
CHAPTER 6

Optional Elements

All statutory references are to the California Government Code unless otherwise noted.

State law offers considerable flexibility to go beyond the mandatory elements of the general plan. Section 65303 enables a county or city to adopt “any other elements or address any other subjects, which, in the judgment of the legislative body, relate to the physical development of the county or city.” Once adopted, an optional element carries the same legal weight as any of the seven mandatory elements and must be consistent with all other elements, as required by §65300.5.

Localities have adopted all kinds of optional elements on topics ranging from aesthetics to water resources. The flexibility of content and format offered by the Government Code allows cities and counties to fashion elements that uniquely address subjects of particular concern to them. This chapter offers some advice on several of the most common and useful optional elements: air quality, capital improvements/public facilities, community design, economic/fiscal development, energy, floodplain management, geothermal, parks and recreation, and water. Of course, these are only suggestions; the actual scope and level of detail contained in an optional element is left to the city or county to decide.

AIR QUALITY

Chronic exposure to air pollutants is a serious health risk to millions of California residents, particularly the young, the elderly, and people with heart disease and respiratory problems. Safeguarding public health has been the primary focus of federal and state air quality legislation and activities for many years. Air pollution also impacts local economies by damaging agricultural crops, natural vegetation, buildings, and other exposed materials. In addition, the economic health of an area can be affected adversely if insufficient air quality improvement triggers more stringent federally mandated air pollution controls on business. Air pollution also can impair visibility and obscure views. For these reasons, cities and counties should strive to reduce emissions for the benefit of both their own residents and those of other communities in their region and the state as a whole.

Local jurisdictions have responsibility for land use planning and can also significantly affect the design,

creation, and management of development and the local circulation system. Local governments have an opportunity to address air quality issues through general plans, development ordinances, local circulation systems, transportation services, and other plans and programs. No other level of government has such responsibility, including air districts.

The general plan, as the foundation for all local planning and development, can be an important tool for implementing policies and programs beneficial to air quality. Communities may choose to adopt a separate air quality element or to integrate air quality-beneficial objectives, policies, and strategies in other elements of the plan, such as the land use, circulation, conservation, and community design elements. Currently, approximately 100 cities and counties in California have adopted air quality elements. Whichever method is selected, consistency among elements and policies within the plan is essential for successful implementation. In addition, cooperation between localities is important since air pollution does not stop at political boundaries.

Relevant Issues

Motor vehicles are a major source of carbon monoxide, fine particulates, and pollutants that combine to form ground-level ozone in the state’s metropolitan areas. The dispersed growth patterns prevalent in many metropolitan areas of California have re-

Key to Abbreviations in Chapter 6

The following abbreviations are used in this chapter to denote other elements that might also address a particular issue:

- L:** Land Use
- CI:** Circulation
- H:** Housing
- CO:** Conservation
- O:** Open Space
- N:** Noise
- S:** Safety

MAP or **DIA** indicates information that can be shown on a map or diagram.

sulted in longer travel distances and have increased the need for reliance on motor vehicles. Land use and transportation planning and development patterns over the last 50 years have generally emphasized the use of the automobile. Less-polluting alternative modes of transportation, such as walking, bicycling, and public transit, have not been emphasized in many areas.

Land use patterns and transportation facilities can affect the number of vehicle trips, miles traveled, and related vehicle emissions per household. The location, density, accessibility, and design of buildings, streets, and other land uses in part determine the distances people need to travel to reach employment sites, stores, schools, and other destinations. These factors also influence which mode of transportation can be provided and used (i.e., car, vanpool, bus, train, walking, or bicycling). Recent research conducted in California has found that land uses and transportation infrastructure that are more friendly to alternative travel modes are associated with reduced per-household driving rates and related pollutant emissions while still affording people the mobility they need, especially in congested metropolitan areas.

Each community contains a unique combination of existing and planned land uses, transportation infrastructure, employment sites, open spaces, and other features. Therefore, strategies must be tailored to fit each area—there is no one-size-fits-all solution to land use, transportation, and air quality issues. In addition, the severity of local air pollution problems may affect the number and scope of strategies that communities may select.

Jurisdictions may also wish to address other activities related to air quality, such as energy conservation; cleaner-fuel vehicles; measures to reduce particulate emissions from roads, construction sites, and fireplaces; and public education programs.

Later in this chapter, guidance on an optional energy element is provided. The issues of energy and air quality are interrelated. Jurisdictions adopting or amending an optional air quality element should consider policies related to the production and use of energy, including energy used for transportation.

Jurisdictions should also examine land use policies affecting the siting of facilities that emit toxic air pollutants. While such facilities may require permits from the local air district, cities and counties retain their responsibility for land use decisions. Chapter 2 discusses the issues of land use compatibility and the overconcentration of hazardous industrial uses.

Ideas for Data and Analysis

Air quality elements typically include many of the following items:

- ◆ **Local Environment:** Brief description of the local setting, including location within a region, and meteorological conditions that may affect air quality.
- ◆ **Air Quality Designation:** Brief description of the area's current air quality designation, as well as projected attainment dates if applicable.
- ◆ **Ambient Air Quality:** Air quality data from local monitoring stations, if available, including the number of days that federal or state standards were exceeded.
- ◆ **Air Quality Laws and Requirements:** A summary of applicable federal and state standards and laws pertaining to air pollution.
- ◆ **Sources of Air Pollution:** A summary of the types of sources located in the jurisdiction or county. These typically include stationary sources, such as factories and power plants; mobile sources, including cars, trucks, buses, motorcycles, and off-road vehicles; area sources, such as lawn and garden equipment, construction activities, and consumer products; sources of toxic air contaminants, which may include certain incinerators, landfills, and manufacturing facilities; and indirect sources such as major thoroughfares, port facilities and airports. (Air districts can provide this information.)
- ◆ **Inventory of Emissions:** A summary of the amounts of emissions produced by categories of sources of air pollution. (Air districts can also provide this data.) Emissions typically include the criteria pollutants for which there are currently national ambient air quality standards: carbon monoxide, ozone, particulates, nitrogen dioxide, and sulfur dioxide.
- ◆ **Air Quality Plans and Programs:** Reference to applicable local or regional air quality plans, which often contain policies, regulations, and programs that may affect local government activities. These may include stationary source permitting requirements, regulations related to major sources of toxic air contaminants, and transportation control measures (TCMs), such as voluntary ridesharing programs.
- ◆ **Transportation:** Local, regional, and state transportation programs, such as congestion management programs and regional transportation planning mandated by the federal Transportation Equity Act (TEA 21), affect the type and location of transportation facilities and therefore also relate to air quality. The federal Transportation Conformity Rule

requires that Regional Transportation Plans (RTPs) conform to motor vehicle emission budgets in the applicable air quality management plan. In addition, vehicle registration fee surcharges provide funding in many areas for local projects and programs that reduce emissions from motor vehicles. (These funds are distributed by air districts, except in the South Coast Air Quality Management District, where a portion of the funds is allocated directly to local governments.)

Ideas for Strategies

Air quality elements may also contain goals, objectives, and policies related to the density and location of land uses, the transportation and circulation system, community design, and other strategies that can help reduce per-household rates of driving and related vehicle emissions. Alternatively, these strategies could be placed in the other parts of the general plan, such as the land use, circulation, conservation, and community design elements.

Research has shown that certain land use and transportation strategies can lead to fewer per-household motor vehicle emissions from driving. These include:

- ◆ Concentrated activity centers, including downtowns, with mixed commercial, office, and residential land uses that can serve as focal points for transit and encourage pedestrian activity.
- ◆ Consolidated growth patterns, such as infill development within existing urban areas, higher-density housing within walking distance of transit stations, and clustered employment centers that enable alternative travel modes.
- ◆ Transit-oriented development (TOD) that provides higher-density mixed-use development around major transit stops.
- ◆ Mixed land uses that bring destinations closer together and make walking, bicycling, and transit use feasible and more attractive.
- ◆ Interconnected street networks that provide numerous routes for autos, pedestrians, and bicyclists rather than focusing traffic onto a few major arterials.
- ◆ Pedestrian and bicycle pathways that provide attractive and safe alternatives to driving.
- ◆ Transit service that provides convenient alternatives to single-occupant automobile travel, especially in congested metropolitan areas.
- ◆ Developing a robust information technology infrastructure to support telecommuting.

Several air districts have developed guidelines that suggest a number of strategies jurisdictions may consider. Some of these include land use and transportation-related strategies, such as those listed above, that can help reduce the need for reliance on automobiles. Jurisdictions are encouraged to contact their air district for additional suggestions and information.

The general plan can also address other air quality issues, such as stationary or “point” sources of air pollution including factories and powerplants. While the permitting of new sources of air emissions falls under the jurisdiction of the local air district, regulation of these use remains a city or county issue. For a discussion of compatibility issues regarding certain industrial land uses, see Chapter 2. Cities and counties can also work with the local air districts to develop policies to reduce emissions from area sources, such as construction activities and consumer products.

The staff at the California Air Resources Board has created a computer program called URBEMIS (Urban Emissions Model) that can be used to estimate emissions associated with land use development projects in California. URBEMIS uses the vehicle emissions model Emfac to calculate motor vehicle emissions. For more information on this and other programs, please see the Bibliography under “Air Quality.”

CAPITAL IMPROVEMENTS/PUBLIC FACILITIES

Numerous cities and counties accentuate the importance of planning for capital improvements and public facilities by adopting a separate capital improvements and/or public facilities element. Capital improvements, such as roads, drainage facilities, sewer and water lines, treatment plants, and transit lines, are the framework that supports development. Their availability plays an important part in determining the pattern of land uses within the community, as well as the direction and intensity of growth. Public facilities, such as police and fire stations, city and county offices, libraries, and parks, are important to residents’ safety and quality of life. The ability to provide these facilities is important to the well-being of the community. Technology infrastructure, such as wired and wireless communication systems, also affect development patterns, quality of life, and economic opportunity.

Capital improvements and public facilities are subjects that are listed under the land use and circulation elements in §65302. In addition, §65401 requires that proposed public works projects be reviewed annually for conformity with the general plan. Further, §65402 prohibits acquisition or disposal of public property with-

out a finding from the planning commission of conformity with the general plan.

A capital improvements/public facilities element provides the policy basis to guide shorter-term documents, such as the capital improvements program and the annual capital budget. The element should offer generalized long-term policies grounded in realistic analyses of existing capacity, future demand, and financing options. If facilities and services are to be provided to existing and future development in an efficient and cost-effective way, then the element must discuss the location of future facilities and improvements, acceptable levels of service, funding priorities, and the timing of facility or service availability.

Public facilities can also be important community design features. Although seldom done, it makes sense to incorporate general community design principles into the element. Good community design creates interesting and attractive spaces that provide positive experiences for those who live, work, or play there. The configuration, location, and orientation to their surroundings of public buildings, such as libraries, city halls, community centers, and schools, can define public space, create community focal points, foster neighborhood integrity, and generally help establish community identity. The capital improvements and/or public facilities element should encourage public structures and facilities that benefit community form. The siting of beneficial public facilities is discussed in Chapter 2.

Consultation with the city or county departments responsible for capital improvements and public facilities (e.g., public works, roads, solid waste, etc.) is one key to realistic planning. The city or county should also consult with other service providers, such as school districts, public water systems (required pursuant to §65352.5), special districts (e.g., fire, drainage, sewer, flood control, etc.), adjoining cities and counties, the Regional Transportation Planning Agency, and public utilities. Given the fiscal need for the efficient development and use of public facilities, the element may be a good place to address the issue of joint use. Additionally, the element should consider the provisions of the city's or county's present and future capital improvements program or other programs for funding, maintaining, and installing specific capital improvements.

Although discussed here in the context of a separate element, a city or county need not adopt a separate capital improvements/public facilities element. In a general plan that has blended and consolidated the mandatory elements, capital improvements/public facilities might be addressed as one component of a land use and circulation section.

Relevant Issues

As always, the issues covered in a general plan element should be limited to those that are relevant to the community. The subjects covered in a capital improvements/public facilities element will depend on the size of the community, the age and adequacy of existing infrastructure and facilities, its fiscal situation, projected demand, the ability of other agencies to provide infrastructure and facilities, and many other factors. The following are some suggestions for the kinds of issues that may be important:

- ◆ General distribution, location, and extent of existing and proposed infrastructure (e.g., water treatment and distribution facilities, wastewater distribution and treatment facilities, streets and roads, drainage facilities, public utilities, flood control structures, etc.).
- ◆ General distribution, location, and extent of existing and proposed public facilities (e.g., police and fire stations, schools, parks, libraries, city hall, public buildings and grounds, etc.).
- ◆ The equitable distribution of new public facilities and services that increase and enhance community quality of life, given the fiscal and legal constraints that restrict the siting of these facilities.
- ◆ General extent of the existing and proposed service capacity of infrastructure and public facilities.
- ◆ Plans of other entities that provide public services or facilities, including service capacities.
- ◆ Schedule or timetable for improvements, expansion, and replacement of infrastructure and facilities.
- ◆ Sources of funding for improvements, expansion, retirement, and maintenance.
- ◆ Consultation/coordination with other service providers and public utilities.

Ideas for Data and Analysis

The following text expands upon the general issues listed above. A city or county may add or subtract items as relevant to its situation and the format and content of its general plan.

General distribution, location, and extent of existing and proposed infrastructure

- ◆ Inventory existing water distribution and treatment facilities (CI), wastewater collection and treatment facilities (L), streets and roads (L, CI), drainage facilities, public utilities (CI), and flood control structures (L, O, S).

- ◆ Analyze, in correlation with the land use element, projected demand for infrastructure and facilities. (L)
- ◆ Inventory the condition of existing infrastructure and analyze the estimated need for maintenance and improvements to meet projected demand.

General distribution, location, and extent of existing and proposed public facilities

- ◆ Inventory existing police and fire stations, parks, libraries, community centers, city and county government buildings, schools, and other public buildings and grounds.
- ◆ Identify areas underserved by public facilities that enhance community quality of life.
- ◆ Analyze, in correlation with the land use element, projected demand for public facilities. (L)
- ◆ Inventory the condition of existing facilities and analyze the estimated need for maintenance and improvements to meet projected demand.
- ◆ Consider community design standards where applicable.

Plans of other entities that provide public services or facilities

- ◆ Collect and review capital improvements and other plans of cities and counties, public utilities, water suppliers, special districts (e.g., fire protection, flood protection, wastewater treatment, schools, etc.), local child care planning and development councils, and other entities that may provide services.
- ◆ Identify opportunities for joint use projects (e.g., new schools and park facilities).
- ◆ Review the Regional Transportation Improvement Program.

Schedule or timetable for improvements, expansion, and replacement of facilities

- ◆ Identify needs of existing facilities.
- ◆ Estimate demand for new facilities.
- ◆ Review capital improvements programs, including those of other affected agencies.

Sources of funding for improvements, expansion, retirement, and maintenance

- ◆ Estimate costs of needed improvements, expansion, and maintenance.
- ◆ Identify viable sources of funding, correlated with the pace of improvements.

Consultation/coordination with other service providers and public utilities

- ◆ Contact other service providers and public utilities regarding service capacities, planned expansions, financing, and other common interests.

Ideas for Development Policies

The following list of suggestions is intended to stimulate ideas; it does not include all possible policies.

- ◆ Identify the locations of existing and proposed major roads and interchanges. (MAP) (CI)
- ◆ Identify the locations of existing and proposed major water transmission and sewer collection lines and treatment facilities. (MAP) (L)
- ◆ Identify the locations of existing and proposed police and fire protection facilities and their service area boundaries. (MAP) (L)
- ◆ Identify the locations of existing and proposed community facilities, such as libraries, community centers, auditoriums, city hall, county courthouse, etc. (MAP) (L)
- ◆ Specify the location, acquisition, development, and management of public parks and recreational areas, including level-of-service standards. (L)
- ◆ Identify the locations of schools and school facilities, coordinated with the plans of the local school district(s). (MAP) (L)
- ◆ Specify the relationship between the distribution of land uses and the local capital improvements program, including the timing and siting of capital improvements. (L)
- ◆ Specify level-of-service standards for specific types of infrastructure and facilities to guide the timing and siting of future capital improvements.
- ◆ Recognize and coordinate with the plans and programs of other cities and counties, public utilities, public water systems (urban water management plan and capital improvements program or plan), special districts (including fire protection, flood protection, and wastewater treatment, as relevant), and other entities that may provide services.
- ◆ Coordinate with the plans and programs of other public agencies that fund public improvements, such as the Regional Transportation Planning Agency (Regional Transportation Plan and Regional Transportation Improvement Program).
- ◆ Provide for the development, maintenance, and sit-

ing of existing and projected public facilities, including buildings and infrastructure.

- ◆ Promote joint use projects where appropriate.
- ◆ Specify the relationship between the element, the city’s or county’s local capital improvements program, if any, and the capital budget.
- ◆ Establish linkages with economic development programs and redevelopment agency activities, if any.
- ◆ Identify a menu of preferred financing methods for infrastructure (e.g., general fund, special tax measure, general obligation bond measure, benefit assessment, tax increment financing, impact fees, etc.), if any.
- ◆ Identify the type of capital improvements to be obtained through development exactions, the relative public/private cost share, and the basis for such exactions (this is expected to be a general guide for exactions, not the sole basis for such exactions).
- ◆ Establish standards for addressing capital improvements/capital facilities in specific plans and community plans.
- ◆ Adopt an energy resources plan, including conservation measures, alternative energy sources, and cost-effective supplies.
- ◆ Establish design standards for public facilities and grounds.

For useful references, see the Bibliography under “Funding and Financial Impact,” “Infrastructure Planning,” and “Urban Design.”

COMMUNITY DESIGN

A community design element may provide additional direction, beyond that of the land use element, to the planning area’s development pattern, form, structure, and sense of place. A community design element may provide the basis for aesthetic regulation of public and private land and structures, which is a valid exercise of the police power (see *Ehrlich v. Culver City*, (1996) 12Cal.4th 854). OPR’s 2002 Local Government Survey identified 113 jurisdictions with adopted community design elements.

The policies and programs of a community design element may provide specific guidance to enhance the sense of place and quality of life in the planning area. It should bring together the principles of the other elements into an overall set of qualita-

tive policies. It may be used to establish principles to guide the form and appearance of neighborhoods, streets, parks, public facilities, new development, and redevelopment.

Relevant Issues

The issues covered by the community design element should be relevant to the physical development of the planning area. The subjects analyzed should reflect those that are important to both public and private interests. The issues should reflect the changing community and the factors that form its existing identity. The following is a list of basic issues that should be covered.

- ◆ **Community Form:** Elements that define the character of the community (e.g., viewsheds, parks, open space, airport, freeways, ridgelines, rivers, etc.).
- ◆ **Neighborhood Structure:** Favorable features that characterize the neighborhoods in the planning area. Street types, parks, landscaping, lot sizes, boundary elements, and architectural types all contribute to the sense of place.
- ◆ **Community Conservation:** Patterns of open space, circulation, and landmarks provide identity to the planning area and neighborhoods, making them more livable. The positive attributes of existing neighborhoods should be preserved and utilized in planning for revitalization with common or related themes.
- ◆ **Commercial/Industrial Connections:** Office buildings and office and industrial parks may include patterns and features that enhance or detract from the existing

OPTIONAL ELEMENTS IN ACTION

One example of the development and implementation of a community design element is the City of Dana Point’s urban design element in its 1991 general plan. The intent of the element is to “...provide proposals and policies to improve the image, character, and quality of life of the city.” The element includes urban design issues, goals, and policies for its viewsheds, civic center, beaches, and other related public and private spaces.

The element is implemented through design guidelines that contain specific standards for public and private projects subject to discretionary design review. These guidelines are intended to “promote higher quality design that is sensitive to Dana Point’s natural setting, surrounding environment, and community design goals.”

community or the general plan vision of the future. Specific design policies should be developed with the input of both the public and business interests.

Ideas For Data And Analysis

The following list of ideas for data and analysis expands upon the relevant issues to provide some broad topics for consideration. Topics may be added or removed depending upon relevance and consistency with the issues pertinent to the planning area.

- ◆ **Transition Areas:** Identify areas in transition. These may include commercial or industrial areas where use is declining or that have been abandoned. Consider implementing zoning and land use designations to allow for adaptive reuse. Analyze the possible causes for the loss of vitality.
- ◆ **Commercial and Industrial Sites:** Analyze criteria for measuring compatibility between proposed development and existing land uses. Formulate flexible development standards that promote solutions to common problems (e.g., unused parking, parking as dominant feature, noise, incompatible uses, etc.).
- ◆ **New Residential Development:** Develop concepts for residential design and identify features of the undeveloped land that will provide continuity with and connections to existing neighborhoods and areas of new development.
- ◆ **Landmarks:** Identify public places, buildings, and open spaces (including landmark trees) that distinguish the planning area and give it a sense of place. Encourage the placement of art within areas used for public gatherings. Consider the use of area history and cultural background as defining factors for public art and displays.
- ◆ **Spatial Definition:** Identify community features that define space (e.g., building mass, landscaping, streets, walls, etc.). Identify community spaces that are attractive (e.g., shopping districts, parks, landscaping, etc.). Analyze how good features may be duplicated through design requirements.
- ◆ **Continuity and Connection:** Identify existing features (e.g., creeks, trails, bike paths, streets, etc.) that provide continuity and connection throughout the planning area. Identify neighborhood and community attributes that can be strengthened to establish connections to the entire planning area.
- ◆ **Landscaping and Trees:** Analyze street landscaping, trees, and the types of landscaping on private residential and commercial lots for visual relief and shade effectiveness. Landscaping and trees provide

energy conservation benefits and add distinctiveness, a sense of quality, spatial definition, and focal breaks to otherwise monotonous streetscapes.

- ◆ **Historic Preservation:** Identify historic and architecturally significant buildings and evaluate their condition. Inventory structures or landmarks that have been or should be designated as historic resources and establish policies for their preservation, protection, and maintenance.
- ◆ **Street Design:** Analyze the relationships between existing streets and the areas and uses they serve. Streets are not important only for transportation; when thoughtfully designed, they establish boundaries, provide focal relief, and contribute to the livability and safety of the community.
- ◆ **Public Art:** Identify existing public art, its location, and the public's reaction to its ability to enhance the community. Classify types of art and the suitable locations for its display. Public art may provide a focal point or social aspect to parks, public facilities, and structures, thereby enhancing the aesthetic environment.
- ◆ **Signage:** Inventory signs that are unique and reflective of the community. Identify sizes, shapes, and designs that are considered to be characteristic of specific areas or commercial districts. For example, commercial strips may be characterized by neon signs whereas the downtown core may be distinguished by natural colors and wooden signs.

Ideas for Development Policies

The following list of broad development policies is intended to provide general guidance in the development of more specific policies oriented to the particular issues facing a local jurisdiction. Many of these policies should be correlated with the land use and circulation elements to ensure that decisions incorporate community design principals.

- ◆ Encourage the development of pedestrian-friendly neighborhoods and communities.
- ◆ Define the urban extent of the community. Identify transitional spaces between the urban limits and the edge of the planning area. (L, O)
- ◆ Encourage community-based rehabilitation and neighborhood improvements, particularly in transition areas.
- ◆ Promote neighborhood cohesiveness through neighborhood-based design guidelines that are consistent with existing or proposed architectural themes. Consider spatial definition, continuity, and building scale.

- ◆ Pursue loan programs specific to the rehabilitation of existing neighborhoods.
 - ◆ Foster new development that is consistent with the type, intensity, character, and scale of the area.
 - ◆ Encourage higher-density housing near transit. (L)
 - ◆ Adopt historic preservation ordinances to preserve and protect historic and cultural resources.
 - ◆ Adopt development guidelines for central commercial and shopping areas that encourage compact (as opposed to strip) form, pedestrian access, and increased pedestrian traffic. (L)
 - ◆ Design focal points and architectural features into the development or rehabilitation of existing neighborhoods.
 - ◆ Establish siting and design criteria for public buildings and parks to enhance spatial definition, create focal points, and provide landscaping and trees.
 - ◆ Design and install entry landscapes at the major entrances to the community and along transportation routes.
 - ◆ Encourage cooperative efforts to provide art in public buildings and private businesses permanently or as part of a rotation of works of art.
 - ◆ Streamline permit processes for the addition of public art and landmarks to existing locations. Provide incentives for development with provisions for the display of art and favorable structural design.
 - ◆ Amend or adopt a sign ordinance that regulates size, type, material, height, location, and lighting consistent with the policies and objectives of the community design element. (L)
 - ◆ Finance and construct gateway structures at the major entrances to the community that are reflective of the community.
 - ◆ Assist private business in the aesthetic improvement of buildings in the downtown business district.
 - ◆ Preserve and protect natural land forms and features, such as rivers, ridgelines, and their viewsheds, that contribute to the identity of the community. (CO, O)
 - ◆ Encourage new development projects to incorporate natural amenities (i.e., landmark trees and rock outcroppings) into their design.
 - ◆ Require connections between neighborhoods, parks, and open space areas for bicycle and jogging paths. (L, CI)
 - ◆ Incorporate flexibility in design and architectural features into development standards.
 - ◆ Encourage and assist in the placement of overhead utilities underground.
 - ◆ Adopt a cellular tower ordinance that promotes flexibility and creative design for placement on existing public and private buildings and structures (e.g., light poles).
- For references on this topic, see the Bibliography under “Transportation and Circulation” and “Urban Design.”

ECONOMIC/FISCAL DEVELOPMENT

The structure of a city’s or county’s economy plays an important role in the physical development of the planning area and the stability of the local tax base. The purpose of adopting an economic/fiscal development element varies by jurisdiction. However, most are based upon a desire to maintain and enhance the economic character of the community while providing for a stable annual budget. An effective element will establish a consistent set of policies that provide general direction to local government on how the community can focus resources to retain local business, attract new industries, support the tax base, and sustain the ability to provide public services for current and future residents.

Economic development elements can function beyond mere statements of policy. An effective element may be used as the basis for a more specific economic development strategy. Consideration should be given during the preparation of the element to the cumulative effectiveness of the integration of policies central to land use, circulation, and public facilities.

Relevant Issues

The contents of an economic/fiscal development element may vary widely between jurisdictions. The element may include any locally or regionally relevant issues and must take into account those issues identified in the other elements. The following is a list of general issues that may be covered:

- ◆ Business Retention and Development by Sector: The needs, limitations, and alternatives to existing businesses and potential improvements and strategies to encourage business retention.
- ◆ Employment Development: Areas of employment growth, shortages, and needs.
- ◆ Business Recruitment: The types, number, and

success of existing and potential recruitment strategies. Identification of businesses that would be compatible with the objectives of the general plan and consistent with the carrying capacity of the land and infrastructure.

- ◆ **Fiscal Stability:** Existing and potential revenue resources, costs of services and facilities, and economic forecasts.
- ◆ **Budgetary Structure:** Existing outlays to departments, services, and comparable revenue recoupment mechanisms and levels. Comparison of facilities and services versus efficiency of providing the programs.

Ideas for Data and Analysis

Background analysis

- ◆ **Historical Perspective on the Local Economy:** Identify the major developments and trends in the local economy over time to provide a basis for future growth projections.
- ◆ **Current Economic Conditions:** Identify economic trends by sector to identify strengths, weaknesses, and opportunities. Use this information to formulate policies and objectives for the retention and attraction of business and employment.
- ◆ **Projected Economic Conditions:** Identify growing sectors of the economy to facilitate and plan for future development. Inventory weak sectors to plan for change or allocation of low-interest funding or

other assistance for viable enterprises.

- ◆ **Employment Characteristics/Demographics:** Analyze existing and predicted employment characteristics and demographics. An economic development strategy must be based upon the internal capacity of the population to provide labor in different stages and sectors of the economy.

Land use

- ◆ **Land Use Inventory and Analysis:** Analyze the type, location, and intensity of land uses designated by the general plan and the ability to support existing and proposed uses consistent with the economic development strategy.
- ◆ **Infrastructure Analysis:** Analyze the capacity of existing and planned infrastructure to accommodate growth, which will directly affect the viability of economic development. Determining the ability of existing systems to support current and future demands and planning for future increases in capacity and extensions must be based on accurate, up-to-date information.

Financing

- ◆ **Capital Improvements Financing:** Analyze the viability, estimated costs, and potential funding sources for each project prior to its submission for approval. Identify effective programs for the replacement of structures and equipment.
- ◆ **Fee Studies:** Conduct comprehensive fee studies to identify the relative amount of recovery for the service provided as compared with other jurisdictions. Prepare long-term comprehensive fee structures and proposed changes, consistent with Proposition 218 of 1996.

Fiscal analysis

- ◆ **Fiscal Stability:** Identify programs that will maintain a diverse and stable revenue system. Evaluate the viability of revenue sources in order to identify those that enhance or limit tax burdens on residents and businesses.
- ◆ **Historic and Projected General Fund Trends:** Identify past, current, and future general fund revenue sources to plan for effective asset management and revenue collection. Provide for the cost-effective supply of services and recovery of costs.
- ◆ **Balanced Budget:** Identify current and prospective sources of revenue to establish funding programs in anticipation of future capital outlays. Identify the

OPTIONAL ELEMENTS IN ACTION

One example of the development and implementation of an economic/fiscal development element is Marin County's Economic Element in its 1994 Countywide Plan. The intent of the element is to "promote a sustainable local economy which will benefit present and future generations without detrimentally affecting resources or biological systems and which will result in balanced communities where residents have opportunities to enjoy the components of a high quality of life: employment, housing which is affordable, transportation services, and physical development..." As part of plan implementation, the Board of Supervisors established the Marin Economic Commission which facilitates economic activities and provides a forum for cooperative economic development in the cities and the county.

steps necessary to maintain a balanced budget to ensure that future obligations can be met by adding to reserves. Evaluate services to identify cost-cutting measures and efficient delivery systems.

Economic development and implementation

- ◆ Economic Objectives: Identify objectives for the local economy and develop economic indicators to measure the success of the implementing programs and policies.
 - ◆ Economic Strategy: Identify a general strategy (process) for accomplishing economic objectives and a local agency with the ability to procure funding and implement the strategy.
 - ◆ Business Recruitment: Identify areas that could support a variety of industrial, commercial, and professional businesses (consistent with the land use element), keeping in mind the desirability of mixed-use districts and also the need to keep certain industrial businesses away from other uses, such as residences, schools, and parks. Identify areas within older, established business districts that could similarly support new businesses.
 - ◆ Business Retention: Identify strategies that include provisions for adequate infrastructure, qualified employees, funding resources, and regulatory policy designed to foster the competitiveness of existing businesses.
 - ◆ Welfare-to-Work Programs: Develop strategies to encourage the business community to form partnerships with state and local efforts for job placement opportunities and training for welfare recipients.
 - ◆ Influencing Factors and Trends: California's economy is in a period of transition, which is redefining the role of the workforce. The change is being influenced by an evolution in the perceived value of quality of life and an emphasis on child welfare and family time. Consider the increasing trend towards more home-based offices, telecommuting, and flexible work schedules. Consider designing flexibility into zoning and land use designations to encourage alternative office/living space arrangements. Policies and programs may directly influence the assumptions made in the housing and circulation elements of the general plan.
- Ideas For Development Policies**
- The following is a laundry list of ideas that may lead to useful economic development policies:
- ◆ Develop and maintain public facilities and infrastructure to encourage business recruitment, support future demand, and ensure an adequate future supply.
 - ◆ Encourage long-term partnerships between local government, businesses, and business organizations and the educational, arts, and environmental communities.
 - ◆ Enhance recruitment and retention factors that draw employers, such as ambiance and educational, cultural, recreational, and environmental resources.
 - ◆ Encourage the development of housing of types and at prices that are consistent with the housing requirements of workers in the community's various employment sectors.
 - ◆ Develop a business recruitment program that includes permit assistance and other incentives.
 - ◆ Hire or retain an economic development coordinator.
 - ◆ For older, established business areas, hire an economic development coordinator, provide support for merchant organizations, and promote business district marketing strategies.
 - ◆ Apply for inclusion in the California Main Street Program to develop a public/private strategy for revitalizing older downtowns through design, economic restructuring, organization, and promotion. (Contact the California Technology, Trade and Commerce Agency for more information, www.commerce.ca.gov.)
 - ◆ Recover the cost of new facilities and infrastructure necessary for new development.
 - ◆ Apply for and establish an Enterprise Zone. (Contact the California Technology, Trade and Commerce Agency for more information.)
 - ◆ Maintain a stable revenue base that is promoted by a diversified economic base.
 - ◆ Adopt a balanced budget.
 - ◆ Establish an assistance program to aid businesses in the fulfillment of their employment objectives.
 - ◆ Avoid short-term borrowing and long-term debt.
 - ◆ Promote cultural amenities and facilitate community-based events.
 - ◆ Develop incentive programs for business retention and recruitment in targeted areas.
 - ◆ Encourage mutually reinforcing businesses to locate near one another.
 - ◆ Adopt an economic development strategic plan. Consider smaller-scale strategic plans for older business areas.

- ◆ Aggressively pursue grants from state and federal sources.
- ◆ Achieve sustainable economic development by limiting growth to that which is compatible with the carrying capacity of the environment and the service infrastructure.
- ◆ Identify and implement ways in which workforce preparation can be improved and create training programs for welfare recipients to meet employers' needs.

For useful references on this topic, see the Bibliography under “Economic Development and Re-development.”

ENERGY

Energy production and consumption are inextricably linked with the physical development of land. As the overarching policy document that guides the physical development of a city or county, there are important energy implications in the general plan. Choices about land use patterns and transportation systems greatly affect the need for and use of energy, which in turn affect the economy and the environment. For example, the density, mix, and spatial arrangement of land uses prescribed in a general plan result in either a large or a limited set of travel options and, therefore, commit the jurisdiction and each business and citizen to a level of

gasoline consumption and tailpipe emissions. Setting policy with an awareness of the level of energy consumption it prescribes will help local governments see the interrelated benefits of conserved energy resources. These benefits include more dollars in the local economy, reduced air pollution, and enhanced economic viability for area businesses.

Communities may address energy production and consumption in the mandatory elements of the general plan or consolidate energy policies in an optional energy element. An energy element can help integrate the economic and environmental effects of energy costs and benefits into a city's or county's long-term growth planning. In this way, an energy element can be a useful component of a sustainable development strategy.

Planning for the efficient use and generation of energy is a good strategy for simultaneously accomplishing other general plan

“You know you are on the right track when your solution to one problem . . . solves several others. You decide to minimize automobile use to conserve fossil fuels, for example, and realize that this will reduce noise, conserve land by minimizing streets and parking, multiply opportunities for social contact, beautify the neighborhood, and make it safer for children.”

Michael Corbett, Developer

goals, including:

- ◆ Affordable Housing: Lower heating, cooling, and transportation-related costs increase the eligibility for home financing. The housing element requirements include “an analysis of opportunities for energy conservation with respect to residential development” (§65583(a)(7)).
- ◆ Greater Mobility Options and Reduced Traffic Congestion: Energy-efficient travel options, such as walking, biking, and public transit, can reduce automobile dependence. Improved land use patterns can reduce the number and length of automobile trips. Strategies to increase automobile occupancy can further reduce traffic congestion.
- ◆ Improved Air Quality and Reduced Greenhouse Gas Emissions: Fewer automobile trips and more efficient houses and businesses result in significantly fewer air pollutants and lower levels of greenhouse gas emissions.
- ◆ Reduced Cost to Provide Public Services: Policies that favor urban infill, redevelopment, and a better mix of uses in the urban core also reduce the length of water, sewer, natural gas, and electric lines needed to serve a community. Reduced length means a potential for significant savings in the construction, operation, and maintenance of lines, booster pumps, etc.

Energy Efficiency vs. Energy Conservation

Although many people use these terms interchangeably, it is useful to differentiate between energy efficiency and conservation. Energy efficiency means using less energy/electricity to perform the same function. Conservation connotes “doing without” in order to save energy rather than using less energy to do the same thing. For example, turning off lights, turning down the air conditioner, and making fewer vehicle trips are all conservation measures. Installing lighting that uses less electricity, installing additional insulation, and switching to a vehicle with better gas mileage are energy efficiency measures.

- ◆ **Open Space and Agricultural Land Preservation:** The efficient development of compact regions and cities reduces the amount of energy needed to build roads; fuel police cars, school buses, garbage trucks, and other public vehicles; and pump water and sewage.
- ◆ **Increased Personal and Business Income:** Energy savings translate into more disposable income for individuals and more working capital for businesses. These dollars tend to recirculate in the local economy, creating more economic benefit than dollars used to purchase energy.
- ◆ **Job Retention and Creation:** Reduced commercial and industrial energy costs and reinvestment of savings can mean better protection of existing jobs and greater potential for new jobs. Economic stability also makes a business more durable during periods of energy supply disruptions and price changes.
- ◆ **Economic Security and Environmental Quality:** Advanced planning to provide space for preferred energy generation options and necessary transmission infrastructure to meet industrial, commercial, and residential long-term needs is good for business and the environment. Preplanned energy supply will enhance the reliability of the energy supply system and help cut construction and operation costs. Environmentally preferred technologies can be integrated more easily if the general plan provides a recommended portfolio of preferred systems.

Relevant Issues

Land use

Inefficient land use patterns lead to inefficient energy use. Leapfrog development and large blocks of low-density development increase both transportation costs (by increasing vehicle miles traveled) and the cost to bring electric and natural gas transmission facilities to the new development. Private utility companies today are less willing to absorb all of the costs associated with serving new development. Compact and mixed-use development can reduce energy usage associated with travel and extending transmission facilities. Climate-sensitive development patterns that take advantage of natural landscapes and landscaping techniques can reduce energy costs associated with heating, cooling, and the transmission of water, sewer, and stormwater. Wide, unshaded streets and large paved areas without adequate landscaping add to cooling demands (a major source of energy usage) by creating heat islands.

Circulation

Transportation consumes 46 percent of all energy in California (*California Energy Demand 2000-2010*, California Energy Commission, June 2000). This is a function of the number of vehicles, total vehicle miles traveled, and the fuel efficiency of vehicles. Local governments can foster energy efficiency measures in all three of these areas. Development patterns that promote the use of alternative transportation modes, including transit use, can reduce the number of vehicles on the road. Encouraging working from home and/or telecommuting is another way to reduce the number of vehicle trips made. Infill development, compact development, and modified grid street patterns can reduce the number of vehicle miles traveled. Local agencies can encourage fuel efficiency by using alternative fuel vehicles in their own fleets and providing alternative fueling facilities in new development.

Subdivision design

The Subdivision Map Act requires the design of a subdivision to provide for future passive or natural heating or cooling opportunities (§66473.1). For example, lot size and orientation may take advantage of solar exposure for heating or prevailing breezes for cooling. In addition, the approving agency may require solar easements as a condition of approval (§55475.3). Properly placed shade trees and other vegetation is one of the most cost-effective and quality-enhancing urban design options for reducing ambient air temperature, air conditioning loads, and energy consumption.

Energy facility siting policies

Some local authority for siting energy facilities is

Energy Commission Siting Authority

The California Energy Commission has the statutory authority to site and license thermal power plants that are rated at 50 megawatts and larger and related transmission lines, fuel supply lines, and other facilities. For more information about the Commission's Energy Facility Siting Procedures, please contact the California Energy Commission, Energy Facility Licensing Office Manager, 1516 Ninth Street, MS-15, Sacramento, CA 95814, (916) 654-5100.

preempted by the State of California. However, the state will consider locally adopted policy when making energy facility siting decisions. Also, many energy facilities fall outside of state siting authority.

Distributed generation

Distributed generation (DG) refers to small-scale power generation technologies (typically in the range of 3 to 10,000 kilowatts) located close to where electricity is used (e.g., a home or business). DG provides an alternative to or an enhancement of the traditional electric power system. DG may include diesel engines, fuel cells, small and micro gas turbines, solar photovoltaic (PV), micro-hydro turbines, and wind turbines. Such technologies may also be combined with electric storage technologies (i.e., batteries). Applications include emergency and stand-by power; cogeneration and renewable energy systems to supplement utility supplies and sell excess power to the transmission grid; power to serve off-grid electric loads; uninterruptible power supplies for sensitive electronic equipment; peaking power to maintain the transmission grid during times of high demand; and facilities that allow customers to respond to price signals by switching to on-site power sources.

DG facilities are subject to the normal local building, zoning, and air district requirements. Local jurisdictions can promote energy independence by specifying suitable location and design standards for various DG technologies. These policies and standards should be carried through local zoning and building standards. Some communities have presented a portfolio of acceptable energy technologies selected to contribute to air quality and economic development goals expressed in other parts of the general plan.

Public facilities and fleets

The cost and reliability of energy systems in public facilities are a concern for local governments. Energy conservation, efficiency, and generation options should be considered when building, acquiring, or retrofitting public facilities. The location of public facilities can affect transportation costs for both employees and users of the facility. Alternative fuel vehicle fleets are in operation in many local governments in California, saving dol-

lars and reducing air pollution from mobile sources.

Geothermal energy

Counties that adopt an optional geothermal element can exert local control over some aspects of geothermal energy exploration, recovery, and power production. Absent this delegation of authority to the county, the Department of Conservation’s Division of Oil, Gas, and

Geothermal Resources regulates geothermal well drilling, while the California Energy Commission licenses geothermal power plants of 50 megawatts (MW) or greater. Geothermal element guidelines appear later in this chapter.

Building standards

Title 24 of the California Code of Regulations incorporates energy efficiency standards into the uniform building code. However, communities can plan for greater energy efficiency in public and private construction than is minimally required by Title 24. A more comprehensive approach to energy conservation in building construction is known as “green building.” Green building techniques integrate energy efficiency and sustainable building practices into the design and construction phases. There are several private and governmental rating systems for green buildings, such as the voluntary LEED (Leadership in Energy and Environmental Design) standard developed by the U.S. Green Building Council.

Water and wastewater

Energy represents the largest controllable cost of providing water and wastewater services to the public. California water and wastewater agencies spend more than \$500 million each year on energy costs.

Environmental justice

Environmental justice concerns should be considered when siting new energy production facilities. Siting policies should seek to avoid overconcentration in proximity to residential dwellings and schools (see Chapter 2). Communities should also take advantage of opportunities to address environmental justice issues, such as through the encouragement of clean DG facilities to lessen the need for conventional power plants.

Small Wind Energy Systems

Government Code §65892.13 creates uniform standards for the approval of small wind energy systems by cities and counties. Cities and counties that do not adopt a small wind energy ordinance must use the state statute for approval of small wind energy systems and the conditions that may be placed on them.

Ideas for Data and Analysis

Before establishing general plan policies for energy production and consumption, it is important to understand all of the factors that influence a local government's energy-related activities. Energy reliability, production, consumption, and conservation are among these factors. The data and analysis required to prepare an energy element may include the following:

- ◆ An analysis of historic and projected energy demands for residential, commercial, industrial, agricultural, and other land uses.
- ◆ An analysis of historic and projected numbers of vehicles and vehicle miles traveled (VMT). (CI)
- ◆ An analysis of energy supply, including local production (thermal power plants, hydroelectric, distributed generation, etc.) and imports.
- ◆ An inventory of existing and potential energy-producing resources, including wind, solar, hydroelectric, geothermal, and biomass. (CO)
- ◆ An inventory of energy conservation opportunities, including transportation, urban design, and residential, commercial, and industrial conservation programs.
- ◆ An inventory of existing energy transmission systems. (CI)
- ◆ The identification of the need for future transmission lines and preferred routes. (CI)
- ◆ An inventory of community facilities with distributed generation and back-up capacity for disaster preparedness.

Ideas for Policy Development

A good energy element should define the city's or county's role in energy production, distribution, and consumption. This role will vary with local circumstances. For example, some communities may

California Solar Rights Act of 1978

The Solar Rights Act of 1978 authorizes cities and counties to require solar easements as a condition of subdivision approval to assure each parcel or unit the right to receive sunlight across adjacent parcels or units for any solar energy system. The Act precludes legislative bodies from enacting ordinances that would make the use of solar energy infeasible.

have significant energy resources, while others may be primarily energy importers. Some communities may focus their efforts in areas of conservation and efficiency, while others may act as energy providers.

The following provides examples of policies that a jurisdiction may wish to include in an optional energy element:

- ◆ Policies, objectives, and standards for energy efficiency in new subdivision design. (L)
- ◆ Policies, objectives, and standards for infill development, compact development, transit-oriented development, and mixed-use development. (L)
- ◆ Policies, objectives, and standards for energy efficiency in residential, commercial, industrial, and public buildings.
- ◆ Policies, objectives, and standards for energy efficiency in water and wastewater facilities.
- ◆ Policies, objectives, and standards for the development of new distributed generation.
- ◆ Policies on the siting of new energy production and transmission facilities. (CI, L, N)
- ◆ Policies for development of areas available for the production of renewable energy, such as wind, large solar PV, or geothermal. (L, CO)
- ◆ Policies to reduce vehicle miles traveled, including transit-supportive policies and development of bicycle and pedestrian facilities. (CI)
- ◆ Standards for bicycle and pedestrian facilities. (CI)
- ◆ Standards for the development of new streets, including width, landscaping, and grid or modified grid pattern. (CI)
- ◆ Policies and objectives related to alternative fuels for public vehicle fleets.

Technical Assistance and Resources

The California Energy Commission has a variety of information and resource available on its website, www.energy.ca.gov, including:

- ◆ *The Energy Yardstick: Using PLACE³S to Create More Sustainable Communities*
- ◆ *The Energy-Aware Planning Guide*

Other useful information on energy-efficient buildings and communities available on the Internet includes the following:

- ◆ U.S. Green Building Council, www.usgbc.org

- ◆ Smart Communities Network, U.S. Department of Energy, www.sustainable.doe.gov

Information on energy-efficient school facilities is available from the following sources:

- ◆ Division of the State Architect, www.sustainableschools.dgs.ca.gov/sustainableschools
- ◆ Collaborative for High Performance Schools, www.chps.net

For other useful resources on this topic, see the Bibliography under “Energy.”

FLOOD MANAGEMENT

Flooding is a natural function of every river, alluvial fan, and coastal area. In riverine systems, floodwaters enrich bottomlands and provide spawning habitats for native fish. There are ecological benefits to maintaining connections between the river and its floodplain.

Land use decisions directly influence the function of floodplains and may either reduce or increase potential flood hazards. The functions of floodplains include, but are not limited to, water supply, water quality, flood and erosion control, and fish and wildlife habitat. Development within floodplains may not only expose people and property to floods, but also increase the potential for flooding elsewhere and negatively impact floodplain ecosystems. Land use regulations, such as zoning and subdivision ordinances, are the primary means of implementing general plan policies established to minimize flood hazards. In addition to including floodplain management policies in the general plan, making related changes to zoning and subdivision ordinances is crucial to the success of a floodplain management program.

The following flood management element guidelines will discuss flood management at both the individual community level and the regional level. They are equally useful in situations where a city or county has unilaterally included flood management in its general plan and where an individual jurisdiction’s flood management element is part of a larger regional strategy to be implemented by more than one agency.

Key Terms

Flood management is defined as the overarching term that encompasses both floodwater management and floodplain management.

Floodwater Management

Floodwater management includes actions to modify the natural flow of floodwaters to reduce losses to human resources and/or to protect benefits to natural resources associated with flooding. Examples of floodwater management actions include containing flows in reservoirs, dams, and natural basins; conveying flows via levees, channels, and natural corridors; managing flows through reservoir reoperation; and managing watersheds by decreasing rainfall runoff and providing headwater stream protection.

Floodplain Management

Floodplain management includes actions to the floodplain to reduce losses to human resources within the floodplain and/or to protect benefits to natural resources associated with flooding. Examples of floodplain management actions include minimizing impacts of flows (e.g., flood-proofing, insurance); maintaining or restoring natural floodplain processes (e.g., riparian restoration, meander corridors, etc.); removing obstacles within the floodplain voluntarily or with just compensation (e.g., relocating at-risk structures); keeping obstacles out of the floodplain (through subdivision and zoning decisions); education and emergency preparedness planning (e.g., emergency response plans, data collection, outreach, insurance requirements, etc.); and ensuring that operations of floodwater management systems are not compromised by activities in the floodplain.

Floodplain management measures interrelate and occasionally overlap with floodwater management measures to reduce losses within the floodplain. Examples of such measures include emergency response activities; realigning levees; reconnecting historical floodplains; and reoperation of reservoirs.

Multi-Hazard Mitigation Approach

Federal law directs states to develop a multi-hazard mitigation program (administered in California by the Office of Emergency Services) to implement effective hazard mitigation measures that reduce the potential damage from natural disasters to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters. While the state directs local governments through existing law to deal with fire and earthquakes in their local planning, the state does not play a major role with land use issues associated with flooding. The general plan law calls for the consideration of flood hazards, flooding, and floodplains in the land use, open-space, conserva-

Tips for Tackling a Regional Floodplain Management Plan

(adapted from U.S. EPA's "Top 10 Watershed Lessons Learned")

- Be sure that a watershed-based or risk-based planning process is needed and has broad community support.
- Invite all those with a stake in the outcome (landowners, residents, cities, counties, etc.) to participate.
- Establish a steering committee of community opinion leaders.
- Inform participants of the issues and problems and a range of possible solutions.
- Identify sources of funding early in the process to help focus the range of potential actions.
- Respect the opinions of residents and other participants.
- Encourage a consensus approach, maintaining good communication among participants.
- Establish clear, measurable goals and feasible objectives.
- Assign responsibility and funding for specific aspects of the plan to each agency.
- Where possible, integrate floodplain management policies and regulations with local general plans, zoning ordinances, and subdivision ordinances.

tion, and safety elements. Local jurisdictions may benefit by taking a multi-hazard planning approach to meet multiple federal and state requirements.

Flood management also may be approached as a stand-alone program or as one component of the broader notion of watershed planning, which also includes objectives such as improved water quality, erosion control, system-wide flood management, and habitat conservation and enhancement. Where possible, a community should take a broader watershed approach to flood management, which would result in a coordinated regional approach to land use planning and flood loss reductions. When incorporated into the general plan, either as an optional element or as a section in the land use, open-space, conservation, or safety element, flood management principles will be reflected as long-term development policies.

Background

Relationship to the General Plan

Flood management may be addressed in an optional element pursuant to §65303. Once adopted, the flood management element becomes an integral part of and carries the same weight as the other elements of the general plan. Its objectives, policies, plan proposals, and implementation measures must be consistent with the entire general plan (§65303.5). The objectives and policies that are adopted as part of the flood management element must not conflict with the general plan as a whole nor with any individual element. A floodplain management element should provide direction and specific policies correlated with the land use, housing, conservation, safety, and open-space elements. For example, policies limiting development within the floodplain to compatible agricultural uses must also be reflected in and internally consistent with the land use, housing, open-space, and conservation elements. Policies regarding levee and channel maintenance might be reflected in the safety element. Many of the provisions under flood management will affect other elements of the general plan, and they should be cross-referenced as necessary.

Where a regional approach is being taken, the policies of a city's or county's flood management element should also correlate to the regional flood management plan. That plan should be specific enough to recognize the differing characteristics of the involved cities and counties and identify the respective roles of each. The regional plan may stipulate that participating cities and counties self-certify the consistency of their flood management elements with the regional plan.

Relationship to CEQA

The adoption or amendment of a floodplain management element is subject to the requirements of CEQA (described in Chapter 4). The element may have direct physical consequences on residential development, wildlife habitat, anadromous fish migration, agricultural resources, vector control, water quality, and other environmental resources common to rivers and their floodplains. The hydrologic and hydraulic characteristics of the rivers and associated floodplains and ecosystems of each river basin or hydrologic unit represents a complete and interconnected system. Changes to one part of the system may change other parts of the system. Floodwater and floodplain approaches must consider these factors. There may be flood management benefits from a watershed perspective for assessing potential impacts and opportunities for mitigation measures.

Flood Insurance

The most common means of planning to avoid or at least mitigate flood damage is participation in the National Flood Insurance Program (NFIP). The Federal Emergency Management Agency (FEMA) administers the program, which makes flood insurance available to those communities that have enacted local ordinances restricting development within the 100-year floodplain. The local floodplain ordinances must meet or exceed FEMA's regulations. As part of NFIP, FEMA prepares a Flood Insurance Rate Map (FIRM) delineating the theoretical boundaries of the 100-year floodplain (i.e., the area within which the statistical frequency of flooding is believed to be 1 in 100 in any given year). These maps form the basis for regulating floodplain development and the rating of flood insurance policies.

The responsibilities of cities and counties participating in NFIP include requiring that all new construction have its lowest floor elevated to or above the "base flood elevation" (this is calculated in conjunction with the 100-year floodplain delineation) and keeping records of development occurring within the designated floodplain. Under federal law, flood insurance must be purchased when obtaining a federally backed loan for a home within the FIRM 100-year floodplain. The availability of other federal funds also may be affected by participation in NFIP. The city or county must submit a biennial report to FEMA describing any changes in the community's flood hazard area, development activities that have taken place within the floodplain, and the number of floodplain residents and structures. As of April 1998, all but 20 of the cities and one of the counties in California participate in NFIP.

Participating in NFIP is no guarantee that a community will escape flood damage or that floods will not occur outside the boundaries of mapped floodplains. The program has a number of recognized shortcomings. For example, FEMA maps tend to underestimate the extent of the floodplain. Existing FIRM maps do not take into account the effects of future development when estimating flood potential and they are not updated frequently enough to reflect changes in the watershed or the floodplain with or without future conditions. New FEMA regulations allow FIRM maps to provide for consideration of future conditions, including build-out and changes to weather patterns associated with climate changes for either upstream or downstream areas that may affect local flood levels. If these maps are to be used as a planning tool, they should be updated using locally collected data to identify existing and future flood levels. The Department of Water Resources (DWR) is currently working in cooperation

with FEMA to update many of these maps.

Residents and decision-makers are not always aware of the actual level of flood risk. The 100-year floodplain is a theoretical construct. In many cases there is simply insufficient historical flood data to accurately judge flood frequency. In addition, the 100-year floodplain designation is commonly misunderstood by the public. It is simply a frequency and intensity probability, meaning that in reality, severe flooding may occur even more than once in any year and in any number of years over a 100-year span. NFIP is a program to enable communities to seek flood insurance and, along with its related mapping, should be viewed as the foundation on which to build comprehensive flood management policies. The general plan may augment this program by providing long-range guidance to avoid and reduce flood hazards.

Flood Management on a Regional Basis

Rivers, creeks, and other potential sources of flooding often cross jurisdictional boundaries. Thus, a regional watershed-based approach may be the most effective means of flood management. The broader scope offers the advantage of involving local governments, other public agencies, interest groups, landowners, and the general public throughout the watershed in a comprehensive, multi-jurisdictional program for reducing flood risk and potential damages and restoring and enhancing floodplain functions. The larger area may offer a wider range of potential projects and policy and regulatory options than would be available in a single jurisdiction. However, regional flood management is also more politically and logistically difficult than management undertaken within a single jurisdiction.

As a component of watershed management, flood management can reduce downstream flood stages and flood damages with benefits for water quality and supply and for ecosystems. The watershed-based approach maintains the floodplain functions of sedimentation, deposition, water filtering, and floodwater absorption. For additional discussion on watershed planning, refer to the optional water element later in this chapter.

Because the dynamics of regional flood management are very situation-specific, the following discussion of regional approaches is limited to generalities. For additional advice, refer to the technical and funding resources listed at the end of this section or refer to the Bibliography under "Flood Management."

Successfully developing a regional flood management plan that includes floodplain strategies depends on several basic prerequisites. There must be:

- ◆ General recognition that there is a regional flooding problem that requires a solution.
- ◆ Some impetus for the involvement of critical agencies and interest groups in the search for a solution.
- ◆ A willingness among the involved agencies and interest groups to work toward a consensus solution.
- ◆ At least one person, group, or agency that will sponsor or champion the process.
- ◆ A range of feasible and practical solutions available.
- ◆ A reasonable possibility that funding exists to pay for both the necessary planning and the implementation of the accepted plan.
- ◆ Specific criteria to measure the effectiveness of plan implementation.

Few of the regional flood management efforts currently being implemented around the state, including watershed management programs, are directly linked to city and county general plans. In fact, city and county land use planning agencies are often conspicuously low on the list of participants. When possible, city and county planners should take an active role in any regional flood management planning process. The local general plans, as well as zoning and subdivision ordinances, can play an important part in a comprehensive, multi-jurisdictional program for flood management. Cities and counties should amend their general plans and revise their zoning and subdivision ordinances when agreed to as part of a regional effort.

Methodology

The process of adopting a flood management element is the same as any other element of the general plan and must follow the procedures set forth by §65350 and §65400. Under state law, the planning agency must provide opportunities for involvement by residents, public agencies, public utility companies, and other community groups through public hearings and any other means found to be necessary or desirable. The planning agency should include in its process affected cities and counties, FEMA, the U.S. Army Corps of Engineers, DWR, reclamation districts, levee districts, resource conservation districts, and interest groups including environmentalists, farmers, builders, and other non-governmental organization (e.g., land trust, conservancy, etc.) that might have an interest in floodplains.

Establishing a steering committee may be useful. The committee can help identify floodplain issues and community objectives, develop policies, and draft the element. Members of the committee should be selected

from among representatives of interested groups, agencies, organizations, and residents. Alternatively, a separate technical advisory group may also be established from among agency representatives.

An optional flood management element may be adopted in any format deemed necessary or appropriate. Flood management is interrelated with most, if not all, of the required elements of the general plan. OPR recommends taking particular care to correlate flood management objectives and policies with those of the land use, open-space, conservation, and safety elements.

Relevant Issues

When a flood management element is being prepared, the issues covered should be limited to those that are relevant to the community, the floodplain, and the watershed. The subjects covered by the flood management element will depend upon the community's location in relation to rivers, streams, alluvial fans, and the coast; the past or future potential for flood events; and the potential to be affected by upstream or to impact downstream land use decisions and flood potential. The following is a list of common issues, not all of which will be relevant in every jurisdiction.

- ◆ State Multi-Hazard Mitigation Plan, prepared by the Office of Emergency Services (OES).
- ◆ The reasonably foreseeable flood area.
- ◆ FEMA NFIP program and community rating system (to reduce flood insurance rates).
- ◆ DWR awareness mapping and other historical flooding resources.
- ◆ Repetitive losses.
- ◆ Land use designations and flood hazard overlay designations.
- ◆ Flood control facilities (i.e., structural approaches to flood management, such as dams, levees, etc.).
- ◆ Floodplain management approaches (i.e., non-structural approaches, including elevation, flood-proofing, floodplain storage, ring levees, etc.).
- ◆ Conformity with federal, state, and local regulations.
- ◆ Regulatory relationships, including permitting.
- ◆ Multi-jurisdictional coordination and watershed planning.
- ◆ Downstream impacts as consequences of land use decisions.
- ◆ Downstream land use planning considerations as consequences of upstream actions.
- ◆ Alternative non-structural allowable floodplain

land uses.

- ◆ Multi-objective floodplain management planning with regional share housing needs; existing land uses; conservation of agricultural land, parks, and open space; habitat restoration; and flood management mitigation measures.
- ◆ Funding of management activities.

Ideas For Data and Analysis

In the process of preparing a flood management element, the city or county will have to collect a substantial amount of information concerning its floodplains and its watershed. There are a variety of sources for this information. FEMA maps are available for most communities. The U.S. Army Corps of Engineers will do floodplain delineation on a cost-sharing basis and has information on floodplains and project levees. DWR also has floodplain information and a floodplain management program, as does the State Reclamation Board in the Central Valley. OES and DWR have information on past flooding and flood levels based on awareness mapping. Local levee districts and resource conservation districts may also have information to share.

The following are ideas for data and analysis to support the development of objectives, policies, and implementation measures.

- ◆ Comprehensively define the floodplain (FEMA vs. Army Corps of Engineers vs. State Reclamation Board vs. local agency definition).
- ◆ Determine the extent and depth of historic flooding. (MAP)
- ◆ Gather historical flooding data.
 - Frequency.
 - Intensity.
 - Duration.
 - Paleoflood.
 - Hydrologic modeling using transposition or meteorologic models.
- ◆ Gather alluvial fan floodplain data.
 - Reasonably foreseeable flood apex flow paths.
 - Flood flow path depths and velocities.
 - Debris and scour.
- ◆ Inventory land and land uses within the floodplain(s)
 - Open space.
 - Habitat.
 - Agriculture.
 - Flood control.
 - Developed (e.g., residential, commercial, industrial, etc.).

- ◆ Identify existing and future problems and opportunities.
 - Development within hazard areas.
 - Undeveloped land suitable for bypass construction.
 - Loss of productive farmland and opportunities for conjunctive farming and floodplain management activities.
 - Community apathy or support.
 - Funding shortfalls.
- ◆ Inventory flood control structures and areas managed for flood control and their controlling agencies.
 - Levees.
 - Flood walls.
 - Bypasses.
 - Dams and reservoirs.
- ◆ Inventory pertinent regulations of federal, state, and local agencies.
 - Regulatory authority.
 - Existing land use and zoning restrictions.
- ◆ Inventory ongoing floodplain or watershed management and planning activities.
 - Local/regional, including those of non-governmental organizations.
 - State.
 - Federal.
- ◆ Inventory past and planned management activities.
 - Local agencies.
 - Reclamation districts.
 - State and federal agencies.
- ◆ Identify sources of funding for planning efforts and for potential implementation activities.
- ◆ Benefit/cost analysis of alternative floodplain management strategies.

Ideas for Development Policies

A flood management element should conform to the pertinent policies, objectives, plans, and proposals central to the land use, conservation, open-space, and safety elements. Policies should recognize existing floodplain management programs and existing regulations. As always, policies must conform to constitutional prohibitions on “regulatory takings.” Further, the policies selected should be physically and economically feasible to implement.

The following are ideas for the general types of policies that may be incorporated into the flood management element:

- ◆ Specify allowable uses within the floodway fringe and floodplains.

- ◆ Specify limits on and construction standards for development and encroachment within floodplains and floodway fringe (e.g., land use density and intensity, elevations, location, etc.), including areas of shallow flooding.
- ◆ Establish policies, plan proposals, and standards for dealing with constraints and minimizing land use and floodplain conflict.
- ◆ Retain and preserve floodplains for open space and recreation.
- ◆ Encourage compatible agricultural uses and practices with habitat banking where compatible with floodplains.
- ◆ Mitigate for impacts, such as loss of agricultural land or changes in flood characteristics.
- ◆ Cooperate with the programs of other agencies and non-governmental organizations, where applicable.
- ◆ Establish consultation procedures with other affected agencies and jurisdictions.
- ◆ Identify criteria for public agency acquisition of development rights in flood-prone areas.
- ◆ Encourage cooperation with non-governmental organizations to acquire development rights.
- ◆ Establish policies, guidelines, standards, and building criteria to ensure that new development will not be damaged by special risks associated with alluvial floods.
- ◆ Encourage multi-jurisdictional flood management cooperation when watersheds cross jurisdictional boundaries.
- ◆ Develop flood hazard mitigation measures within identified reasonable foreseeable flood hazard areas, where appropriate.
- ◆ Encourage coordination between flood management and multi-hazard management planning and mitigation.
- ◆ Retain and preserve connectivity between rivers or streams and their floodplains to preserve floodplain function and natural processes.
- ◆ Adopt flood hazard zoning.
- ◆ Enact floodplain management standards as part of any development ordinance, such as zoning or subdivision ordinances.
- ◆ Consider improved building standards to exceed minimum federal flood insurance requirements.
- ◆ Adopt transfer of development rights programs.
- ◆ Adopt other land use development regulations.
- ◆ Reconnect the river and its floodplain through public land acquisition and structural modification of existing flood control devices.
- ◆ Include non-structural floodplain management approaches to help conserve beneficial uses and functions of the floodplain.
- ◆ Identify the capacity of the floodplain to recharge groundwater.
- ◆ Develop a program for preventative maintenance of active floodplains, control structures, riverbanks, and channels.
- ◆ Identify and utilize floodplain management grants and assistance to develop and implement floodplain management plans and programs.
- ◆ Develop public outreach programs and information.
- ◆ Incorporate watershed and floodplain mapping, from several sources if available, into the city or county geographic information system (GIS).
- ◆ Regularly review floodplain maps and update when new information becomes available.
- ◆ Participate in and provide assistance to stream gauges as appropriate.
- ◆ Develop reasonably foreseeable alluvial fan floodplain maps.
- ◆ Identify repetitive losses, if any (in cooperation with OES and DWR).
- ◆ Prepare and update emergency preparedness plans.
- ◆ Direct local emergency services offices to develop and implement flood warning systems.
- ◆ Establish resources and provide funding for public acquisition of private lands and structures within the floodplain and subject to flood hazards.
- ◆ Institute a planning mechanism and institutional framework to coordinate flood management programs with opportunities for agricultural conservation, ecosystem protection and restoration, and environmental management activities with local, state, federal agencies, and other stakeholders.

Ideas for Implementation

Local agencies should select the combination of implementation measures and strategies that best address the unique characteristics of the specific community and establish an effective long-term approach to floodplain management. The following examples illustrate the kinds of actions local governments may take to implement the floodplain management element:

- ◆ Promote a multi-objective management approach in flood management projects.
- ◆ Initiate actions to avoid inadequate or unclear responsibilities among agencies.
- ◆ Enter into cooperative agreements (e.g., joint powers authority, memorandum of understanding, etc.) with other entities specifying relative roles.
- ◆ Facilitate the coordination of responsibilities and activities among agencies and the public for floodplain management.
- ◆ Develop aquatic and terrestrial habitat restoration plans consistent with floodplain and river channel use guidelines.
- ◆ Develop information and coordination plans with other agencies to educate the public and all planning agencies about floodplain management objectives.
- ◆ Refer to FEMA DMA 2000 Multi-Hazard Mitigation Plan Criteria.
- ◆ Develop awareness mapping.

Technical and Funding Assistance

The following governmental and nongovernmental organizations may provide technical and funding assistance in preparing and adopting a flood management element or incorporating its objectives, plans, policies, and implementation measures into other elements of the general plan.

Floodplain Management Association
4145 Maybell Way
Palo Alto, CA 94306
<http://floodplain.org>

United States Army Corps of Engineers
Floodplain Management Services
South Pacific Division
630 Sansome Street, Room 720
San Francisco, CA 94111
(415) 556-0914
www.usace.army.mil/inet/functions/cw/cwfpms

Federal Emergency Management Agency
1111 Broadway, Suite 1200
Oakland, CA 94607
(510) 627-7100
www.fema.gov
Funding mechanisms: Hazard Mitigation Grant Program, Public Assistance Section 406, National Flood Insurance Program, Performance Partnership Program, Community Assistance Program-State Support Services

Element, Individual and Family Grant Program, Disaster Housing Assistance Program

Governor's Office of Emergency Services
Planning and Technological Assistance Branch
P.O. Box 419047
Rancho Cordova, CA 95741-9047
(916) 464-3200
or
Disaster Assistance Programs Branch
Hazard Mitigation Section
P.O. Box 419023
Rancho Cordova, CA 95741-9023
www.oes.ca.gov
Funding mechanism: Hazard Mitigation Grant Program

California Department of Water Resources
Floodplain Management Branch
P.O. Box 942836
Sacramento, CA 94236-0001
(916) 653-9902
www.water.ca.gov

United States Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105
www.epa.gov
Funding mechanisms: Clean Water Act: 104(b)(3) State Wetland Protection Development Grant; 104(b)(3) NPDES demonstration projects

United States Department of Agriculture
Natural Resource Conservation Service
2121-C 2nd Street, Suite 102
Davis, CA 95616
www.nrcs.usda.gov

For more information on this topic, refer to the Bibliography under "Flood Management."

GEOTHERMAL

The Public Resources Code offers counties (but not cities) the opportunity to exert local control over some aspects of geothermal energy exploration, recovery, and power production. Counties that have adopted geothermal elements may be delegated lead agency responsibilities (defined in the California Environmental Quality Act) for exploratory geothermal well projects and primary permitting powers for large geothermal plants (Public Resources Code §3715.5 and §25540.5). Absent such delegation, these duties are otherwise administered by the Department of Conservation's Division of Oil, Gas, and Geothermal Resources and the Cali-

Useful Definitions: Geothermal Element

Development Well: "...a well, other than an exploratory well, drilled for the purpose of producing either high-temperature or low-temperature geothermal fluids in commercial quantities" (Title 14, California State Code of Regulations, §1920.1(c)).

Equivalent Certification Program: "...a program, as further defined in §25540.5, administered by a county and approved by the [California Energy] commission, which may substitute for the site and related facility certification procedures established pursuant to this division." (Public Resources Code §25115)

Exploratory Geothermal Well: "...a well, other than a development well, drilled to discover or evaluate the presence of either low- or high-temperature geothermal fluids, including steam, where the surface location of the well is at least .8km or one-half mile from the surface location of an existing well capable of producing geothermal fluids in commercial quantities." (Title 14, California Code of Regulations, §1920.1(b))

Geothermal Element: "'Geothermal element' means an element of a county general plan consisting of a statement of geothermal development policies, including a diagram or diagrams and text setting forth objectives, principles, standards, and plan proposals, including a discussion of environmental damages and identification of sensitive environmental areas, including unique wildlife habitat, scenic, residential, and recreational areas, adopted pursuant to §65303 of the Government Code." (Public Resources Code §25133)

Geothermal Exploratory Project: "...a project...composed of not more than six wells and associated drilling and testing equipment, whose chief and original purpose is to evaluate the presence and

characteristics of geothermal resources prior to commencement of a geothermal field project as defined in §65928.5 of the Government Code. Wells included within a geothermal exploratory project must be located at least one-half mile from geothermal development wells which are capable of producing geothermal resources in commercial quantities." (Public Resources Code §21065.5)

Geothermal Field Development Project: "...a development project...composed of geothermal wells, resource transportation lines, production equipment, roads, and other facilities which are necessary to supply geothermal energy to any particular heat utilization equipment for its productive life, all within an area delineated by the applicant." (Government Code §65928.5)

Geothermal Resources: "...the natural heat of the earth, the energy in whatever form below the surface of the earth present in, resulting from, created by, or from which may be extracted natural heat, and all minerals in solution or other products in whatever form obtained from naturally heated fluids, brines, associated gases and steam, excluding oil, hydrocarbon gas or other hydrocarbon substances." (Title 14, California Code of Regulations, §1920(e))

Thermal Power Plant: "Any stationary or floating electrical generating facility using any source of thermal energy, with a generating capacity of 50 megawatts or more, and any facilities appurtenant thereto. Exploratory, development, and production wells, resource transmission lines, and other related facilities used in connection with a geothermal field development project are not appurtenant facilities for the purposes of this division." (Public Resources Code §25120)

fornia Energy Commission (CEC), respectively.

To put this into perspective, under usual circumstances the Division of Oil, Gas, and Geothermal Resources regulates geothermal well drilling (Public Resources Code §3700, et seq. and Title 14, Chapter 4, Subchapter 4, California Code of Regulations). CEC regulates the siting of geothermal power plants over 50 megawatts (MW) to the exclusion of local land use control. Counties may regulate exploratory wells and development-field wells through zoning and other land use controls provided that their regulations do not conflict with those of the state (59 Ops. Cal. Atty. Gen. 461 (1976)).

The administrative regulations adopted by CEC for delegating authority to counties require that OPR review proposed geothermal elements for adequacy (Title 20, California Code of Regulations, §1862). OPR is responsible for developing geothermal element guidelines as a basis for this review. What follows is the current version of these guidelines.

Relationship to the General Plan

A county geothermal element is an optional element under §65303 of the Government Code. Once adopted, it becomes an integral part of the county general plan;

its objectives, policies, plan proposals, and implementation measures must be consistent with the entire general plan (§65300.5). A geothermal element addresses land use, circulation, open-space, safety, housing, noise, and conservation issues. Consequently, its provisions affect each of the seven mandatory general plan elements. It may be necessary for a county to amend its mandatory elements (and any affected optional ones) concurrent with adoption of the geothermal element in order to maintain the internal consistency of its general plan.

When making subsequent amendments to the geothermal element, take care to ensure that the amendments do not conflict with the general plan as a whole or with any other individual element. In cases where a proposed amendment to the geothermal element would conflict with the general plan, the county must either deny the proposed amendment or make related changes to the general plan.

Methodology

The process of adopting a geothermal element is the same as that for any other element of the general plan; counties must follow the procedures established by §65350 through §65400. The county must hold public hearings and provide opportunities for involvement by community groups, residents, public agencies, and utilities. The board of supervisors may appoint a planning advisory committee or other similar body in order to assist in the preparation of the element if it so desires.

Not all counties have reached the same stage in developing their geothermal energy resources. Consequently, the contents of the geothermal element will vary from county to county. In any case, preparation of the local geothermal energy element should follow the basic methodology established in Chapter 3, with a few additional considerations. When formulating objectives, for example, the county must recognize the alternative energy goals of the state as expressed in Public Resources Code §25008. During data gathering, it should contact the California Geological Survey and the Division of Oil, Gas and Geothermal Resources, both within the Department of Conservation, and the CEC for information on geothermal energy resources in the area. The element should enable the county to assume permit responsibilities, including adoption of any necessary ordinances. Furthermore, the element must discuss “environmental damages and identification of sensitive environmental areas, including unique wildlife habitat, scenic, residential, and recreational areas” (Public Resources Code §25133).

A county with existing geothermal exploration and development activities should be able to discuss issues in depth, presenting a detailed program for processing proposals. Counties without such background will be expected to proceed in a more anticipatory and prospective manner. In either case, the geothermal element must include policies that are consistent with the adopted policies of CEC “with respect to the development of geothermal resources for the generation of electrical energy” (Title 20, California Code of Regulations, §1860(b)).

The element must also provide for the following:

- ◆ Certification of geothermal areas as potential multiple facility sites, if so applied for.
- ◆ Processing of and decision on geothermal power plant applications within twelve months of the filing date.
- ◆ Periodic review and updating as may be required by law and CEC.
- ◆ Opportunity for input and review of proposed projects by the public and interested public agencies.
- ◆ Distribution of all applications to the CEC and responsible federal, state, and local agencies and provisions for the receipt of and response to the comments and recommendations of each agency.
- ◆ Public hearings and notice as required for general plan amendments. Hearings must include provisions for adjudication of disputed issues of fact through testimony taken under oath and refutation by cross-examination.
- ◆ Formal intervention by any person with a legally recognizable interest in the outcome of the proceedings.
- ◆ Distribution of a written decision on each power plant application. The decision shall contain each of the findings and conclusions required by §1752 through §1753 of Title 20 of the California Code of Regulations and shall be based upon the formal record of the proceedings.
- ◆ Appeal procedures, including appeals to CEC on substantive issues (Public Resources Code §25540.5 and Title 20, California Code of Regulations, §1863).

In addition, the element should:

- ◆ Identify areas of potential geothermal resources.
- ◆ Identify other land uses, including those that would be affected by geothermal resource exploration and recovery.

- ◆ Establish policies for minimizing conflicts between geothermal resource exploration and recovery activities and sensitive land uses (e.g., residential, scenic, habitat, schools, etc.).

Ideas for Data and Analysis

In the process of preparing a geothermal element, the county will have to collect a good deal of information on a specialized subject. This will include information on the geothermal energy regulatory scheme. Federal and state reports, as well as plans and environmental impact reports prepared for surrounding areas, should be the starting point in describing the environmental setting and the potential for geothermal development. If there is little such information available, the county may have to contract for a report on geothermal potential. CEC's Siting and Environmental Division and the Department of Conservation's Division of Oil, Gas, and Geothermal Resources can provide help in understanding the regulations surrounding geothermal energy exploration and recovery.

The analysis should include, but is not limited to, the following information. If any of this information appears in other parts of the general plan, the geothermal element may simply refer to the appropriate sections.

- ◆ A description of geothermal resources, including:
 - The location of reservoirs (known and potential).
 - The location of existing and proposed wells.
 - An estimate of the ultimate magnitude of geothermal resources.
 - A brief history of local geothermal development.
 - The types of geothermal resources (e.g., steam, hot water, etc.), temperature, potential use (i.e., electric, non-electric), and deleterious materials that limit use.
 - A description of each phase in developing the geothermal resource.
 1. The exploratory phase.
 2. The development field phase.
 3. The power plant phase, if the geothermal energy will be used to generate electricity.
- ◆ A description of areas sensitive to geothermal energy activities, including:
 - Unique wildlife and/or plant habitats, migration routes, wintering grounds.
 - Scenic areas.
 - Recreational areas.
 - Residential areas.
 - Hospitals, schools, rest homes, and other uses that are sensitive to traffic and noise impacts.
 - Areas subject to subsidence, slope instability, and earthquakes.
 - Archaeological and other cultural sites.
- ◆ A description of the potential environmental, economic, and social effects of each phase of the geothermal development process, including:
 - Potential conflicts with other land uses (e.g., agriculture, forestry, mineral extraction, fish and wildlife habitats, recreation, residential, etc.).
 - Water use.
 - Water quality, both surface water and groundwater.
 - Noise and nuisance problems.
 - Demand for emergency services.
 - Disposal of hazardous and non-hazardous wastes.
 - Housing and employment.
 - Air quality.
 - Traffic.
 - Land subsidence.
 - Slope stability.
 - Seismic stability.
 - Soil erosion.
 - Community attitudes.
 - Costs and revenues to local governments.
- ◆ A description of the impacts of geothermal development on incorporated, state and federal lands within the county.

Ideas for Development Policies

The geothermal element's level of specificity will largely depend on the available data and the state of geothermal development in the county. Policies, plan proposals, and standards must be consistent with those found elsewhere in the general plan. At minimum, the geothermal element should include the following:

- ◆ Policies, plan proposals, and standards for dealing with constraints and minimizing conflicts between geothermal development and other land uses, such as agriculture, forestry, mineral extraction, fish and wildlife habitat, recreation, and residential.
- ◆ Policies and standards for minimizing environmental damage from geothermal development (i.e., environmental performance standards for each of the three phases of development).
- ◆ Policies and standards for minimizing aesthetic impacts resulting from facility and transmission line

development.

- ◆ Policies, plan proposals, and standards for the disposal and recovery of resources from hazardous and non-hazardous geothermal wastes.
- ◆ Policies, plan proposals, and standards for evaluating the feasibility of proposed geothermal power plant sites.
- ◆ Policies, plan proposals, and standards for locating power line transmission corridors.
- ◆ Policies and standards for monitoring the environmental effects of geothermal development and mitigating adverse effects as necessary.

Ideas for Implementation Measures

The geothermal element should specify implementation measures, such as:

- ◆ Adoption of an ordinance that establishes a permit system for geothermal projects.
- ◆ Appointment of a planning body for the purpose of administering the geothermal permit program (for counties that process numerous permits annually).
- ◆ Adoption of geothermal overlay zoning for plant sites and buffer zoning for surrounding lands.
- ◆ Adoption of performance standards governing the environmental effects of geothermal development (e.g., air quality, water quality, waste disposal, noise, aesthetic, soil erosion, slope stability, subsidence, etc.).
- ◆ Establishment of a program to monitor the effects of geothermal development (e.g., subsidence, increase in seismic activity, air quality changes, erosion, etc.) and the mitigation measures adopted to lessen the significant effects identified in the EIR.
- ◆ Amendment of the county's capital improvements program to include improvements to roads and facilities supporting geothermal development.

PARKS AND RECREATION

Public parks and the passive and active recreation opportunities they provide are important contributors to a community's quality of life. More than 40 percent of the cities and counties in California have adopted a parks and recreation element, according to OPR's 2002 local government planning survey. This number illustrates the importance placed upon parks and recreational facilities by local jurisdictions.

The Quimby Act (§66477) authorizes cities and counties to require the dedication of parks and recre-

ational land or the payment of in-lieu fees as a condition of tentative subdivision map approval. The Quimby Act can only be invoked when the city or county "has adopted a general plan...containing policies and standards for parks and recreation facilities." A parks and recreation element can be used to meet this requirement. Keep in mind that these exactions are limited to the impacts caused by new residential development and they must bear a reasonable relationship to the use of the park and recreational facilities by the future inhabitants of the area (§66477(e)).

Parks and recreational facilities provide a variety of benefits. Urban parks can offer a soothing contrast to high-density office, commercial, and residential uses. Parks can provide active (e.g., baseball, basketball, soccer, horseback riding, etc.) and passive (e.g., picnicking, fishing, bird watching, etc.) recreational activities for a neighborhood, city, or region. Parks can preserve areas of beauty or historical significance. They can house facilities, such as nature centers, zoos, and historical displays, that educate residents about natural history or allow them to learn about the past.

The utility of parks can transcend simple recreational and educational uses. Bicycle paths offer a non-motorized alternative for commuters, providing traffic and air quality benefits. Urban parks can frame vistas, balance hard structures with massed plantings, and otherwise contribute to effective urban design. Managed open-space lands may also protect watersheds from development or provide habitat for threatened or endangered species. River parkways and golf courses can offer non-structural flood protection or high-water by-passes as part of a floodplain management strategy.

Relevant Issues

The subjects covered in a parks and recreation element and the level of detail at which they are addressed vary greatly among jurisdictions. The size of the jurisdiction, its level of urbanization, location, and funding base all direct the issues that may be included. The user base and the demands it makes on parks and recreational facilities also helps define the important issues. County issues often include regional parks, open-space or habitat preserves, watershed management, and trail systems. Cities, on the other hand, often address neighborhood parks and playgrounds, community parks, recreational facilities, school facilities joint use, and pocket parks. Some issues, such as river parkways and other inter-jurisdictional resources, can be important in both city and county plans.

The following are some basic suggestions for the kinds of issues that may be important:

- ◆ The general distribution, location, and extent of existing public park, recreation, and open-space land and facilities.
 - ◆ Parks and recreation plans of adjacent cities and of regional, state, and federal agencies.
 - ◆ Projected future demand for facilities, by user group and type of facility.
 - ◆ Existing zoning and land uses.
 - ◆ General plan land use designations and transportation plans. (CI, L)
 - ◆ Park and recreational facility policies and standards (including level of service standards and support for Quimby Act exactions).
 - ◆ Natural resource areas (e.g., habitat, natural land and water areas, floodplains, groundwater recharge areas, etc.) amenable to recreational open-space (i.e., passive recreational) use. (O)
 - ◆ The general location of school district properties and their availability for joint use.
 - ◆ Recreational trail systems (e.g., pedestrian, equestrian, bicycle, etc.).
 - ◆ Interagency coordination with open-space districts, parks and recreation districts, other cities and counties, state parks, national parks, forests, monuments, and recreational areas, etc.
 - ◆ Schedule or timetable for improvements, expansion, and retirement of infrastructure and facilities.
 - ◆ Funding sources, including non-governmental sources (e.g., non-profit organizations, private donations, exactions, etc.).
- Parkways and greenways.
 - Trails and trail systems.
 - Regional, state, and federal parks.
 - Equipment and facilities (e.g., playground equipment, pools, tennis courts, sports fields, etc.).
- ◆ Review adjacent cities' parks and recreation plans, as well as the plans of regional, state, and federal agencies (e.g., parks districts, open-space districts, state parks, National Park Service, etc.).
 - ◆ Project future demand for facilities by user group and type of facility.
 - Inventory existing facilities, types of facilities, and levels of use.
 - Identify major user groups and their park and recreational needs.
 - Project future demand for facilities, changes in demand, and capacity to meet future demand.

OPTIONAL ELEMENTS IN ACTION

Santa Clara County's 1995-2010 General Plan dedicates Chapters G (countywide level) and N (rural unincorporated areas) to parks and recreation strategies, policies, and implementation measures. As a county, Santa Clara takes a regional (as opposed to a neighborhood) approach that focuses on regional parks and open-space, trails, and scenic highways. The County has long worked toward the goal of creating a "necklace of parks" encompassing important hillsides, environmentally sensitive lands, bay lands, and stream corridors, linked by a system of multi-use trails. To that end, its strategies, policies, and implementation measures address development standards, accessibility, the balance between recreational and environmental objectives, inter-jurisdictional cooperation relative to planning, acquisition, and operation (with the cities and Midpeninsula Open-Space District), involvement of the private and non-profit sectors in acquisition and operation, the planned trail network, and the designation of scenic highways and protection of scenic corridors. The General Plan pragmatically recognizes that projects such as linear parks and trail systems can take years to complete and involve give and take among agencies, the public, and landowners.

Ideas for Data and Analysis

The following are ideas for data and analysis to support the development of objectives, policies, and implementation measures for the parks and recreation element. The suggestions are loosely based on the framework for park planning contained in the National Recreation and Park Association's publication *Park, Recreation, Open-Space, and Greenway Guidelines*. These are only suggestions, local circumstances and preferences may dictate broadening or narrowing the scope of inquiry.

- ◆ Inventory the general distribution, location, and condition of existing public park, recreation, and open-space land and facilities, including:
 - Neighborhood and community parks.
 - Recreation centers and playgrounds.
 - Recreational open space.

- ◆ Review existing land uses for potential sites and land use plans for compatible sites and policies, including:
 - General plan land use, conservation, and open-space designations.
 - Relative accessibility (circulation/transportation plans).
 - The general location and availability of school district properties for joint use as parks or recreational facilities.
 - Natural resource areas (e.g., habitat, natural land and water areas, floodplains, ground-water recharge areas, etc.) amenable to recreational open-space (i.e., passive recreational) use.
 - Park and recreational facility policies, standards, and principles.
- ◆ Identify feasible sources of funding for improvements, expansion, and maintenance.
 - Governmental funding (e.g., general obligation bonds, special tax, impact fees, etc.).
 - Non-profit organization funding.
 - Private sector funding.

Ideas for Development Policies

The following are some general ideas for development policies. These are intended to stimulate discussion; actual policies would be more focused.

- ◆ Identify the locations of existing and future public parks and recreational areas. (MAP) (L).
- ◆ Establish standards for park acreage by type of park (acres per 1000 residents).
- ◆ Establish standards for providing active and passive recreational facilities.
- ◆ Describe a range of park types (e.g., regional, areawide, neighborhood, pocket, etc.) to serve in specified situations and establish principles (e.g., access, service area, timing, parking, etc.) to guide the location of each type. (L)
- ◆ Establish policies for park and recreational facility accessibility consistent with the Americans with Disabilities Act.
- ◆ Establish policies for the dedication of public parks and recreational areas (or payment of in-lieu fees) in conjunction with new subdivisions, including standards for the amount and type or quality of parkland required, consistent with the Quimby Act. (L)
- ◆ Establish a policy framework for trails plans, balancing trail needs with environmental and landowner concerns. (CI)
- ◆ Establish policies for the use of utility corridors, reclaimed solid waste facilities, abandoned railroad rights of way, etc., for parks and trails.
- ◆ Establish general acquisition criteria/priorities for natural resources, historical resources, habitat, and watershed lands.
- ◆ Establish principles for preserving natural resources, historical resources, habitat, and watershed lands within parks. (O)
- ◆ Preserve visually and environmentally significant open spaces. (O)
- ◆ Provide for joint use of school properties as neighborhood parks and recreational centers. (L)
- ◆ Coordinate planning and standards with other agencies, such as cities, counties, regional parks districts, open-space districts, state parks, and national parks and forests.
- ◆ Establish policies to guide parks and recreational facilities funding, identifying preferable funding sources and general spending priorities.
- ◆ Encourage involvement by the non-profit and private sectors in acquisition, maintenance, and programs.
- ◆ Establish neighborhood, community, and regional park planning committees for consultation and input regarding park policy.
- ◆ Establish policies requiring linkages between past and future development projects through a network of parks, open space, and bicycle and walking paths.

For more information on this topic, see the Bibliography under “Parks and Recreation.”

WATER

Few resources are as intimately tied to the orderly growth and development and economic and environmental well being of California as water, and few present so many planning challenges. California’s 34 million residents, 9 million acres of irrigated agricultural land, and abundant environmental needs require over 80 million acre-feet of water in a normal year (in a drought, this drops to about 59 million acre-feet). By 2020, when California’s population will have grown by an additional 12 million people, the Department of Water Resources (DWR) projects that the state may be short by over 2 million acre-feet of water in a normal year and by over 6 million acre-feet in a drought year.

Water Supply Planning Legislation

In 2001, two water supply planning bills were enacted that require greater coordination and more extensive data to be shared between water suppliers and local land use agencies for large development projects and plans.

Senate Bill 610 (see California Water Code §10631, §10656, §10910, §10912, §10915, §10657) requires a water supply assessment for any development project or related land use plan of more than 500 housing units, 500,000 square feet of retail use, 250,000 square feet of office use, 500 hotel rooms, 40 acres, or 650,000 square feet of business park use or a mixed-use project with any combination equal to the scale noted above. The water supply assessment needs to be part of any CEQA document prepared for the project (EIR or negative declaration). If there is not adequate water to reliably supply the project (and all the other present and future water demands anticipated) in normal, dry, and multiple dry years, new water sources need to be identified. The Urban Water Management Plan may be used, in part, to satisfy the Water Supply Assessment requirement. A strong water element in the general plan that incorporates a coordinated effort between the land use agency and the water supply agency will facilitate implementation of SB 610.

Senate Bill 221 (see Government Code §66410, et seq.) prohibits any land use agency from approving a subdivision map of more than 500 housing units (or a proposed subdivisions of less than 500 units if the project represents 10 percent or more of all connections of a smaller water purveyor—one with fewer than 5,000 connections) unless there is written verification from a water provider that a sufficient and reliable water supply is available. Sufficient water supply is defined as adequate water to supply the new growth in normal, dry, and multiple dry years, taking account of existing and planned water demands on the system. The statute also sets a rigorous standard for considering new water sources. The water source must include water entitlements, capital financing, and all regulatory permits. If a water provider does not respond to requests by the land use agency for water supply data, or the water provider indicates that sufficient water is not available, the land use agency has the ability to seek other water sources to serve the subdivision. However, before the project can be approved, reliable water sources must be secured. Infill housing and exclusively affordable housing are exempt from these requirements. Urban Water Management Plans and related water system master plans are very valuable tools in demonstrating adequate water supplies. An up-to-date water element could be valuable in demonstrating a comprehensive basis for future water supply.

Since 1976, the state has seen major droughts of two and six years in duration. At the same time, due to the seasonal nature of California's rainfall and runoff, flooding is commonplace during winter storm events. Water quality concerns are expanding to all parts of the state, especially areas that rely on groundwater for their water supply.

Given the importance of water to the state's future, a community would be well served to create a separate water element, in conjunction with the appropriate water supply and resource agencies, in which each aspect of the hydrologic cycle is integrated into a single chapter of the general plan. With recent law that requires land use decisions to be linked to water availability, a water element takes on increased importance.

Water Resources in General Plan Statute and Related Requirements

Water resources are cited in various sections of general plan statute (see §65302, §65302.2,

§65303.4, §65352 and §65352.5). However, water-related information, including policies, resource inventories, and supply and demand analysis, are typically fragmented throughout various chapters of the general plan.

Based on several recent state statutes, coordination of water supply and demand information with land use planning is required. Prior to action by a legislative body to adopt or substantially amend a general plan, the planning agency must send a copy of the proposed plan or amendment to any public water system, as defined in Health and Safety Code §4010.1, with 3000 or more service connections and that serves water to customers within the area covered by the proposal. The public water system has at least 45 days to comment on the proposed plan in accordance with §4010.1(b) and to provide the planning agency with the information set forth in §65958.1. Additionally, upon adoption or amendment of the general plan, the same referral must be made (§65357(a)). Fur-

thermore, §65352.5 directs the water supplier to provide a copy of its most recent Urban Water Management Plan and other water supply information to the city or county upon receiving the aforementioned notice.

Issues and Potential Policy Strategies

One way to conceptualize a water element is to consider the entire hydrologic cycle and how community policies and actions affect each component of the system. The following discussion divides the hydrologic cycle into components and highlights a sampling of issues and general policy strategies that might be included in a water management element.

Water supply and demand

Based on statutes passed in 2001 (see discussion about Senate Bills 221 and 610 on previous page), land use decisions for major plans and projects now must be linked to a long-term reliable source of water. Additionally, state law requires that Urban Water Management Plans (water supply/demand plans required of all urban water purveyors of 3000 acre-feet of service or 3000 connections) must be sent to the local land use agency and considered in the general plan.

Typically, water supply issues are addressed as part of the conservation element or in an optional public facilities or services element. A comprehensive assessment would include the following:

- ◆ Inventory of existing water demands, supplies, and providers, as well as established programs for water use efficiency (conservation), recycling, transfers, and conjunctive use of surface and groundwater.
- ◆ Analysis of future water demands based on general plan land use build-out and projected cumulative demands in the region.
- ◆ Assessment of future opportunities for water use efficiency (conservation), recycling of water, water transfers, conjunctive use of groundwater and surface water, additional storage or water development projects, and other potential increases in water entitlements and supply.
- ◆ Assessment of any shortfalls in future water demands based on wet, normal, dry, and multiple dry year types and contingency plans for drought conditions.

- ◆ Inventory of existing ordinances that implement water management issues (e.g., Model Water Recycling Ordinance).

A typical policy response is to ensure the availability and timing of reliable water supplies for existing and future needs under changing hydrologic conditions.

This entails realistic assessment of planned facilities and projects, additional water entitlements, and future regulatory requirements. Such analyses must be coordinated with the local water purveyor(s). Much of the data are contained in a purveyor’s Urban Water Management Plan or Water Master Plan (or related document).

In particular, water use efficiency (conservation) and water recycling have become major “sources” for communities to stretch their available supplies and enable growth without

costly or environmentally damaging water projects. State law requires that local jurisdictions implement landscape water conservation practices and low water use plumbing in new development. Agreements among many of the state’s major water providers also require the use of best management practices for water conservation in the urban sector. These policies and actions should be incorporated into general plans.

Many counties that rely heavily on groundwater also have general plan policies (and implementing ordinances) protecting local groundwater supplies from water quality degradation, excessive extraction, or export.

Before embarking on water supply policies, it is important to understand the institutions that provide water in the area, the various plans and projects in the works, and the constraints on future water supplies.

Water quality

General plans address water quality in various ways, usually in the mandatory conservation and open-space elements or in optional public facilities or environmental elements. Typical issues include:

- ◆ Groundwater contamination from specific sources, such as underground tanks, known spills, contamination sites, or landfills, or from generalized sources, such as septic systems.
- ◆ Sedimentation and related pollutants from land-based activities throughout the watershed, includ-

The California Urban Water Conservation Council is a voluntary association of the major urban water purveyors in California. They have developed a list of best management practices in water use efficiency for members who have agreed to implement these practices in a consistent manner. Their website is www.cuwcc.org.

ing resource extraction, such as logging or vineyard development, or grading for land development.

- ◆ Wastewater treatment and industrial discharges from point sources.
- ◆ Urban and rural stormwater runoff and related non-point source pollutants.

Policy responses vary from general policies to comply with state and federal water quality requirements to specific requirements related to local grading or erosion control ordinances and runoff standards. Many recent water quality requirements link directly to land use and development practices (see Stormwater section below). For example, §303(d) of the Clean Water Act requires states to identify “impaired” water bodies (which California has done) and prepare Total Maximum Daily Load (TMDL) studies and plans to reduce pollutant loads in watersheds and clean up impaired streams or lakes. As these studies become more prevalent, land use plans and development policies and standards will need to be refined to improve water quality.

Wastewater treatment and disposal

Analysis and policies related to wastewater are usually included in the circulation element or in an optional public facilities element. At a minimum, the general plan should inventory existing and planned wastewater treatment and disposal facilities (and regulatory requirements) and any policies and requirements for on-site septic or related disposal systems. Best practices suggest that projections for wastewater demands should be based on the general plan land use build-out assumptions and closely linked to water supply demand assumptions. In addition, where appropriate, opportunities to utilize treated wastewater (recycled or reclaimed water) for landscape, recreational, industrial, or agricultural uses (so-called non-potable reuse) should be analyzed wherever feasible. Urban Water Management Plans are required to address opportunities for using recycled water.

Watershed features and processes

General plans typically identify and map important hydrologic features, such as wetlands, estuaries, streams, designated wild and scenic rivers, lakes, vernal pools, riparian zones, floodplains, and groundwater recharge areas. There are many reasons to protect such water resources, including aquatic biological value; maintaining “free” watershed functions, such as aquifer recharge and runoff filtering; and open space for aesthetic and recreational value. Policies to protect water features are

often articulated in the conservation or open-space element.

There are hundreds of options for policies related to maintaining healthy and functional watersheds, ranging from land use designations (or minimum parcel sizes) that protect floodplains, recharge areas, riparian corridors, wetlands, and other ecologically significant lands to erosion control policies and standards to maintain water quality. Setbacks from riparian corridors, lakes, ponds, and wetlands are typical, as are low-intensity land uses in groundwater recharge zones or water supply watersheds. Watershed-based policies also provide an opportunity to integrate state and federal requirements for protection of wetlands and endangered species habitat.

Flood management

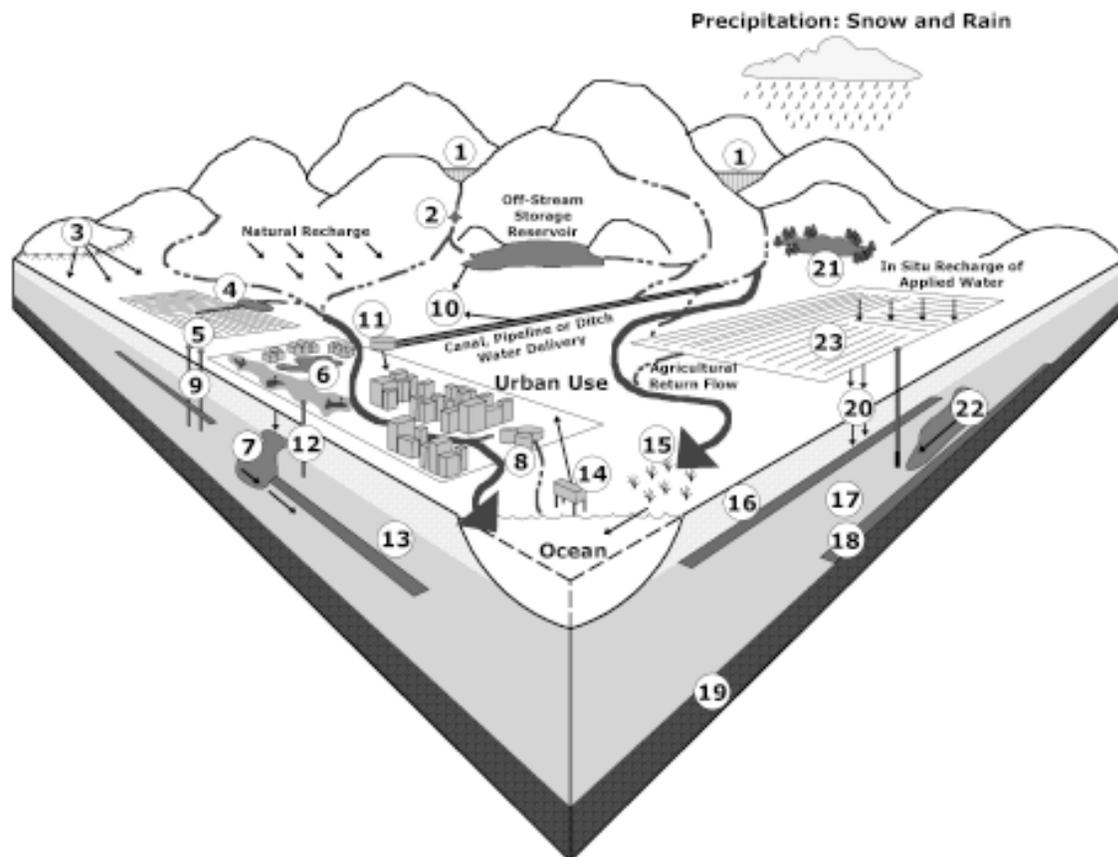
The safety element must identify flood hazard areas and establish policies to avoid unreasonable flooding risks. A comprehensive approach should include careful mapping of floodplains and high-risk areas, establishing policies to keep intensive uses out of these areas and mitigation measures or design requirements to reduce flood risk where improvements are at risk. Additionally, local or regional flood management plans and facilities should be incorporated. A watershed-based approach would employ both structural and non-structural solutions to maintain the floodplain functions of sedimentation, deposition, water filtering, and floodwater absorption. An optional floodplain management element was discussed earlier in this chapter.

Stormwater management

With the expansion of non-point source water quality regulations (under various sections of the Clean Water Act and the Porter Cologne Water Quality Control Act), communities throughout the state are being faced with strict requirements on urban stormwater runoff (and some rural runoff). As a result, general plans have begun to suggest (or require) runoff performance standards that result in an array of site planning and design techniques to reduce storm flows, capture runoff water, and allow it to percolate or filter/settle before being discharged to channels, streams, or lakes. Urban residential and commercial projects and even rural developments are being designed with multi-use stormwater basins, catchment basins and swales, parking lot capture systems, buffer strips to capture and filter water, and similar features to reduce peak storm flows and provide water quality benefit.

These type of facilities and site design features can also restore local aquatic habitat, maintain or enhance groundwater recharge, reduce local flooding peaks,

Modified Land Use/Hydrologic Cycle as a Basis for an Optional Water Element



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|--|--|
| 2. Fish Hatchery and Fisheries Restoration Project | 13. Useable Aquifer |
| 3. Runoff from Rangeland Operation | 14. Proposed Desalination Plant Location |
| 4. Agricultural Tailings Water Pond for Habitat and Pollutant Reduction | 15. Natural or Artificial Wetland to Clean Up Water |
| 5. In Situ Groundwater Treatment | 16. Unsaturated, Unconfined Aquifer |
| 6. Urban Retention Basin for Water Quality Benefit and Flood Management, Recreation, and Habitat | 17. Saturated, Confined Aquifer |
| 7. Groundwater Pollution from Urban Sources: Movement of Contaminated Plume | 18. Confining Layer |
| 8. Wastewater Treatment and Disposal: Reclamation of Treated Effluent | 19. Bedrock |
| 9. Wells for Agricultural and Urban Use | 20. Agricultural Pollution of Upper Groundwater Aquifer |
| 10. Direct Groundwater Recharge | 21. Upstream Fisheries and Riparian Habitat Restoration Project |
| 11. Surface Water Treatment | 22. Lateral and Downslope Movement of Polluted Groundwater Plume |
| | 23. Agricultural Groundwater Use |

Graphics: Lindsey Holm

and provide visual and recreational benefit to the community.

Interagency coordination and collaboration

Communities are often served by multiple districts, agencies, or companies for the different aspects of water management. State law requires coordination between water purveyors and land use planning agencies. State and federal regulators, such as the Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Army Corps of Engineers, the State Water Resources Control Board, and the Regional Water Quality Control Boards, are significantly involved in water resource protection and enhancement. As a result, a water management element is a useful place to incorporate policies and procedures for coordinating all of the entities involved in water resources management.

Why a Water Element is Useful

There are a number of reasons why an integrated water element might be of benefit to a community. By having all water-related policies and actions in one place, the complex issues surrounding water resources are more accessible and understandable to the general public. Few people interact with water districts or the plans and documents they produce, but many lay people interact with a community's general plan.

By directly linking each aspect of the hydrologic system, the projections and forecasts used by the city, county, or special district can be more consistent. For example, future water supply demands, wastewater demands, and drainage needs could all rely on the same land use map and future growth and build-out assumptions. This will help with consistency between general plan elements and lead to more coordinated infrastructure and capital decisions. Each planning agency, whether a water, wastewater, or land-use agency, should consider relying on the general plan land use map and projections for all water-related infrastructure plans and policies. In addition, water suppliers must grant priority to housing projects that would help in the attainment of housing element goals for low income housing when allocating available and future water resources (§65589.7).

An integrated water element can also lead to reduced costs and increased efficiencies for needed infrastructure. For example, placement and location of wastewater treatment and conveyance facilities may be better linked to potential land uses, such as industrial facilities or golf courses, that might take advantage of recycled water. Watershed protection policies might be better linked to groundwater recharge needs or stream

and riparian protection policies. Once a watershed has been modified for urbanization or intensive agriculture (or similar use), it can be prohibitively expensive and potentially impossible to restore the water supply, water quality, and environmental protection value back into the ecosystem.

An integrated water management element might also help with other regulatory and planning functions, such as water quality discharge permits, wetland protection requirements, floodplain management, water supply assessment needs, and the preparation of CEQA documents. Finally, a single water management element might increase the visibility of water and highlight its importance in the future of the community.

Ideas for Data and Analysis

The type and quality of data on water resources will depend on many factors, including the water-related districts and agencies in the area, previous studies, and the level of public attention that has been devoted to

OPTIONAL ELEMENTS IN ACTION

Several jurisdictions have developed or are now preparing water elements or chapters. Imperial County, for example, developed an integrated water element that combines water supply, quality, flood management, wastewater and stormwater policies and analysis into a single General Plan element. This “one-stop” document has been useful to them as the County has engaged in complex negotiations over water transfers and supplies with neighboring jurisdictions. Inyo County has a separate water resources chapter that focuses on water quality, groundwater protection and restoration of water-related habitats. Santa Clara County has an extensive policy base for water supply, water quality and watershed protection as part of its Resource Conservation Element. Nevada County is currently working on a Water Element. Additionally, many jurisdictions have established comprehensive policies for water resource protection or management in different elements in the general plan. Mendocino County, for example, incorporated watershed management policies in its General Plan as early as 1981. Santa Cruz, Marin and Santa Barbara counties have extensive watershed management, water quality, stream and riparian protection policies.

water. For comprehensive planning purposes, the following data and analysis should be part of the general plan:

- ◆ Inventory of existing natural water-related features, such as wetlands, streams, lakes, bays, estuaries, reservoirs, and vernal pools. Information may be available from local, regional, and state GIS databases, specific studies, such as EIRs or specific plans, or from specialized databases such as the Resources Agency’s Legacy Project or the CERES database. (CO, L, O)
- ◆ Delineation of the boundaries of watersheds, aquifer recharge areas, floodplains, and various parameters about groundwater basins (water levels, storage volume, safe or operational yield, etc.). General data on groundwater can be obtained from the Department of Water Resources (Bulletin 118-02 or the State Water Plan) or from individual basin studies. (CO, L, O, S)
- ◆ Analysis of existing water sources, treatment and distribution systems, service district boundaries, wastewater treatment and distribution systems, stormwater and drainage facilities, flood management facilities, and service districts. These data are available from each individual district or service provider. Urban Water Management Plans are a good source for water supply, demand, conservation, and related information. This information will be useful in meeting the information requirements of SB 610 and SB 221.
- ◆ Capacity of existing and planned water and wastewater infrastructure to accommodate new growth and support expansion and improvement. Typical data sources include the Urban Water Management Plans of local water purveyors, Water or Wastewater Master Plans or Integrated Resources Plans of water agencies, and capital improvements plans. Statewide and regional information is available in the State Water Plan. (CI)
- ◆ Reliable water supply and projected demand balance in wet, normal, dry, and multiple dry years; analysis of new sources; drought contingency planning; opportunities for conservation, reuse, transfers, etc.
- ◆ Land-use based projections of build-out and water and wastewater demands specific to each land use. Different land uses and intensities have vastly different demands for water supply. There are also vast differences between different regions in the state.
- ◆ Analysis of generalized water quality in the watershed, available data on water pollution sources,

and various programs and agencies working on these issues.

- ◆ Examination of existing water quality in the watershed.
 - Identify existing and potential water pollution sources.
 - Inventory hazardous materials dumps, ponds, and storage sites (using information plans developed pursuant to Health and Safety Code §25500, et seq.).
 - Identify proposed, existing, and abandoned landfill sites. (MAP)
 - Examine the results of groundwater tests conducted in the vicinities of landfills and hazardous materials dumps, ponds, tanks, and storage areas.
 - Examine regulations regarding the use, storage, and disposal of hazardous materials.
 - Inventory existing and proposed land uses that could contribute to the pollution of streams and other waters.
 - Data sources include the Water Quality Control Plan for the region, TMDL studies (if they are complete), watershed plans for the region, and specific data from the Regional Water Quality Control Board or local water purveyor.
- ◆ Identification of polluted water sources for which reclamation is feasible.
- ◆ Identification of watershed groups, programs, and studies in progress and environmental enhancement programs and projects that are water-related.
- ◆ Identification of water conservation programs that are, or will be, implemented by the water supplier or other entity supplying water to the city or county. This may include information contained in the Urban Water Management Plan or in the Water Recycling Ordinance.
- ◆ Assessment of the use of water bodies for recreational purposes. (CO, L, O)
- ◆ Identification of water bodies and watersheds that must be protected or rehabilitated to promote continued recreational and commercial fishing, including key fish spawning areas. (CO)

Ideas for Development Policies

Water element policies should conform to those found in other elements, such as the land use, circulation, conservation, open-space, and safety elements.

Water-related policies can be centralized in a water element to avoid duplication. Such policies must be consistent with the general plan as a whole, including all mandatory and optional elements. The following provides examples of policies that a jurisdiction may wish to include in a water element:

- ◆ The development, improvement, timing, and location of community sewer, water, and drainage lines and facilities. (CI, CO, L)
- ◆ The protection, use, and development of water bodies and courses (rivers, lakes, streams, harbors, estuaries, and reservoirs). (CO, O)
 - Erosion control and sediment reduction policies.
- ◆ The siting of large new water users. (L)
 - Opportunities for recycled water use.
- ◆ The type and intensity of development in or adjacent to water bodies and courses. (CO, L, O)
 - Setback standards near sensitive water features.
- ◆ The protection of watersheds and aquifer recharge areas. (CO, L, O)
 - Type and intensity of development.
 - Drainage runoff policies and performance standards, such as the reduction of hardscaped areas.
- ◆ Expansion alternatives for new reliable water supplies. (CO)
- ◆ Water efficiency and recycling policies.
- ◆ The use of native vegetation or drought-tolerant landscaping for public facilities and other large installations.
- ◆ The protection of water bodies and watersheds that are important for the management of commercial fisheries. (CO, O)
- ◆ Floodplain management policies. (CO, L, O, S)
- ◆ Minimum private water supply reserves for emergency fire use. (S)

Challenges

Planners face challenges in preparing a single, stand-alone water element. Water districts, wastewater districts, or private water purveyors serve multiple cities and counties with other customers and other planning and reporting requirements. Some cities, such as San Jose, and counties, such as Alameda, have multiple water providers from many different sources. Often there is a wholesaler of water (such as Metropolitan

Water District of Southern California), one or more retailers, and other districts and jurisdictions for wastewater, storm drainage, and flood management. The data for a comprehensive water element may be difficult to collect and analyze. The plans, time horizons, and projections made by various districts and jurisdictions may not be consistent or easily integrated. It is important that the water element neither contradict nor diminish already agreed upon community goals contained in other elements of the general plan. Still, given the complexity of the topic and the critical role water will play in every community's future, a water element is a valuable way to focus on key issues and policy choices.

Technical Assistance

There are hundreds of applicable references that can assist in water resources planning, just a few of which are listed here. Internet resources include:

- ◆ Association of California Water Agencies, www.acwanet.com
- ◆ CALFED Bay Delta Program, www.calfed.water.ca.gov
- ◆ California Department of Water Resources, www.water.ca.gov
- ◆ California Urban Water Conservation Council, www.cuwcc.org
- ◆ State Water Resources Control Board, www.swrcb.ca.gov
- ◆ Water Education Foundation, www.watereducation.org

Useful books and reports include:

- ◆ California Department of Water Resources, *State Water Plan Update, Bulletin 160-98*, 1998. (Note: An updated version is due out at the end of 2003.)
- ◆ Johnson and Loux, *Water and Land Use: Planning for the Future of California as if Water Mattered*, Solano Press Books, 2003.
- ◆ Littleworth and Gardner, *California Water*, Solano Press Books, 1995 (Note: An updated version is due out in 2003).
- ◆ Water Education Foundation, *Layperson's Guide to California Water*, 2000. (Note: 15 other *Layperson's Guides* are available on topics such as Environmental Restoration, Flood Management, etc.)

For more information on this topic, see the Bibliography under "Water."