Leasing fire apparatus; is it right for North Richland Hills?

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CERTIFICATION STATEMENT

I hereby certify this paper constitutes my own product. Where the language of others is set forth, quotation marks so indicate, and appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed:_____

Abstract

The redesign of an apparatus replacement plan is simple enough, however any long range plan which has not considered the financial implications to the governing body has provided nothing more than an illusion of a good thing. The question is, how to do this providing a more frequent replacement of apparatus and maintaining a reasonable cost per year? Leasing has been utilized by a number of departments across the country, but has never been evaluated by the North Richland Hills Fire Department.

The problem is the North Richland Hills Fire Department has not considered leasing as a viable method of financing new apparatus.

The purpose of this research is to evaluate leasing as a method of financing apparatus for the North Richland Hills Fire Department.

A descriptive research methodology was utilized to answer the following questions:

1. What methods are available to North Richland Hills to purchase replacement fire apparatus?
2. What methods are private industries using to purchase capital assets?
3. What is the life-cycle cost per year to the city of North Richland Hills utilizing each method of financing apparatus?

A literature review examined three methods of paying for apparatus; paying cash, leasing, or bond sales, followed by a cost comparison utilizing each method. Results showed leasing is a viable method of financing and cash could be considered to actually cost more after lost earned interest was calculated. Bond sales showed to support the benefits received principle and resulted in an actual lower per year cost to our citizens.

Recommendations included conducting cost comparisons utilizing the life cycle cost to include weighing bond premiums and interest rates prior to purchasing future apparatus. Other

recommendations would include further study into comparison of life cycle costing at 7, 10, or 12 years versus 20 years.

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Introduction

Beginning in late 2007, the world economy slipped into a recession. While speculation and study into the cause continues to this day, it is widely held the failure of the housing market's eight trillion dollar bubble was the precipitating event. The decline of consumption resulted in the loss of over 8.4 million jobs in the United States alone and the decline of median household income by almost one third across the United States during 2008 and 2009 (http://stateofworkingamerica.org/great-recession/other-fallout/).

The decline of household income forced many Americans to reconsider their lifestyles. This careful self-reflection was not limited only to individuals and families, but also to government as well. After all, the same individuals and families were still being required to pay their taxes. Declining home values mean less property tax paid; paying less is a good thing for struggling homeowners, but results in overall less funding available to local governments tasked with maintaining an expected level of service; or more in some instances.

The city of North Richland Hills is only different in that our city and overall metropolitan area was not affected as greatly as the rest of the country, our city was not forced to lay off employees or experience furloughs. However, the employees of North Richland Hills were still expected to carefully evaluate operations and cut cost. Non-core services were carefully evaluated and their specific value to our citizens was carefully considered. If there is any silver lining to the Great Recession, it is that we have been forced to be even more efficient.

Efficiency is often the motivation for careful consideration of what we do and how we do it. In 2006, it was becoming evident that our apparatus replacement program needed to be updated. We had benefited greatly by the development and implementation of the plan in 1997,

but technology and safety were advancing at a faster pace than the planned replacement of apparatus. Not to mention the increase in call volume had resulted in increased maintenance cost and apparatus were being retired after twenty years with over 100,000 miles on the odometer. Reserve apparatus was often in service as much as front line apparatus. But any new apparatus replacement plan would be centered toward more regular replacement, resulting in increasing the budget. The department and city resigned themselves to maintaining the plan in place.

In 2012, with the economy improving and new leadership in the city management office and fire department, careful evaluation has supported revamping the department's replacement plan. The question is, how to do this providing a more frequent replacement of apparatus and maintaining a reasonable cost per year. Leasing has been utilized by a number of departments across the country, but has never been evaluated by the North Richland Hills Fire Department.

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Background and Significance

The city of North Richland Hills was incorporated in 1953. In much the same manner of other towns and communities, a paid fire department was not to be realized until several years later, fire protection was provided by the Smithfield Volunteer Fire Department and other surrounding cities. In 1958 the town of Smithfield was annexed, but the city still did not have its own fire department, all of the fire equipment was owned by the Smithfield Volunteer Fire Department as well as the fire station which had been built in 1948. The City of North Richland Hills purchased the fire station and several pieces of equipment from the Smithfield Volunteer Fire Department for several thousand dollars. The purchase of fire apparatus was not paid for with cash, but by obtaining financing from a local bank.

In 1965, the city hired its first paid firefighters. The fire fighters of 1965 often relied on neighboring cities for assistance with large fires, today many of those same cities rely on the North Richland Hills Fire Department. In the time since 1965, the North Richland Hills Fire Department has taken on the role of EMS provider and become a leader at multiple levels, regionally, state and even nationally, setting the example of regional cooperatives in the late 70s and into the 80s they were the influential organization in the establishment of the Northeast Fire Department Association (then Northeast Fire Department Training Association). In 2008 the Fire Department won the International Fire Chiefs Association's Award for Excellence with their Cath Lab Activation program. Today, the department continues to be respected for its innovative thinking and leadership.

The North Richland Hills Fire Department covers 18.2 square miles with a population of approximately 64,200 residents. The department ran 7202 fire and EMS calls in 2013 from four fire stations, using three fire engines, one quint, one aerial platform, and three advanced life support ambulances. The department maintains two reserve engines, one reserve aerial and three

reserve ambulances. Regular and preventative maintenance is completed by two Emergency Vehicle Technicians under the direction of the City's Fleet Services. The department has had an apparatus placement program in place since 1997 and has benefited from the regular replacement of apparatus. The current plan utilizes a twenty year lifespan of apparatus, thirteen front line and seven in reserve. Ambulances utilize a twelve year life span, six front line and six in reserve. This generally allows for the replacement of a fire apparatus every even year and an ambulance in the odd years.

The development of the replacement program was significant. However, the program was not designed with regard to overall cost, but regular, systematic, planned replacement of apparatus with the lowest possible cost per year. Twenty years as an indicator of needed replacement was little more than a convenient number, it is regularly utilized in bond calculations and allowed for the yearly cost of ownership to be reduced to a then reasonable number.

Just as in 1958, the city of North Richland Hills still advocates the practice of issuing debt for the purchase of fire apparatus. This makes fundamental sense and is supported by the International City Managers Association (ICMA). The ICMA adheres to the "benefits received" principle, which states "capital projects that will provide benefits over many years will benefit future as well as current taxpayers, so the cost of such public investments should be borne by both. Utilizing a portion of their yearly taxes to pay off the debt needed to finance the purchase [of an apparatus] is one way to ensure future taxpayers pay their fair share of the cost associated with the ownership" (Denison, 2013, p. 280).

Utilizing the benefits received principal, ownership of apparatus should be broken down to a cost per year amount. This is achieved by dividing the total cost of ownership which

includes purchase amount, interest and financing fees, and maintenance cost with the resale value subtracted by the number of years of ownership. The North Richland Hills Fire Department has historically financed apparatus over twenty years thereby maintaining ownership for twenty years. This effectively reduces the yearly cost of ownership.

The regular use of 15-20 year old apparatus was a concern to the North Richland Hills Fire Department. During completion of its strategic plan the department identified a major goal of revaluating the apparatus replacement program. The city's Fleet Service Director was equally concerned. During discussions regarding the replacement program, Director of Fleet Services Thomas Powell agreed, 13 years front line and 20 years overall was too long. He stated maintenance cost dramatically increased and the resale value of the vehicle declined exponentially; both factors when considering the yearly cost of ownership. Mr. Powell advised the only method available to reduce maintenance cost and increase resale value was to shorten the time the city maintained ownership, but when financed for twenty years, this was very difficult unless a shorter finance period was utilized. Reducing the number of years the vehicle is financed would have the opposite effect and actually increase the yearly cost of ownership. Mr. Powell suggested an estimate of 7 years as the real turning point when our apparatus begin to require regular maintenance in addition to preventative maintenance. Rough calculations by Fleet Services suggest $5000 per year is spent on each piece of fire apparatus. This provides for two fluid changes, brakes, one set of tires and a minor dollar amount for minor repairs (T. Powell, personal communication, March 12, 2014).

While City Management and the Finance Department have always been diligent in staying abreast of methodologies available to finance capital purchases, decisions on methods, often do not consider the Life-cycle cost, which encompasses the total cost of ownership to

include operation, maintenance, purchase price, financing and interest cost, as well as residual value.

These factors are important since they assist us in determining the true cost of ownership. Ultimately, the city of North Richland Hills must strive to make capital expenditures which are fiscally responsible. Paying more for a fire truck today may be justified if it results in a lower actual cost of ownership over the life of the vehicle.

Leasing has been utilized by numerous departments across the country. Utilizing a lease purchase plan for apparatus might be one method of reducing yearly cost of ownership so that apparatus may be replaced more frequently. This would have several benefits beyond lower maintenance cost and higher resale, but would also allow for more standardization of equipment. Currently, the NRHFD has one apparatus only one month old and another nineteen years old. The technological advances in the fire service and apparatus have been significant. Fuel efficiency, emissions, electronic pressure governors, built in computers to aid with pumping, and numerous safety features like supplemental restraint systems (airbags) and anti-lock braking systems to name a few, make utilizing newer apparatus more beneficial beyond the immediate financial benefits of maintenance and resale value.

Apparatus replacement in the future will no doubt be a significant factor to City Management, a truck purchased today will have an estimated replacement cost of over one million dollars in twenty years. Just as in our personal lives, good financial planning today will benefit our citizens in the future. As a mature city approaching build-out, it will be even more important to continue to evaluate our replacement plan, as it will have a direct effect on our financial plan. Good planning will ensure a level and balanced rate of taxation; citizens do not

want surprises like an increased tax rate or referendums on increased funding (Kavanagh & Han Na, 2008, p. 10).

Involvement in the various levels of government and fire service industry has taught the NRHFD to always consider and evaluate better, more economical ways of doing things. Determining how to pay for capital purchases is no different and is supported in the Executive Fire Officer's Program, Executive Development. In that program, students are encouraged to "get on the balcony" by instructors and the authors of the required reading, "Leadership on the Line" (2002), by Ronald Heifitz and Marty Linsky. The phrase is a metaphor intended to encourage students to view their problems or challenges from another perspective so they may have a better understanding of the solution.

Evaluating leasing as a method of financing apparatus purchases is linked to the United States Fire Administration's strategic plan, goal number two, "Improve local planning and preparedness." By carefully evaluating leasing as an option to financing and ultimately improve the apparatus replacement plan utilized by the North Richland Hills Fire Department, ensures efficient use of tax payer's money, improving our ability to plan and prepare for emergencies. The subsequent improvement of apparatus condition and quality also conforms to the United States Fire Administration's strategic goal number 3, "Improve the fire and emergency services' capability for response to and recovery from all hazards."

Literature Review

A literature review was conducted for this project with focus on three major areas: understanding the current options of purchasing apparatus, determining the life cycle cost, and what private industry is doing in the purchase of capital assets. The review was completed by exploration of numerous Applied Research Projects from the National Fire Academy's Learning

Resource Center, as well as text books and publications obtained from the Willis Library located at the University of North Texas in Denton, Texas, and a personal interview with the Chief Financial Officer of a multi-billion dollar per year business.

Purchasing Options

There is an abundance of purchasing options for a municipality to utilize. The question, "What methods are available to North Richland Hills to purchase replacement fire apparatus?" has a very broad answer. However, the answer can be broken down to three categories. They are the agency can pay cash, they can finance the purchase, or they can lease.

Paying cash has long been utilized by numerous agencies, but inflation and technology have driven the cost of a basic Type I Pumper (fire engine) with minimum options to as much as $500,000. This is a considerable sum for a municipality to pay unless a serious and sound financial plan has been developed and put in place.

Paying cash can be accomplished through several methods. The most common method of this is allotting a specified amount as a line item in the agency's operating budget for a specific purchase. The operating budget is funded through the general fund and allows an agency to allocate resources to departments, activities, and programs, which is then used to monitor actual expenditures, revenues and performance (Kavanagh & Han Na, 2008, p. 16).

One primary disadvantage of utilizing the operating budget is that many departments will not purchase a new apparatus each year. This will inevitably result in years of decreased spending accentuated by periodic and often burdensome spikes in needed increases to the operating budget of a department to facilitate the purchase of a new apparatus.

Many departments and agencies have established a Capital Improvement Plan. These plans have been established by community leaders and identify projects to be funded, funding

sources, and project expenditures over the planning horizon. While many projects will be financed through bond sales or the issuance of debt, some agencies utilize a sinking fund. These accounts are essentially savings accounts utilized by municipalities and government to carry budgeted money over each fiscal year. The money deposited into the sinking fund is earmarked for future replacement purchases of capital assets and once purchased the account is exhausted (Kurish & Tigue, 2005, p. 16).

Sinking funds are an effective tool for saving and allow an agency or municipality to pay cash for large expenditures. However, some state and local laws limit a sinking fund's ability to earn interest. Another downside to sinking funds stem from its effectiveness as a savings tool. These accounts are intended to increase in deposits and they can eventually obtain a significant balance of available cash, which has often proven to be a usable source to fund other projects or shorten the gap between revenue and operational cost when the economy takes an unexpected downturn (Roche, 2002, p. 218-219).

Paying cash can also be accomplished through establishing various revenue accounts. Some municipalities may utilize taxation as a means to raise added funds. In this instance, the municipality may implement variations on property or sales taxes, earmarking an approved portion toward paying for capital purchases. Consumption fees and taxes have been utilized by other agencies as a source of revenue to fund cash purchases or sinking accounts (Mikesell, 2010, p. 197).

Paying cash may not be the best option, it is counter to the benefits received principal. The "benefits received" principle, states "capital projects that will provide benefits over many years will benefit future as well as current taxpayers, so the cost of such public investments should be borne by both. Utilizing a portion of their yearly taxes to pay off the debt needed to

finance the purchase of an apparatus is one way to ensure future taxpayers pay their fair share of the cost associated with the ownership" (Denison, 2013, p. 280). This principal is practiced by numerous municipalities and is supported by the International City/County Management Association.

Cash payment has also proven its ability to in essence rob a municipality. Fire Chief Joseph Anderson explains in his Executive Research Paper, completed for the Financial Management portion, that many times in recent markets interest earned on a cash account actually surpassed interest paid on borrowed money. Although, prior to the Great Recession, this concept or possibility should always be weighed prior to paying cash (Anderson, 2000, p. 28).

Financing capital purchases can be achieved in a number of ways. Perhaps most obvious is the selling of bonds. General obligation bonds are typically issued to finance capital projects which benefit the whole community. Since this type of bond is backed by the issuer (municipality), who pledges to levy any taxes or fees upon the citizens of the municipality to repay the debt, voter approval is usually required. Together with the required voter approval and general taxing authority, general obligation bonds are considered a more secure and less expensive form of debt. General Revenue Bonds are utilized less frequently since these bonds are only secured or guaranteed by a specific source of funds or revenue stream. A municipality may have to show or prove to auditors their ability to generate enough revenue through the programs to pay back the issued bonds. This more defined source of debt payment results in an overall higher cost since they come with greater risk (Kurish & Tigue, 2005, p. 13-14).

In either case of bond issuance, Finance Director Larry Koonce advised the total overall issuance cost, ultimately depends on the market. The fluidity of the market requires North Richland Hills to issue an RFP or Request-For-Proposal from various bond dealers who then

respond with a bid for the total cost of issuance (L. Koonce, personal communication, August 25, 2014). A number of factors are considered in determining the cost of the borrowed money. Perhaps most important in determining the cost is a municipality's likely ability to repay the debt. In the case of a revenue bond a municipality may opt to purchase insurance against the bond in case they are later unable to repay the debt. This too will result in an increase in the cost of borrowing money as well as the pace of the compounded interest. (Kurish & Tigue, 2005, p. 14)

Leasing is a form of financing, and much like financing, there are a variety of structured lease programs a municipality might use to purchase apparatus without utilizing cash reserves or earmarking revenue sources. The benefit of the many leasing structures is that it allows a department to implement the most beneficial method for them specifically. In the book *Debt Issuance* (2005, p. 15-16) its pointed out that "leasing is appropriate for procuring assets that are too expensive to fund with current receipts in any one year, but with useful lives too short to finance with long term debt."

Perhaps the most common method of leasing is offered by the apparatus manufacturer, although most actually utilize a third party capital financing company. These leasing options include a lease/purchase option, a turn in lease program, or a walk away lease program (Laukkonen, 2002, p. 2-6).

In the traditional lease/purchase the agency has a good idea they desire to ultimately own the vehicle and expect it to remain in service for many years. Using this method of leasing the department or agency is listed on the title as the owners of the apparatus. Most companies offer 5 to 7 year agreements, however, a 10 year lease is available at a higher interest rate. In either lease term the apparatus is fully owned at the end of the term. Some agencies opt to include a non-

appropriations clause in their contract in case future funding for payment is not approved by the agency's governing board (Brewer, n.d., p. 21-22)

In the case of a turn-in lease, smaller equal payments are made annually with a large balloon payment due at the end of the term. This type of lease is more complicated, since the leasing company is actually hedging against the expected value of the apparatus at the end of the term. To determine the balloon payment amount the financer must ensure the apparatus is at least worth the amount of the balloon payment should the agency decide to turn it in. In most instances of turn-in leasing, the agency can simply turn in the apparatus towards the purchase of another from the same manufacturer (Drake, n.d., p. 12)

Another type of lease is often known as the walk away lease. This type of lease allows the agency to simply walk away from the lease with no obligation to purchase at predefined intervals during the lease. If the agency decides to keep the apparatus they can purchase it or refinance it at a predetermined price. When a department decides to utilize the turn in lease there may be some question regarding the usefulness of the vehicle after a period of time. Perhaps a department is faced with multiple unknowns such as expected growth. Rather than pay the full purchase price of an apparatus, the department may opt to utilize the walk away lease. This way if growth has not been realized, the municipality is not obligated to complete the term of the lease. When utilizing this type of lease the optimum time to turn in the vehicle in is at the five year mark when the value of the vehicle most closely matches the real value of the apparatus (Drake, n.d., p. 12).

Life Cycle Costing

The International City/County Management Association (ICMA) is a proponent of the "benefits received" principal, sometimes called "pay as you use". The belief is the cost of large

capital purchases should be borne by future residents as well as current residents since they will benefit from the purchase. Using taxes as a means to pay off debt incurred in the purchase of the capital assets is one way to ensure future taxpayers pay their fair share. ICMA also supports spreading the term of the debt over the usable life of the asset in an effort to fully spread the cost of the asset among all of those who benefit (Denison, 2013, p. 280). Considering this principal requires payment for these benefits through taxation and no shorter financing than the life span of the asset, the best method to evaluate cost effectiveness is to determine the life cycle cost divided by the useful age in years. (Coe, 2013, p. 356)

Life cycle cost is the total cost of ownership. Traditional purchasing practices usually only considers the purchase price. Life Cycle Costing totals the ownership, including the product's purchase price, lifetime operating cost (which includes maintenance and energy consumption) and resale value if any. Correctly "calculating the Life Cycle Cost is a four step process: (1) estimate the item's useful life; (2) calculate the ownership cost (acquisition, interest and financing fees, maintenance and energy usage, and operational cost); (3) estimate the salvage value of the item, if any; (4) subtract the salvage value from acquisition and ownership cost" (Coe, 2013, p. 355-356).

Private Industry

Private industry has always been known to have the ability to operate utilizing the most economical and efficient means. Weighing the many options to purchase a capital asset is no different. However, one multibillion dollar company only occasionally leases equipment. Julie Piggott, Burlington Northern Santa Fe (BNSF) Corporation's Chief Financial Officer pointed out in a personal conversation that private or even publicly traded companies "have a different operating goal from that of a municipality, especially if your city is choosing to follow the

benefits received principal. We aren't trying to share the wealth, we are attempting to increase the profits and thus the dividends we pay or increase the value of our company" (J. Piggott, personal communication, August 9, 2014). From this perspective, purchasing capital assets and spreading them over a number of years would reward those people purchasing stock after the purchase. Of course, that is considered in the purchase price of the stock.

Mrs. Piggott advised, "This isn't to say we don't finance or lease equipment, but primarily we have opted to pay cash. Several years ago we took advantage of the very low interest rates to diversify our debt. We could get a better return investing our cash or paying higher dividends and show a more structured balance sheet. This actually showed BNSF as a more financially stable company and stock prices increased over the cost of the debt" (J. Piggott, personal communication, August 9, 2014).

Leasing is touted as a viable option to financing simply because of its many varying structures. It allows for a municipality to decide its current and future needs and then determine which method or structure of payment best suites its current and projected revenues. Just as private industry does, the municipality must look at their actual goals or overall objectives and utilize that as a starting point in the determination. They must also weigh the life cycle cost with their actual goals, since this will ultimately give them a cost per year of achieving the goals.

Procedures

Research for the ARP began in February of 2014. Through group exercises and discussions with classmates the researcher developed a problem statement, a purpose statement and several research questions. During non-assigned periods research was conducted at the National Fire Academy's Learning Resource Center. A search was conducted utilizing "leasing fire apparatus" with disappointing results. The limited number of search returns prompted the

researcher to consider the need for research on the subject. It was suggested by course instructors the lack of available sources actually indicated the need for further study.

Upon returning home, an Applied Research Proposal was submitted, and several beneficial comments were proposed by the evaluator. Research was continued utilizing online sources to complete the literature review. Search returns were increased utilizing “alternative financing of apparatus” and “leasing for capital purchases” as the primary search phrases. In an effort to obtain more current sources, visitation to the Willis Library at The University of North Texas (UNT) in Denton, Texas was done. UNT has an acclaimed Public Administration program and sources on governmental finance and financial planning were abundant.

The researcher did experience several limitations while completing the Applied Research Project. The long term absence of the city’s Finance Director and more notably was the absence of records pertaining to the consumable energy utilized by apparatus and specific maintenance records for those same apparatus. In discussions with Fleet Services Director Thomas Powell the researcher was informed records of this nature were available only to 1992 when the city hired a third party to enter maintenance records. Since that time the city has added over 500 vehicle assets and it was determined work hours were better utilized performing preventative maintenance. This statement was greatly disappointing, and while the lack of maintenance records will affect the determined Life Cycle Cost, the researcher felt an adequate comparison could still be made utilizing an estimated cost of maintenance as long as that estimated cost was utilized consistently for each cost comparison.

Mr. Powell, the Fleet Services Director, suggested an estimate of 7 years as the real turning point when our apparatus begin to require regular maintenance in addition to preventative maintenance. Rough calculations by Fleet Services suggest $5000 per year is spent

on each piece of fire apparatus. This provides for two fluid changes, brakes, one set of tires and a minor amount for incidental repairs (T. Powell, personal communication, March 12, 2014).

Another significant limitation has to be in the fluidity of the Bond Market. Calculations were completed by First Southwest. Mr. Medanich was asked to complete the study utilizing $500,000. He indicated a specific number is quite difficult with the many varying factors which determine the actual cost. His end projection was actually based on $509,000.

The problem which prompted this research was the need to decrease the lifespan of fire apparatus. The redesign of the apparatus plan is simple enough, however any long range plan which has not considered the financial implications to the governing body has provided nothing more than an illusion of a good thing. The ultimate goal of this research is to evaluate leasing as an option to financing replacement apparatus more frequently. Realizing the service life and financing term are dependent on each other, the researcher has sought to decrease the term of the debt while limiting the yearly cost to own and operate the apparatus.

Research question number one, “What methods are available to North Richland Hills to purchase replacement fire apparatus?” required narrowing down the many options of procuring a capital asset. The researcher had planned to interview the city’s Finance Director, but learned he was unavailable (until two weeks prior to the end of submission time for this Applied Research Project) due to a long-term absence for a health ailment. Upon his return to work the researcher was able to speak with him. When specifically asked how the cost of calculating the cost of a bond Mr. Koonce advised, “You can’t, it’s so complex we don’t even try, we send it out for bid on an as needed basis.” (L. Koonce, personal communication, August 25, 2014). The researcher therefore performed a literature review of the many options to financing capital assets.

Fortunately, the University of North Texas is reasonably close and access to the Willis Library was attainable.

Research question number two, “What methods are private industries using to purchase capital assets?” was pursued as a means of validating leasing as a cost effective means of financing. A phone interview was conducted with the Chief Financial Officer of Burlington Northern Santa Fe (BNSF) Corporation. Mrs. Piggott, is currently the CFO of the multibillion dollar company BNSF and a friendly acquaintance of the researcher who felt her 23 years with BNSF and her financial knowledge qualified her as an expert in the field of private industry financing and accounting principles.

Research question number three, “What is the life-cycle cost to the city of North Richland Hills utilizing each method of financing apparatus?” was utilized as this is the only quantitative consideration with regard to determining total cost over a period of years. Literature review and a personal interview were used to gain more knowledge on life cycle costing. The International City/County Management Association states, “calculating the Life Cycle Cost is a four step process: (1) estimate the item’s useful life; (2) calculate the ownership cost (acquisition, interest and financing fees, maintenance and energy usage, and operational cost); (3) estimate the salvage value of the item, if any; (4) subtract the salvage value from acquisition and ownership cost” (Coe, 2013, p. 355-356). This is essentially a best practice adopted by the ICMA, therefore it was utilized in determining the life cycle cost. A cost comparison was completed utilizing the life cycle cost and determining a per year cost as a means of evaluating effectiveness.

The cost per year is calculated in the following manner:

C+F-D-I+M-RV/term= PYC

Where:

C = Cost

F = Cost of Finance plus Fees

D = Discount

I = potential interest earned on cash

M = estimated Maintenance cost

RV = Residual Value

Term = the number of years, (front line service life)

PYC = Per Year Cost

Interest earned on cash was estimated at a modest 2.99%, continuously calculated over seven years.

During the literature review for this question the researcher was introduced to the benefits received principal, which has a direct bearing on determining the life-cycle cost. This principal spreads the purchase of capital equipment over the service life of the vehicle. Since early payoff would result in future citizens benefiting from tax dollars paid by previous citizens. This will ultimately result in vehicles utilized by the city only until they are paid for. The residual or resell value would need to be calculated in the determination of life-cycle cost. Utilization of this principle supports statements made by the Director of Fleet Services, who stated the existing replacement plan was established using the bond or debt terms as the basis in determining an apparatus' service life (T. Powell, personal communication, March 12, 2014).

Results

Research question 1

What methods are available to North Richland Hills to purchase replacement fire apparatus?

There are an abundance of purchasing options for a municipality to utilize. The question, "What methods are available to North Richland Hills to purchase replacement fire apparatus?" has a very broad answer. However, the answer can be broken down to three categories. They are the agency can pay cash, they can finance the purchase, or they can lease.

Paying cash has long been utilized by numerous agencies, but inflation and technology have driven the cost of a basic Type I Pumper (fire engine) with minimum options to as much as $400,000. This is a considerable sum for a municipality to pay unless a serious and sound financial plan has been developed and put in place.

Paying cash can be accomplished through several methods. The most common method of this is allotting a specified amount as a line item in the agency's operating budget for a specific purchase. The operating budget is funded through the general fund and allows an agency to allocate resources to departments, activities, and programs, which is then used to monitor actual expenditures, revenues and performance (Kavanagh & Han Na, 2008, p. 16).

One primary disadvantage of utilizing the operating budget is that many departments will not purchase a new apparatus each year. This will inevitably result in years of decreased spending accentuated by periodic and often burdensome spikes in needed increases to the operating budget of a department to facilitate the purchase of a new apparatus.

Many departments and agencies have established a Capital Improvement Plan. These plans have been established by community leaders and identify projects to be funded, funding sources, and project expenditures over the planning horizon. While many projects will be financed through bond sales or the issuance of debt, some agencies utilize a sinking fund. These accounts are essentially savings accounts utilized by municipalities and government to carry budgeted money over each fiscal year. The money deposited into the sinking fund is earmarked

for future replacement purchases of capital assets and once purchased the account is exhausted (Kurish & Tigue, 2005, p. 16).

Sinking funds are an effective tool for saving and allow an agency or municipality to pay cash for large expenditures. However, some state and local laws limit a sinking fund's ability to earn interest. Another downside to sinking funds stems from its effectiveness as a savings tool. These accounts are intended to increase in deposits and they can eventually obtain a significant balance of available cash, which has often proven to be a viable source to fund other projects or shorten the gap between revenue and operational cost when the economy takes an unexpected downturn (Roche, 2002, p. 218-219).

Paying cash can also be accomplished through establishing various revenue accounts. Some municipalities may utilize taxation as a means to raise added funds. In this instance, the agency may implement variations on property or sales taxes, earmarking an approved portion toward paying for capital purchases. Consumption fees and taxes have been utilized by other agencies as a source of revenue to fund cash purchases or sinking type accounts (Mikesell, 2010, p. 197).

One major downside to paying cash is its counter stance to the benefits received principal which is supported by the International City/County Management Association (ICMA). This principal supports financing as a means of insuring every resident pays for the benefits they receive. Sometimes called "pay as you use", the belief is utilizing taxes as a means to pay off debt incurred in the purchase of the capital assets is one way to ensure future taxpayers pay their fair share. ICMA also supports spreading the term of the debt over the usable life of the asset in an effort to fully spread the cost of the asset among all of those who benefit (Denison, 2013, p. 280).

Financing is an option commonly practiced and supported by the city of North Richland Hills and can be accomplished through bond sales or a municipal equipment lease. Options for bonding are general obligation and revenue bonds. Each option has its beneficial, as well as negative aspects.

In either case of bond issuance, Finance Director Larry Kounce advised the total overall issuance cost, ultimately depends on the market and the city's credit rating. The market is in reference to the interest rate offered by bond dealers and credit rating is established by three standard companies, Standard and Poor's, Moody's and Fitch. Each of these companies will essentially audit the municipality's financial worthiness by looking at their collateral, revenues, existing credit debt level, tax burden, management and economic environment. The fluidity of the market requires North Richland Hills to issue an RFP or Request For Proposal from various bond dealers who then respond with a bid for the total cost of issuance (L. Koonce, personal communication, August 25, 2014).

Research showed there are many more factors involved in establishing a price for the borrowed money. Perhaps the two most important in determining the cost is a municipality's likely ability to repay the debt and the level of existing debt. In the case of a revenue bond a municipality may opt to purchase insurance against the bond in case they are later unable to repay the debt. This too will result in an increase in the cost of borrowing money as well as the pace of the compounded interest (Kurish & Tigue, 2005, p. 14).

The city's current contractor for bond sales is First Southwest Company. A personal conversation with Daniel Medanich the company's representative for North Richland Hills, revealed the city's current interest rate on a General Obligation bond sold with a 7 year term is averaged at 3.76%. This interest rate is very competitive. However, more surprising is the

"Discounted Price". Mr. Medanich explained the Bonds available for the city to issue have a "premium" value in which the city will realize approximately $39,297 in savings on an approximate half million dollar bond. In the instance of a $509,000 bond, the city will actually only realize $470,000 in principal debt. He explained this is due to the par value at purchase versus the interest rate bid by the bond company. Also in this are included the payment structure, the tax savings realized by the buyer, and just as important, the positive credit rating North Richland Hills has achieved and maintained for such a long time, AA+ (D. Medanich, personal communication, August 29, 2014).

Leasing is a form of financing, and much like financing, there are a variety of structured lease programs a municipality might use to purchase apparatus without utilizing cash reserves or earmarking revenue sources. The benefit of the many leasing structures is that it allows a department to implement the most beneficial method for them specifically. Leasing also is utilized as method of borrowing money without impacting a municipality's debt ratio (Laukkonen, 2002).

In the book, *Debt Issuance* (2005, p. 15-16) its pointed out that "leasing is appropriate for procuring assets that are too expensive to fund with current receipts in any one year, but with useful lives too short to finance with long term debt."

Perhaps the most common method of leasing is offered by the apparatus manufacturer, although most actually utilize a third party financing company. These leasing options include a lease/purchase option, a turn in lease program, or a walk away lease program (Drake, n.d., p. 12).

In the traditional lease/purchase the municipality has a good idea they desire to ultimately own the vehicle and expect it to remain in service for many years. Most companies offer 5 to 7 year agreements, however, a 10 year lease is available at a higher interest rate. In either lease

term the apparatus is fully owned at the end of the term. Some agencies opt to include a non-appropriations clause in their contract in case future funding for payment is not approved by the agency's governing board (Brewer, n.d., p. 21-22)

In the case of a turn-in lease, smaller equal payments are made annually with a large balloon payment due at the end of the term. This type of lease is more complicated, since the leasing company is actually hedging against the expected value of the apparatus at the end of the term. To determine the balloon payment amount the financer must ensure the apparatus is at least worth the amount of the balloon payment should the agency decide to turn it in. In most instances of turn-in leasing, the agency can simply turn in the apparatus towards the purchase of another from the same manufacturer (Drake, n.d., p. 12)

Another type of lease is often known as the walk away lease. This type of lease allows the agency to simply walk away from the lease with no obligation to purchase at predefined intervals during the lease. If the agency decides to keep the apparatus they can purchase it or refinance it at a predetermined price. When a department decides to utilize the turn in lease there may be some question regarding the usefulness of the vehicle after a period of time. Perhaps a department is faced with multiple unknowns such as expected growth. Rather than pay the full purchase price of an apparatus, the department may opt to utilize the walk away lease. This way if growth has not been realized, the municipality is not obligated to complete the term of the lease. When utilizing this type of lease the optimum time to turn in the vehicle in is at the five year mark when the value of the vehicle most closely matches the real value of the apparatus (Drake, n.d., p. 12).

Research Question 2

What methods are private industries using to purchase capital assets?

Research and interview revealed an unsuspected finding that beyond short term leasing for equipment used on a temporary basis, private industry may not see the benefit of leasing as a means of finance.

Julie Piggott, Burlington Northern Santa Fe (BNSF) Corporation's Chief Financial Officer, pointed out in a personal conversation that private or publicly traded companies "have a different operating goal from that of a municipality, especially if your city is choosing to follow the benefits received principal. We aren't trying to share the wealth, we are attempting to increase the profits and thus the dividends we pay or increase the value of our company" (J. Piggott, personal communication, August 9, 2014). From this perspective, purchasing capital assets and spreading them over a number of years would reward those people purchasing stock after the purchase. Of course, that is considered in the purchase price of the stock.

Mrs. Piggott advised, "This isn't to say we don't finance or lease equipment, but primarily we have opted to pay cash. Several years ago we took advantage of the very low interest rates to diversify our debt. We could get a better return investing our cash or paying higher dividends and show a more structured balance sheet. This actually showed BNSF as a more financially stable company and stock prices increased over the cost of the debt" (J. Piggott, personal communication, August 9, 2014).

Research Question 3

What is the life-cycle cost to the city of North Richland Hills utilizing each method of financing apparatus?

"Calculating the Life Cycle Cost is a four step process: (1) estimate the item's useful life; (2) calculate the ownership cost (acquisition, interest and financing fees, maintenance and energy usage, and operational cost); (3) estimate the salvage value of the item, if any; (4) subtract the

salvage value from acquisition and ownership cost" (Coe, 2013, p. 355-356). There are an abundance of purchasing options for a municipality to utilize.

A cost comparison was completed utilizing the life cycle cost and determining a per year cost as a means of evaluating effectiveness of purchasing a piece of apparatus paying cash, obtaining a general obligation bond, or leasing.

Paying cash proved to be the most expensive per year costing only $83,058 per year when the total cost is divided by seven years. Not only is paying cash for a fire apparatus counter to the benefits received principle, a municipality will lose the earned interest potential on that cash. In the instance of paying $500,000 for a fire apparatus there is a projected $116,407 in lost earned interest, predicting a modest return on cash investment of 2.99% over the same seven year span.

The results for financing the purchase utilizing bonds resulted in a realized principal of only $470,000. This is due to the nature of the premium (discounted cost) of the bonds and financing options. The Per Year Cost was calculated at $71,404.

Leasing as a purchasing option was believed to have been the better value. However, a quote provided from an available leasing company revealed a Per Year Cost of $74,675.

The cost per year was calculated in the following manner:

C+F-D+I+M-RV/term = PYC

Where:

C = Cost

F = cost of Finance plus Fees

D = Discount

I = earned Interest not realized

M = estimated Maintenance cost

RV = Residual Value

Term = the number of years, (front line service life)

PYC = Per Year Cost

	Cash	G. O. Bond	Leasing
Cost	$500,000	$509,000	$500,000
Finance and fees	N/A	$65,125	$57,725
Premium Discount	N/A	$39,297	N/A
Earned Interest not realized	$116,407	N/A	N/A
Estimated Maintenance	$35,000	$35,000	$35,000
Residual value	$70,000	$70,000	$70,000
Term	7	7	7
Per Year Cost	$83,058	$71,404	$74,675

Table 1- Cost Comparison

Discussion

Many authors have suggested leasing is more cost effective than financing through a bond. However, others realized this just is not so. Chief Joseph Anderson revealed in his Executive Fire Officer Applied Research Paper, “The cost of borrowing funds to purchase the fire engine is less than the cost to lease. It might appear that paying cash would reduce the purchase cost further. The wild card here is that the interest earnings from the cash in the sweep account are outpacing the interest cost of borrowing.” (Anderson, 2000, p. 31).

Chief Anderson’s findings mirrored this researcher’s. His findings concluded that leasing is not the most cost effective method of financing; he also determined the interest earned by

utilizing the cash savings can actually surpass the interest rate charged to borrow money, resulting in a net gain.

The North Richland Hills Finance Director told the researcher, “It isn’t that simple.” when I inquired about determining the cost of a bond for comparison’s sake. This proved to be true, as there are many more factors involved than are discussed in the financial and debt services books referenced for this project. These books only hinted and alluded to the many factors involved. It isn’t as easy as utilizing the time value of money formula to determine the cost. Surprising to the author is the weight and benefit placed on a credit rating. This resulted in a discounted bond amount equaling roughly half of the cost of financing fees when leasing.

As previously mentioned the problem which ultimately prompted this study was an effort to reduce the time a fire apparatus was utilized in a front line capacity. While this will cost more over the years, this study has shown continuing to borrow funds through bonding is less expensive to the city of North Richland Hills at this time.

Leasing is touted as the cure in many of the sources the researcher has referenced for this paper. In each case the author often prefaced, just as the author has, that leasing is beneficial because it provides many options in its structures and ability to turn it in, walk away or keep it. But most of these same authors also find that financing through bonds is actually less expensive. Perhaps the flexibility is what a municipality pays for utilizing a lease, not the cost savings.

The first question any entity should ask as they determine their purchase method is; are we going to keep it. This is determined by the goal, need and use of the apparatus. In the case of North Richland Hills and our current response plan, the answer is most likely going to be yes. However, as we evaluate new and better ways to provide our service we may be faced with the decision to purchase a special use apparatus for the purpose of evaluating its effectiveness in our

response plan. Should that apparatus not perform or result in improved responses; then, if we have utilized the lease with a turn it in or walk away option, we could do that with some possible savings.

Recommendations

The result of this researcher's study and findings show that leasing is indeed a viable option to long term financing. Many departments across the country are utilizing the practice; this is supported by the sheer number of leasing companies found on the internet, all in the business to make money on fees and interest they charge for the "flexibility" of leasing. Perhaps that was why many fire departments are choosing leasing. In the researcher's situation financing through bonds appears to be the most cost effective method of maintaining a low Per Year Cost to the citizens of North Richland Hills at this time.

Nevertheless, those same findings also show that leasing may be a better option as the North Richland Hills Fire Department continuously works to improve its response plan and capabilities. The future may expose a desire to utilize a pumper with transport capabilities in an effort to answer the fire and EMS issues. Point is we can't absolutely say what our goals will be in the future. The strategic plan is in place and we will march toward achieving its goals, but as we march we should look around to make certain we aren't marching off a cliff.

The cost comparison completed for this project is accurate as we approach the fall of 2014. But that same comparison might have had different results had it been completed in the fall of 2007 as we entered the great recession. This supports the author's statement that any organization, not just North Richland Hills, should be cognizant of this and always evaluate their options.

In fiscal year 2016, the North Richland Hills Fire Department is due to replace one Type I pumper and a one hundred foot aerial platform in the same year. The researcher will make the recommendation to formally request quotes for bonding as well as lease purchase options. The results of those will be evaluated.

Additional recommendations would be to conduct life cycle cost comparisons on a seven, ten, twelve and twenty year apparatus life span in an effort to provide sound, factual numbers for comparison and further evaluation of shortening our apparatus' life span.

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Appendix A

Quote for lease with a seven year term

Date of Estimate: 08/26/14

Department Name: North Richland Hills Fire Department

Truck Description: Spartan ERV Custom Pumper

Truck Cost:	$500,000.00
Down Payment:	$0.00
Trade-In:	
Pre-Pay Discount:	

(Deduct cost of performance bond if not already included in truck cost)

Finance Amount: $500,000.00

	3 years	5 years	7 years	10 years	12 years	15 years
Annual Lease Payment:	$175,725	$108,215	$79,675	$58,660	$54,645	$46,495

Qualification: This lease pricing is intended as an estimate and is subject to credit approval and contracts. Final pricing and structure will be provided at the time of application.

Financing administered by Spartan ERV's recommended finance partner:

leasing 2
1720 W. Cass Street
Tampa, Florida 33606
Phone: 800-287-5155 Fax: 813-258-9333
www.firetruckleasing.com

Brad Meyers x12 bmeyers@leasing2.com

Appendix B

Quote for Bond Issuance

SOURCES AND USES OF FUNDS

City of North Richland Hills, Texas
Certificates of Obligation, Series 2014
(Fire Truck Example: $500,000 Level Principal Amortized Over 7 Yrs)
Tax-Exempt Rates As of 08/27/2014 (Aa2 / AA+)
***** Example *****

Dated Date	12/02/2014
Delivery Date	12/02/2014

Sources:	
Bond Proceeds:	
Par Amount	470,000.00
Premium	39,297.15
	509,297.15
Uses:	
Project Fund Deposits:	
Project Fund	500,000.00
Delivery Date Expenses:	
Cost of Issuance	5,000.00
Underwriter's Discount	3,290.00
	8,290.00
Other Uses of Funds:	
Additional Proceeds	1,007.15
	509,297.15

Note: Preliminary, for illustrative purposes only.

BOND SUMMARY STATISTICS

City of North Richland Hills, Texas
Certificates of Obligation, Series 2014
(Fire Truck Example: $500,000 Level Principal Amortized Over 7 Yrs)
Tax-Exempt Rates As of 08/27/2014 (Aa2 / AA+)
*** Example ***

Dated Date	12/02/2014
Delivery Date	12/02/2014
First Coupon	02/15/2015
Last Maturity	02/15/2021
Arbitrage Yield	1.416964%
True Interest Cost (TIC)	1.604604%
Net Interest Cost (NIC)	1.692630%
All-In TIC	1.893039%
Average Coupon	3.785697%
Average Life (years)	3.660
Weighted Average Maturity (years)	3.716
Duration of Issue (years)	3.477
Par Amount	470,000.00
Bond Proceeds	509,297.15
Total Interest	65,125.56
Net Interest	29,118.41
Bond Years from Dated Date	1,720,305.56
Bond Years from Delivery Date	1,720,305.56
Total Debt Service	535,125.56
Maximum Annual Debt Service	95,600.00
Average Annual Debt Service	86,271.92
Underwriter's Fees (per $1000)	
Average Takedown	
Other Fee	7.000000
Total Underwriter's Discount	7.000000
Bid Price	107.661096

Bond Component	Par Value	Price	Average Coupon	Average Life	PV of 1 bp change
Serial Bond	470,000.00	108.361	3.786%	3.660	174.25
	470,000.00			3.660	174.25

	TIC	All-In TIC	Arbitrage Yield
Par Value	470,000.00	470,000.00	470,000.00
+ Accrued Interest			
+ Premium (Discount)	39,297.15	39,297.15	39,297.15
- Underwriter's Discount	-3,290.00	-3,290.00	
- Cost of Issuance Expense		-5,000.00	
- Other Amounts			
Target Value	506,007.15	501,007.15	509,297.15
Target Date	12/02/2014	12/02/2014	12/02/2014
Yield	1.604604%	1.893039%	1.416964%

BOND SUMMARY STATISTICS

City of North Richland Hills, Texas
Certificates of Obligation, Series 2014
(Fire Truck Example: $500,000 Level Principal Amortized Over 7 Yrs)
Tax-Exempt Rates As of 08/27/2014 (Aa2 / AA+)
***** Example *****

Note: Preliminary, for illustrative purposes only.

BOND DEBT SERVICE

City of North Richland Hills, Texas
Certificates of Obligation, Series 2014
(Fire Truck Example: $500,000 Level Principal Amortized Over 7 Yrs)
Tax-Exempt Rates As of 08/27/2014 (Aa2 / AA+)
***** Example *****

Period Ending	Principal	Coupon	Interest	Debt Service	Annual Debt Service
02/15/2015			3,325.56	3,325.56	
08/15/2015			8,200.00	8,200.00	
09/30/2015					11,525.56
02/15/2016	80,000	2.000%	8,200.00	88,200.00	
08/15/2016			7,400.00	7,400.00	
09/30/2016					95,600.00
02/15/2017	80,000	3.000%	7,400.00	87,400.00	
08/15/2017			6,200.00	6,200.00	
09/30/2017					93,600.00
02/15/2018	80,000	4.000%	6,200.00	86,200.00	
08/15/2018			4,600.00	4,600.00	
09/30/2018					90,800.00
02/15/2019	80,000	4.000%	4,600.00	84,600.00	
08/15/2019			3,000.00	3,000.00	
09/30/2019					87,600.00
02/15/2020	75,000	4.000%	3,000.00	78,000.00	
08/15/2020			1,500.00	1,500.00	
09/30/2020					79,500.00
02/15/2021	75,000	4.000%	1,500.00	76,500.00	
09/30/2021					76,500.00
	470,000		65,125.56	535,125.56	535,125.56

Note: Preliminary, for illustrative purposes only.

BOND DEBT SERVICE

City of North Richland Hills, Texas
Certificates of Obligation, Series 2014
(Fire Truck Example: $500,000 Level Principal Amortized Over 7 Yrs)
Tax-Exempt Rates As of 08/27/2014 (Aa2 / AA+)
***** Example *****

Period Ending	Principal	Coupon	Interest	Debt Service
09/30/2015			11,525.56	11,525.56
09/30/2016	80,000	2.000%	15,600.00	95,600.00
09/30/2017	80,000	3.000%	13,600.00	93,600.00
09/30/2018	80,000	4.000%	10,800.00	90,800.00
09/30/2019	80,000	4.000%	7,600.00	87,600.00
09/30/2020	75,000	4.000%	4,500.00	79,500.00
09/30/2021	75,000	4.000%	1,500.00	76,500.00
	470,000		65,125.56	535,125.56

Note: Preliminary, for illustrative purposes only.

BOND PRICING

City of North Richland Hills, Texas
Certificates of Obligation, Series 2014
(Fire Truck Example: $500,000 Level Principal Amortized Over 7 Yrs)
Tax-Exempt Rates As of 08/27/2014 (Aa2 / AA+)
***** Example *****

Bond Component	Maturity Date	Amount	Rate	Yield	Price	Premium (-Discount)	Principal Cost
Serial Bond:							
	02/15/2016	80,000	2.000%	0.450%	101.856	1,484.80	81,484.80
	02/15/2017	80,000	3.000%	0.750%	104.905	3,924.00	83,924.00
	02/15/2018	80,000	4.000%	1.030%	109.332	7,465.60	87,465.60
	02/15/2019	80,000	4.000%	1.350%	110.790	8,632.00	88,632.00
	02/15/2020	75,000	4.000%	1.660%	111.615	8,711.25	83,711.25
	02/15/2021	75,000	4.000%	1.920%	112.106	9,079.50	84,079.50
		470,000				39,297.15	509,297.15

Dated Date	12/02/2014	
Delivery Date	12/02/2014	
First Coupon	02/15/2015	
Par Amount	470,000.00	
Premium	39,297.15	
Production	509,297.15	108.361096%
Underwriter's Discount	-3,290.00	-0.700000%
Purchase Price	506,007.15	107.661096%
Accrued Interest		
Net Proceeds	506,007.15	

Note: Preliminary, for illustrative purposes only.