 project trips in the intersection in the peak hour. The traffic generated from this project does not reach minimum volumes at any intersection. Therefore, as a conservative approach the four arterial-arterial intersections surrounding the project were studied. Figure 6 shows future (2010 Build Out Year) traffic plus project traffic and Figure 8 shows future (2030) traffic plus project traffic on the future street system.

Future traffic volumes used for this study were developed to account for pending GPA/ZC applications for proposed residential and commercial land developments in the Bakersfield area, including but not limited to the previously described Old River Ranch project. In order to quantify the cumulative impacts of these developments, KernCOG prepared a TPPLUS traffic model run of future 2030 traffic which accounts for all such proposed developments.

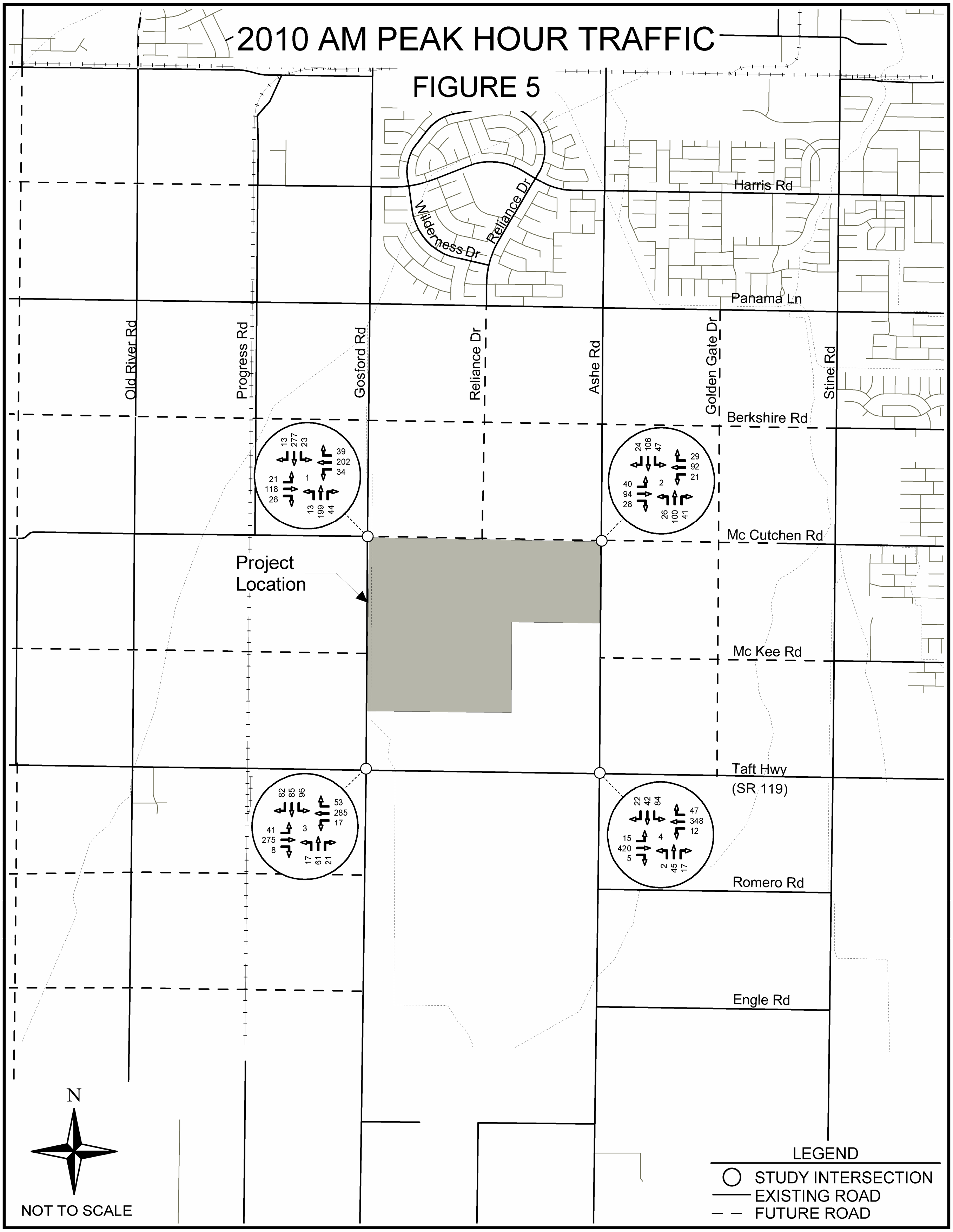
Average annual growth rates of 2.36% to 12.5% were developed based on a review of output from the traffic model run described above. These average annual growth rates were applied to existing traffic volumes to estimate future traffic volumes for the years 2010 and 2030. Future peak hour volumes are shown in Figure 5 for 2010 and Figure 7 for 2030.

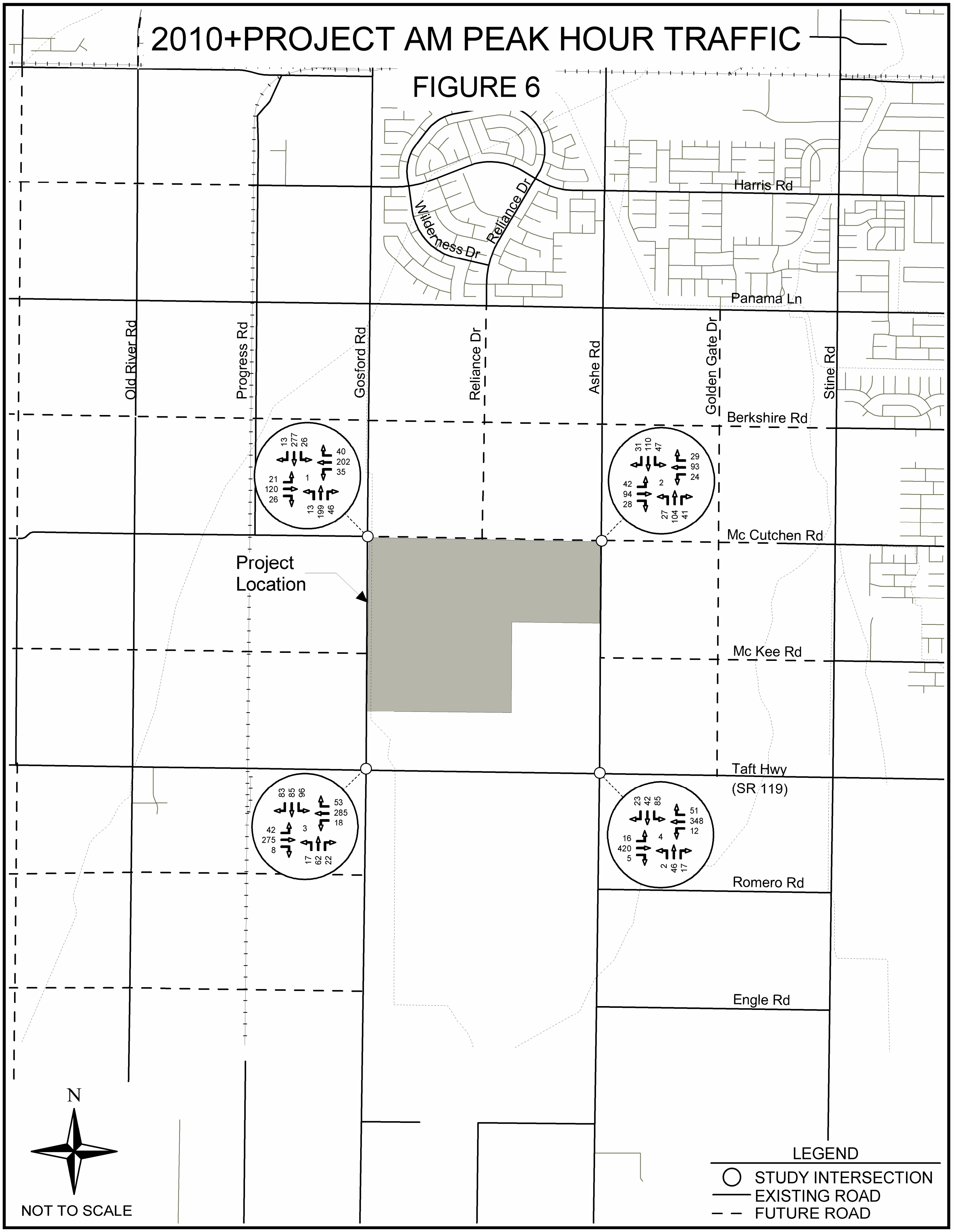

2006 AM PEAK HOUR TRAFFIC
FIGURE 3
Harris Rd
Wilderness Dr
Reliance Dr
Panama Ln
Old River Rd
Progress Rd
Gosford Rd
Reliance Dr
Ashe Rd
Golden Gate Dr
Stine Rd
Berkshire Rd
6
235
5
6
1
4
163
Mc Cutchen Rd
Project Location
Mc Kee Rd
Taft Hwy (SR 119)
70 63 85
45
250
14
34
229
6
3
13 48 16
19 31 75
37
315
9
11
374
3
4
1 30 13
Romero Rd
Engle Rd
N
NOT TO SCALE
LEGEND
STUDY INTERSECTION
EXISTING ROAD
FUTURE ROAD





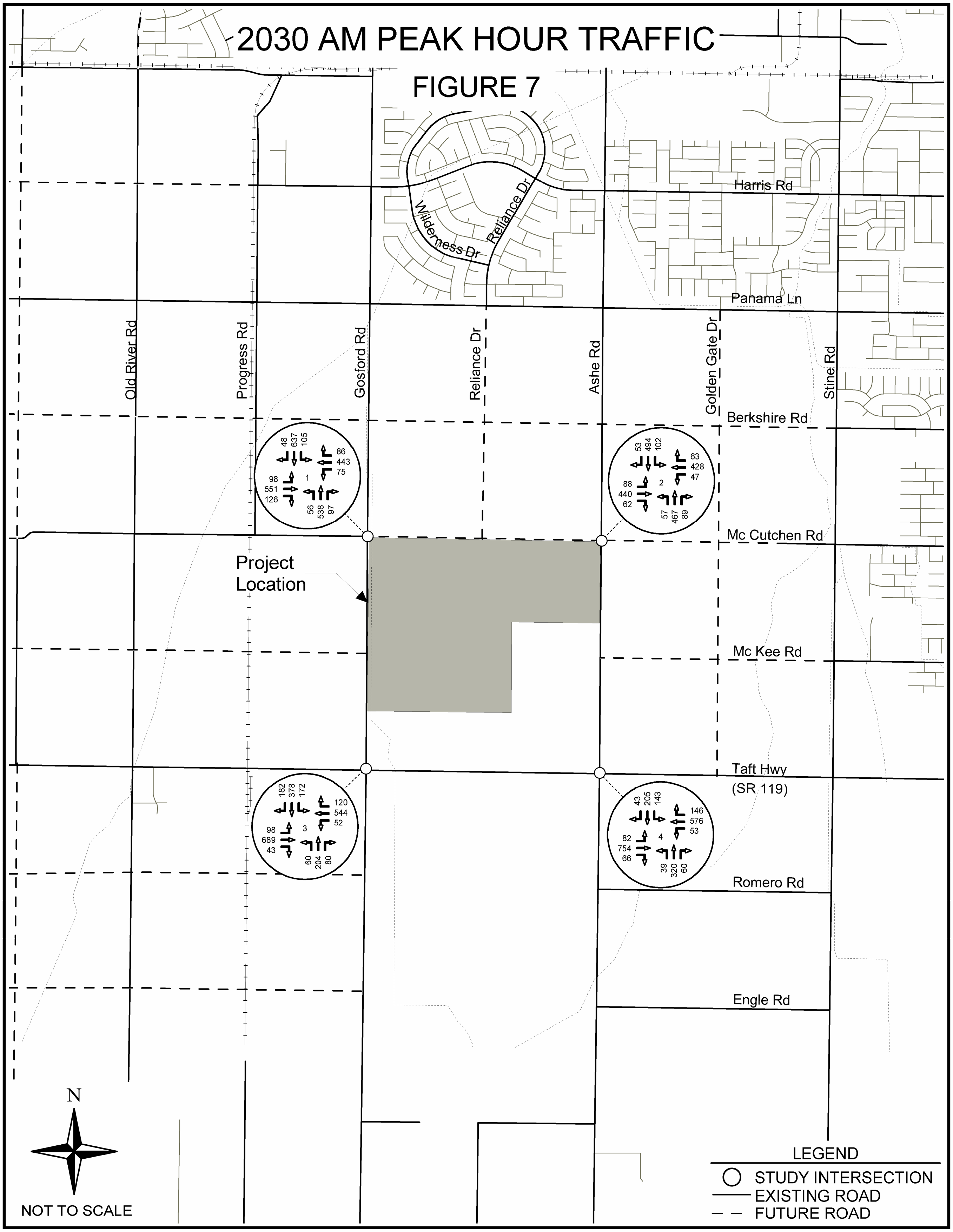

Ruettgers & Schuler Civil Engineers


2010 AM PEAK HOUR TRAFFIC
FIGURE 5
Harris Rd
Wilderness Dr
Reliance Dr
Panama Ln
Old River Rd
Progress Rd
Gosford Rd
Reliance Dr
Ashe Rd
Golden Gate Dr
Stine Rd
Berkshire Rd
Mc Cutchen Rd
Mc Kee Rd
Taft Hwy
(SR 119)
Romero Rd
Engle Rd
Project
Location
1
13 277 23
39 202 34
21 118 26
13 199 44
2
24 106 47
29 92 21
40 94 28
26 100 41
3
82 85 96
53 285 17
41 275 8
17 61 21
4
22 42 84
47 348 12
15 420 5
2 45 17
N
NOT TO SCALE
LEGEND
STUDY INTERSECTION
EXISTING ROAD
FUTURE ROAD



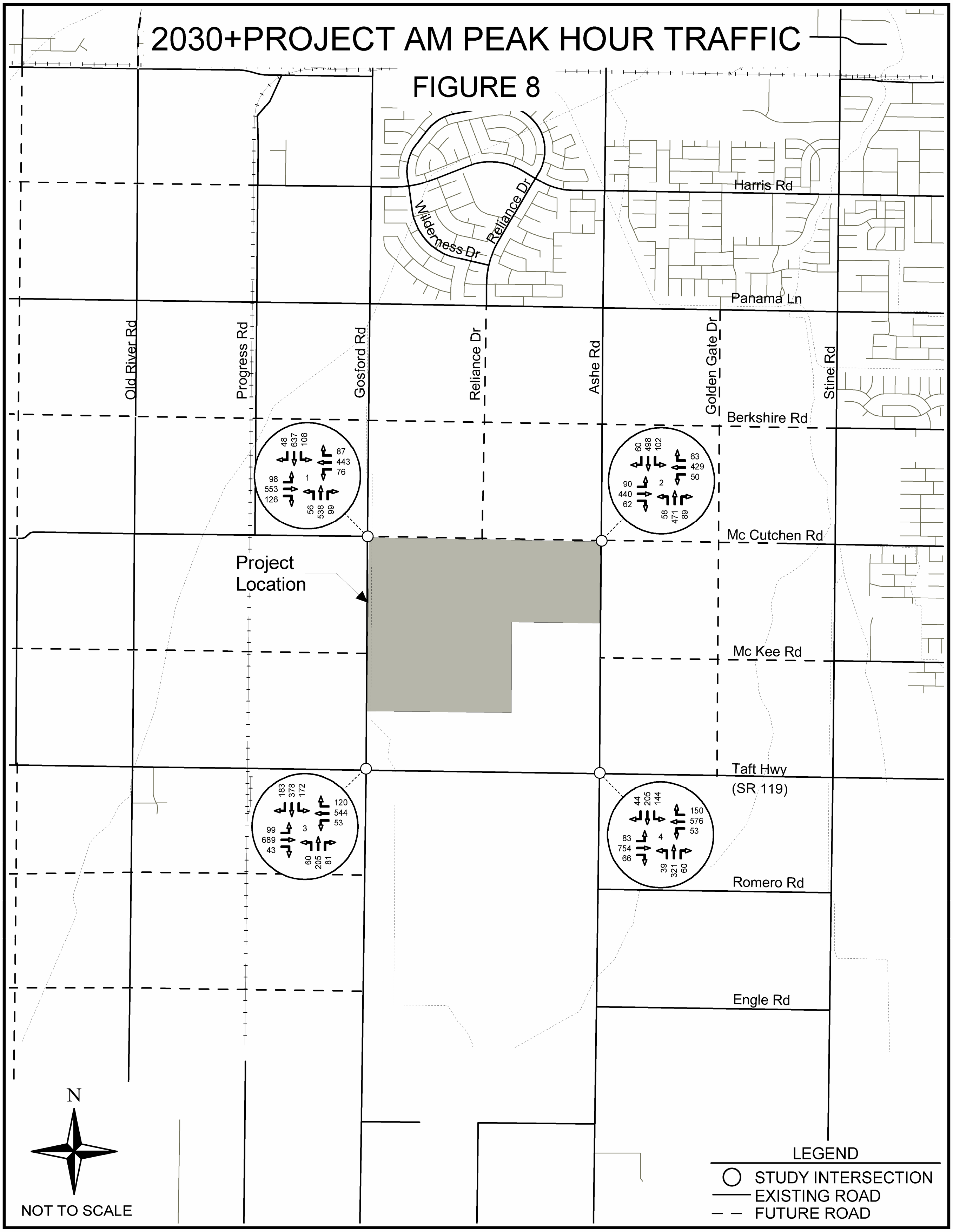


RUETTGERS & SCHULER CIVIL ENGINEERS




2030 AM PEAK HOUR TRAFFIC

FIGURE 7


2030+PROJECT AM PEAK HOUR TRAFFIC
FIGURE 8
Harris Rd
Wilderness Dr
Reliance Dr
Panama Ln
Old River Rd
Progress Rd
Gosford Rd
Reliance Dr
Ashe Rd
Golden Gate Dr
Stine Rd
Berkshire Rd
48 637 108
87 443 76
1
98 553 126
56 538 99
60 498 102
63 429 50
2
90 440 62
58 471 89
Mc Cutchen Rd
Project Location
Mc Kee Rd
Taft Hwy (SR 119)
183 378 172
120 544 53
3
99 689 43
60 205 81
44 205 144
150 576 53
4
83 754 66
39 321 60
Romero Rd
Engle Rd
N
NOT TO SCALE
LEGEND
STUDY INTERSECTION
EXISTING ROAD
FUTURE ROAD

## INTERSECTION ANALYSIS

A capacity analysis of the study intersections was conducted using Synchro software from Trafficware. This software utilizes the capacity analysis methodology in the Transportation Research Board's Highway Capacity Manual. The analysis was performed for the following traffic scenarios: existing (2006), future (2010), future (2010) + project, future (2030), and future (2030) + project.

Criteria for intersection level of service (LOS) are shown in the tables below. The AM peak hour levels of service for the unsignalized intersections in the study are presented in Table 3. Similarly, the AM peak hour levels of service for the signalized intersections in the study are presented in Table 4. The intersection peak hour level of service goal for the City of Bakersfield is LOS C or better.

**LEVEL OF SERVICE CRITERIA**
**UNSIGNALIZED INTERSECTION**

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

**LEVEL OF SERVICE CRITERIA**
**SIGNALIZED INTERSECTIONS**

| Volume/Capacity | Control Delay (sec/veh) | Level of Service |
|---|---|---|
| < 0.60 | ≤ 10 | A |
| 0.61 - 0.70 | > 10 and ≤ 20 | B |
| 0.71 - 0.80 | > 20 and ≤ 35 | C |
| 0.81 - 0.90 | > 35 and ≤ 55 | D |
| 0.91 - 1.00 | > 55 and ≤ 80 | E |
| > 1.0 | > 80 | F |

**Table 3**
**Unsignalized Intersection Level of Service**
**AM Peak Hour**

| # | Intersection | Movement | 2006 | 2010 | 2010+ Project | 2010+ Project w/Mitigation[1] | 2030 | 2030+ Project | 2030+ Project w/Mitigation[1] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Gosford Rd & McCutchen Rd | EB<br>WB | B<br>- | D<br>E | D<br>E | C | F<br>F | F<br>F | C |
| 2 | Ashe Rd & McCutchen Rd | EB<br>WB | -<br>- | C<br>B | C<br>C | -<br>- | F<br>F | F<br>F | C |
| 4 | Ashe Rd & Taft Hwy | NB<br>SB | C<br>D | C<br>E | C<br>F | C | F<br>F | F<br>F | C |

[1]See Table 7 for details

**Table 4**
**Signalized Intersection Level of Service**
**AM Peak Hour**

| # | Intersection | 2006 | 2010 | 2010+ Project | 2010+ Project w/Mitigation[1] | 2030 | 2030+ Project | 2030+ Project w/Mitigation[1] |
|---|---|---|---|---|---|---|---|---|
| 3 | Gosford Rd & Taft Hwy | B | B | B | - | F | F | C |

[1]See Table 7 for details

## TRAFFIC SIGNAL WARRANT ANALYSIS

Peak hour signal warrants were evaluated for each of the unsignalized intersections in the study based on the Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 Edition. The results are shown in Table 5.

**Table 5**
**Traffic Signal Warrants**
**AM Peak Hour**

| | | 2006 | | | 2010 | | | 2010+Project | | | 2030 | | | 2030+Project | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Intersection | Major Street Total Volume | Minor Street High Volume | Warrant Met | Major Street Total Volume | Minor Street High Volume | Warrant Met | Major Street Total Volume | Minor Street High Volume | Warrant Met | Major Street Total Volume | Minor Street High Volume | Warrant Met | Major Street Total Volume | Minor Street High Volume | Warrant Met |
| 1 | Gosford Rd at McCutchen Rd | 408 | 11 | NO | 569 | 275 | YES | 574 | 277 | YES | 1481 | 775 | YES | 1486 | 777 | YES |
| 2 | Ashe Rd at McCutchen Rd | - | - | - | 344 | 162 | NO | 360 | 164 | NO | 1262 | 590 | YES | 1278 | 592 | YES |
| 4 | Ashe Rd at Taft Hwy | 749 | 125 | NO | 847 | 148 | YES | 852 | 150 | YES | 1677 | 419 | YES | 1682 | 420 | YES |

## ROADWAY ANALYSIS

The volume-to-capacity ratios shown in Table 6 were calculated for roadways with published ADT information and future projected traffic. A volume-to-capacity ratio (v/c) of greater than 0.80 corresponds to a LOS of less than C, as defined in the Highway Capacity Manual. The City of Bakersfield's operational goal for roadway capacity is LOS C or better.

**Table 6**
**Daily Roadway Volumes**

| Street | 2004[1] | Project ADT | KCOG 1998 | KCOG 2020 | KCOG 2030[2] | 2010 ADT | 2010+ Project | 2030 ADT | 2030+ Project |
|---|---|---|---|---|---|---|---|---|---|
| Gosford Rd: Berkshire Rd - Taft Hwy (SR 119) | 3950 | 11 | 4500 | 5000 | 17800 | 5603 | 5614 | 17970 | 17981 |
| Gosford Rd: Taft Hwy (SR 119) - Bear Mtn Blvd (SR 223) | 3950 | 3 | - | - | - | 5603 | 5606 | 17970 | 17973 |
| Ashe Rd: Panama Ln - Taft Hwy (SR 119) | 1750 | 28 | 3400 | 6500 | 15200 | 2935 | 2963 | 16449 | 16477 |
| Ashe Rd: Taft Hwy (SR 119) - Romero Rd | 1200 | 5 | - | - | - | 1904 | 1909 | 8876 | 8881 |
| McCutchen Rd: Progress Rd - Gosford Rd | 470 | 2 | - | - | 8800 | 954 | 956 | 10094 | 10096 |
| McCutchen Rd: Gosford Rd - Ashe Rd | - | 19 | - | 400 | 4800 | 2753 | 2772 | 4800 | 4819 |
| McCutchen Rd: Ashe Rd - Stine Rd | - | 5 | - | 200 | 3200 | 4429 | 4434 | 13700 | 13705 |
| Taft Hwy (SR 119): Buena Vista Rd - Gosford Rd | 8500 | 3 | 8000 | 7400 | 14200 | 10149 | 10152 | 18331 | 18334 |
| Taft Hwy (SR 119): Ashe Rd - Wible Rd | 11100 | 11 | 4500 | 5000 | 13700 | 13254 | 13265 | 23938 | 23949 |

[1]Published ADT data
[2]KernCOG TPPLUS model run of future 2030 traffic assuming build out of various proposed residential and/or commercial developments in the Bakersfield area

**Table 6a**
**Daily Roadway Capacity**

| Street | Existing Capacity | 2010 Mitigated Capacity | 2030 Mitigated Capacity | v/c (Ex) 2004 | v/c (Ex) 2004+Proj | v/c (Ex) 2010 | v/c (Ex) 2010+Proj | v/c (Mit) 2010+Proj | v/c (Ex) 2030 | v/c (Ex) 2030+Proj | v/c (Mit) 2030+Proj |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gosford Rd: Berkshire Rd - Taft Hwy (SR 119) | 15000 | - | 30000 | 0.26 | 0.26 | 0.37 | 0.37 | 0.19 | ***1.20*** | ***1.20*** | 0.50 |
| Gosford Rd: Taft Hwy (SR 119) - Bear Mtn Blvd (SR 223) | 15000 | - | 30000 | 0.26 | 0.26 | 0.37 | 0.37 | 0.19 | ***1.20*** | ***1.20*** | 0.60 |
| Ashe Rd: Panama Ln - Taft Hwy (SR 119) | 15000 | - | 30000 | 0.12 | 0.12 | 0.20 | 0.20 | 0.10 | ***1.10*** | ***1.10*** | 0.55 |
| Ashe Rd: Taft Hwy (SR 119) - Romero Rd | 15000 | - | - | 0.08 | 0.08 | 0.13 | 0.13 | - | 0.59 | 0.59 | - |
| McCutchen Rd: Progress Rd - Gosford Rd | 15000 | - | - | 0.03 | 0.03 | 0.06 | 0.06 | - | 0.67 | 0.67 | - |
| McCutchen Rd: Gosford Rd - Ashe Rd | 60000 | - | - | - | - | 0.05 | 0.05 | - | 0.08 | 0.08 | - |
| McCutchen Rd: Ashe Rd - Stine Rd | 60000 | - | - | - | - | 0.07 | 0.07 | - | 0.23 | 0.23 | - |
| Taft Hwy (SR 119): Buena Vista Rd - Gosford Rd | 15000 | - | 30000 | 0.57 | 0.57 | 0.68 | 0.68 | 0.34 | ***1.22*** | ***1.22*** | 0.61 |
| Taft Hwy (SR 119): Ashe Rd - Wible Rd | 15000 | 30000 | 30000 | 0.74 | 0.74 | ***0.88*** | ***0.88*** | 0.44 | ***1.60*** | ***1.60*** | 0.80 |

## MITIGATION

Intersection and roadway improvements needed by the year 2010 and 2030 to maintain or improve the operational level of service of the street system in the vicinity of the project are shown in Tables 7 and 8, respectively. These tables also identify which improvements are not covered by the Regional Transportation Impact Fee (RTIF) program and the project's percent share for the cost of all non-RTIF (local mitigation) improvements. Intersection LOS with mitigation improvements is shown in Tables 3 and 4. Roadway volume-to-capacity ratios with mitigation improvements are shown in Table 6.

**Table 7**
**Future Intersection Improvements and Local Mitigation**

| # | Intersection | Total Improvements Required by 2010 | Total Improvements Required by 2030 | Local Mitigation (Improvements not covered by RTIF) | Project % Share for Local Mitigation |
|---|---|---|---|---|---|
| 1 | Gosford Rd & McCutchen Rd | Install Signal - 1 EBL, 1 WBL, 1 NBL, 1 SBL | Install Signal - 1 EBL, 1 EBR, 1 WBL, 2 NBL, 1 NBT, 1 NBR, 2 SBL, 1 SBT | - | - |
| 2 | Ashe Rd & McCutchen Rd | - | Install Signal - 1 EBL, 1 WBL, 1 NBL, 1 NBT, 1 SBL, 1 SBT | - | - |
| 3 | Gosford Rd & Taft Hwy | - | 1 WBR, 1 NBL, 1 SBL | - | - |
| 4 | Ashe Rd & Taft Hwy | Install Signal - 1 EBL, 1 WBL, 1 NBL, 1 SBL | Install Signal - 1 EBL, 1 EBT, 1 WBL, 1 WBT, 1 NBL, 1 SBL | - | - |

Notes:
NB = Northbound
SB = Southbound L = Left-Turn Lane
WB = Westbound T = Through Lane
EB = Eastbound R = Right-Turn Lane

**Table 8**
**Future Roadway Improvements and Local Mitigation**

| Roadway | Total Improvements Required by 2010 | Total Improvements Required by 2030 | Local Mitigation (Improvements not covered by RTIF) | Project Share for Local Mitigation |
|---|---|---|---|---|
| Gosford Rd: Berkshire Rd to Taft Hwy (SR 119) | - | Add 2 lanes | - | - |
| Gosford Rd: Taft Hwy (SR 119) to Bear Mtn Blvd (SR 223) | - | Add 2 lanes | - | - |
| Ashe Rd: Panama Ln to Taft Hwy (SR 119) | - | Add 2 lanes | - | - |
| Taft Hwy (SR 119): Buena Vista Rd to Gosford Rd | - | Add 2 lanes | - | - |
| Taft Hwy (SR 119): Ashe Rd to Wible Rd | Add 2 lanes | Add 2 lanes | - | - |

## SUMMARY

This report has evaluated the potential traffic impacts of a proposed expansion of the City's WWTP Number 3 at Ashe Road and McCutchen Road. The site is located in an area of mixed resource, agricultural, residential, commercial and industrial land uses. The project would provide a capacity of 32 mgd of wastewater treatment and additional storage ponds. The expansion is scheduled to be completed in the year 2010.

All but one of the study intersections (Ashe Road/Taft Highway) currently operate at or above LOS C during peak hours and none of the unsignalized intersections currently meets peak hour signal warrants. In addition, all roadway segments within the scope of the study currently operate at acceptable levels of service.

The intersection of Gosford Road and McCutchen Road will fall below LOS C by 2010. The intersections of Gosford Road ar McCutchen Road, and Ashe Road at Wible Road will meet peak hour Signal Warrants by the year 2010. All but one of the roadway segments (Taft Highway: Ashe Road to Wible Road) will continue to operate with minimal delays in their present configurations in 2010. It is noted that the addition of project traffic will not cause any intersections and roadway segments to drop below LOS C.

Increases in traffic volumes anticipated by the year 2030 will cause all intersections to operate below LOS C and meet signal warrants if left in their current configuration. In addition, future traffic volumes will exceed theoretical LOS C thresholds for several roadway segments, if left in their present configurations. None of the facilities shown to operate at or above LOS C in the year 2030 will drop below LOS C when project traffic is added to future traffic volumes.

All study intersections shown to operate below LOS C in the year 2010 and 2030 with project traffic can be mitigated to an acceptable level of service with signalization and/or expansion. Similarly, all roadway segments shown to operate below an acceptable level of service with project traffic in the year 2010 and 2030 can be mitigated to operate at or above LOS C with the addition of new lanes.

## CONCLUSIONS

The project is located in an area which is transitioning from agricultural to residential and commercial land uses. Correspondingly, the existing street system in the vicinity of the project is transitioning from two-lane rural roads to fully improved collectors and arterials. All improvements required for this transition have been anticipated and are included in the Regional Transportation Impact Fee (RTIF) program.

Provided RTIF improvements are constructed, traffic generated by the proposed wastewater treatment plant expansion located at the intersection of Ashe Road and McCutchen Road in southwestern metropolitan Bakersfield will have minimal impact on existing and future traffic operations in the vicinity of the project.

## REFERENCES


1. 1989 through 2004 Traffic Volumes, City of Bakersfield
2. 1989 through 2004 Annual Traffic Census, Kern County
3. Highway Capacity Manual, Special Report 209, Transportation Research Board
4. Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 Edition, Federal Highway Administration (FHA)
5. Metropolitan Bakersfield General Plan, December 2002
6. Trip Generation, 7th Edition, Institute of Transportation Engineers (ITE)

# APPENDIX

# Intersection 1
# Gosford Rd & McCutchen Rd

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | Stop | | | | | | | Free | | | Free | |
| Grade | 0% | | | | | | | 0% | | | 0% | |
| Volume (veh/h) | 5 | | 6 | | | | 4 | 163 | | | 235 | 6 |
| Peak Hour Factor | 0.92 | | 0.92 | | | | 0.92 | 0.92 | | | 0.92 | 0.92 |
| Hourly flow rate (vph) | 5 | | 7 | | | | 4 | 177 | | | 255 | 7 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | None | | | | | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 445 | | 259 | | | | 262 | | | | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 445 | | 259 | | | | 262 | | | | | |
| tC, single (s) | 6.4 | | 6.2 | | | | 4.1 | | | | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | | 3.3 | | | | 2.2 | | | | | |
| p0 queue free % | 99 | | 99 | | | | 100 | | | | | |
| cM capacity (veh/h) | 569 | | 780 | | | | 1302 | | | | | |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 12 | 182 | 262 |
| Volume Left | 5 | 4 | 0 |
| Volume Right | 7 | 0 | 7 |
| cSH | 668 | 1302 | 1700 |
| Volume to Capacity | 0.02 | 0.00 | 0.15 |
| Queue Length 95th (ft) | 1 | 0 | 0 |
| Control Delay (s) | 10.5 | 0.2 | 0.0 |
| Lane LOS | B | A | |
| Approach Delay (s) | 10.5 | 0.2 | 0.0 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.4 | | |
| Intersection Capacity Utilization | 22.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 21 | 118 | 26 | 34 | 202 | 39 | 13 | 199 | 44 | 23 | 277 | 13 |
| 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 |
| Hourly flow rate (vph) | 23 | 128 | 28 | 37 | 220 | 42 | 14 | 216 | 48 | 25 | 301 | 14 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 779 | 651 | 308 | 719 | 634 | 240 | 315 | | | 264 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 779 | 651 | 308 | 719 | 634 | 240 | 315 | | | 264 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 86 | 66 | 96 | 84 | 43 | 95 | 99 | | | 98 | | |
| cM capacity (veh/h) | 159 | 376 | 732 | 238 | 385 | 799 | 1245 | | | 1300 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 179 | 299 | 278 | 340 |
| Volume Left | 23 | 37 | 14 | 25 |
| Volume Right | 28 | 42 | 48 | 14 |
| cSH | 343 | 383 | 1245 | 1300 |
| Volume to Capacity | 0.52 | 0.78 | 0.01 | 0.02 |
| Queue Length 95th (ft) | 72 | 164 | 1 | 1 |
| Control Delay (s) | 26.5 | 40.6 | 0.5 | 0.7 |
| Lane LOS | D | E | A | A |
| Approach Delay (s) | 26.5 | 40.6 | 0.5 | 0.7 |
| Approach LOS | D | E | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 15.8 | | |
| Intersection Capacity Utilization | 49.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 21 | 120 | 26 | 35 | 202 | 40 | 13 | 199 | 46 | 26 | 277 | 13 |
| 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 |
| Hourly flow rate (vph) | 23 | 130 | 28 | 38 | 220 | 43 | 14 | 216 | 50 | 28 | 301 | 14 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 788 | 659 | 308 | 728 | 641 | 241 | 315 | | | 266 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 788 | 659 | 308 | 728 | 641 | 241 | 315 | | | 266 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 85 | 65 | 96 | 84 | 42 | 95 | 99 | | | 98 | | |
| cM capacity (veh/h) | 155 | 371 | 732 | 231 | 380 | 798 | 1245 | | | 1298 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 182 | 301 | 280 | 343 |
| Volume Left | 23 | 38 | 14 | 28 |
| Volume Right | 28 | 43 | 50 | 14 |
| cSH | 337 | 378 | 1245 | 1298 |
| Volume to Capacity | 0.54 | 0.80 | 0.01 | 0.02 |
| Queue Length 95th (ft) | 76 | 172 | 1 | 2 |
| Control Delay (s) | 27.4 | 43.1 | 0.5 | 0.8 |
| Lane LOS | D | E | A | A |
| Approach Delay (s) | 27.4 | 43.1 | 0.5 | 0.8 |
| Approach LOS | D | E | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 16.6 | | |
| Intersection Capacity Utilization | 51.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.97 | | 1.00 | 0.98 | | 1.00 | 0.97 | | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1813 | | 1630 | 1817 | | 1630 | 1810 | | 1630 | 1850 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1630 | 1813 | | 1630 | 1817 | | 1630 | 1810 | | 1630 | 1850 | |
| Volume (vph) | 21 | 120 | 26 | 35 | 202 | 40 | 13 | 199 | 46 | 26 | 277 | 13 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 23 | 130 | 28 | 38 | 220 | 43 | 14 | 216 | 50 | 28 | 301 | 14 |
| RTOR Reduction (vph) | 0 | 10 | 0 | 0 | 9 | 0 | 0 | 6 | 0 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 23 | 148 | 0 | 38 | 254 | 0 | 14 | 260 | 0 | 28 | 314 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 3.2 | 13.4 | | 7.8 | 18.0 | | 2.3 | 49.4 | | 3.4 | 50.5 | |
| Effective Green, g (s) | 3.2 | 13.4 | | 7.8 | 18.0 | | 2.3 | 49.4 | | 3.4 | 50.5 | |
| Actuated g/C Ratio | 0.04 | 0.15 | | 0.09 | 0.20 | | 0.03 | 0.55 | | 0.04 | 0.56 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 58 | 270 | | 141 | 363 | | 42 | 993 | | 62 | 1038 | |
| v/s Ratio Prot | 0.01 | 0.08 | | c0.02 | c0.14 | | 0.01 | c0.14 | | c0.02 | c0.17 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.40 | 0.55 | | 0.27 | 0.70 | | 0.33 | 0.26 | | 0.45 | 0.30 | |
| Uniform Delay, d1 | 42.5 | 35.5 | | 38.4 | 33.5 | | 43.1 | 10.7 | | 42.4 | 10.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.01 | 1.00 | | 0.80 | 0.65 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.4 | 2.3 | | 1.0 | 6.0 | | 4.6 | 0.6 | | 5.2 | 0.7 | |
| Delay (s) | 46.9 | 37.8 | | 39.9 | 39.6 | | 39.1 | 7.6 | | 47.5 | 11.2 | |
| Level of Service | D | D | | D | D | | D | A | | D | B | |
| Approach Delay (s) | | 38.9 | | | 39.7 | | | 9.1 | | | 14.2 | |
| Approach LOS | | D | | | D | | | A | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 23.9 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.37 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 48.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 98 | 551 | 126 | 75 | 443 | 86 | 56 | 538 | 97 | 105 | 637 | 48 |
| 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 |
| Hourly flow rate (vph) | 107 | 599 | 137 | 82 | 482 | 93 | 61 | 585 | 105 | 114 | 692 | 52 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 2040 | 1759 | 718 | 2142 | 1732 | 638 | 745 | | | 690 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 2040 | 1759 | 718 | 2142 | 1732 | 638 | 745 | | | 690 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 0 | 0 | 68 | 0 | 0 | 80 | 93 | | | 87 | | |
| cM capacity (veh/h) | 0 | 69 | 429 | 0 | 71 | 477 | 863 | | | 904 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 842 | 657 | 751 | 859 |
| Volume Left | 107 | 82 | 61 | 114 |
| Volume Right | 137 | 93 | 105 | 52 |
| cSH | 0 | 0 | 863 | 904 |
| Volume to Capacity | Err | Err | 0.07 | 0.13 |
| Queue Length 95th (ft) | Err | Err | 6 | 11 |
| Control Delay (s) | Err | Err | 1.8 | 3.1 |
| Lane LOS | F | F | A | A |
| Approach Delay (s) | Err | Err | 1.8 | 3.1 |
| Approach LOS | F | F | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 128.1% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 98 | 553 | 126 | 76 | 443 | 87 | 56 | 538 | 99 | 108 | 637 | 48 |
| 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 |
| Hourly flow rate (vph) | 107 | 601 | 137 | 83 | 482 | 95 | 61 | 585 | 108 | 117 | 692 | 52 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 2049 | 1767 | 718 | 2151 | 1740 | 639 | 745 | | | 692 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 2049 | 1767 | 718 | 2151 | 1740 | 639 | 745 | | | 692 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 0 | 0 | 68 | 0 | 0 | 80 | 93 | | | 87 | | |
| cM capacity (veh/h) | 0 | 68 | 429 | 0 | 70 | 476 | 863 | | | 903 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 845 | 659 | 753 | 862 |
| Volume Left | 107 | 83 | 61 | 117 |
| Volume Right | 137 | 95 | 108 | 52 |
| cSH | 0 | 0 | 863 | 903 |
| Volume to Capacity | Err | Err | 0.07 | 0.13 |
| Queue Length 95th (ft) | Err | Err | 6 | 11 |
| Control Delay (s) | Err | Err | 1.8 | 3.2 |
| Lane LOS | F | F | A | A |
| Approach Delay (s) | Err | Err | 1.8 | 3.2 |
| Approach LOS | F | F | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 129.0% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

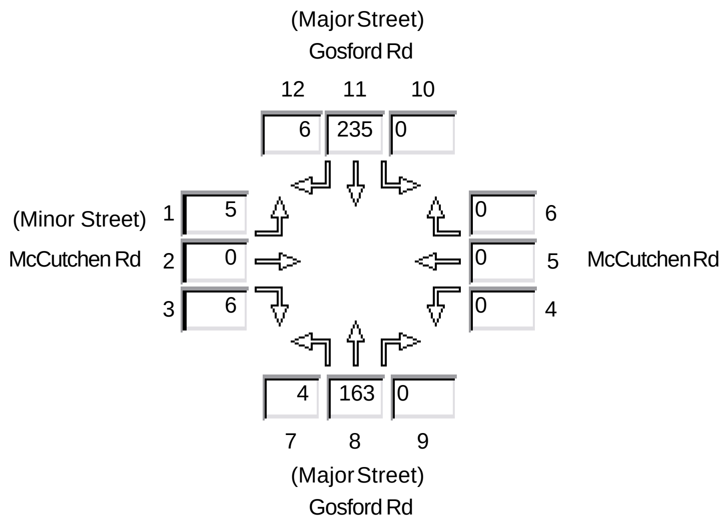
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1863 | 1458 | 1630 | 1817 | | 3162 | 3539 | 1458 | 3162 | 3502 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1630 | 1863 | 1458 | 1630 | 1817 | | 3162 | 3539 | 1458 | 3162 | 3502 | |
| Volume (vph) | 98 | 553 | 126 | 76 | 443 | 87 | 56 | 538 | 99 | 108 | 637 | 48 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 107 | 601 | 137 | 83 | 482 | 95 | 61 | 585 | 108 | 117 | 692 | 52 |
| RTOR Reduction (vph) | 0 | 0 | 87 | 0 | 8 | 0 | 0 | 0 | 79 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 107 | 601 | 50 | 83 | 569 | 0 | 61 | 585 | 29 | 117 | 739 | 0 |
| Turn Type | Prot | | Perm | Prot | | | Prot | | Perm | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | | | | 2 | | | |
| Actuated Green, G (s) | 8.1 | 33.9 | 33.9 | 8.9 | 34.7 | | 3.8 | 24.9 | 24.9 | 8.3 | 29.4 | |
| Effective Green, g (s) | 8.1 | 33.9 | 33.9 | 8.9 | 34.7 | | 3.8 | 24.9 | 24.9 | 8.3 | 29.4 | |
| Actuated g/C Ratio | 0.09 | 0.37 | 0.37 | 0.10 | 0.38 | | 0.04 | 0.27 | 0.27 | 0.09 | 0.32 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 144 | 686 | 537 | 158 | 685 | | 131 | 958 | 395 | 285 | 1119 | |
| v/s Ratio Prot | 0.07 | c0.32 | | 0.05 | c0.31 | | 0.02 | c0.17 | | 0.04 | c0.21 | |
| v/s Ratio Perm | | | 0.03 | | | | | | 0.02 | | | |
| v/c Ratio | 0.74 | 0.88 | 0.09 | 0.53 | 0.83 | | 0.47 | 0.61 | 0.07 | 0.41 | 0.66 | |
| Uniform Delay, d1 | 40.9 | 27.1 | 19.0 | 39.5 | 26.0 | | 43.1 | 29.3 | 25.0 | 39.5 | 27.0 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 0.57 | 0.46 | | 0.93 | 0.99 | 1.36 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 18.6 | 12.1 | 0.1 | 2.2 | 6.2 | | 2.5 | 2.8 | 0.4 | 1.0 | 3.1 | |
| Delay (s) | 59.5 | 39.2 | 19.1 | 24.9 | 18.0 | | 42.7 | 31.7 | 34.4 | 40.5 | 30.1 | |
| Level of Service | E | D | B | C | B | | D | C | C | D | C | |
| Approach Delay (s) | | 38.5 | | | 18.9 | | | 33.0 | | | 31.5 | |
| Approach LOS | | D | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 31.1 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.77 | | |
| Actuated Cycle Length (s) | 92.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 70.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

# Rural Peak Hour Signal Warrant
# Intersection Does Not Meet Signal Warrant

Scenario: AM 2006

Intersection #: 1

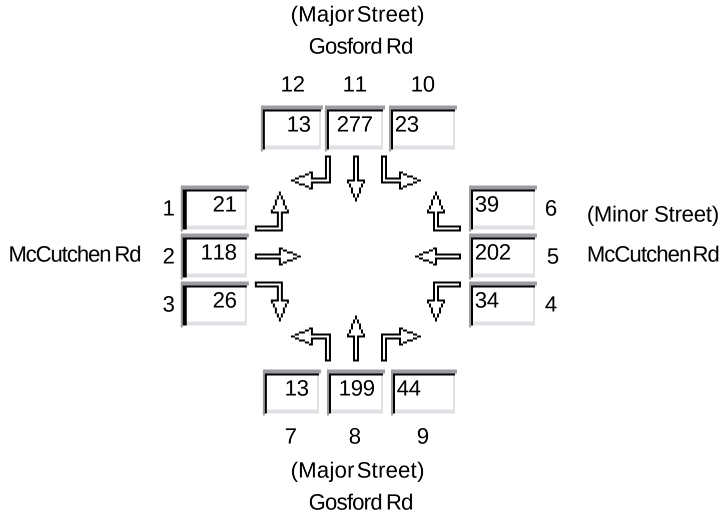



Major Total: 408

Minor High Volume: 11

# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2010
Intersection #: 1

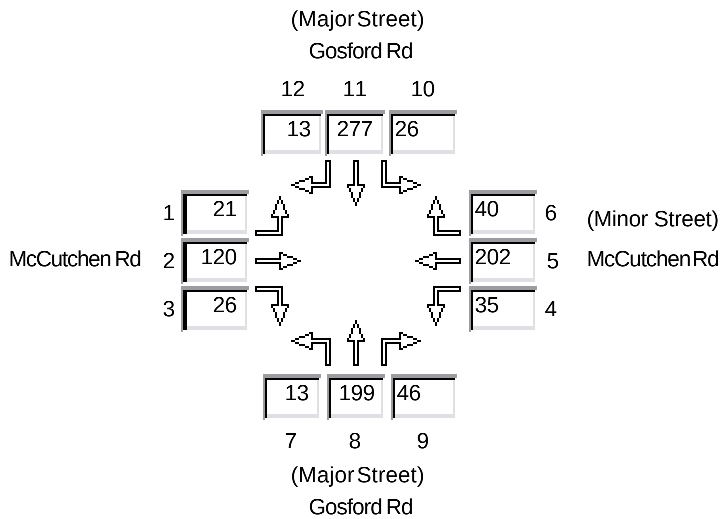



Major Total: 569

Minor High Volume: 275

# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2010+Project
Intersection #: 1



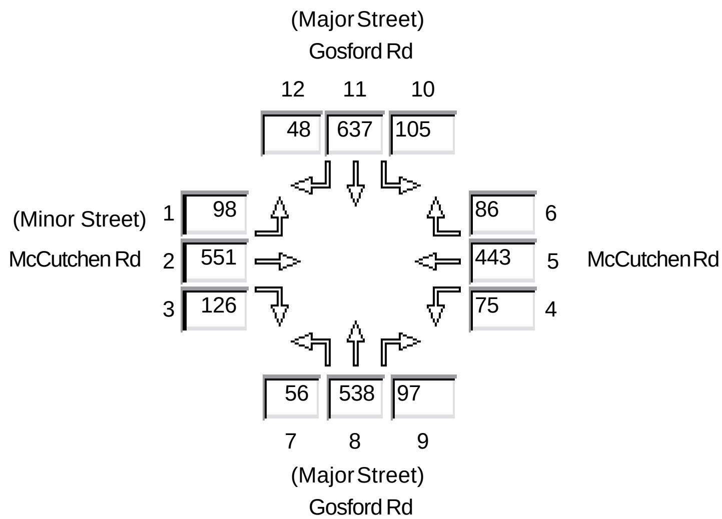

Major Total: 574
Minor High Volume: 277

# Rural Peak Hour Signal Warrant

# Intersection Meets Signal Warrant

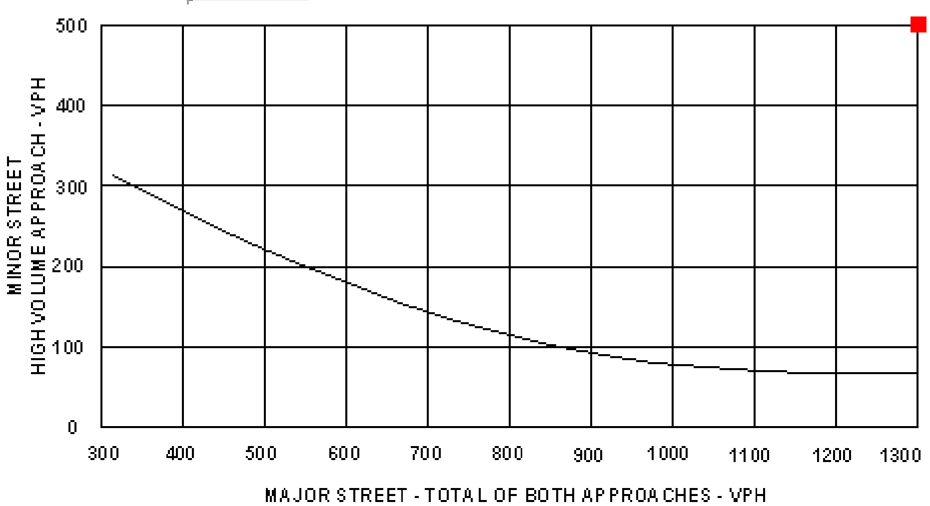
Scenario: AM 2030

Intersection #: 1




Major Total: 1481

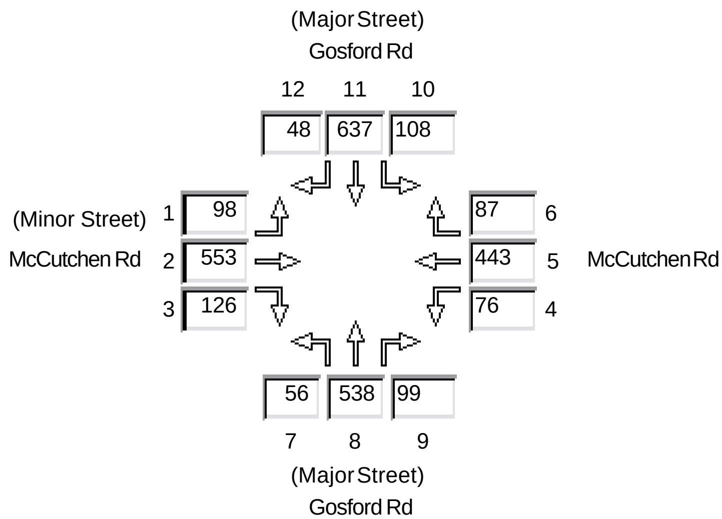
Minor High Volume: 775



# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2030+Project

Intersection #: 1




Major Total: 1486

Minor High Volume: 777

# Intersection 2
# Ashe Rd & McCutchen Rd

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 40 | 94 | 28 | 21 | 92 | 29 | 26 | 100 | 41 | 47 | 106 | 24 |
| 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 |
| Hourly flow rate (vph) | 43 | 102 | 30 | 23 | 100 | 32 | 28 | 109 | 45 | 51 | 115 | 26 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 499 | 440 | 128 | 499 | 431 | 131 | 141 | | | 153 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 499 | 440 | 128 | 499 | 431 | 131 | 141 | | | 153 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 88 | 79 | 97 | 94 | 80 | 97 | 98 | | | 96 | | |
| cM capacity (veh/h) | 376 | 483 | 922 | 374 | 489 | 919 | 1442 | | | 1427 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 176 | 154 | 182 | 192 |
| Volume Left | 43 | 23 | 28 | 51 |
| Volume Right | 30 | 32 | 45 | 26 |
| cSH | 489 | 515 | 1442 | 1427 |
| Volume to Capacity | 0.36 | 0.30 | 0.02 | 0.04 |
| Queue Length 95th (ft) | 41 | 31 | 1 | 3 |
| Control Delay (s) | 16.5 | 15.0 | 1.3 | 2.2 |
| Lane LOS | C | B | A | A |
| Approach Delay (s) | 16.5 | 15.0 | 1.3 | 2.2 |
| Approach LOS | C | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 8.3 | | |
| Intersection Capacity Utilization | 37.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 42 | 94 | 28 | 24 | 93 | 29 | 27 | 104 | 41 | 47 | 110 | 31 |
| 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 |
| Hourly flow rate (vph) | 46 | 102 | 30 | 26 | 101 | 32 | 29 | 113 | 45 | 51 | 120 | 34 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 515 | 455 | 136 | 514 | 449 | 135 | 153 | | | 158 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 515 | 455 | 136 | 514 | 449 | 135 | 153 | | | 158 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 87 | 78 | 97 | 93 | 79 | 97 | 98 | | | 96 | | |
| cM capacity (veh/h) | 365 | 473 | 912 | 364 | 477 | 913 | 1427 | | | 1422 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 178 | 159 | 187 | 204 |
| Volume Left | 46 | 26 | 29 | 51 |
| Volume Right | 30 | 32 | 45 | 34 |
| cSH | 476 | 499 | 1427 | 1422 |
| Volume to Capacity | 0.37 | 0.32 | 0.02 | 0.04 |
| Queue Length 95th (ft) | 43 | 34 | 2 | 3 |
| Control Delay (s) | 17.0 | 15.6 | 1.3 | 2.1 |
| Lane LOS | C | C | A | A |
| Approach Delay (s) | 17.0 | 15.6 | 1.3 | 2.1 |
| Approach LOS | C | C | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 8.5 | | |
| Intersection Capacity Utilization | 37.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 88 | 440 | 62 | 47 | 428 | 63 | 57 | 467 | 89 | 102 | 494 | 53 |
| 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 |
| Hourly flow rate (vph) | 96 | 478 | 67 | 51 | 465 | 68 | 62 | 508 | 97 | 111 | 537 | 58 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1768 | 1516 | 566 | 1774 | 1496 | 556 | 595 | | | 604 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1768 | 1516 | 566 | 1774 | 1496 | 556 | 595 | | | 604 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 0 | 0 | 87 | 0 | 0 | 87 | 94 | | | 89 | | |
| cM capacity (veh/h) | 0 | 99 | 524 | 0 | 102 | 531 | 982 | | | 973 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 641 | 585 | 666 | 705 |
| Volume Left | 96 | 51 | 62 | 111 |
| Volume Right | 67 | 68 | 97 | 58 |
| cSH | 0 | 0 | 982 | 973 |
| Volume to Capacity | Err | Err | 0.06 | 0.11 |
| Queue Length 95th (ft) | Err | Err | 5 | 10 |
| Control Delay (s) | Err | Err | 1.6 | 2.8 |
| Lane LOS | F | F | A | A |
| Approach Delay (s) | Err | Err | 1.6 | 2.8 |
| Approach LOS | F | F | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 112.0% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ✥ | | | ✥ | | | ✥ | | | ✥ | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 90 | 440 | 62 | 50 | 429 | 63 | 58 | 471 | 89 | 102 | 498 | 60 |
| 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 |
| Hourly flow rate (vph) | 98 | 478 | 67 | 54 | 466 | 68 | 63 | 512 | 97 | 111 | 541 | 65 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1784 | 1530 | 574 | 1789 | 1515 | 560 | 607 | | | 609 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1784 | 1530 | 574 | 1789 | 1515 | 560 | 607 | | | 609 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 0 | 0 | 87 | 0 | 0 | 87 | 94 | | | 89 | | |
| cM capacity (veh/h) | 0 | 97 | 518 | 0 | 99 | 528 | 972 | | | 970 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 643 | 589 | 672 | 717 |
| Volume Left | 98 | 54 | 63 | 111 |
| Volume Right | 67 | 68 | 97 | 65 |
| cSH | 0 | 0 | 972 | 970 |
| Volume to Capacity | Err | Err | 0.06 | 0.11 |
| Queue Length 95th (ft) | Err | Err | 5 | 10 |
| Control Delay (s) | Err | Err | 1.7 | 2.8 |
| Lane LOS | F | F | A | A |
| Approach Delay (s) | Err | Err | 1.7 | 2.8 |
| Approach LOS | F | F | | |

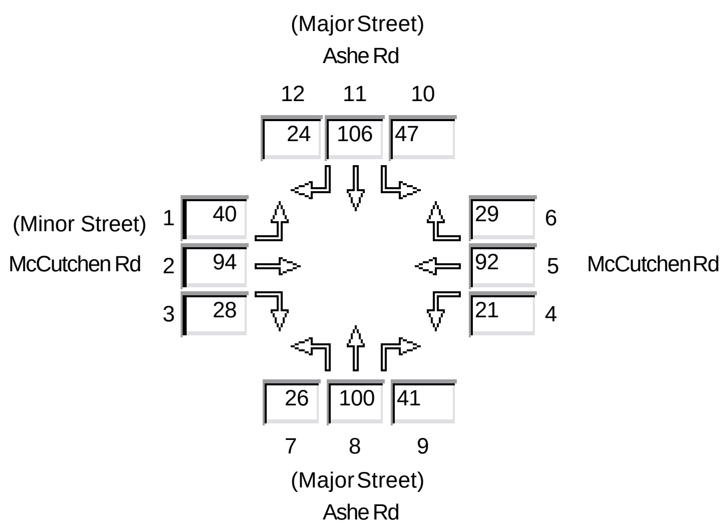
| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 112.1% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 0.98 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1828 | | 1630 | 1827 | | 1630 | 3455 | | 1630 | 3482 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1630 | 1828 | | 1630 | 1827 | | 1630 | 3455 | | 1630 | 3482 | |
| Volume (vph) | 90 | 440 | 62 | 50 | 429 | 63 | 58 | 471 | 89 | 102 | 498 | 60 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 98 | 478 | 67 | 54 | 466 | 68 | 63 | 512 | 97 | 111 | 541 | 65 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 6 | 0 | 0 | 17 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 98 | 540 | 0 | 54 | 528 | 0 | 63 | 592 | 0 | 111 | 596 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 10.3 | 36.6 | | 5.1 | 31.4 | | 8.0 | 24.9 | | 9.4 | 26.3 | |
| Effective Green, g (s) | 10.3 | 36.6 | | 5.1 | 31.4 | | 8.0 | 24.9 | | 9.4 | 26.3 | |
| Actuated g/C Ratio | 0.11 | 0.40 | | 0.06 | 0.34 | | 0.09 | 0.27 | | 0.10 | 0.29 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 182 | 727 | | 90 | 624 | | 142 | 935 | | 167 | 995 | |
| v/s Ratio Prot | 0.06 | c0.30 | | 0.03 | c0.29 | | 0.04 | c0.17 | | 0.07 | c0.17 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.54 | 0.74 | | 0.60 | 0.85 | | 0.44 | 0.63 | | 0.66 | 0.60 | |
| Uniform Delay, d1 | 38.6 | 23.7 | | 42.5 | 28.1 | | 39.9 | 29.5 | | 39.8 | 28.3 | |
| Progression Factor | 0.63 | 0.49 | | 1.00 | 1.00 | | 1.05 | 1.10 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 2.8 | | 10.3 | 10.3 | | 1.4 | 2.1 | | 9.6 | 2.7 | |
| Delay (s) | 26.3 | 14.3 | | 52.8 | 38.3 | | 43.2 | 34.6 | | 49.3 | 31.0 | |
| Level of Service | C | B | | D | D | | D | C | | D | C | |
| Approach Delay (s) | | 16.1 | | | 39.7 | | | 35.4 | | | 33.8 | |
| Approach LOS | | B | | | D | | | D | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 31.2 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.70 | | |
| Actuated Cycle Length (s) | 92.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 67.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

# Rural Peak Hour Signal Warrant
# Intersection Does Not Meet Signal Warrant

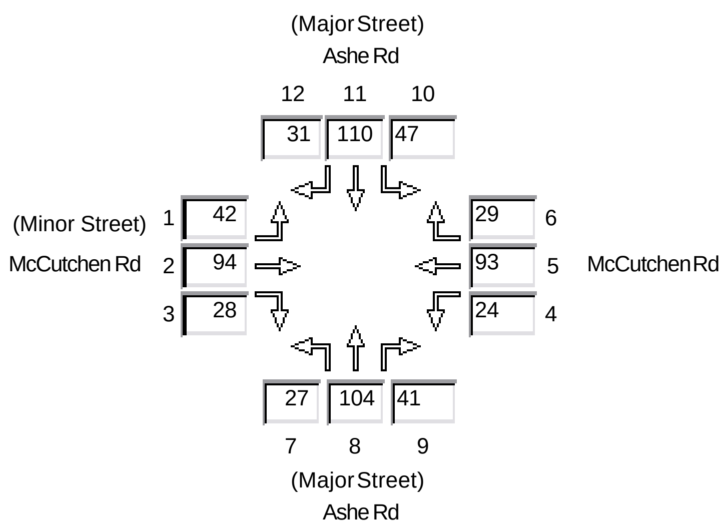
Scenario: AM 2010
Intersection #: 2




Major Total: 344
Minor High Volume: 162

# Rural Peak Hour Signal Warrant
# Intersection Does Not Meet Signal Warrant

Scenario: AM 2010+Project
Intersection #: 2



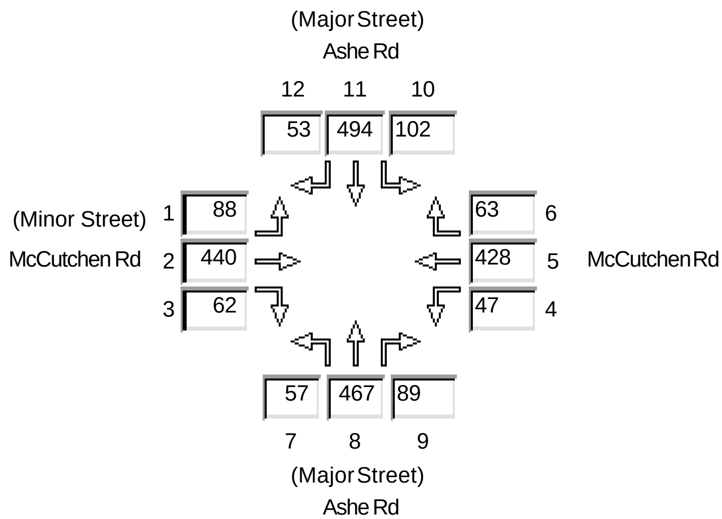

Major Total: 360

Minor High Volume: 164

# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2030

Intersection #: 2



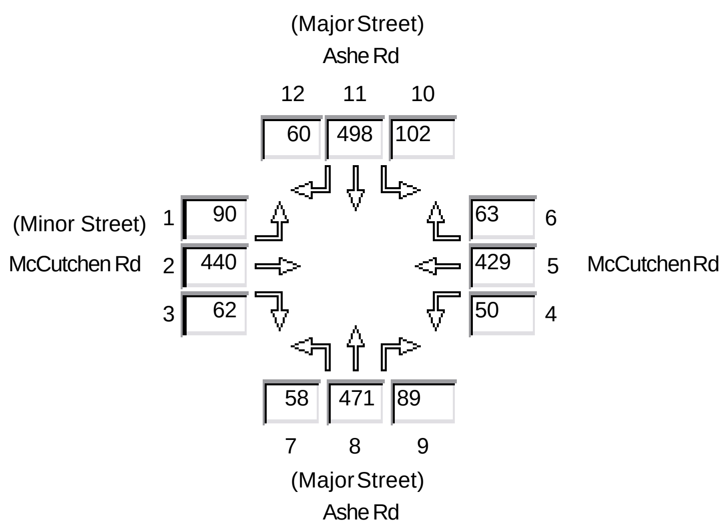

Major Total: 1262

Minor High Volume: 590

# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2030+Project

Intersection #: 2




Major Total: 1278

Minor High Volume: 592

# Intersection 3
# Gosford Rd & Taft Hwy

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | | 0.97 | | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | | | 0.98 | |
| Satd. Flow (prot) | 1630 | 1855 | | 1630 | 1820 | | | 1796 | | | 1748 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.94 | | | 0.86 | |
| Satd. Flow (perm) | 1630 | 1855 | | 1630 | 1820 | | | 1707 | | | 1534 | |
| Volume (vph) | 34 | 229 | 6 | 14 | 250 | 45 | 13 | 48 | 16 | 85 | 63 | 70 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 37 | 249 | 7 | 15 | 272 | 49 | 14 | 52 | 17 | 92 | 68 | 76 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 10 | 0 | 0 | 18 | 0 |
| Lane Group Flow (vph) | 37 | 255 | 0 | 15 | 313 | 0 | 0 | 73 | 0 | 0 | 218 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 2.1 | 11.6 | | 0.9 | 10.4 | | | 14.7 | | | 14.7 | |
| Effective Green, g (s) | 2.1 | 11.6 | | 0.9 | 10.4 | | | 14.7 | | | 14.7 | |
| Actuated g/C Ratio | 0.05 | 0.30 | | 0.02 | 0.27 | | | 0.37 | | | 0.37 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 87 | 549 | | 37 | 483 | | | 640 | | | 575 | |
| v/s Ratio Prot | c0.02 | 0.14 | | 0.01 | c0.17 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.04 | | | c0.14 | |
| v/c Ratio | 0.43 | 0.46 | | 0.41 | 0.65 | | | 0.11 | | | 0.38 | |
| Uniform Delay, d1 | 18.0 | 11.3 | | 18.9 | 12.8 | | | 8.0 | | | 8.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 3.3 | 0.6 | | 7.1 | 3.0 | | | 0.1 | | | 0.4 | |
| Delay (s) | 21.3 | 11.9 | | 26.0 | 15.8 | | | 8.1 | | | 9.3 | |
| Level of Service | C | B | | C | B | | | A | | | A | |
| Approach Delay (s) | | 13.1 | | | 16.2 | | | 8.1 | | | 9.3 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.8 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.49 | | |
| Actuated Cycle Length (s) | 39.2 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 48.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | | 0.97 | | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | | | 0.98 | |
| Satd. Flow (prot) | 1630 | 1855 | | 1630 | 1819 | | | 1794 | | | 1752 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.93 | | | 0.86 | |
| Satd. Flow (perm) | 1630 | 1855 | | 1630 | 1819 | | | 1690 | | | 1529 | |
| Volume (vph) | 41 | 275 | 8 | 17 | 285 | 53 | 17 | 61 | 21 | 96 | 85 | 82 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 45 | 299 | 9 | 18 | 310 | 58 | 18 | 66 | 23 | 104 | 92 | 89 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 18 | 0 |
| Lane Group Flow (vph) | 45 | 307 | 0 | 18 | 359 | 0 | 0 | 97 | 0 | 0 | 267 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 2.2 | 13.0 | | 0.9 | 11.7 | | | 16.3 | | | 16.3 | |
| Effective Green, g (s) | 2.2 | 13.0 | | 0.9 | 11.7 | | | 16.3 | | | 16.3 | |
| Actuated g/C Ratio | 0.05 | 0.31 | | 0.02 | 0.28 | | | 0.39 | | | 0.39 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 85 | 571 | | 35 | 504 | | | 653 | | | 591 | |
| v/s Ratio Prot | c0.03 | 0.17 | | 0.01 | c0.20 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.06 | | | c0.17 | |
| v/c Ratio | 0.53 | 0.54 | | 0.51 | 0.71 | | | 0.15 | | | 0.45 | |
| Uniform Delay, d1 | 19.5 | 12.1 | | 20.4 | 13.7 | | | 8.4 | | | 9.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 5.8 | 1.0 | | 12.2 | 4.7 | | | 0.1 | | | 0.6 | |
| Delay (s) | 25.3 | 13.1 | | 32.6 | 18.5 | | | 8.5 | | | 10.2 | |
| Level of Service | C | B | | C | B | | | A | | | B | |
| Approach Delay (s) | | 14.6 | | | 19.1 | | | 8.5 | | | 10.2 | |
| Approach LOS | | B | | | B | | | A | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 14.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 42.2 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 53.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | | 0.97 | | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | | | 0.98 | |
| Satd. Flow (prot) | 1630 | 1855 | | 1630 | 1819 | | | 1793 | | | 1752 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.94 | | | 0.86 | |
| Satd. Flow (perm) | 1630 | 1855 | | 1630 | 1819 | | | 1691 | | | 1528 | |
| Volume (vph) | 42 | 275 | 8 | 18 | 285 | 53 | 17 | 62 | 22 | 96 | 85 | 83 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 46 | 299 | 9 | 20 | 310 | 58 | 18 | 67 | 24 | 104 | 92 | 90 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 11 | 0 | 0 | 18 | 0 |
| Lane Group Flow (vph) | 46 | 307 | 0 | 20 | 359 | 0 | 0 | 98 | 0 | 0 | 268 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 2.2 | 13.0 | | 0.9 | 11.7 | | | 16.3 | | | 16.3 | |
| Effective Green, g (s) | 2.2 | 13.0 | | 0.9 | 11.7 | | | 16.3 | | | 16.3 | |
| Actuated g/C Ratio | 0.05 | 0.31 | | 0.02 | 0.28 | | | 0.39 | | | 0.39 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 85 | 571 | | 35 | 504 | | | 653 | | | 590 | |
| v/s Ratio Prot | c0.03 | 0.17 | | 0.01 | c0.20 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.06 | | | c0.18 | |
| v/c Ratio | 0.54 | 0.54 | | 0.57 | 0.71 | | | 0.15 | | | 0.45 | |
| Uniform Delay, d1 | 19.5 | 12.1 | | 20.5 | 13.7 | | | 8.4 | | | 9.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 6.9 | 1.0 | | 20.6 | 4.7 | | | 0.1 | | | 0.6 | |
| Delay (s) | 26.4 | 13.1 | | 41.0 | 18.5 | | | 8.5 | | | 10.2 | |
| Level of Service | C | B | | D | B | | | A | | | B | |
| Approach Delay (s) | | 14.8 | | | 19.6 | | | 8.5 | | | 10.2 | |
| Approach LOS | | B | | | B | | | A | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 14.7 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.56 | | |
| Actuated Cycle Length (s) | 42.2 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 53.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | | 0.97 | | | 0.97 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | | | 0.99 | |
| Satd. Flow (prot) | 1630 | 1846 | | 1630 | 1812 | | | 1789 | | | 1779 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.78 | | | 0.76 | |
| Satd. Flow (perm) | 1630 | 1846 | | 1630 | 1812 | | | 1401 | | | 1364 | |
| Volume (vph) | 98 | 689 | 43 | 52 | 544 | 120 | 60 | 204 | 80 | 172 | 378 | 182 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 107 | 749 | 47 | 57 | 591 | 130 | 65 | 222 | 87 | 187 | 411 | 198 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 11 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 107 | 794 | 0 | 57 | 713 | 0 | 0 | 363 | 0 | 0 | 783 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 5.0 | 36.6 | | 3.2 | 34.8 | | | 43.0 | | | 43.0 | |
| Effective Green, g (s) | 5.0 | 36.6 | | 3.2 | 34.8 | | | 43.0 | | | 43.0 | |
| Actuated g/C Ratio | 0.05 | 0.39 | | 0.03 | 0.37 | | | 0.45 | | | 0.45 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 86 | 713 | | 55 | 665 | | | 635 | | | 619 | |
| v/s Ratio Prot | c0.07 | c0.43 | | 0.03 | 0.39 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.26 | | | c0.57 | |
| v/c Ratio | 1.24 | 1.11 | | 1.04 | 1.07 | | | 0.57 | | | 1.27 | |
| Uniform Delay, d1 | 44.9 | 29.1 | | 45.8 | 30.0 | | | 19.1 | | | 25.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 176.3 | 69.1 | | 132.0 | 55.7 | | | 1.2 | | | 132.1 | |
| Delay (s) | 221.2 | 98.2 | | 177.8 | 85.7 | | | 20.3 | | | 158.0 | |
| Level of Service | F | F | | F | F | | | C | | | F | |
| Approach Delay (s) | | 112.8 | | | 92.5 | | | 20.3 | | | 158.0 | |
| Approach LOS | | F | | | F | | | C | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 107.7 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.16 | | |
| Actuated Cycle Length (s) | 94.8 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 112.8% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | | 0.97 | | | 0.97 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | | | 0.99 | |
| Satd. Flow (prot) | 1630 | 1846 | | 1630 | 1812 | | | 1788 | | | 1779 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.78 | | | 0.76 | |
| Satd. Flow (perm) | 1630 | 1846 | | 1630 | 1812 | | | 1404 | | | 1365 | |
| Volume (vph) | 99 | 689 | 43 | 53 | 544 | 120 | 60 | 205 | 81 | 172 | 378 | 183 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 108 | 749 | 47 | 58 | 591 | 130 | 65 | 223 | 88 | 187 | 411 | 199 |
| RTOR Reduction (vph) | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 12 | 0 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 108 | 794 | 0 | 58 | 713 | 0 | 0 | 364 | 0 | 0 | 784 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 5.0 | 35.6 | | 3.2 | 33.8 | | | 42.0 | | | 42.0 | |
| Effective Green, g (s) | 5.0 | 35.6 | | 3.2 | 33.8 | | | 42.0 | | | 42.0 | |
| Actuated g/C Ratio | 0.05 | 0.38 | | 0.03 | 0.36 | | | 0.45 | | | 0.45 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 88 | 708 | | 56 | 660 | | | 635 | | | 618 | |
| v/s Ratio Prot | c0.07 | c0.43 | | 0.04 | 0.39 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.26 | | | c0.57 | |
| v/c Ratio | 1.23 | 1.12 | | 1.04 | 1.08 | | | 0.57 | | | 1.27 | |
| Uniform Delay, d1 | 43.9 | 28.6 | | 44.8 | 29.5 | | | 18.8 | | | 25.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 169.1 | 72.1 | | 130.7 | 58.6 | | | 1.3 | | | 133.2 | |
| Delay (s) | 213.0 | 100.7 | | 175.5 | 88.1 | | | 20.0 | | | 158.6 | |
| Level of Service | F | F | | F | F | | | C | | | F | |
| Approach Delay (s) | | 114.1 | | | 94.6 | | | 20.0 | | | 158.6 | |
| Approach LOS | | F | | | F | | | C | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 108.8 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.17 | | |
| Actuated Cycle Length (s) | 92.8 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 113.0% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.96 | | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1846 | | 1630 | 1863 | 1458 | 1630 | 1784 | | 1630 | 1772 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.12 | 1.00 | | 0.42 | 1.00 | |
| Satd. Flow (perm) | 1630 | 1846 | | 1630 | 1863 | 1458 | 212 | 1784 | | 723 | 1772 | |
| Volume (vph) | 99 | 689 | 43 | 53 | 544 | 120 | 60 | 205 | 81 | 172 | 378 | 183 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 108 | 749 | 47 | 58 | 591 | 130 | 65 | 223 | 88 | 187 | 411 | 199 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 74 | 0 | 16 | 0 | 0 | 19 | 0 |
| Lane Group Flow (vph) | 108 | 793 | 0 | 58 | 591 | 56 | 65 | 295 | 0 | 187 | 591 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | | 6 | | |
| Actuated Green, G (s) | 7.9 | 43.7 | | 4.0 | 39.8 | 39.8 | 32.3 | 32.3 | | 32.3 | 32.3 | |
| Effective Green, g (s) | 7.9 | 43.7 | | 4.0 | 39.8 | 39.8 | 32.3 | 32.3 | | 32.3 | 32.3 | |
| Actuated g/C Ratio | 0.09 | 0.48 | | 0.04 | 0.43 | 0.43 | 0.35 | 0.35 | | 0.35 | 0.35 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 140 | 877 | | 71 | 806 | 631 | 74 | 626 | | 254 | 622 | |
| v/s Ratio Prot | c0.07 | c0.43 | | 0.04 | 0.32 | | | 0.17 | | | c0.33 | |
| v/s Ratio Perm | | | | | | 0.04 | 0.31 | | | 0.26 | | |
| v/c Ratio | 0.77 | 0.90 | | 0.82 | 0.73 | 0.09 | 0.88 | 0.47 | | 0.74 | 0.95 | |
| Uniform Delay, d1 | 41.2 | 22.2 | | 43.6 | 21.7 | 15.4 | 28.0 | 23.2 | | 26.1 | 29.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.40 | 0.54 | 0.04 | 1.00 | 1.00 | | 0.29 | 0.33 | |
| Incremental Delay, d2 | 22.7 | 14.5 | | 45.5 | 5.3 | 0.3 | 64.1 | 0.6 | | 9.0 | 21.3 | |
| Delay (s) | 63.8 | 36.8 | | 106.4 | 16.9 | 0.9 | 92.1 | 23.8 | | 16.5 | 30.9 | |
| Level of Service | E | D | | F | B | A | F | C | | B | C | |
| Approach Delay (s) | | 40.0 | | | 20.9 | | | 35.6 | | | 27.6 | |
| Approach LOS | | D | | | C | | | D | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 30.7 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.93 | | |
| Actuated Cycle Length (s) | 92.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 90.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

# Intersection 4
# Ashe Rd & Taft Hwy

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 11 | 374 | 3 | 9 | 315 | 37 | 1 | 30 | 13 | 75 | 31 | 19 |
| 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 |
| Hourly flow rate (vph) | 12 | 407 | 3 | 10 | 342 | 40 | 1 | 33 | 14 | 82 | 34 | 21 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 383 | | | 410 | | | 852 | 834 | 408 | 845 | 816 | 362 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 383 | | | 410 | | | 852 | 834 | 408 | 845 | 816 | 362 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 99 | | | 100 | 89 | 98 | 67 | 89 | 97 |
| cM capacity (veh/h) | 1176 | | | 1149 | | | 245 | 298 | 643 | 250 | 306 | 682 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 422 | 392 | 48 | 136 |
| Volume Left | 12 | 10 | 1 | 82 |
| Volume Right | 3 | 40 | 14 | 21 |
| cSH | 1176 | 1149 | 352 | 291 |
| Volume to Capacity | 0.01 | 0.01 | 0.14 | 0.47 |
| Queue Length 95th (ft) | 1 | 1 | 12 | 59 |
| Control Delay (s) | 0.3 | 0.3 | 16.8 | 27.7 |
| Lane LOS | A | A | C | D |
| Approach Delay (s) | 0.3 | 0.3 | 16.8 | 27.7 |
| Approach LOS | | | C | D |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.8 | | |
| Intersection Capacity Utilization | 45.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 15 | 420 | 5 | 12 | 348 | 47 | 2 | 45 | 17 | 84 | 42 | 22 |
| 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 |
| Hourly flow rate (vph) | 16 | 457 | 5 | 13 | 378 | 51 | 2 | 49 | 18 | 91 | 46 | 24 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 429 | | | 462 | | | 968 | 947 | 459 | 965 | 924 | 404 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 429 | | | 462 | | | 968 | 947 | 459 | 965 | 924 | 404 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 99 | | | 99 | 81 | 97 | 52 | 83 | 96 |
| cM capacity (veh/h) | 1130 | | | 1099 | | | 191 | 254 | 602 | 190 | 262 | 647 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 478 | 442 | 70 | 161 |
| Volume Left | 16 | 13 | 2 | 91 |
| Volume Right | 5 | 51 | 18 | 24 |
| cSH | 1130 | 1099 | 297 | 233 |
| Volume to Capacity | 0.01 | 0.01 | 0.23 | 0.69 |
| Queue Length 95th (ft) | 1 | 1 | 22 | 112 |
| Control Delay (s) | 0.4 | 0.4 | 20.8 | 49.3 |
| Lane LOS | A | A | C | E |
| Approach Delay (s) | 0.4 | 0.4 | 20.8 | 49.3 |
| Approach LOS | | | C | E |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 8.5 | | |
| Intersection Capacity Utilization | 50.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ✣ | | | ✣ | | | ✣ | | | ✣ | |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 16 | 420 | 5 | 12 | 348 | 51 | 2 | 46 | 17 | 85 | 42 | 23 |
| 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 |
| Hourly flow rate (vph) | 17 | 457 | 5 | 13 | 378 | 55 | 2 | 50 | 18 | 92 | 46 | 25 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 434 | | | 462 | | | 974 | 954 | 459 | 970 | 929 | 406 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 434 | | | 462 | | | 974 | 954 | 459 | 970 | 929 | 406 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 98 | | | 99 | | | 99 | 80 | 97 | 51 | 82 | 96 |
| cM capacity (veh/h) | 1126 | | | 1099 | | | 188 | 252 | 602 | 187 | 260 | 645 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 479 | 447 | 71 | 163 |
| Volume Left | 17 | 13 | 2 | 92 |
| Volume Right | 5 | 55 | 18 | 25 |
| cSH | 1126 | 1099 | 293 | 230 |
| Volume to Capacity | 0.02 | 0.01 | 0.24 | 0.71 |
| Queue Length 95th (ft) | 1 | 1 | 23 | 117 |
| Control Delay (s) | 0.5 | 0.4 | 21.1 | 51.3 |
| Lane LOS | A | A | C | F |
| Approach Delay (s) | 0.5 | 0.4 | 21.1 | 51.3 |
| Approach LOS | | | C | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 8.8 | | |
| Intersection Capacity Utilization | 51.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | 1.00 | 0.96 | | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1860 | | 1630 | 1827 | | 1630 | 1789 | | 1630 | 1764 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1630 | 1860 | | 1630 | 1827 | | 1630 | 1789 | | 1630 | 1764 | |
| Volume (vph) | 16 | 420 | 5 | 12 | 348 | 51 | 2 | 46 | 17 | 85 | 42 | 23 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 17 | 457 | 5 | 13 | 378 | 55 | 2 | 50 | 18 | 92 | 46 | 25 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 7 | 0 | 0 | 12 | 0 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 17 | 461 | 0 | 13 | 426 | 0 | 2 | 56 | 0 | 92 | 57 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 3.5 | 32.0 | | 1.5 | 30.0 | | 1.2 | 31.7 | | 8.8 | 39.3 | |
| Effective Green, g (s) | 3.5 | 32.0 | | 1.5 | 30.0 | | 1.2 | 31.7 | | 8.8 | 39.3 | |
| Actuated g/C Ratio | 0.04 | 0.36 | | 0.02 | 0.33 | | 0.01 | 0.35 | | 0.10 | 0.44 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 63 | 661 | | 27 | 609 | | 22 | 630 | | 159 | 770 | |
| v/s Ratio Prot | 0.01 | c0.25 | | 0.01 | c0.23 | | 0.00 | c0.03 | | c0.06 | 0.03 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.27 | 0.70 | | 0.48 | 0.70 | | 0.09 | 0.09 | | 0.58 | 0.07 | |
| Uniform Delay, d1 | 42.0 | 24.9 | | 43.9 | 26.1 | | 43.9 | 19.5 | | 38.8 | 14.8 | |
| Progression Factor | 0.69 | 0.70 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 3.1 | | 12.9 | 3.6 | | 1.8 | 0.3 | | 5.0 | 0.2 | |
| Delay (s) | 31.4 | 20.4 | | 56.8 | 29.7 | | 45.7 | 19.8 | | 43.9 | 14.9 | |
| Level of Service | C | C | | E | C | | D | B | | D | B | |
| Approach Delay (s) | | 20.8 | | | 30.5 | | | 20.5 | | | 31.3 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 26.0 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.42 | | |
| Actuated Cycle Length (s) | 90.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 40.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 82 | 754 | 66 | 53 | 576 | 146 | 39 | 320 | 60 | 143 | 205 | 43 |
| 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 |
| Hourly flow rate (vph) | 89 | 820 | 72 | 58 | 626 | 159 | 42 | 348 | 65 | 155 | 223 | 47 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 785 | | | 891 | | | 2012 | 1934 | 855 | 2093 | 1890 | 705 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 785 | | | 891 | | | 2012 | 1934 | 855 | 2093 | 1890 | 705 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 89 | | | 92 | | | 0 | 0 | 82 | 0 | 0 | 89 |
| cM capacity (veh/h) | 834 | | | 761 | | | 0 | 54 | 358 | 0 | 58 | 436 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 980 | 842 | 455 | 425 |
| Volume Left | 89 | 58 | 42 | 155 |
| Volume Right | 72 | 159 | 65 | 47 |
| cSH | 834 | 761 | 0 | 0 |
| Volume to Capacity | 0.11 | 0.08 | Err | Err |
| Queue Length 95th (ft) | 9 | 6 | Err | Err |
| Control Delay (s) | 2.9 | 2.0 | Err | Err |
| Lane LOS | A | A | F | F |
| Approach Delay (s) | 2.9 | 2.0 | Err | Err |
| Approach LOS | | | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 121.7% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 83 | 754 | 66 | 53 | 576 | 150 | 39 | 321 | 60 | 144 | 205 | 44 |
| 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 |
| Hourly flow rate (vph) | 90 | 820 | 72 | 58 | 626 | 163 | 42 | 349 | 65 | 157 | 223 | 48 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 789 | | | 891 | | | 2018 | 1940 | 855 | 2098 | 1895 | 708 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 789 | | | 891 | | | 2018 | 1940 | 855 | 2098 | 1895 | 708 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 89 | | | 92 | | | 0 | 0 | 82 | 0 | 0 | 89 |
| cM capacity (veh/h) | 831 | | | 761 | | | 0 | 54 | 358 | 0 | 57 | 435 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 982 | 847 | 457 | 427 |
| Volume Left | 90 | 58 | 42 | 157 |
| Volume Right | 72 | 163 | 65 | 48 |
| cSH | 831 | 761 | 0 | 0 |
| Volume to Capacity | 0.11 | 0.08 | Err | Err |
| Queue Length 95th (ft) | 9 | 6 | Err | Err |
| Control Delay (s) | 3.0 | 2.0 | Err | Err |
| Lane LOS | A | A | F | F |
| Approach Delay (s) | 3.0 | 2.0 | Err | Err |
| Approach LOS | | | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 122.2% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

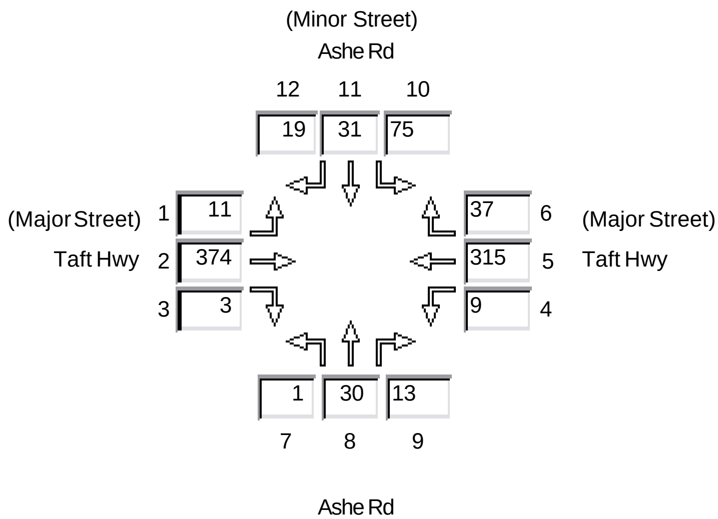
c Critical Lane Group

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 | 1750 | 1900 | 1750 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.97 | | 1.00 | 0.98 | | 1.00 | 0.97 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 3496 | | 1630 | 3430 | | 1630 | 1819 | | 1630 | 1813 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1630 | 3496 | | 1630 | 3430 | | 1630 | 1819 | | 1630 | 1813 | |
| Volume (vph) | 83 | 754 | 66 | 53 | 576 | 150 | 39 | 321 | 60 | 144 | 205 | 44 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 90 | 820 | 72 | 58 | 626 | 163 | 42 | 349 | 65 | 157 | 223 | 48 |
| RTOR Reduction (vph) | 0 | 7 | 0 | 0 | 26 | 0 | 0 | 7 | 0 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 90 | 885 | 0 | 58 | 763 | 0 | 42 | 407 | 0 | 157 | 263 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 6.0 | 38.8 | | 5.6 | 38.4 | | 3.6 | 21.0 | | 10.6 | 28.0 | |
| Effective Green, g (s) | 6.0 | 38.8 | | 5.6 | 38.4 | | 3.6 | 21.0 | | 10.6 | 28.0 | |
| Actuated g/C Ratio | 0.07 | 0.42 | | 0.06 | 0.42 | | 0.04 | 0.23 | | 0.12 | 0.30 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 106 | 1474 | | 99 | 1432 | | 64 | 415 | | 188 | 552 | |
| v/s Ratio Prot | c0.06 | c0.25 | | 0.04 | c0.22 | | 0.03 | c0.22 | | c0.10 | 0.15 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.85 | 0.60 | | 0.59 | 0.53 | | 0.66 | 0.98 | | 0.84 | 0.48 | |
| Uniform Delay, d1 | 42.6 | 20.6 | | 42.1 | 20.1 | | 43.6 | 35.3 | | 39.8 | 26.0 | |
| Progression Factor | 0.85 | 1.30 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.47 | 0.27 | |
| Incremental Delay, d2 | 27.2 | 1.0 | | 8.6 | 1.4 | | 21.7 | 39.0 | | 22.3 | 0.5 | |
| Delay (s) | 63.5 | 27.8 | | 50.6 | 21.5 | | 65.3 | 74.3 | | 41.0 | 7.7 | |
| Level of Service | E | C | | D | C | | E | E | | D | A | |
| Approach Delay (s) | | 31.1 | | | 23.5 | | | 73.4 | | | 19.9 | |
| Approach LOS | | C | | | C | | | E | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 34.1 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 92.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 68.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

# Rural Peak Hour Signal Warrant
# Intersection Does Not Meet Signal Warrant

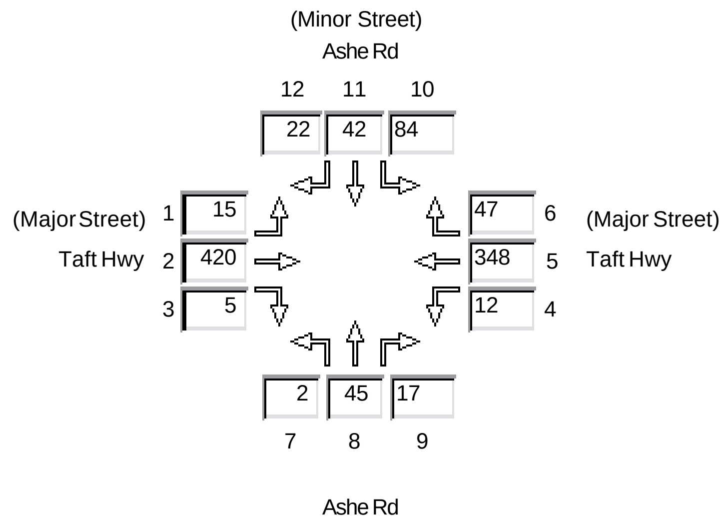
Scenario: AM 2006
Intersection #: 4




Major Total: 749
Minor High Volume: 125

# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2010
Intersection #: 4



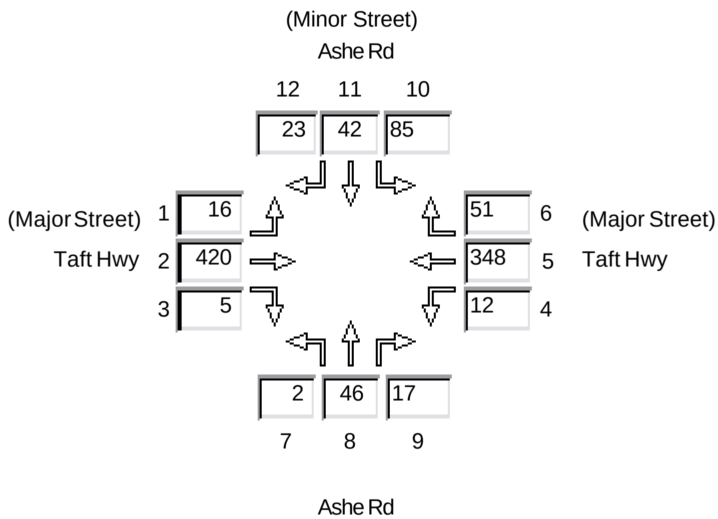

Major Total: 847

Minor High Volume: 148

# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2010+Project

Intersection #: 4

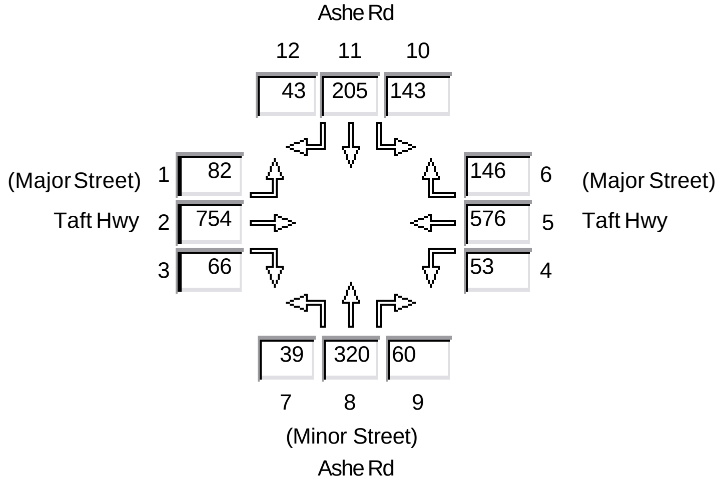



Major Total: 852

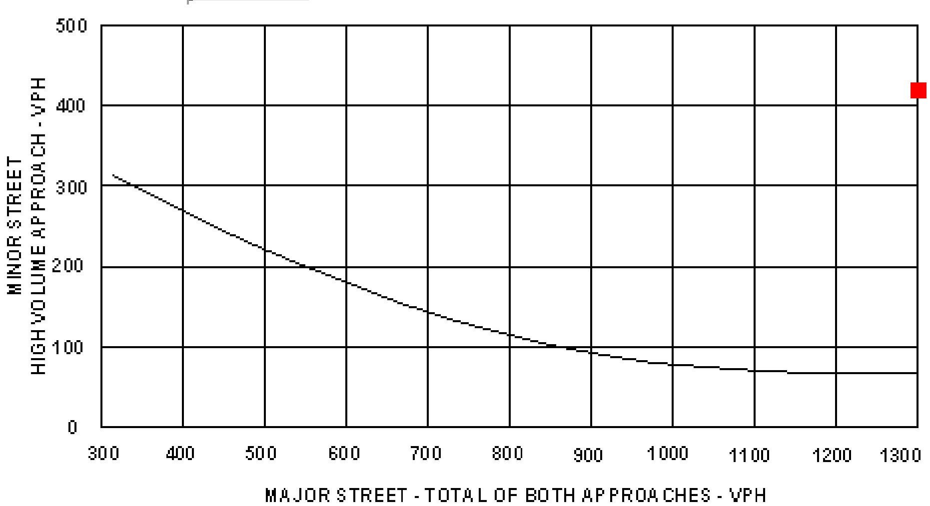
Minor High Volume: 150

# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2030
Intersection #: 4

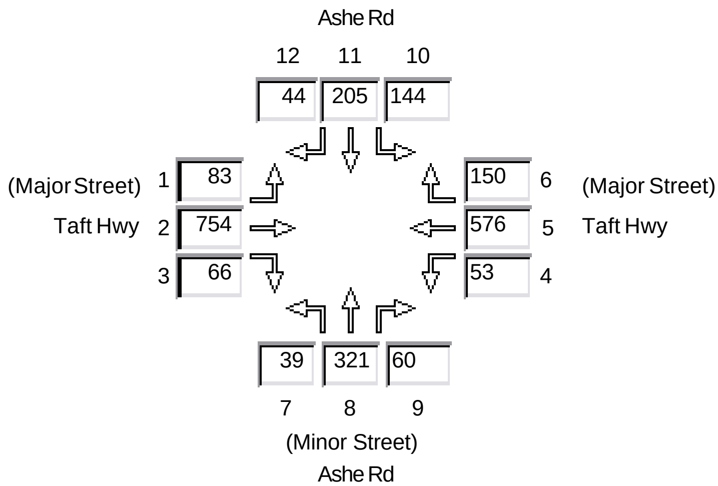



Major Total: 1677
Minor High Volume: 419



# Rural Peak Hour Signal Warrant
# Intersection Meets Signal Warrant

Scenario: AM 2030+Project
Intersection #: 4




Major Total: 1682
Minor High Volume: 420

# 15.8 GOALS AND POLICY ANALYSIS

# 15.8 Goals and Policy Analysis
## Metropolitan Bakersfield General Plan

| Land Use Element | | |
|---|---|---|
| **No.** | **Goal/Policy** | **Analysis** |
| **G2** | "Accommodate new development which provides a full mix of uses to support its population." | The project will provide the needed utility services for developments that provide a full mix of uses. |
| **G3** | "Accommodate new development which is compatible with and complements existing land uses." | The proposed project is consistent with its CUP (# 05-0669) and will be consistent with its new CUP per the most recent application. Therefore, it will be consistent with zoning and land use designations on the project site. |
| **G4** | "Accommodate new development which channels land uses in a phased, orderly manner and is coordinated with the provision of infrastructure and public improvements." | The proposed project will provide the necessary infrastructure to accommodate orderly development in western Bakersfield. |
| **G5** | "Accommodate new development which capitalizes on the planning area's natural environmental setting, including the Kern River and foothills." | The subject project is currently a wastewater treatment plant. It is surrounded by approved residential development and is not located near any identified City or County natural settings of importance, although, the project will provide the needed infrastructure to support development along the Kern River in western Bakersfield that may capitalize on its location. |
| **G6** | "Accommodate new development that is sensitive to the natural environment, and accounts for environmental hazards." | The proposed project has incorporated design features that help the project limit environmental impacts and has mitigated all environmental impacts still created by the proposed project in order that the project remains sensitive to its natural environment and accounts for any natural hazards that may impact the project. |
| **G7** | "Establish a built environment which achieves a compatible functional and visual relationship among individual buildings and sites." | The proposed project has incorporated several measures to help alleviate any visual impacts associated with the project and future development on surrounding properties in order to facilitate a balance between the needed functionality of the treatment plant with the visual quality of the surrounding proposed development. |
| **G8** | "Target growth companies that meet clean air requirements, and create sustainable employment in jobs paying higher wages." | The subject project will help provide the needed infrastructure to attract these growth companies. |
| **P3** | "Ensure that residential uses are located in proximity to commercial services, employment centers, public services, transportation routes, and recreational and cultural resources." | The subject project is surrounded by City approved residential development, therefore, the project locates needed public services near residential users. |

G=Goal
P= Policy

| No. | Goal/Policy | Analysis |
|---|---|---|
| **P35** | "Encourage upgrading of visual character of heavy manufacturing industrial areas through the use of landscaping or screening of visually unattractive buildings and storage areas." | The subject project will provide landscaping and/or berms on all perimeters of the project to visually screen the surrounding proposed developments in order to upgrade and maintain the visual character of the surrounding land uses. |
| **P36** | "Require that industrial uses provide design features, such as screen walls, landscaping and height, setback and lighting restrictions between the boundaries of adjacent residential land use designations so as to reduce impacts to residences due to light, noise, sound and vibration." | The subject project will provide landscaping and or berms on all perimeters of the project to visually screen the surrounding proposed residential developments in order to upgrade and maintain the visual character of the surrounding neighborhoods. Further, the project will include shielded lighting in compliance with all City requirements. |
| **P38** | "Minimize impacts of industrial traffic on adjacent residential parcels through the use of site plan review and improvement standards." | The project will meet all City standards in regards to project related traffic by the completion of street improvements along the proposed projects frontage as well as by planned on-site truck circulation. |
| **P44** | "Provide for the establishment of the following new centers as the focus of development in the planning area: a) Southwest b) Northwest c) Northeast." | The subject project will provide the needed infrastructure improvements to develop a Southwest Bakersfield center. |
| **P52** | "Locate new development where infrastructure is available or can be expanded to serve the proposed development." | The project is the expansion and upgrade of the wastewater treatment plant in order to provide service to new development in west Bakersfield. |
| **P53** | "Ensure that land use and infrastructure development are coordinated." | This project is in response to approved and proposed development in the project area. |
| **P55** | "Provide for the mitigation of signficant noise impacts on adjacent sensitive uses from transportation corridor improvements." | The project will adhere to all City noise standards, as well as implement baffling and other measures to mitigate any noise impacts above City noise standards. |
| **P75** | "Provide adequate land area for the expansion of existing uses and development of new uses consistent with the policies of the general plan." | Please refer to G1, G2, G3, & G4 |
| **P78** | "Accommodate new projects which are infill or expansion of existing urban development." | The current project is already within the City limits and will make maximum use of the site it is on, which is currently vacant land. This "infill" is a needed extension which will help promote orderly expansion of existing urban development in western Bakersfield. |
| **P79** | "Provide for an orderly outward expansion of new urban development (any commercial, industrial, and residential development having a density greater than one unit per acre) so that it maintains continuity of existing devlepment, allows for the incremental expansion of infrastructure and public services, minimises impacts on natural environment resources and povides a high quality environment for living and business." | Please refer to G3, G4, G6, P52, P75, & P78. |

| No. | Goal/Policy | Analysis |
|---|---|---|
| **Circulation Element-Streets** | | |
| **G3** | "Minimize the impact of truck traffic on circulation, and on noise sensitive land uses." | The proposed project is including internal circulation plans to help minimize loading on adjacent street system. Further, the project will participate in the RTIF program to help ameliorate any impacts from truck traffic associated with the proposed project. Moreover, the project will be voluntarily improving portions of Ashe, McCutchen, and Gosford Roads in order help alleviate traffic circulation problems which may be caused by traffic associated with the proposed project. |
| **P3** | "Provide additional right-of-way and pavement width to accommodate turn lanes at intersections." | The proposed project is improving portions of Ashe, McCutchen, and Gosford Roads which may include turn lanes to help facilitate orderly traffic patterns at intersections in the project area. |
| **P4** | "Provide additional right-of-way and pavement width at other locations for turn lanes, bus lanes, etc., as needed, based on engineering study." | See G3 and P3 above. |
| **P6** | "Design and locate site access driveways to minimize traffic disruption where possible considering items such topography, past parcelization and other factors." | The proposed project has carefully sited all entrances and exits for both truck and employee traffic associated with the project in accordance with all City of Bakersfield requirements as well as in consultation with the City Traffic Engineering Department. |
| **P17** | "Require buildings expected to be serviced by delivery trucks to provide off-street facilities for access and parking." | The proposed project has created an internal circulation distribution system which will contain off-street facilities for access and parking of various types of faciltity related traffic to avoid stacking of trucks on the public streets. |
| **P19** | "Provide and maintain landscaping on both sides of collector streets. In unincorporated areas, landscaping within road right-of-way may be allowed and shall be limited to low shrubs." | Please refer to P35 in the Land Use Element Section. |
| **P35** | "Require new development and expansion of existing development in incorporated areas to fully provide for on-site transporation facilities including streets, curbs, traffic control devices, etc. Within unicorporated areas street improvement will be determined by County Ordinance." | Please see G3 and P3 above. |
| **P36** | "Prevent streets and intersections from degrading below Level of Service "C" where possible due to physical constraints (as defined in a Level of Service Ordinance) or when the existing Level of Service is below "C" prevent where possible further degradation due to new development with a three part mitigation program: adjacent right-of-way dedication, access improvements and/or on area - wide impact fee. The area-wide impact fee would | As indicated in the Traffic Impact Study completed by Ruettger's and Schuler for the proposed project, project related traffic will not result in Levels of Service below "C". Futher, the proposed project will pay RTIF fees as well as voluntarily improving portions of Ashe, McCutchen, and Gosford Roads in order to alleviate traffic issues in the project area. |

| No. | Goal/Policy | Analysis |
|---|---|---|
| | be used where the physical changes for mitigation are not possible due to existing development and/or the mitigation measure is part of a larger project, such as freeways, which will be built at a later date." | |
| **P37** | "Require new development and expansion of existing development to pay for necessary access improvement, such as street extensions, widenings, turn lanes, signals, etc., as identified in the transportation impact report as may be required for a project." | Please see G3, P3, and P36, above. |
| **P39** | "Require new development and expansion of existing development to pay or participate in it's pro rata share of the costs of expansion in area-wide transportation facilities and services which it necessitates." | The project will pay its pro rata share of the costs to expand transportation services by participating in the RTIF program. |
| **Circulation Element-Transit** | | |
| **P4** | "Coordinate with GET and Kern Transit to locate bus stops as close as possible to the facilities they serve." | The project will pay transportation impact fees which in part are used to support mass transit (acquisition of buses for GET). The proposed project would not involve any change in the location of bus routes, stops, or other facilities used for alternative transit. |
| **Circulation Element-Bikeways** | | |
| **P11** | "Construct bike lanes in conjunction with all street improvement projects that coincide with the Bikeway Master Plan." | The Project will be subject to the *Bakersfield Municipal Code* requirements and the City's Bikeway Plan contained in the *Metropolitan Bakersfield General Plan* Circulation Element. |
| **Circulation Element-Parking** | | |
| **G2** | "Satisfy parking requirements in all new development through off-street facilities." | The project will be subject to all City parking requirements as set forth in the MBGP and the City of Bakersfield Municipal Code. |
| **P3** | "Ensure that adequate on-site parking supply and parking lot circulation is provided on all site plans in accordance with the adopted parking standards." | See G2, above. |
| **Conservation Element- Biological Resources** | | |
| **G1** | "Conserve and enhance Bakersfield's biological resources in a manner which facilitates orderly development and reflects the sensitivities and constraints of these resources." | The project is subject to the Metropolitan Bakersfield Habitat Conservation Plan which endeavors to protect special biological resources in the Greater Bakersfield area. |
| **Conservation Element- Mineral Resources** | | |
| **G1** | "Protect areas of significant resource potential for future use." | The project site is not located within a designated oil field, within an area used for sand & gravel mining, nor is it designated with a land use of Resource- Mineral Petroleum. The project will not impact mineral resources. |
| **G3** | "Avoid conflicts beetween the productive use of | See G1, above. |

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| | mineral and energy resource land and urban growth.” | |
| **Conservation Element- Soils and Agriculture** | | |
| **G1** | “Provide for the planned management, conservation, and wise utilization of agricultural land in the planning area.” | The site is currently a wastewater treatment plant. It’s expansion is in response to a developing west Bakersfield and an attempt to logically guide and support contigous orderly development patterns, so that agricultural lands are not prematurely taken out of their current production. |
| **P6** | “Continue implementing land grading ordinances that reduce soil erosion/siltation commonly associated with land development.” | Project grading will be conducted in accordance with applicable local grading ordinance, standards, and practices to minimize soil erosion and siltation. |
| **P7** | “Land use patterns, grading, and landscaping practices shall be designed to prevent soil erosion while retaining natural watercourses when possible.” | Project grading and landsaping practices will be conducted in accordance with applicable local grading ordinance, standards, and practices to minimize soil erosion and siltation. Note that there are no natural watercourses on the project area. |
| **P12** | “Prohibit premature removal of ground cover in advance of development and require measures to prevent soil erosion during and immediately after construction.” | The project will adhere to all City standards and ordinances for grading and land-clearing. |
| **P13** | “Minimize the alteration of natural drainage and require development plans to include necessary construction to stabilize runoff and silt deposition through enforcement of grading and flood protection ordinances.” | See P6, P7, & P12, above. |
| **Conservation Element- Water Resources** | | |
| **G1** | “Conserve and augment the available water resources of the planning area.” | The proposed project will require additional amounts of water to support treatment operations but will utilize tertiary treated water for either plant makeup or wash water or nearby landscaping irrigation needs. The reuse of such water will help lessen the overall need for potable water in the treatment plant processes, in turn, helping to conserve the available water resources in the planning area. |
| **G4** | “Continue cooperative planning of and implementation of programs and projects which will resolve water resource deficiencies and water quality problems.” | The project will help enhance water quality in the area due to its increased effluent quality from advanced secondary treatment over that attainable with the current secondary treatment plant facilities, therefore, helping to resolve water quality problems in the planning area. Further, the reuse of such water will help lessen the overall need for potable water in the treatment plant processes, helping to reduce impacts on water resource deficiences. |
| **P1** | “Develop and maintain facilities for groundwater | The proposed project will allow on-site |

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| | recharge in the planning area." | percolation helping to recharge shallow groundwater in the planning area in an environmentally responsible manner. |
| **P6** | "Protect planning area groundwater resources from further quality degradation." | The City of Bakersfield will install additional monitor wells to help ensure that the advanced secondary treated wastewater effluent is appropriately disposed of in accordance with all regulatory requirements. Also, contaminated soil will be removed to a depth of no less than 5 feet bgs or as will be determined in the work plan to be developed by the City of Bakersfield in coordination with the RWQCB. Further, as evaluated in the hydrogeolgical report, the excellent chemical quality of the effluent would result in minimal impacts to groundwater quality. See also G1 and G4, above. |
| **Conservation Element- Air Quality** | | |
| **G1** | "Promote air quality that is compatible with health, well being, and enjoyment of life by controlling point sources and minimizing vehicular trips to reduce air pollutants." | The proposed project will not create large volumes of traffic, and will adhere to all SJVAPCD standards and criteria as well as utilize digester gas to supply cogeneration power and process heat, and utilize effective odor controls to reduce air pollutants. |
| **G2** | Continue working toward attainment of Federal, State and Local standards as enforced by the San Joaquin Valley Air Pollution control District." | The proposed project will comply with all SJVAPCD requirements for air emimssions and, therefore, will help in the efforts to achieve air quality standards. |
| **G3** | Reduce the amount of vehicular emissions in the planning area. | The proposed project does not create a signficant number of vehicular traffic and therefore does not significantly contribute to vehicular emissions in the planning area. |
| **P1** | "Comply with and promote San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) control measures regarding Reactive Organic Gases (ROG). Such measures are focused on: (a) steam driven well vents, (b) Psuedo-cyclic wells, (c) natural gas processing plant fugitives, (d) heavy oil test stations, (e) light oil production fugitives, (f) refinery pumps and compressors, and (g) vehicle inspection and maintenance." | See G1, above. |
| **P2** | "Encourage land uses and landuse practices which do not contribute significantly to air quality degradation." | The proposed project site is currently a wastewater treatment plant which is regulated by the SJVAPCD. Control measures have been and will be implemented in order to prevent significant contribution to air quality degradation. |
| **P3** | "Require dust abatement measures during significant grading and constuction operations." | The project will comply with all SJVAPCD Rule VIII requirements for grading and construction operations. |
| **P4** | "Consider air pollution impacts when evaluating discretionary permits for land use proposals. | The project will be completing improvements for internal ciculation of truck traffic on site; |

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| | Considerations should include: (a) alternative access routes to reduce traffic congestion (b) development phasing to match road capacities (c) buffers including increased vegetation to increase emission dispersion and reduce impacts of gaseous or particulate matter on sensitive uses." | exterior road improvements to Gosford Road, McCutchen Road, and Ashe Road; accel and decel lanes as the traffic situation warrants; as well as provide exterior landscaping. |
| **P5** | "Consider the location of sensitive receptors such as schools, hospitals, and housing developments when locating industrial uses to minimize the impact of industrial sources of air pollution." | As required by the City of Bakersfield, no residences are allowed to be located within ¼ mile of the wastewater treatment plant. This will minimize the exposure of sensitive receptors to air pollution. |
| **Noise Element** | | |
| **G1** | "Ensure that residents of the Bakersfield Metropolitan Area are protected from excessive noise and existing moderate levels of noise are maintained." | The noise impacts from the project will be mitigated in order to meet City standards for allowable ambient noise levels. |
| **G2** | "Protect the citizens of the planning area from the harmful effects of exposure to excessive noise, and protect the economic base of the area by preventing the encroachment of incompatible land uses near known noise-producing roadways, industries, railroads, airports, and other sources." | See G1, above, and Conservation Element – Air Quality number P5. |
| **P1** | "Identify noise-impact areas exposed to existing or projected noise levels exceeding 65 dB CNEL (exterior) or the performance standards described in Table VII-2. The noise exposure contour maps on file at the City of Bakersfield and County of Kern indicate areas where existing and projected noise exposures exceed 65db CNEL (exterior) for the major noise sources identified." | See G1, above and Conservation Element-Air Quality number P5 |
| **P2** | "Prohibit new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into project design to reduce noise to acceptable levels." | Please See G2, above. |
| **P3** | "Review discretionary industrial, commercial or other noise-generating land use project for compatibility with nearby noise-sensitive receptors." | Please See G2, above. |
| **P4** | "Require noise level criteria applied to land uses other than residential or other noise-sensitive uses to be consistent with the recommendations of the California Office of Noise Control." | Please See G2, above |
| **P5** | "Encourage vegetation and landscaping along roadways and adjacent to other noise sources in order to increase absorption of noise." | Please See Land Use Element Number P36. |
| **Safety Element- Seismic** | | |
| **P2** | "Require that the siting and development of critical faciltiies under discretionary approval by the City Council and Board of Supervisors be supported by documentation of thorough hazard investigations relating to site selection, | The proposed project is not located on an active fault or an active fault zone. The nearest known fault zone is approx. 13 miles to the east of the project. Any structures located on site will be required to implement |

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| | preconstruction site investigations and application of the most current professional standards for seismic design." | all Uniform Building Code Seismic Zone 4 building standards in order to avoid any seismic safety concerns on site. Further, the project wil adhere to all modern earthquake construction standards. |
| **P4** | "Encourage critical facilities in dam inundation areas to develop and maintain plans for safe shut-down and efficient evacuation from their facilities, as appropriate to the degree of flood hazard for each facility." | According to the 2002 Metropolitan Bakersfield General Plant, the project site is not located within the dam inundation area. |
| **P18** | "Design discretionary critical facilities located within the potential inundation area for dam failure in order to: mitigate the effects of inundation on the facillity; promote orderly shut-down and evacuation (as appropriate); and prevent on-site hazards from affecting building occupants and the surrounding communities in the event of dam failure." | See P4, above. |
| **P19** | "Design discretionary facilities in the potential dam inundation area used for the manufacture, storage or use of hazardous materials to prevent on-site hazards from affecting surrounding communities in the event of inundation." | See P4, above. |
| **Safety Element- Public Safety** | | |
| **P2** | "Require discretionary projects to assess impacts on police and fire services and facilities." | Such impacts were assessed and discussed as part of the Initial Study/Notice of Preparation and found to be less than signficant. |
| **Public Services & Facilities Element** | | |
| **G1** | "Maintain a coordinated planning and implementation program for the provision of public utlities to the planning area." | The proposed project has been determined in this EIR to be in response to growth in western Bakersfield. As indicated in this EIR the proposed expansion of the wastewater treatment plant will be accounted for by 8 of the largest projects in the future service area all of which are in varying stages of planning and development. Therefore, demonstrating a coordinated effort between the growth in western Bakersfield and the provision of public services. |
| **G2** | "Coordinate the planning and implementation of planning area municipal-type utility facilities and services." | See G1, above. |
| **P5** | "Require all new development to pay its pro rata share of the cost of necessary expansion in municipal utilities, facilities and infrastructure for which it generates demand and upon which it is dependent." | The project is the expansion of existing utilities and therefore will not require the expansion of municipal utiltities, facilities or infrastructure |
| **Public Services & Facilities Element- Water Distribution** | | |
| **G1** | "Require that all new development proposals have an adequate water supply available." | As indicated in the EIR, sufficient water exists for use by the project, and recycled |



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| | | water will be utilized to reduce demands on the potable water system.. |
| **Public Services & Facilities Element- Sewer Service** | | |
| **G1** | "Ensure the provision of adequate sewer service to serve the needs of existing and planned development in the planning area." | The project is the expansion and upgrade of the wastewater treatment plant in order to provide adequate sewer service to west Bakersfield. |
| **G3** | "Provide trunk sewer availability to and treatment/disposal capacity for all metropolitan urban areas, to enable cessation or prevention of the use of septic tanks where such usage creates potential public health hazards or may impair groundwater quality, and to assist in the consolidation of sewerage systems. Provide sewer service for urban development regardless of jurisdiction." | See G1, above. |
| **Public Services & Facilities Element- Street Lighting** | | |
| **G1** | "Provide uniform and adequate public lighting for all developed and developing portions of the planning area." | The project will comply with all city lighting ordinances and standards. |
| **G2** | "Develop uniform planning area street light location and design standards." | See G1, above. |
| **P3** | "Complete the conversion of all planning area lighting to energy efficient lighting." | The wastewater treatment plant will use energy efficient lighting as part of the proposed project. |
| **P4** | "Require developers to install street lighting in all new development in accord with adopted city standards and county policies." | See G1, above. |
| **Parks Element** | | |
| **P28** | "Encourage pedestrian and bicyle linkages between residential and commercial uses." | The project includes the upgrade and expansion of portion of Ashe, Gosford, and McCutchen Roads, which will include bike lanes per the MBGP and/or City standards. |

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