

Report No. 41-7327-2

A FIRE PROTECTION  
IMPROVEMENT PROGRAM  
AND  
LONG RANGE PLAN  
FOR  
SANTA CRUZ COUNTY,  
CALIFORNIA

December 17, 1973

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## F O R E W O R D

This report is an objective and comprehensive study of the present and future fire protection needs of Santa Cruz County. The purpose of the study is to identify and evaluate various alternatives for satisfying the public fire protection needs of Santa Cruz County. Long and short-range improvement programs are developed which will be compatible with the needs and desires of each community while producing an optimum cost benefit relationship for the entire County.

Louis E. Almgren, P.E., was Project Engineer for the study. He was assisted by staff members Edward K. Vining, Gary S. Jensen, Jack H. Martin, Robert B. Burns and Otto A. Schleich. Other staff members were utilized where their expertise was valuable to the study. Field work was started on July 24, 1973. The final report was submitted on December 17, 1973.

The valuable assistance rendered by all persons contacted during the course of this study is gratefully acknowledged. Particular thanks is extended to all fire service personnel for their help in the data gathering phase of the study.

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# PART I

## SUMMARY AND CONCLUSIONS

Fire Department Service in Santa Cruz County ranges from concentrated urban type service as provided in the City of Santa Cruz to minimal services in several remote sparsely populated areas of Santa Cruz County. Between these two extremes there exists a full spectrum of fire department functions providing varying levels of protection. The large majority of residents are receiving a reasonably adequate level of service. The primary problems in furnishing adequate fire protection are encountered in remote areas of the County where it is not economically feasible to provide more than token service. In four Fire Protection Districts the tax base is too small to satisfactorily support a fire department. While it is not economically possible to furnish adequate public fire protection service in remote areas, at this time, it is possible to improve service in the smaller Districts by combining their resources into a single functioning unit. The details of this proposal are contained in the Recommendations Section of this report.

Other recommendations which will economically improve service to the smaller fire jurisdictions include a county-wide communications system, county fire prevention program, centralized training, automatic fire response between jurisdictions, and apparatus maintenance and purchasing. Because some jurisdictions are presently expending limited funds on many of these functions, certain cost benefits are based on projected needs.

Ultimately, all non-wildland fire suppression in the County should be integrated into one of these four districts:

1. Mid-County District
2. South County District
3. San Lorenzo Valley District
4. Rural Service Area

A detailed implementation program is presented in the Recommendation Section of this report.

The recommended program is designed to accomplish specific improvements in a series of phases which can be implemented independently or as a complete program. Although the recommended improvement program is a complete fire protection system for the County, it is so designed that it is possible to implement individual recommendations if this becomes desirable.

Combining the smaller districts will, in most instances, result in reducing operating costs, however, the primary benefit to the taxpayer will be in the form of improved services. Operational costs of the Schedule A contract, excluding Pajaro Dunes, will increase from the present level of \$87,419.00 to approximately \$140,000. An additional \$25,000.00 a year should be expended over the next five years to modernize equipment.

? How

Although county-wide programs for communications, fire prevention, training, and apparatus maintenance will result in increased costs, much of this expense will be recoverable by eliminating these programs from each of the individual fire jurisdictions.

? How

Savings resulting from the long-range recommendation to create four districts will vary by district; eliminating duplicate services in the Mid-County District could result in savings as high as 20%. In other areas, because services are not as extensive or developed, savings will not be as great. The primary goal of this study, however, was not to save money, but to improve cost effectiveness in achieving an acceptable level of protection.

? How

# PART II

## RECOMMENDED IMPROVEMENT PROGRAM

### INTRODUCTION

There are several immediate improvements which should be made in fire department service in Santa Cruz County. The changes are needed to provide a reasonable level of fire department service to the citizens of Santa Cruz County and to improve the cost effectiveness of fire department operations. These changes will enable the citizens to realize maximum benefit for each tax dollar spent while meeting the requirements of future growth. The recommendations cover seven primary areas:

1. jurisdictional realignments,
2. operational coordination,
3. station locations, ✓
4. fire prevention, ?
5. training,
6. apparatus maintenance and replacement, ✓ and
7. communications. ✓

In all cases, the intent of the recommendations is to provide all citizens of Santa Cruz County with an acceptable level of fire protection. For those who presently receive a higher level of fire protection, the benefits accrued will occur mainly in improving the cost benefit relationship. For many, benefits will be quite substantial and an improvement in service will be readily identifiable. For residents living in remote areas of the County, the improvements will be minimal.

It is not the goal of this system to provide the same level of fire protection service throughout the County. Urban areas will

continue to receive a higher level of fire protection service since the fire problems are greater and the tax base is larger. Areas remote from urban centers should receive a reasonable level of fire protection service available within the limitations of tax income. In non-urban areas, a high reliance upon "self-help" fire protection is necessary, primarily in the form of fire prevention programs. Fire protection agencies in these areas should allocate substantial resources to assist citizens in self-help fire loss control programs and activities.

} SPECIFICS

## RECOMMENDATION NO. 1

### IMMEDIATE IMPROVEMENTS IN FIRE DEPARTMENT SERVICE

The following changes should be made in fire protection district jurisdictions:

1. Merge Branciforte Fire Protection District into the Scotts Valley Fire Protection District.
2. Merge Zayante Fire Protection District into the Scotts Valley, Ben Lomond, and Felton Fire Protection Districts as appropriate.
3. Dissolve the Davenport Fire Protection District. Arrange for the California Division of Forestry to provide fire protection as a part of the County Schedule A contract.
4. Merge La Selva Beach Fire Protection District with Aptos Fire Protection District.

Improved fire suppression services should be provided in areas outside of Fire Protection Districts.

Estimated Cost: Schedule A contract will increase \$50,000/yr.

#### DISCUSSION

The Branciforte, Davenport, La Selva Beach and Zayante Fire Protection Districts are not providing an acceptable minimum level of protection. The primary reason for this condition is that the Districts' tax bases are too small to provide sufficient funds to properly operate a fire department. Much of the tax revenue is used for administrative and related costs and little is left for operational expenses and providing modern equipment. Although existing fire protection facilities provide some measure of fire protection to some citizens, it has little ability to control fire losses and the price paid is much too high.

It is a major problem to provide adequate fire protection to a small community without unrealistically high taxes. The problem is compounded when two similar adjoining communities operate separate fire jurisdictions. Public officials in these communities have an obligation to combine fire protection functions in order to provide adequate protection at a reasonable cost. Combining some fire districts is necessary for service to continue. Local control is an expendable luxury.

Fire suppression services provided in Santa Cruz County by the California Division of Forestry should be expanded from 3 to 7 stations. It is recommended that this be accomplished by integrating the four Civil Defense Fire Teams into the CDF operation and absorbing the personnel and equipment of the Davenport Fire Protection District. Each of these units should be operated as a volunteer company with the Division of Forestry providing overall supervision, financial support, and training.

At the present time the CD fire teams lack maximum effectiveness because of a combination of factors stemming from underfunding. Primary deficiencies are out-dated fire apparatus, inadequate communications equipment and a lack of personnel protective equipment. By including the fire teams in the Schedule A contract and placing them under the direct supervision of the California Division of Forestry, they can be upgraded to a point where they can make a much more valuable contribution to rural fire protection in the County.

BUT WILL THEY?

The increased funding will permit an apparatus modernization program, and provide each volunteer with a tone activated radio and complete personnel protective equipment. A regular training program should be established to develop fire fighting skills and insure a high degree of proficiency. The scope of CDF services under the Schedule A contract would remain essentially the same as in the past, except that an additional supervisory level ranger

may be required to provide management and training services for the new fire units. Maintenance and insurance costs to cover the additional personnel, equipment and stations would also increase.

## RECOMMENDATION NO. 2

### WATER SUPPLIES FOR FIRE FIGHTING IN DEFICIENT AREAS

Fire Departments in areas of the County lacking water systems capable of supplying adequate water flows for fire fighting should overcome this deficiency by strengthening their operating methods by one or both of the following:

1. Hoseline relay, and,
2. Tanker shuttle.

This capability should be developed not only from the standpoint of improved fire fighting ability, but also to qualify for the Insurance Services Office Dwelling Protection Class 8 in areas that would not normally qualify.

Estimated Cost: \$5,000/hoseline relay. (See Recommendation No. 7 for tanker cost.)

#### DISCUSSION

There are two primary methods for moving large amounts of water where the source is located more than 1,000 ft. from the fire scene. One is to relay water through hose lines using pumpers spaced every 500 to 1,000 ft., and the other is to use large tankers to shuttle water from the source of supply to the scene of the fire.

Ideally a hose line relay would utilize hose 3 in. or larger in diameter. The hydraulic characteristics of this hose enables a single line to efficiently move 500 gallons per minute distances up to 1,000 ft. At present only one department in the County is equipped with this type of hose. Relays using the more common 2 1/2 in. hose can also be utilized but this is more difficult and time consuming to set up. Any hose line relay has the inherent deficiency that it is a system made up of a number of relatively fragile interdependent components and a failure anywhere in the system will render it inoperative. Although hose line relays are not theoretically limited to any maximum distance, there is a practical length limitation of 2,000 to 4,000 ft. depending on avail-

? WRONG

ability of equipment and the proficiency of personnel.

The use of tankers can provide a very efficient method of moving and applying large quantities of water. A total of 11 tankers are presently being operated in the County by 7 fire departments, 3 civil defense fire teams, and the California Division of Forestry. The condition and capacity of these units vary quite widely. Many are overage or military surplus units of questionable reliability and safety. Several are not properly set up for rapid fill and dump. Table 9 in the Details Section lists characteristics and condition of each unit.

In order to properly utilize a tanker relay, a uniform system of operation should be adopted county-wide and equipment should be standardized as much as possible. All departments operating in water deficient areas should be equipped with tankers having a minimum capacity of 1500 gallons and a fill and dump rate of 500 gallons per minute. An initial capability of applying water at a rate of 200 gallons per minute for 20 minutes should be established. As improvements are made this should be increased to 500 gallons per minute for 30 minutes.

RECOMMENDATION NO. 3  
COUNTY-WIDE OPERATIONAL COORDINATION

A county wide automatic response program between fire jurisdictions should be adopted. The program should provide for automatic response of the nearest companies to an emergency without regard to jurisdiction boundaries. This program can result in positive and immediate improvements in fire fighting capabilities in Santa Cruz County.

Estimated Cost: Minimal. ? WILL COST MORE.

DISCUSSION

The principal benefit of improving operational coordination will be to develop a logical and more efficient fire department first response to fire alarms, thereby improving overall service at a small additional cost. Other potential benefits include:

1. A more uniform level of fire protection. ?
2. Increased efficiency at major incidents due to day-to-day joint response. ?
3. Ability to provide more adequate fire fighting force in remote areas near jurisdictional boundaries, without depleting resources. ?
4. Simultaneous incident response capability. ?

Implementation of an automatic response system will require careful planning. It will also be necessary to improve or initiate several supportive functions, including a prearranged running schedule, coordinated operating procedures, central dispatching and uniform training.

In order to implement this program, the plan should provide for dividing the County into four operational areas with coordination

of response activity on all area boundaries. Since the areas are geographically separated, with minimal common boundaries, response to boundary fires should not create any unmanageable problems. The suggested operational areas are as follows:

OPERATIONAL AREA #1 - MID-COUNTY

Santa Cruz  
University of California - Santa Cruz  
Live Oak  
Capitola  
Soquel  
Aptos  
La Selva Beach

OPERATIONAL AREA #2 - SOUTH COUNTY

Watsonville  
Freedom  
Salsipuedes  
County Services Area #4, Pajaro Dunes  
County Services Area #5

OPERATIONAL AREA #3 - SAN LORENZO VALLEY

Scotts Valley  
Ben Lomond (Branciforte and Zayante)  
Felton  
Boulder Creek

OPERATIONAL AREA #4 - SCHEDULE A CONTRACT, CALIFORNIA DIVISION  
OF FORESTRY

Remainder of County

RECOMMENDATION NO. 4  
COUNTY-WIDE FIRE PREVENTION PROGRAM

A county wide fire prevention program should be established as part of the County functions to provide fire prevention services for all fire jurisdictions in the County. Acceptance of this service should be optional for incorporated cities.

Estimated Cost: First Year - \$30,000  
Thereafter - \$125,000/yr.

DISCUSSION

One of the major opportunities to control fire losses and the costs of providing fire protection service exists in the provision of adequate fire prevention enforcement. Without the enactment and enforcement of fire codes, new fire problems develop unrestricted causing an increased burden on fire protection services.

Many existing fire jurisdictions are deficient in an adequate program for plan review of new construction, inspection of new and existing facilities, control of special hazards and public fire safety education. There is essentially no coordination among building, planning and fire departments, (only a few of the departments have the resources to conduct thorough fire investigations, and there is a need for improved fire prevention data and record systems.) **CIFRS ?**  
The recommended County fire prevention bureau will establish a system that will correct these deficiencies.

The building official's interpretation and enforcement of the building code can have a dramatic impact upon a community's fire protection. The processes of plan review, construction inspection, occupancy certification, occupancy change and reinspections should be closely coordinated between building and fire officials. Unfortunately their interrelationship cannot now be described as cooperative. It should be the goal of the fire prevention bureau to establish a

working relationship with the County Building Department and develop a coordinated program of working together.

Positive programs should be initiated by the fire marshal to improve building department and fire department coordination. This should include joint checking, field inspections and joint approval of occupancy certificate. Where possible building and fire protection bureaus should be housed in the same general area. Joint training programs should be conducted to improve coordination and understanding of each others' role. Building Officials and responsible Fire Officials should jointly classify all occupancies.

An effective county-wide fire prevention program can provide the following results:

1. Insure that adequate levels of fire protection and life safety are provided in new construction.
2. Insure that fire protection requirements are uniformly applied.
3. Help to reduce the cost of fire fighting. *In how many years?*
4. Provide a basis for fire protection planning and code revision.
5. Provide a deterrent to incendiary fires, through fire cause and analysis. *?*
6. Serve to protect the economic, aesthetic and environmental resources of Santa Cruz County.

The fire prevention program should provide for the following:

1. A County Fire Marshal who would report directly to the County Administrative Officer.

2. A staff of personnel adequate to provide the levels of service that are identified and adopted.
3. Adoption of a fire prevention code - the Uniform Fire Code is recommended.
4. Close coordination with the planning, building and zoning departments.
5. Code amendments which meet the specific needs of the various areas and jurisdictions within the County while at the same time maintaining a proper balance of standardization.
6. Plan review and code enforcement in new developments.
7. Programs of reinspection to maintain conditions at an acceptable level.
8. Regulation and control of special hazards, especially in high life hazard occupancies.
9. Fire cause investigation.
10. Maintenance of records and data which would be available to all jurisdictions for fire protection management analysis and decisions.

*How effective on  
a \$130,000 budget?*

#### PLAN REVIEW OF NEW CONSTRUCTION

All plans for new construction in the County, including repair or remodeling of existing occupancies, would be reviewed for compliance with fire codes. Plan reviews would be coordinated with the appropriate planning and building departments, and a program of follow-up field inspections developed to assure compliance. Buildings should not be certified for occupancy until all fire and life safety requirements have been met. Special fire protection requirements for the construction phase of a development should be coordinated

with the responsible fire protection authority. To offset the cost of plan review and field inspections, a fee schedule should be established.

#### FIRE PREVENTION INSPECTIONS

In order to assure adequate maintenance of fire prevention conditions, a periodic schedule of inspections should be implemented. The Fire Marshal's office should conduct or coordinate routine inspections of all commercial, industrial, educational, institutional and public assemblage occupancies within the County. The frequency of inspections will be determined by the relative fire and life hazard involved and frequency of fire experience. An annual inspection would be considered minimal. At least a semi-annual inspection is recommended for high hazard and life safety occupancies. With approximately 4,000 occupancies in the County requiring routine inspections, it is essential that in-service company fire prevention inspection programs be implemented in all fire departments which have this capability. In addition, the program will require a minimum of four fire inspectors.

#### FIRE PREVENTION IN WILDLAND AREAS

The County Fire Marshal should cooperate with the California Division of Forestry, in the wildland fire control program. The goal of this program would be to develop plans and programs for wildland fire loss management with strong emphasis on preventive and precontrol factors. The program should include, but not be restricted to, the following:

- Identify areas of high hazard and so designate on maps for purpose of controlling development in those areas.
- Develop brush clearance requirements for structures.
- Develop a system of fire fuel control which will assist fire suppression by dividing fire areas into manageable sections, this could include:

- Reduction of fuel density,
  - Vegetation modification,
  - Selective burning,
  - Provision of fuel breaks,
  - Provision of fire trails.
- Review plans of all structures to be constructed in wildland areas for compliance with hazardous fire area requirements.
  - Establish plans for increased dispatching of fire fighting forces during high hazard periods and control of access during high hazard, to park and wildland areas.
  - Establish public education programs which inform residents of the hazards they encounter and the reliance upon "self-help" fire protection measures in remote areas. This is especially important where there is an influx of formerly urban residents who may bring urban attitudes to wildland areas. *every weekend*

All fire suppression agencies which have a wildland fire protection responsibility should allocate some part of their resources to these fire prevention and public education programs.

#### PERMITS

The County Fire Marshal should issue permits for the purpose of controlling special hazard materials and/or occupancies. This should include those permits as listed and applicable under the Uniform Fire Code. A fee schedule should be developed to offset the cost of this program.

Occupancy permits should be issued for all occupancies except one and two family dwellings. These permits are usually issued by the

building official. The permit system is important in controlling the fire protection and fire prevention requirements which may occur between occupancy changes. Before issuing an occupancy permit, approval of both the Fire Marshal and the Building Official should be necessary.

#### INVESTIGATIONS

The Fire Marshal's office should conduct investigations to determine and record the causes of important fires. Basically the Fire Marshal's office should be responsible for the investigation of all major loss fires (over \$1,000 loss), fire involving serious injuries or fatalities, and fires of undetermined or suspicious origins. All other fire causes would normally be determined by the fire officer in charge of fire suppression activities. Reports of all fires would be forwarded to the County Fire Marshal.

The Fire Marshal would pursue suspected arson or incendiary fires, in conjunction with the local police agencies, and where necessary would seek legal action with the proper prosecuting authorities.

#### FIRE CODE

The County Board of Supervisors should adopt the most recent edition of the Uniform Fire Code with appropriate amendments. The County Fire Marshal should be empowered to enforce the fire code throughout the unincorporated areas of the County and cities so desiring to participate.

#### PUBLIC FIRE SAFETY EDUCATION

The Fire Marshal should strive to develop a county-wide fire safety education program. This would include:

- Fire safety programs in schools,
- Industrial and commercial fire safety programs,
- Public education via radio, TV and newspapers,
- Coordination with architects and developers,
- Institutional occupancy life safety programs.

### FIRE INSPECTION AND CODE ENFORCEMENT TRAINING

The Fire Marshal should prepare and coordinate a program of fire protection training for members of his staff and other fire department personnel in order to develop and maintain fire prevention inspection skills.

### RECORDS

The evaluation of the fire prevention program and the development of code changes requires an adequate records system. The County Fire Marshal should maintain a record of each occupancy, which will include inspection reports, occupancy changes, permits, fire incidents and fire investigations.

In January of 1974 all fire agencies will be required to submit fire reports to the State Fire Marshal's office under the California Fire Incident Reporting System. It is recommended that the County Fire Marshal coordinate the implementation and management of this program. A County wide fire data system should be built around this program with consideration of electronic data processing when such expenditures can be justified.

### COORDINATION WITH BUILDING DEPARTMENTS

A lack of coordination between Building Departments and Fire Prevention Bureaus is a frequent cause of inefficiency in enforcing laws and ordinances dealing with fire safety. The building code and its application by the Building Official have a substantial impact upon fire protection for a community. The responsibilities of building departments in fire protection should be clearly defined. Governing bodies should take the necessary actions to reduce existing conflicts and maximize cooperation between Building Departments and Fire Departments.

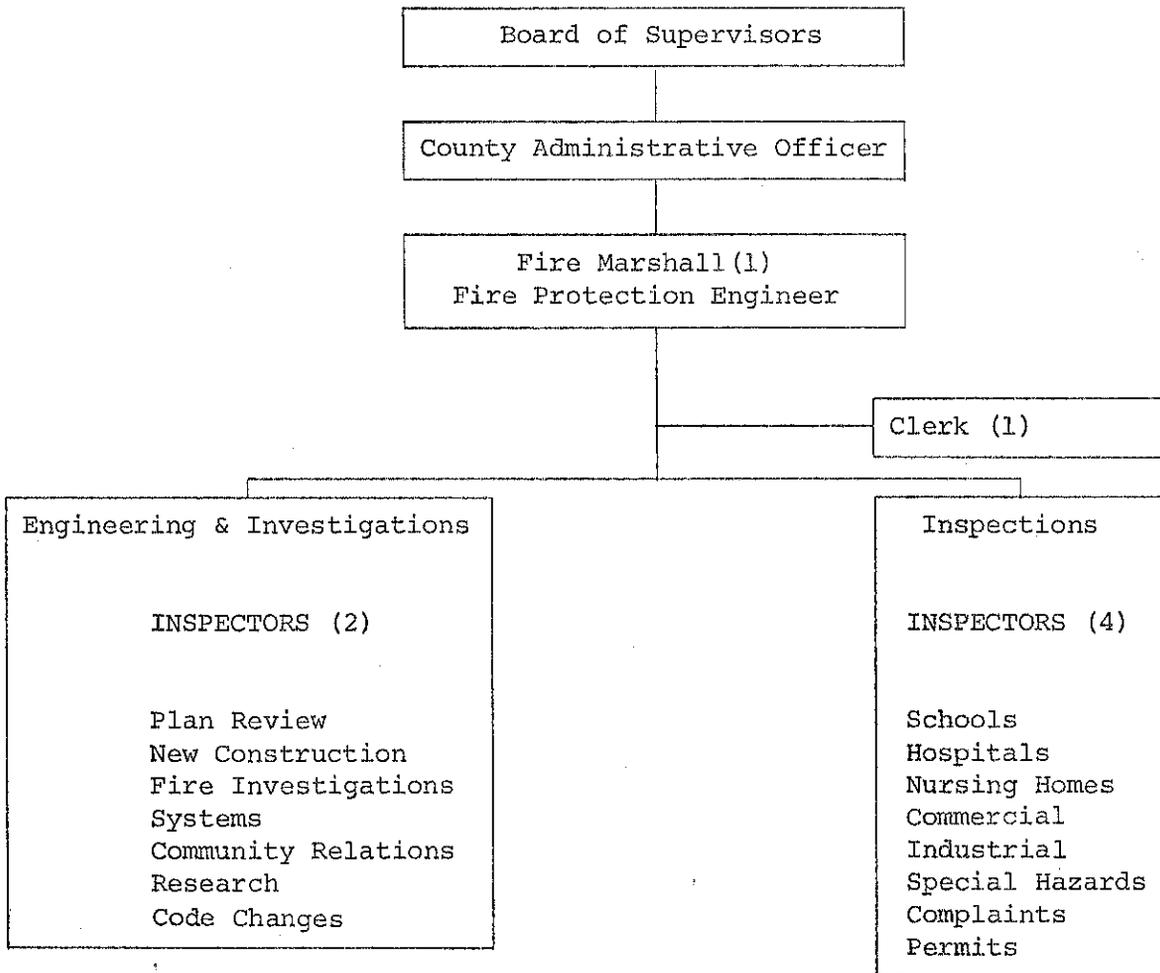
The plan submitted by the Santa Cruz County Fire Marshal's Association should be used as a guide in establishing the Fire Marshal's office. It is suggested that the first step would be to appoint

a Fire Marshal with instructions to develop necessary procedures and programs to implement the plan. An organization chart is shown on Plate I.

all this with \$135,000 - and only  
four inspectors?  
T/O shows 8 people - on \$135,000?

PLATE I

RECOMMENDED ORGANIZATION CHART - COUNTY FIRE MARSHALS OFFICE



RECOMMENDATION NO. 5  
COORDINATED TRAINING PROGRAM

Fire department training in Santa Cruz County should be improved by establishing a coordinated program and providing adequate facilities. A Fire Service Training Coordinator should be appointed to develop and implement the program.

Estimated Cost: Training Program \$25,000  
Training Facilities \$50,000

DISCUSSION

All fire departments in the County indicated that they have some form of training. The quality and frequency of such training varies widely. Watsonville and Live Oak have training facilities, both of which need expansion to provide a full range of training. Only two departments have training officers assigned full time.

Since most fire fighters do not experience enough actual fire fighting to maintain a high level of proficiency in the basic skills, it is important that training programs be continuous and comprehensive. On-the-job experience should not be substituted for training for several reasons, including:

1. Adequate supervision is usually not available.
2. Frequency and type of fires (and therefore the learning experience) cannot be controlled.
3. Trainees' reactions are not predictable.

Modern technology is introducing new and unusual fire hazards at an increasing rate. All fire fighters, but particularly volunteers, have little available time to learn of new hazards and fire fighting developments. In addition, fire department officers should be trained in modern personnel management practices in order to function more efficiently.

Fire department training requirements demand a substantial commitment of time and resources to develop and maintain adequate levels of proficiency. Innovative training methods are needed to provide adequate training at acceptable levels of cost. Cooperative inter-agency training programs can reduce the cost and increase the productivity of training resources. *WHAT COST?*

Training needs of Fire Protection Agencies fall into the following general categories:

1. Operational training (hose, ladders, breathing equipment, apparatus operation, etc.), for fire fighters (paid and volunteer). There is a need for actual fire fighting under controlled conditions such as the burning of structures for demolition. *See Mr. Hanson.*
2. Multiple company and multiple jurisdiction operational training in multiple company evolutions.
3. Tactics and strategy training for fire officers.
4. Management development for supervisory and administrative personnel.
5. Fire prevention training for fire prevention and fire suppression personnel.
6. Exercises of county-wide fire and disaster plans.

The new program should be organized to include the following elements:

1. Standardized methods of operations should be established by adopting the California State

Training Standards and Methods, including the appropriate training manuals as published by the State Department of Industrial Education and International Fire Service Training Association. The program should include standards for minimal levels of training for volunteers and recruit firemen of paid status.

2. Establish a position of Fire Service Training Coordinator, who would have the responsibility for developing and conducting training programs to meet specific needs of different jurisdictions. As the program develops additional personnel may be needed. This would include operational training, fire prevention and management development programs. This position could be provided:

- a. By a member of the proposed County Fire Marshal's staff,
- b. By a Fire Science Coordinator under the community college system at Cabrillo College.
- c. Funded 50% by the community college and 50% by the County with assignment to either agency.

*Time to be acquired where?*

3. An advisory board consisting of County fire chiefs should be established.

*Ongoing*

4. Two training centers should be developed in the County to provide facilities for regional training programs:

- a. The Watsonville training facility should be expanded.
- b. The Live Oak facility should be improved.
- c. A new facility should be developed in the urban area. *where?*

These facilities should include a training tower, a fire building, drafting pit, sufficient yard area for driver training and multiple company operational drills, LPG fire prop, classroom with an occupant load of at least 100 and the appropriate visual aid equipment.

*The land will cost more than \$50,000.*

Where travel distances to training facilities prohibit frequent usage by fire departments outside urban areas (such as San Lorenzo Valley), existing facilities (parking lots, school classrooms) should be identified as potential training facilities and arrangements made for usage.

5. First aid training should be provided for all volunteer and paid firemen in order that they will maintain first aid skills as required under the California Health and Safety Code.
6. Each fire department should assign the responsibility for coordinating repetitive training needs with the County fire service training coordinator. Skill maintenance training should not be less than 4 hours per month for volunteers and 20 hours per month for paid fire fighters.
7. Provisions should be made for actual fire fighting training, especially for new firemen. This should preferably be done outside the urban areas and should include structural, transportation vehicles, liquified petroleum gas and flammable liquid fire fighting.

*Ongoing*

*on a 56 hr. week?*

*Specific area + Mr. Munson.*

8. Maximum use should be made of training resources available through the State Department of Education Fire Service Training Program and the fire science programs available through the community colleges. The fire science program at Cabrillo College should be supported. Consideration should be given to providing one full-time coordinator under a joint agreement between Cabrillo, Monterey Peninsula, Gavalin and Hartnell Colleges, to serve the needs and coordinate the fire science program between these four colleges. The intent is to provide a broad base of students, improve quality of instruction and eliminate duplication, yet provide a wider choice of courses.
  
9. A recruit training program should be established to provide initial training for newly appointed fire fighters (paid and volunteer). A strong basic training program is essential to the development of a total training program. The program should be on a county-wide basis through the community college fire science program, for funding.
  
10. A County fire disaster plan should be developed. The recommended emergency operations plans as developed by the State Department of Industrial Education Fire Service Training should be used as a model. Each operational area should conduct two partial activations of the plan on a training basis each year. In addition, a once a year full scale training exercise of the plan should be conducted on a county-wide basis.

RECOMMENDATION NO. 6  
FIRE STATION LOCATIONS

With the implementation of Recommendation No. 3 (automatic response), the present distribution of fire stations should be reprogrammed to reduce the overlapping coverage and improve coverage to some areas. The following fire stations should be provided in the approximate order listed below.

REDISTRIBUTION PLAN

1. Relocate Capitola station to the vicinity of 41st Street and Capitola Road. The current facility is inadequate and is located within the Soquel response area. This relocation will provide adequate coverage for Capitola and will provide protection for the anticipated dense development in the area of 41st and Capitola. This should be a three bay station. ✓

Estimated Cost: \$200,000.00

2. Construct a permanent station in the vicinity of West Beach Road and San Andreas Road to serve County Services Area #4 and areas north as growth occurs. This should be a two bay station.

Estimated Cost: \$100,000.00

3. A new station should be constructed at Davenport to house the recommended Schedule A volunteer company and also the CDF unit that is normally located in this area during the fire season. This should be a two bay station.

Estimated Cost: \$100,000.00

4. A new two bay station should be constructed to replace the

existing station at Salsipuedes due to inadequate facilities.

*Improved already.*

Estimated Cost: \$100,000.00

5. The station presently serving Zayante should be relocated. The current site near the creek is not desirable due to potential flooding or earthquake damage. This should be a two bay station.

Estimated Cost: \$100,000.00

6. Santa Cruz Station 2 should be relocated to a more suitable site in the same general vicinity as the present station. New administrative offices should be provided in this station.

Estimated Cost: \$250,000.00

7. A program for improving existing facilities should be undertaken. This program should include the following:

- a. provide expanded or new dormitory facilities at Soquel, Scotts Valley Station 2, Branciforte, and Freedom.
- b. provide an enclosed apparatus garage at Corralitos. This garage should be large enough to house the apparatus of the California Division of Forestry and the Schedule A Volunteer Fire Company. This may be deferred pending planned construction of a new fire station. County should participate by jointly financing the new facility with the Division of Forestry.
- c. reconstruct administrative area and living quarters of Watsonville station on existing site.

#### DISCUSSION

Fire stations should be located to provide a level of service which is consistent with the hazards, development and economic capacity of the area it is serving. The same level of services cannot be

provided in all areas of the County. The most commonly used criteria for fire station locations is that developed by the Insurance Services Office (ISO). These criteria appear to be valid when modified to meet local needs, desires and economic limitations. The ISO standards for response distances are based upon fire flow requirements in areas to be served. See Table No. 23, page 89.

The following criteria which are based on ISO standards were used in this study to evaluate station locations and levels of service:

	<u>Urban</u>	<u>Urban Fringe</u>	<u>Rural</u>
Response time	4 minutes	4 - 7 minutes	7 - 15 minutes
Response distance	<u>1 - 2 miles</u>	2 to 4 miles	4+ miles
Fire Flows from public water systems	<u>1,000 - 6,000 gpm</u>	500 to 2,000 some reliance upon water tankers & auxiliary water supplies	water tanker & auxiliary water supplies

New fire stations should be constructed to include most of the facilities indicated in Appendix B.

Future fire station needs should relate to population growth, density of development and land usage. In evaluating the needs, heavy reliance has been placed upon data gathered from the Santa Cruz County Parks and Recreation and Open Space Plan, which projects land use through 1980. A fire protection general plan element that is compatible with County and City plans should be prepared in order that the fire protection needs of the County will be considered and modified as the elements of the County development plans are updated. It is especially important that a relationship between fire protection levels of service and resources is identified as they relate to

density of development and land use and any proposed changes in density or use. Included in these considerations should be:

- a. Fire Protection resources needed for density of development.
- b. Reduction of fire protection resources needed as a result of "built-in" protection.
- c. Travel distance from station.
- d. Water supplies for fire flow.

The projected need for additional new fire stations will be contingent upon the following:

1. If extensive development occurs east of Watsonville, a fire station should be provided in the area of Holohan Road and Lake Avenue.
2. Projected developments between La Selva Beach and Pajaro Dunes west of Highway 101 would not require an additional fire station. However, if development exceeds that currently estimated, a fire station should be planned for that vicinity.
3. Future development north of Boulder Creek on Highway 9 could require a fire station in the Redwood Grove-Riverside Grove area.
4. It may also eventually be necessary to provide Schedule A volunteer companies at the CDF's Saratoga Summit and Soquel stations.

RECOMMENDATION NO. 7

APPARATUS MAINTENANCE AND REPLACEMENT

A County wide fire apparatus maintenance program should be established, and made available to all unincorporated areas on a mandatory basis and incorporated cities on an optional basis. The program should include one or more centrally located maintenance facilities. A central shop could be operated by Santa Cruz County or on a joint power basis. The program should also include a systematic apparatus replacement program. Standardized specifications should be developed to facilitate joint purchasing.

Total Estimated Cost: \$550,000.00

APPARATUS PURCHASE PROGRAM

Aptos	One 1000 gpm Tanker with 1500 gallon tank (for La Selva Station)	
Aromas	One 1000 gpm Tanker with 1500 gallon tank	
Ben Lomond	Two 1000 gpm Tankers with 1500 gallon tank (one for Zayante Station)	
Boulder Creek	One 1000 gpm Tanker with 1500 gallon tank	
Capitola	One 1250 gpm Pumper with 500 gallon tank*	✓ ordered
Davenport	One 500 gpm Tanker with 1500 gallon tank	
Felton	One 1000 gpm Tanker with 1500 gallon tank	
Live Oak (in cooperation with Capitola, Soquel and Aptos)	One 100 ft. aerial ladder	✓ ?
Santa Cruz	One 1250 gpm Pumper with 500 gallon tank*	✓ ordered
	One 100 ft. aerial ladder	
Salsipuedes	One 1250 gpm Pumper with 1000 gallon tank	
Scotts Valley	Three 1000 gpm Tankers with 1500 gallon tanks (One for Branciforte Station)	
	One 1250 gpm Pumper with 1000 gallon tank (for Branciforte Station)	
Soquel	One 1250 gpm Pumper with 1000 gallon tank	
Watsonville	One 1250 gpm Pumper with 500 gallon tank*	✓ ordered

\*On order

Where extensive off-road grass and brush fire fighting is required fire departments should consider light weight 4-wheel drive vehicles which have water capacity of approximately 200 gallons and a small pump.

An apparatus replacement and maintenance program should include the following:

1. Standardized specifications (note: savings here will occur primarily in reduced maintenance costs and down time rather than initial purchase savings); however, this should leave flexibility for specially designed equipment to meet specific local needs. *no excessive cost or down time to date.*
2. Regionalized preventive maintenance system which provides maintenance facilities, parts warehousing and full-time mechanics trained in fire apparatus maintenance. *Ours is 40 miles away.*
3. Sufficient reserve apparatus to replace first line equipment during preventive maintenance.
4. Preparation of and adherence to specifications for purchase of new apparatus which provide maximum cost benefit for anticipated usage.

## DISCUSSION

### APPARATUS MAINTENANCE

With the exception of the City of Santa Cruz, each department is presently maintaining their own apparatus. Because of a lack of adequate facilities, much of the repair work must be contracted out. Centralized facilities would enable much of the repair work to be accomplished in-house with improved control of work performed.

It would also eliminate the expense and effort that each department is devoting to the apparatus maintenance program. Also the general overall level of service should improve.

#### APPARATUS MODERNIZATION

Many departments in the County are operating with fire apparatus that is out-dated and should be replaced. It is suggested that the recommended apparatus purchases be made within the next two or three years. Following that, a regular apparatus replacement program should be established.

An additional aerial ladder apparatus should be provided to cover the urbanized area on a regional basis. The same concept can be applied to emergency lighting, salvage, heavy rescue and other such apparatus as the need for such apparatus develops. Where truck companies are not readily available for urban or fringe urban areas, extra equipment should be carried on engine companies.

*Being  
done*

Typical replacement programs for custom built fire apparatus are:

Engines: 15 years, first line service, 10 years  
reserve = 25 years

Trucks: 20 years, first line service, 10 years  
reserve = 30 years

Any replacement schedule should consider the rate and type of usage of each specific agency. Extensive "off-road" operations will result in a shorter life expectancy. Some fire agencies, including heavily urbanized cities, are purchasing commercial chassis pumpers, of 1000 to 1250 gpm capability with an anticipated replacement at 10 year intervals.

## RECOMMENDATION NO. 8

### COMMUNICATIONS

Communications systems serving the fire service in Santa Cruz County should be centralized in order to facilitate other operational improvements such as joint response and eventual implementation of 911.

Estimated Cost: See recent communications study.

#### DISCUSSION

Since a separate county-wide communications study was being undertaken simultaneously with this study, it will be discussed only briefly in this report.

Adequate communications are essential to most improvements in the fire protection system in Santa Cruz County. Included under communications are the following functions related to fire protection:

1. Means for public to notify proper fire agency of an emergency. 2
2. Means for automatic systems to transmit alarm signals to proper fire agency. ?
3. Location for fire protection agency to receive alarms. ?
4. Method of dispatching apparatus and alerting off-duty, paid on-call, or volunteer fire fighters. *Now in use.*
5. Means for fire apparatus of different departments to communicate with each other. *Now in use.*
6. Dispatching and coordinating multiple agency operations at major incidents.

Since most fire agencies depend upon regional assistance in major fire incidents, a closely coordinated communications system is essential. Centralized communications systems should be organized under a joint powers agreement between all participating fire agencies.

Centralized communications systems should provide the following:

- Receipt of all emergency calls.
- Receipt of business calls outside normal working hours.
- System should be capable of meeting the requirements of 911 system.
- Develop and maintain a dispatch system for the area served, this should include:
  - a. Standardized run map system with distribution of standard maps to all participating and mutual aid agencies.
  - b. A run card assignment system.
  - c. An automatic multiple alarm and mutual aid system.
  - d. Continuous recording of telephone and radio circuits with instant play-back of telephone recording.
  - e. A system of preventive maintenance and repair, for mobile and base station equipment, including cost analysis and scheduled replacement programs.
  - f. Record maintenance for emergency incidents and communications activities.

#### ALTERNATIVES

- One County wide joint powers operated communications center, including Division of Forestry.
- One County wide joint powers operated communications center, excluding Division of Forestry.
- Four joint powers operated communication centers:
  - San Lorenzo Valley
  - Urban coastal area -- Santa Cruz to La Selva Beach
  - Watsonville Area
  - Division of Forestry
- Retain current dispatching and communications system.

This system should provide for multiple simultaneous communication nets. The routine use of multiple frequencies should be implemented and utilized in normal operations and planned for use in major emergencies. Routine use of such a system improves its reliability for major incidents.

The following general recommendations are made to facilitate implementation of other recommendations of the study:

1. Communications should be centralized as much as possible. This will be necessary to implement and adopt the universal emergency reporting telephone 911. Substantial savings in the cost over operating separate communication centers should also be realized. Communication centers should conform to the suggested criteria in the appendix.
2. All fire equipment in the County should be equipped with four frequency radios. ?
3. All apparatus, except "reserve" apparatus, should be provided with four frequency portable radios. ?
4. The alerting systems utilized to notify all off-duty, paid on-call, and volunteer fire fighting personnel should incorporate the use of portable tone activated radio receivers. Receivers should be provided with a rechargeable battery stand-by power supply. In addition, it may also be desirable to provide certain personnel with pocket-pager type radio receivers.

At present, only a few fire departments are using tone activated radios for alerting fire fighting personnel not in the station at

the time of an alarm. Many rely only on an outdoor siren. Since personnel live and work in widely scattered areas, a siren is often of limited value. A siren is also difficult to hear under certain conditions. A few departments are using a pyramiding telephone call system to alert their members of an alarm. This method should be phased out since it is both unreliable and time consuming.

RECOMMENDATION NO. 9  
WATER SERVICE FOR FIRE PROTECTION

County and city ordinances controlling installation and improvement of water systems should be adopted. The ordinances should incorporate performance standards which will specify required fire flows and minimum hydrant types based on building construction or projected land use.

Estimated Cost: Minimal.

DISCUSSION

There are numerous instances throughout the County where water service is inadequate for fire fighting and hydrants are not well located. A review of fire flow tests conducted by the Insurance Services Office shows that many water systems serving urbanized areas of the County are not capable of providing even minimal fire flows. In fact, a few areas have no system capabilities at all. Remote sections generally do not have water systems having a recognized fire flow capability. While several fire departments have inventoried water supplies in remote areas, most supplies or systems have never been tested and their performance is questionable.

Performance of water systems is usually limited by the use of underground mains which are too small to provide adequate flows for fire fighting. It is recommended that in general pipes supplying hydrants be not less than 6 inches in diameter and well gridded. Arterial mains should be 8 inches or larger as dictated by the potential hazards. In urban areas, water system performance should be at least 1,000 gallons per minute. Insurance Services Office criteria for fire flows are established based on size and construction of the buildings. While the requirements in some cases tend to be excessive, they do serve as a guide for system performance. The following table indicates typical ranges of fire flow requirements.

TABLE NO. 1  
TYPICAL ISO REQUIRED FIRE FLOWS

Single Family Residential	1000 - 1500 gallons per minute
Multiple Family Residential	2000 - 3500
Minor Business	1500 - 3500
Major Business	2000 - 5500
Industrial	2000 - 6000
Institutional	1500 - 4000

In a few especially severe cases fire flow requirements may exceed those listed. Credit is given for superior construction and where automatic sprinkler systems are installed. Water systems are also required to deliver the indicated flow for a specified duration ranging from 2 to 10 hours. In Santa Cruz County the typical maximum ISO requirement would be for less than 5 hours.

In remote areas, it is usually not feasible to provide water systems which conform to ISO criteria. In such cases, in areas of single family dwellings, a water system should be provided which will provide a minimum of 500 gallons per minute for one hour.

Extensive use is made of wharf type hydrants with a single outlet. New hydrants, as a minimum, should be the two-way type. A 4 1/2 in. steamer connection is desirable in urban areas. Spacing between hydrants should not exceed 1000 ft. in rural areas and 500 ft. in urban areas.

There does not appear to be a simple inexpensive solution to deficiencies in existing water systems, except to embark on an extensive improvement program designed to provide maximum benefits for the most reasonable cost. Goals should include adequate hydrants and

mains in urban areas, a combination of hydrants and tankers in urban fringe areas, and tankers in rural areas. It is recommended that a county-wide study be conducted to inventory fire water supplies, pumping capacity, available storage, other static supplies and to determine performance of all water systems and supplies.

RECOMMENDATION NO. 10  
BUILT-IN PROTECTION

A county-wide ordinance should be developed to require increased built-in fire protection for buildings.

Estimated Cost: Minimal.

DISCUSSION

If automatic alarm and suppression systems were built into all large buildings and hazardous occupancies, the need for high levels of public fire department staffing could be significantly reduced. By reducing the potential for large fires, fire departments could be staffed to control fires of a maximum magnitude created by fire areas equal to one or two family residences. Manageable fire areas would be defined and maintained via built-in protection. This is the most logical means of reducing fire department costs without increasing the fire control problem. The upward spiral of wages and equipment costs along with reduction in working hours, have combined to increase fire department budgets to a point where the public is reluctant to accept any further tax increases. Fire problems of new construction designs and technology are creating fire problems which cannot effectively be controlled through traditional staffing and fire department operations.

The primary benefit of built-in protection, however, is in the improved fire protection afforded a structure and the increased safety to life afforded building occupants. Most building owners would also benefit by reductions in fire insurance premiums that result when automatic sprinklers are installed. Frequently, the savings on fire insurance premiums will pay for the cost of installing an automatic sprinkler system in four to six years. After that, savings are essentially pure profit. There are other financial benefits, such as reduced construction costs, construction flexibility, occupancy change flexibility, and business loss protection.

Once fire potential is reduced, the fire department can concentrate on insuring that all automatic systems are properly maintained and hazards are controlled. Occupancy changes should be closely monitored to prevent the introduction of hazards for which automatic systems were not designed.

Since over half of the 12,000 annual fire fatalities occur in residential occupancies, early warning fire detection systems should be installed in all dwelling units. Fatal dwelling fires often occur at night when the occupants are asleep. Victims are typically found in or near their beds where they were overcome by smoke and fire gases before they could escape. It appears that fire detectors which react to low levels of products of combustion would provide sufficient warning to allow occupants to escape before they are overcome or trapped. In order to regulate the sale and installation of home fire alarm systems, a section of the ordinance should be designed to prevent unethical persons from selling unapproved systems. Adoption of the 1973 Uniform Building Code would accomplish this.

It is beyond the scope of this study to suggest specific code changes to implement this program. It is recommended that an in-depth study be made to determine the types of building restrictions needed to responsibly and adequately control fire problems in Santa Cruz County to a level consistent with the ability to provide public fire protection.

RECOMMENDATION NO. 11  
LONG RANGE PLAN

All fire suppression in Santa Cruz County should eventually be integrated into one of four jurisdictions based on the previously recommended operational areas.

Cost Not Estimated.

DISCUSSION

Implementation of this recommendation will be a natural progression from the changes implemented in Recommendations No. 1 through 9. The recommended four jurisdictions should be essentially the same as the four operational areas of Recommendation No. 2. In a few areas, it will be necessary to realign boundaries to insure that the character of a district is compatible with the jurisdiction serving it. In order to implement this recommendation, it will only be necessary to consolidate the administrative functions of the various fire departments.

The principal advantage of consolidating fire suppression services is economic. It is projected that savings of 10 to 20% will be possible compared with the cost of continuing to operate 18 small independent departments. The constantly increasing cost of providing fire department service, particularly the cost of personnel, makes it imperative that fire department service be provided as efficiently as possible.

Administration is also one of the areas where savings are possible. Instead of having 18 different administrative organizations, each duplicating the work of the other, the number would be reduced to four. At the same time, the recommended four jurisdictions will be small enough to remain responsive to public needs.

Another advantage of consolidation is that it will be possible to assure continuous operational efficiency without the fluctuations

that will occur with changes of personnel in traditional departments.

Map Number 2 illustrates the general outline of suggested jurisdiction boundaries and station locations. Note that the Aromas Fire Protection District has not been included in the South County District.

#### DISCUSSION OF ALTERNATIVES

This study considered several alternative methods for providing improvements in the Santa Cruz County fire protection system.

The alternatives consisted of the following:

1. Continue as present; no change.
2. Consolidation of support services only.
3. Consolidation of support services and partial consolidation of fire suppression services.
4. Complete consolidation of all functions into one County Fire Department.

#### ALTERNATIVE 1

There are several reasons why fire protection in Santa Cruz County should not continue unchanged. The predominant reason is that residents of four fire protection districts are not receiving an adequate level of protection. It would be extremely costly and inefficient to improve fire protection service to an acceptable level without combining some of the services as suggested in the other alternatives

#### ALTERNATIVE 2

Overall effectiveness can be improved by only improving support services such as communications, training, fire prevention, equipment maintenance and purchasing. Every fire jurisdiction in the County

lacks in one or more of the functions listed. The principal reason for this is, that most jurisdictions are too small to provide good services by themselves. By providing these functions at the County level, it will be possible to achieve greater efficiency and generally improve the level of service to all residents of the County.

Since fire suppression activities would continue to be handled by existing jurisdictions (with the exception of the four small districts), this alternative would result in the retention of the largest degree of local control and therefore will probably be the most acceptable politically. If a high degree of cooperation can be achieved between jurisdictions, the only reason for not recommending this alternative is the higher operational costs that would result as compared to Alternative 3.

#### ALTERNATIVE 3

This alternative provides for a partial consolidation of fire suppression jurisdictions in addition to the consolidation of support services discussed in Alternative 2. For the purpose of fire suppression, the County would be divided into four districts. Two districts would protect the mid and south-county region while the third district would include the San Lorenzo Valley and Scotts Valley areas. The fourth district would incorporate all rural areas not included in the first three. This alternative would permit a greater degree of local control to be retained while still achieving most of the economies of a single county-wide district. This alternative is recommended as being the most feasible to implement at this time.

#### ALTERNATIVE 4

This plan would consolidate all fire protection functions into one County Fire Protection District. This alternative has the advantage of being the most efficient and economical system, however, it would also result in the greatest loss of local control. This factor

?

alone would probably make it unacceptable at this time. The disadvantage of a county-wide fire department is that it would be impossible to provide a uniform level of protection throughout the County. Yet residents of rural areas would be taxed at the same rate as suburban and urban residents. Special taxing zones can be set up for rural areas. However, the cost of achieving urban levels of protection would result in an unacceptable tax rate in the rural areas. Also the urban needs would tend to dominate the type of service provided and this service may not be the best available to rural areas.

P A R T   I I I  
EXISTING FIRE DEPARTMENT SERVICES  
IN SANTA CRUZ COUNTY

Primary structural fire fighting service in Santa Cruz County is provided by two municipal fire departments, 15 fire protection districts and the State of California, Division of Forestry. In addition, a private fire department serves the facilities of the Lockheed Missile and Space Division and a new fire department is being organized to serve the Santa Cruz campus of the University of California. The California Division of Forestry (CDF) has responsibility for all watershed fires in the County and also provides structural fire protection under a contract with the County for all areas of the County not served by organized fire departments or districts. The CDF also operates the Pajaro Dunes County Service Area Fire Department under a contract with the Service Area. Four civil defense fire teams operate in remote areas of the County under the direction of the CDF.

Basic data on the municipal fire departments and fire protection districts are summarized in the following tables:

TABLE NO. 2

## FIRE DEPARTMENTS AND CHIEFS

City, Village or Town	Fire Department	Chiefs' Name
Aptos	Aptos Fire Protection District	R. Chinn
Aromas	Aromas Fire Protection District	A. J. Deshaies
Ben Lomond	Ben Lomond Fire Protection District	C. Fisher
Boulder Creek	Boulder Creek Fire Protection District	Bud Tomlin
Branciforte	Branciforte Fire Protection District	W. D. Thomas
Capitola	Capitola Fire Protection District	F. H. Jarvis
Davenport	Davenport Fire Protection District	E. Orlando
Felton	Felton Fire Protection District	Ted Toft
Freedom	Freedom Fire Protection District	E. A. Espindola
La Selva Beach	La Selva Fire Protection District	R. H. Hiles
Live Oak	Live Oak Fire Protection District	R. H. Pound
Salsipuedes	Salsipuedes Fire Protection District	M. E. Souza
Santa Cruz	Santa Cruz Fire Department	C. Schneider
Scotts Valley	Scotts Valley Fire Protection District	C. Bruce Scott
Soquel	Soquel Fire Protection District	Raymond Negro
Watsonville	Watsonville Fire Department	W. B. Connick
Zayante	Zayante Fire Protection District	L. W. Fowler

TABLE NO. 3

## FIRE STATION LOCATIONS

Fire Department	Location
Aptos Station #1 Station #2	6934 Soquel Drive Bonita and Monterey Drives
Aromas  Ben Lomond	Blohm and Carpenteria Avenue  Highway 9, Ben Lomond
Boulder Creek  Branciforte  Capitola	Central and Basin Way  2711 Branciforte Drive  405 Capitola
Davenport  Felton  Freedom  La Selva Beach	  Kirby and Gushee  2021 Freedom Blvd.  312 Estrella
Live Oak Station #1 Station #2	930 - 17th Avenue 3445 Turber Lane (Twin Hills)
Salsipuedes	562 Casserly Road
Santa Cruz Station #1 Station #2 Station #3	711 Center Street 1103 Soquel 335 Younglove Avenue
Scotts Valley Station #1 Station #2	4423 Scotts Valley Drive 19 Sims Road, Santa Cruz, CA
Soquel  Watsonville  Zayante	4747 Soquel Drive  Second and Rodriguez  832 East Zayante Road

TABLE NO. 4

## DATA ON FIRE STATIONS

Fire Department	Year Built	Bays	Condition	Comments
Aptos Station #1	1967	3	Good	Located one block from northern of district. Inadequate dormitory Type V-N
Station #2	1973	2	Good	
Aromas	1920's	3	Poor	1. Not centrally located 2. Designed as a school 3. Inadequate sanitation and dorm facilities
Ben Lomond	1942	3	Good	Type V-N
Boulder Creek	1943	3	Good	
Branciforte	1966	3	Good	Inadequate dormitory
Capitola	1955	2	Good	Inadequate size and facilities
Davenport	1960	3	Poor	
Felton	Main bldg. 1950 add'n 1970	7	Good	
Freedom	1955	4	Fair	Inadequate Dormitory
La Selva	1971	3	Good	Type V-N, crowded
Live Oak Station #1	----	3	Good	
Station #2	1963	3	Good	
Salsipuedes	1951	2	Fair	Type V-N, crowded
Santa Cruz Station #1	1941	3	Good	Lack of office space for headquarters Station located too close to Soquel Avenue (traffic hazard)
Station #2	1948	2	Good	
Station #3	1954	2	Good	
Scotts Valley Station #1	1960	4	Good	Poor location
Station #2	1963	2	Good	

Soquel	1957	4	Good	No dormitory
Watsonville	1924, 1928 1967	4	Good	Living and administration areas not functional - over distant from some response areas
Zayante	1942	2	Poor	Type V-N

TABLE NO. 5

## FIRE DEPARTMENT MANPOWER

Fire Department	Paid	Paid on Call & Volunteers
Aptos	22	--
Aromas	4	17
Ben Lomond	3	36
Boulder Creek	--	30
Branciforte	2	14
Capitola	8	20
Davenport	--	14
Felton	1	25
Freedom	3	25
La Selva	--	20
Live Oak	21	29
Salsipuedes	2	24
Santa Cruz	42	--
Scotts Valley	8	30
Soquel	2	38
Watsonville	19	34
Zayante	1	13
TOTAL	138	369

TABLE NO. 6  
FIRE STATIONS AND APPARATUS

FIRE DEPARTMENT	No. Fire Stations	Pumpers		Ladder Trucks	Tanker	Brush	Rescue	Other
		500 gpm or less	750 gpm or larger					
Aptos	2	1	4	-	1	1	-	-
Aromas	1	2	-	-	-	1	1	-
Ben Lomond	1	1	2	-	1	1	1	-
Boulder Creek	1	1	3	-	-	1	1	-
Branciforte	2*	1	1	-	1	1	-	-
Capitola	1	-	2	-	-	-	1	1
Davenport	1	2	-	-	-	-	1	-
Felton	1	1	2	-	-	1	1	-
Freedom	1	2	2	-	1	1	-	-
La Selva	1	2	-	-	-	-	1	1
Live Oak	1	2	4	-	-	2	-	-
Salsipuedes	1	-	1	-	1	1	-	-
Santa Cruz	3	1	4	1	-	1	-	1
Scotts Valley	2	2	3	-	1	2	-	-
Soquel	1	1	2	-	1	3	1	-
Watsonville	1	-	5	2	-	-	-	-
Zayante	1	-	2	-	-	1	-	-
<b>TOTALS</b>	<b>23</b>	<b>18</b>	<b>37</b>	<b>3</b>	<b>7</b>	<b>17</b>	<b>8</b>	<b>3</b>

\*One Temporary

TABLE NO. 7

## DATA ON APPARATUS

Fire Department	Company Number	Year and Make	Type
Aptos	3510	1965-Mack	1250 GPM - Pumper
	3511	1966-Mack	1000 GPM - Pumper
	3520	1972-GMC-Howe	750 GPM - Pumper
	3521	1972-GMC-Howe	750 GPM - Pumper
	3531	1948-Dodge-Van Pelt	500 GPM - Pumper (Reserve)
	3540	n/a - GMC	500 GPM - 3300 Gal. Tanker
	3550	1972-GMC-Howe	300 GPM - Brush Rig
Aromas	#131	1955-Sherman-Dodge Weapons Carrier	Brush Rig
	#132	1953-Curtis-Ford	500 GPM - Pumper
	#133	1955-Sherman-International	500 GPM - Pumper
	#134	1972-John Bean-Ford Pick Up	10 GPM - Rescue
Ben Lomond	2211	1963-Van Pelt-Ford	1000 GPM - Pumper
	2212	1970-Van Pelt-International	1000 GPM - Pumper
	2231	1952-Coast-International	250 GPM - Pumper
	2232	1948-Van Pelt-White	350 GPM - 1000 Gal. Tanker
	2261	n/a Jeep	2-Pump Cans-Brush Rig <u>RESCUE</u>
Boulder Creek	2111	1970-American La France	1250 GPM - Pumper
	2121	1956-American La France-GMC	750 GPM - Pumper
	2122	1963-American La France-Ford	750 GPM - Pumper
	2123	1946-American La France	500 GPM - Pumper
	2151	1968-Chevrolet Pick Up	25 GPM - Brush Rig
	2161	1974-Dodge Mixivan	<u>Rescue</u>
Branciforte	2610	1955-Coast-Peterbilt	1000 GPM - Pumper
	2631	1939-Darley-GMC	500 GPM - Pumper
	2641	1940-GMC	1000 Gal. Tanker
	2651	1968-Dodge Pick Up	35 GPM - Brush Rig

n/a not available

DATA ON APPARATUS (Continued)

Fire Department	Company Number	Year and Make	Type
Capitola	<del>3341</del> <del>3341</del>	1950-Mack 1960-Mack	750 GPM - Pumper <del>1000</del> GPM - Pumper Rescue Truck
Davenport	----- ----- -----	1954-Chevrolet 1954-Ford 4 x 4 1965-International Pick Up 4 x 4	500 GPM - Pumper 500 GPM - Pumper <u>Rescue</u>
Felton	2321 2311 2361 2312 2362	1948-Van Pelt-White 1963-American La France-Ford 1947-Dodge 4 x 4 Weapons Carrier 1972-Van Pelt-International 1960-Chevrolet Panel	500 GPM - Pumper (Reserve) 1000 GPM - Pumper 100 GPM - Brush Rig 1000 GPM - Pumper <u>Rescue Truck</u>
Freedom	4211 4210 4250 4240 4221 4222	1973-Seagrave 1968-Mack 1952-Dodge 4 x 4 Weapons Carrier 1962-Hirsch-GMC 1949-Coast-International 1952 Crown-International	1500 GPM - Pumper 1250 GPM - Pumper 150 GPM - Brush Rig 250 GPM - 1500 Gal. Tanker 500 GPM - Pumper 500 GPM - Pumper
La Selva	4121 4130 4150 4161	1948-Van Pelt-White 1955-International 1965-John Bean-Ford 1957-Willlys Jeep	500 GPM - Pumper 250 GPM - CDF Type Pumper 37 GPM - High Pressure <u>Rescue Truck</u>
Live Oak	3210 3211 3220 3221 3250 3251 3222	1965-Crown 1969-Crown 1950-Van Pelt-White 1947-Van Pelt-White 1967-Chevrolet 3/4 Ton 1963-Chevrolet 3/4 Ton 1951-Ward La France	1250 GPM - Pumper 1250 GPM - Pumper 750 GPM - Pumper 500 GPM - Pumper 200 GPM - Pick Up 200 GPM - Pick Up 750 GPM - Pumper (Reserve)

DATA ON APPARATUS (Continued)

Fire Department	Company Number	Year and Make	Type
Salsipuedes	4321	1951-Van Pelt-GMC	750 GPM - Pumper
	4331	1956-Van Pelt-GMC	350 GPM - 1000 Gal. Tanker
	4351	1952-Weapons Carrier Dodge	35 GPM - Brush Rig
Santa Cruz	E-1	1965-Van Pelt	1250 GPM - Pumper
	E-2	1955-Seagrave	1000 GPM - Pumper
	E-3	1956-Seagrave	1000 GPM - Pumper
	E-4	1950-Seagrave	1000 GPM - Pumper
	E-5	1946-Van Pelt-White	500 GPM - Pumper (Reserve)
	Truck-1 Utility-1 Salvage-1	1949-American La France 1957-Chevrolet Pick Up 1946-Chevrolet Panel	75' Aerial Ladder Truck 90 GPM - Brush Rig Salvage Truck
Scotts Valley	2511	1964-Van Pelt-Ford	1000 GPM - Pumper
	2510	1972-Van Pelt-Ford	750 GPM - Pumper
	2522	1957-Curtis-GMC	750 GPM - Pumper
	2541	1944-International	350 GPM - 2000 Gal. Tanker
	2552	1954-Dodge Weapons Carrier	126 GPM - Brush Rig
	2553	1971-Ford Pick Up	10 GPM - Brush Rig
	2521	1948-GMC	250 GPM - Pumper
Soquel	3410	1962-Van Pelt-Ford	1000 GPM - Pumper
	3420	1950-Van Pelt-GMC	750 GPM - Pumper
	3430	1947-Van Pelt-Dodge	350 GPM - Pumper
	3440	1964-Van Pelt-Ford	250 GPM - 2000 Gal. Tanker
	3450	1961-Jeep	12 GPM - Brush Rig
	3460	1971-Dodge Maxivan	Rescue
	3490	1968-Ford Pick Up	23 GPM - Brush Rig
	3491	1969-Ford Pick Up	100 GPM - Brush Rig

DATA ON APPARATUS (Continued)

Fire Department	Company Number	Year and Make	Type
Watsonville	4461	1967-Crown-Maxim	100' Aerial Ladder Truck
	4462	1928-Seagrave	City Service Ladder Truck (Reserve)
	4411	1967-Crown	1250 GPM - Pumper
	4412	1970-Van Pelt	1250 GPM - Pumper
	4413*	1966-International-Van Pelt	1000 GPM - Pumper
	4414	1959-Seagrave	1000 GPM - Pumper
	4425	1951-GMC-Coast	600 GPM - Pumper (Reserve)
	2422	1964-American La France-Ford	750 GPM - Pumper
	2421	1958-American La France-GMC	750 GPM - Pumper
	2400	1960-Chevrolet Pick Up	10 GPM - Brush Rig
Zayante			

\* Owned by Pajaro Fire District, Monterey County

TABLE NO. 8

SUMMARY OF APPARATUS

<u>PUMPERS</u>	<u>TANKERS</u>
Less Than 500 GPM - 35 500 GPM - 13 600 GPM - 1 750 GPM - <del>13</del> 1000 GPM - <del>14</del> 1250 GPM - 8 1500 GPM - 1 <hr/> 55	1000 Gallon - 3 1500 Gallon - 1 2000 Gallon - 2 3300 Gallon - 1 <hr/> 7
<u>LADDER TRUCKS</u>	<u>OTHER APPARATUS</u>
75' Aerial - 1 100' Aerial - 1 No Aerial - 1 <hr/> 3	Brush Trucks - 17 Rescue - <del>7</del> Salvage - 1 High Pressure - 1 <hr/> 25

TABLE NO. 9

## MOBILE WATER SUPPLY APPARATUS

Department	Year & Make	Tank Cap.	Pump Cap.	Condition & Capability
Aptos	n/a GMC	3300 gallons	1000 gpm	Good
Ben Lomond	1948 Van Pelt - White	1000 gallons	350 gpm	Fair
Branciforte	1940 GMC	1000 gallons	150 gpm	Fair
Freedom	1962 Hirsch-GMC	1500 gallons	250 gpm	Fair
Salsipuedes	1956 Van Pelt-GMC	1000 gallons	350 gpm	Fair
Scotts Valley	1944-International	2000 gallons	350 gpm	Fair
Soquel	1964-Van Pelt-Ford	2000 gallons	250 gpm	Good
Bonny Doon	1951-Federal	2000 gallons	n/a	Poor
Corralitos	n/a International	3200 gallons	n/a	Poor
Loma Prieta	n/a	3200 gallons	n/a	Poor
Cal. Div. Forestry	n/a Ford	1200 gallons	500 gpm	Good

n/a Not Available

TABLE NO. 10  
EMERGENCY CALLS

Fire Department	Structural	Rescue or First Aid	Vehicle	Grass or Range	False	Other	Total	
Aptos	26	75	29	34	12	198	374	5
Aromas	5	0	12	28	0	6	51	12
Ben Lomond	17	42	20	20	5	26	130	9
Boulder Creek	17	155	0	7	0	84	263	7
Branciforte	6	2	3	4	6	28	49	14
Capitola	42	150	22	34	10	157	415	3
Davenport	2	34	7	0	0	0	43	15
Felton	10	62	4	9	0	23	108	11
Freedom	32	8	24	21	4	26	115	10
La Selva	n/a	n/a	n/a	n/a	n/a	n/a	50	13
Live Oak	55	107	32	48	29	278	549	2
Salsipuedes	3	0	6	13	2	14	38	17
Santa Cruz	65	355	83	97	260	341	1201	1
Scotts Valley	28	46	42	23	25	157	321	6
Soquel	22	84	23	31	15	47	222	P
Watsonville	90	11	40	65	76	95	377	4
Zayante	27	0	4	9	0	0	40	16
Total	447	1,131	351	443	444	1,480	4,346	

n/a Not Available

TABLE NO. 11

## FIRE DEPARTMENT RADIO EQUIPMENT

Fire Departments	Frequency	Number Mobile Units	Number Portable Units
Aptos	154.325 MHz	6	4
Aromas	154.325 MHz	3	2 (citizens band)
Ben Lomond	154.325 MHz	5	1
Boulder Creek	154.325 MHz	6	6
Branciforte	154.325 MHz	3	2
Capitola	154.325 MHz	7	2
Davenport	154.325 MHz	3	3
Felton	154.325 MHz	5	2
Freedom	154.325 MHz	6	3
La Selva	154.325 MHz	4	0
Live Oak	154.325 MHz	7	5
Salsipuedes	154.325 MHz	3	1
Santa Cruz	154.415 MHz 154.325 MHz	8	7
Scotts Valley	154.325 MHz	6	0
Soquel	154.325 MHz	8	2
Watsonville	154.445 MHz 154.325 MHz	7	4
Zayante	154.325 MHz	3	0

TABLE NO. 12

COMMUNICATIONS

DISTRICT	Method of alerting volunteers or recalling off-shift						Method of dispatching companies (applies only to departments having two or more stations)		
	Fire Alarm Box System	Siren or Horn	Tone Radio	Telephone	Group Alerting	Telephone System	Telephone or Hot Line	Radio	Intercom
APTOS			X				X	X	
AROMAS		X		X					
BEN LOMOND		X		X					
BOULDER CREEK		X							
BRANCIFORTE					X				
CAPITOLA		X	X	X					
DAVENPORT		X		X					
FELTON		X							
FREEDOM		X	X						
LA SELVA		X							
LIVE OAK		X		X			X		
SALSIPUEDES		X		X					
SANTA CRUZ	X			X					X
SCOTTS VALLEY						X	X	X	
SOQUEL		X							
WATSONVILLE	X		X						
ZAYANTE		X		X					

TABLE NO. 13

FIRE PREVENTION AND TRAINING

District	Building Code	Fire Prevention Program	Fire Prevention Code	Electrical Code	Training Program	Training Facilities
APTOS	County	Planned	UFC	NEC	X	Use
AROMAS	UBC	Planned	UFC		X	Watsonville
BEN LOMOND	County	None	None		X	None
BOULDER CREEK	UBC	None	None	Yes	X	None
BRANCIFORTE		Planned	None		X	None
CAPITOLA	UBC	Yes	Yes	NEC	X	None
DAVENPORT		None	None		X	None
FELTON	County	None	None		X	None
FREEDOM	County	Yes	NBFU 1960	Yes	X	None
LA SELVA	County	Yes	None		X	None
LIVE OAK	UBC	Yes	Yes	County	X	Yes
SALSIPUEDES	UBC	Yes	None	NEC	X	None
SANTA CRUZ	UBC	Yes	UFC	NEC	X	None
SCOTTS VALLEY	UBC	Yes	Yes	NEC	X	None
SOQUEL	UBC	None	None		X	None
WATSONVILLE	UBC	Yes	Yes	NEC	X	Yes
ZAYANTE		None	None		X	None

County - County Building Code  
 UBC - Uniform Building Code  
 UFC - Uniform Fire Code  
 NBFU - National Board of Fire Underwriters  
 NEC - National Electrical Code

TABLE NO. 14

## FIRE DEPARTMENT COST DATA

DISTRICT	POPULATION	AREA SQ. MI.	BUDGET	PER CAPITA COST	ASSESSED VALUE PER SQ. MI.
APTOS	12,000	8	\$557,518	\$46.46	\$4,687,500
AROMAS	2,500	36	86,353	34.54	n.a.
BEN LOMOND	3,500	5	52,000*	14.86	1,560,000
BOULDER CREEK	4,500	7	72,200	16.04	1,686,000
BRANCIFORTE	1,000	8	42,500	42.50	375,000
CAPITOLA	7,200	2	137,500	55.47 <del>16.37</del>	9,350,000
DAVENPORT	1,000	19	3,600*	3.60	184,000
FELTON	3,500	5	40,000	11.43	2,000,000
FREEDOM	5,700	8	140,050	24.57	1,575,000
LA SELVA	2,100	1	65,000	30.95	3,300,000
LIVE OAK	20,400	5	419,123	20.55	7,680,000
SALSIPUEDES	4,500	31	73,000	16.22	419,000
SANTA CRUZ	34,000	10.5	758,410	22.31	8,857,000
SCOTTS VALLEY	12,628	25	216,000	17.10	1,032,000
SOQUEL	6,000	14	95,600	15.93	1,143,000
WATSONVILLE	16,350	4.8	329,050	20.12	8,521,000
ZAYANTE	3,000	11	17,000*	5.67	527,000
TOTAL	139,878				

\* estimated

TABLE NO. 15

## FIRE DEPARTMENT BUDGETS

Fire Department	Budget 1971-72	Expenditures 1971-72	Budget 1972-73	Expenditures 1972-73	Budget 1973-74
Aptos	\$348,663.00	\$322,620.95	\$527,907.00	n/a	\$557,517.97
Aromas	34,811.00	34,811.00	40,680.00	40,680.00	86,353.00
Ben Lomond	n/a	n/a	n/a	n/a	n/a
Boulder Creek	53,840.00	n/a	56,550.00	n/a	72,200.00
Branciforte	27,000.00	25,000.00	32,000.00	n/a	42,500.00
Capitola	363,575.00	127,457.00	399,443.00	137,500.00	n/a
Davenport*	34 to 3,600.	34 to 3,600.	34 to 3,600.	34 to 3,600.	34 to 3,600.
Felton	36,032.35	36,032.35	79,737.72	79,737.72	40,000.00
Freedom	92,736.00	61,138.51	116,162.00	85,000.00	140,050.00
La Selva	55,900.00	15,000.00	56,000.00	17,545.00	65,000.00
Live Oak	335,331.00	312,860.57	378,160.00	295,160.00	419,123.00
Salsipuedes	21,030.18	8,480.96	59,350.00	13,350.00	73,000.00
Santa Cruz	633,579.00	677,984.00	722,812.00	707,053.00	758,410.00
Scotts Valley	172,345.00	126,743.93	224,976.00	108,817.00	216,000.00
Soquel	99,320.00	63,159.00	104,150.00	92,066.00	95,650.00
Watsonville	262,725.00	262,725.00	311,775.00	311,775.00	329,050.00
Zayante*	15,000.00	15,000.00	17,000.00	17,000.00	n/a

\*Estimate by Chief of Department

TABLE NO. 16

## HISTORICAL FIRE PROTECTION TAX RATES BY DISTRICT

Tax Rate Per \$100 Assessed Valuation

Year	1972-73	1971-72	1970-71	1969-70	1968-69	1967-68
District						
Aptos	.800	.758	.805	.787	.525	.674
Aromas	.438	.429	.330	.259	.180	.430
Ben Lomond	.664	.572	.503	.570	.324	.564
Boulder Creek	.430	.452	.345	.462	.328	.334
Branciforte	1.075*	.747*	.642*	.527*	.632*	.690*
Capitola	.796	.796	.960	.825	.594	.683
Davenport	None	.110	.035	.094	.100	.025
Felton	.328	.351	.358	.351	.300	.308
Freedom	.657*	.644*	.628*	.558*	.519*	.539*
La Selva	.710	.647	.588	.540	.642	.500
Live Oak	.890	1.054	.859	.793	.688	.596
Salsipuedes	.239	.194	.203	.097	.160	.139
Scotts Valley	.585	.553	.465	.438	.445	.423
Soquel	.499	.458	.486*	.456*	.458*	.430*
Zayante	.244	.241	.234	.309	.349	.364
Pajaro Dunes (CSA #4)	1.300	None	None	None	None	None
Santa Cruz	1.50 <sup>+</sup>					
Watsonville	2.05 <sup>+</sup>					

\* Includes debt service

<sup>+</sup> Total city tax rate

TABLE NO. 17

HISTORICAL ASSESSED VALUATION BY DISTRICT  
(Valuation in Millions of Dollars)

Year	1972-73	71-72'	70-71'	69-70'	68-69'	67-68'
District						
Aptos	37.5	34.3	30.4	28.3	27.0	25.4
Aromas	.5	.5	.4	.4	.4	.4
Ben Lomond	7.8	7.5	6.1	5.9	5.8	5.7
Boulder Creek	11.8*	11.3	10.7	9.2	9.0	8.7
Branciforte	3.0	2.8	2.6	2.5	2.2	2.2
Capitola	18.7	16.0	14.8	14.2	13.7	12.9
Davenport	3.5	4.4	4.2	1.8	1.8	2.0
Felton	10.0	9.6	8.9	8.7	8.4	8.1
Freedom	12.6	12.0	11.3	10.7	10.2	10.0
La Selva	3.3	3.0	2.8	2.7	2.7	2.4
Live Oak	38.4	31.0	28.9	27.8	27.2	26.3
Salsipuedes	13.0	12.0	11.1	10.8	10.5	10.2
Scotts Valley	25.8	23.1	21.1	19.7	18.3	17.2
Soquel	16.0	14.3	13.4	13.2	11.9	11.3
Zayante	5.8	5.4	4.7	4.6	4.2	3.9
Pajaro Dunes (CSA#4)	2.6	2.0	1.7	1.3	1.0	.7
Santa Cruz	93.0	86.3	81.2	77.9	76.0	72.0
Watsonville	40.9	38.5	36.1	34.2	33.1	31.8
County (CDF)	60.2	55.3	50.9	45.8	42.9	38.0
TOTAL	404.4	369.3	344.1	319.7	306.3	289.2

\*Recent annexation will increase 1973-74 valuation to approximately 15.9 million.

## TRAINING

All fire departments in the County report conducting some type of training program although the frequency of training sessions and the material covered varies considerably. Watsonville and Live Oak have training facilities that include a drill tower, and several departments report using Watsonville's tower on occasion. Only 2 of the fire departments have full-time training officers.

## FIRE PREVENTION

Eight departments have adopted a fire prevention code, however, only Capitola, Santa Cruz, Scotts Valley and Watsonville have a man assigned to fire prevention full time. Several departments report no fire prevention program. Nine departments report making regularly scheduled inspections of businesses. None have a home inspection program.

## MAINTENANCE

All departments perform their own routine apparatus maintenance. Most major work is handled by private garages or factory mechanics. Santa Cruz utilizes the facilities of their municipal garage. None of the fire departments have adequate shop facilities of their own.

P A R T I V  
CALIFORNIA DIVISION OF FORESTRY

GENERAL

The California Division of Forestry (CDF) has primary responsibility for preventing and suppressing watershed fires in the State of California. However, improvements, such as homes which are placed on watershed lands, are the fire protection responsibility of local government. Providing two fire departments to serve the same area would be an unnecessary duplication. Therefore, Santa Cruz County contracts with the California Division of Forestry to provide structural fire protection for all areas of the County not within a municipality or fire protection district.

During the wildland fire season, the CDF operates a total of seven fire stations in Santa Cruz County. Although their primary responsibility is watershed protection, they also respond to structural fires since all structural fires are potential watershed fires. During the non-fire season, however, all fire stations except the headquarters would normally be closed. Therefore, in order to maintain year-round structural protection, the County has contracted with the Division of Forestry to keep three fire stations open for 5 1/2 months during the non-fire season. The service provided under this contract is referred to as "Schedule A."

Areas of the County served by the CDF are generally remote and the terrain is quite hilly. Although most main roads are paved, they are usually narrow. Moderately steep grades are not uncommon. Land use is almost exclusively single-family residential with minor areas devoted to agriculture. Many dwellings are summer homes or are used for recreational purposes although year-round occupancy is becoming more common. Most buildings are well separated and fires usually do not communicate from building to building unless vegetation is

a factor. It was noted that many of the newer homes have been constructed with wood shingle roofs. Except for a few newer developments, water supplies adequate for fire fighting are almost non-existent. Assessed valuation of the area served by the CDF is approximately \$60,000,000.

Because of long response distances and narrow, hilly roads, response times are likely to be excessive and total destruction of the building or origin can be expected.

Other responsibilities of the CDF include operation of the Pajaro Dunes Fire Department under a contract with Service Area Number 4 and supervision of four Civil Defense fire teams.

#### ORGANIZATION

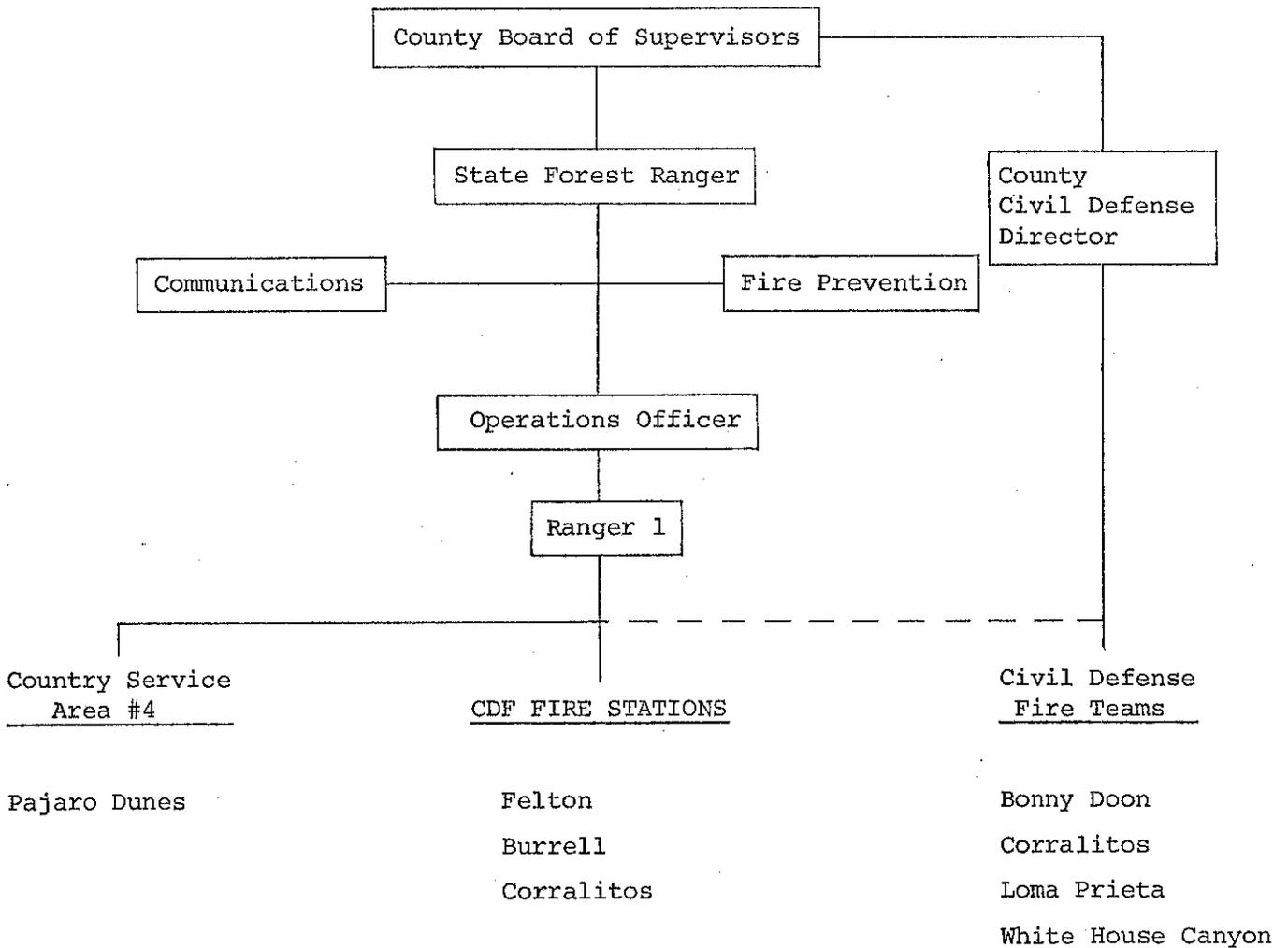
Fire suppression services of the California Division of Forestry operate in Santa Cruz County under the general supervision of the State Ranger charged with fire suppression responsibilities for Santa Cruz and San Mateo Counties with headquarters offices located in Felton. Plate No. II illustrates the basic organizational structure of the CDF under Schedule A (non-fire season) operations.

PLATE NO. II

ORGANIZATION CHART

CALIFORNIA DIVISION OF FORESTRY

SANTA CRUZ COUNTY



## OPERATING COSTS

Total cost to the County for operation of the three CDF fire stations during the non-fire season for the past three years is as follows:

1971 - 72	\$56,921
1972 - 73	\$63,109
1973 - 74	\$87,419

## MANPOWER

County subsidized Schedule A operations provide for one engineer on duty at all times at each of the three stations. At least one sleeper is also assigned to each station at night. During the fire season enough additional personnel are hired to operate each piece of apparatus with three or four men. Full-time personnel work an average 84 hour week. Seasonal fire fighters work an average 120 hour week.

## APPARATUS AND EQUIPMENT

Apparatus operated under Schedule A include a Pumper-Tanker at Felton and Pumpers at Corralitos and Burrel. During the non-fire season additional specialized equipment for structural fire fighting, including breathing apparatus, is placed on the trucks. Pertinent details of CDF fire apparatus is listed in the following table.

TABLE NO. 18  
 CALIFORNIA DIVISION OF FORESTRY  
 SCHEDULE 'A' FIRE APPARATUS

TYPE	PUMP CAPACITY	TANK CAPACITY	HOSE CARRIED		
			Booster	1 1/2"	2 1/2"
No. 1 Heavy Pumper	300 gpm	500 gallons	600'	1800'	500'
No. 8 Pumper-Tanker	500 gpm	1200 gallons	300'	1500'	500'

RESPONSE TO ALARMS

Normal response to a reported building fire during the non-fire season is one engine and two or three men. During the fire season as many as four engines plus other equipment may be dispatched. Mutual aid assistance is available on request from any of the fire protection districts when necessary.

COMMUNICATIONS

Alarms are received by telephone at the Division of Forestry communications center at the Felton Headquarters. Dispatching is performed by radio via tone activated receivers in each fire station. A telephone back-up is also available. All apparatus is equipped with dual frequency radios having a capability on both the state and county frequencies. Radio repeaters at strategic locations provide generally good coverage throughout the County.

PAJARO DUNES

County Service Area Number Four was formed to provide community services including a fire protection for the Pajaro Dunes development

near Watsonville. The Service Area contracts with the California Division of Forestry to operate the fire department. Annual cost to the Service Area is as follows:

1972 - 73	\$85,357
1973 - 74	\$85,943

A temporary station is located near the main entrance at West Beach Road and River Road. Permanent facilities are planned nearby.

One engineer is on duty 24 hours a day at this station and one sleeper is provided at night. Ten volunteer fire men have been recruited and trained from local residents. Eight maintenance men employed at Pajaro Dunes have also received fire training and respond to alarms when working in the area.

Apparatus consists of a 1973 Van Pelt-Ford 1000 gpm pumper with a 500 gallon tank and 2800 ft. of hose. A Cushman tracklayer is used for fire fighting access and for laying hose via the sand dunes area not served by roads. The contract with the Service Area also provides for automatic response of one engine and five men from Watsonville to all building fires at Pajaro Dunes. The Pajaro Dunes Fire Department does not respond to alarms outside of the Service Area.

Pajaro Dunes is served by the Watsonville Water Department. Adequate water is available for fire fighting. Hydrants are well distributed throughout the development.

#### CIVIL DEFENSE FIRE TEAMS

Four fire teams have been organized in remote areas of Santa Cruz County by the County Civil Defense Office. The fire teams are organized similar to independent volunteer fire departments, but

are under the operational control of the California Division of Forestry.

Apparatus used by the fire teams consists of government surplus fire fighting equipment and is generally old and of questionable reliability and safety. Since a total of only \$9,450 is available for operation of teams, each team usually relies on a fund raising activity to support its total operation. Two of the teams recently paid for the construction of new stations in this manner. Details on the fire teams are summarized in the following table:

TABLE NO. 19  
CIVIL DEFENSE FIRE TEAMS

Team Name	Personnel		Major Apparatus Data				Fire Station Data			
	No.	Chief	Unit Designation	Year & Make	Type	Station Location	Year Built	Bays	Condition	
Bonny Doon	40	Ethmer Jackson	CD-66 CD-20 CD-107 CD-46 n/a	1953 Reo 1951 Federal Ford Jeep Dodge	Pumper 2000 gal. tanker n/a Brush Truck Ambulance	985 Martin Road	1972	4	Good	
Corralitos	40	Eldon Pierce	CD-106 CD-14 CD-67 n/a	White n/a 1951 Cadillac Jeep	Pumper 3200 gal. tanker Ambulance Brush Truck	Browns Valley Road	n/a	n/a	Poor Open Shed	
Loma Prieta	40	Dennis Heimer	CD-76 CD-63 CD-25 CD-120 CD-112	1953 Reo n/a Jeep 1963 Ford Dodge	Pumper 3200 gal. tanker Brush Truck Pick-up Ambulance	Old Summit Road	1969	2	Good	
White House Canyon	15	James Harper	CD-52	1952 LaFrance Ford	500 gpm pumper	White House Canyon Road	n/a	1	Private Garage	

# PART V

## APPENDIX A

### FIRE INSURANCE GRADING

The "Grading Schedule for Municipal Fire Protection" is used by the Insurance Service Office (ISO) to classify cities, towns, fire districts or other legal organizations with respect to their fire defenses.

The Grading Schedule establishes standards for water supply, fire departments, fire service communications, and fire safety control. Existing conditions in a community are compared to the standards. Deficiency points are assigned for each deviation from the standards. The number of points assigned each item is dependent on the relative importance of the item and the degree of deviation. The maximum number of deficiency points is 5000. There are 10 classes of protection, with each increment of 500 points determining a class. The following table illustrates Grading Schedule classes:

TABLE NO. 20  
GRADING SCHEDULE CLASSES

Points of Deficiency	Class
0 - 500	1
501 - 1000	2
1001 - 1500	3
1501 - 2000	4
2001 - 2500	5
<del>2501 - 3000</del> 2885	6
3001 - 3500	7
3501 - 4000	8
4001 - 4500	9
4501 - 5000	10

The "Protection Class" of a jurisdiction is used by the insurance industry as a factor in the rate making process for fire insurance. Plate III on page 80 illustrates how insurance premiums for dwellings are influenced by the protection class.

A 10th Class is essentially an unprotected area having no recognized fire department or water supply.

Ninth Class is typical for areas served by a recognized fire department but lacking an adequate water supply. In certain cases where a water supply is lacking, dwellings can qualify for Class 8 provided the fire department can meet the criteria of a special supplement to the Grading Schedule as shown at the end of this section.

The table shown below illustrates the four principal features considered in the Grading Schedule and the maximum number of deficiency points allocated to each category.

TABLE NO. 21  
GRADING SCHEDULE FEATURES

Feature	Max. No. of Def. Points	% of Total
Water Supply	1950	39
Fire Department	1950	39
Fire Service Communications	450	9
Fire Safety Control	650	13
	5000	100

Additional deficiency points can also be assessed for adverse climatic conditions and other occurrences such as civil disturbances, floods, earthquakes and forest fires.

If there is an excessive difference between the fire department and

the water supply, a divergence charge will be added.

Basic information on the fire insurance grading for each jurisdiction in Santa Cruz County is shown in the table on the following page.

TABLE NO. 22

## FIRE INSURANCE GRADING

Jurisdiction	Date Graded	Total Deficiency Points	Grading Class
Aptos	1966	4443	9*
Aromas	1961	Between 4251 & 4500	9
Ben Lomond	1956	3471	7
Boulder Creek	1972	2927	6
Braniciforte	1972	4001	9
Capitola	1966	2885	6
Davenport	Grading not Established	----	10
Felton	1972	3886	8
Freedom	1963	2861	6
LaSelva Beach	1970	4431	9
Live Oak	1971	2310	5
Salispuedes	1951	Between 4251 & 4500	9*
Santa Cruz	1972	1675	4
Scotts Valley	1966	3405	7
Soquel	1972	2712	6*
Watsonville	1958	1901	4
Zayante	Grading not Established	----	10

\* Class 8 for dwellings in areas not having gradable water supply, but meeting criteria of a special supplement to the grading schedule.

A revised edition of the Grading Schedule was published early in 1973, therefore, all gradings listed were done under the 1956 edition of the Schedule. The Grading Schedule was revised in order to reflect modern developments and current good practice in fire protection. The grading of any fire department which has progressed should not be materially affected by the new Schedule.

## FIRE INSURANCE RATES

### GENERAL

Fire insurance rates are usually not competitive. In California rates are made by the Insurance Services Office, a private organization set up to serve insurance companies. Rating, as differentiated from grading, is the process of determining the cost of fire insurance for an individual building or group of buildings. Fire insurance rating is extremely complex, and no attempt is made in this report to do more than to describe some of the basic principles.

Total fire insurance premiums collected must be sufficient to cover losses incurred and the expense of operating the business along with a reasonable profit. In an attempt to apportion the premiums equitably, rating methods consider differences in hazards, in susceptibility to loss, in private protection and in public protection. There are two broad rating methods in use - class rating and schedule rating. Class rates are used for occupancies that are similar in character - dwellings, apartment buildings, clubs, farms, etc. Schedule rates are developed from a physical inspection of individual buildings and application of appropriate insurance rate schedules. At least two rates are developed for any occupancy - the building rate and the contents rate.

### DWELLING INSURANCE PREMIUMS

For dwellings there are two types of insurance in common use; straight "Fire", which covers property damage only, and "Homeowners" which covers both property damage and liability. Plate No. III shows how the premiums for these coverages vary with the public protection grading classification for a typical dwelling. Single-family dwellings in California are normally insured through homeowners policies. It should be noted that premiums on dwellings remain the same, even if the classification changes. In other words, it is possible that a change in classification will not change the cost of dwelling insurance.

### INSURANCE PREMIUMS ON SPECIFICALLY RATED PROPERTIES

Rate determination for schedule rated properties (stores, factories, etc.) is more complicated. Details of building construction, protective features, exposures, and fire hydrant locations are all considered, as well as the public protection grading classification. Charges for insurance are stated as rates for each \$100 of insurance; that is, twice as much insurance costs double the premium. Plates III and IV illustrate the typical effect of the grading class on the rate. Although differences will appear for other occupancies, types of construction, etc., the general variation in insurance costs will be similar.

PLATE III

INSURANCE PREMIUM vs. PROTECTION CLASS  
FOR TYPICAL DWELLING AND CONTENTS

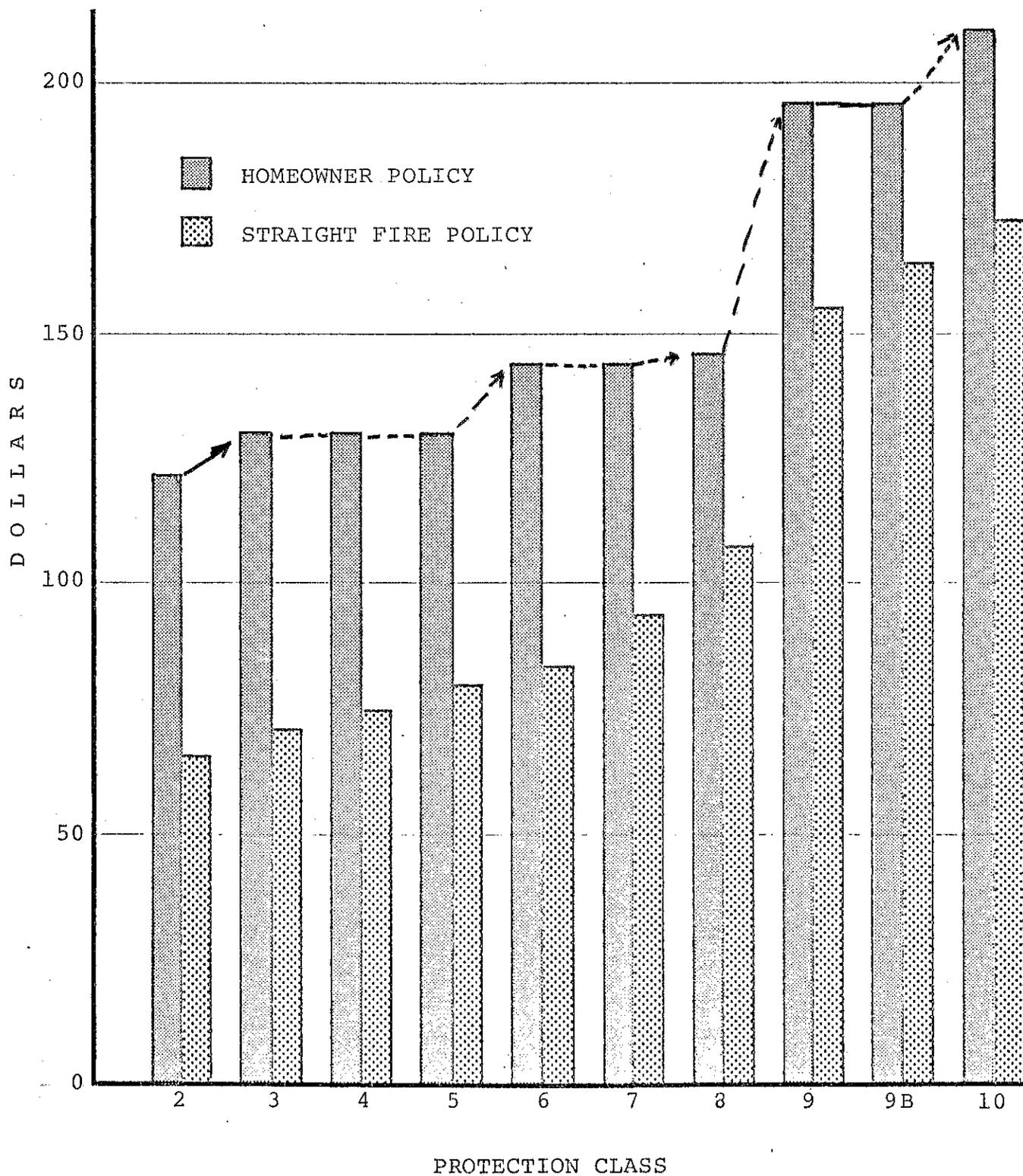
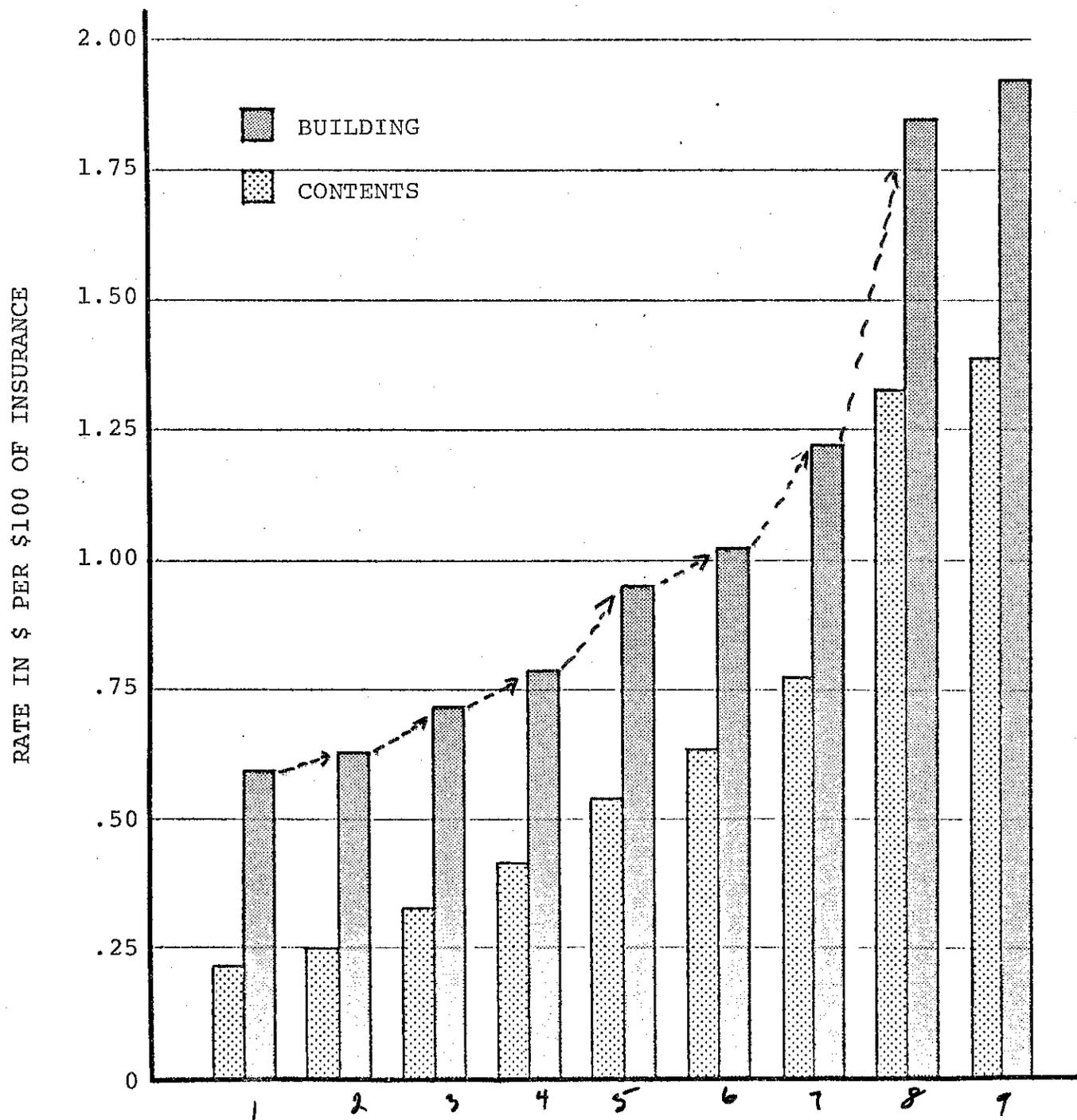


PLATE IV

INSURANCE RATE vs. PROTECTION CLASS  
FOR TYPICAL RETAIL STORE



PROTECTION CLASS

CRITERIA FOR DWELLING CLASS 8 IN AREAS  
LACKING RECOGNIZED WATER SUPPLY

INSURANCE SERVICES OFFICE  
PACIFIC REGION

A SUPPLEMENT TO THE STANDARD SCHEDULE FOR GRADING CITIES AND TOWNS  
OF THE UNITED STATES WITH REFERENCE TO THEIR FIRE DEFENSES AND PHYSICAL  
CONDITIONS . . . ESTABLISHING CRITERIA FOR PROTECTION CLASS  
IN AREAS NOT HAVING A WATER SUPPLY GRADABLE UNDER THE STANDARD SCHEDULE.

STRUCTURAL

Section A: To qualify for Dwelling Protection Class 8, conditions  
must be equal to, or superior to the following:

1. The fire department qualifies as a recognized fire department.
2. Areas are within a five-mile response (road) distance of the closest engine (pumper) company, and within an eight mile distance of the balance of any apparatus units required under A-8(b).
3. For more than one unit of apparatus, all assigned apparatus is radio equipped.
4. For more than one unit of apparatus, there are not less than five men responding on first alarm.
5. There is additional manpower as necessary to meet the conditions of A-7 and 8 (b).
6. At least one unit of apparatus is a pumper constructed and equipped in accordance with the intent of the Standards of NFPA No. 19.
7. The department demonstrates a capability to effectively develop and continuously apply water for not less than 20 minutes, at a rate of not less than 200 gpm, commencing with the initial evolutions of the first due company.
8. Apparatus
  - (a) For areas adequately served by fire flows (avail-

able throughout the year) of not less than 200 gpm, a single pumper may suffice.

- (b) For all other areas, there are not less than two units and all units are suitable for the intended service.
- (c) Risks not of the dwelling class are considered to have Protection Class 9 (4,001 - 4,250 deficiency points) if conditions favorably equate with 1 through 8 above.

Section B: When there is a recognized fire department not meeting the criteria of A-2 through 8, areas within a ten-mile response (road) distance may be considered as grading 4,251 - 4,500 deficiency points. Adverse conditions affecting response shall be considered when evaluating response distances.

## APPENDIX B

### FIRE STATION DESIGN CRITERIA

The following criteria would provide an ideal fire station design, and where funds are available, new stations should incorporate these features. It is recognized, however, that often it is not possible or practical to provide many of the items listed. In such cases, it is possible to construct a perfectly adequate and functional station at a minimum cost by omitting the features which are not essential to the housing of fire apparatus.

1. Construction with fire resistance of at least one hour. (Automatic sprinkler system is recommended.) Fire resistive roof covering.
2. Constructed to accepted earthquake resistance standards.
3. Apparatus Room:
  - Separated from remainder of station by two hour wall.
  - Minimum of two bays, each a minimum of twenty feet in width and 75 feet in length.
  - Apparatus doors, 12 ft. x 12 ft., electrically operated with manual override.
4. Storage and drying facilities for hose.
5. Equipment storage and workshop area.
6. Flammable liquid storage area.
7. Combination classroom - meeting room - dining area, minimum size 1,000 sq. ft.

8. Kitchen facilities.
9. Dormitory facilities - separate beds for each shift. Should be designed for future expansion if paid-on-duty personnel are anticipated.
10. Automatic starting generator to provide emergency power for communications equipment, doors, and basic lighting.
11. Signal controls where traffic problems exist. (Control of regular signals - special signals for fire stations are usually ineffective.)
12. Outside underground fuel tank (manual pump or emergency generator).
13. Minimum lot size for 3 bay station - 30,000 sq. ft.
14. Minimum lot size for 2 bay station - 25,000 sq. ft.
15. Watch desk, office facilities for company and chief officers.
16. Shower-locker facilities.

## APPENDIX C

### CRITERIA FOR DISTRIBUTION OF FIRE STATIONS AND COMPANIES

The primary objective in determining fire station location and companies is to establish an optimum relationship between travel time and potential fire severity for any given situation. Since travel time is a function of distance the first arriving company must travel to reach the fire scene, station locations are usually developed on the basis of response distances. Potential fire severity is expressed as the maximum fire flow considered necessary to contain a major fire in a building or a group of buildings. High required fire flows require closer spacing of stations and a higher concentration of companies. Although it is important to minimize the interval between receipt of an alarm and arrival at the scene, it is much more important to minimize the time interval between start of the fire and transmission of the alarm. Delayed alarms are one of the principal reasons for large loss fires. Because of the high cost of land acquisition, building and apparatus costs, and especially salaries, a generally conservative approach is taken in planning fire station locations.

The factors that are considered in accomplishing the primary objective are as follows:

1. A sufficient number of stations should be located near major commercial and industrial districts so that response distance in the nearest company to a majority of the area is not in excess of 1 mile. With an average apparatus speed of 30 m.p.h. this distance represents 2 minutes. At present, only the central business districts of the larger communities fall in this category. Some judgment in applying this standard is allowed where small building groups are located in fringe areas and the relative number of buildings with high loss potential is insufficient to justify additional stations for coverage.

2. In those high value districts having a lower level of fire loss potential, the allowable travel distance can be increased to 1 1/2 miles. This includes shopping centers, commercial strip, schools and apartment districts. Adequate service to residential districts can usually be provided by stations within 2 miles. In rural areas, where residences have an average separation of 100 feet or more, the travel distance can be increased to 4 miles.
3. Since response time is the ultimate criterion in determining response distances, some reductions in the distances given in paragraphs 1 and 2 above may be necessary if the average speed of apparatus is estimated to be less than 30 m.p.h. Such features as traffic congestion, topographical features, man-made barriers such as railroad and highway structures, or other local conditions that hinder response time may require a reduction in those distances.
4. Steps must be taken to assure adequate coverage during simultaneous fires and other periods of high demand on the fire department. The need for placing additional companies in service or relocating companies during periods of high frequency of alarms must be considered.
5. When protection is furnished to territory outside of the fire district limits, additional companies may be required, depending on the size of the area served, the number and extent of runs to that territory, the amount of service provided, and contractual and other agreements that have been made.
6. In addition to consideration for the first due company response distance, an allowance must be made for addi-

Mutual Aid  
Now Provides.

tional companies needed for the first alarm and for the maximum multiple alarm. The concentration of engine and ladder companies increases proportionately with the fire severity as shown in Table No.23 on the following page. Variations from these requirements have to be made where individual study indicates a greater or lesser degree of protection is required.

7. The specific fire station site should be selected with due consideration for convenience and safe entry into streets. Ample area should be provided for parking of private autos, limited drills and for the station building itself.

Table No. 23

Insurance Services Office Standards

Number of Engine and Ladder Companies Needed  
within Travel Distance of Established Fire Flows

Engine Companies

Required Fire Flow gpm	First Due Company Miles	Total Alarm No.	First Response Miles	Total Maximum Multiple Alarm Response	
				No.	Miles
Less than 2000	1 1/2 ‡	2	4	2	4
2000	1 1/2 ‡	2	2 1/2	2	2 1/2
2500	1 1/2	2	2 1/2	2	2 1/2
3000	1 1/2	2	2 1/2	3	3
3500	1 1/2	2	2 1/2	3	3
<i>Disco</i> 4000	<u>1 1/2</u>	<u>2</u>	<u>2 1/2</u>	<u>4</u>	<u>3 1/2</u>
4500	1 1/2	2	2 1/2	4	3 1/2
5000	1	2	2	5	3 1/2
5500	1	2	2	5	3 1/2
6000	1	2	2	6	4

TABLE NO. 23 (Cont'd)

Ladder Companies

Required Fire Flow gpm	First Due Company Miles	Total Alarm		First Response		Total Maximum Multiple Alarm Response	
		No.	Miles	No.	Miles	No.	Miles
Less than 2000	2**	1*	2**	1*	2**	1*	2**
2000	2**	1*	2**	1*	2**	1*	2**
2500	2	1*	2	1*	2	1*	2
3000	2	1*	2	1*	2	1*	2
3500	2	1*	2	1*	2	1*	2
<b>Disco</b> 4000	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>
4500	2	1	2	1	2	1	2
5000	1 1/2	1	1 1/2	2	2 1/2	2	2 1/2
5500	1 1/2	1	1 1/2	2	2 1/2	2	2 1/2
6000	1 1/2	1	1 1/2	2	2 1/2	2	2 1/2

\* Ladder company may not be required where there are less than 5 buildings of height corresponding to 3 or more stories.

\*\* May be increased to 3 miles for residential districts of 1 and 2 family dwellings and to 4 miles where such dwellings have an average separation of 100 feet or more.

‡ May be increased to 2 miles for residential districts of 1 and 2 family dwellings, and to 4 miles where such dwellings have an average separation of 100 feet or more.

## APPENDIX D

### WATER SERVICE FOR FIRE PROTECTION

Water service in Santa Cruz County is provided by a multitude of public and private water companies. In most cases the companies adequately furnish domestic water requirements since consumption does not fluctuate drastically. A fire, however, may place concentrated demands ranging from several hundred to several thousand gallons per minute at any point in the system. This demand generally results in the system becoming over burdened. In order to provide adequate fire flows, it is generally necessary to provide larger sized distribution mains that are well grided and supplied by large arterial mains. Sufficient storage and pumping capacity should be provided to insure that fire flows can be maintained for 2 to 6 hours depending on the hazard.

The Insurance Services Office establishes fire flow requirements based on area and type of construction for specific buildings. The required fire flow is considered the amount of water necessary to contain a fire to that building under adverse fire fighting conditions. Normally a flow of over 200 gallons per minute is necessary in less than 1% of all fires. However, the 1% of the fires do represent a major portion of the annual fire loss record.

Fire flow tests conducted by the Insurance Services Office throughout the County indicate that most fire flow deficiencies exist in areas served by the smaller private water companies. Most areas served by the Santa Cruz and Watsonville municipal water systems are in general conformance with the criteria established by ISO. Many of the small water companies serving only a few residences have little or no fire flow capability. A few 2 1/2 inch connections are provided on water storage tanks, however, few have ever been tested. In some cases, the local fire department had not identified all potential sources of supply or were not equipped to fully

utilize these sources except as booster tank refill.

Principal water companies in Santa Cruz County and areas they serve are shown in the following table:

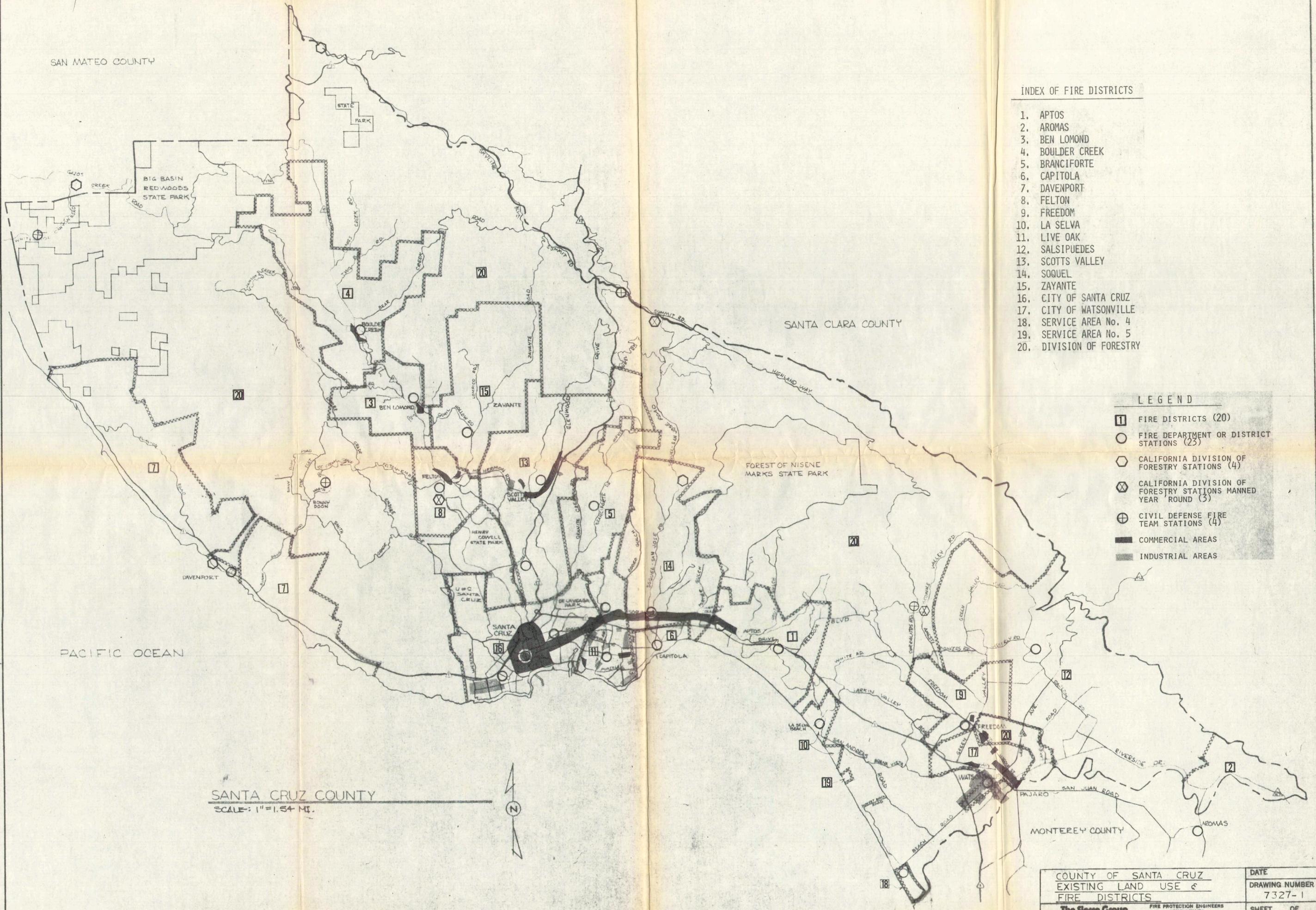
TABLE NO. 24  
PRINCIPAL WATER COMPANIES  
SANTA CRUZ COUNTY

<u>Company</u>	<u>Areas Served</u>
Santa Cruz Municipal	Santa Cruz Scotts Valley Live Oak Capitola Branciforte Soquel
Watsonville Municipal	Watsonville Freedom Salsipuedes Pajaro Dunes
Soquel Creek County Water District	Soquel Aptos Capitola La Selva
San Lorenzo Valley County Water District	Ben Lomond Boulder Creek Scotts Valley
Scotts Valley County Water District	Scotts Valley
Citizens Utility Company of California	Felton

As part of this study, a brief review was made of existing information contained in grading reports prepared by the Insurance Services Office (made available from fire department officials). Water system deficiencies were fairly consistent for all but the larger water systems, and could be grouped under one or more of the following categories:

1. inadequate fire flows available due to poor distribution systems, i.e., incomplete grid, mains too small, and excessively long dead-end mains.
2. insufficient storage and pumping capacity.
3. unreliability factors, such as a single pipe supplying an entire system, lack of standby power, etc.

SAN MATEO COUNTY



INDEX OF FIRE DISTRICTS

- 1. APTOS
- 2. AROMAS
- 3. BEN LOMOND
- 4. BOULDER CREEK
- 5. BRANCIFORTE
- 6. CAPITOLA
- 7. DAVENPORT
- 8. FELTON
- 9. FREEDOM
- 10. LA SELVA
- 11. LIVE OAK
- 12. SALSIPUEDES
- 13. SCOTTS VALLEY
- 14. SOQUEL
- 15. ZAYANTE
- 16. CITY OF SANTA CRUZ
- 17. CITY OF WATSONVILLE
- 18. SERVICE AREA No. 4
- 19. SERVICE AREA No. 5
- 20. DIVISION OF FORESTRY

LEGEND

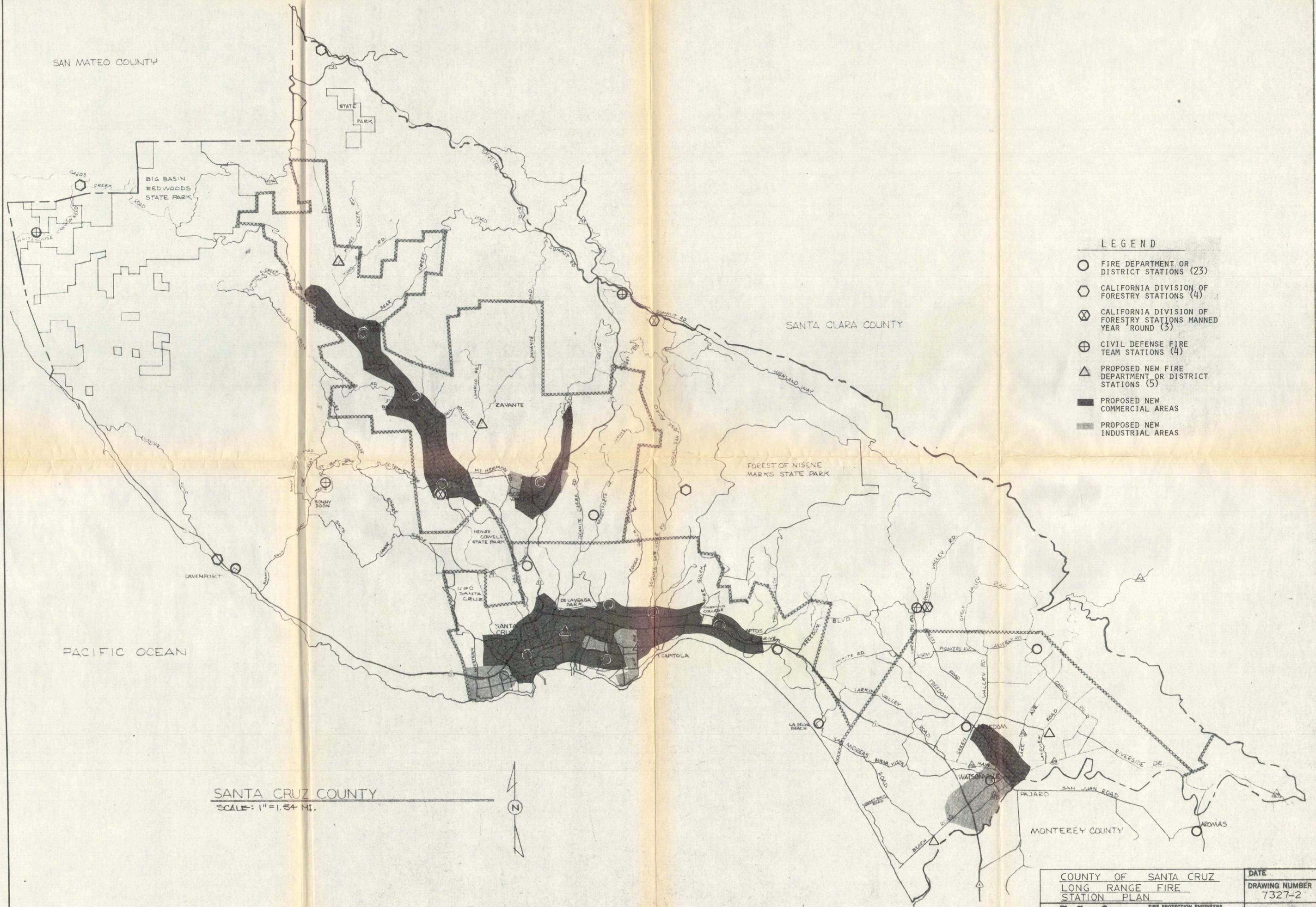
- 1 FIRE DISTRICTS (20)
- FIRE DEPARTMENT OR DISTRICT STATIONS (23)
- ◻ CALIFORNIA DIVISION OF FORESTRY STATIONS (4)
- ⊗ CALIFORNIA DIVISION OF FORESTRY STATIONS MANNED YEAR 'ROUND (3)
- ⊕ CIVIL DEFENSE FIRE TEAM STATIONS (4)
- COMMERCIAL AREAS
- INDUSTRIAL AREAS

SANTA CRUZ COUNTY  
SCALE: 1" = 1.54 MI.



COUNTY OF SANTA CRUZ		DATE
EXISTING LAND USE &		DRAWING NUMBER
FIRE DISTRICTS		7327-1
The Sierra Group FIRE PROTECTION ENGINEERS CONSULTANTS		SHEET OF

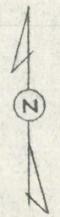
SAN MATEO COUNTY



LEGEND

- FIRE DEPARTMENT OR DISTRICT STATIONS (23)
- ⬡ CALIFORNIA DIVISION OF FORESTRY STATIONS (4)
- ⊠ CALIFORNIA DIVISION OF FORESTRY STATIONS MANNED YEAR 'ROUND (3)
- ⊕ CIVIL DEFENSE FIRE TEAM STATIONS (4)
- △ PROPOSED NEW FIRE DEPARTMENT OR DISTRICT STATIONS (5)
- PROPOSED NEW COMMERCIAL AREAS
- ▨ PROPOSED NEW INDUSTRIAL AREAS

SANTA CRUZ COUNTY  
SCALE: 1" = 1.54 MI.



COUNTY OF SANTA CRUZ	DATE
LONG RANGE FIRE STATION PLAN	DRAWING NUMBER 7327-2
The Sierra Group FIRE PROTECTION ENGINEERS CONSULTANTS	SHEET OF