The City of Alexander City has begun an aggressive pavement management program in an effort to improve the overall quality of its streets. Over the years, the condition of the streets in Alexander City, as well as in many other communities, has deteriorated substantially. In many cases, this extreme deterioration will require that the street be completely rehabilitated (i.e. relatively much greater cost) as opposed to routinely maintained with an asphalt overlay (i.e. relatively lower cost) that could be used if the street were in better condition. It is the goal of this pavement management program to increase the street conditions over time such that at some point in the future the city streets require only the significantly less costly routine maintenance and overlay tasks. However, this will only be possible after the comprehensive rehabilitation of the streets has been completed. The rehabilitation program that we are beginning has been designed to *maximize cost-effectiveness* at every step.

As their part of the program, the Alexander City City Council, the Mayor, and the Finance Director have worked at actually procuring funding for starting the rehabilitation as well as developing a general finance plan for the future. Generally, the finance plan is a combination of borrowed funds (municipal bonds) and city revenue funds. Early in the pavement management plan, as we begin to rehabilitate streets that are well beyond their useful life, the funding will be primarily borrowed money from municipal bonds. As the rehabilitation proceeds over the next few years the average condition of the streets will improve; thereby, reducing the required annual pavement management costs and enabling the city to then use city funds without borrowing.

As their part of the program, the City Engineer, the Street Department, and the Progreciv Group have worked on developing the philosophical, technical and engineering aspects of the pavement management plan.

One of the first tasks was the selection of a pavement management software. The city selected PAVER because it provided all of the functionality and features that the city needed; not to mention that the purchase price was less than the competitive software, the ongoing licensing and support cost was less, and it will interface more effectively with the Cityworks software (Public Works♠ work order and work documentation software). Analysis of the data output by the PAVER software will enable the City Engineer to more effectively manage the overall condition of the city streets by providing ■what if• funding options and on an annual basis for the mayor and city council. The employees of the Street Department, which along with the City Engineer received training for the software, have begun to evaluate the streets and to input the data into the software. We look forward anxiously to completing this process and beginning to use the software. It will be a large step forward in managing our street infrastructure.

The next and most difficult task was to develop a philosophy that maximized the cost-effectiveness of rehabilitating a street system that has degraded beyond the ■routine

maintenance and overlay• condition. Based on previous city paving projects, the cost to rehabilitate one mile of collector street (relatively higher traffic counts) is about $300,000 and one mile of minor street (relatively lower traffic counts) is about $130,000. With a street network of about 170 miles made up of about 40 miles of collectors and 130 miles of minors, the initial cost for rehabilitation of all streets would be roughly $29,000,000, which is well beyond any reasonable amount of money that the city might have available now or in the near future. It was obvious that some innovative measures would be required to accomplish our objective of minimizing costs while maximizing quality.

One concept that could greatly increase cost-effectiveness was to minimize the highest unit-cost item, deep patching, which is about twice the cost per ton as compared to a regular asphalt overlay (because of its labor intensity); but, and equally important to the quality of the road, to make sure that deep patching *is* used where necessary. If these two conditions are not met, we would either be overusing deep patching (i.e. wasting money where not needed at a very high unit cost) or not using enough (i.e. resulting in short term failure of a repaired road). Therefore, it is critical to know exactly where to prescribe deep patching. After consulting with other cities and other experts in the field of pavement management, and considering our experience and institutional knowledge of Alexander City streets, we developed a systematic approach to the rehabilitation of the streets.

Basically, the philosophy for diagnosing and prescribing repairs for our streets developed as follows:

> as we evaluated each degraded collector street we tried to discern if the damage to the road was reasonably expected to be, or might be, *ongoing* or if the damage could be determined to be *inactve*. An ongoing failure could be the result of such conditions as ground-water-saturated subgrade, ground water saturated base, improperly compacted subgrade or base, improperly constructed roadbed, ongoing leaking water line, ongoing leaking sewer line, improper ditch drainage, improper curb/pipe drainage, improper roadbed drainage, damaged culverts or other causes of damage that could, if not able to be determined and abated, continue to cause failure of the roadbed. If the failure was ongoing, or could have been ongoing, we elected to prescribe a surface treatment (also known as chip seal, tar and gravel, bituminous treatment) on the street and to keep a watch on the street over the next few months or years. The ongoing failures will show themselves soon enough at which time we will deep patch them.
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> An inactive failure is the opposite of an ongoing failure and could be the result of such things as previously leaking water lines or sewer lines, previous improper street or roadbed drainage, previous lack of compaction (as related to original construction or utility cuts) that has now consolidated, and any other cause of

failure that has been terminated. The inactive failures will not show up over time and can be covered up with leveling or regular asphalt overlay, which is significantly less expensive. If a street was determined to have *only inactive* failures, we elected to go ahead with leveling and an asphalt overly.

Over the next few months or years we will keep a watch on the streets that have been surface treated. We will patch and level as dictated by failures, and the street will then be ready for an overlay of asphalt once we are satisfied that we have patched the active failures.

The City is aware that a surface treatment might not be the first choice of a wearing layer for Alexander City residents; however, its use as a tool for increasing the cost-effectiveness makes it absolutely necessary. Also, the collector streets that get the surface treatment will get an asphalt overlay in the next few years depending on the rate of ongoing failure.

The following Paving Plan is designed to increase the ride quality of the street, to identify potential ongoing failures and to mitigate the deterioration of the street and roadbed. Ultimately, the goal is to increase the average condition of our street network. Keep in mind that the Paving Plan beyond Phase I, which has already been bid, is only a plan and could be revised based on many factors. However, the requirement to be highly cost-effective will be the foundation of any future plan revisions and will follow the logic discussed previously.

The current Paving Plan is divided into four phases:

Phase I, which will begin in May 2011, will consist primarily of leveling and surface treatment (also known as tar and gravel, or chip seal) of about 25 miles of collectors, with only a small portion being asphalted. The surface treated roads will be evaluated and scheduled for an eventual asphalt overlay, which will be within the next few years or so in Phase III, depending on how well they perform.

Phase II, which will begin in May 2012, is being designed to stop the degradation of the minor streets. Phase II will consist primarily of the leveling and surface treatment of about 50 to 60 miles of minor streets. The surface treated minor streets will be evaluated on an ongoing basis and will be overlain with asphalt in Phase IV within the next 5 years or so, depending on how well they perform.

Phase III, which will begin around 2013 to 2017, will be designed to put an asphalt overlay on the streets that were surface treated in Phase I.

Phase IV will begin several years after the completion of Phase II and will be designed to put an asphalt overlay on the minor streets that were surface treated in Phase II.