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PUBLIC WORKS

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February 13, 1990

Budget and Finance/Transportation
and Community Development Committees
Sacramento, California

Honorable Members in Session:

SUBJECT: **STREET RIGHT-OF-WAY INFRASTRUCTURE REPORT**

SUMMARY

The City Council has asked staff to report on the condition of the City's infrastructure, identify deficiencies, and outline plans to meet future growth. Reports have been presented on the water, storm drainage, sewer, flood control, parking, and transportation systems.

The attached Street Right-of-Way Infrastructure Report discusses the City's street system from the standpoint of the condition of the street paving, curbs, gutters, and sidewalks. The financial requirements to make major street repairs and to conduct a comprehensive, ongoing preventive maintenance program to keep the system in good repair, before major deterioration occurs in the future, is also discussed. In addition, the report discusses the City's alley system and describes present and recommended future efforts.

It is important to note that the City's investment in its street system is substantial. The estimated cost to replace curbs, gutters, sidewalks, and paving is approximately $675 million. This report provides information on the condition of each street classification, discusses the City's present maintenance efforts, and suggests programs which can be considered in the future to retain and preserve our street system in an acceptable condition.

This report does not address the condition or inventory of bridges, which will be presented in a separate staff report.

POLICY CONSIDERATIONS

The increased street maintenance funding provided by Measure A, in addition to funds from other sources such as State gas tax, gives the City an opportunity to reduce its pavement maintenance backlog over a period of years and to begin a program which is much more effective and economical over the long run. Periodic reevaluation of the system, when placed into the City's Pavement Management System (P.M.S.), will provide a method of tracking our progress over time.

FINANCIAL CONSIDERATIONS

Not applicable.

MBE/WBE

Not applicable.

RECOMMENDATION

This report is submitted for Committee information only.

Respectfully submitted,

for Reginald Young

Melvin F. Johnson
Director of Public Works

Approved for Committee Information:

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February 13, 1990
All Districts

CITY OF SACRAMENTO

OVERVIEW

OF

CURRENT AND PROJECTED

STREET RIGHT-OF-WAY

INFRASTRUCTURE REQUIREMENTS

PREPARED BY

DEPARTMENT OF PUBLIC WORKS

STREET DIVISION

FEBRUARY 1990

CONTENTS

EXECUTIVE SUMMARY

The Street Right-of-Way Infrastructure Report presents the current status of the City's street paving, curb, and sidewalk facilities. Included in this report is a description of our street facilities, a discussion of their maintenance, a summary of current and future maintenance backlogs, an estimate of projected expenditures, a description of current maintenance programs, and an outline of possible future programs. Maintenance of street paving and curbs is a City responsibility. Maintenance of sidewalks is the responsibility of abutting property owners.

The City's street system consists of approximately 1,130 linear miles of streets, including two, four, and six lane streets; 1,010 miles of these streets have curbs and 960 miles also have sidewalks. The replacement value of those facilities is approximately $675 million.

An inventory of paved streets reveals that 415 miles (42%) of our streets are in very good or better condition; 452 miles (40%) are in good condition and the remaining 203 miles (18%) are in fair to very poor condition. The estimated five-year backlog of needed preventive pavement maintenance is $17 million. In addition, the estimated backlog of major work such as rehabilitation, overlays, or reconstruction is estimated at $34 million. The progress which is made in reducing this backlog will be tracked on the City's computerized Pavement Management System and periodically reported to the City Council.

It is estimated that the City's shortfall in replacing damaged concrete curbs is in excess of $17 million. An inventory to more accurately identify this shortfall will be conducted, placed in our computerized data bank and regularly updated. If our concrete curbs were to be replaced every 50 years, the annual cost is estimated at greater than $3 million. The city presently budgets $650,000 a year for this work.

The City's concrete sidewalks presently have an estimated replacement backlog of $15 million. If our sidewalks were replaced every 50 years, an annual expenditure of $3 million would be required. In FY 1988-89, $525,000 was spent on sidewalk replacement, of which $375,000 was provided by abutting property owners and $150,000 appropriated from the City's General Fund to replace round corners and install handicap ramps.

There are the equivalent of 24 blocks of "hollow sidewalks" in the central city, many of which are over 120 years old. Some of these sidewalks may require extensive refurbishment. A consultant study is proposed to identify problem areas, propose solutions, and estimate costs.

There are a total of 72 miles of alleys within the City limits, most of which are in poor condition. It is proposed that a program be undertaken to either improve many of these alleys through assessment district proceedings, or to abandon other alleys which serve no useful public purpose.

RIGHT OF WAY INFRASTRUCTURE REPORT

INTRODUCTION

Over the past 80 years the City of Sacramento has grown from an area of 10 square miles with a population of 25,000 to an area of approximately 100 square miles and 350,000 population. Numerous annexations of developed and undeveloped land and subsequent increases in land use intensities from ongoing development have contributed to this significant growth.

The roads and streets within the City have been subjected to continual increases in traffic loads which accelerate wear and deterioration of the asphalt street surfaces and the underlying base materials. As the traffic loading on our street system increases in the future, the City will incur an escalating maintenance expense in order to retain an efficient traffic network for the movement of people and goods.

A majority of our streets contain concrete curbs and sidewalks. These facilities provide for delineation of the street for vehicles, drainage control, and separation of vehicular traffic from pedestrian traffic. Curbs and sidewalks also suffer deterioration from traffic loads, adverse soil conditions, tree root upheaval, etc. Damaged curbs do not permit the free flow of drainage and irrigation water, resulting in unsightly 'puddles' along the street. In addition, damaged curbs permit infiltration of water into the pavement which results in increased pavement maintenance expense over time.

Damaged sidewalks present a tripping hazard to pedestrians, especially the visually impaired, physically disabled, and the elderly. A program for the timely repair and replacement of these facilities must also be an integral part of our City's street maintenance strategy.

This report examines the present condition of our street paving, curbs, sidewalks, and alleys. It will also identify the shortfall in our maintenance effort and associated maintenance costs. It also suggests alternate maintenance strategies, methods, and funding sources which can be considered to provide a most efficient and economical maintenance program.

STREET PAVING INFRASTRUCTURE

The City's street system, exclusive of alleys, contains 1130 linear miles, or 2450 lane miles, of paved streets. The condition of our system varies from excellent (little work needed in the near term) to poor and very poor (major restoration expense required).

A large percentage of street paving is in "good" condition. This category of streets is of middle age and in need of preventive maintenance to preclude their rapid deterioration into the "fair" to "poor" categories. A relatively small expenditure for surface treatments now will prevent the need for more costly maintenance operations later.

Table I contains a complete breakdown of our street paving by street category and condition. These streets have a total estimated replacement cost of $350 million for pavement alone.

Pavement Management System (P.M.S.)

In 1986 the City contracted with Carter Associates, Consulting Engineers, to develop a pavement evaluation and maintenance management system for the City. This system is a computer data base containing information on the condition of the pavement for every street in the City's system and an evaluation of recommended maintenance programs for these streets.

Various programs built into the system can provide reports on priorities, costs, funding requirements, and budgeting. The system is based upon a field inventory of the condition of our City streets, which is entered into the computer. Based on this information, the computer assigns an "overall condition number" which in turn suggests the most appropriate and cost effective maintenance strategy ranging from seal coats to overlays or reconstruction. Most of the statistics and projections in this section of the report are based upon the computer output and a report dated January 2, 1987, by Carter Associates.

Present Street Pavement Condition

Table I describes our street system's pavement condition by street classification and suggests the best maintenance strategy for each degree of street condition (from excellent to very poor).

TABLE 1

Condition Distribution of City Street Paving

Condition Percentage (%) (Miles)

Class	Lane Miles (a)	Excellent (No immediate work required)	Very Good (Oil)	Good (Oil or seal coat)	Fair to Poor (Seal coat or overlay)	Poor (Overlay or Reconstruct)	Very Poor (Reconstruct)
Arterial	483	13.1% (63)	26.5% (128)	39.5% (190)	15.1% (73)	3.9% (19)	2.0% (10)
Collector	387	7.9% (31)	24.0% (93)	42.0% (163)	18.7% (72)	3.2% (12)	4.2% (16)
Industrial	96	26.0% (25)	33.3% (32)	24.5% (24)	5.0% (5)	3.5% (3)	7.5% (7)
Local	255	14.3% (36)	28.5% (73)	39.6% (102)	8.8% (22)	6.0% (15)	2.8% (7)
Residential	1,229	10.7% (132)	32.9% (404)	40.4% (495)	9.4% (116)	4.5% (55)	2.1% (26)
Total System	2,450	12.0% (287)	30.0% (730)	40.0% (975)	12.0% (288)	4.0% (104)	3.0% (66)

a) Lane miles include a multiple of the linear miles that reflects the 2-4-6 lane streets.

Based on the Table 1 statistics, the following expenditures for preventive maintenance (seal coats, etc.) were recommended by the Carter Report beginning in 1987-88. These are compared to the actual or projected expenditures by the City over the same period as contained in approved budgets.

	Recommended by Carter P.M.S.	Actual or Project Expenditures
1987/88	$ 9,535,000	$ 2,700,000 Actual
1988/89	16,125,000	2,700,000 Actual
1989/90	10,310,000	5,760,000 Approved
1990/91	4,490,000	7,800,000 Projected
1991/92	3,000,000	7,800,000 Projected
TOTAL FOR 5 YEARS	**$43,460,000**	**$26,760,000**

The expenditures for the first three years of the program were recommended to eliminate the backlog of required minor maintenance procedures such as oil treatments, and seal coats. The delay in executing these procedures will result in our street system further deteriorating, thus requiring a more expensive maintenance method in the future. In addition, the P.M.S. identified $34 million in major work such as overlays and reconstruction which, when added to the $17 million backlog of preventive pavement maintenance, equals over $50 million in unmet funding.

A percentage of the data base will be updated yearly. A complete inventory of the thoroughfares will occur every two years; minor streets will be updated every four years. This updating will permit the City to evaluate progress in reducing the maintenance backlog from time to time and to adjust funding accordingly.

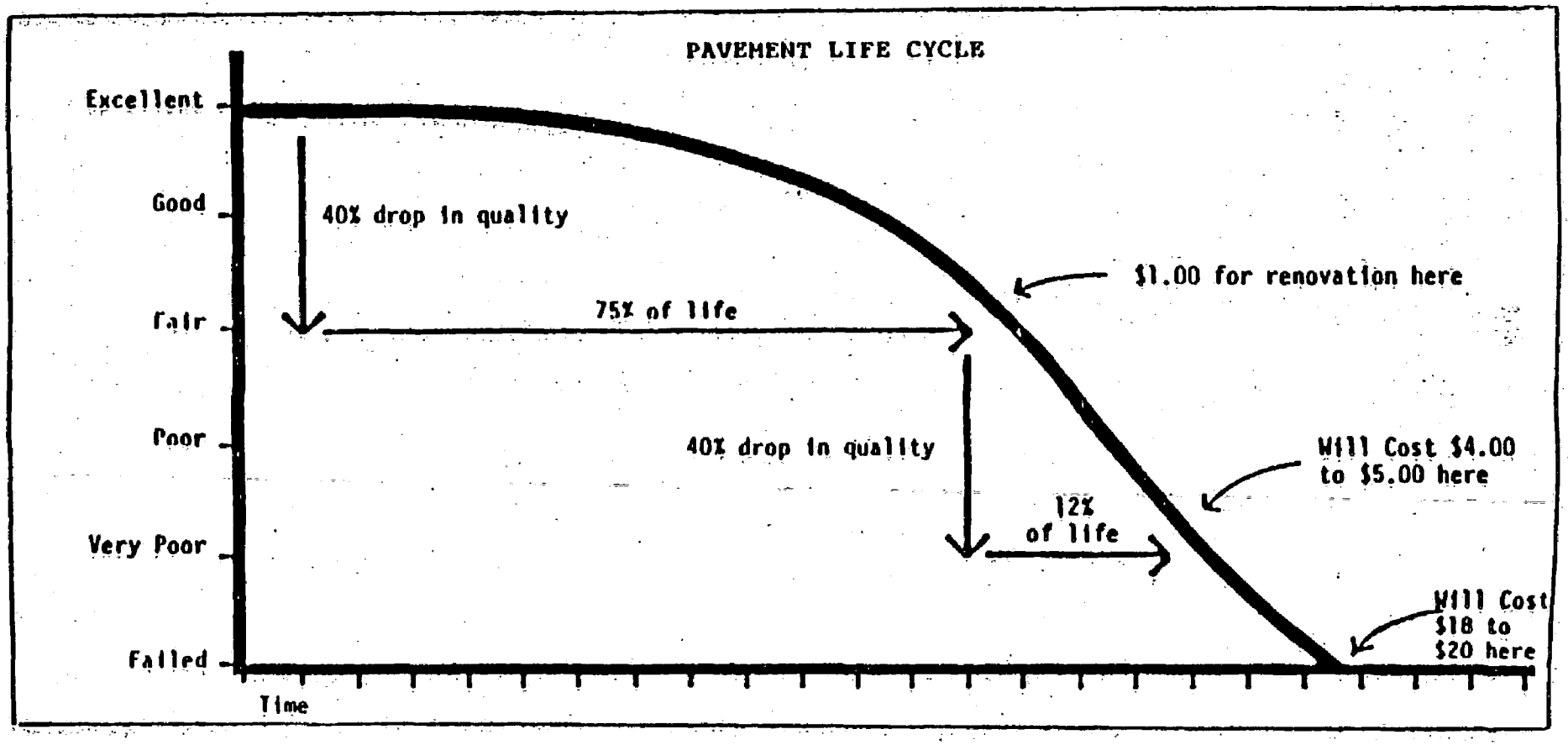
Past and Proposed Pavement Maintenance Strategies

Prior to 1989, funding for pavement maintenance activities was severely restricted. Actual work was insufficient to keep up with needs and the City's street paving suffered continuing deterioration. Only a few overlays and seal coats were accomplished and a maintenance backlog amounting to approximately $36 million had accumulated as of 1988.

Figure I is a curve showing the effect of age on pavement condition as has been observed in numerous cities in the country. The exhibit graphically indicates the accelerating rate of deterioration of an unmaintained street over time. As the curve indicates, a typical street will suffer a 40% drop in quality over the first 75% of its "life" and an additional 40% drop in quality over its next 12% of life. Maintenance costs quadruple after the first 75% of the life of a street; every dollar spent during the first 75% of life will cost $4 to $5 during its next 12% of life. If the pavement fails during the last 13% of life, it will cost $18 to $20 to replace the same segment of roadway that cost one dollar to maintain during the first 75% of the street's life. Dependent upon design and utilization, the life of a street can range from 10 to 30 years.

Figure 1 illustrates that timely and appropriate maintenance during the period when the street pavement is in good to fair condition pays for itself many times over. Waiting until the street is in poor to very poor condition requires much more expensive maintenance procedures.

FIGURE I


PAVEMENT LIFE CYCLE
Excellent
Good
Fair
Poor
Very Poor
Failed
Time
40% drop in quality
75% of life
$1.00 for renovation here
40% drop in quality
12% of life
Will Cost $4.00 to $5.00 here
Will Cost $18 to $20 here

In recognition of the above, and with additional funding made possible by the electorate's approval of the Measure A sales tax increase, staff is preparing a program which will provide a full range of pavement maintenance activities to reduce the maintenance backlog and preserve those streets still in good condition. This program outline is shown in the Preventive Maintenance scenarios. The exact timing will be as suggested by the City's P.M.S., but the timing suggested in the scenarios is considered a reasonable approximation of scheduling. The major task facing the City is the reduction of our maintenance backlog so that this maintenance strategy can be fully implemented.

PREVENTIVE MAINTENANCE SCENARIOS

Arterial		Collector		Industrial	
Age (Yrs)	Strategy	Age (Yrs)	Strategy	Age (Yrs)	Strategy
4	Slurry Seal	2	Oil Treatment	4	Slurry Seal
9	Slurry Seal	5	Slurry Seal	9	Slurry Seal
14	Cape Seal	10	Slurry Seal	14	Cape Seal
21	2" Overlay or Recycle	15	Slurry Seal	21	2" Overlay or Recycle
		19	Cape Seal		
		26	2" Overlay or Recycle		

Local		Residential	
Age (Yrs)	Strategy	Age (Yrs)	Strategy
2	Oil Treatment	2	Oil Treatment
5	Oil Treatment	5	Oil Treatment
8	Chip with Fog	8	Chip with Fog
16	Chip with Fog	16	Chip with Fog
23	Chip with Fog	23	Chip with Fog
29	1.5" Overlay or Recycle	29	1.5" Overlay or Recycle

Pavement Recycling

The recycling of used material such as paper, glass, and metal is recognized as an essential element in our society. Another material which is easily and economically recycled is old asphalt pavement. This material can be removed from the street surface, mixed with minimal amounts of rejuvenating agents, and placed back on the street exactly like new asphalt pavement. The process is energy efficient, utilizes 100% of the old material and requires only a fraction of the asphalt content of a new asphalt overlay. The recycling of existing asphalt pavement should become a major feature of the City's future street maintenance program and AB 939 waste reduction mandates.

Pavement recycling is not a new concept to the industry and has been in use for a number of years. The City's first pavement recycling project occurred in 1970 on 5th Street between W Street and Q Street. Many other projects have been accomplished since that time.

One very important development in pavement recycling technology, which has recently been perfected, involves recycling of used asphalt pavement in the cold state rather than in the "hot" state. This cold process eliminates the air pollutant smoke and the scorching of overhanging trees which was a major drawback of "hot" recycling. The cold process is also far more energy efficient.

The cold recycling equipment recently placed on the market yields excellent results and can enhance the

City's pavement maintenance capability. The process reuses 100% of the old pavement material, requires only a fraction of new asphalt compared to new "hot mix," and has proven to be very cost effective when compared to a new overlay.

The Street Division may propose purchase of the necessary asphalt recycling equipment in the future and intends to undertake an aggressive program of street rehabilitation utilizing this new technology and equipment by contract, if approved by the City Council.

Conclusion

The increased street maintenance funding provided by Measure A, in addition to funds from other sources such as State gas tax, gives the City an opportunity to reduce its pavement maintenance backlog over a period of years and to begin a program which is much more effective and economical over the long run. Periodic reevaluation of the system, when placed into the City's Pavement Management System (P.M.S.), will provide a method of tracking our progress over time.

Projected increased vehicle traffic will result in further pavement wear. The Transportation Infrastructure Report, recently presented to the Budget & Finance and Transportation & Community Development Committees, projected a doubling of traffic on City streets by the year 2016. This traffic increase will impact the life of the street pavement; thus, the cost to maintain it in an acceptable way.

CONCRETE CURB INFRASTRUCTURE

Background

The City's street system generally includes concrete curbs and gutters. The majority of these facilities were installed at the expense of property owners in connection with subdivisions, commercial, and multi-family developments and assessment districts.

Of the 1,130 linear miles of City streets, approximately 120 linear miles (240 curb miles) remain without curbs. South of the American River, 60 curb miles remain without curbs; the other 180 curb miles are north of the American River. This total is being reduced gradually each year with new developments, assessment districts, and S.H.R.A. programs. In the past five years S.H.R.A. has refurbished 10 linear miles (20 curb miles) with curbs and sidewalks.

Present Program

While the installation of curbs and gutters is deemed a property owner responsibility by most cities in California, the maintenance of these facilities, similar to street pavement maintenance, is deemed the responsibility of the city. As such, the City of Sacramento regularly funds a limited program of curb and gutter replacement. This program is presently carried out on a complaint basis from affected property owners where "puddles" appear in their gutters due to vertical displacement of a section of curb. This displacement is sometimes the result of damage from various sources such as truck and bus wheels but is most often the result of root damage from adjacent trees.

The FY 1988-89 City Budget included one Construction Inspector to administer the program and $450,000 for curb and gutter replacement. Due to the volume of complaints, the City Council authorized an additional Construction Inspector and a total of $800,000 for this work in FY 1989-90. Complaints are listed by geographic areas, and the work is done in groups. Often, many additional gutters, beyond that reported, need to be replaced to move the drainage water to an inlet. The existing backlog equals about two years of work at the current budgeted amount. This backlog is based on complaints and not on a complete inventory of needed work.

In the past, since the replacement was accomplished on a complaint basis, no inventory of the curb and gutter deficiencies was maintained. With increased staffing, the Street Division plans to institute an inventory which would be placed in a computer data base. The replacement cost of curbs in the City's street system is estimated to be $175 million. If these curbs are replaced every 50 years, the City's yearly cost would be $3.45 million, which far exceeds the $650,000 presently budgeted annually.

An estimated 10% of the curbs in the City warrant replacement at this time. Present policy dictates replacement at 1/2" to 3/4" displacement. The estimated backlog of cost for these curb replacements is, therefore, in excess of $17 million.

Since a majority of curb replacements are necessitated by tree root intrusion, many curbs will have to be replaced more often than every 50 years, thus further increasing costs. Staff is presently using a root deflection material in an attempt to reduce the damage by tree roots to both curbs and sidewalks.

Conclusion

The City's curb replacement program, similar to the pavement maintenance program, suffers from a significant backlog of work and a yearly cost far in excess of that presently budgeted. Any increase in this service level will require that additional funding sources be identified. Since Gas Tax and Measure A sales

tax revenue appear barely sufficient to maintain the City's street pavement over the foreseeable future, because of the significant backlog of needed work, other means such as bond issues, maintenance districts, or general fund participation should be considered.

SIDEWALKS

Background

Concrete sidewalks have been constructed adjacent to most of the curbed streets in the City. Sidewalks provide for safe pedestrian travel outside the vehicular roadway. With the exception of those sidewalks financed by S.H.R.A., existing sidewalks were installed at property owner expense. Unlike concrete curbs, the cost of maintaining sidewalks is deemed by State law to be the abutting property owner's responsibility, and most cities in the State follow this practice. Of the 1,130 linear miles of City streets, 960 linear miles (1,920 curb miles) presently have sidewalks adjacent to them.

The principal cause of sidewalk damage is tree root intrusion. This occurs when trees are placed in the planter strips between the curb and sidewalk and in "tree wells" cut into the sidewalk. Tree root damage also occurs where trees are planted on private property near the sidewalk and where heavy vehicles have crossed the sidewalk at driveways and round corners.

Present Program

Government Code, Section 5600 et seq, specifically assigns the responsibility for funding sidewalk maintenance to the abutting property owner. The Code also specifies notification and payment collection procedures if necessary.

Projects included in the City's current program are identified via public complaints of tripping hazards, which they discover, or from conditions discovered by the City staff in connection with curb replacement; as discussed earlier in this report. A tripping hazard is defined as a vertical displacement of 1/2" or greater.

Where such a hazard is reported or discovered by staff, the hazard is temporarily patched with asphalt and the abutting property owner is notified of the problem. The owner then has the choice of replacing the defective section(s) directly, hiring a contractor to do the work, or using a contractor hired by the City. If the City contracts for the replacement, the cost of the work is paid by the owner directly to the City's contractor. If the owner fails to pay, the amount is assessed as a lien against the property. In FY 1988/89 the property owner cost for this program was $375,000 and the City's cost for this work was $150,000. Where sidewalk replacement involves a corner lot, the City pays the cost of the round corner replacement and handicap ramp construction. Most sidewalk replacements occur in the downtown core area and older residential areas.

The estimated replacement value of the City's sidewalks is $150 million. The backlog of sidewalk repairs is estimated at $15 million. If sidewalks were replaced every 50 years, a yearly expenditure of $3 million would be required in addition to the $15 million backlog. Clearly, the City's present program is not adequate to keep up with this maintenance demand.

As stated earlier, most cities in California follow the Government Code pertaining to requiring sidewalk repairs at property owner's expense. Two exceptions to this practice are the City of Berkeley and the City of Fresno. These cities have a limited program of repair at general public expense. Due to the demand for this service and the limited funding available, they have a large backlog of work, and the public is dissatisfied with the lack of service provided. These programs are not considered successful.

Between 1973 and 1976, the City of Sacramento converted sidewalk repairs from a property owner obligation to a City service. The program was funded by Federal Revenue Sharing money. As often happens when public funding becomes available for a service formerly funded by private dollars, sidewalk repair complaints increased dramatically in this period and a severe backlog of work was developed for

which there was insufficient funding. In 1978 the City reinstituted its present program of 100% property owner funding.

Hollow Sidewalks

During the 1860's, the streets in downtown Sacramento (generally bounded by I Street, L Street, 12th Street, and the Sacramento River) were raised up to 12 feet above grade to reduce flooding hazards. Retaining walls were constructed at the present curb line of these streets and this area was filled. The space between the curb line and the existing buildings was spanned by a sidewalk supported by various means from below. This created a cavity beneath the sidewalks which was used for many purposes, including storage or for delivery by elevator from above.

Subsequent development over a period of 120 years eliminated some of these hollow sidewalks and some have been reinforced as they deteriorated; however, there are still approximately 24 blocks of hollow sidewalks in the downtown area. A program for systematically examining these structures and determining their maintenance requirements should be implemented. Due to the complexity of the problem and anticipated very high costs for the needed corrective work, staff recommends preparation of a separate consultant report on this item for the Council's review in the future.

Conclusion

As with pavement and curb maintenance, the City's sidewalk repair program suffers from a severe backlog. It is anticipated that the 1989-1990 replacement program will be greater than in past years, but it is doubtful that the backlog of needed work will be significantly reduced in the near future.

Since this program has been carried out on a complaint basis, no inventory of deficiencies has been prepared. The Street Division intends to make such an inventory, along with the curb and gutter inventory discussed earlier. From this information, more accurate costs will be available and an expanded, revised program can be devised.

ALLEYS

Background

There are 1,009 alleys (approximately 72 miles) within the City. Of these, 55 miles are south of the American River and 17 miles are to the north. These alleys sometimes serve as delivery points for businesses and as access to garages and parking areas. In some instances, dwellings front on alleys and have no other access. Other alleys are generally unused by the public except as repositories for trash. The alley system is composed of some improved alleys and others with marginal or no improvements. They can be broken down as follows:

- 384 Improved alleys paved with concrete or asphalt surfacing and with drainage facilities. In some cases the paving is in poor condition and drainage is marginal.
- 189 Semi-improved alleys with some asphalt surfacing and little or no drainage.
- 436 Unimproved alleys, often overgrown with weeds and bushes and often barely passable. No drainage.

Present Program

Over the last 20 years, the City's alley maintenance program has been minimal. Maintenance has been performed on a complaint basis, and the unimproved alleys have been given a once-a-year cleaning of debris and brush. In addition, a limited program of weekly cleaning on some of the most heavily utilized downtown alleys has been started recently. Much of the alley program has been accomplished with a $60,000 a year contract with Sacramento Local Conservation Corps workers.

Future Programs

Those alleys which are a useful part of the City's transportation system should be improved and maintained in an acceptable manner. Since these alleys provide service almost exclusively to abutting properties, the cost of such improvement should properly be the responsibility of those owners. This could best be accomplished through assessment district proceedings. Continuing maintenance would then be the responsibility of the City.

Those alleys which provide little or no service to abutting owners or the general public are best abandoned by the City and returned to the abutting owners. In the past, the City has abandoned approximately 200 alleys at the request of property owners who wished to develop, or otherwise utilize, the property.

Staff is in the process of conducting a comprehensive inventory of existing alleys and will present a program for action, as described above, in the future.

Conclusion

The City's alley system is in need of streamlining and refurbishment. The program described above will accomplish this goal.