

Cobbledick Basin

- Due to the landslide at Haverhill Dr., the situation in Beaconsfield Canyon is rapidly growing worse, with the landslide deposition blocking the creek channel and flow diverted onto the fire road, due to landslide deposition blocking the creek channel.
- Upstream from Haverhill Dr., the creek is eroding soil from under the edge of the road
- A new and significant gully has appeared in Castle Canyon; a possible cause is a new storm drain installed on private property at the top of the canyon; it's very likely that this gully is responsible for the large amounts of deposition in the channel along Larry Lane.
- One of the "extreme" creek channels is located on Holyrood Dr. in the upper part of the watershed; the homes next to this creek channel have soil eroded from underneath their foundations.

V. LAND USE AND MANAGEMENT

Sausal Creek watershed is home to about 80,000 residents and includes 2127.6 acres of urban land (Figure 43). The density of housing varies between the steep hills of the upper watershed and flatter lands of the lower watershed. Above and just below Highway 13, residential density has less than 49% cover of impervious surfaces. From Dimond Park downstream, high intensity urban areas have 50-100% impervious coverage. Most of this urban area is residential, with commercial areas in Montclair, along Fruitvale Ave., and along MacArthur Blvd. Parkland covers approximately 650 acres in the watershed.

RELEVANT PLANS, POLICIES, AND PERMITTING

City of Oakland General Plan and Land Use Designations

Above Hwy. 13 the City of Oakland General Plan designates the primary land uses as Hillside Residential, Resource Conservation Areas, and Urban Open Space (Table 50). Most of the three major sub-basins are located above Highway 13. Shephard Creek flows through underground storm drains in Hillside Residential areas until it reaches Shepherd Canyon Park, designated as a Resource Conservation Area and Urban Open Space. Cobbledick Creek flows above ground and through storm drains through Hillside Residential areas and under Joaquin Miller Elementary/Montara Middle School. Palo Seco Creek flows almost entirely through Joaquin Miller Park, designated as a Resource Conservation Area and Urban Open Space.

Between Highway 13 and I-580 most of the watershed land use is designated as Hillside Residential and Detached Unit Residential, with the exception of Dimond Canyon, a Resource Conservation Area. Nearing I-580, however, these land uses transition to medium density Mixed Housing Type Residential, which is the dominant land use between I-580 and the neighborhood around I-880 and International Blvd. In this area, land use is designated for a mix of Urban Residential, Mixed Housing Type Residential, Community Commercial, and Neighborhood Center Mixed Use, including transit-oriented development.

Table 50: Oakland Zoning Classifications and Definitions (currently being updated by City of Oakland)

Oakland Zoning Classification	Definition
Hillside Residential	<ul style="list-style-type: none"> • Low density development • Slope protection and emergency vehicle access are key considerations • Wall height restrictions differ between upslope and downslope lots
Resource Conservation Area	<ul style="list-style-type: none"> • Includes most publicly-owned hillsides, canyons, and wetland • Parkland consisting of rugged terrain covered by woodland, grassland, or scrub vegetation • Provides important area for groundwater recharge and habitat for wildlife • Activities generally limited to passive recreation and vegetation management • Has maximum impervious surface area standards: one percent of total park area or 2500 square feet, whichever is smaller, excluding parking areas which meet requirements
Open Space/Urban Open Space	<ul style="list-style-type: none"> • Any parcel or area of land or water which is essentially unimproved or devoted to an open space use, including land used for the preservation of natural resources, land used for the managed production of natural resources, and land used for outdoor recreation • A general designation that includes Resource Conservation Areas
Detached Unit Residential	<ul style="list-style-type: none"> • This zone maintains areas with detached, single unit structures; a limited number of commercial uses are permitted or conditionally permitted in existing non-residential facilities. • The density for Detached Unit Residential is one unit per 2,969 sq. ft.
Mixed Housing Type Residential	<ul style="list-style-type: none"> • Characterized by a mix of single-family homes, townhomes, small apartments and neighborhood serving businesses.
Urban Residential	<ul style="list-style-type: none"> • Primarily residential with multi-unit, mid-rise to high-rise buildings that may have some ground floor commercial uses and public facilities of compatible character in certain areas of the city where appropriate.
Community Commercial	
Neighborhood Center Mixed Use	

Oakland General Plan – Open Space, Conservation, and Recreation (OSCAR) Element

The OSCAR Element of the Oakland General Plan, adopted in 1996, called for the designation of existing parks, including the parks in the upper Sausal Creek watershed, as “Resource Conservation Areas,”

replacing the previously un-zoned or residential-zoned status of the parks. Other directives of the OSCAR Element relevant to the Sausal Creek watershed include:

- Prioritizing flatland open space acquisition
- Promoting the conservation of ridges and knolls
- Promoting community-based gardening
- Conserving the rural character of large lot residential areas
- Continuing to require private open space in multi-family residential development
- Supporting an integrated network of bicycle and pedestrian trails
- Recommending access improvements to creeks on public properties
- Recommending requirements for erosion control, vegetation management, and building setbacks on creekside private properties
- Mandating public input and community involvement in creek planning
- Maintaining and enforcing grading, sedimentation, and erosion control ordinances
- Supporting measures to conserve groundwater, including the maintenance of open space in high recharge areas and minimizing the risks of groundwater pollution
- Supporting water conservation and recycling strategies
- Implementing the Alameda Countywide Clean Water Program, such as regular city maintenance of the storm drain system
- Endorsing the preparation of a Creeks Master Plan
- Conserving remaining oak woodlands, redwood forests, native perennial grasslands, and riparian areas, including precise mapping of these plant communities
- Encouraging plant diversity in wildland areas and the use of native and drought-tolerant plants in landscaping in developed areas
- Designating wildlife corridors on undeveloped properties in the Oakland hills
- Emphasizing strategies for fire prevention

The OSCAR Element, as with the General Plan, is intended for use as a guide for City staff in making decisions, as well as for residents of Oakland, local business and development, communities, and local landowners.

Infill Development Policy

The City of Oakland has no infill development policy; however, according to the Oakland General Plan, most of the City has been designated a Priority Development Area by the Association of Bay Area Governments (ABAG) for having existing infill development opportunities within communities easily accessible to transit, jobs, shopping and services. In addition, Oakland is considered to be “built-out,” meaning that most development opportunities consist of urban infill and redevelopment of under-utilized or vacant sites.

City of Oakland Wildfire Prevention District

Most of the upper Sausal Creek watershed has been designated by the Oakland Fire Department as a Very High Fire Hazard Severity Zone and falls within the Wildfire Prevention District (WPD), which includes both public and private land within the City of Oakland. The Wildfire District was established in 2004 as a response to the 1991 fire in the Oakland hills, and inspects properties for fire safety, provides resources and free services such as curbside tree and brush chipping, educates the public on fire safety compliance standards and recommends fire-resistant plants for landscaping.

The priorities of the Wildfire Prevention District for 2004-2014 are to:

- Establish and implement a strategic, cost-effective, sustainable, environmentally sensitive fuel management plan
- Encourage the involvement of and increase the knowledge of property owners, developers and the public-at-large in fire safe practices
- Enhance cooperation and communication with the community, City, other agencies and neighboring districts
- Establish and refine policies, procedures and regulations that improve fire safety

The Vegetation Management Program run by the Wildfire District provides lists of fire-resistant native plants and recommendations for ecologically sensitive landscaping as well as lists and photos of invasive plants and rare native plant species. As part of the Vegetation Management Program, the Wildfire District uses goat grazing to reduce fuel loads on public property. In the Sausal Creek watershed, goats are grazed throughout parts of Joaquin Miller Park and in Shepherd Canyon Park and Castle Canyon Park. The Friends of Sausal Creek, concerned about the possible destruction of rare native plants, has negotiated modifications to the goat grazing program to protect areas with rare natives (Appendix D).

Project sites for the future include non-native tree removal on the median strip along Skyline Blvd., continued invasive plant removal in Beaconsfield Canyon and goat grazing vegetation management in Joaquin Miller Park, and a LIDAR vegetation survey.

According to FOSC:

The Wildfire Prevention District hires contractors to clear vegetation on city-owned properties, including roadsides, vacant lots, open space, and parkland. The general clearance regime is that all plants taller than six feet tall are limbed up to at least six feet, and all other vegetation is cut extremely short. On small lots, the entire lot is cleared; on larger parcels, clearing may be primarily around the perimeter. While the guidelines specify a minimum height of 4 inches for remaining vegetation, in practice contractors sometimes clear to bare mineral soil on steep slopes.

Other issues which FOSC has raised with the WPD include:

- Failure to comply with the creek ordinance provisions prohibiting the removal of all vegetation from the bed and banks of creek channels
- Use of ephemeral creek channels as debris chutes for hauling large woody debris down hillsides
- Leaving large amounts of debris in ephemeral creek channels, leading to blocked storm drains and flooding during the rainy season
- Failure to protect endangered plant species
- Extreme negative impacts on biodiversity and habitat values from their clear-cutting policies
- Failure to remove invasive species; many sites with broom, pampas grass, and other invasives are cut yearly; plants are not dug or pulled
- Spreading invasive species; for example, contractors weed-whack Cape ivy and cut broom plants while in seed
- Too much exposed and disturbed soil that leads to sediment in runoff

The Fire Department staff and Community Advisory Board of the WPD have been very responsive. Some of these problems have been addressed, in particular concerns about the creek ordinance and endangered species.

FOSC's efforts have led to two projects that involve FOSC and the WPD:

- Due to concerns about the loss of species in the grazed areas of Joaquin Miller Park, FOSC entered into a 5-year agreement with the WPD and Oakland Parks and Recreation
 - There is a pilot project in Beaconsfield Canyon with a yearly contract. Contractors work with a botanist who flags native species to preserve, recommends cutting times and methods, and encourages the use of pulling and digging rather than repeated cutting (FOSC 2010)."

City of Oakland Creek Protection, Storm Water Management and Discharge Control Ordinance

The purpose of the Creek Protection, Storm Water Management and Discharge Control Ordinance is to:

- Eliminate non-storm water discharges to the municipal storm drain system;
- Control the discharge to municipal storm drains from spills, dumping or disposal of materials other than storm water;
- Reduce pollutants in storm water discharges to the maximum extent practicable;
- Safeguard and preserve creeks and riparian corridors in a natural state;
- Preserve and enhance creekside vegetation and wildlife;
- Prevent activities that would contribute significantly to flooding, erosion or sedimentation, or that would destroy riparian areas or would inhibit their restoration;
- Enhance recreational and beneficial uses of creeks;
- Control erosion and sedimentation;
- Protect drainage facilities;
- Protect the public health and safety, and public and private property.

Under the ordinance, non-regulated non-storm water discharges and increases in flow to the City storm drain system are prohibited, except for managed releases of water line flushing and other discharges from potable water sources, landscape irrigation and lawn watering, irrigation water, diverted stream flows, rising ground waters, infiltration to separate storm drains, less than 1,000 gallons per day of uncontaminated pumped ground water, foundation and footing drains, water from crawl space pumps, air conditioning condensation, springs, individual residential car washings, flows from riparian habitats and wetlands, de-chlorinated swimming pool discharges, or flows from fire fighting.

In 1997 a creek component was added to Oakland's stormwater ordinance and provides guidelines for any construction or development on properties adjacent to creeks. The ordinance recommends the use of Best Management Practices (BMPs) for all development, requiring at minimum that filter materials at the catch basin be established to prevent any debris and dirt from flowing into the City's storm drain system, and that the ordinance for sediment and erosion control is followed. All construction on creekside properties are required to apply for a Creek Protection Permit, which in turn may require the creation of a Creek Protection Plan to ensure that adequate measures are taken to protect the creek.

According to FOSC:

The watershed improvement program works closely with creek groups. It sponsors Creek-to-Bay Day, providing planning, publicity, and city resources that provide a very large volunteer turn out for FOSC's restoration efforts. Staff also assists when permits

are needed for creek projects, and responds to problems of illegal dumping, chemicals, and fish kills.

FOSC maintains a good working relationship with the City of Oakland Public Works Agency, in particular the Park and Building Services Division, who assists the organization's efforts by providing mulch for restoration efforts, removing plant debris after clearing of invasive plants, and working with FOSC to solve watershed problems. The Public Works agency is responsible for storm drain problems such as blocked drains. The agency also removes silt and debris from landslides onto roads, and responds to illegal dumping problems.

"The City of Oakland Office of Parks and Recreation (OPR) strongly supports FOSC's restoration efforts by providing space for the Native Plant Nursery in Joaquin Miller Park and help in the planning and staging of many work days. OPR also works with FOSC on removal of large, invasive trees, such as acacia, from our restoration sites (FOSC 2010)."

San Francisco Bay Regional Water Quality Control Board

San Francisco Bay Basin Plan

Sausal Creek is included in the San Francisco Bay Basin Plan as a tributary to the South Bay Basin area of the San Francisco Bay. Beneficial Uses of the South Basin include: Agricultural Supply (AGR); Areas of Special Biological Significance (ASBS); Cold Freshwater Habitat (COLD); Ocean, Commercial, and Sportfishing (COMM); Estuarine Habitat (EST); Freshwater Replenishment (FRSH); Groundwater Recharge (GWR); Industrial Service Supply (IND); Marine Habitat (MAR); Fish Migration (MIGR); Municipal and Domestic Supply (MUN); Navigation (NAV); Industrial Process Supply (PRO); Preservation of Rare and Endangered Species (RARE); Water Contact Recreation (REC1); Noncontact Water Recreation (REC2); Shellfish Harvesting (SHELL); Fish Spawning (SPWN); Warm Freshwater Habitat (WARM); and Wildlife Habitat (WILD). Sausal Creek is not one of the waterbodies identified in the Basin Plan for existing, limited, or potential Beneficial Uses.

In 2009 the San Francisco Bay Regional Water Quality Control Board approved listing Sausal Creek along with many other Bay area creeks for trash as a water contaminant under Section 303(d) of the Clean Water Act. The State Water Resources Control Board is currently considering the listing. Urban trash includes plastic and paper objects which wash off streets, sidewalks, parking lots, and yards into creeks. Trash has become so abundant in San Francisco Bay that it is now a pollutant. The primary beneficial use affected by trash is wildlife habitat.

NPDES Permit

In December 2009 the San Francisco Bay Regional Water Quality Control Board issued an updated Municipal Regional Storm Water NPDES Permit for the Alameda Countywide Clean Water Program, which includes the City of Oakland. The permit requires all municipalities, including Oakland, to comply with existing federal, state, and regional regulations regarding storm water discharge and storm drain systems. Included in the permit are specific BMPs for municipal operations, such as asphalt/concrete removal, sidewalk and plaza maintenance, graffiti removal, and corporation yard maintenance. The

permit also specifies requirements for public information and outreach in order to increase public knowledge of the impacts of storm water pollution.

In addition, the updated permit provides guidelines for source control, site design, and storm water treatment measures in development and redevelopment projects. The permit specifies the use of low impact development, or LID, techniques in reaching the goal of preventing increases in the volume of runoff flows. All regulated projects are required to implement LID source control, site design, and storm water treatment measures; non-regulated projects should be encouraged to include site design measure that minimize impervious surface construction and land disturbance, cluster structures and pavement, use micro-detention and landscape-based detention areas, preserve open space, restore or protect riparian corridors and wetlands, and direct roof runoff to vegetated areas among other recommendations. Regulated projects are defined as projects that create or replace 10,000 square feet or more of impervious surface, including road projects and creekside trail projects; and projects with alterations of more than 50% of the impervious surface of a previously existing development, with some exceptions.

Oakland and the other Alameda municipalities are required to complete a total of at least two “green street pilot projects” that incorporate LID techniques in site design and treatment.

INFRASTRUCTURE

Transportation Corridors

Major transportation corridors in the watershed include three highways: Interstate 880, Interstate 580, and State Highway 13. I-580 was constructed in the 1950s following the route of MacArthur Blvd., the historic route linking East Oakland to downtown (Figure 4). State Highway 13 follows a route through the rift valley of the Hayward fault zone. Park Boulevard and Lincoln and Fruitvale Avenues were developed as haul roads, first for timber and later for farm products.

Storm Drain System

There are several different types of pipes in the watershed: water lines, storm drains and sanitary sewers. Figure 77 depicts the system of storm drain pipes in the entire Sausal Creek watershed as mapped by the City of Oakland. There are a number of locations where pipes exist but are not on this GIS layer. In addition, some of the drop structures in Dimond Canyon are indicated as storm drains.

Storm drains are installed in urban areas to replace natural creek channels and carry rain runoff from streets and houses. In the Oakland hills portion of the Sausal Creek watershed, the storm drain system is incomplete and has been installed piecemeal at various locations. Many locations have a few storm drains collecting runoff and releasing it into open creek channels. In the more urbanized lower area of the drainage basin, the storm drain system is very complete, with pipes replacing nearly all creek channels. Additional information on the storm drain system is included on pages 143-154.

Sanitary Sewer System

The sanitary sewer system carries raw sewage from residential and commercial areas to the East Bay Municipal Utilities District (EBMUD) wastewater treatment facility in west Oakland. Figures 100-105

depict the City of Oakland sanitary sewer GIS layer. This layer indicates the diameter of the sewer pipe. One category in the GIS layer indicates a diameter of 0 inches, which has been mapped as “unknown.” The sanitary sewer system is depicted on six maps along with creeks and roads. The maze of sewer lines in the hilly residential areas of Shephard Creek and Cobbledick Creek sub-basins appear to feed into main lines along the major creek courses. This system of sewer pipes from the upper watershed feeds into the main sewer, which follows Sausal Creek through Dimond Canyon. Several major lateral pipes feed into the main sewer in Dimond Canyon. Sewer pipes also cross Sausal Creek at several points in the lower watershed. The route of the main sewer line leaves the Sausal Creek bed at the end of Dimond Park and follows Dimond Avenue and then Fruitvale Avenue.

There are several locations where the sanitary sewer system is known to overflow during large rainstorms. Where the main sewer extends down Sausal Creek from Highway 13 to Dimond Avenue, the manhole covers pop off the sewer in large storms and raw sewage flows into Sausal Creek (Figures 106-108). Sewage also flows into Palo Seco Creek out of the sewer manhole on Joaquin Miller Court just upstream of the Highway 13 crossing. There are likely additional locations where similar problems occur.

The City of Oakland and EBMUD have a program to replace older sewer pipes that are prone to stormwater infiltration with modern pipes. In most of the area of the Sausal Creek watershed above Highway 13 this process has been completed (pers. comm. Allan Law), but most of the lower watershed still retains the old pipes, including most of the main sewer line in Sausal Creek.

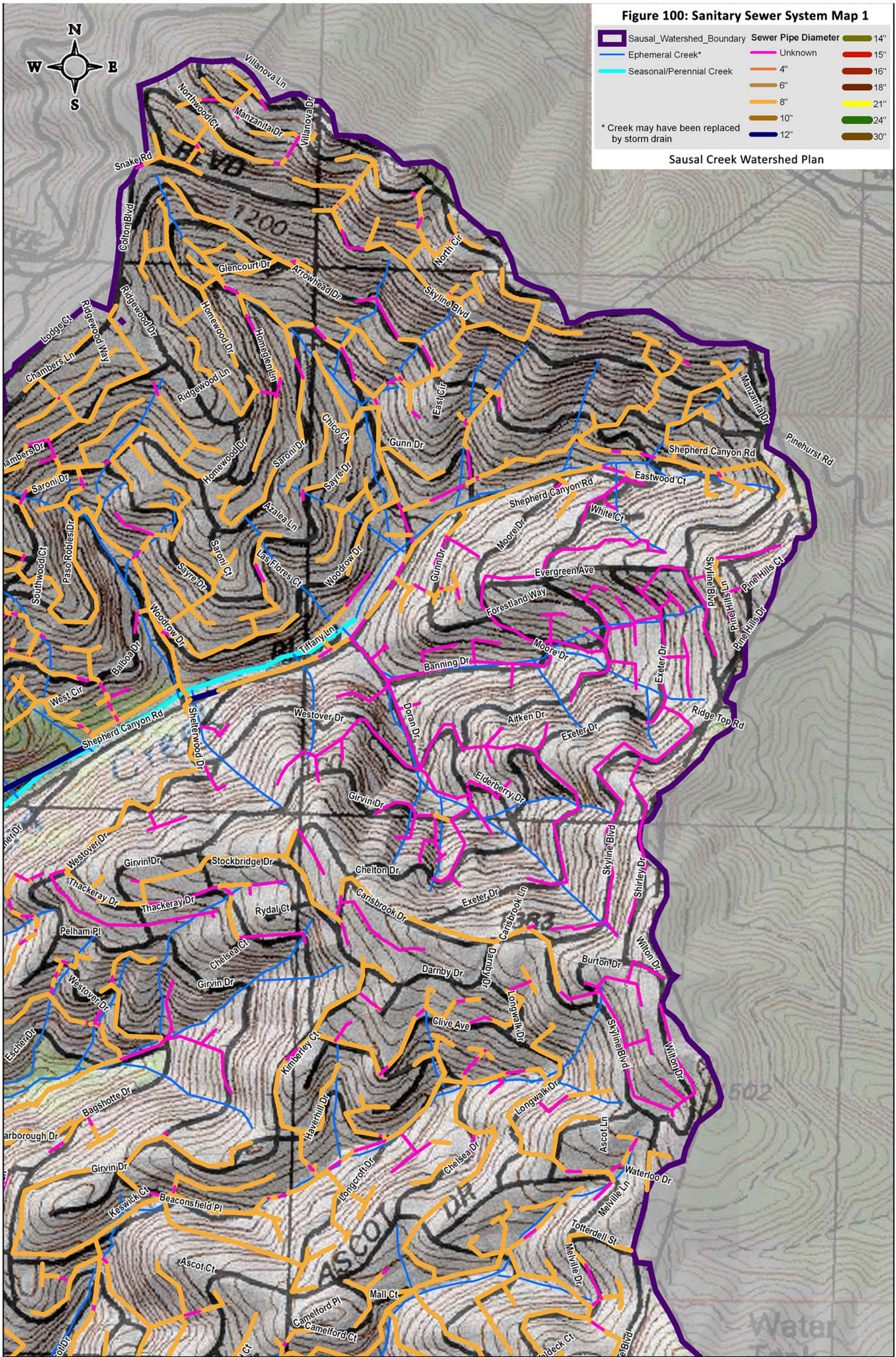


Figure 100: Sanitary Sewer System Map 1

Sausal_Watershed_Boundary

Ephemeral Creek*

Seasonal/Perennial Creek

Unknown

4"

6"

8"

10"

12"

14"

15"

16"

18"

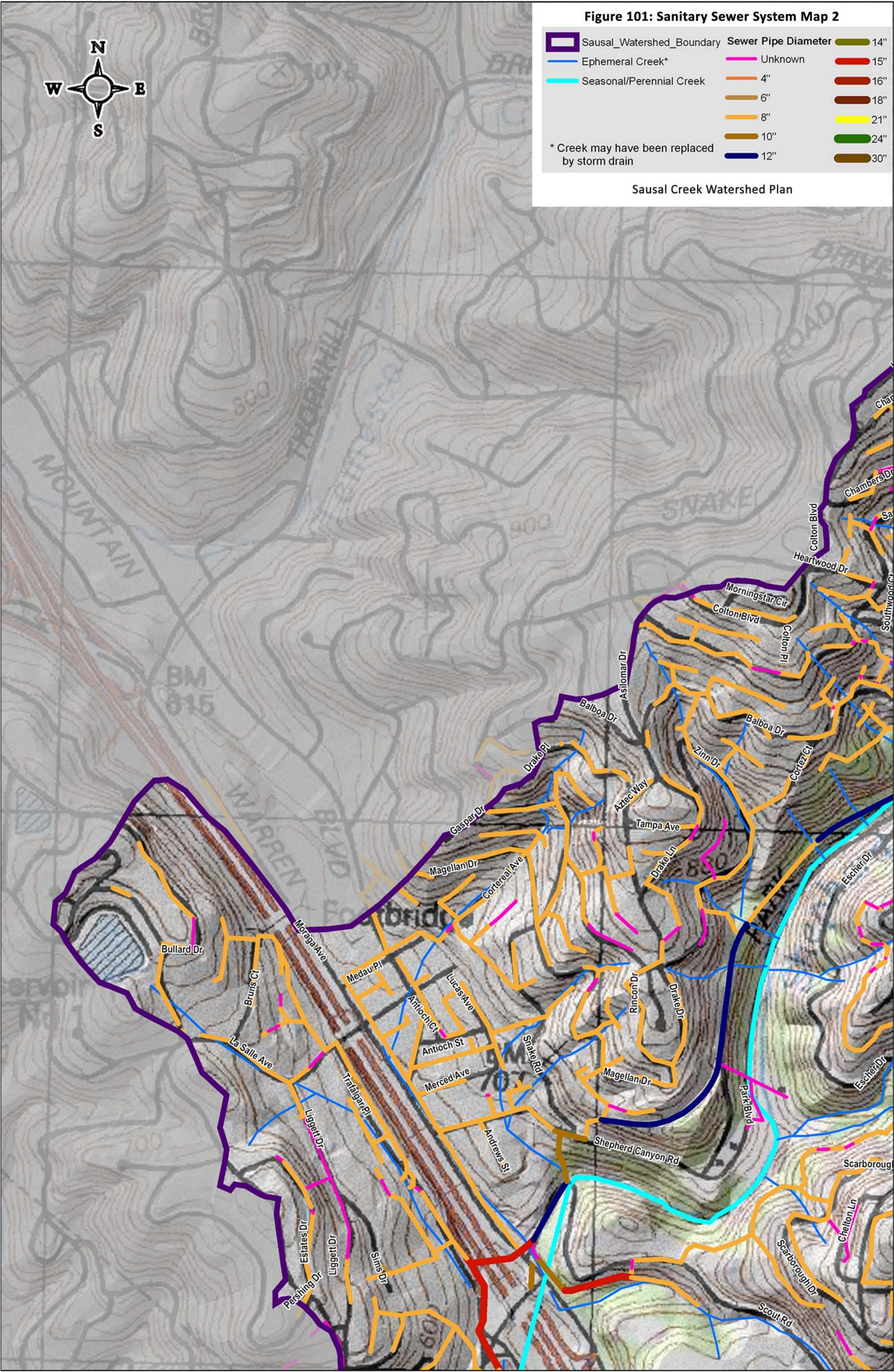
21"

24"

30"

* Creek may have been replaced by storm drain

Sausal Creek Watershed Plan



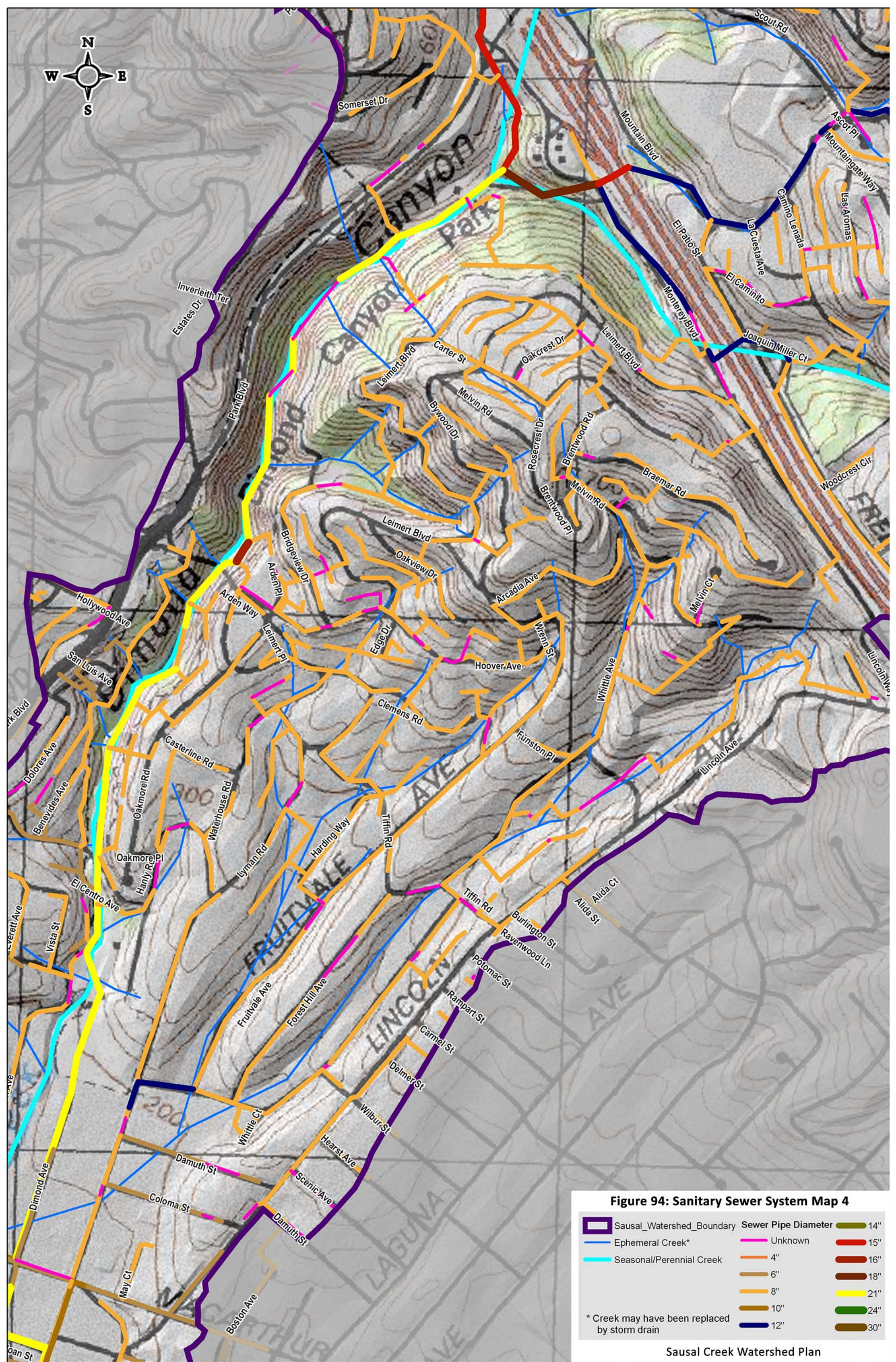
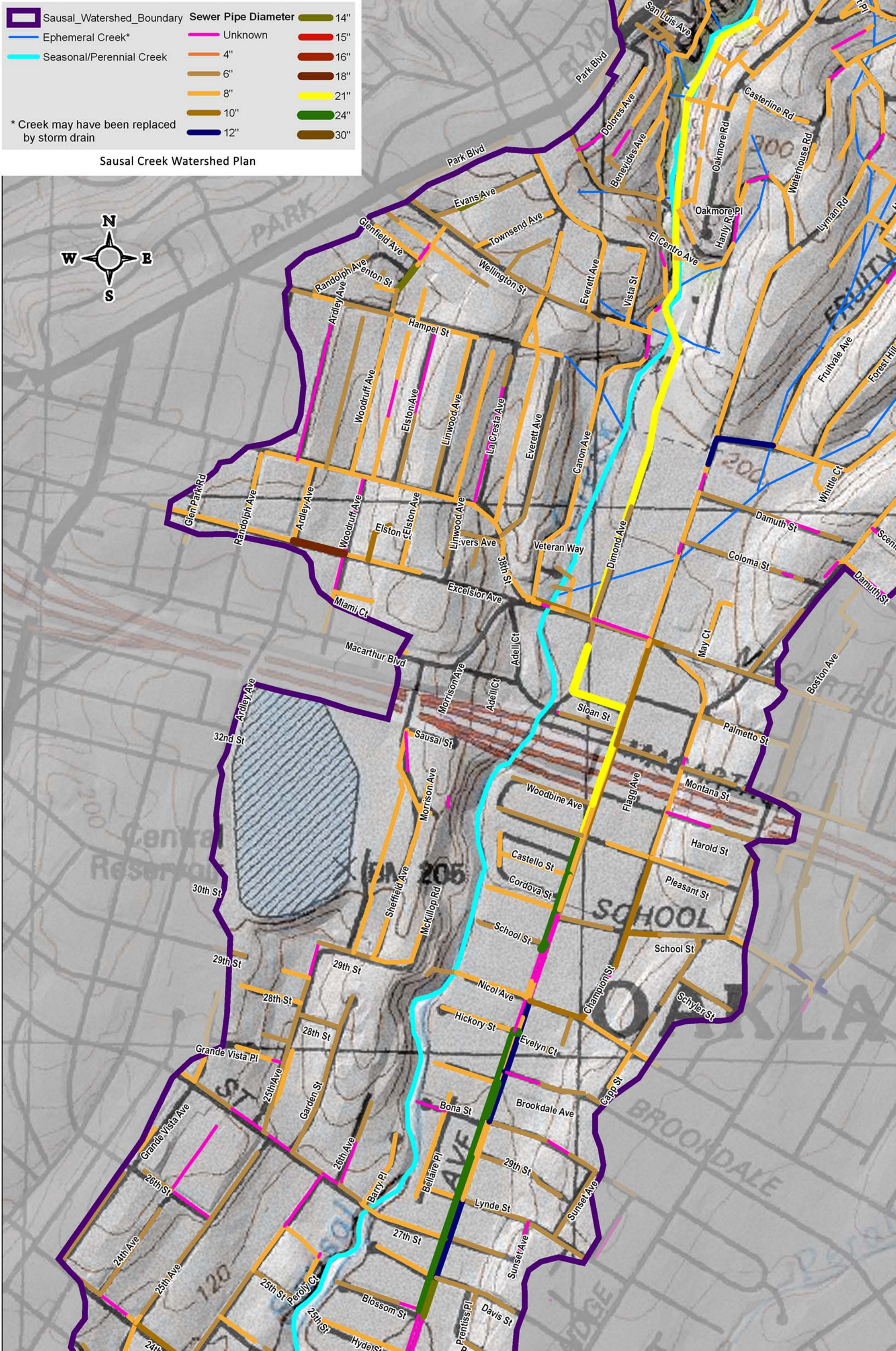





Figure 104: Sanitary Sewer System Map 5



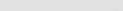
 Sausal_Watershed_Boundary



 Ephemeral Creek*

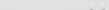
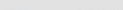
 Seasonal/Perennial Creek



* Creek may have been replaced by storm drain



Sewer Pipe Diameter

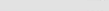

 14"



 Unknown  15"

 4"  16"

 6"  18"

 8"  21"

 10"  24"

 12"  30"

Sausal Creek Watershed Plan

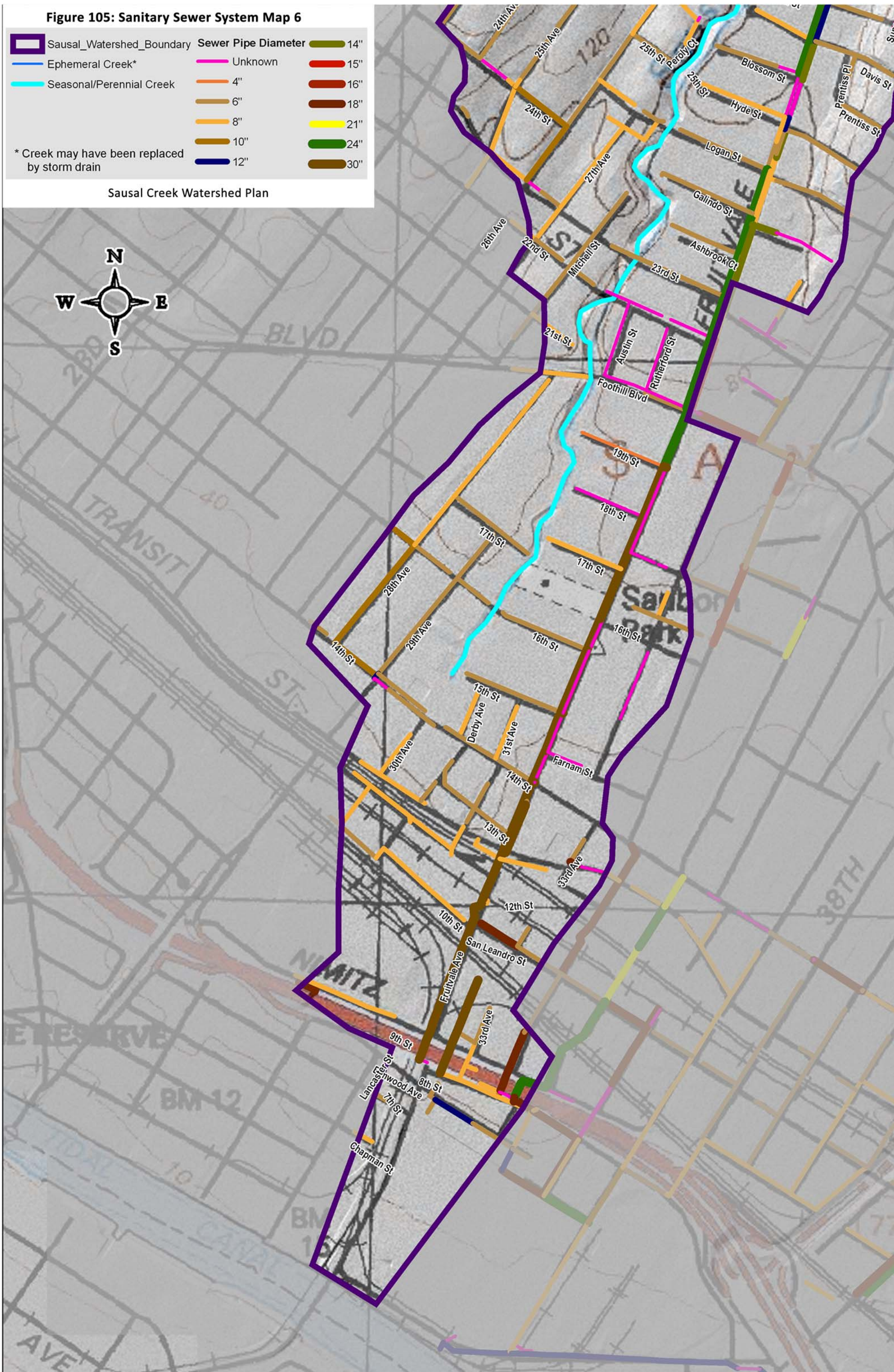
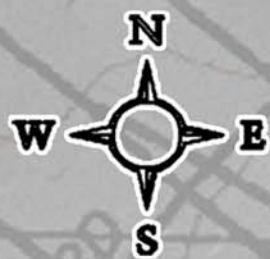




Figure 106: Sanitary sewer overflow following the January 1, 2006 flood.



Figure 107: Manhole cover blown off the sanitary sewer, allowing raw sewage to enter Sausal Creek in Dimond Canyon Park following the January 1, 2006 flood.



Figure 108: Top: main sewer line in the bed of Sausal Creek This new pipe was installed during the creek restoration in 2001. Bottom: Sausal Creek in Dimond Park. A lateral sewer line is visible underneath the concrete apron (red arrow).

PARKS

Several areas of the Sausal Creek watershed were made into parks by the City of Oakland (Figure 109).

Joaquin Miller Park

The City purchased 68 acres from Joaquin Miller's estate in 1919. Additional lands were added in 1928, creating Joaquin Miller Park at a total of 500 acres. In 1948 the Sequoia Lodge and Horse Arena were completed. During the period from 2000 to 2007, the Chabot Space and Science Center and Joaquin Miller Community Center were built. Joaquin Miller Park (JMP) encompasses second-growth redwood forest and several other types of native vegetation. Monterey pines and cypress, along with Eucalyptus trees, have been planted in the park and along with invasive plants such as French broom, Himalayan blackberry, pampas grass, and Algerian and cape ivy create a large non-native plant component to the park

Several Works Progress Administration (WPA) projects were completed in Joaquin Miller Park, including the Woodminster Amphitheater and Cascade, completed in 1941, which is outside of the Sausal Creek watershed. As part of the Cascade project, portions of Palo Seco Creek and Fern Ravine Creek were put into culverts and the streambed filled and developed into a meadow.

The Wildfire District grazes goats on about 60 acres in Joaquin Miller Park to clear weeds and reduce fire danger. FOSC was concerned the impacts of grazing on native and rare plants. Starting in spring 2008, FOSC entered into a 5-year agreement with the Oakland Fire Department and Parks and Recreation Department to reduce the impact of grazing on native plants in Joaquin Miller Park. Appendix F shows areas of the park and a grazing schedule for 2009-2012 designed to reduce impacts to rare and native plants. The plan's major components were:




- Eliminate grazing in areas where rare plants are present, and low fuel conditions or distance from structures present low fire risk;
- Reduce the frequency of grazing in many other areas from yearly grazing to grazing every 2-3 years;
- Reduce grazing on steep trailcuts to prevent erosion.

FOSC, the grazing contractors, and a City representative tour the grazed areas each spring to determine goat exclusion areas and assess each area. Park trails are discussed on pages 160-174.

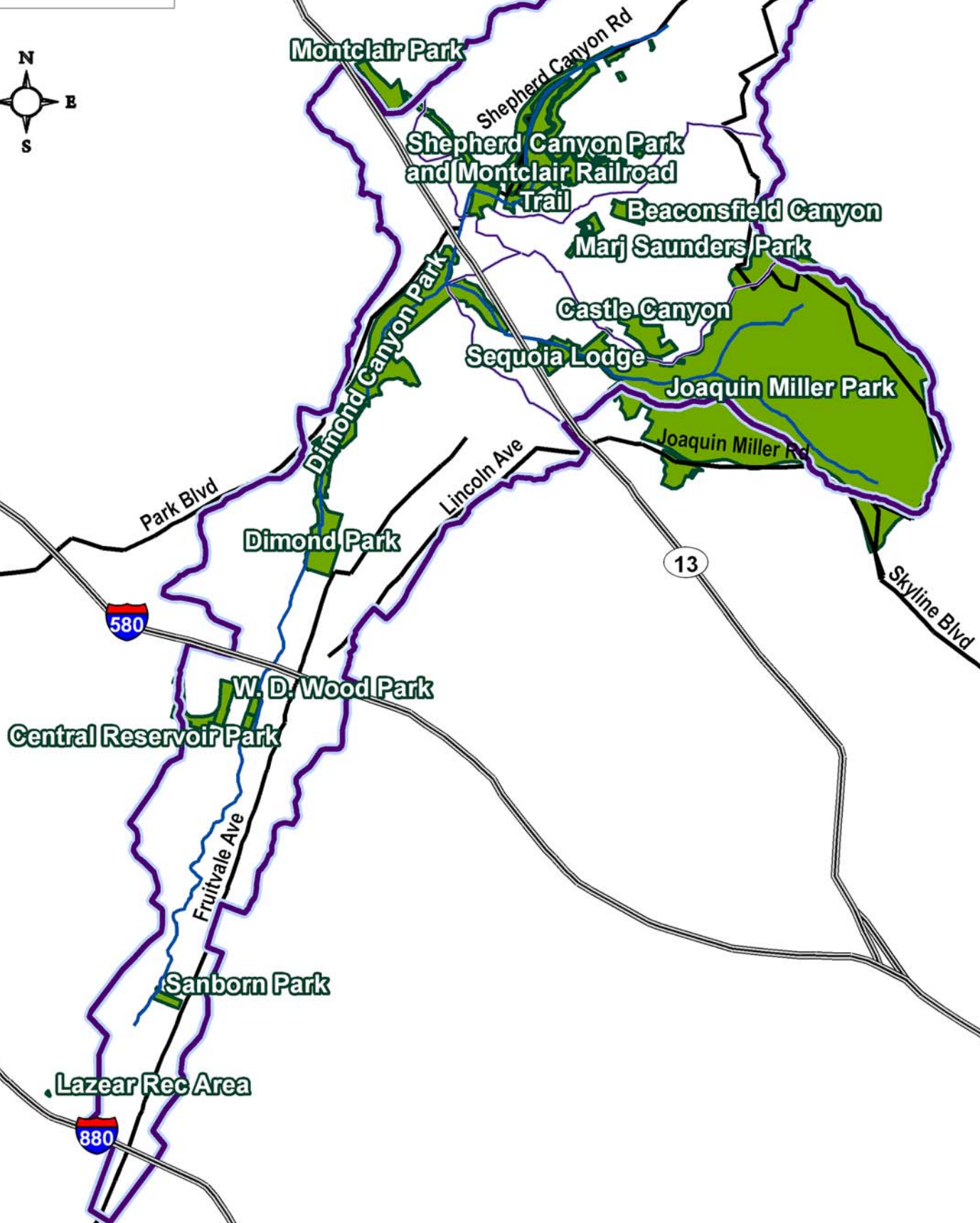
According to FOSC:

After a community meeting in 2005, the Joaquin Miller Working Group was formed to represent various park constituencies, and to recommend actions to improve the park's facilities and use. The group is currently in the process of morphing into Friends of Joaquin Miller Park, and is now soliciting memberships. Accomplishments include rerouting two eroding and dangerous trails, creating a fenced off-leash dog area (in a mulched parking lot), and initiating a restoration of the Abbey. There is some commitment to restoration; they've just started a Redwood Committee looking at problems at various redwood sites (Fern Ravine wetland, a trail problem in Big Trees, and the Holly near Palo Seco). Friends of Sausal Creek is currently working on the planning efforts in the Fern Ravine wetland and the redwoods along the stream below the wetland.

Figure 109: Public Parks of the Sausal Creek Watershed

-  Watershed Boundary
-  SubBasin Boundary
-  Park

Sausal Creek Watershed Plan



Dimond Canyon and Dimond Park

In 1850 Hugh Dimond purchased and named the land in Dimond Canyon from the Peralta family. This land became two parks: Dimond Canyon, which stretches from the Montclair Golf Course to the El Centro crossing, and Dimond Park, the more developed area stretching from El Centro to Dimond Ave. (see Figure 109). Dimond used the bricks of the Peralta's adobe house to create a playhouse for his son in the location where the Boy Scout Hut now stands. In 1917 the City of Oakland purchased 12 acres of this land as a park.

During the 1930s the Works Progress Administration (WPA) straightened the Sausal Creek channel, built cement walls, installed drop or grade control structures, and lined the streambed with cement in Dimond Canyon. A major sanitary sewer line is located in the creek bed in this canyon. This WPA project may have been done to protect the sewer line from erosion, or to protect the footings of the Leimert Bridge, or for some other reason. The WPA project may also have been a make-work project to provide employment during the Great Depression.

The creek channel and floodplain was filled to create a meadow, and the creek was channelized and culverted. The Lions pool was built in 1929 and remodeled in 1959. A recreation center was built in 1955 using community donations. In 2001 the Friends of Sausal Creek partnered with the City of Oakland to implement a creek restoration project on Sausal Creek in Dimond Canyon Park. Friends of Sausal Creek installed and maintains a native plant demonstration garden in Dimond Park, and works on removing invasives and planting natives along the creek.

According to FOSC:

Friends of Sausal Creek has many restoration sites in Dimond Canyon. The channel restoration and revegetation project done in 2001 begins about ¼ mile upstream from El Centro; removal of invasives currently focuses on efforts in the first 600 feet of this reach. On the west bank of the creek, two large sites have been adopted by FOSC members, are being maintained clear of most non-native plants, and are becoming well-covered without planted natives. A project at the end of Benevides Street has created a street-side garden near the trailhead, and has cleared invasive understory and planted many native plants. A group has recently formed to work near the Bridgeview trailhead as well. At the opposite end of the Canyon, FOSC has worked on a redwood site since 2003; invasive plants have been cleared in the areas surrounding the switchback trail. A swale was created to move storm drain output away from the site, and eroding sections of the trail were rebuilt.

Shepherd Canyon Park and Montclair Railroad Trail

Shepherd Canyon Park was acquired by the City of Oakland in 1978 and includes approximately 34 acres of sports fields and natural lands. The Shephard Creek channel was filled to create the park, with a culvert installed for creek flow. An ephemeral tributary to Shephard Creek named Escher Creek was relocated to the edge of the fill.

According to FOSC:

Shepherd Canyon Homeowners Association has been involved in strategic planning and stewardship of Shepherd Canyon Park since 2003. The Association hosts monthly park

cleanups and has cleared nonnative invasive plants and replanted with natives. Future priorities include addressing sediment and erosion problems from city storm drains and the creation of a long-planned trail to connect Shepherd Canyon Park with Dimond Canyon Park.

Across the road from the park, the Montclair Railroad Trail, a hiking/bike path, follows the former railroad route and connects Shepherd Canyon Park with Montclair Park. This land was recently transferred to the City of Oakland in a land-swap with the East Bay Regional Park District. A newly formed group, Friends of the Montclair Railroad Trail, has begun removing invasive plants and planting natives.

Montclair Park

Montclair Park, a small park of about 9 acres, sits above Highway 13 and is partly in the Sausal Creek watershed. The City of Oakland has plans to renovate play structures and create wheelchair access to the park.

Montclair Golf Course

The Montclair Golf Course is located atop a large culverted and filled section of Sausal Creek just downstream of Highway 13. The Golf Course was completed in 1960.

Castle Canyon Park

The 10 acres of Castle Canyon Park were purchased by the City of Oakland in 2004. The Piedmont Pines Neighborhood Association worked for over two decades to protect this area from development. The Association undertook a process to create a master plan for Castle Canyon Park in 2004 and 2005. A survey of residents resulted in the adoption of three ideas for the park: leave the canyon in its existing condition; create a trail to join Joaquin Miller Park; or replace non-native plants with fire-retardant landscaping. Volunteers hold two work days per year in Castle Canyon on Earth Day and on Creek-to-Bay Day.

Marjorie Saunders Park

Usually called Marj Saunders Park, this 2-acre site formerly known as Sulphur Springs was re-named in honor of a long-time local resident. Marj Saunders, who moved to the area in 1941, worked to preserve open space by fighting plans for a four-lane highway on Skyline Boulevard and helped in efforts to create Beaconsfield Canyon Park. Piedmont Pines Neighborhood Association has adopted this park and holds monthly work events. In addition, the Joaquin Miller Elementary School Ecology Club has adopted the butterfly garden, and has removed some invasives and planted native plants.

Beaconsfield Canyon Park

Most of the land for this park was purchased by the City of Oakland in the 1990s; in April 2008 the City purchased the remaining section of Beaconsfield Canyon, creating a 5-acre park. Cottonwood Creek, a tributary to Cobble Dick Creek, runs along the bottom of the canyon. Black cottonwood and red elderberry grow along the creek.

According to FOSC:

The Wildfire Protection District is using Beaconsfield Canyon as a pilot project for an improved model of fuel abatement that targets cutting or removal of invasive species just before they seed. By clearing individual species at various times of year, the program aims to prevent annual propagation of fire-prone plants and encourage the growth of natives. The goal is to reduce long-term fire maintenance costs and maximize habitat value, biodiversity, and park esthetics. Starting in 2009, the fuel management contract for Beaconsfield is the only year-round contract issued by the WPD. The contract requires a botanist to be on site whenever work is being performed, in order to protect native diversity and to recommend effective fuel treatment measures. With strong participation from Friends of Sausal Creek, volunteers hold workdays one Saturday per month to remove invasive vegetation and plant native plants. A project to remove the culvert and restore the creek channel is in the early planning stages.

Central Reservoir Recreation Area

This small park owned by the City of Oakland primarily consists of a playground.

William D. Wood Park

The Friends of Sausal Creek have removed invasive non-native broom on the site since 1996. A group of neighbors holds monthly work parties at W.D. Wood Park, mainly focused on removing invasive non-native French broom and planting native plants. Sausal Creek passes through the base of this park in a culvert.

Sanborn Park/Josie D. de la Cruz Park

Less than two acres in size, this park in the flatlands of the Sausal Creek watershed features a revitalized community center.

VI. SUMMARY OF WATERSHED CONDITIONS

The following table provides a summary of the information and analysis completed for the Sausal Creek watershed. The table organizes the analysis in terms of opportunities and constraints for restoration.

Table 51: Summary of Watershed Conditions

Feature	Opportunities	Constraints
Physical Features	<p>Many of the creek channels in the upper watershed are open and unculverted.</p> <p>Most of the Palo Seco Creek sub-basin is undeveloped.</p> <p>Sausal Creek is largely unculverted from the Montclair Golf Course to just below Foothill Boulevard.</p> <p>Palo Seco Creek and a large portion of Sausal Creek are in public parks.</p> <p>Many of the ephemeral creeks in the upper watershed are natural channels.</p>	<p>The Sausal Creek watershed is “built out” as a residential area with some commercial areas. In a built out area it is more difficult to implement creek setbacks, low impact development (LID), stormwater detention, and other facilities to mitigate the pollutant and peak flow effects caused by urbanization than if an area is in the process of being developed.</p> <p>The upper watershed is prone to landslides and erosion due to the steep slopes and highly fractured rock along the Hayward fault.</p> <p>Most of the creeks downstream of I-580 are culverted.</p> <p>Rainstorms of 1 inch precipitation or less cause a 1-year frequency flow event. This frequency flow disturbs aquatic habitats.</p> <p>Trails in Joaquin Miller Park have numerous erosion sites.</p> <p>Storm drains direct additional runoff into hillside ephemeral creeks, increasing erosion at the outlet of the culvert and in the creek channel.</p>
Biological Features	<p>Palo Seco Creek retains high quality aquatic habitat as demonstrated by the diversity, abundance, and pollution-sensitive taxa of aquatic insects sampled in the creek.</p>	<p>Sausal Creek watershed is 78% urban land uses with intensive development from the El Centro crossing downstream and less intensive development upstream.</p> <p>Residential areas harbor numerous ornamental plants, some of</p>

Table 51: Summary of Watershed Conditions

Feature	Opportunities	Constraints
	<p>Although infested with invasive non-native plants in some locations, the parkland of the Sausal Creek watershed supports a diversity of native and rare plant species.</p> <p>A small population of rainbow trout lives in Sausal Creek and lower Palo Seco Creek.</p> <p>There are a number of city parks in the watershed where projects to improve creeks and habitats can be implemented.</p>	<p>which are invasive and can spread into natural creeks and out-compete native plants. These invasive non-native plants are widespread in the natural lands of Sausal Creek watershed. Urban areas are a never-ending source of infestation. Many invasive plants are fire hazards.</p> <p>Water quality sampling at the five stations in the Sausal Creek watershed found excessive levels of nutrients, no persistent pollutants, and some negative effects from bioassay tests on sediment samples.</p> <p>Aquatic insect sampling at all the Sausal stations found poor aquatic habitat conditions and limited aquatic insect abundance and diversity, with almost no pollution-sensitive taxa.</p> <p>Bacteria sampling in Sausal Creek and Palo Seco Creek found levels of <i>E. coli</i> in excess of standards for water contact recreation in all but one sample.</p>
Planning and Infrastructure	<p>The City of Oakland has a creek protection ordinance.</p> <p>Oakland has a Wildfire Prevention District works with residents to control invasive non-native plants that are also fire hazards.</p> <p>FOSC has implemented a program of invasive non-native plant control and native plant installation involving and educating many residents.</p>	<p>The main sanitary sewer is located adjacent to and in Sausal Creek from below Highway 13 to Dimond Avenue. Raw sewage overflows occur during flood events and <i>E. coli</i> sampling indicates leaks may also be occurring.</p> <p>Storm drain outlets in the Sausal Creek watershed create erosion in a number of locations.</p> <p>The control methods used by the Wildfire Prevention District often cut the same vegetation numerous times and is believed to spread invasive plants through inappropriate management actions (FOSC 2010).</p>