City of Woodland

Public Works Department

2008 Road Program Report

January 1, 2004 – March 15, 2008

Prepared By:

Katie Wurzel, PE
Associate Civil Engineer

Executive Summary

The City of Woodland's largest infrastructure investment (valued at $385 Million) is its 183 centerline miles of roadway. This asset impacts the quality of life and/or bottom-line of every individual and business in the city on some level (safe and efficient transportation, efficient delivery of goods and services, etc.). As such, and after public safety, Public Works O&M and Engineering places a very high focus and effort on efficiency and cost-effectiveness in managing this system. Federal and State experience and economic and management studies over the years demonstrate that, when it comes to pavements, the highest return on investment is achieved through well-timed, recurring preventive maintenance.

Flexible (asphalt) pavement systems derive their primary structural strength and durability from a well-compacted base course that's protected from excessive water intrusion by a well-preserved asphalt surface. As shown in Appendix A, Exhibit B, the average life-cycle cost to preserve (slurry/chip seal) and rehabilitate (repair/restore) Woodland pavements has been approximately 15% of the life-cycle cost for the full-depth removal and reconstruction of failed pavement systems (major base failure). Accordingly, after addressing any public safety concerns, the key focus of in-house and contract paving projects is on recurring preventive maintenance while continuing to prioritize and maintain a balanced focus on remaining repair and reconstruction requirements.

With the passing of the Measure H ½ cent sales tax in 2000 and the Measure E ½ cent sales tax in 2006, the City has made (and will continue to make) significant gains in 'catching up' with city-wide road repair and reconstruction requirements. Since the December 2003 Road Report, approximately 50% of the City's road system received preventive maintenance or rehabilitation work and some significant, long-anticipated reconstruction projects were completed.

With the update to the City's pavement management program, MicroPAVER™, a more accurate picture of the pavement system's current condition will be available. The program will also be able to provide condition and budget forecasts that will help to determine if the existing funding levels are sufficient.

It's our hope you find this report complete and amply informative for basing sound program and project-related decisions as the city moves forward.

Respectfully,

Dick Donnelly, P.E.
Interim Director of Public Works

Table of Contents

Pavement Network

The City of Woodland roadway network has 183 centerline miles of streets. Streets are broken into four categories, as shown in Figure 1 below; arterial (principal 15 miles, minor 19 miles), collector (26 miles), local (114 miles) and alley (9 miles). These miles include the streets being developed in Spring Lake although many are not yet accepted.

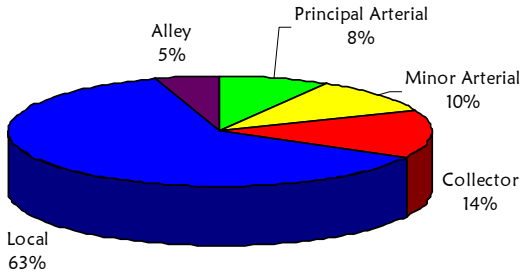
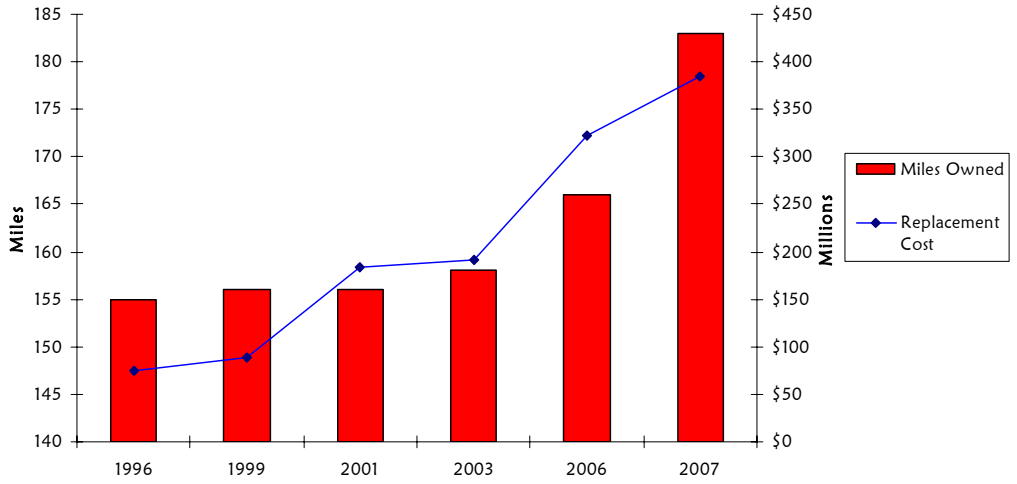


Figure 1: Road Classification Division

Arterial streets are major throughways that are expected to carry large volumes of traffic. Arterial streets are further distinguished as principal or minor based upon the volume of traffic they carry. Collector streets are designed to collect traffic from local streets and distribute it to arterials. Local streets are typically residential and have low traffic volumes. Alleys are narrow streets that run behind businesses or residences intended for access. Exhibit A in Appendix A is a map showing classification of all city streets as expected in the year 2020.

Streets are primarily constructed of two materials: Portland Cement Concrete (PCC) and Asphalt Concrete (AC). AC is most commonly used for new road construction in the City of Woodland. PCC is used for bus stops but not typically for the entire roadway width.

Figure 2: Roadway Network Historical Replacement Cost



Information based on years from which data is available. Replacement cost is the cost of building new roads assuming they did not previously exist. Reconstruction is more expensive because it requires removal and reconstruction and traffic control for vehicles and pedestrians.

The current estimated replacement cost of the roadway network is $385 Million. Figure 2 above shows the change in miles owned and the change in replacement cost of the system over the past 11 years. Replacement cost is the cost of building new roads assuming they did not previously exist. This cost is typically less expensive than reconstruction because it does not require removal and reconstruction or traffic control for vehicles and pedestrians.

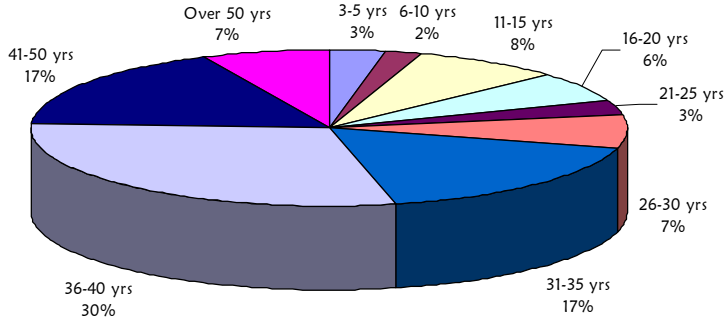
Pavement Program

Pavement Maintenance Concept

Providing a safe traveling network, preserving the existing pavement and extending pavement life are the goals of the pavement program. The key to accomplishing these goals is to apply the right treatment to the right road at the right time.

The average design life of newly constructed streets is 20 years, meaning the time between construction and when a pavement is likely to require reconstruction is approximately 20 years. As shown in Figure 3, over 80% of the City's streets have exceeded their design life, with the majority being between 31 and 50 years.

Figure 3: Pavement Age



The age of a pavement is set back to zero when the road is reconstructed. Major rehabilitation and surface treatments significantly extend the service life of pavement but does not reset the age to zero. Many older streets are still sound and in serviceable conditions due to the regular application of preventive maintenance and rehabilitation. Exhibit B in Appendix A shows the service life of pavements and how it is improved by maintenance and rehabilitation treatments versus minimal safety maintenance.

Pavement Deterioration

It is important to understand why pavements deteriorate so the correct treatment can be identified based on condition. Many of our streets have deteriorated beyond the condition when a lower-cost maintenance treatment would have a measurable benefit. To provide a visual representation of pavement deterioration, a series of photos are provided in Appendix D showing different streets with pavement in various conditions and proposed treatment. It is important to note that what constitutes failed on an arterial roadway is often salvageable on a local street due to differing traffic volumes and characteristics.

Similar to many materials, asphalt begins to deteriorate from the day it is placed. With regular preventive maintenance the serviceable life of a pavement can be extended well beyond its design life. Pavement deterioration is caused by many factors. The four most destructive are water, sun, traffic loading and age.

Water can seep into the pavement through cracks in the pavement. Water can come from rain, groundwater, landscape sprinklers or other sources. The combination of water and vehicle traffic loads can destroy the structural, load-bearing capacity of the under-

lying base material and eventually the asphalt surface. Sealing surface cracks prevents much of the water intrusion.

Figure 4: **Left -** Water penetrates the pavement and into the base via cracks in the asphalt. **Right -** Landscape water is avoidable yet is the most prevalent non-natural source of water on the pavement.

Sun and UV light causes unavoidable pavement surface damage. As the sun heats the pavement surface, it changes the composition of the asphalt binder which causes aggregate to dislodge, rapidly increasing the deterioration of the pavement. Regular application of surface seal coats replenishes the asphalt in the pavement surface and replaces some of the lost rock.

Traffic loads on roads cause stress in the base material and the asphalt pavement itself. Heavy loads on roads that are not designed for them can quickly deteriorate a pavement and road base. Many streets were designed and built before current large waste collection and delivery trucks were in use.

Age of the pavement has a significant impact on both pavement distress propagation and deterioration rates. As pavements approach the end of their service life they are more brittle and less able to endure environmental and traffic impacts.

In-House Repair and Maintenance

The City of Woodland Operation and Maintenance Street Branch performs crack sealing, skin patching/paving, base failure repair and pothole repairs annually on an as needed basis. In addition to being preparatory work for surface seals, these traditional maintenance techniques are stand alone maintenance strategies.

Appendix C contains descriptions and general costs for the most common types of repair performed in the City of Woodland.

Preventive Maintenance Surface Seals

Preventive maintenance is a proactive approach to maintaining our street network. It includes the careful evaluation of every street to select the right treatment for that surface

in an attempt to lengthen the life of the pavement by preventing premature deterioration and aging.

Preventive maintenance has been studied and promoted by the Federal Highway Administration (FHWA). As stated in an October 8, 2004 memorandum "Experience has shown that when properly applied, preventive maintenance is a cost-effective way of extending the service life of highway facilities". FHWA has an entire page on their website dedicated to pavement preservation: http://www.fhwa.dot.gov/preservation.

Caltrans and many other agencies both public and private have also studied the impacts of preventive maintenance and all conclude that preventive maintenance is more cost-effective over the life of a pavement than other maintenance alternatives. Caltrans specifies pavement maintenance in the Maintenance Technical Advisory Guide used by their maintenance field crews.

Prevention does not include work that increases the capacity or structure of the roadway. It is intended solely to reduce aging and restore serviceability. Preventive maintenance is typically applied to streets in good condition with minor distresses and rarely addresses deficiencies with curbs, gutters, sidewalks or curb ramps.

This is a very stark contrast to the 'worst first' approach to maintenance in which streets that are in the worst condition – and therefore the most expensive – are maintained first. The 'worst first' approach allows good pavements to deteriorate beyond preventive maintenance thus requiring more expensive treatments when they are maintained.

Exhibit B in Appendix A is a plot of pavement condition against pavement age showing the effects of preventive maintenance and also the relative work requirement cost. Additionally, Exhibits C and D in Appendix A show historical trends in paving material costs and surface treatment costs for the years that the City has recorded use of these materials and treatments.

The City uses many strategies to extend the life of pavements that are in good condition as well as restore the surface of severely deteriorated streets. Many of these treatments require surface preparation and repair before the treatments can be applied.

Appendix C contains descriptions and general costs for the different types of maintenance seals used in the City of Woodland.

Road Rehabilitation

When pavement condition has deteriorated beyond the benefit of surface treatments and isolated repairs, rehabilitation is required. This consists of thin or thick overlays or complete reconstruction and is intended to renew the pavement structure. Due to the extent of equipment, labor and expertise required for rehabilitation work, this work is often performed by contract.

Road rehabilitation typically requires the improvement of adjacent curb, gutter, sidewalk and compliance with Americans with Disability Act (ADA) regulations. These improvements typically add a significant cost to a project.

Minor Rehabilitation consists of non-structural enhancements which remove age related surface distresses. Major rehabilitation improves the structural section of the existing pavement. Reconstruction is the complete removal and replacement of the existing pavement.

Appendix C contains descriptions and general costs for the different types of rehabilitation performed in the City of Woodland.

Other Pavement Program Considerations

When pavement is maintained or rehabilitated other related items and adjacent features need to be considered. These include ADA requirements, bike lanes, markings, curb and gutter repairs, landscape within the right of way and decorative streetscape features among others.

With all major work, ADA requirements must be addressed and facilities brought to current standards within the project area as well as areas directly impacted by the project. The requirement to provide this access can significantly increase the cost of rehabilitation projects.

Figure 10: Installing ADA ramps can add significant cost to road projects depending on existing conditions.

Existing and proposed bike routes are considered with every major project to determine if the project complies with the City's Bike Master Plan and if improvements to the system can be incorporated. These improvements are typically not a large cost relative to the overall project but can make significant improvements in the bike system if biking concerns are addressed whenever possible.

Curb and gutter repairs are also a major consideration within the street network. Curbs and gutters in disrepair provide a path for water to get into the pavement and the underlying pavement base. Damage from water intrusion is a major contributor to

premature pavement failure which can be avoided by curb and gutter system maintenance and repair.

With every seal coat and with every resurfacing the pavement elevation is incrementally raised. Typically the affect is minimal and acceptable or is countered by grinding the pavement surface adjacent to curb lines. However, the current increase in streetscape features like stamped concrete crosswalks is anticipated to become a future maintenance issue.

Figure 11: Stamped crosswalks are a trade-off between aesthetics and pavement maintenance costs.

Program Management

In managing the pavement infrastructure, the method by which we manage the system is as important as the method by which we repair it. With a systematic approach to pavement maintenance, life-cycle costs and system priority is taken into account. The overall condition of the network can experience accelerated deterioration if there is no planned approach to maintenance accounting for the timing and appropriateness of preventive maintenance treatments.

A pavement management system is primarily a budgeting tool to aid in the determination of the most cost-effective maintenance program and determination of funding requirements. The system does not provide a list of road work that needs to be completed every year. It does, however, provide a starting point from which professional judgment can be applied to determine work needs.

The primary goal of pavement management is to bring all pavements to a condition where preventive maintenance is the primary focus of the program. This focus helps improve the overall condition of the road network and eventually stabilizes funding needs.

Staff uses MicroPAVER™ to determine funding needs, identify - on a preliminary basis - pavements that remain in the preventive maintenance mode and those that are beyond maintenance levels and require reconstruction.

MicroPAVER™

In 2004, the City converted to the current computerized pavement management system MicroPAVER™. MicroPAVER™ was developed in the late 1970s by the Army Corps of Engineers and is endorsed by the American Public Works Association. The program is compatible with the Operations and Maintenance Department's work order tracking system (CityWorks) as well as the City's Geographic Information System.

MicroPAVER™ utilizes a visual inspection criteria to calculate and assign an objective condition rating based upon surface distresses in the pavement. These distresses are indicative of the overall condition and the maintenance and repair needs of the network.

The visual inspection ratings are scheduled on a four-year cycle, rating one-fourth of the local roads and collectors every year and all of the arterials every year. This method was chosen because it provides a cost- and time-effective method of re-inspection that corresponds with roadway use. In other words, the roads that see the greatest use, and thus greatest deterioration, are inspected every year to give a more accurate representation of the life-cycle of these pavements.

Historically, the pavement inspection process was completed by contracted consultants. In 2006, personnel from the Street Branch were trained to complete the pavement inspections. The complete re-rating of the network in 2006 and the cyclical ratings in 2007 and 2008 were completed with success by the Street Branch. The switch has

proven to be approximately 35% less expensive than contracting and the work was accomplished in the same timeframe.

The MicroPAVER™ system stores the road inventory, inspection data, performance history and work costs. Appendix B contains maps of road conditions based on the 2006 visual condition rating. Staff uses this information to determine the optimal method of maintenance, what applications are most cost-effective based upon historical performance and the timing of application. Each re-inspection updates the performance history in the system thus resulting in a more realistic empirical prediction of pavement network performance and maintenance costs.

When the City's pavement management system was converted to MicroPAVER™, it was set up as a network level system. This means the system evaluates the streets in general terms and gives an overall level of information regarding condition, work need and budget requirements.

Since MicroPAVER™ is used as a budgeting tool as well as a preliminary project identification tool, it needs to be converted to a project level system. To do this, the road segments need to be input into the system on a block-by-block basis, coordinated with the GIS system, rather than large multi-block segments. This will allow more accurate tracking of work history, material usage and performance as well as condition and budget.

Using MicroPAVER™ as an inventory tracking tool and for the ability to produce graphical representations of road conditions is very valuable for staff in the programming of projects and evaluating maintenance needs of the network. Staff is very optimistic that this aspect will be even more effective after the conversion.

Although the system is widely used in California for budget forecasting, this benefit has not yet been sufficiently realized at the City because of the way the system was configured. Staff is optimistic that, once the conversion to a project level system is complete and new reports can be run, we will find the program to be a valuable budgeting tool.

The budget forecasting capabilities of MicroPAVER™ will allow Staff to present to council and the public a more accurate picture of the maintenance and rehabilitation needs of the roadway network. The MicroPAVER™ program will provide a prediction of roadway condition based upon differing funding levels which will help to determine sufficient funding levels for the road program.

Work Priority Concepts

Typically, preventive maintenance and rehabilitation work should be coordinated such that the highest priority work in each category is programmed within the current capital budget year. A pavement that is near the end of its maintainable lifecycle and on the verge of requiring reconstruction may have a higher priority than a pavement that already needs reconstruction. This is because there is benefit to completing less expensive

maintenance before pavements require reconstruction. Exhibit B in Appendix A shows the lifecycle of pavements and the relative cost of work at different pavement conditions.

Normally, once reconstruction is required, work should be delayed as long as practical and safe, since this work is the least cost-effective. However, some road reconstruction will be performed sooner for various reasons, primarily to ensure safety to the traveling public.

Prioritization is subject to other factors that affect efficiency and practicality of the work such as:

- Similarity of pavement treatment
- Coordination of projects with other utility, development or planned work
- Funding availability and source of funding
- Backlog reduction work - high priority reconstructions
- Involvement of varied techniques or materials for testing and evaluation
- Pavement deterioration causing significant safety concerns
- Broad public and council priority

In addition, to reduce disruption and cost for local streets a shift is being made toward a zone maintenance philosophy.

Working in Zones

In the pavement program the street network is broken into 14 zones which can be seen in Exhibit E in Appendix A. The intent is to perform preventive and corrective maintenance on local streets in one or two zones per year. This means that each zone should receive local street maintenance on an average 7-9 year cycle. Arterial and collector streets should also be maintained on a 7-9 year cycle that will be based upon condition rather than geography.

One major benefit of working by zone is that it provides a clear, easy way to coordinate pavement work and utility work which reduces the number of trenches cut into new street surfaces.

Figure 18: Road closures can be minimized by working in zones.

Another important benefit to concentrating work efforts into zones is that it means less disruption to the residents. It does mean a more concentrated disruption for one year but that is offset by having minimal road maintenance presence for the following 6-8 years.

In the past a resident could be affected by having surfacing done on their street one year followed by work the next year on an adjacent street that directly impacts their driving routes and parking on their street. This method would eliminate much of that disruption.

This cyclic method of preventive and corrective maintenance does not mean that once a zone is complete, it is ignored for 6-8 years. Maintenance staff will continue to complete annual inspections of the road surfaces and perform spot maintenance as needed in all zones.

Program Accomplishments

In the years since the 2003 Road Report was produced, much has changed in the road network. Over $24 million was spent on the road network in the form of new roads, reconstructions and preventive maintenance.

Over $15 million was development-funded construction of 10 miles of new roads in Spring Lake. The remainder was capital projects to reconstruct or resurface various streets throughout the city.

Excluded from the $24 million is the $550,000 of work completed by the Street Branch. Over 90 centerline miles of pavement maintenance was completed including over 30 miles of seal coats, 600,000 linear feet of cracks sealed and over 4,500 potholes filled (and re-filled as needed).

The Street Branch work includes over $110,000 spent annually to repair potholes and perform skin patching and paving to maintain a reasonable level of safety and ride-ability on pavements that are classified as failed and deemed uneconomical to repair.

Operations & Maintenance Program

Operations and Maintenance Street Branch performs a significant amount of pavement maintenance on the street network annually. In addition to this work, many non-pavement maintenance tasks are also completed by the Branch.

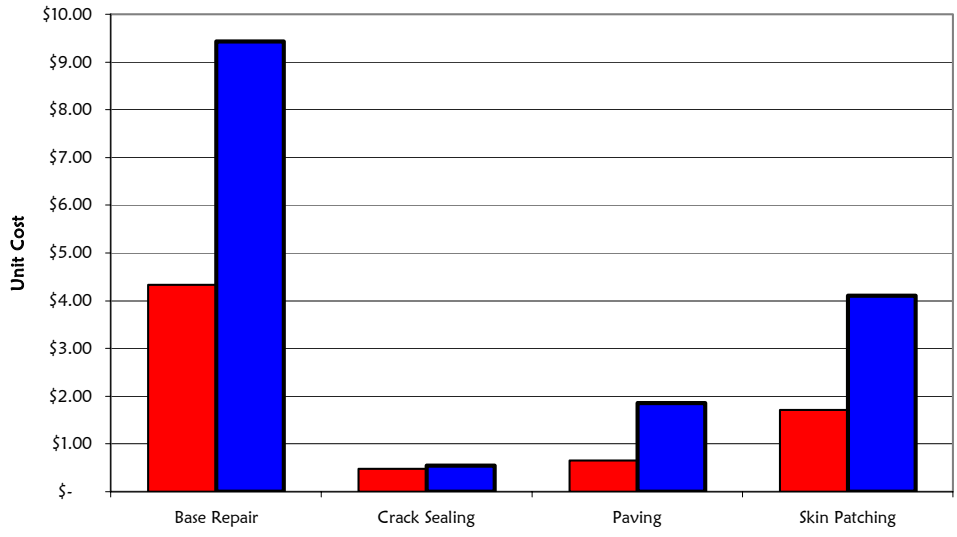
Pavement Responsibility

The Street Branch is primarily responsible for the condition and safe operation of the road network. In addition to this function other street related tasks are borne by the Branch.

Condition Ratings are performed on an annual basis, this process is later explained in the discussion of program management and MicroPAVER™. These visual condition ratings occupy approximately three weeks time for two raters every year. The fully benefited cost of performing this work with in-house forces was $14,400 compared to $22,300 for contract ratings.

Preparatory Work for upcoming annual road maintenance projects is a large portion of the maintenance work performed each year. Performing this work in-house lowers project costs and has historically been accommodated as a part of the street branch

Figure 16: Road Work
In-House vs. Contract Cost



City	Contract
In House unit costs are derived from actual work completed during the 2006 calendar year. These unit costs inlcude material, labor, equipment, traffic control and overhead.	Contract unit costs are bid line items received by various local agencies and Caltrans, between 2003 and 2006, and escalated to 2006. Price is strictly in place material costs.

operating budget. This work has only recently begun being tracked in association with capital projects but is estimated to be over 40 percent of the total annual work effort.

Corrective Maintenance is a reactive approach to maintenance. Corrective maintenance work is done to restore pavement in areas where unexpected failures occur. This work includes but is not limited to pothole repairs, base failure repair and minor safety repairs, as well as small and large scale skin patching and paving to smooth rough roads.

Preventive Maintenance seal coats are no longer a current function of the Street Branch. Until 2005, the Street Branch was responsible for the annual application of preventive maintenance surface seals. The Branch currently focuses preventive maintenance efforts toward crack sealing and skin paving.

Beyond Pavement

A significant amount of work performed by the Street Branch is not specifically pavement related. Many of these tasks are miscellaneous tasks that fall outside the boundary of most of the Operations and Maintenance Branches and are borne by the Street Branch.

Debris Cleanup consists of removing any debris in the right-of-way. Natural items such as tree branches that fall onto the streets and sidewalks must be removed. Debris cleanup also includes removing materials illegally dumped.

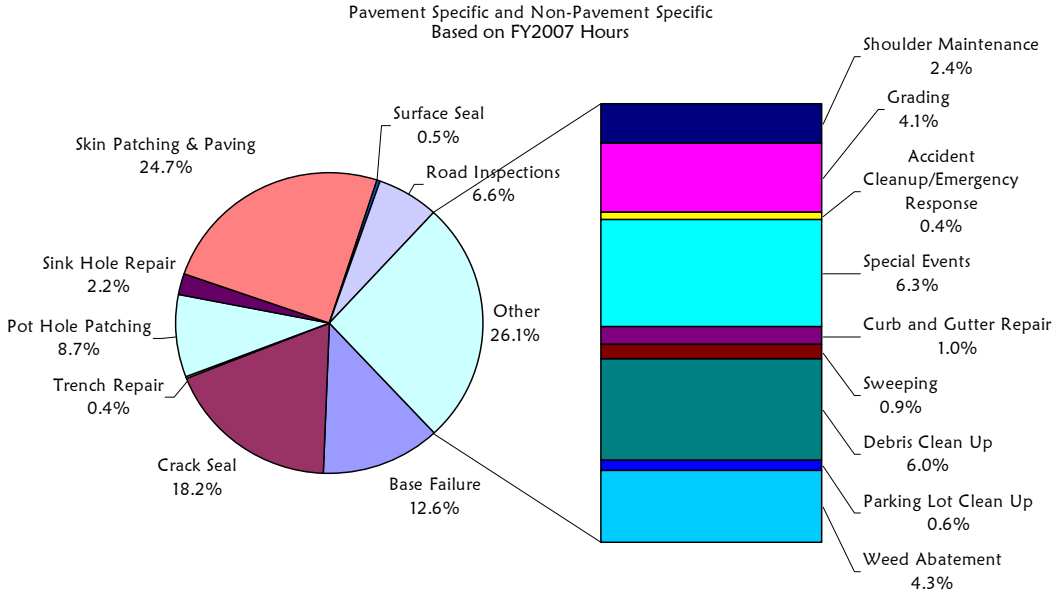
Special Events often require assistance from the Street Branch to hang the downtown banners, provide traffic control signs and personnel and/or loading and unloading equipment and materials.

Weed Abatement adjacent to private property is the responsibility of the property owners. Likewise, weed abatement in the streets, sidewalks, right-of-way and City owned property is the responsibility of the City and this task falls to the Street Branch. In an effort to spend funding dollars most efficiently, weed abatement is now being completed in part by the probation office. The City pays a probation officer to guard people while they complete community service hours performing weed abatement. This also provides the County a source of community service to use for their program.

Emergency/Accident Cleanup support is typically required after vehicle accidents, fires or spills. In the case when an accident, fire or other emergency causes a street closure, the Street Branch will set up traffic control and detours as well as provide assistance in clean up for these incidents.

In fiscal year 2007, the Street Branch had five full-time and four temporary, seasonal employees. The non-pavement maintenance work and associated overhead equates to approximately 26% of the total work effort expended by the Branch. This 26% equates to the entire work effort of the four temporary employees.

Figure 17: Street Branch Duties



Into the Future

The current (FY07/08) operating budget includes funding for new equipment; an asphalt grinder, a broom and a self-propelled, laser-leveling paving machine and tilt-trailer. After following the procurement procedures, the grinder has been purchased and delivered, the paving machine is on order and the broom is in the final process of bidding.

With this new equipment, maintenance work is expected to be more time and cost-effective. The Street Branch will continue with the historical road maintenance services of crack sealing, base repairs, skin patching and paving, etc.

Funding

In the mid-80's, in response to budget constraints, the City ceased General Fund support for street maintenance. This meant that the pavement program needed alternative funding to support the budget requirements.

Revenue Sources

After shifting from General Funding, the city primarily relied on a fully funded Street Branch and state and federal funding for capital projects. Measure H, a ½ cent sales tax provided supplemental funding from 2000 until 2006. The success of Measure H was apparent when the community passed Measure E - a new ½ cent sales tax measure – in 2006, which is expected to provide $2.5 million annually to supplement state and federal sources through 2018.

Transportation Development Act (TDA) is the act that specifies how local sales tax for road maintenance purposes is distributed back into each county. TDA funds are allocated first to transit; after transit needs are provided for, the remaining funding is allocated to the City for road maintenance needs. TDA funds have been the primary funding source for work performed by the Street Branch. As transit needs increase the funding available for road maintenance decreases.

Gas Tax is an 18 cent, state excise tax on every gallon of fuel, in addition to federal excise and other taxes. The gas tax is the primary source of funding for street lights, traffic signals, and street signs and pavement markings. While these are pavement related, they are not a financial aspect of the pavement program.

Federal Transportation Funding is federal revenues that are redistributed to cities and counties on an annual or biannual basis. The Regional Surface Transportation Program (RSTP) funds approximately $200-300 thousand per year. This funding is expected to be diverted to other regional funding programs if Proposition 42 fully funded.

Transportation Congestion Improvement Act -Proposition 42 designates state sales tax on gasoline to transportation rather than the general fund. In the past, annual Proposition 42 funds have often been suspended due to state fiscal emergencies.

Road Development Fees are collected from building permit applicants to account for the impact of increased traffic due to new development on the road network. These fees can only be spent with a 2/3 non-development fee funding match and can only be spent on rehabilitation of arterial and collector streets.

Measure E is the ½ cent sales tax that was passed in 2006, after the sunset of Measure H. A minimum 45% of Measure E revenues will fund road maintenance and rehabilitation. This sales tax is collected by the State and returned in full to the City. This money is used in part to fund pavement maintenance work among other voter supported expenditures.

Figure 19: Projected Funding by Source

Funding Source	Projected Amount (M)	Use
Transportation Development Act (TDA)	$0.8	O&M Funding
Gas Tax	$0.9	O&M Funding
Federal Transportation Funding (RSTP)	$0.25	Capital Project Funding
Traffic Congestion Relief (Prop 42)	$0-0.4	Capital Project Funding
Road Development Fees	$0.5	Capital Project Funding
Measure E	$2.5	Capital Projects and Pavement Maintenance

TDA and Gas Tax funds have not kept pace with inflation. The funding expected does not provide sufficient funding for the Street Branch to continue performing the preparatory work for capital preventive maintenance projects in addition to the rest of their work plan.

A result of this funding shortage is that a Council decision was made in a meeting on October 2, 2007, to approve charging in-house road maintenance and preparatory work to Measure E.

This means all work completed will be tracked by work type, location and its project association if available. This will allow capital project related work to be appropriately tracked with the capital project.

Work not directly associated with a capital project will be tracked as in the past, based on type of work done and location of work. This provides a way to determine the annual time requirements for varying types of maintenance work.

The cost tracking and reporting will provide staff and management a method by which to evaluate the cost-effectiveness of in-house forces completing the preparatory work. Initial cost comparisons show that most maintenance strategies are more economically provided by the Street Branch (See Figure 16: Road Work In-House vs. Contract Cost).

This alleviates some of the funding pressure while continuing with what is expected to be the most cost-effective method of completing the work. All work will be tracked, and assessed on an annual basis to ensure efficiency and effectiveness.

These assessments will be reported to the City Council and the Council Infrastructure Subcommittee. The information will also be incorporated into future versions of this report.

Budget

The proposed 10-year Capital Budget provides funding for one preventive maintenance project and one road rehabilitation every few years. Approximately half of this project funding is provided by Measure E. These budgets are highly dependent on annual revenues. Shortfalls in revenues or diversions of funding, as was seen with Measure H, will significantly impact the budget and scope of road projects.

With the $800,000 programmed for last fiscal year, approximately 20 centerline miles of roadways received preventive or minor rehabilitative maintenance in the early summer. Based upon the amount of work completed, it is estimated that roads will receive preventive and minor rehabilitative maintenance on a 7-9 year cycle.

One major factor that affects the amount of work completed every year is the cost of materials. Over the past few years, changes in the market have dramatically changed the price of materials and treatments (See Exhibits C and D in Appendix A for material historical costs). As the price of material increases, so do contract costs, resulting in a reduction in the amount of work the program budget can address.

Staff has historically worked to secure state and federal funding to help leverage our local funding and make our road program dollars go farther. This effort will be continued into future fiscal years to help offset decreasing budget and increasing costs.

Pavement Priorities

Each year, funds available for the pavement program are divided between preventive maintenance and rehabilitation projects. Work is identified and priorities are created within these categories. It is not uncommon for the priorities to be shifted. These shifts can be based upon utility coordination, project needs, available funding or other compelling reasons.

Preventive Maintenance Priorities

It is important to focus as much on preventing pavement deterioration as it is to ensure that poor pavements are caught before they fall into a condition that requires expensive reconstruction. For this reason, the funding available is split between work in areas that are in fair to good condition as well as those that are in poor conditions.

With the funding levels anticipated, it is projected that between 15-20 centerline miles of streets will be maintained or rehabilitated every year. In addition to this work, staff anticipates one rehabilitation or reconstruction project every few years. These projections are based on 2007 cost estimates and funding sources and are highly susceptible to budget changes.

The work areas for the preventive maintenance project for 2008 are Zone 7 and Zone 4. Exhibit F in Appendix A shows the zones that the city is divided into. Based upon construction costs and funding availability.

Major Rehabilitation Priorities

Many large road rehabilitation or reconstruction projects have been identified for need. Not all of these streets have funding sources identified to date. The table below summarizes some of the large rehabilitation priorities. The list is sorted alphabetically by street and is not indicative of the priority rating of the areas.

Figure 20: Major Rehabilitation Priorities

Project	Project Length	Estimated Project Cost[1]	Comments
Beamer Street Under Crossing	0.5 mile	$2-5 Million	Preliminary engineering is nearly complete. Coordination with the State Water Quality Control Board for ground water pumping permits. Subterranean roadway and water table require a to preventing future water intrusion through the roadway. The project difficult to recommend within the 10-year plan due to the high cost of

			repair relative to available funding, other priorities and the importance of this road segment
East Beamer Street Rehabilitation	1.0 mile	$1 Million	Rehabilitate between Pioneer and CR102 to accommodate current and future heavy vehicles.
Kentucky Avenue Widening and Reconstruction	1.0 mile	$13 Million	Widen and reconstruct Kentucky between East and West Streets including associated utility rehabilitation. Construction of the first phase (from East to Palm) is proposed for 2012 and phase 2 (Palm to West) for 2018. Costs are escalated by the need to purchase land in addition to reconstructing the roadway.
Lincoln Avenue Rehabilitation	2.0 miles	$3.5 Million	Rehabilitate Lincoln Avenue between Sixth Street and County Road 98, including associated utility rehabilitation. Major ADA upgrades will occur with the rehabilitation of this roadway.

[1] Estimated project costs are based on best available information at the time of this report and are only intended to provide a relative cost associated with the project.

Lincoln Avenue Rehabilitation has been identified as the rehabilitation project for 2008. The project is currently out to bid and construction is anticipated to begin in July 2008 and be complete by the end of 2008.

Conclusion

With an ever growing roadway network, requiring regular maintenance and repair, there is an equally increasing need to be as efficient, cost-effective and creative as possible with our pavement program funding. Additionally, as the City grows, so does the non-pavement maintenance and repair work and the financial need.

Staff continually attempts to maximize the cost-efficiency of funds available for use on pavements by utilizing outside funding sources, grouping work to capture the economy of larger scale projects and testing new treatments to determine their cost-effectiveness and value.

In an attempt to further the efficiency and effectiveness of our dollars, Council approved a funding alternative which uses Measure E funds to pay for road maintenance and preparatory work completed by the Street Branch in lieu of contracting these items at a higher cost. By taking steps in this direction, we are providing the potential ability to complete more road work for less money as we move into the future.