



APPROVED
BY THE CITY COUNCIL

MAY 26 1987

OFFICE OF THE
CITY CLERK

29

DEPARTMENT OF PARKS
AND COMMUNITY SERVICES

ROBERT P. THOMAS
DIRECTOR

G. ERLING LINGGI
ASSISTANT DIRECTOR

CITY OF SACRAMENTO
CALIFORNIA

May 20, 1987

CITY MANAGER'S OFFICE
RECEIVED
MAY 20 1987

1231 I STREET
SUITE 400
SACRAMENTO, CA
95814-2977

916-449-5200

DIVISIONS:

CROCKER ART MUSEUM
GOLF
METROPOLITAN ARTS
MUSEUM & HISTORY
PARKS
RECREATION
ZOO

City Council
Sacramento, California

Honorable Members in Session:

SUBJECT: Median Strip Master Plan

SUMMARY

This report, requested by the City Council, recommends approval of a Median Strip Master Plan and Criteria developed by the Department of Parks and Community Services and the Public Works Department. This report further requests the City Council direct staff to proceed in developing an implementation plan and financing plan.

TRANSPORTATION AND COMMUNITY DEVELOPMENT COMMITTEE ACTION

The Transportation and Community Development Committee will hear the attached report at their meeting of May 21, 1987. Action taken by the Committee will be presented orally at the May 26 Council meeting.

RECOMMENDATION

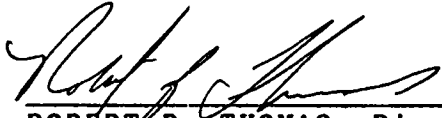
It is recommended that the City Council, by resolution:

1. approve the Median Strip Master Plan and Criteria (Attachments A and B) as developed by the Department of Parks and Community Services and the Public Works Department; and

City Council
May 20, 1987
Page Two

- 2. direct staff to develop an implementation plan and financing plan.

Respectfully submitted,

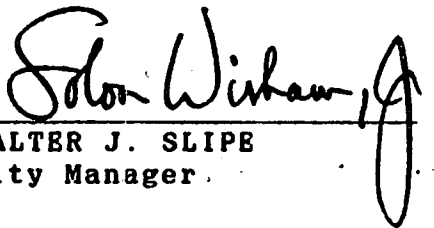


 ROBERT P. THOMAS, Director
 Parks and Community Services

FOR 

 MEL JOHNSON, Director
 Public Works Department

Recommendation Approved:



 WALTER J. SLIPE
 City Manager

RPT:ja

May 26, 1987
All Districts

RESOLUTION NO. 87-415

ADOPTED BY THE SACRAMENTO CITY COUNCIL ON DATE OF

APPROVED
BY THE CITY COUNCIL

MAY 26 1987

A RESOLUTION ADOPTING THE MEDIAN STRIP MASTER PLAN
AND DIRECTING STAFF TO DEVELOP AN IMPLEMENTATION
PLAN AND FINANCING PLAN

OFFICE OF THE
CITY CLERK

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

1. That the Median Strip Master Plan and Criteria, attached hereto and included as if set forth hereat in full, as developed by the Department of Parks and Community Services and the Public Works Department, are hereby approved.
2. That the Parks and Community Services and Public Works staff are hereby directed to develop a Median Strip Master Plan and Criteria implementation plan and financing plan.

MAYOR

ATTEST:

CITY CLERK

DEPARTMENT OF PARKS
AND COMMUNITY SERVICES

CITY OF SACRAMENTO
CALIFORNIA

1231 I STREET
SUITE 400
SACRAMENTO, CA
95814-2977

ROBERT P. THOMAS
DIRECTOR

May 5, 1987

916-449-5200

G. ERLING LINGGI
ASSISTANT DIRECTOR

DIVISIONS:

CROCKER ART MUSEUM
GOLF
METROPOLITAN ARTS
MUSEUM & HISTORY
PARKS
RECREATION
ZOO

Transportation and Community Development Committee
Sacramento, California

Honorable Members in Session:

SUBJECT: Median Strip Master Plan

SUMMARY

This report, requested by the City Council, recommends approval of a Median Strip Master Plan and Criteria developed by the Department of Parks and Community Services and the Public Works Department. This report further requests the City Council direct staff to proceed in developing an implementation plan and financing plan.

BACKGROUND INFORMATION

The Sacramento City parks system encompasses 97 parks covering approximately 2,500 acres, as well as the care of over 200,000 street and park trees. In addition, the Parks Division is responsible for other diversified landscapes including median strips, park strips (areas between curbs and sidewalks), and subdivision walls.

Sacramento's street system is a network of circulation routes that delineate land uses and establish continuity throughout the urban area. Streets contribute to the overall visual attributes of any city, and when maintained for maximum effect, play a significant role in providing a positive image for residents and visitors alike. Landscaping in particular along median strips, park strips and subdivision walls, is the most significant factor that increases the aesthetic quality and visual appeal of the street environment.

In September 1985, City Council directed Parks and Community Services staff to develop a master plan for development and maintenance of City median strips which would: 1) compare costs of median strip development and maintenance with aesthetic benefits; (2) determine the appropriate median strip type for each type of surrounding area (i.e. industrial, commercial/retail or residential); and (3) on the basis of the comparisons and determinations above, recommend specific criteria for public landscaping.

①

Since September 1985, staff has conducted a nation-wide, computerized survey of cities in order to build on the experience of other municipalities and districts. Survey results revealed that while some cities had analyzed certain elements of maintenance, development or aesthetics of median strips, none of those surveyed had completed a study of the scope which this master plan encompasses. Additionally, staff conducted an extensive and thorough inventory of the City of Sacramento's current and planned median strips. This inventory is the basis of the Median Strip Master Plan (Attachment A). The Master Plan addresses all public landscaping in median strips, park strips and subdivision walls.

As a result of Median Strip Master Plan recommendations, a number of median strip criteria have been developed (Attachment B). These criteria will establish continuity of future public landscaping by standardizing development of median strips. The Median Strip Master Plan and Criteria will ensure the continuance of liveable street environments in Sacramento.

Major results of the inventory and key points of the Master Plan follow:

Inventory

1. Although many design variations currently exist, three basic landscaped median strip design styles are predominant in Sacramento: (a) turf and trees; (b) groundcover and trees; and (c) concrete paving with large cut-outs for groundcover and trees (Exhibit C of the Master Plan).
2. Turf-and-trees type medians have dominated both previous median development and medians currently in the design phase.
3. Results of a comparison of the total development costs and annual maintenance costs of all types of median strips, adjusted for inflation over a period of 50 years, include (Exhibits E and F of the Master Plan):
 - Concrete paved medians with landscaped cut-outs cost \$10.00 per linear foot more to develop than turf and trees but cost 30% less annually to maintain. After 20 years, the costs equalize.
 - Bomanite costs approximately \$2.00 more per linear foot to install than plain concrete; however, landscape and street maintenance costs are identical to the concrete designs. Bomanite is a process which offers a wide range of color, pattern, and texture to a concrete surface. This process offers great versatility in design styles.
 - Initially, medians with groundcover and trees cost slightly more when compared to turf and trees because of higher maintenance required to establish the groundcover. Gradually, the costs equalize at the three-year mark. From that time, groundcover and trees become less expensive to maintain compared to turf and trees. At 20 years, there is a \$4.21 per linear foot annual savings for groundcover and trees.

- Shrub screens cost the least to develop and maintain.

Median Strips

Landscaped median strips are typically found on divided major streets and significantly increase the aesthetic quality and visual appeal of the street environment. The park system currently includes approximately 65 acres of landscaped median strips at over 35 locations City-wide.

This Master Plan details the various landscape design styles of median strips and compares their development, street maintenance and landscape maintenance costs. Relevant water issues are identified as they pertain to future water supplies, plant water requirements, irrigation systems and the use of drought-tolerant plant species.

Key recommendations for future median designs include the elimination of turf grass, substituting concrete or textured paving and drought-tolerant plants. A list of drought-tolerant plants is included in the Master Plan as Exhibit G.

Park Strips

Park strips, or maintenance strips, are areas between curbs and sidewalks. Section 45.5 of the Sacramento City Code requires the adjacent property owner to maintain park strips. Park strips are subject to extensive foot traffic.

Key recommendations for future park strip development include the use of interlocking pavers with tree wells and grates in newly landscaped areas of the central business district or using appropriate landscaping around existing mature street trees. Turf is recommended in residential areas in park strips.

Subdivision Walls

Subdivision walls, or sound walls, are located on private properties behind the street row line. They separate the streets from the private yards in single family developments and from the private common areas in multi-family developments. The City of Sacramento's 1974 General Plan permitted the design of subdivisions with these walls. The existing conditions of these areas vary tremendously.

In 1983, staff inventoried existing walls noting locations, types and current conditions. The cost of developing these areas was estimated to be about \$2 million while the annual maintenance cost was assessed at \$65,000. In early 1984, the Parks Division assumed the maintenance responsibility for the public area between the walls and the street curbs. The adjacent property owners have responsibility for the walls.

Transportation and Community Development
May 5, 1987
Page Four

Key recommendations for future development of subdivision walls include minimal low maintenance landscaping dependent upon available space. Staff will investigate the possible utilization of the Landscape and Lighting Act of 1972 as a source of funding. This issue will be addressed in a separate financing plan to be developed pending City Council approval of the Median Strip Master Plan and Criteria.

Implementation of the Median Strip Master Plan and Criteria and subsequent development of median strips in accordance with the Master Plan requirements is expected to cause an initial increase in costs associated with median strips. However, because maintenance costs associated with the recommended types of median strips are low, the overall costs to the City of public landscaping will be decreased.

FINANCIAL DATA

Costs of future development and maintenance of median strips in accordance with the requirements of the Median Strip Master Plan and Criteria will be addressed in a separate study to be submitted in 90 days.

RECOMMENDATION

This report recommends that the Transportation and Community Development Committee approve this report and refer it to the full City Council for action. Further, it is recommended that the City Council by resolution:

1. approve the Median Strip Master Plan and Criteria (Attachments A and B) as developed by the Department of Parks and Community Services and the Public Works Department; and
2. direct staff to develop an implementation plan and financing plan.

Respectfully submitted,

for G. Erling Surgen
 ROBERT P. THOMAS, Director
 Parks and Community Services

(original signed
 by Mel Johnson)
MEL JOHNSON, Director
 Public Works Department

Recommendation Approved:

DAVID R. MARTINEZ
 Deputy City Manager

RPT:ja

May 21, 1987
All Districts

MEDIAN STRIP MASTER PLAN

Introduction

Sacramento's street system is a network of circulation routes that delineate land uses and establish continuity throughout the urban area. Streets contribute to the overall visual attributes of any city, and when maintained for maximum effect, play a significant role in providing a positive image for residents and visitors alike. A passerby could easily form a positive or negative image of any community based entirely on a single trip down a street. The quality of street maintenance and cleanliness influences one's initial impression of the hardscape. Landscaping, however, is the most significant factor that increases the aesthetic quality and visual appeal of the street environment. Adjacent properties as well benefit from landscaping because their values increase. Plant materials, by nature of their color, texture and form, produce visual contrasts and "cooling effects" in an otherwise barren street environment. Landscaping produces an association with nature, forming a picturesque concept of a pleasing and liveable space.

The purpose of this master plan is to specify criteria for public landscaping throughout Sacramento's arterial street right-of-way including median strips, park strips and subdivision walls. This plan will establish continuity of quality public landscaping through standardized development, ensuring the continuance of livable street environments in Sacramento.

Median Strips

The City of Sacramento is responsible for designing, constructing and maintaining median strips. Typically, median strips are found on divided major streets (Exhibit A). Staff recently compiled a survey of the various types of landscaped median strips found in Sacramento. Although many design variations currently exist, three basic design styles are predominant: (1) turf and trees; (2) groundcover and trees; and (3) concrete paving with large cut-outs for groundcover and trees. Typical examples of each style are Howe Avenue, Center Parkway, and 65th Street Expressway respectively. Turf and trees, however, has dominated both previous median development and medians currently in the design phase. In the past the choice of design style was based primarily on aesthetic preference, considering maintenance requirements. Exhibit B provides a list of medians that are currently being designed and those that were developed in the last five years.

Landscape Designs of Median Strips

Exhibit C illustrates the various types of landscape designs of median strips. Type A, shrub screens, is typically found along frontage roads parallel to divided major streets. Shrub screens consist of shrubbery at least 36" high which create a buffer zone that helps reduce headlight glare. Shrubs with a growth height greater than 24" should not be planted on center divider median strips because of sight clearance requirements. Types B, C, and D feature landscaping in large cut-outs, reducing the amount of landscaping but retaining a larger ratio of plants to paving. Types D, E and F, feature tree wells surrounded by paving, further reducing the landscaped area and represents the smallest amount of landscaping on medians. Type B and D medians are constructed with concrete paving. Type C and F medians are constructed using bomanite, a process which consists of a colored concrete being stamped, producing a patterned effect. Other appropriate patterned surfaces such as brick or exposed aggregate are acceptable substitutes. Type D and G medians are constructed with interlocking pavers. Type H, turf and trees and Type J, groundcover and trees are typically the most common median designs. Type I and K medians feature the same sort of landscaping as Types H and J, adding an 18" concrete edge to both sides of the median. This edge increases the safety of workers on the median.

Analysis of Development and Maintenance Costs

Exhibit D is a numerical analysis of the various costs related to the different types of median strips. Staff anticipates the average life expectancy of medians to be 50 years, barring changes in the road system; it is indicated by the shading on this exhibit. These costs were calculated per linear foot over this 50-year span. There are three costs associated with median strips: development, street maintenance and landscape maintenance. First, development or construction costs were calculated using the current rates available from general contractors. Second, street maintenance costs were based on a study done by the Public Works Department which examined the impact of irrigation infiltration and runoff and subsequent deterioration of the street paving. The findings indicate a significant increase in pavement deterioration of medians constructed with extruded curbs, curbs placed on top of the pavement in comparison to curbs poured in place. Extruded curbs allow irrigation water to seep under-neath them, thus damaging the pavement. The estimated cost of repairing the damage varies from \$.02 to \$.35 per linear foot per year for Type D, concrete with tree wells, and Type F, turf and trees, respectively. These estimated values are averages and will vary with each specific site. Medians, therefore, should be constructed with curbs and gutters including gutter drains to avoid irrigation infiltration and runoff. Third, landscape maintenance costs were based on averaging the bid prices for medians currently being maintained under contract with a 5% annual inflation factor added in for each year. The sum of the street and landscape maintenance costs represent the total annual maintenance cost for each type of median. The total cost includes all three cost factors.

Exhibit E illustrates in graphic form a comparison of the total development and annual maintenance costs over a period of 50 years. The intersection of any two lines on this graph indicates the point in time when the costs for certain medians reach an equal value. An analysis of Exhibit E follows:

1. Type A medians, shrub screens, cost the least to develop and maintain.
2. Initially, medians with groundcover and trees (Type J) cost slightly more when compared to turf and trees (Type H) because of higher maintenance required to establish the groundcover. Gradually, the costs equalize at the three-year mark (see Example 1 on Exhibit E). From that point in time, groundcover and trees become less expensive to maintain compared to turf and trees. At 20 years, there is a \$4.21 per linear foot annual savings.
3. Concrete paved medians with landscaped cut-outs (Type B) cost \$10.00 per linear foot more to develop than turf and trees (Type H) but cost 30% less annually to maintain. After 20 years, the costs equalize, demonstrated by the intersecting lines (see Example 2 on Exhibit E). Subsequently, the Type B median is less expensive to maintain; at the 30-, 40-, and 50-year marks, there are annual savings per linear foot of \$5.08, \$10.11 and \$15.16 respectively.
4. Type I and K medians are both constructed with an 18" concrete curb on both sides of the median. It is felt that this added width provides a safer environment for workers. For both medians, this concrete edge increases the development costs but reduces the annual maintenance costs. In comparing median Types H and I, the costs equalize at the forty-two year mark (see Example 3 on Exhibit E). Presently, most medians without this buffer are being chemically edged, while those medians having this buffer are being mechanically edged. Mechanical edging next to a regular curb requires the closure of one lane of traffic adjacent the median at each edging. Mechanically edged turf is more attractive, so the concrete edges are desirable in highly visible areas.
5. Type C and F medians are both constructed using bomanite. Bomanite is a process which offers a wide range of color, pattern, and texture to a concrete surface. This process offers great versatility in design styles. Bomanite costs approximately \$2.00 per linear foot more to install than plain concrete, however landscape and street maintenance costs are identical to the concrete designs, Types B and E. Other appropriate patterned surfaces such as brick or exposed aggregate are acceptable substitutes in lieu of bomanite.
6. Type D and G medians are both constructed with interlocking pavers, a type of brick paving. They are highly attractive and have a far greater visual appeal compared to concrete. By nature of their porous qualities and non-mortared installation, pavers allow the exchange of air and water from the subsurface soils through the pavers. This flexibility is desirable in certain locations due to an abundance of expansive clay soils in Sacramento. Pavers are expensive and appreciably raise the development costs of the medians. Maintenance costs are less on Type G because of the reduced area of landscaping as compared to Type D. Due to high cost of construction, Type D and G medians are the most costly.

Exhibit F illustrates the relationship of the annual maintenance costs only. This relationship is important because maintenance costs continue throughout the median's life span and thus represent future expenditures. Turf medians, Types H and I, are labor intensive and subsequently cost the most to maintain because of frequent mowing, edging and weeding. Groundcover medians, Types J and K, are the next most costly to maintain due to periodic weeding and edging. Medians with large cut-outs, Types B, C and D fall in the middle range of maintenance requirements and costs. Shrub screens, Type A, are the fourth least expensive median to maintain due to infrequent maintenance requirements. Medians with tree wells, Types E, F, and G have the smallest amount of landscaping and therefore are the least expensive to maintain. Medians constructed with interlocking pavers, Types D and G, cost slightly more to maintain than concrete or bomanite surfaces because the pavers are not mortared together resulting in increased weed abatement procedures.

Water Issues

Water, a necessary and valuable resource, has created controversies for centuries and continues to be a major issue in our society. Historically, water rights have played an important role in the evolution of our society. Initially, the frontier settlers adopted riparian rights which meant that those along a stream had the right to the water. This concept had historical precedent in English common law. The discovery and subsequent mining of gold dramatically changed water rights because it became necessary to divert water to nonriparian locations. The doctrine of prior appropriation was established which determined water rights as "first in time, first in right" and became part of mining claims. In 1851 one of the first actions the California State Legislature took was to sanction the local customs of water and mineral rights. It became necessary, however, for courts to render decisions on complicated water disputes. These decisions eventually led to constitutional and statutory laws dealing with water issues which formed the basis for public land use policies. As demands increase and water supplies diminish due to water rights' challenges, the cost of water increases and its availability decreases. Experts predict widespread water shortages by the year 2000. The quality, supply and cost of water is rising to the top of the list of concerns in landscaping.

Plant water requirements are met from two sources -- seasonal rainfall and supplemental irrigation. Research has shown that seasonal rainfall effectively meets about 25% of a plant's needs. Large amounts of precipitation occur when the plant's needs are low and losses occur from (1) excess runoff; (2) leaf surface evaporation; and (3) rainfall occurring after the soil has reached field capacity resulting in deep percolation losses. Supplemental irrigation is estimated to be 75% effective, this figure reflects losses from runoff, deep percolation, wind drift and overspray. The primary objective of an irrigation system is to provide the right amount of water whenever plant stress is about to occur and to supply just enough water at that time to replenish the amount of water used since the last irrigation. This objective is met through adequate design and proper application schedules. Irrigation designs should provide adequate coverage for healthy plant growth with a minimum of waste or overspray. There is unmeasurable negative impact from excess water running across a street. Moreover, this adds to street deterioration and subsequent maintenance costs.

Turf, by nature of its shallow roots, requires frequent irrigation throughout its growing cycle. Trees, shrubs, and to some extent groundcovers have deeper root systems which give them greater access to soil moisture. This quality allows these plants to endure much higher levels of moisture stress compared to turf. Turf irrigation systems are typically spray heads which, by nature of their application, result in a 40-60% loss of applied water in runoff, overspray and surface evaporation. Trees in turf areas often develop surface roots in response to frequent surface waterings and fertilizer applications. Surface watering lessens the drought tolerance of the trees because of their dependence on surface water. Overdevelopment of surface roots greatly increases the probability of wind damage to the trees, particularly in wet soil conditions. Surface rooting of trees on medians also causes significant street damage requiring costly street repairs.

Presently, Sacramento's water supply is non-metered. Although the cost of water can be a significant factor in landscaping, the issue is not addressed in this master plan. In light of unknown future water supplies and potential costs, it is desirable to reduce turf areas on medians, substituting landscapes that are low in water use. This not only conserves water but also reduces long-term maintenance costs. Selected plant materials must be compatible; i.e., drought tolerant. Drought tolerant plants are defined as ones which have:

- (1) a deep and well developed root zone
- (2) a waxy leaf surface
- (3) leaf hairs present to reduce air flow
- (4) light coloring to reflect light
- (5) leaves that fold up or drop under stress conditions.

Many native and ornamental plants are drought tolerant or adaptable to arid conditions. Exhibit G is a representative list of various drought tolerant plant materials suitable to the Sacramento area. This list was compiled by the Southgate Recreation and Park District. Applicable plant species should be selected on the basis of this quality as well as their color, form, texture, mature height and other distinguishing characteristics. Plant species not listed on Exhibit G may be specified. All selections are subject to the approval of the City Landscape Architect.

Park Strips

Park strips or maintenance strips are areas between curbs and sidewalks. Section 45.5 of the Sacramento City Code requires the adjacent property owner to maintain park strips. Park strips are subject to extensive pedestrian traffic. In the Central Business District park strips should be attractive, aesthetically pleasing and require minimum maintenance. In downtown areas with new landscaping interlocking pavers and cut-outs for trees with grates are recommended. The surface of the pavers must be treated with an impermeable glaze to prevent staining. In downtown areas with existing mature street trees, alternate and appropriate plantings are recommended to preserve the trees. In residential areas, turf is the most appropriate selection because of its ability to withstand foot traffic and its low initial installation cost.

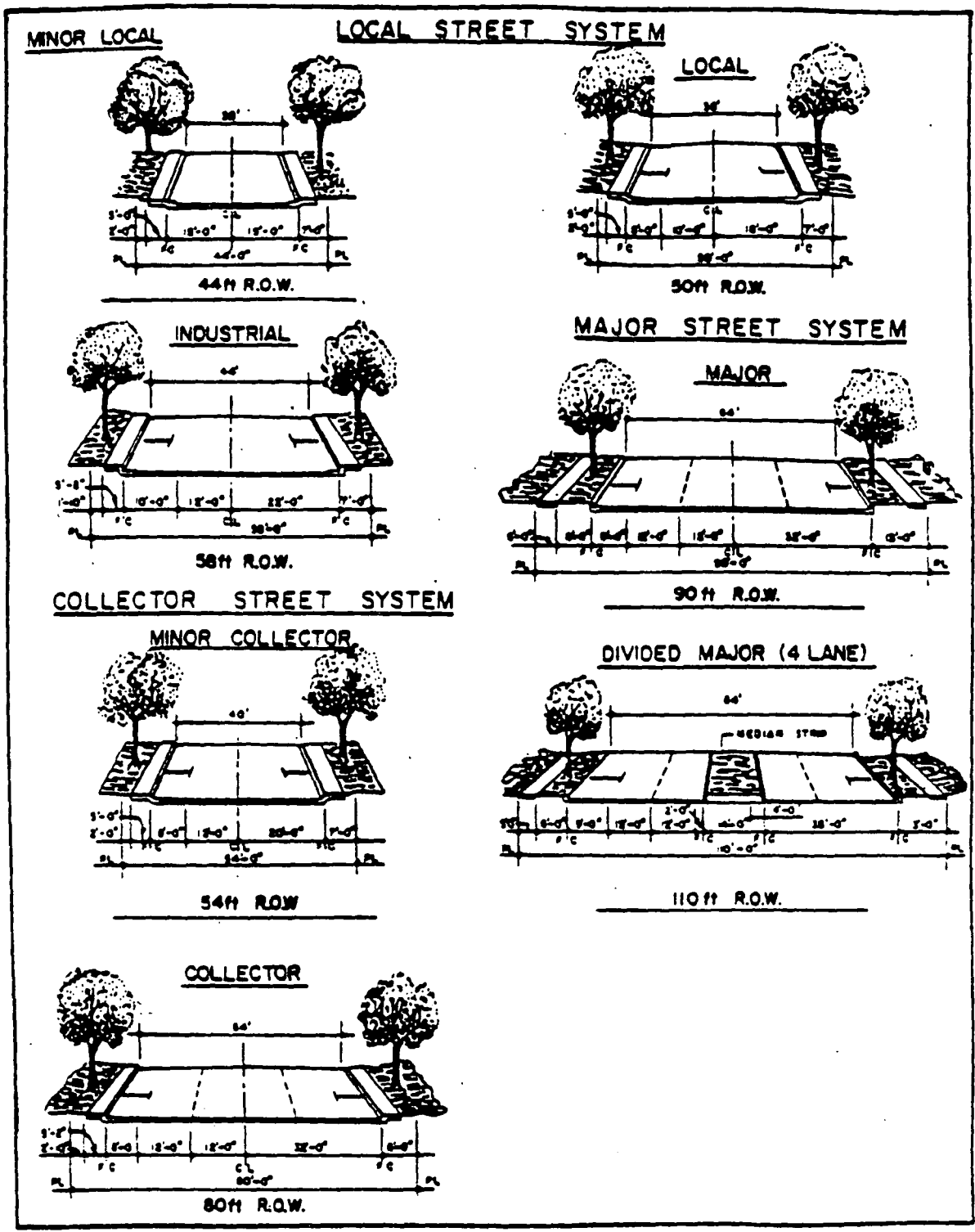


Subdivision Walls

Subdivision walls or sound walls are private properties located between sidewalks and fencing on arterial streets. The City of Sacramento 1974 General Plan permitted the design of subdivisions with these walls. The walls range from wooden fences with no landscaping to masonry fences with complete landscaping. In some cases, the landscaping is privately maintained by subdivision association fees. An overwhelming majority of these areas are not maintained. In 1983, staff conducted an inventory of existing walls, identifying locations, types, and current conditions. The cost of developing these areas was estimated to be about \$2 million while the annual maintenance cost was assessed at \$65,000. In early 1984, a program was prepared for maintenance and weed abatement of these areas and also for paved (unplanted) medians as well. Additional staff and equipment was appropriated to the Parks Division. Currently, a two-person crew maintains these areas year-round.

The existing spaces between sidewalks and the walls vary in width from zero to 55 feet. For purposes of this master plan areas with a space less than two feet wide should be paved. Only weed abatement and litter removal would be necessary. Larger spaces should be minimally landscaped with cut-outs for tree wells. It is possible to obtain funds for developing and maintaining these areas through the Landscaping and Lighting Act of 1972. This legislation permits government agencies to create assessment districts and levy a tax. This type of funding would decrease the city's general fund obligations. Staff will investigate the possible use of this act and subsequent implementation in a separate financing plan to be developed, pending City Council approval of this Master Plan.

STREET SYSTEM STANDARDS



MEDIAN DEVELOPMENT

Medians Currently in Design Phase

- Mack Road (Brookfield to Valley Hi)
- Arden Way (Point West to Ethan)
- Greenhaven Drive (Vicinity of Secret River)
- Florin Road (East of S. Land Park Drive)

Type Landscaping

Turf/Trees
 Undecided
 Turf/Trees
 Shrub Screen

Medians Developed In the Last Five Years

- "R" St. Cutouts (3rd to 10th St.)
- Florin Road (I-5 West to Gloria)
- Harvard St. (Arden Way to Silica Ave.)
- 21st Ave. Extension (West of Stockton Blvd.)
- Riverside Blvd. (Florin Rd to Pocket Rd.)
- W. El Camino Ave. (I-5 East to Azevedo)

Type Landscaping Year

Groundcover/Trees 1982
 Groundcover/Trees 1983
 Groundcover/Trees 1983
 Turf/Trees 1983
 Turf/Trees 1984
 Turf/Trees 1985

MEDIAN STRIP DIAGRAMS

TYPE

PLAN VIEW

1" 40'

SECTION

1" 20'

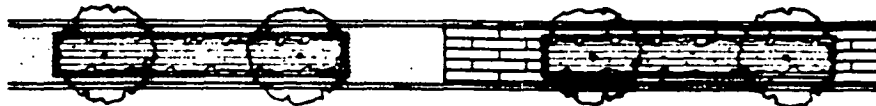
A



A - SHRUB SCREEN



B,C,D



B - CONCRETE W/ CUT-OUTS C - BOMANITE W/ CUT-OUTS
D - PAVERS W/ CUT-OUTS



E,F,G



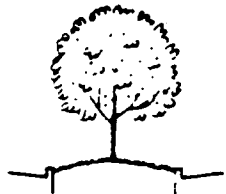
E - CONCRETE W/ TREE WELLS F - BOMANITE W/ TREE WELLS
G - PAVERS W/ TREE WELLS



H



H - LAWN & TREES



I



I - LAWN & TREES W/ CONC. EDGE



J



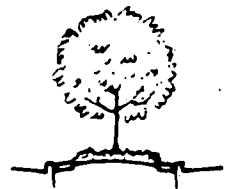
J - GROUNDCOVER & TREES



K



K - GROUNDCOVER & TREES W/ CONC. EDGE



13

MEDIAN STRIP COST ANALYSIS

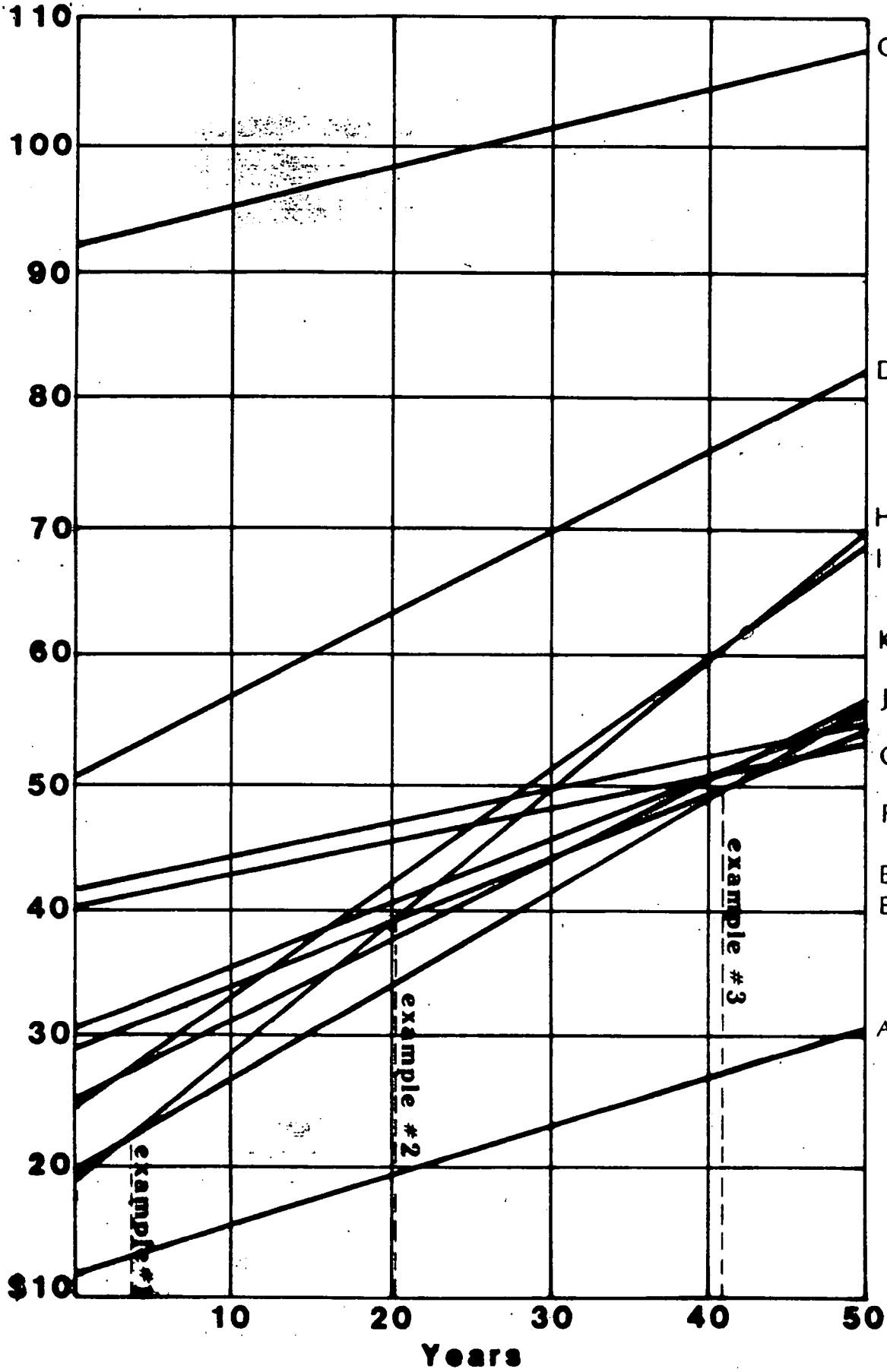
Type Description	Const. Cost	Landscape Maint. Cost	Street Maint. Cost	Total Maint. Cost	Total Cost	Total Cost	Total Cost	Total Cost	Total Cost	Total Cost
	L.F.	L.F./Yr.	L.F./Yr.	L.F./Yr.	L.F./1Yr.	L.F./10Yr.	L.F./20Yr.	L.F./30Yr.	L.F./40Yr.	L.F./50Yr.
A Shrub Screen	\$12.00	\$0.26	\$0.09	\$0.35	\$12.35	\$15.66	\$19.33	\$ 22.99	\$ 26.66	\$ 30.34
B Concrete with Cut-Outs	\$28.00	\$0.40	\$0.11	\$0.51	\$28.51	\$33.33	\$38.68	\$ 44.01	\$ 49.37	\$ 54.72
C Bomanite with Cut-Outs	\$30.00	\$0.40	\$0.11	\$0.51	\$30.51	\$35.33	\$40.68	\$ 46.01	\$ 51.37	\$ 56.72
D Pavers with Cut-Outs	\$50.00	\$0.43	\$0.11	\$0.54	\$50.54	\$55.64	\$61.31	\$ 66.96	\$ 72.63	\$ 78.30
E Concrete with Tree Wells	\$40.00	\$0.24	\$0.02	\$0.26	\$40.26	\$42.72	\$45.45	\$ 48.16	\$ 50.89	\$ 53.62
F Bomanite with Tree Wells	\$42.00	\$0.24	\$0.02	\$0.26	\$42.26	\$44.72	\$47.45	\$ 50.16	\$ 52.89	\$ 55.62
G Pavers with Tree Wells	\$92.00	\$0.27	\$0.02	\$0.29	\$92.29	\$95.03	\$98.08	\$101.11	\$104.15	\$107.20
H Turf and Trees	\$18.00	\$0.64	\$0.35	\$0.99	\$18.99	\$28.35	\$38.74	\$ 49.09	\$ 59.48	\$ 69.88
I Turf and Trees with Conc. Edge	\$24.00	\$0.60	\$0.25	\$0.85	\$24.85	\$32.88	\$41.81	\$ 50.69	\$ 59.61	\$ 68.54
J Groundcover and Trees (new)	\$19.00	\$0.66	\$0.26	\$0.92	\$19.92	\$27.07	\$34.53	\$ 41.98	\$ 49.44	\$ 56.89
K Groundcover and Trees with Conc Edge (new)	\$25.00	\$0.60	\$0.16	\$0.76	\$25.76	\$31.77	\$38.07	\$ 44.37	\$ 50.67	\$ 56.97

Type Description (Existing)	Const. Cost	Landscape Maint. Cost	Street Maint. Cost	Total Maint. Cost	Total Cost	Total Cost	Total Cost
	L.F.	L.F./Yr.	L.F./Yr.	L.F./Yr.	L.F./1Yr.	L.F./2Yr.	L.F./3Yr.
J Groundcover and Trees	\$19.00	\$ 0.45	\$ 0.26	\$ 0.71	\$19.71	\$20.46	\$21.20
K Groundcover and Trees with Conc. Edge	\$25.00	\$ 0.40	\$ 0.18	\$ 0.60	\$25.60	\$26.23	\$26.86

EXHIBIT D

29

EXHIBIT E



G (PAVERS / TREE WELLS)

29

D (PAVERS W/ CUTOUTS)

H (TURF & TREES)

I (TURF & TREES W/EDGE)

K (GROUNDCOVER & TREES W/ EDGE)

J (GROUNDCOVER & TREES)

C (BOMANITE W/ CUTOUTS)

F (BOMANITE W/ TREE WELLS)

B (CONC. W/ CUTOUTS)

E (CONC. W/ TREE WELLS)

A (SHRUBS)

example #3

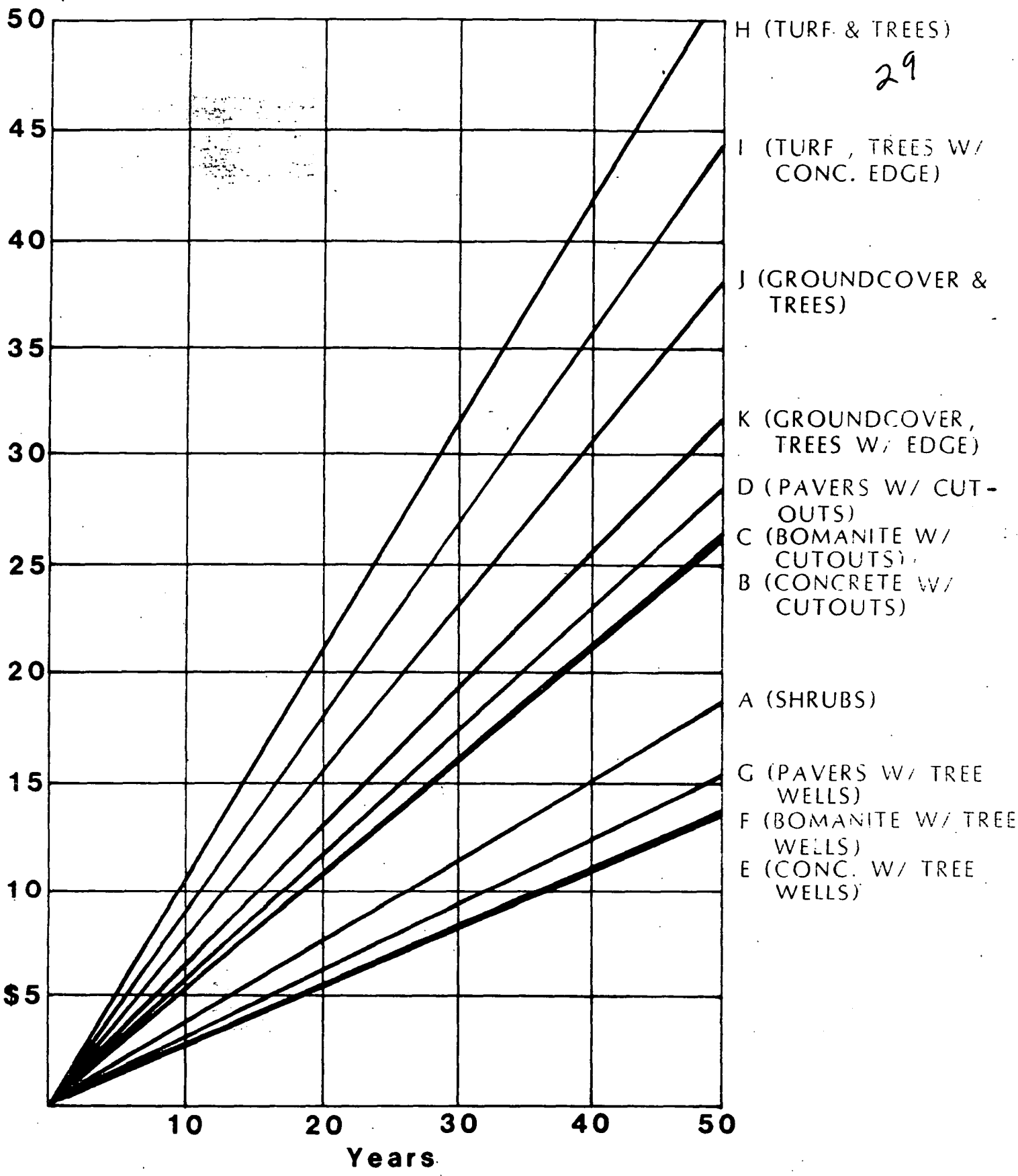
example #2

example #1

TOTAL COSTS

16

EXHIBIT F



MAINTENANCE COSTS

16

DROUGHT TOLERANT LANDSCAPE PLANTS

The following list is a composite of California natives as well as ornamentals which are drought tolerant, will take full sun and adapt to Sacramento valley conditions after their establishment. Although not especially frail or delicate, most should have an infrequent watering (*better with occasional water), during the summer months and few will adapt to overwatering.

<u>TREES - Scientific Name</u>	<u>Common Name</u>	<u>Evergreen</u>	<u>Deciduous</u>
Aesculus californica	Calif. Buckeye		X
Acacia - many varieties		X	
Ailanthus altissima	Tree-of-Heaven		X
Albizia julibrissin	Silk tree		X
Casuarina	Beefwood	X	
Calocedrus decurrens	Incense Cedar	X	
Cedrus deodara	Deodar Cedar	X	
Celtis	Hackberry		X
Cerratonia siliqua*	St. John's Bread	X	
Cupressus glabra	Arizona Cypress	X	
Eriobotrya japonica*	Loquat	X	
Eucalyptus - many varieties		X	
Fig, edible variety*			X
Fraxinus dipetala	Calif. Flowering Ash		X
Koelreuteria paniculata	Goldenrain Tree		X
Maclura pomifera	Osage orange		X
Olea europaea	Olive	X	
Pinus coulteri	Coulter Pine	X	
Pinus edulis	Pinon Pine	X	
Pinus sabiniana	Digger Pine	X	
Pinus torreyana	Torrey Pine	X	
Pistacia atlantica	Mt. Atlas Pistache		X
Populus fremontii	Fremont Cottonwood		X
Quercus douglasii	Blue Oak		X
Quercus engelmannii	Mesa Oak		
Quercus lobata	Valley Oak		X

DROUGHT TOLERANT LANDSCAPE PLANTS (Con't.)

<u>TREES - Scientific Name</u>	<u>Common Name</u>	<u>Evergreen</u>	<u>Deciduous</u>
Quercus wislizeni	Interior Live Oak		X
Rhus lancea*	African Sumac	X	
Robina	Black Locust		X
Schinus molle	California Pepper	X	
Schinus terebinthifolius	Brazilian Pepper	X	
Sequoiadendron giganteum	Giant Sequoia	X	
Tilia tomentosa	Silver Linden		X
Washingtonia filifera	Calif Fan Palm	X	
Zizyphus jujuba	Chinese Jujube		X

<u>SHRUBS - Scientific Name</u>	<u>Common Name</u>	<u>Size</u>				<u>Evgrn</u>	<u>Decds.</u>
		<u>L</u>	<u>M</u>	<u>S</u>	<u>GC</u>		
Acacia - many varieties	Acacia	X	X			X	
Adenostomata fasciculatum	Chamise		X			X	
Arbutus unedo*	Strawberry tree	X				X	
Arctostaphylos - many varieties		X	X	X	X	X	
Arctotheca calendula	Cape Weed				X	X	
Artemisia pycnocephala	Sandhill Sage			X		X	
Atriplex canescens	Four-wing Saltbush		X			X	
Atriplex semibaccata	Australian Saltbush				X	X	
Baccharis pilularis	Coyote Brush				X	X	
Calistemon* - many varieties	Bottle Brush	X	X			X	
Carpobrotus edulis	Ice Plant				X	X	
Ceanothus - many varieties		X	X	X	X	X	
Centranthus ruber	Jupiter's Beard				X		X
Cercis occidentalis	Western Redbud	X					X
Cercocarpus betuloides.	Mountain Mahogany	X				X	
Chamelaucium uncinatum	Geraldton Waxflower		X			X	
Chamaerops humilis	Mediterranean Fanpalm	X	X			X	
Cistus incanus	Rockrose			X		X	
Cistus salviifolius	Sageleaf Rockrose				X	X	
Convolvulus	Morning Glory			X	X	X	

DROUGHT TOLERANT LANDSCAPE PLANTS (Con't.)

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<u>SHRUBS - Scientific Name</u>	<u>Common Name</u>	<u>Size</u>				<u>Evgrn</u>	<u>Decds.</u>
		<u>L</u>	<u>M</u>	<u>S</u>	<u>GC</u>		
Coprosma kirkii	Coprosma			X		X	
Correa pulchella	Australia Fuchsia				X	X	
Cotinus coggygia	Smoke Tree	X					X
Cotoneaster - many varieties		X	X	X	X	X	X
Cytisus canariensis	Canary Is. Broom		X			X	
Cytisus racemosus	similar to canariensis		X			X	
Cytisus scoparius	Scotch Broom	X				X	
Dendromecon harfordii	Island Tree Poppy	X				X	
Dendromecon rigida	Brush Poppy		X			X	
Dodonaea viscosa	Hopseed Bush	X				X	
Drosanthemum floribundum	Rosea Ice Plant				X	X	
Eleagnus pungens	Silverberry	X				X	
Eriogonum fasciculatum	Calif. Buckwheat			X		X	
Fallugia paradoxa	Apache Plume		X			X	Partially
Festuca ovina v. glauca	Sheep Fescue				X	X	
Fremontodendron californicum	Common Flannel Bush		X			X	
Fremontodendron mexicanum	Southern Flannel "	X				X	
Garrya elliptica*	Coast Silktassel		X			X	
Garrya fremontii	Fremont Silktassel		X			X	
Genista aethnensis	Mt. Aetna Broom	X					X
Genista hispanica	Spanish Broom				X		X
Genista pilosa					X		X
Genista sagittalis					X		X
Grevillea 'Aromas'		X				X	
Grevillea rosmarinifolia	Rosemary Grevillea		X			X	
Grevillea tridentifera			X			X	
Hakea salinga	Willowleaf Hakea	X				X	
Hakea snaveolens	Sweet Hakea	X				X	
Haplopappus canus	Hazardia			X			X
Haplopappus parishii	Goldenbrush	X				X	
Helianthemum scoparium	Rush Rose		X		X	X	
Helianthemum nummularium	Sunrose				X	X	
Heteromeles arbutifolia*	Toyon	X				X	
Hypericum calycinum*	Aaron's Beard				X	X	

DROUGHT TOLERANT LANDSCAPE PLANTS (Con't.)

<u>SHRUBS - Scientific Name</u>	<u>Common Name</u>	<u>Size</u>				<u>Evgrn</u>	<u>Decds.</u>
		<u>L</u>	<u>M</u>	<u>S</u>	<u>GC</u>		
Hypericum coris				X		X	
Isomeris arborea	Bladder pod			X			
Lagerstroemia indica*	Crape Myrtle	X					X
Lampranthus spectabilis	Training Ice Plt.			X		X	
Lantana montevidensis*	Trailing Lantana			X		X	
Larrea tridentata	Creosote Bush		X			X	
Lavandula* - several varities	Lavender			X		X	
Lavatera assurgentifolia	Tree Mallow	X				X	
Leptospermum - several varities	Tea Tree	X	X	X	X	X	
Leptodactylon californicum	Prickly Phlox			X		X	
Leucophyllum frutescens	Texas Ranger		X			X	
Lithodora diffusa	Lithodora				X		X
Lupinus longifolius	Bush Lupine			X			X
Lysiloma thornberi	Feather Bush	X					X
Mahonia* - many varities			X	X	X	X	
Melaleuca - several varities		X	X			X	
Myoporum parvifolium*	Myoporum				X	X	
Myrica californica	Pacific Wax Myrtle	X				X	
Nerium oleander*	Oleander	X		X		X	
Osteospermum fruticosum*	African Daisy				X	X	
Penstemon cordifolius	Beard Tongue		X			X	
Phlox subulata*	Moss pink				X		X
Phormium colensoi*	Flax		X			X	
Phormium tenax*	New Zealand Flax	X				X	
Photinia fraseri*	Photinia	X	X			X	
Photinia serrulata*	Chinese Photinia	X				X	
Pinus edulis	Pinon Pine	X				X	
Pittosporum phillyraeoides*	Willow Pittosporum	X				X	
Plumbago auriculata	Cape Plumbago			X	X	X	
Polygonum capitatum	Knotweed				X	X	
Potentilla tabernaemontanii*	Spring Cinquefoil				X	X	
Prunus caroliniana*	Carolina Laurel Ch.	X				X	
Prunus ilicifolia	Hollyleaf Cherry	X				X	
Prunus lyonii	Catalina Cherry	X				X	

DROUGHT TOLERANT LANDSCAPE PLANTS (Con't.)

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<u>SHRUBS - Scientific Name</u>	<u>Common Name</u>	L	M	S	GS	Evgrn.	Decds.
Pyracantha* - several varieties		X	X	X	X	X	
Quercus dumosa	Calif. Scrub Oak		X			X	
Rhamnus alaternus*	Italian Buckthorn	X				X	
Rhamnus californica	Coffeeberry		X			X	
Rhamnus c. ilicifolia	Holly-leaf Redberry		X			X	
Rhus galbra	Smooth Sumac	X					X
Rhus laurina	Laurel Sumac	X				X	
Rhus ovata	Sugar Bush		X	X		X	
Ribes viburnifolium	Evergreen Currant			X	X	X	
Rosa rugosa	Ramanas Rose		X				X
Rosmarinus officinalis	Rosemary		X	X		X	
Salvia - several varieties	Sage		X	X			X
Sedum* - many varieties	Stonecrop				X	X	
Santolina chamaecyparissus	Lavender Cotton				X	X	
Senecio* - many varieties				X	X	X	
Simmondsia chinensis	Jojoba		X			X	
Sphaeralcea ambigua	Desert Mallow		X				X
Stachys byzantina*	Lambs Ears				X	X	
Styrax officinalis californicus	Snowdrop Bush	X	X				X
Symphoricarpos mollis	Creeping Snowberry				X		X
Tamarix - several varieties	Tamarisk	X				X	
Teucrium chamaedrys	Germander				X	X	
Teucrium fruticans	Bush Germander		X			X	
Thymus - several varieties	Thyme				X		X
Trichostema lanatum	Wooly Blue Curls			X		X	
Xylosma congestum	Xylosma	X	X			X	
Verbena - several varieties					X		X
Yucca - several varieties.		X	X			X	
Zauchneria californica	Calif. Fuchsia			X	X	X	

RLC/ph

(This list was compiled by the Southgate Recreation and Park District).

MEDIAN STRIP MASTER PLAN CRITERIA

The following criteria shall be implemented in the planning and development phases of median strips, park strips, and sound walls throughout Sacramento.

1. Median strips shall be developed only on divided major streets.
2. Median strips may be constructed on public streets in private developments as long as funding for construction and perpetual maintenance is obtained from private sources, including all corresponding street maintenance costs.
3. Shrub screens, Type A, shall consist of shrubbery at least 36" high. At least the first 80' on each side of an intersection shall be concrete/paving or landscaped with groundcover having a maximum growth height of 24".
4. All future median development shall be one of the following: concrete with cut-outs, Type B; bomanite with cut-outs, Type C; pavers with cut-outs, Type D; concrete with tree wells, Type E; bomanite with tree wells, Type F; pavers with tree wells, Type G. Concrete paving, Types B and E, is acceptable in residential, industrial and commercial areas. Bomanite paving, Types C and F, shall be used in retail business areas to increase the aesthetic qualities. Interlocking pavers, Type D and G, shall be used only in special situations due to the high cost of installation. Other appropriate surfacing such as brick or exposed aggregate may be substituted for bomanite. All selections shall be approved by the Director of Parks and Community Services and the Director of Public Works.
5. Irrigation designs shall provide adequate coverage and sufficient water for the healthy growth of all landscaped areas. Drainage shall be provided to eliminate surface runoff across the pavement.
6. Irrigation systems shall be designed with a minimum of waste and overspray and shall not throw water off the landscaped area onto non-planted areas. Drainage shall be an integral part of the irrigation system.
7. When practical, low precipitation irrigation systems shall be used to conserve water. Sprinkler heads and surface spray irrigation shall be avoided when possible.
8. Selected plant species shall be drought tolerant or adaptable to arid conditions. All selections are subject to approval of the City Landscape Architect.

9. Park strips in the Central Business District in areas of new landscaping shall consist of interlocking pavers and cut-outs for trees with grates. The surface of these pavers shall be treated with an impermeable glaze to prevent staining.
10. Park strips in the Central Business Districts with existing mature street trees shall consist of an acceptable alternate and appropriate landscaping, subject to the approval of the City Landscape Architect and City Arborist.
11. Park strips in residential areas shall be turf because of its aesthetic appeal, low installation cost and its ability to withstand high levels of foot traffic.
12. Subdivision walls that have a space between the sidewalk and wall less than two feet wide shall be paved.
13. Subdivision walls with an area more than two feet wide shall have minimal landscaping consisting of cut-outs for tree wells.