



# Guardian

America's First Choice for Environmental Restoration

A Publication of the Installation Restoration Program

Travis Air Force Base, California

January 2002

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(Photo by Dale Malsberger)

**Mitigation Begins** — Travis AFB is creating wetlands in the northern part of the base near the Castle Terrace Housing Area. This mitigation is part of planned soil remediation elsewhere on base.

## Wetland Mitigation Project Begins

### Why do we need to mitigate?

By Dale Malsberger  
Travis Restoration Staff

Travis AFB is creating 2.2 acres of wetlands in the northern part of the base near the Castle Terrace Housing Area. This mitigation is part of our planned soil remediation at the former landfill #2 (LF007).

The existing landfill was closed and capped in 1974. The cap currently has many subsidence trenches where the solid waste under the cap has decomposed. These trenches collect water during the winter and now contain the plant life and soil type that defines a "wetland." Maintenance of the landfill cap will require about 2 acres of wetlands to be filled in and graded to achieve proper drainage. This filled and graded area will also serve as the foundation for our CAMU (Corrective Action Management Unit) where we will consolidate and cap contaminated soils from other restoration sites at the base. In

addition, up to 0.1 acre of wetland may be affected by installation of two groundwater extraction wells at the north base boundary of landfill # 2.

The base consulted with the US Army Corps of Engineers (ACOE) and the US Fish and Wildlife Service regarding wetland mitigation requirements. These agencies agreed that they do not require mitigation because the wetlands to be filled in are not within the ACOE's jurisdiction, and the planned action will not impact federally listed species. Mitigation is required, however, to comply with an Air Force Instruction that implements 1977 Executive Order 11990 requiring no net loss of wetlands at federal facilities.

### How do we mitigate wetlands?

The mitigation design consists of five separate pools. Each pool is oval with a shallow flat bottom and gradual side slopes. The pools are constructed with a bulldozer which also

See **MITIGATION**, page 5



Travis Air Force Base, California

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The Guardian is a publication of the 60th Civil Engineer Squadron's Installation Restoration Program (IRP). The newsletter is designed to inform and educate the public about the base's ongoing environmental cleanup program. Contents expressed herein are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the Department of the Air Force. Additional information about the program can be obtained from the public website at <http://www.travis.af.mil/pages/enviro>. Questions and comments about the environmental cleanup program should be addressed to:

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## RAB — The Next Level

Being a RAB member is a privilege and an honor knowing you can influence the clean up of contaminated properties and strive to protect the surrounding environment whether it is an ecological sensitive habitat or a housing development. As RAB members at Travis AFB, we listen intently to the issues and raise questions that we believe are pertinent, but are we doing everything possible to be better informed and to ensure we target the technical issues that can help expedite the remedial plans? There are many ways of enhancing the technical knowledge of the RAB members and I would like to promote a few ideas that will raise the Travis RAB to the level the USAF expects. Granted we can read the remediation plans drafted by the environmental consultants, and any number of books focused on the restoration of impacted soil & groundwater. There may be an easier, less time-intensive method of raising the bar. Workshops hosted by the military or by the consultants can help mold the RAB to make even better informed decisions and to understand the proposed mitigation plans. For example, I attended the Bay Area RAB meeting hosted by the Navy at Treasure Island. This was a streamlined version of the



### VIEWPOINT

Kurt M. Urquhart  
 BF Goodrich  
 Aerospace

annual Navy RAB meeting held earlier this year in Denver. Topics included the role of the RABs, budgeting restoration programs, the CERCLA process, and an open house hosted by all the Bay Area Naval sites. Another avenue of technical training is to have the remediation consultants host technical briefings over dinner. For example, I attended a dinner briefing hosted by the consultant managing the clean up at Mare Island Naval Station. They invited the Mare Island RAB and regulators to hear a discussion of current and past investigative techniques for finding unexploded ordnance (UXO). So perhaps the Travis AFB IRP consultants can host technical briefings and the USAF/Navy/US Army in the Bay Area can team up to sponsor RAB meetings so we can learn from others, can gain more technical insight, and can become more informed RAB members. ✈

## Air Force Wins Restoration Award



### IN THE NEWS

Linda Weese  
 60th AMW  
 Public Affairs

The 60th Civil Engineering Squadron Environmental Restoration Division recently won the General Thomas D. White Restoration Award for best restoration program in Air Mobility Command and will now go on to compete at the Air Force level.

"Protecting the world's environment is a major component of our Air Force culture," said Fred Kuhn, acting principal

deputy assistant secretary for manpower, Reserve affairs, installations and environment, commenting on last year's White Awards. "We have one of the finest environmental programs in the Department of Defense, one of the best in the United States Government, and are equal to or better than any program in industry."

The award program is designed to recognize outstanding Air Force efforts to preserve and protect the environment. The award is given annually to the best and most improved restoration programs in the current fiscal year.

The evaluation process considers the planning to either close or have in final remediation all contaminated sites by the

year 2015, and innovative actions to limit further expansion of contamination and to speed up the final remediation action.

“Winning this award pays a high compliment to the men and women of the Travis environmental team who are the professional stewards of cleaning up the environmental practices of the past and preserving the base and surrounding land for years to come,” commented Al Brick-reen, chief of the Travis environmental restoration program.

Brickeen went on to outline a few of the factors that led to the winning of this award: He said that more than 80 percent of the base’s groundwater contamination sites have interim remedies in place and that an innovative approach has been taken to eliminate transport of contaminated soil

off site, saving up to \$50 million.

Other factors that contributed to winning the award were increasing the Restoration Advisory Board membership by 60 percent, to 16 community stakeholders. The Environmental Division also highlighted their projects and activities at Air Expo 2001, the Solano County Air Fair and at Travis Earth Day events.

In addition to the unit award, Dale Malsberger, Travis remedial project manager, also earned individual honors for his significant contributions to the Environmental Restoration Program. Some of his accomplishments included completing remedial investigations, feasibility studies, and a proposed cleanup plan for over 75 percent of Travis’ Installation Restoration Program sites 8.5 years ahead of schedule

and implementing Environmental Protection Agency-approved innovative remedial action projects at two groundwater treatment sites. ✈



(Photo by Dale Malsberger)

**Winners** — The Travis AFB environmental restoration team wins the General Thomas D. White Award for the best restoration program in Air Mobility Command.

## Budget Impacts for 2002

As you might imagine, the country’s War on Terrorism has had an impact on Travis AFB as well as on other Air Force bases. Delays in approval of the defense budget are reflected in delays in funding environmental restoration projects. While we expect delays in receiving funding for this year’s projects, we are working to minimize the impact to the successful operation of the program.

Travis is anticipating receiving \$3.2 million for restoration projects in 2002. Most of that money will be spent on continued operation of our installed remediation systems. About \$400,000 will be spent on new remediation projects.

We were recently informed that funding for our projects would be delayed until early February 2002. We normally expect to receive our funding in mid-December. Projects for operation of our existing systems are funded annually. When we award a contract to operate a system the contract generally covers a period ending in January or February. Three projects are at risk in our 2002 program.

Our annual groundwater sampling and analysis program is the largest project in our budget. Groundwater is sampled quarterly to assure that the groundwater remediation systems are operating as planned and that contaminated groundwater is not



### COMMENTARY

Allen Brickeen  
Chief, Environmental  
Restoration

escaping the capture zone. The sampling plan is developed with and approved by the U.S. EPA, the California Department of Toxic Substances Control and the San Francisco Bay Regional Water Quality Control Board.

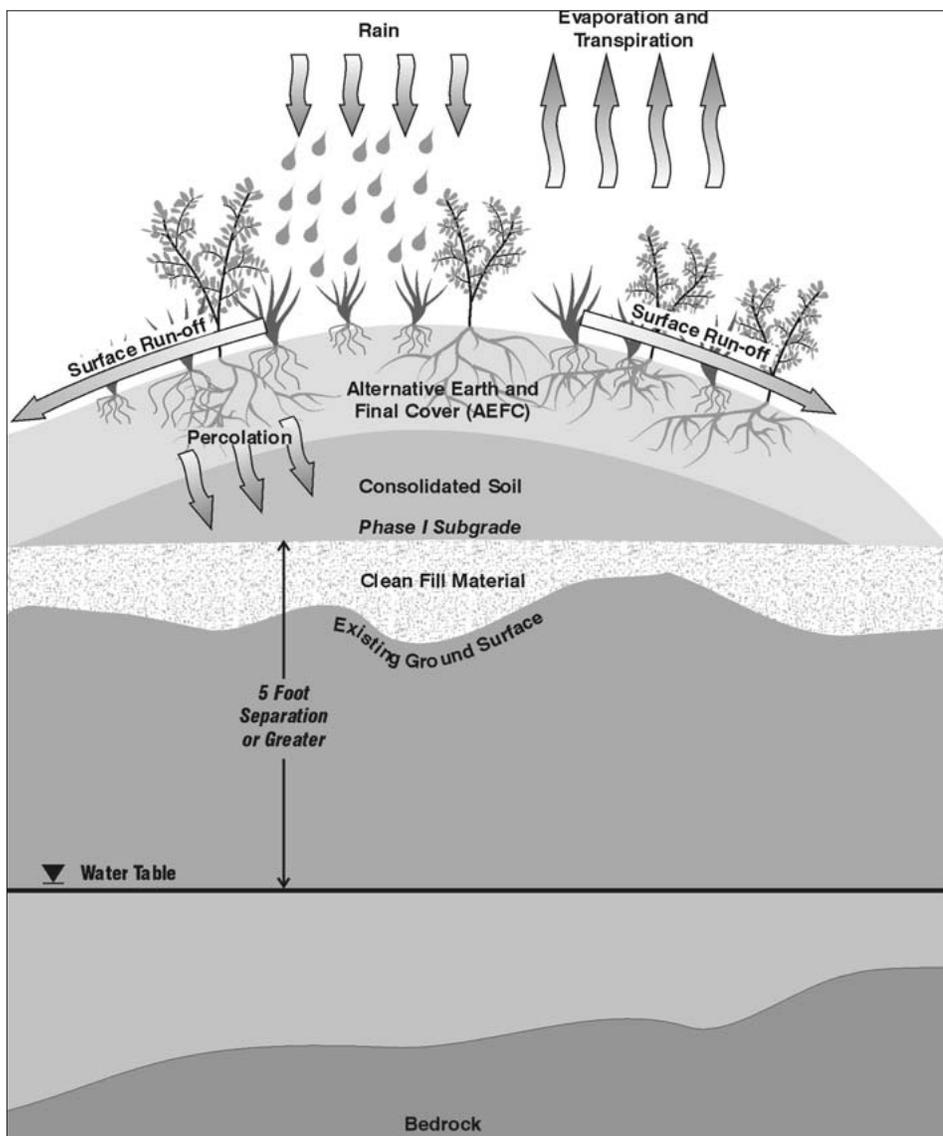
A sampling event is scheduled for early February 2002. Delays in funding will affect the completion of that sampling. If the funds become available and we are able to award a contract in early February, we may still be able to complete the sampling with minimal delay. Further delays in funding could result in the cancellation of the February sampling which would create gaps in the groundwater data, delay the completion of quarterly sampling, and increase cost.

We plan to begin our soil remediation in 2002. Before contaminated soil can be removed, a remedial design detailing the cleanup and acceptance procedure must be created and approved by the regulatory agencies. Because of the time involved to develop the design and get it approved

by all parties, it generally must be started six months prior to starting the excavation. The excavation work is scheduled for August 2002, therefore the remedial design must begin in early February. Delays in beginning the design could result in delaying the remedial action at Site SD041 by as much as three years and/or significantly increasing the cost.

Because of an unexpected increased cost of operating the South Base Boundary Groundwater Treatment Plant this year, we expect funds for this year’s operation will be used up by the end of February 2002. We experienced several months of delay in obtaining regulatory approval of a chemical additive to the treatment system what would have reduced costs. Additionally we had problems with communications between the extraction wells and treatment plant that took several months to resolve. Both problems are resolved, but took more funds than anticipated. Delays in funding this year’s project could result in closing down the treatment plant until the funds are received and the contract awarded.

We are working closely with our contracting agent and our contractors to assure that there will be minimal delays in awarding contracts and in beginning work when funds arrive. ✈



**Cross Section** — CAMU soil mitigation design.

## CAMU Soil Acceptance Levels

Base establishes criteria for consolidating soil into the CAMU

By Dale Malsberger  
Travis Restoration Staff

Travis Air Force Base plans to consolidate contaminated soil excavated from base Installation Restoration Program sites to a portion of former base landfill #2 (LF007) that will be designated a corrective action management unit (CAMU). The base has reached agreement with the regulatory agencies on the acceptable levels of contamination in the consolidated

soil. These levels were developed with guidance from the San Francisco Bay Regional Water Quality Control Board and documented in the Travis AFB CAMU Soil Acceptance Criteria Technical Memorandum issued in August.

### Acceptance levels protect groundwater

State and Federal regulations require a CAMU to protect human health and the environment. The soils consolidated into the CAMU will be covered with four feet of clean soil, which will prevent direct exposure. To prevent indirect exposure

See **CAMU Soil**, page 6

FROM THE

## FIELD

### North, East and West Industrial Operable Unit (SS029):

The SS029 extraction wells had been operating intermittently due to telemetry system problems. The wiring to the modems of each well panel caused frequent system communication failures. The wiring problem was corrected in each well, and one-by-one, the wells were brought back on line. By the end of October, all wells except EW02x29 were back on line and functioning normally.

### Facility 811 (SD034):

Since the base began using passive hydro-skimmers at the site in June 1988, more than 34 gallons of pure PD-680 solvent have been recovered from the groundwater. Of this amount, 7.3 gallons were removed this year.

### Area G Spill Area (SS014):

Passive hydro-skimmers have removed more than 165 gallons of pure fuel from the groundwater since 1998. In February 2000 we started removing groundwater from the nearby Trichloroethene (TCE) contaminated groundwater plume. This has resulted in lowering the groundwater table at SS014. This lower groundwater table has enabled fuel to reach the hydro-skimmers in SS014 faster, resulting in 103 gallons of pure fuel being removed this year.

### East Industrial Operable Unit (SS016):

Thermal Oxidizer Sampling Plan tests were carried out during Nov. 19<sup>th</sup> and 20<sup>th</sup> at the 2-phase/dual phase extraction wells network located in site SS016. Three test runs were made to evaluate and quantify the presence of dioxins and PCBs in the exhaust gases. System operating data, such as combustion temperature, gas velocity, etc. were measured and controlled during the runs. In addition, the concentrations of combustion products including carbon dioxide, water vapor, residual natural gas, etc., were measured using state-of-the-art analytical techniques. Gas samples for dioxin and PCBs were collected at appropriate time intervals and were sent to State-certified laboratories for analysis. Initial evaluation of the tests results show the presence of dioxins as non-detect. Detailed analysis, results, and data interpretation will be presented in a report to be published in February 2002.

## CAMU Soil

■ From page 4

through groundwater, the CAMU acceptance levels are based on maintaining groundwater to drinking water standards.

### Acceptance level development and usage

The acceptance levels are based on a combination of modeling and data from site-specific soil sampling. The figure on page 4 shows a conceptual model of the CAMU design. The modeling simulated the migration of each contaminant through the 5 feet of subgrade beneath the consolidated soil. The first input parameter included in the model is the amount of rainwater that will pass through the final cover and into the consolidated soil, called percolation. The amount of percolation depends not only on the amount of rainfall, but also on how much water is evaporated

back to the air (either directly or through the natural actions of the vegetation on the CAMU cover) and how much water runoff as surface water. An average of 1 inch per year percolation was selected. The CAMU cover will be designed to meet this performance requirement.

Another input parameter included in the model is the amount of contamination that will dissolve or leach into the water as it passes through the consolidated soil. This value, called leachate, is based on the adsorption coefficient of each contaminant. For most contaminants, this amount was based on the most conservative adsorption coefficient values found in scientific literature. For a few compounds, field samples were collected and analyzed to give site-specific values.

Using an assumed attenuation factor as a starting point for the contaminated soil and the drinking water standard as the end point for the groundwater underneath the CAMU, the allowable level of leachate for

each contaminant was determined. The model results showed that an attenuation factor of 100 (the assumed leachate concentration at the bottom of the consolidated soil is 100 times the drinking water standard) would produce groundwater concentrations that were within drinking water standards. The allowable level of each contaminant in the consolidated soil was then calculated using its adsorption factor.

At soil contamination sites throughout the base, the soil that is excavated will be analyzed and compared to the CAMU acceptance levels. Soil that is below the acceptance level for all contaminants will be consolidated into the CAMU. Soils that exceed any of the acceptance levels will be sent to an appropriate off-base landfill. The base has completed an important step in our basewide soil remediation program by establishing soil acceptance and leachate acceptance levels for the soil contaminants at Travis. 

## Mitigation

■ From page 1

compacts the surface of the completed pool to ensure good water holding capacity. The pool is then seeded with suitable wetland plants. The plants selected are found at existing wetlands at the mitigation site, at existing wetlands at landfill # 2, or both. We completed building and seeding four of the pools during October and November. A large rainstorm in November forced us to stop work on the fifth pool. The construction and seeding of the fifth pool will be completed this spring or earlier if weather permits.

### Trails and maintenance

The project includes the addition of a trail in the area to provide access for recreational visitors to view the pools as they develop. The base will also perform maintenance, such as weed control and possibly selective re-seeding. Effective weed control is needed to ensure development of desirable plant species in the pools. We hope to use this project to increase com-



(Photo by Dale Malsberger)

**Construction of pools** — Beginning construction of the trenches that will become the wetland pools.

munity involvement.

Completion of this wetland mitigation project is an important milestone in the cleanup of contaminated soils throughout the base. It allows us to proceed with

the maintenance of the existing landfill cap and the construction of CAMU while preserving the overall area of wetlands on the base. 

# Pumping Groundwater with No Moving Parts!

Base uses submersed eductor system to extract contaminated groundwater

By Dale Malsberger  
Travis Restoration Staff

Travis Air Force Base has effectively applied an old technology in its program to cleanup groundwater contamination on the base. Eductor pumps have been used for the past two years to pump contaminated water from the ground at multiple locations throughout the base.

Eductor pumps (also referred to as jet pumps) are simple, cost-effective mechanical devices that are installed in the bottoms of extraction wells instead of conventional submersible electric pumps. Eductor pumps have been used for decades, primarily in the oil industry.

## Simple and reliable

While eductor pumps come in various sizes and configurations, they all operate in the same way (see accompanying figure). Supply water is pumped from the treatment plant, enters the inlet of the eductor, and travels through the nozzle. In the nozzle, the speed of the water increases and creates a partial vacuum in the suction chamber. The water in the well is drawn into the suction chamber, combines with the supply water, and flows out the discharge and back to the treatment plant.

The reliability of the eductor pump is due to its simple design. There are no moving parts, no required lubrication, and low maintenance. This same principle is at work in other common devices, such as some garden sprayers and paint sprayguns.

The water from the extraction wells is held in a storage tank before being treated to remove contaminants. This storage tank is used for the supply water to the eductors. While an electric submersible pump cycles on and off based on levels in the well, the eductor system runs continually. This keeps the water level in the well at, or near, the level of the eductor. It does not harm the eductor to “run dry” (water level drops below the eductor’s suction pipe). Each well has a check valve installed in



(Photo by Kevin Jackson)

**Demonstration** — Contractor personnel give an eductor demonstration.

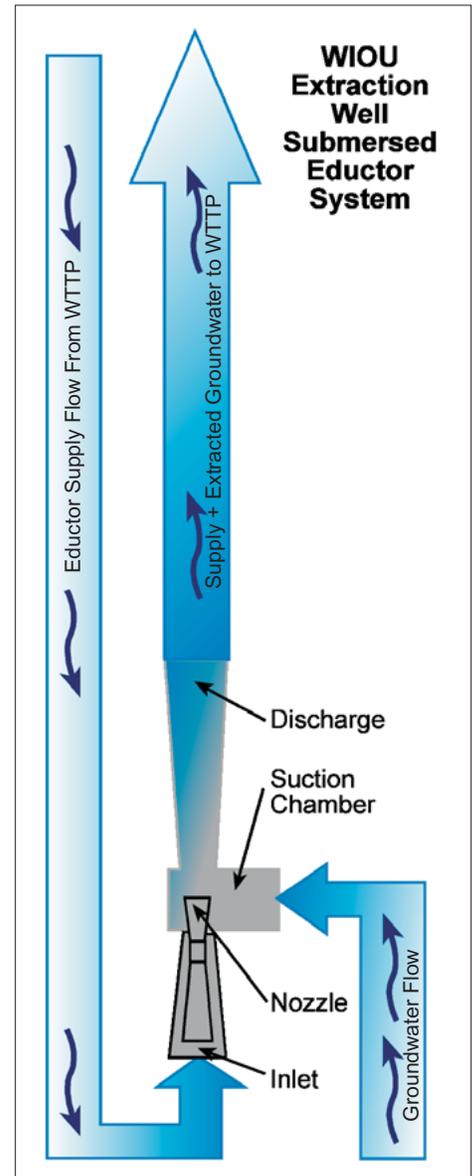
the eductor to prevent supply water from draining into the well if the system is shut down for repair or maintenance.

## Cost-effective for large extraction systems

An eductor extraction system uses a single electric pump at the associated treatment plant instead of individual electric pumps in each well. Eductor pumps can be used cost-effectively in groundwater extraction system with many extraction wells near the treatment plant. Some disadvantages of eductor systems are that they require a supply water tank level control system and an additional flow monitor for each well.

Of the base’s four groundwater extraction and treatment systems, the West Treatment and Transfer Plant system and the North Treatment Plant system were designed with eductor pumps. A total of 29 extraction wells with eductor pumps have been installed in the two systems. Cost analysis showed that for these systems, the use of eductor pumps saves both initial construction costs and operation and maintenance costs.

The base has been operating extraction



Eductors have three primary features: inlet, suction and discharge.

wells with the eductor pumps for over 2 years and they have performed effectively and with minimal maintenance. In today’s high-tech world, sometimes low-tech still has its place. ✈



**Travis AFB**  
**Restoration Advisory Board**  
**Meeting Agenda**  
**January 24, 2002**

McBride Senior Center  
411 Kendall Street  
Vacaville, California

**6:30 - 7:00 p.m. Poster Session:**

The poster session allows RAB and community members to view posterboards about ongoing Travis AFB restoration program activities. It also allows the public the opportunity to discuss the program with the Travis AFB environmental restoration staff on a one-to-one basis.

**7:00 - 9:00 p.m. RAB General Meeting**

- I. Welcome and Introductions**
- II. Approval of Minutes**
- III. Additional Agenda Items and Questions**
- IV. Discussion Topics**
  - Wetlands Mitigation Activities

*Break*

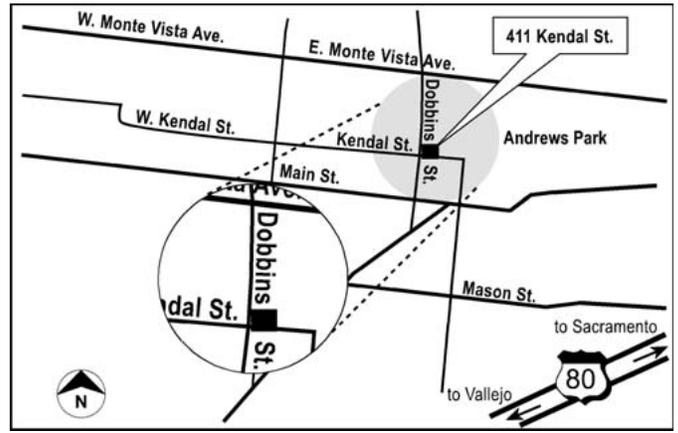
- V. Cleanup Program Status**
  - Real Estate Agreements
  - West/Annexes/Basewide Operable Unit Soil Record of Decision
  - 2002 Soil Remediation Actions
  - Air Force Organization
- VI. Regulatory Agency Reports**
- VII. Focus Group Reports**
- VIII. RAB/Public Questions**
- IX. Set Time and Place for Next RAB Meeting**
- X. Set Focus Group Meeting Times**
- XI. RAB Meeting Debrief Topics for Next Meeting**

*Adjourn*

# Travis AFB Restoration Advisory Board Meeting

January 24, 2002  
7 p.m.

McBride Senior Center  
411 Kendal Street  
Vacaville, CA



## LOCATION OF INFORMATION REPOSITORIES

### Vacaville Public Library

1020 Ulatis Drive  
Vacaville, CA 95688

(707) 449-6290

**Monday-Thursday:** 10 a.m. - 9 p.m.

**Friday-Saturday:** 10 a.m. - 5 p.m.

**Sunday:** 1 p.m. - 5 p.m.

### Fairfield-Suisun Com. Library

1150 Kentucky Street  
Fairfield, CA 94533

(707) 421-6500

**Monday-Thursday:** 10 a.m. - 9 p.m.

**Friday-Saturday:** 10 a.m. - 5 p.m.

**Sunday:** 1 p.m. - 5 p.m.

### Mitchell Memorial Library

510 Travis Boulevard  
Travis AFB, CA 94535

(707) 424-3279

**Monday-Thursday:** 10 a.m. - 9 p.m.

**Friday:** 10 a.m. - 6 p.m.

**Saturday:** Closed  
**Sunday:** 12 p.m. - 6 p.m.



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