



NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS

Regional Stop Illegal Dumping Cost/Benefit Analysis Study



AUGUST 2003

**RS
&Y**

a division of R. W. Beck, Inc.

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EXECUTIVE SUMMARY

BACKGROUND

The *SEE Less Trash Regional Solid Waste Management Plan (Plan)*, which is the regional solid waste management plan for the North Central Texas Council of Governments (NCTCOG), includes “Stop Illegal Dumping” as a goal for the North Central Texas region. The *Plan* identified a need for a study that would evaluate the actual costs and benefits of cleaning-up illegal dumpsites throughout North Central Texas. NCTCOG recognized the need for a study to assist communities to establish a more proactive approach to the education and outreach, enforcement and cleanup of illegal dumping, rather than simply a reactionary approach of merely cleaning-up site after site without the possibility of apprehending the offenders.

To address these issues, NCTCOG applied for and received a grant from the Resource Conservation Council (RCC) of NCTCOG to conduct a “Regional Stop Illegal Dumping Cost/Benefit Analysis Study.” NCTCOG retained the services of Reed, Stowe & Yanke, a division of R.W. Beck, Inc., (RS&Y) to conduct the study. NCTCOG staff and members of the RCC’s Stop Illegal Dumping Project Oversight Subcommittee provided supervision and guidance in the conduct of the study.

The Regional Stop Illegal Dumping Cost/Benefit Analysis Study is intended to complement both NCTCOG’s *SEE Less Trash Regional Solid Waste Management Plan* and TCEQ’s *Solid Waste Management in Texas: Strategic Plan 2001-2015*. In addition, this study complies with all of the TCEQ’s requirements for the development of a technical study, as described in 30 Texas Administrative Code, Chapter 330, Subchapter O.

PROJECT PURPOSE

This study has two primary purposes. The first purpose is to determine the extent to which communities in the North Central Texas region are allocating resources to address their illegal dumping problems. Specifically, NCTCOG sought to address the extent to which local governments’ resources should be focused on initiatives to prevent illegal dumping (e.g. enforcement, education and outreach and collection/disposal) instead of being reactive by only cleaning-up illegal dumping after it occurs.

The second purpose of this study was to evaluate the most cost-effective and efficient approaches to conduct clean-up, enforcement and education and outreach programs. To accomplish this, RS&Y evaluated the practices in place and costs associated with these programs.

KEY FINDINGS

While the case study communities varied in how they specifically address their illegal dumping problems, there were several key findings that were consistent for all five case studies that are especially relevant to this study.

For each case study, RS&Y concluded that all local governments are spending significantly more funds for clean-up activities, as compared to costs for preventative measures for enforcement and education and outreach. Overall, these five case studies found that the local governmental entities allocate 56.1 percent of their illegal dumping prevention and response budget to clean-up activities, and only allocate 27.4 percent to enforcement and 16.5 percent to education and outreach. Table ES.1 provides a summary of the costs each community incurs annually.

The initial goal of the study was to provide the communities in the North Central Texas region with a cost/benefit analysis of how the costs of clean-up measures compare to the cost of enforcement and education and outreach measures. To prove our original hypothesis that communities dedicating a significant amount of funding toward proactive measures would reduce the funding needed for clean-up programs, RS&Y set out to identify a benchmark program that displayed these characteristics.

Table ES.1 – Summary of Total Costs for All Case Studies

Local Government	Costs by Program			
	Cleanup	Enforcement	Education and Outreach	Total
City of Allen	\$ 135,844	\$ 11,166	\$ 34,030	\$ 181,040
City of Grand Prairie	\$ 125,607	\$ 50,654	\$ 54,898	\$ 231,159
Collin County	\$ 114,245	\$ 88,410	\$ 10,165	\$ 212,820
Kaufman County	\$ 205,074	\$ 78,867	\$ 91,627	\$ 375,568
Tarrant County	\$ 198,970	\$ 151,077	\$ 37,851	\$ 387,898
TOTAL	\$ 779,740	\$ 380,174	\$ 228,571	\$ 1,388,485
TOTAL by %	56.1 %	27.4 %	16.5 %	100.0 %

RS&Y concluded that many of the programs in the North Central Texas region are relatively young and have yet to realize reductions in the costs of clean-up efforts. RS&Y was able to determine a clean-up cost per dumpsite and a cost per ton for illegal dumped materials cleaned up. These figures are described in Tables ES.2 and ES.3.

The average clean-up cost per dumpsite and clean-up cost per ton were developed through data collected by county staff over 2002. The average cost per ton of illegal

dumped material is approximately \$326 and the average cost per dumpsite cleaned up is approximately \$805. It is important to emphasize that cleaning-up illegal dumping at a cost of \$326 per ton is a significant amount. RS&Y believes that these case study communities should maintain these records over several years to determine the effectiveness of their proactive measures.

Table ES.2 – Clean-up Cost per Dumpsite

Local Government	Cost per Dumpsite
City of Allen	\$ 629
City of Grand Prairie	\$ 457
Collin County	\$ 952
Kaufman County ¹	\$ 456
Tarrant County – Precinct 1	\$ 1,531
Average Cost per Dumpsite	\$805

Table ES.3 – Clean-up Cost per Ton of Illegally Dumped Material

Local Government	Cost per Ton
City of Allen	\$ 354
City of Grand Prairie	\$ 359
Collin County	\$ 85
Kaufman County	Data Unavailable
Tarrant County – Precinct 1	\$ 506
Average Cost per Ton	\$ 326

Many of these programs established their education and outreach programs within the last four years or have increased their activities partially based on the NCTCOG's 2001 *Targeted Illegal Dumper Study*. While these programs profiled in the case studies are very proactive, dedicating an average of approximately 17 percent of their program budget to illegal dumping education and outreach, RS&Y found it difficult to identify a mature program in the North Central Texas region that has seen reductions in the costs of cleanups. Table ES.4 describes the dates each enforcement and education and outreach program was established in each case study community.

As indicated by Table ES.4, while many of these programs have established environmental enforcement programs prior to 1998, education and outreach programs for illegal dumping are relatively new, the oldest program established in the last six years. RS&Y believes that as these programs mature they will likely see the cost of operating a clean-up program diminish. RS&Y recommends that these case study communities

¹ The cost per dumpsite and cost per ton data developed for Kaufman County was developed using the clean-up budget for Precinct 1 and the community clean-up event budget for the entire county.

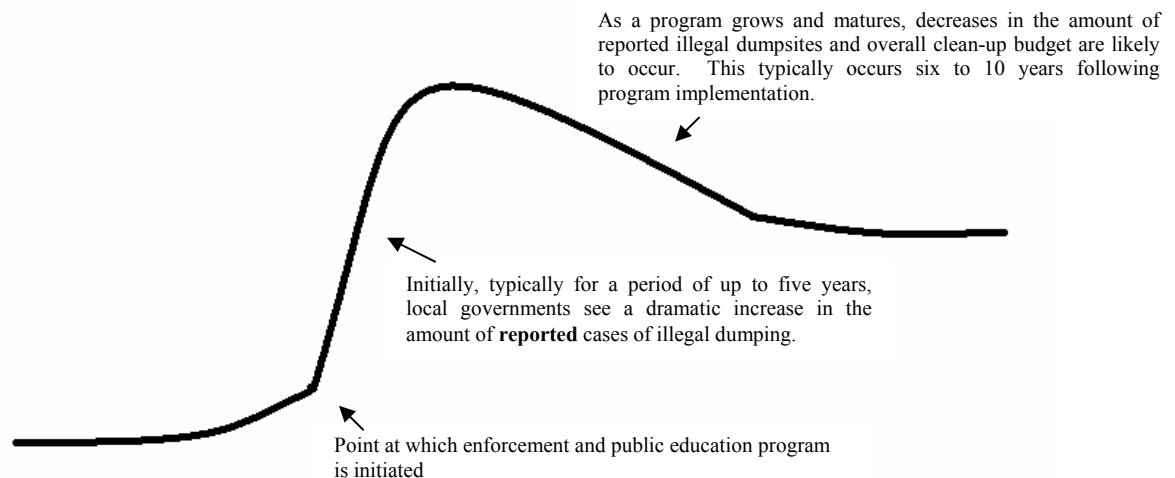
continue to proactively address the problem of illegal dumping and look to follow the recommendations provided for each community as well as those provided in Section 5.

Table ES.4 – Enforcement and Education and Outreach Program Establishment Dates

Local Government	Enforcement Program Date Established	Education Program Date Established
City of Allen	1995	1999
City of Grand Prairie	1998	2000
Collin County	1992 & 2000 ²	2003
Kaufman County	1990	1998
Tarrant County	1999 ³	2001

Several programs around the nation have operated proactive environmental enforcement and education and outreach programs for the past eight to 15 years. RS&Y considers these to be mature programs that have developed active enforcement and education and outreach campaigns over several years. During interviews conducted by RS&Y, these communities have initially observed sharp increases in the amount of illegally dumped material reported by citizens and environmental enforcement staff, followed by gradual decreases in the amount of illegal dumping or in the number of illegal dumping reports. Based on interviews with staff from mature programs, Figure ES.1 describes the pattern that many illegal dumping programs follow. It is important to note that the point at which a local government may see a decrease in reported cases of illegal dumping or decreases in the clean-up budget varies on a case-by-case basis.

Figure ES.1 – Pattern of Illegal Dumping in Programs Actively Combating Illegal Dumping



² The Collin County Sheriff's Department established an environmental enforcement program in 1992, and the Collin County Constable's Office – Precinct 3 established an environmental enforcement program in 2000.

³ Tarrant County enforcement activities are now housed in the Sheriff's Office as of September 2001.

RS&Y believes that the programs profiled for our case study analysis, if they continue to operate active enforcement and education and outreach activities, are likely to see decreases in the number of reported illegal dumpsites in their respective areas. Specific descriptions of these communities are included in Section 1.

The overarching theme of the study is to illustrate how local governments can operate in a cost-effective manner. Additionally, local governments can look to benchmark what the case study communities in the North Central Texas region should spend on their illegal dumping prevention and response program through case study analyses. Local governments in the region should look to the case studies profiles to assist and guide them as they develop their own program.

RS&Y was also able to identify many cost-effective measures that local governments could implement in various aspects of their program. RS&Y believes that by operating more efficiently and more cost-effectively, local governments have the opportunity to reduce overall operating expenses and redirect some of these funds to proactive measures. RS&Y created recommendations for a model illegal dumping prevention and response program in Section 5 of this study.

STUDY FORMAT

RS&Y developed this study through a progression of logical steps. RS&Y has described the evaluations and analyses completed for this study in the following sections of the report:

- Section 1: Describes the methodology and results of cost/benefit analysis for each of the case studies conducted for this study. The actual case studies are included in Appendix A.
- Section 2: Provides a description and the costs associated with the various types of clean-up personnel, equipment, and other illegal dumping cleanup issues affecting the method of cleanup.
- Section 3: Provides a description and the costs associated with the various aspects of an environmental enforcement program. The overview includes information on environmental enforcement personnel, equipment and issues commonly effecting environmental enforcement staff.
- Section 4: Describes the various aspects and costs associated with an illegal dumping education and outreach program. Provided in this section are details of the various materials, strategies and personnel that can be developed for an illegal dumping education and outreach campaign at the regional and local level.

Section 5: Provides recommendations to assist local governments in preventing and responding to illegal dumping. Many of these recommendations can be implemented at the local and regional level to assist in the creation of a model illegal dumping prevention and response program.

Appendix A: Includes the case studies included in the cost/benefit analysis. Specific case studies in the appendix include:

- No. 1 City of Allen
- No. 2 City of Grand Prairie
- No. 3 Collin County
- No. 4 Kaufman County
- No. 5 Tarrant County

Appendix B: Includes a profile of the various types of illegally dumped materials identified in the 2001 *Targeted Illegal Dumper Study*. These profiles include a discussion on the most appropriate type of personnel and equipment used to effectively cleanup the material as well as the costs associated with the disposal of the material.

Appendix C: Includes a map of the case study communities.

HOW TO USE THIS STUDY

RS&Y developed this study with the intention that it would serve as an on-going in-depth reference and planning guide for governmental entities in the North Central Texas region. Based on these principles, RS&Y developed a comprehensive clean-up, environmental enforcement and education and outreach program overviews assessing the positives and negatives of each facet of a program as well as identifying the various costs associated with them. RS&Y designed these overviews with the goal of creating a study to be as user-friendly as possible for new and experienced personnel who will utilize the study in the future.

RS&Y was able to identify several specific preventative measures that could be implemented at the local, sub-regional, and regional levels. RS&Y developed these preventative measures from a cost/benefit perspective. A listing of these specific recommendations is located in Section 5 of this study. For example, RS&Y believes that providing environmental enforcement officers at the local level with various pieces of high-tech equipment allows them to operate in a “mobile office” atmosphere. This will provide them with more opportunities to remain in the field to monitor illegal dumping without having to return to their office.

These recommendations have been developed through case study interviews and research of various equipment and strategies. RS&Y expects that over time the implementation of such measures within the region would both allow programs to operate more cost-effectively and decrease the costs and need for clean-up programs in the future.

ACKNOWLEDGEMENTS

RS&Y would like to express its appreciation to the many people throughout the North Central Texas region who contributed to the development of this study. To conduct this study, RS&Y conducted approximately 37 interviews with law enforcement and solid waste personnel. RS&Y appreciates the time and effort taken by these individuals to provide valuable information. RS&Y would also like to thank staff at NCTCOG who provided significant input, data and coordination efforts for the project. In addition, the project oversight committee contributed key ideas and valuable direction for the project.

This project was funded through the regional solid waste grants program, which is administered by the Texas Commission on Environmental Quality (TCEQ).

SECTION I - COST/BENEFIT ANALYSIS

Addressing illegal dumping problems within a community can occur through several methods. The most common methods to address illegal dumping involves cleaning-up dumpsites, taking enforcement action against illegal dumpers and developing public awareness campaigns to discourage illegal dumping from occurring.⁴ Depending on the community, these methods are sometimes implemented independently, while other communities have developed multiple, integrated programs to address their illegal dumping problems.

While clean-up, environmental enforcement and education and outreach programs are all necessary components of an illegal dumping prevention and response program, a number of communities within the North Central Texas region have raised questions about what is the most appropriate mix of programs from a cost/benefit perspective. In other words, these communities have sought to determine the extent to which funds should be focused on initiatives to prevent illegal dumping (e.g. enforcement, education and outreach and collection/disposal) instead of being reactive by only cleaning-up dumping after it occurs.

In conducting research for the NCTCOG's *Targeted Illegal Dumper Study* in 2001, several local governments' representatives, who are responsible for various illegal dumping abatement programs, stated that there was a concern that several local governments in the North Central Texas region spend significant amounts of money annually cleaning-up illegal dumpsites. However, many public officials in these local governments may not be aware of these costs. Furthermore, these officials may not realize that they could address illegal dumping problems more effectively by developing a more proactive approach, rather than just reacting by cleaning-up dumpsites on an on-going basis.

Based on this concern, NCTCOG and members of the RCC's Stop Illegal Dumping Project Oversight Subcommittee recognized the need to complete a study to address this issue. Based on the conclusions of this study, these findings could be provided to local government officials to assist them in realizing the importance of having effective environmental enforcement and education and outreach programs, instead of only focusing on cleaning-up illegal dumpsites.

The Regional Stop Illegal Dumping Cost/Benefit Analysis Study is intended to complement both NCTCOG's *SEE Less Trash Regional Solid Waste Management Plan* and TCEQ's *Solid Waste Management in Texas: Strategic Plan 2001-2015*. In addition, this study complies with all of the TCEQ's requirements for the development of a

⁴ In addition, providing residents and businesses with viable collection and disposal options is also a critical component to an illegal dumping abatement program. However, this issue was not addressed as a key focus of this study, as it was the focus of another NCTCOG project that was developed at the same time as this study. This other study, *Rural and Underserved Disposal Needs Study*, is available from NCTCOG.

technical study, as described in 30 Texas Administrative Code, Chapter 330, Subchapter O.

1.1 CONDUCTING COST/BENEFIT ANALYSIS CASE STUDIES

To obtain a fundamental understanding of the costs and benefits associated with clean-up, enforcement and education and outreach programs, RS&Y conducted a series of case studies of five local governments located in the North Central Texas region. These case studies were selected based on RS&Y's understanding of active illegal dumping programs and recommendations from the Stop Illegal Dumping project oversight subcommittee. These case studies represented both city and county programs, and covered urban, suburban and rural areas. The five case studies included the following local governments, with the type of area provided in parenthesis:

- No. 1 City of Allen (suburban)
- No. 2 City of Grand Prairie (urban and suburban)
- No. 3 Collin County (suburban and rural)
- No. 4 Kaufman County (rural)
- No. 5 Tarrant County (urban, suburban and rural)

In developing the case studies, RS&Y worked directly with the local government representatives responsible for managing and conducting program operations. RS&Y conducted interviews with staff, made field visits to dumpsites and analyzed budgets and related financial information. Each case study includes a detailed description of the local government's clean-up, enforcement and education and outreach programs. In addition, RS&Y has documented the total annual costs associated with each program. RS&Y has specifically detailed costs for categories that include but are not limited to personnel, equipment, materials, transportation and disposal. Each case study includes key findings and recommendations to help each local government develop more effective and efficient illegal dumping abatement programs. All case studies are included in Appendix A.

1.2 KEY FINDINGS

While the case study communities varied in how they specifically address their illegal dumping problems, there were several key findings that were consistent for all five case studies that are especially relevant to this study.

For each case study, RS&Y concluded that all local governments are spending significantly more funds for clean-up activities, as compared to costs for preventative measures for enforcement and education and outreach. Overall, these five case studies found that the local governmental entities allocate 56.1 percent of their illegal dumping prevention and response budget to clean-up activities, and only allocate 27.4 percent to

enforcement and 16.5 percent to education and outreach. Table 1-1 provides a summary of the costs each community incurs annually.

The initial goal of the study was to provide the communities in the North Central Texas region with a cost/benefit analysis of how the costs of clean-up measures compare to the cost of enforcement and education and outreach measures. To prove our original hypothesis, that communities dedicating a significant amount of funding toward proactive measures would reduce the funding needed for clean-up programs, RS&Y set out to identify a benchmark program that displayed these characteristics.

Table 1.1 – Summary of Total Costs for All Case Studies

Local Government	Costs by Program			
	Cleanup	Enforcement	Education and Outreach	Total
City of Allen	\$ 135,844	\$ 11,166	\$ 34,030	\$ 181,040
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Collin County	\$ 114,245	\$ 88,410	\$ 10,165	\$ 212,820
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TOTAL	\$ 779,740	\$ 380,174	\$ 228,571	\$ 1,388,485
TOTAL by %	56.1 %	27.4 %	16.5 %	100.0 %

RS&Y concluded that many of the programs in the North Central Texas region are relatively young and have yet to realize reductions in the costs of clean-up efforts. RS&Y was able to determine a clean-up cost per dumpsite and a cost per ton for illegal dumped materials cleaned up. These figures are described in Tables 1.2 and 1.3.

Table 1.2 – Clean-up Cost per Dumpsite

Local Government	Cost per Dumpsite
City of Allen	\$ 629
City of Grand Prairie	\$ 457
Collin County	\$ 952
Kaufman County ⁵	\$ 456
Tarrant County – Precinct 1	\$ 1,531
Average Cost per Dumpsite	\$ 805

⁵ The cost per dumpsite and cost per ton data developed for the Kaufman County was developed using the clean-up budget for Precinct 1 and the community clean-up event budget for the entire county.

Table 1.3 – Clean-up Cost per Ton of Illegally Dumped Material

Local Government	Cost per Ton
City of Allen	\$ 354
City of Grand Prairie	\$ 359
Collin County	\$ 85
Kaufman County	Data Unavailable
Tarrant County – Precinct 1	\$ 506
Average Cost per Ton	\$ 326

The average clean-up cost per dumpsite and clean-up cost per ton were developed through data collected by county staff over the last year. The average cost per ton of illegally dumped material is approximately \$326 and the average cost per dumpsite cleaned up is approximately \$805. Local governments should recognize that a cost of \$326 per ton for the clean-up of illegal dumping is a significant amount. RS&Y believes that these case study communities should maintain these records over several years to determine the effectiveness of their proactive measures.

Many of these programs established their education and outreach programs within the last four years or have increased their activities partially based on the NCTCOG's 2001 *Targeted Illegal Dumper Study*. While these programs profiled in the case studies are very proactive, dedicating an average of approximately 17 percent of their program budget to illegal dumping education and outreach, RS&Y found it difficult to identify a mature program in the North Central Texas region that has seen reductions in the costs of cleanups. Table 1.4 describes the dates each enforcement and education and outreach program was established in each case study community.

Table 1.4 – Enforcement and Public Education Program Establishment Dates

Local Government	Enforcement Program Date Established	Education Program Date Established
City of Allen	1995	1999
City of Grand Prairie	1998	2000
Collin County	1992 & 2000 ⁶	2003
Kaufman County	1990	1998
Tarrant County	1999 ⁷	2001

As indicated by Table 1.4, while many of these programs have established environmental enforcement programs prior to 1998, education and outreach programs for illegal dumping are relatively new, the oldest program established in the last six years. RS&Y

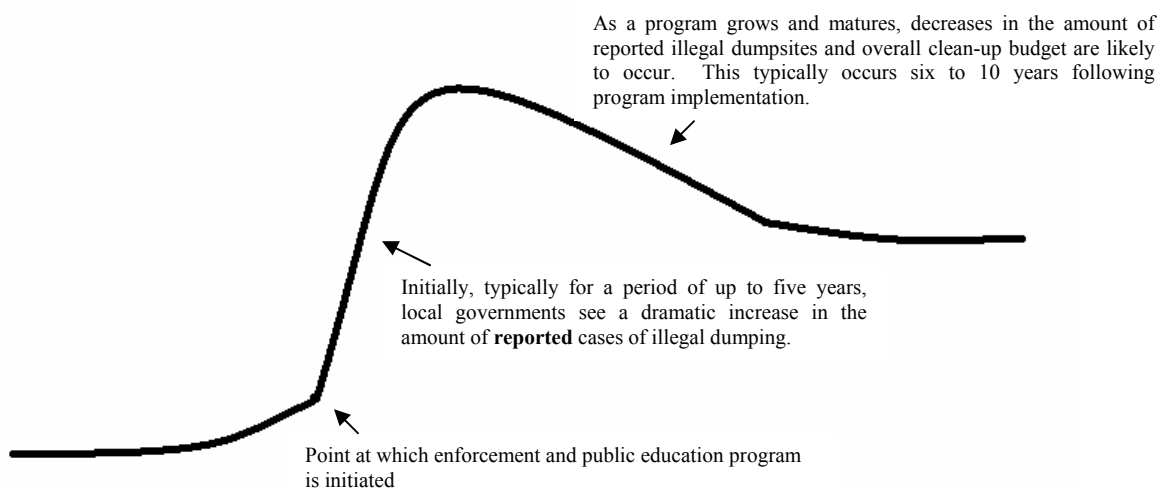
⁶ The Collin County Sheriff's Department established an environmental enforcement program in 1992, and the Collin County Constable's Office – Precinct 3 established an environmental enforcement program in 2000.

⁷ Tarrant County enforcement activities are now housed in the Sheriff's Office as of September 2001.

believes that as these programs mature they will likely see the cost of operating a clean-up program diminish. RS&Y recommends that these case study communities continue to proactively address the problem of illegal dumping and look to follow the recommendations provided for each community as well as those provided in Section 5.

Several programs around the nation have operated proactive environmental enforcement and education and outreach programs for the past eight to 15 years. RS&Y considers these to be mature programs that have developed active enforcement and education and outreach campaigns over several years. During interviews conducted by RS&Y, these communities have initially observed sharp increases in the amount of illegally dumped material reported by citizens and environmental enforcement staff, followed by gradual decreases in the amount of illegal dumping or in the number of illegal dumping reports. Based on interviews with staff from mature programs, Figure 1.1 describes the pattern that many illegal dumping programs follow. It is important to note that the point at which a local government may see a decrease in reported cases of illegal dumping or decreases in the clean-up budget varies on a case-by-case basis.

**Figure 1.1 – Pattern of Illegal Dumping in Programs
Actively Combating Illegal Dumping**



RS&Y believes that if the programs profiled through the case study analysis continue to operate active enforcement and education and outreach activities, they are likely to see decreases in the number of reported illegal dumpsites in their respective areas overtime. The following descriptions provide additional information on each of the mature programs that served as the basis for this analysis:

- *Palm Beach County, Florida* has developed a very proactive enforcement and education and outreach program since 1988. Over the years, the county has realized specific reductions in the amount of funds dedicated to illegal dumping cleanup. The county also stated that it has witnessed the virtual elimination of all

residential dumping in the county.⁸ The county attributes this to a sustained environmental enforcement and education and outreach campaign that has been in place since the program's conception.

The county began to notice a slight decrease in illegal dumping complaints in 1993, five years after enforcement and education and outreach activities began. Since that time, the county has continued to observe decreases in illegal dumping.

The county operates a multi-faceted education and outreach campaign that includes 30-minute Public Service Announcements (PSAs) broadcast on public access and private channels and placards placed on disposal trucks promoting the illegal dumping hotline. Other activities include public awareness meetings, educational materials, and promotional items.

From an enforcement perspective, the county made significant changes to the sentencing guidelines for illegal dumping violations. If convicted, illegal dumpers are required to pay the costs of the investigation, pay the costs of clean-up and disposal of materials, and perform community service. The county stated that judges will often assign violators with the maximum penalty.

The county coordinates countywide enforcement efforts through the Illegal Dumping Task Force. Since 1990, the task force has brought representatives together from the various clean-up, enforcement and education and outreach departments as well as other departments such as planning and zoning, real estate, and real estate management. For example, the planning and zoning department notifies enforcement officers of new businesses that will be locating in the county that may need to be educated on the hazards and penalties of illegal dumping.

- *City of Houston, Texas* has operated an environmental enforcement and education and outreach program since 1992. The city houses its program within the Houston Police Department – Environmental Investigations Unit and, devotes 15 employees to environmental enforcement.⁹ The program was initially created as an environmental crimes hotline that offered cash rewards to citizens reporting illegal dumping, but grew steadily with the help of grant funding. City staff stated that in the last year, the city has observed a decrease in the amount of reported illegal dumping throughout the city.

The city maintains an extensive database that includes information on the number of complaints, number of dumpsites cleaned, chronic illegal dumpsites, and other information used as a performance measure for the program.

⁸ The county stated that in the past few years, the program has shifted its focus to address the problem of illegal landfills/sham recyclers and other more covert, large-scale illegal dumpsites on private property.

⁹ This includes a community liaison, several supervisors, inspectors, sergeants, police officers, and administrative staff.

The city also conducts education and outreach programs in the community as part of its Neighborhood Environmental Education Training (NEET) project. NEET conducts seminars and activities aimed at discouraging litter and illegal dumping of hazardous materials. Education and outreach programs also encourage recycling, pollution prevention, and safe waste handling methods.

- *Fort Bend County, Texas* houses its environmental enforcement and education and outreach program within the County Environmental Health Department. While the program recently relocated to the environmental health department in 2002, the county has operated its program since 1996. The county has reported a significant decrease in the number of identified dumpsites throughout the county. The county attributes the significant decrease in number of identified dumpsites due to the high priority it places on educational programs, public speaking engagements, and the distribution of in-house produced literature and brochures.

From an enforcement perspective, two full-time code enforcement officers dedicate approximately 40 hours per week to environmental enforcement and education and outreach. Additionally, three support staff members dedicate approximately 12 hours per week to environmental enforcement and education and outreach. These individuals enforce illegal dumping statutes, maintain an illegal dumping database, identify illegal dumping hot spots, and attend numerous public speaking engagements.¹⁰

The county has also been successful incorporating education and outreach through the "Adopt-A-County-Road" Program which currently has 47.5 miles of county roads adopted by individuals, churches, businesses, and civic groups. County staff recently attended a workshop regarding the implementation of an organized countywide solid waste collection system.

- *City of Chicago, Illinois* initiated its environmental enforcement and education and outreach program in 1996 with the creation of the environmental enforcement unit. The program is housed within the Department of the Environment that coordinates both enforcement and educational efforts. The city has observed decreases in the amount of illegally dumped material within the city. The city perceives this decrease to be a result of a very active enforcement and education and outreach campaign.

From a education and outreach perspective, the city is able to maintain community and governmental involvement by continually broadening the scope of the program and by developing a strong education and outreach component

¹⁰ The county's illegal dumping database is very extensive and has historical data going back several years. The database contains data including: the number of complaints received, verbal warnings issued, public speaking engagements attended, and training hours attended by all environmental enforcement staff.

which includes brochures, billboards, bus cards, and an information video, as well as participation in events such as senior citizen picnics, super block meetings and festivals. In addition, from 1996 to 2003 the city has received approximately 1,500 calls to report illegal dumping.

The city is very committed to the enforcement of its illegal dumping statutes. For example, the city stated that increasing the cost to dumpers was an important step in improving the city's enforcement program. Fines were increased to between \$1,000 and \$2,000 for first offenses, and vehicles of illegal dumpers were impounded at an additional charge of \$2,000.

The overarching theme of the study is to illustrate how local governments can operate in a cost-effective manner. Additionally, local governments can look to benchmark what case study communities in the North Central Texas region should spend on their illegal dumping prevention and response program through case study analyses. Local governments in the region should look to the case study profiles to assist and guide them as they develop their own program.

RS&Y was also able to identify many cost-effective measures that local governments could implement in various aspects of their program. RS&Y believes that by operating more efficiently and more cost-effectively, local governments have the opportunity to reduce operating expenses overall and redirect some of these funds to proactive measures. RS&Y created recommendations for a model illegal dumping prevention and response program in Section 5 of this study.

SECTION II – THE COSTS OF ILLEGAL DUMPING CLEAN-UP

2.1 INTRODUCTION

In order to examine all phases of an illegal dumping abatement program, RS&Y examined the many factors that affect the clean-up of illegal dumpsites. Based on interviews with city and county staff within the North Central Texas region, industry research and RS&Y's comprehensive knowledge of illegal dumping abatement programs, the following section introduces how the type and volume of illegally dumped material as well as the location of dumpsites affect the method and personnel utilized during illegal dumpsite cleanups.

Included in this section is a discussion of appropriate locations for an illegal dumping clean-up program, the various types of equipment often dedicated to illegal dumping cleanup, and other issues regarding illegal dumping cleanup that have been identified throughout the course of study.

2.2 CLEAN-UP PERSONNEL PROFILES

The following discussion presents several examples of various city/county/volunteer personnel that can be utilized for illegal dumping clean-up efforts. Included in this discussion are:

- General descriptions of personnel at the city, county, and sub-regional level.
- Brief profiles of the jurisdiction and duties of each personnel type.
- Available equipment which can be utilized for dumpsite cleanups.
- Limitations which might constrain the ability to perform dumpsite cleanup.
- Various personnel costs associated with performing illegal dumping cleanups.

2.2.3 PUBLIC WORKS STAFF

General Description

Public works staff operates as the primary resource for illegal dumping clean-up efforts in many cities and counties across the North Central Texas region. Within the public works department, there is often road crew and right of way maintenance staff, which has responsibility for illegal dumping cleanup. These groups can work independently or can combine efforts with other departments in cases of extreme or high volume illegal dumping.

Based on interviews with city/county staff, between 15 and 20 hours per week of public works staff time is dedicated to illegal dumping cleanup. Variations occur according to division or specified role the individual.

For example, In Tarrant County Precinct 1, right of way maintenance staff dedicate approximately 15 to 18 hours per week toward illegal dumping cleanup while road crew staff dedicate an average of one day per month toward illegal dumping. Right of way maintenance crew performs routine small volume or weekly dumpsite cleanups, while road crew staff assists in large volume dumpsite cleanups which occur on a monthly and semi-annual basis. In Tarrant County Precinct 1, road crew staff maintains and operates all heavy machinery.

Jurisdiction and Duties

In general, public works staff are responsible to maintain all roadways and the right of way, approximately 15 feet along each side of the roadway. Duties include keeping illegally dumped material and litter off of county roadways and rights of way. Based on interviews with county staff, cleanups occur weekly, monthly and semi-annually. Larger cleanups that require the use of heavy machinery usually occur monthly or semi-annually.



The clean-up crew in Tarrant County – Precinct 1 assesses clean-up options for a large illegal dumpsite.

Based on the case study analysis, Table 2.1 identifies common titles of individuals, divisions within the public works department and the number of hours dedicated to illegal dumping cleanup.

Table 2.1 –Time Dedicated to Illegal Dumpsite Cleanup: Public Works Department

Division	Title	Time Dedicated to Illegal Dumping Cleanups
Illegal Dumping Clean-up Crew	Supervisor and Staff	40 hours per week
Right of Way Maintenance Crew	Supervisor and Staff	15-20 hours per week
Road Crew	Supervisor and Staff	1 day per month

Equipment

Public works staff should be equipped with a brush truck, reflective vests, gigs and disposal bags. Heavy equipment needs vary according to volume and type of material dumped, in some scenarios (i.e. large dumpsite cleanups) a front-end loader with bucket and jaw, 30-cubic yard dump truck, and tracked excavator may be necessary. In cases where it is not feasible to dedicate heavy equipment specifically to illegal dumping, illegal dumping clean-up crews may seek to borrow equipment from other divisions within the public works department.

Limitations

Public works staff typically cannot clean-up illegal dumpsites located outside the publicly owned property. Furthermore, since illegal dumpsite cleanups are normally not the primary duties of public works staff, the use of heavy equipment for illegal dumping cleanups is proportional to the amount of time certain divisions of public works staff are dedicated to illegal dumpsite cleanup. To address these issues, public works supervisors should work to schedule a time that is mutually acceptable for both parties to participate in illegal dumping.

Approximate Cost

Based on interviews with city/county public works personnel, public works departments spend a significant amount of the overall budget on illegal dumpsite cleanups. In many cases there is no line-item in the budget dedicated solely for illegal dumpsite cleanups, therefore, cities and counties are unaware of what percentage of the budget is dedicated to or the actual costs of illegal dumpsite cleanups. Based on case study data, Table 2.2 examines the actual costs and percentage of the total budget dedicated to illegal dumpsite cleanups for each case study.

Table 2.2 – Case Study Clean-up Costs

City/County	Annual Cost of Illegal Dumping Cleanups	Percentage of Total Illegal Dumping Program Budget
City of Allen	\$ 135,844	75%
City of Grand Prairie	\$ 125,607	54%
Collin County	\$ 114,245	53%
Kaufman County	\$ 205,074	55%
Tarrant County - Precinct 1	\$ 198,970	51%

2.2.2 ENFORCEMENT OFFICER

General Description

Enforcement officers are responsible for issuing citations, making arrests as well as assist clean-up efforts in a city or county. During the regular patrols of illegal dumpsites, enforcement officers may take a few moments to cleanup small illegal dumpsites. Often, it is much quicker and easier for an officer to put a bag of residential solid waste in the back of their vehicle than it would be to call a clean-up crew to come out and cleanup the site.

For example, two environmental enforcement officers in Kaufman County estimated that combined in 2002, 500 hours were spent on illegal dumping cleanup. The officers stated that they performed illegal dumping cleanups during the course of their enforcement

activities, transporting illegally dumped materials in the bed of their pickup trucks. The officers also stated that on most occasions, the illegally dumped materials consisted of residential or commercial municipal solid waste.

Jurisdiction and Duties

Enforcement officers are responsible for assisting city/county clean-up efforts through:

- Performing manual cleanups of roadside or right of way illegal dumping.
- Identifying and notifying the public works department regarding large volume dumpsites.
- Responding to local citizen illegal dumping calls as well as NCTCOG Illegal Dumping Hotline calls.

Equipment

Enforcement officers should be equipped with latex protective gloves, garbage bags and truck bed or trunk space for storage and transportation of illegally dumped materials.

Limitations

Factors that limit enforcement officer clean-up efforts include:

- Officers are prohibited from cleaning-up illegal dumping on private property.
- Due to vehicle and storage constraints, officers are limited in the amount of illegally dumped material they can transport in their vehicle at one time.
- Officers are often occupied with various other cases, or have a heavy backlog of cases they are currently investigating, which may limit the amount of time they spend conducting clean-up activities.



Enforcement officers in Kaufman County perform clean-up activities in conjunction with enforcement efforts.

Approximate Cost

Salaries for environmental enforcement officers vary depending on the location of the position, experience and responsibilities of the individual. Personnel cost (including salary and benefits) can range from \$30,000 to \$70,000 annually.

Based on interviews with city and county enforcement staff, environmental enforcement officers generally dedicate approximately four to eight hours per week performing illegal dumping cleanups. The amount of time dedicated to environmental enforcement clean-up activities vary according to availability, nature of the position and whether the officer has Texas Environmental Law Enforcement Association (TELEA) or Southern Environmental Enforcement Network (SEEN) training. Table 2.3 estimates the amount

of time spent on illegal dumping based on type of officer based on case studies completed for this project.

Table 2.3 –Time Dedicated to Illegal Dumping Cleanup: Enforcement Staff

Officer	Hours per Week
Environmental Enforcement	6 - 8 hours
Sheriff	1 - 2 hours
Constable	1 - 2 hours
City Police	1 - 2 hours
Code Enforcement	2 – 4 hours

2.2.2 CONTRACTORS

General Description

Contractors are private individuals or companies which are able to assist municipalities and counties in the abatement of illegal dumpsites. Contractors can be used in place of public works crews or to supplement efforts during the cleanup of a large volume dumpsites or hazardous materials. Contractors may be engaged on a case-by-case basis or as part of the qualifications for those wishing to provide collection services within a municipality.

For example, the City of Allen utilizes a contracted service to perform illegal dumping/litter cleanups on the right of way along State Highway 75 that runs through the City of Allen¹¹. The contractor performs manual cleanups and disposes of illegally dumped materials and litter. Based on stipulations set up in the contract, the service is to be performed on a weekly basis. As detailed in Case Study #1, the city dedicates approximately \$42,000 annually to cleanup of this area.

Additionally, the City of Grand Prairie, where previously all illegal dumping cleanup efforts were contracted out, the city had budgeted \$40,000 annually for illegal dumping clean-up contracts. The contractor was responsible for illegal dumpsite cleanups for the entire city. The city did not seek to renew the contract in 2001 and chose to begin an illegal dumping clean-up program internally.

Jurisdiction and Duties

Duties and jurisdiction of contractors vary along with the type of services retained by the community. It is recommended that in scenarios where contractors will be utilized as the primary source of illegal dumping clean-up efforts, duties should be clearly defined during the procurement process.

¹¹ There are approximately 86 acres of right-of-way along State Highway 75.

Equipment

Contractors should be equipped with disposal truck(s), trailers, reflective vests, gigs and disposal bags. Heavy equipment needs vary according to volume and type of material dumped, however each contractor engaged in high volume illegal dumpsite cleanup should have the capability to provide a brush truck or other heavy equipment to assist in the cleanup of illegal dumpsites.

Limitations

The following are scenarios have been identified as limitations for the use of contractors as the sole or primary source of illegal dumping clean-up efforts:

- Unless stated in the service contract, contractors may not be required to provide documentation showing materials have been properly disposed of.
- Contractor may be more difficult to coordinate with environmental enforcement activities than a public works crew.

Approximate Cost

Costs may depend on the degree of services requested by the entity. Factors that can determine the cost of contractor services include the number of times per week a site is to be maintained and the size of the site (i.e. a single stretch of highway versus clean-up services for an entire community).

Clean-up services can be either contracted during the procurement of solid waste services or as a stand alone contract that can go out for bid. Information on procuring stand alone contracts can be found in the Federal Emergency Management Agency's (FEMA) Debris Management Guide: Publication 325. While this publication is geared toward debris management clean-up, there are many similarities to illegal dumping cleanups. For example, both debris and large illegal dumpsite cleanups occur on a sporadic and period basis. This document can be downloaded from the FEMA website at: <http://www.fema.gov/rrr/pa/dmgtoc.shtm>.

2.2.4 COUNTY JAIL TRUSTEES

General Description

Trustees from the county jail function as an auxiliary source of manpower which can be dedicated to illegal dumping cleanups on public property. Trustees, who are available for illegal dumping cleanups, should be identified as low risk, many times serving jail sentences for minor offenses.

For example, Tarrant County – Precinct 1, in coordination with the Tarrant County Jail, utilizes five jail trustees for six hours per day, five days per week to perform manual cleanups of illegal dumpsites. As described in Case Study #5, the Road Crew supervisor, by obtaining his jailer's license, can accompany up to five county jail trustees on illegal dumpsite cleanups.

Jurisdiction and Duties

County jail trustees are only available for illegal dumping cleanups on public property and cannot operate any heavy equipment. Tasks which can be performed consist of manual cleanup of low volume dumpsites or illegally disposed material over a large area.

Limitations

Drawbacks to the use of trustees during illegal dumpsite cleanup include:

- Certified jailer must supervise county jail trustees at all times.
- County jail trustees cannot operate heavy machinery.
- Transportation for trustees to and from jail must be provided by the certified jailer.
- Although not designated as dangerous criminals, county jail trustees must be supervised and could potentially pose a threat to certified jailers or the public.

Equipment

County jail trustees must be provided all equipment associated with manual clean-up efforts. Based on interviews with city and county staff, the county must provide transportation to and from the jail for the county jail trustees.

Approximate Cost

County jail trustees can serve as an illegal dumping clean-up crew at a minimal cost to the county. Costs include personnel costs for the certified jailer, use of a vehicle when transportation cannot be provided for the trustees, and materials. No direct cost exists for the use of county jail trustees.

2.2.5 VOLUNTEER/COMMUNITY GROUPS

General Description

Volunteer/Community groups serve as an auxiliary source of clean-up personnel for illegal dumpsite or litter cleanup. Many local community groups volunteer their efforts for various types of clean-up efforts including roadside, right-of-way cleanup, and park cleanups. Typical groups who volunteer their time for community cleanups include:

- Community outreach organizations (Kiwanas, Lion's Club)
- Church groups
- Youth groups
- Senior citizens groups
- Keep America Beautiful (local chapter)
- Keep Texas Beautiful



A group of young people participate in clean-up activities such as the Adopt-a-Spot program in Denton County.

Many communities in the North Central Texas region, including several that have been profiled in the Case Study section, coordinate community clean-up events regularly. For example, the City of Allen's Great American Trash-off collected more than 86 tons of materials, of which a significant amount of the material collected was recycled.

Jurisdiction and Duties

Volunteer/Community groups are only available for cleanups on public areas, unless the group coordinates a cleanup with a private property owner. Duties frequently include the cleanup of litter along public roads or small volume illegal dumping.

Limitations

Volunteer/community groups in most scenarios are unable to operate heavy machinery or participate in heavy illegal dumpsite cleanups.

Equipment

Volunteer/Community groups will provide all materials commonly associated with manual clean-up efforts.

Approximate Cost

The governmental body does not incur any labor or material costs during volunteer/community clean-up efforts.

2.3 ILLEGAL DUMPING CLEAN-UP EQUIPMENT

When faced with the task of illegal dumpsite cleanups, personnel must determine what equipment is best suited for various types of illegal dumpsites. The most appropriate equipment must be used in order for clean-up personnel to minimize health and safety risks. Additionally maximizing the efficiency of dumpsite clean-up time is a key component when deciding the most appropriate equipment type.

The various types of equipment necessary to perform illegal dumping cleanups for small volume or scattered dumpsites and large volume dumpsites are described in this section based on the following categories:

- Review of materials found at illegal dumpsites
- Applicability and limitations of equipment
- Costs associated with equipment

2.3.1 SMALL VOLUME OR SCATTERED DUMPSITE CLEANUP

Material Profile

Materials often found at small volume or scattered dumpsites include, but are not limited to: residential/commercial wastes, bulky items, and scrap tires.

Equipment Profile

Since small volume or scattered illegal dumping are the result of littering, fly-dumping, or waste haulers traveling with uncovered or unsecured loads, the manual clean-up approach is often the recommended approach for clean-up efforts. The following are materials frequently used during manual clean-up efforts:

Reflective vests: Due to heavy traffic that may occur on roadways where illegal dumping clean-up efforts take place, reflective vests serve as a tool that can be implemented to increase visibility and help ensure the safety of individuals performing cleanups.

Garbage bags: Garbage bags can be used to store litter and other loose illegally dumped items. Specialized bags are also available for the disposal and transportation of hazardous materials.

Trash picker: To accommodate some clean-up personnel, trash pickers can be used to collect litter or other loose illegally dumped materials.

Protective gloves: Protective gloves should be worn by all individuals during illegal dumpsite cleanups. Common types of protective gloves include latex or leather.

Pickup trucks: Standard sized pickup trucks with towing capabilities are ideal for temporary storage and transportation of illegally dumped materials. For cases involving dead animals, trucks lined with a leak proof liner are necessary for transportation.

Trailers: Utilizing a flatbed trailer during dumpsite cleanup has many advantages that can expedite the process of illegal dumpsite cleanups. These advantages include:

- Added mobility: When unhinged, trailers become a stationary drop-off point for the materials in the field.
- Increased transportation capabilities: Trailers increase the amount of material that is able to be transported for disposal, not only reducing fuel consumption but decreasing the number of disposal trips per cleanup.
- Additional Equipment: Trailers can be equipped with hydraulic tailgate and bed lifts, which can decrease loading and unloading times as well as reduce the chance of injury during the loading and unloading of bulky items.



Hydraulic dump trailers can be very useful during illegal dumping clean-up efforts.

Approximate Cost

Most of the equipment used in manual clean-up efforts is relatively inexpensive. These materials can also be used in non-illegal dumping clean-up duties of the individual or crew. Table 2.4 outlines the various types of equipment and estimated costs.

Table 2.4 – Small Volume Clean-up Equipment Costs

Equipment	Cost	Unit
Reflective vests	\$1,900	100 units
Trash picker	\$1,400	100 units
Protective gloves		
Leather	\$700	100 units
Latex	\$1,800	100 boxes
Pickup truck	\$20,000	1 unit
Trailer		
Standard dump trailer	\$3,800	1 unit
Hydraulic bed lift	\$4,400	

2.3.2 LARGE VOLUME DUMPSITE CLEANUP

Material Profile

Materials which are commonly identified at large volume dumpsites include, but are not limited to:

- C&D
- Hazardous materials
- Dead animals
- Bulky waste
- White goods
- Brush
- Residential/commercial waste
- Ashes
- Liquid wastes
- Motor oil
- Hazardous materials

Equipment Profile

All equipment profiled in this section must be operated by trained or experienced staff and should be used in coordination with manual clean-up efforts if necessary.

Front-end loader: Lightweight models are used for scooping and moving loose materials, such as C&D debris, concrete, gravel, etc. Heavier weight models can be used for digging out soil in contaminated areas. Front-end loaders can be equipped with bucket or jaw, depending on the needs of the cleanup.

Front-end loaders typically have difficulty retrieving material that has been dumped in ravines or muddy areas. These limitations exist due to mechanical restrictions placed on the arm's range of motion and curtailed ability to maneuver in muddy or steep areas.

Knuckleboom: Hydraulically operated loading booms whose mechanical action imitates the human arm. Knucklebooms can be operated as an individual unit or

attached to a disposal bed. These machines are most adept for loading woody debris or large quantities of C&D debris. Scenarios that can limit the effectiveness of a knuckleboom include:

- Low volume dumpsites
- When attached to a disposal bed, numerous trips to an off-site disposal facility may be necessary, thus limiting the amount of “on-site” time for equipment
- Muddy or steep terrain

Roll-off container and truck: A roll-off is a container that can be left on site, separate from the truck. Roll-off containers are usually available in several sizes, from 10-cubic yards to 40-cubic yards. To drop-off and remove roll-off containers, a specialized roll-off truck is required.

Dump truck: A specialized truck designed with a bed capable of hydraulically lifting to empty its contents. Used for transporting large volume dumpsite debris, such as C&D debris or residential waste. The time that is required to remove materials from truck bed is considerably reduced by a hydraulic lifting device on the tailgate.

Tracked excavator:

A hydraulically operated loading machine whose mechanical action can be equipped for excavating. Excavators can also be equipped with a grapple to mimic the motion of a human hand. Tracked excavators should be used in large volume illegal dumping cleanups or during soil removal.



A tracked excavator is used at a large illegal dumpsite cleanup in Tarrant County – Precinct 1

Brush collection vehicle: Brush trucks are versatile trash loading systems that can be designed to be attached with 24 – 42 cubic yard dump bodies or as stand alone units. All units are equipped with a boom and clamshell bucket. These systems have the ability to reach up to 20 feet, and are ideal for illegally dumped materials located in ravines or creeks. Stand alone units are more easily maneuverable than those with dump bodies; however, a roll-off or dump truck would be necessary to accompany a stand alone unit during clean-up activities. Scenarios where stand alone and dump body brush trucks would be ideal would include:

- Large dumpsite cleanups, stand alone units can be left onsite while multiple roll-off trucks transport material to and from disposal facility.
- When several larger illegal dumpsites are located throughout the county, units equipped with dump bodies foster increased productivity by allowing

personnel to travel from site to site without a need for additional equipment or frequent visits to disposal facility.

Tow truck: Tow trucks can be utilized in the removal of junked vehicles on public property. Tow trucks sizes vary depending on the size of junked vehicles. The three basic types of tow trucks include; automotive, flat-bed, and tractor/trailer tow trucks, for large vehicles which have been dumped in ravines or river beds.



A brush truck lifts bulky items into a dump bed for disposal at a landfill.

Approximate Cost

Table 2.5 lists the prices for equipment appropriate for large volume dumpsite cleanups. Based on interviews with clean-up personnel, large volume dumpsite cleanups require coordinated efforts between equipment capable of grasping illegally dumped materials and vehicles hauling the materials away. It would be expected that the costs of one piece of heavy equipment and one disposal vehicle would range from \$250,000 to \$350,000.

Table 2.5 – Large Volume Dumpsite Clean-Up Equipment Costs

Item	Cost
Front-end loader	\$ 216,000
Knuckleboom	\$ 250,000
Roll-off Container	\$ 2,500
Roll-off Truck	\$ 100,000
Dump Truck	\$ 132,000
Brush Collection Truck	\$ 80,000
Tracked Excavator	\$ 156,000
Grapple Attachment	\$ 27,000
Tow Truck	Rental Price

From a cost/benefit perspective, communities may wish to investigate the feasibility of purchasing and dedicating a brush collection truck to illegal dumpsite cleanups. Since these vehicles can be equipped with grapple and dump bed, and can be operated by one person, there are many advantages over purchasing several pieces of heavy equipment (e.g. front-end loader and dump truck to perform illegal dumping cleanups) and disposal vehicle (e.g. roll-off truck).

Additionally, local governments choosing to invest in heavy equipment may reduce costs in other areas of the clean-up budget. This includes a possible reduction in time

dedicated to manual cleanups, personnel costs, transportation costs, and worker compensation costs. As stated in the previous section, if properly maintained, equipment can last for several years, thus reducing the cost of the clean-up program in the long run.

Most of the equipment described in Table 2.5 may also be rented on an “as needed” basis from various heavy equipment rental firms in the North Central Texas region.

2.4 OTHER ILLEGAL DUMPING CLEAN-UP ISSUES

As previously indicated, the nature of illegal dumping is erratic and dynamic, and often times does not fit into categories described in Appendix B. The authors have identified six scenarios that can adversely affect normal clean-up options. These issues may lead to increased clean-up costs that could put significant strains on clean-up budgets.

2.4.1 PUBLIC AND PRIVATE PROPERTY

Illegal dumping on contiguous or nearby public and private properties is one of the most common and problematic scenarios clean-up personnel face when trying to keep illegal dumpsites clean. Since public works crews, county trustee labor and community/ volunteer groups are only permitted to clean illegal dumpsites on public property, illegal dumping that has occurred on adjacent private property is left undisturbed. Based on the broken window¹² theory, the site can become a chronic illegal dumpsite requiring frequent and repeated cleanups by public works staff.



The above photo shows an area of recently cleaned public property (lower right) adjacent to private property that has illegally dumped material on it (upper left). The public property is likely to attract more illegally dumped material soon.

For example, Tarrant County – Precinct 1 has observed that illegal dumpsites are more likely to become “chronic” illegal dumpsites when the adjacent public property experiences a degree of illegal dumping or looks abandoned or unkempt. Precinct 1 clean-up crews do not have the authority to cleanup illegal dumping on private property.

Based on interviews with city and county staff, RS&Y was able to formulate an overview of the process a local government may take to cleanup an illegal dumpsite on private property.

¹² Broken window theory states that an area that looks unkempt (e.g. a building with broken windows) is more likely to attract illegally dumped materials than an area that is well taken care of and free of illegally dumped materials.

Local governments seeking to cleanup large dumpsites on private property should first contact local environmental enforcement staff. A determination should then be made whether the facility is registered or licensed to receive waste or registered as a recycler. If they are not eligible to receive waste, then they can be cited for carrying on an unauthorized action and prosecutors can file a temporary restraining order (TRO) to halt the dumping. Enforcement staff should contact these property owners requesting that areas be cleaned-up subject to penalties. Should the parties fail to cooperate or take steps to remedy the situation; governments can seek relief through a civil suit against the illegal dumper.¹³ Based on adequate evidence presented by both parties, the court may issue a judgment for the local government. These judgments may take the form of a decision that states the local government can perform a cleanup of the property and bill the property owner for the service. If the individual will not or cannot reimburse the local government for the service, the local government could put a lien on his property.

Based on interviews with county and city staff, this process may take a significant amount of time and obstacles may arise. Potential obstacles which may arise in these scenarios include:

- Ownership of the property cannot be determined or may be hard to establish.
- Ownership of the property rests in the hands of a group of individuals.
- Owners may be unwilling or unable to cleanup the dumpsite.
- Owners may choose to clean the property infrequently or sporadically, and may be able to prove they are taking steps to clean the dumpsite.
- Inadequate or insufficient evidence.
- Enforcement and prosecution staff is unable to identify public health, safety or welfare concerns arising from the illegal dumping.

RS&Y would like to state that all efforts to cleanup private property must be judged on a case-by-case basis. The purpose of the overview presented in this section is to provide local governments with a guide to address the problem of illegal dumping on private property.

2.4.2 HEAVY RAIN CLEANUP

Located across the Trinity River Basin, the North Central Texas region is negatively affected by heavy rains and susceptible to periodic flooding. Heavy rains create many additional challenges for clean-up personnel to address during illegal dumpsite cleanups. The following scenarios have been identified by city/county staff:

¹³ Based on interviews with environmental prosecutors, cities or counties seeking relief in court must be able to establish and identify all public health, safety or welfare threats created by the illegal dumpsite. To identify public health threats, local governments should identify any impacted media (air, water) nearby, affected by the illegal dumping.

- Large illegal dumpsite clean-up events may be coordinated between staff or volunteer groups and heavy equipment must often be requested, therefore, rescheduling “wash outs” are very difficult.
- Heavy rains often damage the integrity of the soil, possibly rendering disposal trucks and non-tracked heavy equipment immobile in mud.
- Flooding and heavy rains can potentially cause illegal dumpsites to move, spread out over a given area or block stormwater and other drainage systems. This can possibly lead to bridge, stormwater system, or residential/commercial property damage.

2.4.3 RIVER, STREAM OR CREEK BED CLEANUP

In attempts to hide or conceal illegally dumped materials, illegal dumpers will often improperly dispose of materials in river, stream or creek beds. River, stream or creek beds can be perpetually dry, part of a regional flood control management system, or have a steady flow of water leading to a reservoir or lake. Not only can illegal dumping pose an immediate threat to a community’s water supply, but may clog up a river or a stream leading to flooding during heavy rains.¹⁴



A brush collection vehicle is used here to lift illegally dumped materials out of a ravine.

For example, in Kaufman County a wooden bridge was washed out because of a large illegally dumped item which was located in a creek bed. During a heavy rain, the item was carried downstream toward a bridge and acted like a dam once it hit the bridge. As the water continued to flow down stream, the creek was flooded causing significant damage the integrity of the bridge. The cost to replace the bridge was approximately \$25,000. Scenarios, that can be difficult to cleanup and could require special equipment include:

- Junked autos, bulky items, or white goods that have dumped into dry/flowing creek bed
- River bank is steep or unstable
- Distance from river to flat, stable surface is considerable

For example, some communities utilize brush trucks equipped with a boom and grapple or clamshell that can extend into the ravine to capture materials. Brush trucks are often more maneuverable and can efficiently cleanup dumpsites described in the previous scenarios.

¹⁴ One quart of motor oil dumped into a water source can pollute up to 250,000 gallons of fresh water.

2.4.4 ROADSIDE DITCHES

Based on the 2001 NCTCOG *Targeted Illegal Dumper Study* drainage ditches along rural or infrequently traveled roadsides have been identified as a common location for illegal dumpers to dispose of material. These roadside ditches can pose considerable difficulty for clean-up crews during illegal dumping cleanups. Scenarios that have been identified by city and county staff as potentially problematic include:

- Nearby heavily wooded areas
- Heavy rain
- Frequent traffic

When addressing illegal dumping along roadside ditches, it may be appropriate to employ heavy equipment to perform dumpsite cleanups when possible. This may reduce the chance employees receiving injuries on the job. While manual cleanup of some materials will never be eliminated from this scenario, using heavy equipment when possible may reduce this necessity.



Illegally dumped materials in roadside ditches can be near heavily wooded areas as displayed in the photo above.

2.4.5 LARGE¹⁵ ILLEGAL DUMPSITE

The discovery of a massive illegal dumpsite can put a significant strain on the budget and dedicated manpower due to the overwhelming effort that is often required to cleanup these dumpsites.

Since these dumpsites are often sporadic, many communities are not prepared or equipped with the necessary heavy equipment required to tackle such a situation.



Disposal trucks and excavator sit nearby a large illegal dumpsite.

Although it is recommended that once an illegal dumpsite of this magnitude is identified it is immediately cleaned up, due to issues such as:

- Property disputes between private property owners and local governments
- Ongoing environmental investigations

¹⁵ For the purposes of this profile, *large illegal dumpsite* describes any illegal dumpsite, which has several of types of identifiable and non-identifiable materials and is of substantial volume and area.

- Inclement weather
- Improper equipment
- Not enough personnel

Because of the reasons identified, clean-up crews are often unable to attend to the dumpsite in a prompt manner, thus prolonging any health or safety risks it poses to the community.

2.4.6 SIGNIFICANT DISTANCES TO DISPOSAL FACILITY

Since illegal dumping often occurs in rural or remote areas, distances between the dumpsites and legal disposal facilities can frequently be significant. This factor not only affects clean-up activities by requiring staff to spend a great deal of time traveling to and from disposal facilities but can negatively impact fuel and maintenance costs.

For example, in Collin County, Road Crew staff must often travel up to two hours between dumpsites and the landfill daily to dispose of illegally dumped materials. This lengthy travel period prevents Collin County from spending more time cleaning-up illegal dumpsites.

Some communities have addressed this problem by temporarily storing materials at a public works facility or commissioner's barn that is centrally located. Temporary storage can be achieved through dedicating a few roll-off containers for illegally dumped materials. Once enough materials are collected, the roll-offs are sent to the landfill or transfer station. By disposing of materials at the landfill less frequently it will potentially reduce the amount of time dedicated to the transportation of materials, thus allowing clean-up crews to focus more time on addressing dumpsite cleanups. For example, Tarrant County – Precinct 1 store materials at the Precinct 1 facility, then take materials to the City of Arlington Landfill on an infrequent basis.

Counties and cities may also wish to consider the use of a brush truck equipped with a dump body to perform dumpsite cleanups and transport materials. Use of these units may eliminate the need for several roll-off or dump trucks that traditionally accompany heavy equipment during dumpsite cleanups. Brush truck dump bodies can also act as a temporary storage for illegally dumped materials. Storing these materials temporarily can reduce the number of trips to a landfill or transfer station to dispose of collected materials.

SECTION III –THE COSTS OF ENVIRONMENTAL ENFORCEMENT

3.1 INTRODUCTION

The following section is a discussion of the many facets and components of an environmental enforcement program. The information regarding environmental enforcement programs has been based on industry research, interviews with city and county environmental enforcement staff as well as RS&Y's technical expertise in the field of illegal dumping enforcement programs in Texas and around the nation.

The information included in this section can be used as a tool to assist counties and cities in the creation, implementation or expansion of an environmental enforcement program. Included in this section is:

- General descriptions of common environmental enforcement personnel and equipment as well as an investigation into alternative enforcement strategies.
- Possible advantages and disadvantages to enforcement strategies and equipment.
- The costs associated with the various forms of personnel and equipment that can be dedicated to environmental enforcement.

3.2 ENVIRONMENTAL ENFORCEMENT PERSONNEL PROFILES¹⁶

Environmental enforcement programs may vary widely in degree of activity and can be located in various departments. The following profiles outline common environmental enforcement personnel, responsibilities as well as the advantages and disadvantages of operating an environmental enforcement program out of that particular department.

3.2.1 SHERIFF'S OFFICE

General Description

The sheriff's office is the chief law enforcement department of the county and is responsible for operating the county jail, investigating crimes, and maintaining communications with other law enforcement organizations. The sheriff possesses countywide jurisdiction, but in practice, concentrates on activities outside city limits where municipal officers cannot operate.

For example, both Tarrant County and Collin County house, in whole or in part, environmental enforcement activities within the Sheriff's Department. Deputies dedicate approximately 30 to 40 hours a week to environmental enforcement related activities.

¹⁶ It is recommended that during the course of environmental crimes investigation and prosecution that local personnel contact or meet with TCEQ regional office staff to ensure that the interpretation of environmental laws by local personnel correspond with the TCEQ's policies. For example, many environmental enforcement officers invite TCEQ staff to accompany them on dumpsite visits to ensure investigations are being conducted correctly.

Perceived Advantages

- Since illegal dumping often occurs in remote or rural locations outside of city limits, the sheriff's office is often more knowledgeable and familiar with the locations of chronic illegal dumpsites throughout the county.
- Environmental crimes units with dedicated environmental enforcement officers can be created within the sheriff's office to address the problems of illegal dumping within a community.

Perceived Disadvantages

- The sheriff's office is responsible for the entire county, therefore some remote areas where illegal dumping is present, may go undiscovered or unidentified.

Approximate Cost

Salary and benefits for sheriff's office staff range from approximately \$32,000 to \$81,000. In cases where resources are not available to fund one or several FTE within the sheriff's department, a percentage of one FTE or several FTEs can be utilized to reduce costs.

3.2.2 CONSTABLE'S OFFICE

General Description

Constables are peace officers which are elected by precinct within a county. Constables and their deputies have all the rights and powers of a peace officer in the State of Texas. While their jurisdiction encompasses all areas of the precinct, in practice many times focus their efforts in unincorporated areas of the county.

Perceived Advantages

- Since constable precincts divide portions of the county, it is likely they are familiar with chronic illegal dumpsites and residents in the area.
- Constables have the capability of responding to reports of illegal dumping quicker than other law enforcement departments, since headquarters and patrol routes are located in a particular precinct.

Perceived Disadvantages

- In scenarios where illegal dumpers cross precinct boundaries (i.e. illegal dumpers may live in one area and illegally dump in another), investigations and subsequent prosecution may be hindered due to jurisdictional authority.
- If one precinct is more involved in environmental enforcement than another, a lack of continuity occurs and can lead to more illegal dumping in those precincts not aggressively combating illegal dumping.
- Since constables are elected on four year terms, there is a probability that policies toward illegal dumping may change with each new constable.

Approximate Cost

The salary and benefits for constable's officers range from approximately \$30,000 to \$47,000. In cases where resources are not available to fund one or several FTE within the constable's office, a percentage of one FTE or several FTEs can be utilized to reduce costs.

3.2.3 FIRE MARSHAL'S OFFICE

General Description

The fire marshal's office is the law enforcement agency responsible for fire investigations, fire inspections and code enforcement within the county. All fire marshals are certified fire/arson investigators, certified fire inspectors and licensed peace officers. In some scenarios, fire marshal's may take an active role in illegal dumping enforcement and investigations.

For example, Denton County houses a portion of its environmental enforcement program within the Fire Marshal's office. One of the county's fire investigators is dedicated to illegal dumping enforcement within the county. The fire investigator also operates a patrol boat to catch illegal dumping on the county's various lakes.

Perceived Advantages

- Fire marshals are licensed peace officers with the ability to carry a weapon and arrest those suspected of illegal dumping.
- Fire marshals are trained and experienced in investigations, which relieves the need to seek support from other departments.

Perceived Disadvantages

- Fire marshals may not be able to fully dedicate their time to illegal dumping investigations, since many are also charged with building inspections and issuing permits.

Approximate Cost

The salary and benefits for fire marshals range from approximately \$32,000 to \$45,000. In cases where resources are not available to fund one or several FTE within the fire marshal's office, a percentage of one FTE or several FTEs can be utilized to reduce costs.

3.2.4 POLICE DEPARTMENT

General Description

The police department is the main law enforcement body for municipalities. Police departments operate the city jail, investigate crimes and maintain open lines of communication between various departments within the city and law enforcement bodies in the area.

For example, the City of Denton houses its environmental enforcement program through the City of Denton Police Department's Environmental Crimes Unit (ECU). The ECU has been active in combating illegal dumping since September 1, 2000 when the program was established. The program has also been very successful in prosecuting illegal dumping and other nuisance violations.

Perceived Advantages

- Police officers are very knowledgeable in many aspects of investigations and have experience preparing cases for a prosecutor to take to trial.

Perceived Disadvantages

- Police officers may not deem environmental crimes as a high priority relative to other types of crime, and therefore may not enforce those areas of the code.
- Since environmental laws are not part of the Texas Commission on Law Enforcement Officer Standards and Education (TCLEOSE) curriculum, many officers are unfamiliar with sections of the code regarding environmental laws.

Approximate Cost

The salary and benefits for police officers range from approximately \$37,000 to \$49,000. Operating an environmental enforcement program through a police department may be more appropriate for cities with large urban populations. In cases where resources are not available to fund one or several FTEs within the police department, a percentage of one FTE or several FTE can be utilized to reduce costs.

3.2.5 CODE ENFORCEMENT OFFICE

General Description

The code enforcement office is charged with investigating and enforcing a local government's property maintenance regulations while ensuring the health and safety of residences.

For example, the City of Grand Prairie and the City of Allen both house illegal dumping activities within the code enforcement department. City staff in each city noted that since complaints they respond to are related to code compliance issue, many times there is illegal dumping present. The City of Grand Prairie's code enforcement officer recently became a commissioned peace officer.

Perceived Advantages

- Code enforcement officers have a familiarity with environmental laws that many other departments may not have.
- Code enforcement officers, although not required, can obtain a peace officer commission.

Perceived Disadvantages

- Code enforcement officers are unable to carry firearms, make arrests, or enforcement criminal statutes.
- Since code enforcement officers are not licensed peace officers, some scenarios may require assistance from other departments.
- Non-commissioned peace officers are not granted access into the Texas and National Crime Institute databases.

Approximate Cost

The salary and benefits for code enforcement officers range from approximately \$34,000 to \$50,000. In cases where resources are not available to fund one or several FTE within the code enforcement department, a percentage of one FTE or several FTEs can be utilized to reduce costs.

3.2.6 PUBLIC WORKS DEPARTMENT

General Description

Special divisions within the public works department can be assigned the duties of environmental enforcement in a city or county. Public works department officers may have a better working relationship with members of the public works staff who perform dumpsite cleanups, than other county departments. Moreover, Public works staff may be required to assist in performing manual dumpsite cleanups during the course of enforcement activities.

For example, Kaufman County dedicates two FTEs housed in the public works department to environmental enforcement. These officers are commissioned through the Fire Marshal's Office, and have all the duties and capabilities of a commissioned peace officer. In 2002, the two FTEs also combined to also perform approximately 500 hours to dumpsite cleanups.

Perceived Advantages

- Since in many cases public works departments are involved in the cleanup of illegal dumpsites, it is easier to coordinate enforcement activities at the same time.

Perceived Disadvantages

- Unless the public works department makes environmental enforcement a priority, an environmental enforcement program can potentially receive less attention than other solid waste services, which are perceived as the public works department's primary task.
- The program may be perceived as more of a clean-up program than an enforcement or prevention program.
- Non-commissioned peace officers are not granted access into the Texas and National Crime Institute databases.

Approximate Cost

The salary and benefits for public works officers range from approximately \$30,000 to \$42,000. Since the public works department does not have the authority to commission peace officers, peace officers must be commissioned out of another department within the county. In cases where resources are not available to fund one or several FTE within the public works department, a percentage of one FTE or several FTE can be utilized to reduce costs.

3.2.7 HEALTH DEPARTMENT OR ENVIRONMENTAL HEALTH DEPARTMENT

General Description

Health or environmental health departments have the ability to enforce the various sections of the health and safety code. Health departments often house investigators and peace officers to enforce these laws.

Perceived Advantages

- Investigators and inspectors are familiar with environmental laws and the negatives associated with illegal dumping.

Perceived Disadvantages

- Inspectors and investigators may not be able to fully dedicate their time to illegal dumping, since they regularly inspect on-site sewage facilities or gas pipelines as well.
- If health department officers are not commissioned peace officers, some scenarios may require assistance from other departments.
- Non-commissioned peace officers are not granted access into the Texas and National Crime Institute databases.

Approximate Cost

The salary and benefits for health department staff range from approximately \$40,000 to \$53,000. In cases where resources are not available to fund one or several FTE within the environmental health department, a percentage of one FTE or several FTEs can be utilized to reduce costs.

3.2.8 DISTRICT/COUNTY ATTORNEY'S OFFICE

General Description

The district or county attorney is considered the chief prosecutorial body for criminal cases and/or civil cases in the county¹⁷. In many cases all criminal cases are assigned to the district attorney, while all cases seeking civil venue are assigned to the county

¹⁷ For example, Dallas County houses both civil and criminal prosecutors in the District Attorney's Office, while in Harris County the two offices are separated into the District and County Attorney's Offices, respectively.

attorney. The district and/or county attorney represents the state in cases which have been assigned to district and/or county court.

For example, in 2002 Dallas County, through a criminal justice grant provided by NCTCOG, established a felony environmental prosecutor position within the Dallas County District Attorney's Office. During the past year, the prosecutor dedicates approximately 27 hours per week to both felony and misdemeanor environmental crimes. Approximately 70 percent of the cases are felonies, while 30 percent are misdemeanors. The County has experienced a great deal of success with the position including the prosecution of 186 cases from September 1, 2002 to August 1, 2003.¹⁸ Prior to the creation of this position, the County prosecuted approximately 60 cases from 1999 to 2001.

Perceived Advantages

- Prosecuting illegal dumpers through the district court can result in stiff penalties and jail time for those convicted of illegal dumping.
- Convictions of illegal dumpers in district or county court can be published in a local or regional newspaper to deter illegal dumping.

Perceived Disadvantages

- District/county attorneys are often overburdened with huge case loads and often cannot commit a significant amount of time to environmental crimes.
- Some attorneys may be unfamiliar with environmental code and may not be committed to prosecuting illegal dumpers vigorously.

Approximate Cost

The salary range for district and county attorney's fall between \$65,000 and \$80,000 annually based on level of experience. Based on information gathered through Case Study interviews, many prosecutors dedicate fewer than four hours per week to environmental enforcement.

3.3 ENVIRONMENTAL ENFORCEMENT EQUIPMENT

Environmental enforcement officers utilize various equipment and strategies to assist them in apprehending illegal dumpers. Often, circumstantial evidence (i.e. finding a scrap of paper with an individual's name on it in illegally dumped material) is not enough for a conviction of illegal dumper, therefore environmental enforcement personnel may employ the strategies and equipment described below to obtain evidence for trial and make their environmental enforcement programs more effective.

¹⁸ The Dallas County environmental prosecutor reported that an additional 28 investigations are ongoing. The environmental prosecutor in Dallas County has received several awards for the work conducted in 2003.

3.3.1 DIGITAL CAMERA

General Description

A digital camera is a specialized camera that stores images electronically on disks, which later can be transferred and stored on a computer or printed. These cameras function without the use of film, however are operated in much of the same way traditional cameras function. Digital cameras typically require a desktop or laptop computers.

Applicability

- Environmental enforcement officers may use digital cameras to obtain images of an illegal dumpsite and store them on their laptop or desktop computer. Not only will storing images electronically alleviate office space needed for hardcopy photograph storage, but can be easily categorized and maintained electronically on the hard drive.
- Images can be e-mailed or saved to a diskette for sharing with other enforcement staff and easy transportation.
- Images can be printed in the field using a laptop computer and mobile printer.

Limitations

- Since digital cameras are a relatively new technology, some training for enforcement officers on software may be necessary.
- Digital cameras are comparatively more expensive than 35mm cameras.

Approximate Cost

Digital cameras with a minimum of 2.0 mega pixel capability are recommended to ensure clear and comprehensible pictures. Base prices for 2.0 mega pixel digital cameras have decreased considerably in recent years, and currently cost approximately \$200-\$500 per unit.

3.3.2 REMOTE VIDEO RECORDING SYSTEM

General Description

Video recording systems allow environmental enforcement officers to monitor activities at potential or chronic illegal dumpsites at all times. These systems have the potential to capture still and motion images of all activities occurring at illegal dumpsites without being detected by the individuals. It is recommended that all remote video recording systems used in the surveillance of illegal dumpsites be hidden or have camouflage exteriors to avoid detection by illegal dumpers.



Sensors placed near the dumpsite trigger a device to begin recording.

In 2002, Collin County received five remote video recording systems from a grant funded by NCTCOG. The systems have been divided between the various county constable precincts, and are now in use monitoring chronic illegal dumpsites around Collin County.

There are many options that are available to potentially increase the effective of the system including:

Passive Infrared Sensors (PI) – Passive infrared sensors detect differentiations in temperature. If an illegal dumper enters an area monitored by a PI sensor, the PI will recognize the change in temperature and begin recording. Some passive infrared sensors can distinguish variations as slight as 1/2 degree. PI sensors are extremely difficult for outdoor scenarios because any animal, hiker, or jogger entering the monitored area may set off the sensor erroneously.

Seismic Sensors – Seismic sensors detect vibrations in the ground. If illegal dumpers enter an area monitored by a seismic sensor, the sensor will recognize the vibrations from their automobile or footsteps and begin recording. Some seismic sensors can be set to higher (footsteps) and lower (automobile) frequencies. Seismic sensors may be difficult for outdoor scenarios because any animal, hiker, jogger or passing automobile in the monitored area may set off the sensor erroneously.

Magnetometer Sensors – Magnetometer sensors detect large ferrous metal objects. If an illegal dumper enters an area monitored by a magnetometer in an automobile, the magnetometer will recognize the vehicle and begin recording. This sensor is ideal for outdoor scenarios since illegal dumpers often arrive and transport their materials in vehicles. Since the magnetometer will not pick up vibrations or temperature variations, the chance for the sensor to be mistakenly set off is diminished.

Wireless Sensors – Wireless sensors (magnetometer, seismic or passive infrared) function without the use wires that lead back to the recording unit. Wireless sensors reduce the risk that the sensors and/or the video recording system will be detected by illegal dumpers.

Low Light Lenses – Camera lenses that function in low light or darkness are available for some video recording systems. If a chronic illegal dumpsite has been identified as a dumpsite that is frequented at night, low light lenses will allow the camera to capture images traditional lenses could not.

Tree Mounts – Tree mounts are plastic objects made to look like a tree trunk, in which a video camera can be placed in. The object is ideal for outdoor, woody environments where a tree trunk could blend in.

Cell Phone Remote Dialer – Some remote video recording systems have the capability of notifying a law enforcement officer or department each time the sensor is set off and the system begins to record. Ideally, if an officer is in the

area and the officer is notified, it may apprehend the suspect in the act of illegal dumping.

Remote monitoring system – Some units may be equipped with satellite or cable modem transmitting devices that broadcast live video to monitoring stations offsite. These devices allow video to be viewed at an offsite facility (i.e. Sheriff's Office) when the camera is active. Satellite transmitting devices, are currently very expensive and therefore are cost-prohibitive in many cases for local governments.

Applicability

A remote video recording system can be stationed at most locations in both rural and urban settings. The probability that a system will go undetected by criminals increases with the amount of available groundcover or the availability of locations where a unit can be hidden.

Based on the experiences of city and county staff with remote video recording systems, the following are a series of recommendations to maximize the effectiveness of a remote video recording system:

- To ensure the highest quality image, the video recording device should be equipped to record on digital video tapes, instead of video home system (VHS) cassettes.
- Video recording systems should be equipped with automatic focus capability to reduce the probability that the footage captured will be grainy or out of focus.

Limitations

The following are limitations which have been identified with city and county staff who have experience with a remote video recording system:

- If a camera is not properly hidden or camouflaged, there is a probability it will be stolen.
- Variances in the amount and source of light may cause images to be unclear or unidentifiable.

Approximate Cost

Prices for video recording systems begin at approximately \$2,000 per unit and can increase to \$10,000 per unit with a variety of accessories available. Environmental enforcement programs in the North Central Texas region, who have received grant funds for remote video recording systems, have purchased units with a cost of approximately \$5,000 per unit.

Based on interviews with enforcement staff, success with surveillance equipment varies based on experience with units. For example, Collin County has been using surveillance equipment since March 2003. While the cameras are relatively simple to assemble, the officers are still having difficulty setting up the units in the correct place to capture the images of violators at illegal dumpsites.

RS&Y believes that local governments interested in purchasing surveillance equipment should contact NCTCOG to inquire about the testing the equipment for a brief period of time.¹⁹ This would allow officers to try out the equipment to get a sense of what its applications and limitations are. RS&Y believes that a local government should test surveillance equipment at several locations for several days or a week at a time.

3.3.3 TWO WAY RADIOS

General Description

Two way radios allow for two or more individuals to converse over a public or private radio channel. In many cases, two way radios have a range of up to five miles and can be set up to allow many individuals connect to a single radio channel.

Applicability

- Two way radios are durable, versatile, and will retain power for extended periods of time in the field.

Limitations

- Radio interference, tall buildings or other large obstructions may hinder the performance and capabilities of the radios.

Approximate Cost

The unit price for a pair of two way radios is approximately \$100 to \$125 each.

3.3.4 CELLULAR PHONES (EQUIPPED WITH TWO WAY RADIO CAPABILITY)

General Description

Cellular phones may be equipped with a long range, digital two way radio feature. This feature allows individuals on a specific network (or cellular service provider) to directly and instantly connect to each other at any given time and place. Some cellular phones with this feature allow groups or several individuals to speak to each other in a conference call atmosphere.

Applicability

- Regional task force operations, operations involving multiple officers from a single department or operations involving representatives from multiple departments can be in touch with each other instantly during the course of an illegal dumping investigation or stakeout.
- Supervisors can speak to and coordinate an operation with multiple officers in a conference call setting.

¹⁹ NCTCOG staff can also provide local governments with information on the procedures to receive a camera on a trial basis.

- In addition to having a cellular capability, phones are equipped with two way radio capability.

Limitations

- All officers must be serviced by the same cellular service provider and have cellular phones equipped with a two way radio feature.

Approximate Cost

Prices for a cellular phone equipped with a two way radio feature range from approximately \$100 to \$400. Cellular service plans may vary based on airtime rate plan and location of service provider.

3.3.5 BINOCULARS (WITH NIGHT VISION CAPABILITY)

General Description

Binoculars equipped with special illumination optical systems allow the operator to see individuals and objects clearly and crisply at night. Some night vision binoculars are outfitted with infrared illumination which allows the operator to see in total darkness.

Applicability

- Night vision binoculars may be used during night and evening stakeouts of illegal dumpsites.

Limitations

- Night vision binoculars cannot be equipped with a recording system or remote recording system; therefore the operator must be actually present at the illegal dumpsite.
- These binoculars cannot be used during the day and may be limited on nights when the moon is full or in areas where artificial light is present.

Approximate Cost

The unit prices for binoculars with night vision capability range from \$400 to \$7,000 dollars.

3.3.6 LAPTOP COMPUTERS

General Description

Laptop computers are portable computers that function like a desktop computer, but have the capability to be transported and operated in the field or in a vehicle. Laptop computers have the capability of storing information, case files, documents, digital photographs on the hard drive and can be accessed at any time. Various accessories are available for laptop computers including: wireless connections, GPS software, mobile printers and projectors.

Applicability

- Officers using laptops can store and manipulate digital photographs, type reports, and create PowerPoint presentations.
- Laptops can be connected to projector screen to display photographs in court or during educational presentations.
- Laptops can be removed from the vehicle, so officers may work from their office or home if they wish.
- A variety of programs and applications can be loaded onto a laptop hard drive.
- Real-time access to national and Texas criminal information databases.

Limitations

- Laptops may be expensive and can be easily damaged if not properly stored correctly or taken care of.
- Access to the Texas Crime Institute Center (TCIC) and National Crime Institute Center (NCIC) databases are prohibited for non-commissioned code enforcement staff.

Approximate Cost

Laptops purchased for environmental enforcement staff should be rugged, because these laptops will be on the road, used during investigations and potentially transferred in and out of the vehicle. These “tough books” are designed specifically for law enforcement personnel or activities and are created to withstand rough treatment. Accessories that are available for laptop computers include:



Rugged laptop computers and portable printers allow officers to operate in a “mobile office setting”. Officer Mike Sweet of the City of Denton displays his laptop computer on his pickup truck.

GPS Software and Receiver:

Much like handheld GPS units,

GPS software on laptop computers allows officers to pinpoint the position of illegal dumpsites. Additionally, some software enables officers to save positions of chronic illegal dumpsites, print up maps detailing where illegal dumpsites are located.

Texas Law Enforcement Telecommunications System (TLETS): TLETS allows authorized users to access the TCIC and NCIC databases on their laptop computer. This TCIC and NCIC databases allow users to query searches on a variety of topics including arrest warrants, stolen property, and previous convictions.

Mobile Printers: Utilizing thermal printing technology, these printers are approximately 10.4" x 1.18" x 2.17" in size and can be stored safely in a vehicle.

Mobile printers are operated using rechargeable batteries or can be plugged into the power plug in the vehicle. Connection to the laptop can occur through an infrared signal or through a USB cable. Mobile printers can be mounted easily in an enforcement vehicle. Mobile printers can be store in temperatures ranging from 5 to 140 degrees Fahrenheit.

Projectors: Projectors can display computer images on a wall or projector screen. These images can be displayed during presentations to groups on illegal dumping or during a trial at a court house. By providing images of illegal dumpsites to a judge or group, individuals will be able to clearly see the severity of the problem.

Table 3.1 describes the costs associated with the purchase of laptop computers.

Table 3.1 – Laptop Computer Equipment Costs

Item	Approximate Cost
Laptop	\$ 2,000
GPS Software and Receiver	\$ 350
Mobile Printers	\$ 400
Projector	\$ 3,000

3.3.7 MOBILE DIGITAL TERMINALS

General Description

The Mobile Digital Terminal (MDT) is similar to laptop computers located in a patrol vehicle. The MDT can access motor vehicle files through the Texas Law Enforcement Telecommunications System (TLETS) and Texas Crime Institute Center (TCIC) and National Crime Institute Center's (NCIC) databases.



Officers can operate in a mobile office type setting using laptops and MDTs.

The MDT also has the capability to communicate with other agencies throughout the county and in the event coordination is necessary during an illegal dumping investigation or task force initiative. In addition, officers can type reports in their vehicles and transfer them to police headquarters.

Applicability

- Connectivity through the TLETS allows enforcement officers to access criminal records, identification information, if the suspect's vehicle is stolen or if the suspected is wanted in any other part of the Country.²⁰

²⁰ Based on interviews with city and county staff, often illegal dumpers may have participated in other criminal activities in the past.

- Officers would be able to use their vehicles like a “mobile office,” leading to greater visibility and more contact with the community.
- Officers in rural areas, where jurisdictions may cover several hundred square miles would be able to spend more time in the field without losing touch with their offices.

Limitations

- MDTs are unable to operate various computer programs such as GPS or GIS mapping software.
- MDTs are stationary units in the enforcement vehicle and cannot be removed.
- Access to the TCIC and NCIC databases are prohibited for code enforcement staff.

Approximate Cost

Approximate costs for MDTs range from \$5,000 to \$12,000.

3.3.8 MOBILE SCALE SYSTEMS

General Description

Mobile scale systems are floor scales with the capabilities of being transported easily to various indoor and outdoor locations while maintaining accuracy. Scale systems allow for vehicles to be driven upon them to weight the vehicle. Traditionally, vehicles are weighed before and after illegally dumped materials are loaded on the vehicle.

Since illegal dumping laws are partially based on the amount of illegally dumped material present, an accurate measure of the material allows enforcement officers to prosecute violators more effectively.

For example, the Tarrant County Sheriff’s Department utilizes mobile scale systems during the course of enforcement investigations. Based on interviews with County staff, the success of the program can be attributed in part to the evidence gathered through the scale systems.

Applicability

- Illegally dumped materials can be weighed easily and quickly at the dumpsite.
- Provides prosecutors with additional evidence to be used against violators.
- If well maintained, scale systems may last up to 20 years.

Limitations

- Scale systems are bulky and require significant space for secured storage.
- NTEP certified scale systems are expensive.
- May be damaged in the rain or other elements.

Approximate Cost

Mobile, axel scale systems that are National Type Evaluation Program²¹ (NTEP) certified can range between \$25,000 and \$45,000, depending on the level of performance of the unit and the number of platforms. A scale must be NTEP certified for its accuracy and repeatability if it is to be entered in as evidence in a trial. Based on interviews with industry professionals, to maintain the NTEP certification scale systems must be checked for accuracy and repeatability and if necessary be recalibrated yearly. The cost of this yearly maintenance is approximately \$200 - \$300 per year.

Based on interviews with industry professionals and enforcement staff, when purchasing scale systems one may want to be sure that the scale system has the following:

- NTEP certified.
- Powered by D/C outlets in an enforcement vehicle or rechargeable batteries.
- A load capacity of approximately 6,000 pounds to 10,000 pounds.
- Four to six axel scale units to allow for a vehicle and trailer to be weighed simultaneously.
- Ramps to allow vehicles greater ease when mounting scale system.

From a cost/benefit perspective, due to the expensive nature of these machines, local governments may wish to contact scale system vendors in the North Central Texas region for further information. Vendors could be invited to attend meetings with one or several local governments to provide more information and see the machines as they actually work.

3.3.9 GLOBAL POSITIONING SYSTEMS

General Description

Global Positioning Systems (GPS) enable an individual to compute position, velocity and time. GPS units can be individual hand held units or hardware/software combinations loaded on a laptop computer. GPS units display longitude and latitude coordinates to pinpoint locations and are accurate between three and 20 feet.

Applicability

- GPS allows individuals to know the specific location of illegal dumpsites.
- Coordinates of illegal dumpsites can be loaded in a database to allow officers to track and monitor chronic illegal dumpsites.

Limitations

- Accuracy of GPS units may vary based on the quality of the unit.
- Some units may not have the capability to store coordinates or additional location information.

²¹ The NTEP certification is governed by the National Conference of Weights and Measures which regulates the accuracy and performance of scale systems.

Approximate Cost

The cost of a handheld GPS unit ranges from \$200 to \$500. GPS software and receiver units that are loaded on laptop computers range from \$300 to \$700.

3.4 OVERVIEW OF ENFORCEMENT VEHICLES

Environmental enforcement officers, unlike other peace officers and enforcement staff, often conduct investigations in remote areas that are not easily accessible. Environmental enforcement officers often employ specialized vehicles that are better suited to handle rough or unusual terrain. From a cost-benefit perspective, equipping environmental enforcement officers with the right equipment can often lead to greater efficiency and effectiveness.

3.4.1 PICKUP TRUCK

General Description

Since illegal dumpsites are often located in and along roadsides, ditches, wooded areas, fields, or other rural areas, vehicles capable of handling those conditions should be used. In most cases small to midsize pickup trucks are capable or can be equipped to handle the often difficult driving conditions that characterize the travel to illegal dumpsites.

The City of Allen, Texas provides each of its code enforcement officers, who enforce the city's illegal dumping ordinances, with small pickup trucks. The officers use the pickup trucks during investigations and stakeouts of illegal dumpsites.

Applicability

Small to midsize pickup trucks have a variety of applications that can be useful to environmental enforcement officers including:

- Truck beds are ideal for hauling evidence from illegal dumpsites.
- Many trucks can be equipped with four wheel drive capability, ideal for scenarios that require an officer to investigate an illegal dumpsite which is in a field or off road.
- Decals, bumper stickers or magnets can be placed on trucks to promote illegal dumping hotlines.
- Environmental enforcement officers can use trucks to assist in cleanups of illegal dumpsites, storing material in the truck bed.

Limitations

- Trucks have very limited room for multiple passengers.
- Storing some types of equipment in the truck bed may be unsafe and could potentially be stolen or fly out during travel.

Approximate Cost

The cost of a small to midsize truck ranges from approximately \$15,000 to \$20,000.

3.4.2 SPORT UTILITY VEHICLE

General Description

Sport utility vehicles (SUV) are primarily utilized by enforcement personnel at the county level who are responsible for enforcing illegal dumping laws in the unincorporated areas of the county. These areas are commonly very extensive and officers are often expected to patrol several hundred square miles. SUVs allow officers to use their vehicles as “mobile offices”, by giving them ample room to engage in administrative and other enforcement activities. In most cases, SUVs offer the same abilities that pick-up trucks offer, but also allow for more secure storage of equipment.

As described in Case Study #3, the environmental enforcement officer in the Collin County Sheriff's Office uses a mid-sized SUV during the course of his enforcement activities. Since the County spans over 800 square miles, the officer spends a significant amount of time in the field. The SUV coupled with electronic communication devices and a laptop, allows the officer to function almost as effectively as if the officer was in the office.

Applicability

- SUVs offer secure storage for valuable enforcement equipment such as scale systems or surveillance cameras.
- Decals, bumper stickers or magnets can be placed on an SUV to publicize illegal dumping hotlines.
- The secured bed of the SUV allows for bulky enforcement equipment or files to be stored, without getting in the way of the officer's activities.
- SUVs can maneuver well in off-road areas.

Limitations

- SUVs are limited in what kind of materials they can transport in the bed because of size restrictions. For example, officers might be hesitant to perform illegal dumping cleanups or load an illegally dumped sofa which may not fit in the vehicle.
- SUV are not as fuel efficient as other automobiles or small trucks.

Approximate Cost

The cost of a midsize SUV is approximately \$25,000, while other larger SUVs may have a range of \$30,000 to \$35,000. Available equipment for the SUV includes:

Cargo carrier: Also known as basket carriers can carry up to 300 – 350 lbs. of materials or equipment and can be attached to the trailer hitch mounted on most SUVs. When mounted, enforcement officers would be able to transport illegally

dumped materials or other bulky equipment. Standard sizes range from 20" x 48" and 24" x 60." Costs are approximately \$100 to \$125.

3.4.3 AIRPLANE

General Description

During some illegal dumping investigations, it may be necessary for environmental enforcement officers to acquire aerial photographs of illegal dumpsites. Small single engine airplanes can be used to fly environmental enforcement officers over an illegal dumpsite to acquire photographs.

Applicability

- Often these dumpsites are located in remote areas of the county, cover a large area, or are on private property and cannot be reached by vehicles.
- Aerial photographs may be useful to show the breadth of an illegal dumpsite and the seriousness of the situation.



Small single engine airplanes have been used effectively in environmental enforcement investigations.

Limitations

- Airplanes are very expensive, specialized aircraft limited in use and expensive to maintain.
- Operation of an airplane requires a pilot's license.

Approximate Cost

The cost of a small single engine airplane is approximately \$80,000. Since these aircraft are relatively expensive and also require a pilots license for operation, environmental enforcement officers are strongly encouraged to contact their local airfield or law enforcement department's aircraft unit to inquire about the assistance in the conduct of aerial investigations.

If the time on an aircraft cannot be donated by an individual, officers should contact any Part 135 Operations.²² Rates for surveillance flights range from \$200 to \$500 per hour and include time on the aircraft, fuel, and a commercially licensed pilot. Listings for Part 135 Operations can be found under *helicopter/airplane rental* of your local telephone directory.

3.4.6 HELICOPTER

General Description

Airborne patrolling gives environmental enforcement officers a "bird's eye view" of what's happening in and around areas suspected of illegal dumping. Helicopters can

²² Part 135 Operations refer to any for-profit entity that is certified to transport individuals in an aircraft.

maneuver easily to different points in a given area as well as hover over an illegal dumping site. Video tapes and images taken by cameras from airborne platforms mounted on helicopters or handheld cameras make the difference between a solid conviction in court, or losing a difficult case for lack of evidence.

For example, if an individual is suspected of illegal dumping on remote areas of his property, a helicopter may provide aerial photographs of areas where enforcement officers cannot reach by land.

Applicability

- Can be flown lower than airplanes over suspected areas.
- Can hover or move slowly over a specific area to allow for clear pictures to be taken of dumpsites.

Limitations

- Helicopters are very expensive, specialized aircraft limited in use and difficult to maintain.
- Operation of a helicopter requires a pilot's license.

Approximate Cost

The cost of a small helicopter is approximately, \$500,000. Since these aircraft are extremely expensive and also require a pilot's license for operation, environmental enforcement officers are strongly encouraged to contact their local airfield or law enforcement department's aircraft unit to inquire about the assistance in the conduct of aerial investigations.

If the time on an aircraft cannot be donated by an individual, officers should contact any Part 135 Operations to inquire about chartering a helicopter. Rates for surveillance charters range from \$600 to \$700 per hour, and include time on the aircraft and a commercially licensed pilot. Listings for Part 135 Operations can be found under *helicopter/airplane rental* of your local telephone directory.

3.4.4 PATROL BOAT

General Description

Based on interviews conducted with environmental enforcement staff in the North Central Texas region, chronic illegal dumping is often identified near or in the many lakes and rivers in the North Central Texas region. A patrol boat may be used in some scenarios to identify areas and individuals engaging in illegal dumping.

For example, Denton County received a \$32,000 grant from NCTCOG to purchase a patrol boat dedicated to investigating illegal dumping and littering in and along the three lakes within Denton County. The patrol boat is dedicated approximately 70 percent of the time to Lake Lewisville, 15 percent of the time to Lake Grapevine, and 15 percent of

the time to Lake Ray Roberts. The patrol boat is operational from May through October when boating traffic on the lakes is the heaviest. Based on interviews with County staff, the boat has been very useful in curbing littering and illegal dumping in the lakes where the boat is operational.

Applicability

- In some scenarios, heavy woods or rough terrain may prevent vehicles from reaching an illegal dumpsite; in that case a boat may be the only alternative to reach an area to investigate.
- Boats may allow environmental enforcement officers to acquire different angles of the illegal dumpsite.



Environmental enforcement officers in Denton County use patrol boats to combat illegal dumping.

Limitations

- Patrol boats are only useful during investigations in and around large lakes or rivers.
- Patrol boats consume large quantities of gasoline in a short period of time. Based on interviews with Denton County staff it is not uncommon to use up to 80 gallons in a three day period, or approximately \$120-\$140.
- Drought conditions during the summer may cause areas of a lake or river levels to fall and areas to dry up, preventing boats from reaching a particular area.
- Officers piloting boats must be well trained in the operation of boats and marine emergency safety.

Approximate Cost

The cost of a 19' to 22' boat with 150 horsepower engine is approximately \$23,000 to \$30,000. Other navigation, sampling, and communication equipment may be necessary to fully equip the vessel for environmental enforcement. Based on interviews with Denton County staff, other costs include fuel and maintenance costs which may range between \$1,000 and \$1,200 per month.

Since the costs of the vessel may outweigh its potential usefulness, it is recommended that environmental enforcement officers wishing to engage in such an investigation contact a local marina or other lake patrol organization/departments to potentially rent a boat on an as-needed basis.

3.4.5 JET SKIS

General Description

Jet skis are small, sturdy and maneuverable personal watercraft that can be a viable alternative to a patrol boat when engaging in illegal dumping enforcement along rivers and lakes. Jet skis, generally, can be operated very easily. Jet skis are commonly used to

transport only one officer at a time. For example, the Brazos River Authority enforcement staff utilizes jet skis to combat boating violations and illegal dumping along the Brazos River.

Applicability

- Jet skis are a cheaper, more fuel efficient alternative to patrol boats in and along lakes and rivers.
- Due to the small size of the watercraft, jet skis can maneuver easily in shallow waters or narrow spaces.
- Jet skis are able to keep pace with almost any boat who might try to flee.

Limitations

- Jet skis have limited storage areas.
- Some enforcement equipment that can be damaged by water may not be suited for use on jet skis.
- Jet skis are more easily capsized or damaged than patrol boats.

Approximate Cost

Jet skis have an approximate cost between \$5,000 and \$7,000. Fuel and maintenance costs for jet skis are approximately \$300 to \$500 per month. From a cost/benefit perspective, the purchase of a jet ski for use primarily during the summer months, when traffic on lakes and rivers is at its peak, may be a viable alternative to the purchase of a patrol boat.

3.5 OTHER ENVIRONMENTAL ENFORCEMENT ISSUES

The following section describes alternative enforcement programs or entities that have been created in the North Central Texas region as well as other parts of county to address the problem of illegal dumping on a sub-regional basis. Additionally, discussions of various issues that have been raised during the course of this study have been included in this section.

3.5.1 SUB-REGIONAL ENVIRONMENTAL ENFORCEMENT TASK FORCE

General Description

A formal or informal agreement between governmental entities that create a network of environmental enforcement programs and facilitates communication and sharing of resources between programs. Many environmental enforcement task force programs aid their members by providing:

- Technical expertise on environmental law for prosecutors and investigators
- Prosecution and law enforcement training
- Manpower or resource support to member entities

Perceived Advantages

- Rural programs would have greater access to resources unavailable to them in the past.
- An ability to act quickly in a concerted effort on an illegal dumping investigation.
- Training and seminars could be coordinated through a centralized unit.
- Visibility of illegal dumping efforts increases, thus making communities more aware of the efforts made by environmental enforcement teams.

Perceived Disadvantages

- Task force may become too large to move swiftly into action when called upon.
- Conflicting ideas and competing egos may inhibit a cohesive and effective task force.

Approximate Cost

The costs of establishing an environmental task force are historically very low. RS&Y has observed several programs around the country establish and operate a very effective task force at a low cost. Since many of the goals of the task force can be achieved through periodic meetings or coordination over the telephone or electronically, the bulk of the program costs are associated with these activities.

3.5.2 SUB-REGIONAL ENVIRONMENTAL ENFORCEMENT OFFICE

General Description

A sub-regional environmental enforcement office is an entity which can be created through an interlocal agreement between two or more governmental bodies with the goal of enforcing environmental laws at a sub-regional level. In some cases, each participating member funds a portion of the office. Since the interlocal agreement allows for a degree of flexibility, licensed peace officers or code enforcement officers can possibly staff the office.

For example, four counties in Iowa have established the Appanoose, Davis, Lucas and Monroe Counties Environmental Health Department through an interlocal agreement between the counties. Each county is responsible for funding a portion of the operations cost. As a result of this collaborative effort, the counties have seen greater communication and cooperation between the four counties.

Perceived Advantages

- Rural counties, who could otherwise not afford a full-time environmental enforcement program, can combine environmental enforcement efforts and pool resources.
- A sub-regional approach facilitates a consistent approach to environmental enforcement throughout the region.

- Visibility of illegal dumping efforts increase, thus making communities more aware of efforts made by environmental enforcement teams.

Perceived Disadvantages

- Unless a sub-regional enforcement program receives support and the participating entities make environmental enforcement a priority, this program can potentially receive less attention and eventually cease to exist.

Approximate Cost

A typical enforcement officer with TELEA or SEEN training in environmental laws may have a salary and benefits which ranges between \$32,000 and \$60,000. Since a regional enforcement officer would service multiple counties or communities, each community would be expected, as a stipulation of the interlocal agreement, to provide funds for a portion of the circuit rider's salary. This may allow counties with tighter budgets to participate more easily in a program like this.

Since the enforcement officer would service multiple counties, more than one enforcement officer may be needed to provide adequate services to the region.

3.5.3 SUB-REGIONAL CIRCUIT RIDER PROSECUTOR

General Description

Currently, there are few prosecutors who are familiar or experienced with environmental prosecution in the North Central Texas region. Environmental prosecution is often different from the cases that prosecutors normally handle in court using the criminal code. Therefore, these environmental cases require a special understanding and knowledge that most prosecutors may not currently possess.

A sub-regional circuit rider prosecutor could function in numerous capacities including:

- Assisting local prosecutors by sitting as a "second chair prosecutor" during a criminal or civil trial.
- Providing training to other local prosecutors and environmental enforcement officers on environmental laws.
- Acting as a resource for prosecutors to contact on an as needed basis.

Perceived Advantages

- Costs of a sub-regional circuit rider prosecutor can be disseminated among the many participating counties.
- Grants could be pursued to assist in the funding of such a position during the first two to four of years of the program.

Perceived Disadvantages

- County officials may have to be educated in the advantages of taking an increased role in environmental enforcement and the establishment of such a sub-regional circuit rider prosecutor.

Approximate Cost

A typical lawyer with experience in environmental law may have a salary which ranges between \$65,000 and \$80,000. Other costs associated with a circuit rider prosecutor might include a laptop computer at approximately \$2,000 and a vehicle at approximately \$17,000.²³ Since a sub-regional circuit rider prosecutor would service multiple counties or communities, each community would be expected, as a stipulation of the interlocal agreement, to provide funds for a portion of the sub-regional circuit rider's salary. This may allow counties with tighter budgets to participate more easily in a program like this.

3.5.4 ENVIRONMENTAL COURT

General Description

Law enforcement officials and prosecutors have at times expressed frustration with the judicial system's treatment of environmental crimes. Many environmental enforcement officials have commented that court systems in the North Central Texas region are often overloaded with a heavy backlog of cases.

Several communities in the United States have been successful in establishing environmental courts that deal only with environmental crimes. These courts have proven successful in reducing illegal dumping for reasons including: judges and prosecutors know the applicable environmental laws and the courts can recognize repeat offenders.

Perceived Advantages

- Enforcement personnel become more active in the enforcement of environmental crimes as there is a greater likelihood that their efforts will result in a conviction.
- Enforcement personnel can be more effective in the field, as they know that the environmental court can ultimately "back-up" any requests for compliance.
- Provides an opportunity for multiple cities and/or counties to coordinate efforts to enforce environmental crimes.
- Penalties can be enforced on a consistent basis and with a purpose of reducing future illegal dumping through fines and/or jail time.
- Provides an opportunity to focus on compliance from offenders in terms of cleaning-up illegal dumpsites.

Perceived Disadvantages

²³ Local governments may wish to reimburse the circuit rider for all travel expenses at a cost of approximately \$0.36 per mile, instead of purchasing or leasing a vehicles.

- The establishment of an environmental court would necessitate the passage of a law through the Texas Legislature and approval from the Governor.²⁴

Approximate Cost

The cost of establishing and operating an environmental court may be cost-prohibitive and counties may not be able to afford or have the demand which requires the establishment of a new court dedicated to environmental crimes.

From a cost/benefit perspective, a county may wish to dedicate one day per week or two days per month to hearing all environmental crimes or code enforcement cases. Other communities have found success through this approach because the judges will be prepared and ready to hear all cases relating to a specific field and can feel more comfortable during the trials.

3.5.5 FINES COLLECTED BY ENFORCEMENT PERSONNEL

Environmental enforcement fines have been historically utilized in supporting compliance behavior with regard to illegal dumping. Fines collected by enforcement personnel can be an effective enforcement tool. Results from the case studies conducted by RS&Y show that the majority of monies generated by enforcement fees have been deposited back into the general revenue fund account of the local government.²⁵ Based on case study data, fines typically range from \$200 to \$300.

Counties prosecute more severe illegal dumping cases in county or district court. If convicted, the fine money is divided between the county and the state equally.²⁶ Based on data received from the case studies, a minority of illegal dumping cases are tried in a county or district court.

Table CS5.5 Illegal Dumper Investigation and Conviction Data in Appendix A, services as an example of how Tarrant County keeps track of convictions and fees to gain an understanding of how successful enforcement activities are from year to year.

In an effort to gain an understanding of how successful enforcement activities are on a regional level, officials at NCTCOG could begin the process and track convictions and fees generated in the region. Information collected would be utilized, as an internal tool, to understand how enforcement programs are progressing or not.

²⁴ In 2001, House Bill 1979 was passed to create a new district court dedicated to environmental crimes in El Paso County.

²⁵ Based on an evaluation of case study data, the majority of cases involving illegal dumping are sent to municipal court.

²⁶ In some cases where the county provides more resources during prosecution of a case, 75 percent of the fine money is given to the county's general fund and 25 percent of the fine money is received by the State of Texas.

3.5.6 SUPPLEMENTAL ENVIRONMENTAL PROJECTS (SEP)²⁷

Supplemental Environmental Projects (SEPs) are a method for collecting fines and penalties for environmental crimes that can be directed toward environmentally beneficial projects. SEPs are authorized through the Texas Water Code Section 7.067. A SEP is a program for an alleged violator to offset a portion of a monetary penalty by doing an environmental enhancement project where the violation occurred.

The further use and expansion of SEPs for various environmental projects in the North Central Texas region could potentially be implemented. Possible uses for the SEPs may include:

- Laboratory testing for criminal investigations
- Hazardous material cleanup
- Junked vehicle removal
- Municipal solid waste cleanup
- Scrap tire collection and recycling

It may be appropriate for local governments to operate a SEP independently, at a sub-regional level through an interlocal agreement, or at the regional level. In all scenarios, prosecutors must be aware and well educated about SEPs.

²⁷ For further information on this issue, refer to the TCEQ's "Use of Supplemental Environmental Projects (SEPs)." To obtain a copy of this regulatory guidance document, contract the TCEQ by telephone at (512) 239-0028 or via the Internet at <http://www.tnrcc.state.tx.us/cgi-bin/exec/publications.pl>. When requesting the publication, ask for RG-367.

SECTION IV – THE COSTS OF EDUCATION AND OUTREACH

4.1 INTRODUCTION

This section of the study examines the various components of an education and outreach program. Discussions of the duties of an education and outreach coordinator, educational strategies and materials have been included in the text.

Each topic is addressed through an examination of:

- The general applicability of the approach
- Potential advantages and limitations that may exist
- Associated costs of the development and production of various materials

4.2 EDUCATION AND OUTREACH PERSONNEL PROFILES

Education and outreach activities can be coordinated through a single or a combination of departments at the city or county level. Among the community outreach and public education tasks to be performed are:

- Writing and distributing press releases
- Taking publicity photographs
- Coordinating the production of printed materials (posters, brochures, fliers, etc.)
- Establishing and responding to calls from the public hotline
- Responding to non-hotline public calls
- Scheduling and delivering public presentations
- Producing support materials for presentations
- Coordinating and promoting clean-up days
- Development of public awareness campaigns and materials

Below are several profiles of departments that could house the entity's illegal dumping education and outreach program.

4.2.1 ENVIRONMENTAL ENFORCEMENT OFFICER

General Description

Environmental enforcement officers are the most common personnel dedicated to education and outreach. Officers should plan to spend time in the community making presentations to adults and school children as well as to local officials and fellow officers. Community outreach by enforcement officers will continue to be important throughout the life of the program. For this reason, it is highly advisable to emphasize good communication and interpersonal skills when selecting environmental enforcement personnel to act as the education and outreach coordinator.

For example, the Tarrant County Sheriff's Department operates the education and outreach program for the county. As described in Case Study #5, each of the four FTE dedicate approximately eight hours per week to illegal dumping education and outreach activities. The majority of their time is spent educating violators or raising illegal dumping awareness on a one-on-one basis. The sheriff's office has developed brochures that display the NCTCOG's Stop illegal dumping logo and provide information regarding the NCTCOG Illegal Dumping Hotline.

Potential Advantages

- Officers are seen as an authority figure to young children and adults.
- Officers are the most knowledgeable on the laws governing illegal dumping.

Potential Disadvantages

- Officers may be viewed as too authoritarian by audiences.
- Too much emphasis might be placed on the legal issues of illegal dumping.
- Officers may be untrained in successful public speaking strategies.
- Some environmental enforcement staff may not feel comfortable in presenting to groups or other public speaking engagements.

Associated Cost

Based on experiences around Texas and the nation, environmental enforcement officers can rarely dedicate 40 hours per week toward the development of educational materials and programs. Instead, many governments choose to dedicate a portion of an individual's time to an illegal dumping education and outreach program. RS&Y has observed that environmental enforcement officers are often able to dedicate approximately four and 18 hours per week to illegal dumping educational efforts.

4.2.2 PUBLIC INFORMATION OFFICER

General Description

A public information officer is responsible for creating and presenting information to city or county residents and the media. In regards to illegal dumping education and outreach activities, a public information officer can publish or provide information on illegal dumping investigations and convictions, clean-up events, and other illegal dumping related topics. Public information officers may also be charged with researching and writing for various grants that are available.

For example, in 2003 Collin County created a public information officer position to provide information to residents of the county as well as the media regarding activities, programs and events that are occurring within the County. As a part of the position, the public information officer was given the responsibility of coordinating all illegal dumping education and outreach materials and programs.

Potential Advantages

- Public information officers are likely to be experienced and knowledgeable in effective communication strategies.
- Public information officers are in regular contact with media sources.

Potential Disadvantages

- Public information officers may not be viewed as an authority figure on illegal dumping.
- The legal aspects of illegal dumping may be a topic that the public information officer is uncomfortable or unfamiliar with.

Associated Costs

The salary and benefits for a public information officer range from approximately \$40,000 to \$80,000 annually. In cases where resources are not available to fund one or several FTE serving under the public information officer position, a percentage of one FTE or several FTEs can be utilized to reduce costs.

4.2.3 SOLID WASTE/PUBLIC WORKS STAFF

General Description

Some communities may wish to house illegal dumping education and outreach activities within the solid waste or public works departments. In most cases, these departments currently dedicated significant resources to illegal dumping cleanups, therefore have an existing relationship with the issue of illegal dumping. Like enforcement staff, solid waste or public works department staff must have strong communication and interpersonal skills to serve as education and outreach coordinators.

For example, Kaufman County houses its education and outreach activities through a solid waste management cooperative and a portion in the public works department. These activities have been ongoing since 1998 and have worked most notably with the various school districts to develop illegal dumping curriculum for students. As described in Case Study #4, the education and outreach program is very active and observed documented results from its education and outreach efforts.

Potential Advantages

- Clean-up crews can easily provide education and outreach personnel with information regarding areas of chronic illegal dumping. This information may be used when targeting various areas for an educational campaign.
- Illegal dumping information can be distributed at community clean-up events coordinated through the public works or solid waste department.
- Preexisting relationships may be present between solid waste or public works department staff since waste haulers are often licensed through these departments.

Potential Disadvantages

- Solid waste or public works staff may not be trained in public speaking techniques.
- Audiences may not view solid waste or public works staff as an authority on illegal dumping.

Associated Costs

The salary and benefits for a solid waste or public works department staff range from approximately \$37,000 and \$71,000 annually. In cases where resources are not available to fund one or several FTE serving under the solid waste or public works department position, a percentage of one FTE or several FTEs can be utilized to reduce costs.

4.3 EDUCATION AND OUTREACH MATERIALS AND STRATEGIES

An overview has been provided of the various educational materials that may be used to inform and educate the public on many issues associated with illegal dumping. Education and outreach is imperative for any successful illegal dumping prevention and response program, and ideally must be used in conjunction with cleanup and enforcement measures.

The information included in this section can be used as a tool to assist counties and cities in the creation, implementation or expansion of a successful illegal dumping education and outreach program. The various types of educational materials and outreach strategies²⁸ that can be created or implemented are profiled in the section based on the following categories:

- A general description of the various educational materials or strategies
- Advantages and disadvantages of the various educational materials or strategies
- Costs associated with the development of educational materials or strategies

4.3.1 BROCHURES

General Applications

Brochures containing information on proper disposal methods and the hazards associated with illegal dumping have been widely used by state, regional and local entities such as the Texas Commission on Environmental Quality (TCEQ), NCTCOG with much success. In general, brochures should be attractive and informative. Photographs, animated characters, logos or illustrations are commonly used to provide visual appeal. Producing brochures in color also adds a degree of visual appeal and are generally considered more attractive than monochrome brochures.

²⁸ All educational materials discussed in the following section can be translated into foreign languages (i.e. Spanish or Asian languages) to reach the many individuals in the North Central Texas region who do not consider English their principal language.

In 2001, NCTCOG printed and distributed a tri-fold brochure entitled “Stop Illegal Dumping - In Its Tracks!” This brochure included information regarding how to report illegal dumping, the NCTCOG Illegal Dumping Hotline, penalties for illegal dumping, and examples of illegal dumping. The brochure included descriptive pictures and NCTCOG Stop Illegal Dumping logo.

Potential Advantages

- Desktop publishing programs can be used to design brochures in-house. Publishing software is relatively inexpensive and very user friendly.
- Professional design firms, artists, and photographers may be used to provide high quality images and publications that many in the public have come to expect.

Potential Disadvantages

- Professional design firms, artists and photographers can be expensive
- Publication of brochures is often more expensive than other forms of publications like fliers and postcards.

Approximate Cost

Brochures may be created internally or contracted out to a graphics and design firm. If a brochure is created internally costs may include the purchase of desktop software which cost between \$200 to \$600, depending on the sophistication and complexity of the software. Other costs include reproduction of the brochure. Since brochures should be printed rather than photocopied on higher quality paper, to ensure durability and quality of color and graphics, printing and production companies may be a sensible alternative to producing these brochures internally. Many printing and production companies may not have compatible software, it is recommended that all internal production be converted to Adobe Acrobat format (.PDF format).



The NCTCOG STOP illegal dumping logo should be included on all educational brochures.

If brochures are created by a graphics and design firm, several costs may be incurred during this process. They include:

- *Design:* Freelance or corporate design firms may be used to design a professional quality brochure for production. In many cases photographs, logos and text must be provided to the designer prior to production. The cost of most freelance or corporate design firms range from \$500 to \$600.
- *Printing:* Printing costs will vary based on the number colors used in the brochure. One can expect that 2,000 copies of four-color brochures would cost approximately \$1,500.

From a cost/benefit perspective, local governments who incorporate NCTCOG designed templates and materials can reduce the cost of the production of brochures. This reduction could be as much as \$600, the approximate cost of designing a brochure.

4.3.2 FLIERS

General Applications

Fliers are an inexpensive product that has been used extensively by successful local and regional education and outreach programs to advertise and inform the public about special events, hotlines, or environmental programs. Fliers may also be considered a transitional general information piece for use until a brochure is developed and printed.

Potential Advantages

- Fliers can be reproduced by a copy machine rather than individually printed.
- Production time for fliers is shorter than other educational materials.
- Fliers are less expensive to produce and can be reproduced in mass quantities in-house.

Potential Disadvantages

- Fliers are easily torn, wrinkled or weathered and do not last as long as other educational materials.

Approximate Cost

Since fliers are generally reproduced in mass quantities by a copy machine, costs associated with the production of fliers are generally minor. Based on market research, 100 copies of fliers produced on a copier is approximately \$8 to \$10.



This t-shirt, sponsored by Keep Denton County Beautiful is an example of a promotional item.

4.3.3 PROMOTIONAL ITEMS

General Applications

Promotional items maybe produced as gifts for public presentations or at community special events. Items can be imprinted with the program message and may also be used to commemorate special events. Examples of promotional items that have been used by environmental educational programs in the past include:

- | | | |
|-------------------|------------|-----------------|
| • Posters | • T-shirts | • Magnets |
| • Bus Cards | • Pencils | • Coasters |
| • Bumper stickers | • Rulers | • Drink Coozies |

For example, the City of Greenville has produced refrigerator magnets displaying the City's name along with the North Central Texas Illegal Dumper hotline and logo. By utilizing a logo designed by NCTCOG, the city was able to reduce the costs to produce the magnets. These magnets have been handed out at various events sponsored by the city and are available through the City.

Potential Advantages

- Promotional items are generally used around homes or worn on a regular basis; therefore, printed messages are re-enforced.
- These items are generally long-lasting and are not easily destroyed, lost or weathered (i.e. paper products).

Potential Disadvantages

- Many promotional items can be expensive to design and produce.

Approximate Cost

Table 4.1 – Promotional Item Costs

Item	Unit Price	Set-Up Fees ²⁹
T-Shirt	\$ 5.00 - \$ 10.00	Included in Unit Price
Round Wooden Pencils	\$ 0.14 - \$ 0.17	Included in Unit Price
Retractable Pen	\$ 0.59 - \$ 0.69	Included in Unit Price
6" Ruler	\$ 0.12 - \$ 0.28	\$ 35.00
3" x 3" Magnet	\$ 0.31 - \$ 0.60	Include in Unit Price
Cork Coasters	\$ 0.45 - \$ 0.65	\$ 35.00
Drink Coozies	\$ 0.75 - \$ 1.45	\$ 40.00

Additional charges may apply in scenarios which necessitate multiple colors, designs, logos or other intricate illustrations.

4.3.4 BILLBOARDS

General Applications

Billboards located along highways are an advertising strategy used to convey a single message to those in passing cars. Billboards should be memorable, visually attractive, and present a message that is clear and concise.



This billboard appeared throughout the City of Dubuque, Iowa during the initiation of their illegal dumping hotline.

²⁹ Fees have been based on the cost of one color set up.

The City of Dubuque, Iowa used a billboard campaign to publicize the City's Stop Illegal Dumping Hotline. These billboards were located in areas of town that experienced a substantial amount of illegal dumping for approximately six weeks. The billboard campaign was used to "kick off" the implementation of the hotline, and proved to be a valuable marketing tool for the City.

Potential Advantages

- Billboards can reach a large and diverse audience, and have the possibility of connecting with several million drivers and passengers on a regular basis.
- Billboards have no distributing costs, and will last the length of the engagement.
- Billboards will reach individuals traveling in vehicles; some might be on their way to illegally dump.

Potential Disadvantages

- Messages on billboard may alienate or be unable to reach a certain audience group.
- Billboards located in remote or less frequently traveled areas of town may not reach a significant number of individuals.
- Billboards are more expensive than other types of mediums.

Approximate Cost

Price estimates for billboards vary according to the location, the size and the type of billboard. Based on interviews with industry professionals, the cost of billboards can range from \$10,000 to \$100,000 for a six month period.

Size: Sizes can range from the large 30 sheet billboards to the small eight sheet billboards.

Location: The location of the billboard is commonly the greatest determinant on the cost. Each location is rated on a Gross Rating Point (GRP) scale. The GRP is calculated by dividing the traffic count by the population of the area. For example, if you want a 75 GRP (showing), then 75 percent of the population should see you billboard every single day

Type: The most common types of billboards which are produced are vinyl or paper bulletins. Vinyl has greater durability and can last for several years; however the cost of vinyl billboards is much greater than paper bulletins. Vinyl billboards can also come in a flex style which can be hung on the edges of the boards and can be moved to different locations. Paper bulletins often last for approximately 30 days and can be easily damaged by inclement weather. Based on interviews with industry representatives, paper bulletins usually show wear after the first rain.

From a cost/benefit perspective, billboards are very costly and may be more appropriate for use in a regional campaign administrated by NCTCOG, where several billboards can be displayed throughout the region. Based on interviews with industry professionals, if NCTCOG were to purchase several billboards they would likely receive discounted rates.

4.3.5 BANNERS

General Applications

Banners made of mylar, a strong polyester film, can be placed throughout a community with various messages printed on them. These banners can be hung on fences, across streets or outside community centers.

For example, Kaufman County posted banners across the County informing citizens of the NCTCOG Illegal Dumping Hotline. The County hung these banners on fences along county roads, and near County buildings. As detailed in Case Study #4, the County observed a significant increase in the number of calls received on the NCTCOG Illegal Dumping Hotline.

Potential Advantages

- Banners are significantly less expensive than billboards.
- Banners can come in various colors and can be printed to specifically meet the needs of the community.

Potential Disadvantages

- If not properly secured, banners can be damaged or destroyed by the weather.
- Banners can be a target of vandalism or theft.



Banners, like the one pictured above, can be placed throughout rural areas to publicize an illegal dumping hotline or program.

Approximate Cost

Based on information provided by Kaufman County, the cost of banners is approximately \$20 per unit. To reduce costs during the development of banners, local governments may wish to use graphics and logos developed by NCTCOG.

4.3.6 RADIO ADVERTISEMENTS

General Applications

The use of radio advertisements is commonly perceived as the most powerful and cost-effective way to reach a broad numbers of citizens. Depending on your target audience, one can utilize the radio station formatting categories to focus your efforts on stations that your indented audience will hear. For example, if your group was trying to educate Caucasian, English speaking, males between the ages of 18 to 45, one might want to advertise on a sports talk program between the hours of 8 a.m. to 5 p.m.

An example of how another council of governments has used radio as part of a public awareness campaign, Houston-Galveston Area Council (H-GAC) has recently kicked off a

“Paint Smart” campaign which included a series of 10 to 60 second audio public service announcements that have been played on various Houston area radio stations. The public service announcements incorporated phone numbers, websites, proper disposal method information in a song with an upbeat tune. The H-GAC observed an approximate 1,000 percent increase in the number of hits their website per month during the campaign.

Potential Advantages

- Catchy jingles or tunes can be used in advertisements that help to associate your message with something entertaining.
- Since most individuals listen to the radio while driving, radio is a medium which plays to a captive audience.
- Radio may be the last medium to reach a perspective illegal dumper prior to the act of dumping.

Potential Disadvantages

- Radio advertisements during peak hours can often be more expensive than other mediums.
- Radio advertisements may be expensive to produce and the availability of firms specializing in broadcast advertisements may be scarce in rural areas.

Approximate Cost

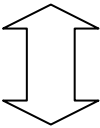
Costs are dependant on several factors which govern the cost of advertising on radio:

Common programming categories:

- | | | |
|------------------|--------------------|---------------|
| • Top 40 | • All news | • Sports Talk |
| • Easy Listening | • All talk | • Tejano |
| • Golden Oldies | • Progressive Rock | • Other |
| • Country | | |

Variability of airtime rates:

Table 4.2 – Variability of Airtime Rates

Cost	Time of Day	
<div style="text-align: center;">  </div>	Morning drive time	6 a.m.- 10 a.m., Weekdays
	Evening drive time	3 p.m. – 7 p.m., Weekdays
	Midday	10 a.m. – 3 p.m., Weekdays
	Evening	7 p.m. to Midnight, Weekdays
	Late night	Midnight to 6 a.m., Weekdays
	Weekends	All weekend
Least Expensive		

- The length of that various public service announcement or advertisement also determines how much the advertisement will cost. Traditionally, the length of a radio advertisement range between 10 to 60 seconds.

- The number of times your advertisement appears during the course of the day. In certain areas, the greater the frequency and the length in which the radio spot will run, price breaks may be available.

Industry professionals have also stated that it is often beneficial to broadcast the radio spots more frequently during the first few weeks of a campaign in the attempt to introduce the maximum number of potential listeners to the message. Then, as the campaign progresses, radio spots can appear less frequently with the goal of reinforcing the message to those listeners who have been previously introduced.

Cost saving strategies which can be implemented to reduce some of the development and production cost of radio advertisements include:

- *Studio Time:* Local radio stations may donate studio time to the record of radio PSA
- *Actors:* Contacting community acting theater to recruit actors to donate their voices for PSA

From a cost/benefit perspective, radio PSAs can be very costly but have a reach of several million individuals. RS&Y believes that it may be more appropriate for use in a regional campaign by NCTCOG, where PSAs on several radio stations can be broadcast throughout the region. Based on interviews with industry professionals, if NCTCOG were to purchase airtime on several radio stations NCTCOG would likely receive discounted rates.

4.3.7 UTILITY BILL INSERTS

General Applications

Utility bill inserts can take various forms such as a pamphlet or brochure as well as a flier. Commonly, local governments will include inserts such as community newsletters, current events calendars or fact/information sheets.

Potential Advantages

- Many residents in incorporated areas receive electric and water utility bills.
- Utility bill inserts are very easy to distribute compared to other methods.

Potential Disadvantages

- Utility bills are limited to those individuals receiving services provided by the utility. For example, in many unincorporated areas of the county, individuals have private wells and do not receive services from a water supply entity; therefore a certain portion of the targeted population may not receive the information.
- Utility bills are weight restricted, which limit the number of inserts that can be included in a utility bill. Many times, departments must compete over what and who is allowed to include information in these monthly bills.

Approximate Cost

Generally, utility bill inserts can be produced and printed in-house using desktop software and copy machines, as a result the costs associated with producing these inserts is low. Based on market research, 100 copies cost approximately between \$8 and \$10.

Based on interviews with City and County staff, inserting a logo, short message or hotline number directly on the utility bill may be more effective to reach citizens than inserting additional pages.

4.3.8 DOOR HANGERS

General Applications

Door hangers are a common educational and advertising tool used by many programs in the North Central Texas region because of their adaptability to different situations and audiences. Door hangers can be placed on the entrances of multi-family housing units, single family housing units and businesses.

For example, the City of Allen's Public Works Department targets specific areas where illegal dumping is prevalent and places door hangers on all multi- and single family housing units prior to a city sponsored neighborhood cleanup. The City has experienced a great deal success and a positive feedback from this strategy.

Potential Advantages

- Door hangers are ideal for advertising one-time or special events in a specified area.

Potential Disadvantages

- Door hangers must be distributed manually in various areas of town, this method can be a time consuming and lengthy process.
- Door hangers do not last very long, and are often disposed of quickly by the individual.

Approximate Cost

Due to the unusual form and dye cuts required to produce door hangers, it is recommended that the production of door hangers be sent to a local printing company. Door hangers should be printed on card stock or glossy paper and have a dye cut hole near the top to hang on the door handle. Many printing companies will send out door hangers to a bindery firm for these dye cuts. The production of 2,000 standard size, one color door hangers approximate cost \$150 to \$200.

4.3.9 PUBLIC SCHOOL ENGAGEMENTS

General Applications

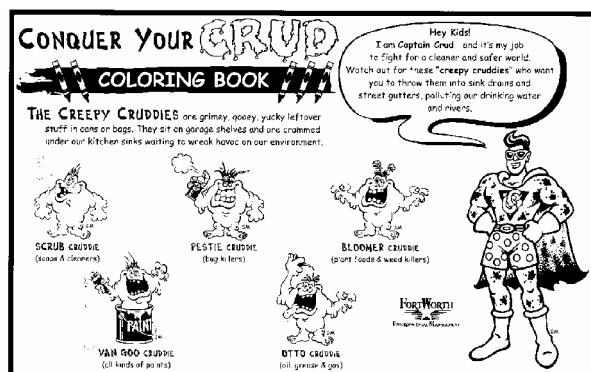
Presentations to children have been a mainstay of many environmental education and outreach programs. It is widely accepted that children are more open to new ideas and often more eager to act constructively to improve their neighborhood, than other age groups.

Children can also build family support for an environmental program and get their parents involved in efforts to reduce illegal dumping, illegal dumpsite cleanups or proper disposal methods. Many times education and outreach programs at the city/county level can be incorporated with the curriculum of health and science departments within each school district.

Based on case study data, environmental education programs commonly focus on children in the 3rd and 5th grades respectively. Staff noted that children in these age groups are old enough to understand the material presented, and have not yet reached their typically rebellious teenage years.

Potential Advantages

- The use of visual aids and creative props can help capture and hold children's attention, thus allowing them to focus on the message presented.
- Fliers or brochures developed for adults can be given to children for them to take home to their parents.
- Fliers or brochures developed for adults can reinforce messages aimed at younger audiences.
- The Parent-Teacher Association (PTA) should also be considered as another group of adults that can be provided educational materials.



Captain Crud coloring book, sponsored by the City of Fort Worth, are given to children to teach them about proper disposal methods.

Potential Disadvantages

- The message may be too complex for younger students, resulting in the children lack of comprehension of the message.
- The students may be at the age where boredom and rebellion are common, and the message may fall on deaf ears.

Associated Cost

Often, the only associated cost with presentations to students is the time that is dedicated by the environmental educational coordinators. Based on interviews with city/county staff, educational coordinators must create a presentation or lesson plans, schedule presentations, and perform presentations. Other minor costs include fliers, educational brochures given to the students.

4.3.10 PROFESSIONAL SEMINARS / COMMUNITY OUTREACH

General Applications

Educational presentations can also be aimed at adults to inform and educate them about the various aspects of an environmental enforcement program. Similar to educational presentations to children, audio-visual materials are recommended. PowerPoint computer presentations, informational videos, or slides are a few examples of visual tools which can be used to reinforce the message presented.

Presentations may include images of environmental officers on the job, dumpsites, a court scene, or citizen collection station. Information should focus on the hazards of illegal dumping, punishment and penalties for illegal dumping, as well as proper disposal methods. Contacting groups like adult service organizations, neighborhood watch groups, senior citizens, chambers of commerce, environmental organizations, and area businesses are ideal audiences.



Communities should look to attend seminars or other presentations sponsored at the local and regional level on issues such as illegal dumping.

Potential Advantages

- Presentations can be prepared and made at a variety of venues including community/civic club meetings, professional workshops or conventions, and at local businesses.
- Presentations are inexpensive to design and produce, yet provide an easy way to communicate a powerful and informative message.

Potential Disadvantages

- Some environmental enforcement staff may not feel comfortable in presenting to groups or other public speaking engagements.

Approximate Cost

There are few significant costs associated with presentations at professional seminars, based on interviews with city/county staff. Labor costs associated with the scheduling, creation, preparation and the performance of a presentation at an event typically make up the majority of the cost.

4.3.11 WEBSITE DEVELOPMENT

General Applications

As society moves into the information age, the use of the internet is becoming more prevalent as a means of advertisement, entertainment, and providing informational resources that are available at the touch of a button. The development of a website to promote environmental enforcement is a strategy employed by many programs around the nation and in the North

Central Texas region. Some examples of information regarding illegal dumping on websites include:

- Hotlines or Tip-line Information
- Information on hazards associated with illegal dumping
- Online forms to report illegal dumping
- Pictures of illegal dumpsites and cleanups
- Video of a dumpsite or dumpsite cleanup
- Pictures of known illegal dumpers still at-large
- Environmental games for children to learn about illegal dumping and proper disposal
- Frequently Asked Questions (FAQ) regarding illegal dumping and penalties for illegal dumping.

Potential Advantages

- The internet reaches millions of individuals and businesses around the state and region.
- A simple, yet informative website can potentially be created internally, with the aid of inexpensive instructional books or tutorial software.
- Websites can be developed that contain helpful phone numbers, interactive applications, video, and pictures of illegal dumping.

Potential Disadvantages

- The development of a complex website can be expensive to create and maintain.
- Websites may not reach those individuals without access to the internet.

Approximate Cost

There are several basic steps that are involved in the creation, development and maintenance of a website. The following table is based on interviews and research produced by website developers in the North Central Texas region. All costs described in the Table 4.3 are approximations.

Table 4.3 – Website Development Costs

Phase	Description	Approximate Cost
Domain Name	<p>Buying a domain name secures the name of the website, for example:</p> <p>http://www.nodumpinginnctcog.org</p> <p>http://www.illegaldumpers.org</p> <p>would ensure exclusive rights to these catchy names.</p>	\$35 per year
Hosting	<p>Once the domain name is purchased, it must be hosted on a server. Prices may vary according to the size of the website (Bandwidth), and the number of e-mail addresses. Factors which may increase the size of the website include: text, pictures, video, audio clips, number of pages. Servers should allow full-time and free-form access to website.</p>	\$20 per month but may increased
Development	<p>A website could potential be developed in four manners:</p> <ul style="list-style-type: none"> • Freelance website developer • Internal assignment for information technology employee • Internal design based on boilerplate “fill-in” templates • Internal developed aided by website development software 	\$30-\$40 per hour or flat rates of \$1,000 - \$10,000
Maintenance	<p>In some instances, information or pictures need to be updated periodically. This can be done internally with the aid of web development software or contracted out to a freelance website developer.</p>	Case-by-case basis depending on type of maintenance needed.
Secure Socket Layer (Optional)	<p>Provides a secure connection between those sending information and those receiving information. A secure socket layer would be recommended for websites offering on-line forms to report illegal dumping.</p>	\$200-\$500 per year

4.3.12 VIDEO PUBLIC SERVICE ANNOUNCEMENTS

General Applications

Public Service Announcements (PSAs) can be short, "non-commercial" announcements prepared to provide information to the public on a specific topic. A non-commercial announcement contains information that benefits its intended audience. As an example, a PSA that provides information on the consequences of illegal dumping differ from an ad that promotes the sale of a household product. As a result, most PSAs are developed by nonprofit organizations.

PSAs should contain information that is beneficial to the community. In most cases, free air time (usually 10- to 60-second spots) on television and radio is available to groups such as community associations, advocate groups, nonprofit organizations. TV stations often donate air time to meet the Federal Communications Commission's public service requirements.

Potential Advantages

- Can be utilized in different settings to reach various audiences (e.g. movie theaters, public access stations, City workshops, and school cable stations).
- Can also be translated into different languages to reach more of the public.
- Can be used to publicize community clean-up events.
- Can provide health and safety issues with regard to illegal dumping.
- Can be used for fund raising efforts aimed at cleaning-up chronic dumpsites.
- Would help influence public opinion on the issue of illegal dumping.
- Can be used to inform residents about an illegal dumping hotline and ways to report illegal dumping.



Captain Crud teaches children about various solid waste issues including illegal dumping.

Potential Disadvantages

- Developing a uniform platform as to the subject matter on the PSA can be a tedious process.
- Developing a PSA may be more costly than other forms of education and outreach strategies.

Approximate Cost

Depending on the simplicity or complexity of the PSA, the cost of developing can range considerably. For example, a video PSA versus a radio PSA would require consideration of the following:

- Locating an advertising/marketing expert to develop ideas on how to approach the video PSA
- Development of a script
- Development of a performance script (what the video will show)
- Casting
- Production and editing of the video PSA

Depending on the budget for education and outreach activities, resources may be better spent on informing and educating the general public through the use of other cost-effective

methods. Video PSAs could be developed as part of a regional campaign, instead of at a local level.

From a cost/benefit perspective, entities wishing to go forward in the development of a video PSA should consider to what extent community acting groups can be contacted. These actors will often donate their time to perform in a video PSA or lend their voices to a radio PSA.

An alternative to video PSA development is cinema advertising. The following section will detail the costs and benefits associated with cinema advertising.

4.3.13 CINEMA ADVERTISING

General Description

Cinema advertising generally refers to those still photo or motion picture advertisements displayed prior to the showing of a motion picture. Cinema advertising has grown rapidly in recent years and is now a multi-billion dollar business that has the potential to reach a large audience.

Based on data collected from a 2002 Arbitron Inc. survey, the following findings were released on the effectiveness of cinema advertising:

- Two-thirds of all moviegoers ages 12-24 noted that they did not mind cinema advertising.
- Eighty-six percent of moviegoers were aware of advertising seen before the movie.
- Forty percent of Americans aged 12 and older went to the movies in the past month, during the Holiday 2002 movie season.
- Moviegoers arrive at the theater early and are aware of their enhanced media environment. Adults who frequent the theater monthly tend to arrive, on average, 19 minutes early. This allows ample time for a variety of media to reach consumers including cinema advertising.

Video or still images should be eye-catching, colorful and reach out to younger audiences. Messages should be simple, bold, and use photographs or graphics. Photographs or graphics can depict scenes of



These NCTCOG grant funded cinema advertisements played for over four months in Grand Prairie.

illegal dumping activities, illegal dumpsites, or violators being arrested for illegal dumping.

In 2003, the City of Grand Prairie implemented a cinema advertising program to promote their illegal dumping hotline and to inform citizens about reporting illegal dumping. As detailed in Case Study #2, the City designed and broadcast these images on 12 movie theaters in the Grand Prairie area.

Potential Advantages

- The majority of movie goers are between the ages of 12 to 24. Litter and illegal dumping studies in the past indicate, that the 18-24 age group typically participates in illegal dumping activities.
- Based on case study data, cinema advertising firms will provide discounts to governments who wish to use their service.
- Cinema advertising would be a very cost-effective medium for the implementation of a regional illegal dumping educational campaign, since movie theaters are located across the entire region.

Potential Disadvantages

- Cinemas in rural areas may not offer cinema advertising at the local movie theater.
- Movie theaters in rural areas may be independently owned and may need to be negotiated at a local level.
- Some larger movie theater companies may not offer advertising at a local level.
- Communities may not be able to financially support the development and display costs associated with cinema advertising.

Approximate Cost

Based on data received from the City of Grand Prairie, the cost of cinema advertising over a six month period was \$9,101. Stipulations of the contract included:

- The PSA was to be shown on all 15 screens at a local movie theater.
- 75,000 showings of the image were played on each screen over the duration of the contract.
- Images were shown an average of three times prior to each movie.
- The average cost of each broadcast of the PSA was \$0.12 per showing.

From a cost/benefit perspective, cinema advertising is a relatively low cost and highly effective medium to reach younger audiences.

4.3.14 NEWSPAPERS AND CIRCULARS

General Applications

One of the most cost-effective means of reaching the general public is advertising in a newspaper or circular. A newspaper or circular can be used to target specific municipalities or regions on a broad range of topics.

Potential Advantages

- A newspaper or circular is the most economical means of reaching the maximum number of the population.
- New residents to an area turn to the newspaper for information.
- You can continually reach and educate communities regarding illegal dumping education and outreach and clean-up activities.
- By advertising regularly, you can establish a good reputation in the community and influence public opinion on the tolerance of illegal dumping.
- Consistent advertising in newspapers could result in lower per-unit costs due to economy of scale.
- Newspaper and circulars allow flexibility; information can be tailored to meet a budget or target a particular group.

Potential Disadvantages

- Local newspaper and circulars may only have a limited range with regard to circulation.

Approximate Cost

Depending on the type of advertising, newspaper and location you will want to advertise in, the price can vary. Price can be determined in some local newspapers or circulars by the number of words in the advertisement, size of the advertisement, special font styles, included pictures and the length of time the advertisement will run.

In order to estimate costs associated with a regional approach to advertising, RS&Y contacted a large newspaper in the North Central Texas region to gain an understanding of the costs associated for a non-profit organization, such as NCTCOG. Table 4.4 provides the associated rates for advertisements.

Table 4.4 – Advertising for Non-Profit Organizations

Day of the Week	Cost
Sunday	\$ 200.00/column inch
Monday and Tuesday	\$ 120.00/column inch
Wednesday and Thursday	\$ 143.00/column inch
Friday and Saturday	\$ 159.00/column inch

One could expect that these rates would be considerably less in local newspapers. From a cost/benefit perspective, by advertising in a local newspaper, local governments would have a greater opportunity to reach their intended audience and observe much lower rates than those set by larger regional newspapers.

In addition, local governments should always look to contact their local newspaper to publish stories about chronic illegal dumpsites, environmental enforcement activities or educational campaigns. This is a low cost method of gaining exposure to a new or existing illegal dumping prevention and response program.

4.3.15 TEXTBOOK COVERS

General Description

Information on illegal dumping can be aimed at children in school through messages and logos printed on textbook covers. It is a state law that all public school textbook be required to have a book cover on it.

For example in Kaufman County, the county has purchased textbook covers from a distributor in the North Central Texas region to supply these covers to the school districts in their county. These textbook covers contained messages and information on stopping and reporting illegal dumping. The textbook covers are eye catching and use a four-color design.

Potential Advantages

- Messages can be distributed to a large number of individuals
- There is the potential that these messages will have a viewed by students repeatedly throughout the school year.
- Messages also have a chance to reach parents when textbooks are taken home by the student.

Potential Disadvantages

- Textbook covers are easily torn, wrinkled or weathered and do not last as long as other educational materials.

Approximate Costs

Based on interviews with industry professionals, textbook covers should be designed and developed using vibrant colors, catchy or trendy phrases, as well as informative messages. The average student uses seven to eight textbook covers per year. As a general guideline, a community should expect to produce one textbook cover per student, however a community may wish to produce more depending on their needs.



This is an example of the book cover designed by NCTCOG and TCEQ that has been used in Ellis and Kaufman counties.

The cost of textbook covers is dependant on the number of

colors and quantities in which they are purchased. The cost range from approximately \$880 for 5000 book covers to \$119,000 for 100,000 book covers.

Communities wishing to incorporate textbook covers in their public outreach campaign may wish to utilize a previously designed textbook cover that was designed in cooperation with NCTCOG and TCEQ. These covers can be tailored specifically to the needs of the community and include information about that community such as contact information or a supplementary logo and slogan.

From a cost/benefit perspective, since a new design would not require the community to spend a significant amount of money on the design, the community may have an opportunity to produce additional textbook covers or develop additional educational materials.

SECTION V – RECOMMENDATIONS TO DEVELOP A MODEL ILLEGAL DUMPING PREVENTION AND RESPONSE PROGRAM

The following section includes recommendations to assist governments in building a model illegal dumping prevention and response program. The purpose of this section is to identify specific measures, various equipment, and explicit strategies that local governments may wish to implement when organizing or expanding their program. RS&Y developed each recommendation from a cost/benefit perspective, while maintaining a sense of what strategy is most appropriate for the various types of communities in the North Central Texas region (e.g. rural, sub-urban, and urban). Additionally, several recommendations have been developed from a regional perspective and may be most appropriate to implement on a sub-regional or regional basis.

The foundation for these recommendations has been developed through our analysis of illegal dumping prevention and response programs in several communities in the North Central Texas region and supplementary research of various related issues.

5.1 CLEANUP

Virtually all communities in the North Central Texas region essentially operate an illegal dumping clean-up program. As profiled in Section 2.2, this program can be housed in a variety of departments and can be assisted by many different groups. Many of the costs associated with an illegal dumping clean-up program are derived from the salaries and benefits of personnel.

RS&Y recommends that communities in the North Central Texas region should maintain a clean-up program and reexamine existing clean-up methodologies. Communities should examine several issues related to reducing personnel costs while maintaining a commitment to cleaning-up illegal dumping. Communities should approach this systematically and carefully tailor a program to fit the needs of the community. RS&Y has developed several key recommendations that can be used as a guide for communities.

5.1.1 REQUIRE OFFICERS TO PERFORM SMALL DUMPSITE CLEANUPS WHEN AVAILABLE

Based on case study profiles, environmental enforcement officers discover many illegal dumpsites during their regular patrol activities. After conducting an investigation of the contents of the dumped material, officers will often contact clean-up crews to take the material to a disposal facility. In scenarios where the dumpsite could be described as a small volume dumpsite, it may become inefficient for clean-up crews to travel to that location.

RS&Y recommends that officers should consider cleaning-up dumping during their visit to the dumpsite. Officers could store the material in the rear of a pick-up truck, SUV,

sedan, or cargo carrier until they can take it to a proper disposal facility. Officers would not only save the regular clean-up crew the time it would take for them to visit the illegal dumpsite, but would also make sure the dumpsite is cleaned up quickly. More information on this topic is provided in Section 2.2.1.

5.1.2 USE CONTRACTORS TO ASSIST IN CLEAN-UP EFFORTS

Many communities are unable to dedicate a significant amount of resources toward illegal dumping cleanups or do not experience large amounts of illegal dumping. These communities often have difficulty convincing policy makers to provide clean-up crews with needed equipment. Many communities are also unable to dedicate the adequate manpower to address illegal dumping sufficiently.

RS&Y believes that these communities may wish to contract illegal dumping clean-up services out to a private company. Communities may do this during the procurement of a solid waste services contract or as a stand alone contract that can go out for bid. These services may be provided on a regular or periodic basis to meet the needs of the community. A more in depth look at the applicability of contractors is provided in Section 2.2.2.

5.1.3 INCORPORATE VOLUNTEER GROUPS AND COUNTY JAIL TRUSTEES IN CLEAN-UP EFFORTS

One of the most significant costs associated with illegal dumping clean-up operations are personnel. Table 5.1 describes clean-up personnel costs for each of the case study communities.

Table 5.1 – Clean-up Personnel Costs

Entity	Personnel Cost	Percentage of Clean-up Budget
City of Allen	\$ 74,360	55 %
City of Grand Prairie	\$ 101,345	81 %
Collin County	\$ 52,655	46 %
Kaufman County	\$ 48,425	23 %
Tarrant County	\$ 153,530	77 %

RS&Y believes that one way communities could look to ease this cost is through the use of county jail trustees and volunteer groups for manual clean-up activities. As described in Section 2.2.4, county jail trustees have very little cost associated with them and can perform many of the regular clean-up crew's tasks.

5.1.4 PURCHASE DEDICATED ILLEGAL DUMPING CLEAN-UP EQUIPMENT

Many communities in the North Central Texas region rely heavily on manual clean-up efforts to abate illegal dumpsites. Manual cleanup is often an inefficient and potentially dangerous method of cleaning-up illegal dumping. The integration of mechanized equipment is crucial for any program participating in clean-ups.

Based on case study profiles, RS&Y recognizes a need for communities to move away from a heavy reliance on manual pickup to using mechanized equipment to clean-up illegal dumping. RS&Y believes that the most appropriate mechanized equipment for the cleanup of illegal dumpsites is a brush truck. However, the purchase of brush trucks may not be suitable for all communities, and must be evaluated on a case-by-case basis. Communities should refer to Section 2.3 and 2.4 of this study to learn more about brush trucks. Table 5.2 describes the costs associated with commonly used illegal dumping clean-up equipment

Table 5.2 –Clean-Up Equipment Costs

Item	Cost
Front-end loader	\$ 216,000
Knuckleboom	\$ 250,000
Roll-off Container	\$ 2,500
Roll-off Truck	\$ 100,000
Dump Truck	\$ 132,000
Brush Collection Truck	\$ 80,000
Tracked Excavator	\$ 156,000
Grapple Attachment	\$ 27,000
Tow Truck	Rental Price

RS&Y has developed three different scenarios that describe the situations facing various communities in the North Central Texas region related to the implementation of mechanized equipment in clean-up activities.

Scenario 1 – Mechanized equipment is currently available and is used in whole or in part for illegal dumping cleanups.

In this situation, local governments should continue to use existing equipment until the equipment is replaced. At that point, local governments can evaluate whether brush trucks would be feasible to purchase in place of other heavy equipment.

Scenario 2 – Mechanized equipment is not available, and there is a heavy reliance on manual cleanup. The community can afford clean-up equipment.

In this scenario, local governments should look toward a greater use of mechanized equipment. The purchase of a brush truck is appropriate to consider. RS&Y recognizes that while \$80,000 is a significant amount of money for the equipment, brush trucks are often less expensive on an annual basis and more capable of cleaning-up illegal dumping than other equipment.³⁰ Additionally, if a brush truck is well maintained it may have a useful life of between seven and 10 years. Overall, the potential benefits could outweigh the costs of such equipment, because the program has the opportunity to operate in a more efficient manner.

Scenario 3 - Mechanized equipment is not available, and there is a heavy reliance on manual cleanup. The community cannot afford the purchase of equipment.

If a community cannot justify the purchase of dedicated illegal dumping clean-up equipment or there is not a great deal of illegal dumping in the area, they should consider two alternatives. A community could either participate in an equipment sharing program between several departments, or could consider renting equipment periodically when the need arises. Communities may also investigate applying for NCTCOG grants for the purchase of a brush truck.

5.1.5 ADDRESS ILLEGAL DUMPING ON PRIVATE PROPERTY

In several case studies, the issue of cleaning-up illegal dumpsites on private property presents a significant challenge for many communities. Illegal dumping on private property often attracts more illegally dumped materials on neighboring public property, if both are not addressed. Local governments seeking to address this issue have found many obstacles that prevent them from taking action.

RS&Y has concluded that local governments throughout the region should develop an action plan for addressing these dumpsites and actively prosecute those property owners. More information on the prosecuting illegal dumping on private property is located in section 2.4.1.

5.1.6 UTILIZE STORAGE FACILITIES TO TEMPORARILY STORE MATERIALS

Many clean-up programs in the North Central Texas region take cleaned-up material regularly to transfer stations or landfills. Clean-up crews must often travel long distances to take this material to these facilities, which leads to a reduction of time spent in the field cleaning-up illegal dumping. This issue is especially pertinent to communities operating

³⁰ When calculating annual cost, communities must take into consideration annual maintenance and fuel costs.

in rural areas or in communities without disposal facilities nearby. For more information on this issue, refer to Section 2.4.6 of this study.

RS&Y believes communities should dedicate a storage container or area to temporarily store illegal dumped materials until enough materials are collected to warrant a trip to a proper disposal facility. Communities could place roll-off containers at public works facilities or commissioner's barns.

5.1.7 IMPLEMENT AN ORGANIZED COUNTYWIDE SOLID WASTE COLLECTION PROGRAM

To address the issue of illegal dumping from a long term perspective, cities and counties should evaluate collection services to be provided to its citizens. For example, cities may need to examine the extent bulk collection services are provided and rural and unincorporated areas may need to evaluate the need for basic solid waste collection services.

NCTCOG's *Rural and Underserved Area Disposal Needs Study* addresses this issue in much greater detail, assesses the attitudes and perceptions of counties in the North Central Texas region, and make recommendations regarding this issue.

5.2 ENVIRONMENTAL ENFORCEMENT

Environmental enforcement is a vital component to any illegal dumping prevention and response program. Many communities in the North Central Texas region are developing very successful environmental enforcement programs to prosecute illegal dumpers.

As detailed in Section 1, over time developing an active environment enforcement program will potentially lead to a reduction in the need for clean-up activities. These communities could also expect to see a decrease in the overall program budget. RS&Y believes that an environmental enforcement program should be carefully developed to meet the needs of each community on an individual basis.

While these recommendations have been developed for the entire North Central Texas region, some equipment discussed in this section may not be appropriate for all scenarios. For example, it may not be appropriate to use the same approach to catch illegal dumpers in an urban area for a rural area.

5.2.1 EVALUATE ENVIRONMENTAL ENFORCEMENT PERSONNEL

One of the most difficult tasks communities face when establishing an environmental enforcement program is deciding where to house the program. Communities are also faced with the challenge of deciding where and how many officers should be dedicated to environmental enforcement.

RS&Y recommends that these communities should generally look to certified peace officers to operate an environmental enforcement program as opposed to non-commissioned officers. As detailed in Section 3.2, certified peace officers have several advantages over non-commissioned officers when combating illegal dumping. Communities currently housing programs within the code enforcement department may look to evaluate the option for code enforcement officers to become certified peace officers, since these personnel are already familiar with the laws governing illegal dumping.

Additionally, it is not RS&Y's expectation for communities to dedicate 100 percent of several FTE to illegal dumping; however, it is realistic for communities to look to dedicate a significant percentage of several FTE to environmental enforcement activities.

As stated in the 2001 NCTCOG *Targeted Illegal Dumper Study*, communities should encourage all enforcement officers to enforce laws on illegal dumping. Local governments may wish to provide environmental enforcement training to as many officers as possible. While these officers may not be designated as environmental enforcement officers, they will be more aware of what illegal dumping looks like and be more familiar with the laws regarding illegal dumping.

5.2.2 ENHANCE COMMUNICATION AND COOPERATION BETWEEN ENFORCEMENT STAFF AND PROSECUTORS AND JUDGES

During the course of the case study examinations, several communities expressed a need to enhance the fines and penalties that illegal dumpers receive. While this issue was raised in the 2001 NCTCOG *Targeted Illegal Dumper Study*, RS&Y recognized a need to further address this issue from a cost/benefit perspective.

RS&Y recommends that enforcement staff should continue to communicate and cooperate with city/county prosecutors and judges. From a cost/benefit perspective, prosecuting illegal dumping in a criminal or civil venue has the potential for greater fines or jail time for illegal dumpers, thus acting as a deterrent for future illegal dumping. By working with prosecutors and judges to educate them on illegal dumping, they will be more equipped to take these violations to civil or criminal venues instead of municipal court. Additional information on issue is detailed in Sections 3.2.8 and 3.5.

5.2.3 ALLOW OFFICERS TO FUNCTION IN A MOBILE OFFICE SETTING THROUGH THE PURCHASE OF EQUIPMENT

Several case study communities expressed an interest in providing environmental enforcement officers with greater mobility while on patrol. Giving officers the capability to function in a mobile office setting would allow them a greater capacity to conduct illegal dumping investigations as well as educate individuals while on patrol. RS&Y recommends the purchase of several pieces of equipment, described in Section 3.3, that could increase the ability for officers to do so.

RS&Y believes that officers should be equipped with laptop computers with remote access capability or Mobile Digital Terminals, digital cameras, and an enforcement vehicle with ample space to safely store equipment and materials. RS&Y acknowledges that some equipment may be expensive, but recommends that communities investigate to what extent grant funds may be available to purchase this equipment.

5.2.4 INVESTIGATE THE PURCHASE OF SUPPLEMENTARY ENFORCEMENT EQUIPMENT

RS&Y observed during case study profiles, that many environmental enforcement programs utilize various pieces of equipment to assist officers during illegal dumping investigations. These communities have experienced varying degrees of success with the equipment, and have expressed a desire to determine what equipment is most appropriate for illegal dumping investigations.

Through an evaluation of equipment commonly used for illegal dumping enforcement in Section 3.3, RS&Y believes the purchase of equipment to assist enforcement officers can be very helpful in gathering evidence against violators. From a cost/benefit perspective, RS&Y recommends that environmental enforcement programs should carefully evaluate the extent to which remote video recording systems, mobile scale systems, and global positioning systems can be used.

RS&Y believes that local governments interested in purchasing surveillance equipment should contact NCTCOG to inquire about testing the equipment for a brief period of time. This would allow officers to try out the equipment to get a sense of what its applications and limitations are. A local government should test surveillance equipment at several locations for several days or a week at a time.

5.2.5 PURCHASE APPROPRIATE VEHICLES FOR ENVIRONMENTAL ENFORCEMENT OFFICERS

Unlike traditional enforcement officers, environmental enforcement officers are often required to investigate illegal dumping in remote or extremely rural areas. These officers are also often asked to carry sophisticated equipment or clean-up illegal dumping. These officers should be provided with an appropriate vehicle for these activities. Additional information on environmental enforcement vehicles is provided in Section 3.4 of this study.

RS&Y recommends that environmental enforcement officers use four-wheel drive vehicles as well as periodically utilize aircraft to monitor illegal dumping activities in their jurisdiction. As previously discussed in this section, the purchase of SUVs allow officers to function in a mobile office setting is appropriate for programs in rural areas.

5.2.6 ORGANIZE A LOCAL ILLEGAL DUMPING TASK FORCE/ROUNDTABLE GROUP

Case study communities have described a need for greater organizational efforts in regard to environmental enforcement. This need for coordination is especially relevant for communities that coordinate environmental enforcement efforts within several different departments.

One way communities can coordinate environmental enforcement efforts is through the organization of an illegal dumping task force or roundtable group. A task force can foster communication and lead to greater cooperation between departments. More information on the establishment and costs associated with a task force is described in Section 3.5.

5.2.7 KEEP RECORDS OF ILLEGAL DUMPING INVESTIGATIONS AND CONVICTION DATA

Several case study communities profiled for this study have stressed a need for greater record keeping activities on illegal dumping investigations and convictions. RS&Y recommends that environmental enforcement investigators and prosecutors keep records of all illegal dumping activities.

By keeping records of illegal dumping data, enforcement programs may be able to determine trends and patterns where illegal dumping is taking place, who is illegally dumping and increases or decreases in the number of illegal dumpsites. Additional information on communities that keep records of illegal dumping data is located in the case study profiles.

5.3 EDUCATION AND OUTREACH

Developing proactive measures to address the problem of illegal dumping provides opportunities to reduce the need for illegal dumping cleanups. Through an educational campaign on the hazards of illegal dumping, the means to report illegal dumpers to authorities and the penalties associated with illegal dumping, citizens will be better informed and may be less inclined to illegally dump.

RS&Y recommends that communities develop an integrated education and outreach campaign through careful deliberation and planning. Local governments should use the information and cost data to identify measures that would be appropriate and economically feasible for their community.

5.3.1 EXPAND ILLEGAL DUMPING EDUCATION AND OUTREACH EFFORTS AT THE REGIONAL LEVEL

Several case study communities have expressed an interest in expanding education and outreach efforts at the regional level. In most scenarios it may not be cost-effective for a local government to develop a sophisticated illegal dumping education and outreach

campaign. Instead, RS&Y believes NCTCOG should continue to expand its education and outreach efforts throughout the region.

Based on industry research and interviews conducted for case study profiles, NCTCOG should take several steps over the next year to develop this campaign. The expansion of the program should involve:

- *Coordinating the development and production of PSAs.*

A comprehensive public service announcement campaign should be directed at citizens throughout the region with a focus on publicizing the NCTCOG Illegal Dumping Hotline and website. As detailed in Section 4.3, NCTCOG should look to develop this campaign using cinema advertising, radio PSAs, and billboards.

Prior to the initiation of this campaign, NCTCOG should retain the services of a marketing strategy firm to assist in the implementation of this plan. Marketing strategy firms can provide NCTCOG with valuable planning information to maximize the effectiveness of a education and outreach campaign.

- *Updating NCTCOG produced educational material templates.*

The brochures should reflect changes to the illegal dumping laws based on the 78th legislative session. NCTCOG should also examine the extent that new brochure designs or templates can be developed and distributed to local governments. NCTCOG should also develop banner templates that local governments in rural areas can produce and set-out throughout the area.

- *Requiring all NCTCOG grant recipients to incorporate NCTCOG Stop Illegal Dumping messages in educational materials.*

NCTCOG could incorporate language to reflect this policy in all grant applications for the upcoming grant cycle. By eliminating the need for local governments to design brochures and other educational materials, more grant funds may be made available for project implementation.

- *Evaluating the NCTCOG Stop Illegal Dumping website.*

NCTCOG should investigate the possibility of updating the website address as described in Section 4.3.1. This could make it easier for individuals to recall the website address and potentially lead to more reports of illegal dumping on-line. Additionally, redesigning the website make the website more user friendly to citizens could be undertaken by NCTCOG.

RS&Y recommends a significant amount of funds be dedicated to a regional campaign during the next funding cycle, and evaluation measures should be in place to measure the effectiveness of such a campaign.

5.3.2 DEVELOP WORKSHOPS FOR ILLEGAL DUMPING PREVENTION AND RESPONSE STAFF

Much of the equipment, topics and recommendations discussed in this study may be unfamiliar to many local governments in the North Central Texas region. As a result, these governments may be hesitant to implement any of the recommendations discussed in this section into their illegal dumping prevention and response programs.

As a way to reinforce the topics discussed in this study, RS&Y recommends that a regional entity (e.g. IRATE, NCTCOG, or TCEQ) explore the development of workshops for all illegal dumping prevention and response staff. These workshops can be held periodically, and focus on different topics including: clean-up equipment and strategies, enforcement equipment and strategies, and education and outreach materials and methods. The workshops may include demonstrations of equipment, representatives from local programs, and speakers to discuss issues identified in this study.

5.3.3 INCORPORATE NCTCOG DEVELOPED MATERIALS IN EDUCATIONAL MATERIALS

Local governments often choose to design educational materials with specially developed logos, hotline numbers or slogans for their particular community. From a cost/benefit perspective, it is inefficient for each local government to create specially designed educational materials. Instead, local governments may look to incorporate NCTCOG developed materials (i.e. logos and slogans) into their own education and outreach materials.

As detailed in Section 4.3, NCTCOG can provide templates and designs that can be tailored for a local campaign. By developing a consistent campaign throughout the North Central Texas region, citizens are more likely to recognize and recall a consistent message.

5.3.4 BUILD RELATIONSHIPS WITH LOCAL MEDIA OUTLETS

Many local governments have expressed an interest in publishing PSAs in newspapers and on television and radio stations. From a cost/benefit perspective, purchasing advertisements can be very costly and may reach a large unintended audience.

Education and outreach programs searching for a cost-effective method of reaching a specific audience may look to contacting a local media outlet to provide exposure to many aspects of illegal dumping enforcement. As detailed in Section 4.3, newspapers, television and radio stations often welcome stories on cases of illegal dumping or the establishment of a new program. RS&Y recommends education and outreach

coordinators at local and regional levels build relationships with local media outlets to foster these activities.

NCTCOG should also investigate the development of media kits to provide local governments to use with local media. These kits could include examples of articles publicizing illegal dumping enforcement programs, contact information and implementation strategies.

5.3.5 DEVELOP A REGIONAL K-12 ILLEGAL DUMPING CURRICULUM

Based on interviews with case study communities, several local governments have expressed an interest in developing more educational materials for schools. This could be achieved by developing a curriculum for all students in grades K-12 on illegal dumping.

RS&Y recommends NCTCOG develop a regional curriculum that can be implemented at the elementary, middle school and high school levels. NCTCOG could look to the applicability of curriculum developed in Kaufman County on a regional basis. As described in Section 4.3, targeting younger audiences with materials on illegal dumping may lead to behavioral changes in parents and the youth in the future.

5.3.6 PRODUCE BANNERS TO PROMOTE THE REGIONAL ILLEGAL DUMPING HOTLINE IN RURAL AREAS

Rural areas or unincorporated regions of the county are easy targets for illegal dumpers. However, local governments have found it is often a challenge to provide education and outreach materials to those areas. For example, local governments have difficulty finding areas to display educational messages or may lack the necessary funds to designate to illegal dumping educational campaigns.

From a cost/benefit perspective, local governments may look to produce banners which promote the regional NCTCOG Illegal Dumping Hotline. These banners, as detailed in Section 4.3, are relatively inexpensive and can be displayed in a variety of places. RS&Y recommends that local governments in rural areas develop banners and place them along county roadways or highways throughout the county.

5.3.7 PROVIDE INFORMATION ON ILLEGAL DUMPING AT ALL SOLID WASTE THEMED EVENTS

Many local governments hold periodic city/county sponsored clean-up events. Based on case study profiles, these events are popular among citizens. However, as described in Section 4.3, some communities could incorporate more information regarding illegal dumping related topics to those attending these events.

While RS&Y would like to note these events may not be the most cost-effective manner for governments to provide illegal dumping alternatives to its citizens, however, RS&Y

realizes these events are often very popular with citizens in the community. Therefore, RS&Y recommends that when local governments hold these solid waste themed events, the local government provide educational materials to attendees. Additionally, a representative of the environmental enforcement group could attend providing information on the hazards of illegal dumping or proper disposal alternatives.

5.3.8 ENHANCE COMMUNICATION BETWEEN NEIGHBORING ENTITIES

Communities in the North Central Texas region are continually developing education and outreach programs. Some communities have developed very active and successful programs while others in the region are in the developmental stages or have very young programs. Many of these communities lack the experiential knowledge that other, more established programs have already gained. This issue is discussed in greater detail in the case study profiles located in Appendix A.

RS&Y recommends that younger education and outreach programs communicate with more established programs in the North Central Texas region to assist them in developing a successful program. Based on interviews conducted for the case study profiles, more established programs are often willing to provide information on successful and unsuccessful strategies. From a cost/benefit perspective, avoiding the same mistakes of other communities will prevent younger programs from dedicating funds to ineffective and costly educational strategies.

APPENDIX A: CASE STUDY SUMMARIES

APPENDIX A – CASE STUDY SUMMARIES

To obtain a fundamental understanding of the costs and benefits associated with clean-up, enforcement and education and outreach programs, RS&Y conducted a series of case studies of five local governments located in the North Central Texas region. These case studies were selected based on RS&Y's understanding of active illegal dumping programs and recommendations from the Stop Illegal Dumping project oversight subcommittee. These case studies represented both city and county programs, and covered urban, suburban and rural areas. The five case studies included the following local governments, with the type of area provided in parenthesis:

- No. 1 City of Allen (suburban)
- No. 2 City of Grand Prairie (urban and suburban)
- No. 3 Collin County (suburban and rural)
- No. 4 Kaufman County (rural)
- No. 5 Tarrant County (urban, suburban and rural)

In developing the case studies, RS&Y worked directly with the local government representatives responsible for managing and conducting program operations. RS&Y conducted interviews with staff, made field visits to dumpsites and analyzed budgets and related financial information. Each case study includes a detailed description of the local government's clean-up, enforcement and education and outreach programs. In addition, RS&Y has documented the total annual costs associated with each program. RS&Y has specifically detailed costs for categories that include but are not limited to personnel, equipment, materials, transportation and disposal. Each case study includes key findings and recommendations to help each local government develop more effective and efficient illegal dumping abatement programs.

LIST OF CONTACTS – CASE STUDIES

Category	Department	Personnel Contact	Phone
CITY OF ALLEN			
Cleanup	Community Services Department	Ms. Donna Kliewer Mr. Terry Holley	972-727-0179 972-727-0163
Enforcement	Environmental Services Department	Mr. Joey Allette, R.S.	972-727-0123
Education and Outreach	Community Services Department	Ms. Donna Kliewer	972-727-0179
CITY OF GRAND PRAIRIE			
Cleanup	Public Works Department	Mr. Ronnie Bates	972-237-8526
Enforcement	Code Enforcement Department	Mr. Joe Graves	972-237-8049 (Office/Hotline)
Education and Outreach	City Manager's Office	Ms. Tammy Chan	972-237-8152
COLLIN COUNTY			
Cleanup	Public Works Department	Mr. Mike McClatchy	972-548-3700
Enforcement	Collin County Sheriff's Office Collin County Constable's Office – Precinct 3	Sergeant James Henry Chief Deputy Lonnie Simmons	972-547-5100 972-424-1460 ext. 3070
Education and Outreach	County Commissioner's Office	Ms. Leigh Hornsby	972-548-4772
KAUFMAN COUNTY			
Cleanup	Kaufman County - Precinct 1	Commissioner Rhea Fox	972-932-3684
Enforcement	Kaufman County Public Works Department	Ms. Kathy Paget	972-932-4331 ext. 143
Education and Outreach	Kaufman County Solid Waste Management Cooperative	Ms. Charlotte Gilmore	972-932-7954
TARRANT COUNTY			
Cleanup	Tarrant County - Precinct 1	Mr. T.C. Webster Mr. Clarence Lyons	817-615-4050
Enforcement	Tarrant County Sheriff's Office	Sgt. Jerry Brown	817-740-4354
Education and Outreach	Tarrant County Sheriff's Office	Sgt. Jerry Brown	817-740-4354

CASE STUDY #1 - CITY OF ALLEN

INTRODUCTION

The City of Allen (City) is third largest city in Collin County with a population of approximately 44,000 residents.¹ Neighboring the cities of Plano, Frisco and McKinney, the City is centrally located along State Highway 75. The population of the City has increased more than 137 percent from 1990 to 2000 and is expected to continue growing.²

Based on interviews with City staff, there are approximately 15 to 20 known illegal dumpsites currently within the City of Allen. Most of these dumpsites would be considered chronic illegal dumpsites, since very few new illegal dumpsites are discovered each year. City staff stated that due to the rapid growth the City has experienced in the past 10 years and the reduction of rural areas, there are fewer remote and inconspicuous locations that are attractive or available to illegal dumpers each year.

City staff acknowledged that illegal dumping along the undeveloped outskirts of the City has seen a increased significantly. This is observed most clearly in areas of the City that border rural and unincorporated areas of Collin County.

CLEANUP

The City houses its illegal dumping clean-up program within the Community Services Department. Clean-up efforts are provided by the City's Household Hazardous Waste Crew (HHW Crew) and Drainage Crew. The City established the current illegal dumping clean-up program in 2000. Prior to that time City staff stated that illegal dumping cleanups were "unfocused" and relatively inactive.

The City's funds clean-up activities through a variety of sources including user fees from both the solid waste and drainage utility bill, grants from NCTCOG, and payments from the general fund. In the past year the City has received two grants from NCTCOG to assist in the creation and implementation of the clean-up program. Table CS1.1 describes NCTCOG grant funding for illegal dumping clean-up projects.

Table CS1.1 – NCTCOG Grant Funds Dedicated to Clean-up Projects

Fiscal Year	Grant Amount	Description
2003	\$ 17,000	Community cleanups to be held in the older areas of City
2002	\$ 80,000	Funds 1 FTE ³ , pickup truck, payment to City of Plano for use at HHW reuse facility, and educational fliers

¹ Source: 2000 Census

² As of May 2003, the City has an estimated 63,000 residents.

³ Full Time Equivalent

Personnel

The City of Allen dedicates a percentage of eight FTEs to illegal dumping clean-up efforts. Staff responsible for cleanups is located in the HHW Crew and Drainage Crews. The two HHW Crew members' spend approximately 30 hours per week on illegal dumping cleanup activities⁴, while the six Drainage Crew members' dedicated an estimated four hours per week to illegal dumping cleanups. The costs associated with the salaries and benefits for staff with a percentage of time dedicated to illegal dumping is approximately \$74,360 annually, as described in Schedule CS1.

The HHW Crew is made up of one supervisor and one staff member. The HHW Crew primarily handles the cleanup of illegally dumped materials such as municipal solid waste, household hazardous waste, commercial waste, small tire dumpsites and dead animals. The HHW Crew performs manual clean-up activities for all illegally dumped materials. Table CS1.2 shows the allocation of time spent toward illegal dumping for the HHW Crew.

Table CS1.2 – HHW Crew Allocation of Time

Task	Percentage of Time
Cleanups	75 %
Transporting waste to disposal facility	15 %
Administrative (paperwork)	10 %

The Drainage Crew is responsible for the cleanup of large illegal dumpsites and brush, C&D debris and bulky items. Typically, illegal dumpsites are identified by the HHW Crew who then determine whether or not they would be able to perform the dumpsite cleanup. If it is determined that the dumpsite is too large or it would take a significant amount of time for the HHW Crew to perform cleanup the Drainage Crew is notified. Drainage Crew then transports heavy equipment and collection vehicles to perform the cleanup. Drainage Crew staff also assist in the manual lifting and transportation of heavy items which HHW Crew vehicles cannot transport. At the present time, the HHW Crew does not have dedicated heavy equipment hauling capabilities.

Additionally, a contractor provides clean-up services to the City for 86 acres of State right-of-way along State Highway 75. Like nearby cities of Plano and Richardson, City staff found that state funded litter control was inadequate to meet the expectations of residents. Thus, the City assumed the litter control pickup responsibilities for the Texas Department of Transportation (TxDOT). Based on interviews with City staff, the contractor is required to manually clean-up illegally dumped material along the rights of

⁴ The City has chosen to assign the responsibility of cleanup activities in the HHW Crew because of the connected nature of illegal dumping and household hazardous waste pickup. As well as conditions stipulated in the NCTCOG grant the City has received in 2003 for funding the pilot program.

way on a weekly basis⁵. The City allocates approximately \$42,107 for these services, as described in Schedule CS1.

The City also utilizes volunteer groups and other City staff to perform illegal dumpsite cleanups. Most of the materials collected by these groups is characterized as residential or commercial waste at small volume dumpsites. Based on interviews with City staff, it is estimated that in 2002 various volunteer groups, individuals satisfying community service requirements or members of the Collin County Constable's Office, performed a total of 2,612 hours of manual clean-up activities.

The costs of these cleanups are of no direct cost to the City; however, these citizens provide a service that save the City approximately \$39,612⁶ annually. Many of these cleanups focus on illegal dumping along roadsides or on public property. From a cost/benefit perspective, this is a very effective method of utilizing alternative resources to perform illegal dumpsite cleanups. Table CS1.3 describes the various groups that provide supplemental clean-up personnel.

Table CS1.3 – Supplemental Clean-up Personnel

Other Personnel	Estimated Number of Hours Worked Annually for Clean-up Activities
Collin County Constable's Office Precinct 1	60 hours
Volunteer Groups	2,308 hours
Individuals satisfying probation/parole/community service requirements	244 hours
TOTAL	2,612 hours

Equipment

HHW Crew and Drainage Crew staff dedicate a portion of various heavy equipment and motor vehicles to illegal dumping activities. Additionally, HHW Crew utilizes various protective gloves, clothing and containers during manual cleanups. Vehicles allocated to HHW Crew are primarily used to transport staff and illegally dumped materials that have been collected. HHW Crew noted that in some scenarios there is not enough space on their trucks or materials such as bulky items cannot be lifted or fit in the truck bed. In those cases, HHW Crew utilizes the Drainage Crew's 16-foot hydraulic tilt-bed trailer. Use of this trailer occurs weekly.

⁵ Additionally, the contractor maintains State Highway 75 intersections and concrete slope pavement on a twice a month schedule.

⁶Based on the annual performance of 2,612 hours of volunteer cleanups, with value based on salary and benefits of a HHW Crew Staff member.

Table CS1.4 – HHW Crew Clean-up Equipment Profile

Equipment	Description
Pickup Truck	Three-quarter ton pickup truck that is used to transport illegally dumped materials, equipment and staff.
Pickup Truck ⁷	Quarter ton pickup that is used to transport illegally dumped materials, equipment and staff.
Dump Trailer ⁸	16-foot trailer with hydraulic lift that is used to transport illegally dumped materials.
Rubber Aprons	Protective clothing that is used when handling hazardous wastes.
Containment Bags	Bags used in the field to dispose of non-hazardous illegally dumped material.
Chemical Bins	Containers used to transport dead animals or hazardous waste to prevent leakage of waste.
Protective Gloves	During manual cleanup, gloves are used to handle and load illegally dumped materials

Heavy equipment is used in the cleanup of large illegal dumpsites and is dedicated to the Drainage Crew. Use of this equipment occurs infrequently, when the determination is made that it would save time to utilize equipment to perform the cleanup. Table CS1.5 describes equipment used by Drainage Crew staff during cleanups.

Table CS1.5 – Drainage Crew Clean-up Equipment Profile

Equipment	Description
Front End Loader	Used to hoist illegally dumped materials such as C&D debris.
Backhoe with Grapple	Used to clean-up bulky items or tires in fields or ditches.
Dump truck	Primary mode of transportation for illegally dumped materials.
Excavator	Used to secure dumped materials in fields or ditches

Other equipment that is associated with illegal dumping cleanup is the utilization of roll-off containers set out across the City for the disposal of solid waste. In the City's solid waste services agreement, the solid waste hauler must agree to provide the City with 25 30 cubic yard, open top roll-off containers annually and provide hauling services to these containers. 12 - 15 roll-off containers are used during the Great American Trash Off event and the remainder are placed throughout the City at designated spots. The only cost to the City is the landfill tipping fee at the regional landfill.

⁷ In FY 2004, this truck will be replaced by a ¾ ton pickup truck, since the HHW team has found the ½ ton pickup to be too small.

⁸ In FY 2004, the HHW crew will purchase a fully dedicated dump trailer for their illegal dumping cleanup activities.

Disposal

All municipal solid waste collected from illegal dumpsite cleanups as well as free solid waste disposal events is disposed of at either the transfer station located in the City of Plano or at the McKinney Landfill. The distance to the transfer station is approximately six miles from the furthest part of the City and travel time is approximately 45 minutes roundtrip, while the landfill is approximately 12 miles from the City and travel and disposal time may take up to an hour and a half. City staff state that all illegally dumped material is disposed of at the transfer station and disposal at the landfill only occurs during large illegal dumpsite cleanups when it requires the use of Drainage Crew dump trucks.

Approximately 384 tons of waste was collected in 2002, 300 tons from the 216 illegal dumpsite cleanups and 84 tons from the Great American Trash Off. Disposal costs for this material are \$7,500 annually, as detailed in Schedule CS1. Table CS1.6 illustrates the types of illegal dumpsites cleaned up annually by HHW and Drainage Crew staff.

Table CS1.6 – Profile of Illegal Dumpsites in City of Allen

Type of Illegal Dumping	Number of Sites
Rural residents	22
Urban/suburban residents	27
Private/commercial haulers	15
Contractors/remodelers	52-70
Drug labs	Unknown ⁹
Illegal solid waste facilities	1 ¹⁰

Key Findings and Recommendations

1. Through the establishment of a more organized and efficient illegal dumping clean-up program, City staff has observed fewer new illegal dumpsites and overall decrease in the time illegally dumped materials are left unchecked.
2. The City receives a substantial benefit from structuring its solid waste collection services contract with private haulers to include that the haulers will supply roll-off containers for use by the City. This measure can be considered a type of preventative clean-up measure by supplying would-be illegal dumpers with a no-cost disposal option.

⁹ City Staff interviewed were aware of the existence of illegal drug labs in the City, however were unable to estimate the number of illegal drug labs in City.

¹⁰ Has been in existence since 1930, however today it is primarily inactive. City Staff estimate that cleanup costs could reach \$250,000.

3. The City has developed an effective system for the identification of illegal dumpsites and coordination of cleanups. The City could, however, benefit from the purchase of a brush collection truck to be dedicated to the HHW Crew. This could possibly lead to a reduction in personnel costs and equipment needs provided by the Drainage Crew, as a brush truck with onboard grapple and dump bed is best suited for the type of waste found at most dumpsites.
4. The HHW Crew pilot program's grant funding ends in FY 2003. There is a need for funding to continue to provide the City with illegal dumping clean-up services. RS&Y recommends that the City look into funding the entire program a HHW fee in the future.
5. Illegal dumping from rural areas may be difficult for the City of Allen to stop or control, since it is coming from sources outside the City limits. RS&Y recommends that the City continue to coordinate various illegal dumping efforts with Collin County in the future. Collin County may need to establish mandatory solid waste collection services for unincorporated areas of the county.

ENVIRONMENTAL ENFORCEMENT

The City of Allen houses its environmental enforcement program in the Environmental Services Division of the Building and Code Compliance Department. The program has been in place within the division since 1999. The funding for the Environmental Services Division is provided entirely through the general fund.

Personnel

The Environmental Services Division is comprised of three inspectors and one supervisor who dedicate approximately two hours per week on illegal dumping related activities. The total personnel cost for the enforcement program is approximately \$10,660, as detailed in Schedule CS1. Table CS1.7 shows the allocation of time for the Environmental Services Division.

Table CS1.7 – Enforcement Personnel Duties

Task	Percentage of Time
Investigations	55 %
Stakeouts	10 %
Developing cases for prosecution/filing	30 %
Education	5 %

City staff stated that each inspector is dedicated to certain quadrant of the City and performs a variety of tasks related to illegal dumping. Inspectors patrol their quadrant to identify illegal dumpsites or stakeout an area which has been identified as a known illegal dumpsite. City staff stated that the City enjoys the services of Inspectors that treat illegal

dumping as a serious violation. Since each inspector is responsible for a small area of the City, an inspector has the ability to become familiar with his “assigned turf”, any chronic illegal dumpsites, as well as build relationships with individuals in the community. Inspectors are familiar with the area and will often drive “back roads” near previously identified chronic illegal dumpsites. City staff also noted that building relationships with residents of the community has been an effective method of educating individuals on the negatives associated with illegal dumping.

The Environmental Services Division, working with the district attorneys office, has developed a uniform investigation procedure for illegal dumping investigations to ensure a successful prosecution of a suspected offender. As described by City staff, complaints by citizens who call the City of Allen Police Department and Collin County Constable’s Office drive many of the illegal dumping investigations.

After investigators identify the dumpsite, photographs are taken of the illegally dumped materials for evidentiary purposes. Investigators will also look for a name or address on materials. The material is also weighed to determine the level of penalty which must be assessed. Code Enforcement staff noted that in cases involving large amounts of illegally dumped material, a Texas Commission on Environmental Quality (TCEQ) field office representative is contacted by the Code Enforcement Supervisor to ensure the correct procedure is being carried out.

Equipment

Each inspector equipped with a quarter-ton pickup truck which allows them to investigate illegal dumpsites in areas that might be difficult to reach in sedans. City staff stated that illegal dumping most commonly occurs in rural areas, especially along the outskirts of the City. City staff noted that the use of trucks instead of sedans has been very beneficial to inspectors during investigations by allowing for greater mobility.

Inspectors also share two digital cameras, which are used to capture digital images of illegal dumpsites during investigations. The cost of equipment associated with illegal dumping activities¹¹ is approximately \$466, as detailed in Schedule CS1. Table CS1.8 describes the equipment and cost associated with environmental enforcement equipment.

Table CS1.8 – Enforcement Equipment Profile

Item	Quantity	Description
Truck	4	Quarter ton pickup truck used as the primary means of transporting staff and equipment
Digital Camera	2	2.0 MegaPixel digital camera used to photograph and document illegal dumpsites

¹¹ This cost includes the percentage of the annual fuel and maintenance costs of \$ 175 which is associated with illegal dumping, as described in Schedule CS1.

Investigation and Conviction Data

Table CS1.9 illustrates the number of illegal dumper investigations, prosecutions and convictions in 2002.

Table CS1.9 – Illegal Dumper Investigation and Conviction Data

Year	Investigations Conducted	Prosecutions	Convictions	Convictions Resulting in Jail Time	Convictions Resulting in Fines
2002	27	8	8	0	8

After building a case file, investigators take it to the Justice of the Peace Court or to the District Attorney. City staff estimates that the typical fine amount is \$250. Fine money as a result of an illegal dumping conviction is directed into the City's general fund.

Key Findings and Recommendations

1. The Code Services Department operates an effective system for the investigation and prosecution of illegal dumpers. The department could, however, potentially look to increase the time dedicated to environmental enforcement activities or purchase additional enforcement equipment to monitor illegal dumpsites.
2. Based on interviews with City staff, there is a need for additional environmental enforcement activities in the outlying areas of the City adjacent to unincorporated areas of Collin County. The City could place a greater emphasis on environmental enforcement activities in those areas or increase involvement with the City of Allen Police Department to address this issue.
3. During illegal dumping investigations the Code Services Department is in contact with District Attorney staff and TCEQ Regional Office staff to ensure that a case develops properly and that staff has followed all appropriate policies. RS&Y recommends that Code Enforcement staff continue to work with TCEQ Regional Offices, District Attorney's Office and County and Justice of the Peace Judges closely to ensure they are familiar with illegal dumping laws.
4. RS&Y recommends Code Enforcement staff consider investigating the possibility of performing light illegal dumping cleanups during the course of their regular patrols of chronic illegal dumpsites. This could possibly lead to a reduction in clean-up activities performed by the Community Services Department.

EDUCATION AND OUTREACH

The education and outreach program in the City of Allen is operated from the Community Services Department under the direction of the Solid Waste/HHW/Recycling

Coordinator. The entire program budget is approximately \$34,030. The City has operated an educational and outreach program through Keep Allen Beautiful since 1995.

The program receives funding primarily through the Keep Allen Beautiful fund¹², which in 2002, dedicated approximately \$23,000, as described in Table CS1.10. The illegal dumping education and outreach program also received funds through various NCTCOG grants. Table CS1.10 describes the various funding sources and dedication of funds.

Table CS1.10 –Education and Outreach Funding Sources

Funding Type	Dedication	Amount	Description	Funding Source
Grant	Educational Materials	\$ 1,174	Community clean-up	NCTCOG (FY2002)
Grant	Educational Materials	\$ 8,850	HHW grant	NCTCOG (FY2003)
Solid Waste Enterprise Fund	Keep Allen Beautiful	\$23,000	Solid waste user fee	Residents

Personnel

The HHW/Solid Waste/Recycling Coordinator dedicates approximately 10 hours per week is dedicated to education and outreach on illegal dumping. In addition a member of the Environmental Services division dedicates approximately two hours per week to education and outreach on illegal dumping. Total personnel costs for illegal dumping educational activities are an estimated to be \$19,110 annually, as described in Schedule CS1.

The Environmental Services Inspector conducts speaking engagements at public schools, and discusses the negatives associated with illegal dumping to students at the elementary school level. From a cost/benefit perspective this activity has relatively low cost associated with it and has the potential to have a significant impact on the community.

The HHW/Solid Waste/Recycling Coordinator performs a variety of activities associated with education and outreach programs. Table CS1.11 illustrates the allocation of time for the education and outreach activities for the Recycling/Solid Waste/HHW Coordinator.

¹² Source of the Keep Allen Beautiful fund are through the City of Allen general fund.

Table CS1.11 – Education and Outreach Staff Activities

Task	Percentage of Time
Presentations to community organizations	15 %
Public awareness educational programs in local schools	25 %
Development of media campaigns	10 %
Special Events	30 %
Development of educational materials	20 %

Equipment and Materials

Equipment used during education and outreach activities consists of vehicles that carry the staff member, educational brochures and promotional items to and from events. The equipment costs associated with illegal dumping education and outreach are \$570, as detailed in Schedule CS1.

The HHW/Solid Waste/Recycling Coordinator actively engages in the development of educational publications and promotional items which are distributed at various events throughout the year. Materials and activities include:

- The development of Public Service Announcements (PSAs) on the City website and City television channel regarding negatives associated with illegal dumping and advertisement of period clean-up events.
- Brochures and fliers on illegal dumping and information regarding proper disposal methods.
- Dedicating a portion of a informational newsletter which is located with the utility bill distributed to all residents of the City.
- T-shirt and other promotional materials that are provided to individuals at community clean-up activities.
- Door hangers which are distributed in certain areas of the City prior to community clean-up events in the area.

City staff described successful cost saving measures used to develop educational and outreach methods. These methods include the development of these materials by City staff internally. Specifically, this has been through the use of desktop software to design templates for brochures and promotional items and the utilization of the network of individuals throughout the community to acquire donations and support. The Recycling/Solid Waste/HHW coordinator also utilizes the NCTCOG logo and NCTCOG developed brochure templates to assist in reducing costs.

The City also holds various annual community clean-up events throughout the year, these events have been utilized as a means to educate and distribute materials to citizens.

These events are orchestrated by the Recycling/Solid Waste/HHW Coordinator. Table CS1.12 describes illegal dumping education and clean-up events and the success that these events have enjoyed.

Table CS1.12 – Solid Waste Cleanup and Education Community Events

Event	Description
Great American Trash Off	In 2002 collected 84 tons of waste, winner of Texas and national awards for waste diversion
Allen, USA	Fourth of July Event, provides information about illegal dumping
Corporate Challenge	Annual effort to draw businesses and their employees to participate in a greenbelt and stream cleanup effort
Adopt-a-Highway	Families, groups and residents adopt and maintain a segment of road
Keep Allen Beautiful – School Contests	Two yearly contests to teach students about illegal dumping and recycling

City staff has observed a greater response and believes it is more cost effective to educate individuals on a “one on one” basis at community cleanups or citywide events, as opposed to mass communication methods like televised PSAs. City staff believes that by educating individuals and small groups face to face and explaining to them various aspects of illegal dumping, the individual will be more likely to remember the materials presented.

City staff stated that it would be more cost-effective and beneficial to all communities in the region if NCTCOG would develop a regionally broadcast PSA on the radio or television, billboard along heavily traveled highways, or advertise in the *Dallas Morning News*. A PSA of this nature could provide more exposure throughout the NCTCOG region to the stop illegal dumping campaign. City staff also stated that a campaign of this nature could be created through cooperation at a subregional level. For example, a group of communities could come together and pool resources to develop similar campaigns or develop one campaign listing the various communities that are involved in this effort.

Key Findings and Recommendations

1. The City has utilized brochure templates and logos provided by NCTCOG and incorporated them into materials developed by the City. The City should work to incorporate NCTCOG information in other aspects of the education and outreach program, since it is often unnecessary for materials to be “reinvented”.
2. Since the educational and outreach program for Collin County is a relatively new and inexperienced program, City staff could potentially work to share information, positive and negative experiences, and educational materials with Collin County.

3. Grant funding for the development of educational materials will expire in FY 2003 and is in need of funding to continue to provide the City with illegal dumping educational materials. RS&Y recommends that the City look into funding the entire program through the City's solid waste and drainage funds in the future. The City could also look into obtaining supplementary funding through grants or awards such as:
 - Texas Department of Transportation Governor's Community Achievement Awards
 - Various Keep Texas Beautiful Awards
 - NCTCOG Solid Waste Implementation Projects
4. The City could potentially consider assisting in the establishment or coordination of a subregional illegal dumping media campaign. RS&Y recommends the City work with Collin County and the neighboring Cities of Plano, Frisco, McKinney and Richardson to assist in the development of such a campaign.

PROGRAM BUDGET

The City of Allen dedicates approximately \$181,040 to its illegal dumping cleanup, enforcement and education/outreach efforts. Approximately 75 percent of that budget is directed at clean-up activities, six percent of the budget is dedicated to environmental enforcement, and 19 percent of the budget is applied to education and outreach activities, as described in Table CS1.13.

While cleanup is a valid and necessary component to an illegal dumping prevention and response program, RS&Y believes that additional resources could be dedicated to environmental enforcement and education and outreach programs. There is a possibility that City of Allen would not only see a reduction in future illegal dumping, but could also present an opportunity to reduce the costs associated with clean-up activities. In addition, City staff feel it is gaining control of illegal dumping through an expansion of resources (educational and enforcement) as well as educating individuals to report illegal dumping.

Table CS1.13 – Illegal Dumping Program Budget

Task	Annual Cost Allocated to Illegal Dumping	Percentage of Total Budget
Cleanup	\$ 135,844	75 %
Enforcement	\$ 11,166	6 %
Education and Outreach	\$ 34,030	19 %
TOTAL	\$ 181,040	

KEY CONTACTS

Table CS1.14 – Illegal Dumping Contact List

Category	Department	Personnel Contact	Phone
Cleanup	Community Services Department	Ms. Donna Kliewer Mr. Terry Holley	972-727-0179 972-727-0163
Enforcement	Environmental Services Department	Mr. Joey Allette, R.S.	972-727-0123
Education and Outreach	Community Services Department	Ms. Donna Kliewer	972-727-0179

Case Study # 1 - City of Allen
Schedule CS1

Cleanup					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Community Services Department	Conducts majority of cleanups for City				
Household Hazardous Waste Crew Supervisor		\$ 41,600	75%		\$ 31,200
Household Hazardous Waste Crew Staff		\$ 31,200	75%		\$ 23,400
Community Services Department	Provides supplementary assistance during large illegal dumpsite cleanups				
Drainage Crew Supervisor		\$ 41,600	10%		\$ 4,160
Drainage Crew Staff		\$ 31,200	10%		\$ 3,120
Drainage Crew Staff		\$ 31,200	10%		\$ 3,120
Drainage Crew Staff		\$ 31,200	10%		\$ 3,120
Drainage Crew Staff		\$ 31,200	10%		\$ 3,120
Drainage Crew Staff		\$ 31,200	10%		\$ 3,120
SUBTOTAL		\$ 270,400			\$ 74,360
Equipment					
Community Services Department					
Truck	3/4 Ton pickup used to transport staff and materials	\$ 18,000	75%	5	\$ 2,700
Truck	1/4 Ton pickup used to transport staff and materials	\$ 14,000	75%	5	\$ 2,100
Hydraulic Dump Trailer	Used for transporting bulky or volumous waste	\$ 8,000	10%	10	\$ 80
Front End Loader	Used to capture large quantities of dumped material	\$ 60,000	5%	10	\$ 300
Gradall	Used to capture large quantities of dumped material	\$ 192,000	5%	10	\$ 960
Backhoe	Four wheel drive, used to capture material	\$ 52,000	5%	10	\$ 260
International Dump Truck	Used for transporting bulky or volumous waste	\$ 65,000	5%	10	\$ 325
HHW Crew Fuel		\$ 1,500	75%		\$ 1,125
HHW Crew Maintenance		\$ 500	75%		\$ 375
Drainage Crew Fuel		\$ 7,000	10%		\$ 700
Drainage Crew Maintenance		\$ 7,950	10%		\$ 795
SUBTOTAL		\$ 425,950			\$ 9,720
Other					
Community Services Department					
Illegal Dumping Emergency Fund	Immediate cleanup of material, rolled over annually if not used	\$ 1,500	100%		\$ 1,500
Supplies					
Office Supplies		\$ 500	10%		\$ 50
Uniforms		\$ 2,151	10%		\$ 215
Small Tools/Minor Equipment	Supplies which assist in dumpsite cleanup, i.e. bags	\$ 2,620	10%		\$ 262
Medical & Chemical Supply	Protective clothing i.e. rubber aprons	\$ 1,300	10%		\$ 130
Waste Hauler Contract	Roll-off containers are provided through hauler contract	\$ -			\$ -
Disposal	Disposal of illegally dumped material	\$ 7,500	100%		\$ 7,500
Contracted Cleanup Services	Clean city right of way along Interstate 75	\$ 52,634	80%		\$ 42,107
SUBTOTAL		\$ 68,205			\$ 51,764
TOTAL		\$ 764,555			\$ 135,844

Enforcement

Page 2

Case Study # 1 - City of Allen
Schedule CS1

Education and Outreach					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Community Services Department Recycling/Solid Waste/ HHW Coordinator	Coordinates all educational events and creates all materials for distribution to public, also speaks at various engagements	\$ 66,300	25%		\$ 16,575
Environmental Services Department Inspector	Conducts educational presentations at public schools	\$ 50,700	5%		\$ 2,535
	SUBTOTAL	<u>\$ 117,000</u>			<u>\$ 19,110</u>
Equipment					
Community Services Department Sedan	Primary transportation to educational events	\$ 20,000	25%	10	\$ 500
Environmental Services Department Truck	Primary transportation to educational events	\$ 14,000	5%	10	\$ 70
	SUBTOTAL	<u>\$ 34,000</u>			<u>\$ 570</u>
Materials					
Publications	Brochures	\$ 1,500	100%		\$ 1,500
Publications	Illegal Dumping Literature	\$ 600	100%		\$ 600
Publications	Utility Bill Insert	\$ 5,000	75%		\$ 3,750
Promotional Item	T-Shirts	\$ 8,000	100%		\$ 8,000
Promotional Item	Door Hanger	\$ 500	100%		\$ 500
	SUBTOTAL	<u>\$ 15,600</u>			<u>\$ 14,350</u>
	TOTAL	<u>\$ 166,600</u>			<u>\$ 34,030</u>

CASE STUDY #2 - CITY OF GRAND PRAIRIE

INTRODUCTION

The City of Grand Prairie is located midway between the cities of Dallas and Fort Worth and is located in both Tarrant and Dallas counties. The current population of the City is 129,356.¹ Population projections estimated the City could grow to a population of 205,698 by the year 2020, an increase of approximately 37 percent since 1990.

City staff stated that there has been a significant increase the number of illegal dumpsites over the past five years. City staff attributed this increase to:

- Development within the City has occurred in the southern part of the City, further away from the landfill located in the northern part of the City.
- City created new policies that led to ending the yard waste curbside collection program.

Based on interviews with City staff, there are currently 20 chronic known illegal dumpsites in the City, and approximately 275 illegal dumpsites appear or are cleaned up annually.

Due to the severity of illegal dumping that is occurring, the City has taken a more aggressive approach to combat illegal dumping. The City currently operates illegal dumping cleanup, environmental enforcement, and illegal dumping educational programs.

CLEANUP

The City of Grand Prairie operates the illegal dumping clean-up program through the Public Works Department, Street/Drainage Division. This program has been in existence since 2000, and is funded through the general fund.

Personnel

The City dedicates a percentage of four Full Time Equivalents (FTEs) to illegal dumping clean-up efforts. These individuals are located in the City's Drainage/Right of Way Clean-up Crew (Drainage/ROW Crew) as well as the Special Projects Coordinator within the City Manager's Office. The personnel cost allocated to illegal dumping clean-up efforts total approximately \$101,345, as detailed in Schedule CS2.

Members of the Drainage/ROW Crew are responsible for all large and small illegal dumpsites that occur on public rights of way. Members of this division include a supervisor, heavy equipment operator, and laborer. Staff members dedicate an estimated 35 hours per week to illegal dumping cleanups. In addition, an administrative assistant

¹ Source: 2000 Census Data

dedicates approximately two hours per week to assist in any administrative tasks, related to illegal dumping cleanups.

The Drainage/ROW Crew respond to citizen complaints as well as patrol 88 square miles within City limits. The nature of the illegally dumped material is commonly residential and commercial wastes, C&D waste and scrap tires. After illegal dumpsites are identified, a determination will be made to see if manual cleanup or manual cleanup with assistance provided by heavy equipment is necessary. Determination for this procedure is based on the type of illegally dumped materials identified and volume of the material. In most cases, manual cleanup is the preferred method of operation utilized by the Drainage/ROW Crew.

Equipment

The City dedicates a percentage of various types of transportation and heavy equipment to illegal dumping cleanups. The total annual cost for illegal dumping clean-up equipment is \$18,721, as detailed in Schedule CS2. While the bulk of this cost is funded through the general fund, NCTCOG grant funds were secured to cover the cost of a hydraulic dump truck. Table CS2.1 describes the various equipment and costs associated with them for clean-up operations.

Equipment is utilized to transport Drainage/ROW Crew to illegal dumpsites and take illegally dumped materials to the landfill. Trucks are utilized most commonly for the cleanup of small illegal dumpsites. Larger equipment such as dump trucks and flatbed trucks are utilized on an as needed basis when it is determined that the material is too large to be transported by other means. City staff stated that in rare cases front-end loaders are used to cleanup illegal dumpsites. Approximately one percent of the time for the use of a front-end loader is dedicated to illegal dumpsite cleanups.

Additionally, the special projects coordinator uses a large dump truck equipped with a hydraulic bed during the conduct of small illegal dumpsites by volunteers. The truck, acquired through a NCTCOG grant, is dedicated fully to illegal dumping cleanups. For example, in 2002, the special projects coordinator teamed up with the Grand Prairie Youth Services Boot Camp² for cleanup of illegal dumpsites. An average of 2 tons of illegally dumped materials per day manually in parks, fields and creeks by participants of the Youth Services Boot Camp cleanup. Drill sergeants from the Youth Services Boot Camp noted that the youth always comment that they enjoyed the cleanup and feel a sense of satisfaction.

² The four-week program serves about 30 to 50 male youth, ages 10 to 17. Most of the boys that attend are referred by the juvenile court. They must be non-violent offenders with no convictions of adult charges. Voluntary enrollment is accepted.

Table CS2.1 – Illegal Dumping Clean-up Equipment

Item	Description
Pickup Truck	Supercrew utility pickup truck used to transport crew to dumpsites and disposal facility.
Flatbed Truck	Two and a half ton pickup truck used to haul illegally dumped material to road crew facility.
Front-End Loader	Used to capture illegally dumped debris, and is only utilized in large volume dumpsites or bulky items cleanups.
Dump Truck	Used to transport illegally dumped material to road crew facilities.
Dump Truck	Used during volunteer clean-up projects only. Transports volunteer staff and illegally dumped materials to disposal facility.

Disposal

City of Grand Prairie staff transport and temporarily store illegally dumped materials at the Street/Drainage Division facility, to be ultimately brought to the landfill. When it has been determined by clean-up staff that enough material has been collected or rain prohibits clean-up efforts for that day, the material is then taken to the City of Grand Prairie Landfill.

The City of Grand Prairie Landfill is approximately 15 miles from the center of the City. The tipping fee is \$32 per ton. City staff stated it has found that by temporarily storing material at the Street/Drainage Division facilities, there is a significant cost savings in fuel and maintenance due to a reduction the number of trips to the landfill.

Key Findings and Recommendations

1. The Drainage/ROW Crew works thoroughly to cleanup illegal dumping in the City of Grand Prairie. However, the effectiveness of their program is limited due to staff having to perform manual clean-up activities.
2. Based on the analysis of the Drainage/ROW Crew clean-up measures, RS&Y believes that the Street/Drainage Division could explore the purchase of a brush collection vehicle to be dedicated to the Drainage/ROW Crew. This measure could eliminate the need for large dumpsite cleanups involving borrowed equipment.
3. The City coordinates volunteer clean-up efforts with various youth and community groups in the area. The City may wish to also examine ways to incorporate the use of City or County Jail Trustees to perform illegal dumping clean-up measures along public rights of way. RS&Y recommends that a supervisor in the Drainage/ROW Crew obtain a Jailer's License to conduct jail trustee clean-up activities.

4. By storing illegally dumped materials temporarily at the Street/Drainage Division facilities, the City is operating its illegal dumping disposal activities in a cost-effective manner. RS&Y recommends that the City continues this practice in the future.

ENFORCEMENT

The City of Grand Prairie houses its environmental enforcement program in the Code Enforcement Department. The program was established in 1998 and is funded primarily through solid waste disposal fees. During that time, the environmental enforcement program received a NCTCOG grant in 2001 for \$32,000 to purchase environmental enforcement equipment.

Personnel

The code enforcement officer, located in the Environmental Services Department, is the single FTE dedicated to environmental enforcement and estimates that approximately 32 hours per week is spent on illegal dumping related activities. Personnel costs allocated to illegal dumping are \$41,600 annually, as described in Schedule CS2. Table CS2.2 illustrates estimates of task allocation for enforcement personnel.

Table CS2.2 – Enforcement Personnel Activity Allocation

Task	Percentage of Time
Investigations	80 %
Stakeouts	0 % ³
Developing cases for prosecution	15 %
Education	5 % ⁴

Based on interviews with City staff, enforcement staff has the responsibility to follow a detailed investigation procedure to ensure each conviction by prosecutors. In many cases, illegal dumpsites are discovered through patrolling the City and through citizen complaints from the Illegal Dumping Hotline.

The enforcement officer will next collect evidence, photograph dumpsites and weigh evidence. All information is gathered and a case file is created. RS&Y observed that the code enforcement officer keeps all case file documents in a neat and orderly fashion located in a 3-ring notebook. This practice allows the officer to take all case related material out of the office during investigations or when meeting the District Attorney's Office.

³ The use of surveillance equipment has alleviated the need for long periods of time spent at stakeouts. The percentage of time dedicated to set up surveillance equipment was captured in the investigation task.

⁴ Officer stated that in the future, he hopes to have more time to schedule educational training and information sessions on illegal dumping.

The officer contacts suspected illegal dumpers in person to obtain their side of the story. If the illegal dumping infraction is minor, the offender will be issued a citation; if it is a more severe offense will prompt enforcement officers to contact the District Attorney's Office to explore the possibility of taking such a case to trial. During felony cases, the officer is in regular contact with TCEQ staff, detectives and the District Attorney's Office to ensure the case is built correctly.

The code enforcement officer also tracks illegal dumpsites by plotting points on a map of the City. This allows the code enforcement officer to identify areas where greater enforcement efforts or surveillance may be necessary.

Equipment

The City utilizes various pieces of equipment during illegal dumping investigations and prosecutions. Table CS2.3 illustrates the types of equipment used during environmental enforcement investigations and operations. The annual cost of equipment allocated to illegal dumping is approximately \$9,054, as described in Schedule CS2.

The code enforcement officer provided RS&Y with an example of how the video surveillance system has been useful in environmental enforcement efforts. Once an area is identified as a chronic illegal dumpsite, the code enforcement officer places a motion detection surveillance camera nearby to catch illegal dumpers. The officer ensures that the camera is pointed directly at dumpsite to make certain that clear and unambiguous video images are captured. The video captured by surveillance systems are often used in court to convict illegal dumpers. By utilizing surveillance equipment, the officer is relieved of spending a substantial amount of his time performing stakeouts

Table CS2.3 – Enforcement Equipment Profile

Item	Quantity	Description
Pickup Truck	1	4x4, half ton pickup used to transport code enforcement staff.
Digital Camera	1	2.0 MegaPixel digital camera used to document cases of illegal dumping.
Surveillance System	2	Motion detection surveillance system used in stakeouts of illegal dumpsites.
Digital Projector	1	Projection system used during presentations on illegal dumping and cases brought against individuals for illegal dumping.

Investigations and Convictions

All fines collected from illegal dumping are deposited to the general fund. Fines typically range between \$500 and \$600; however, fines may increase due to the amount of illegally dumped material. Additionally, in felony illegal dumping cases, restitution

for illegal dumping cleanups are issued and violators are required to pay for cleanups provided by Street/Drainage Division.

Key Findings are Recommendations

1. The City dedicates a large percentage of one FTE to environmental enforcement. While the enforcement officer has been capable of investigating illegal dumping, the City may wish to explore increasing the number of enforcement officers dedicated to illegal dumping. RS&Y recommends adding another enforcement officer or look to the Grand Prairie Police Department for assistance.
2. The code enforcement officer utilizes surveillance equipment in an effective manner to supplant his time that was previously spent conducting stakeouts. The City may benefit from the purchase of additional surveillance cameras which would allow the enforcement officer more time to dedicate to investigation activities.
3. The code enforcement officer keeps all illegal dumping records in a 3-ring notebook, which allows him mobile access to information at all times. RS&Y recommends that the City look into purchasing a laptop computer for the code enforcement officer. This would allow him mobile access to all records (digital pictures and case file information) stored electronically, and allow him to input data in the field.
4. The code enforcement officer tracks illegal dumpsites by plotting locations with pushpins on a physical map. RS&Y recommends that the City purchase Geographic Information System (GIS) software or to rely on the City GIS staff. The City could benefit from this through the various detailed reports and trend analyses available to be used to track illegal dumping.
5. To allow the code enforcement officer to function more efficiently, the officer may wish to track his investigation, prosecution, and conviction statistics in the future. This would allow the officer to track performance by the prosecutors, and indicate any progress that is being made to diminish illegal dumping in the City.

EDUCATION AND OUTREACH

The City of Grand Prairie in the past three years has taken a very active role in establishing and implementing an illegal dumping educational and outreach program. Both code enforcement staff and the special projects coordinator have contributed time to creating publications, messages and materials regarding illegal dumping. The educational and outreach program in the City has garnered enormous support from NCTCOG grants which have assisted in establishing this program.

Personnel

A portion of four FTEs allocate time to illegal dumping education and outreach events and programs. The salary for the special projects coordinator and Sign Crew has been funded by NCTCOG grant funds, and the salary for the code enforcement officer has been funded through the general fund. The special projects coordinator approximately spends 14 hours per week on illegal dumping education activities.

The special projects coordinator has applied and received numerous grants through her partnership with Keep Grand Prairie Beautiful (KGPB). The programs include Adopt-a-Street, community clean-up events, Adopt-a-spot, and Adopt-a-River. The special projects coordinator often meets with 22 neighborhood groups within in the City to speak on illegal dumping and educate individuals on what to do when you see illegal dumping.

Additionally, the special projects coordinator allocate a percentage of time to researching and developing grants to acquire funding for the various initiatives hosted by the City. Since acquiring several grants over the past few years from NCTCOG, the special projects coordinator has been able to dedicate more time to illegal dumping education and awareness. The special projects coordinator believes that the program has been effective in reducing the amount of illegally dumped materials in the City.

Equipment and Materials

The City of Grand Prairie has developed several campaigns and materials that address the issue of illegal dumping. These materials focus on making the community more aware of the aesthetic costs of illegal dumping and attempt to instill a sense of ownership to residents of the community. Educational materials include signs, Public Service Announcement (PSA) shown in movie theaters as well as brochures focusing on the hazards of illegal dumping.

The code enforcement officer stated that one of the most successful campaigns involving illegal dumping has been through the creation of a PSA shown prior to movies at the theaters around Grand Prairie. The City feels that movie theaters are an effective way to reach their target audience of 16 – 24 year olds.

The theaters displayed the illegal dumping PSA three times prior to each of the 15 movies that were showing at each theater. The contract stipulated that there would be a minimum of 75,000 showings of the PSA. The City worked with a movie advertising firm to coordinate this program. The code enforcement officer stated that the advertising firm was very willing to accommodate the City's needs and provided the City with a discount for this service. The cost of this program were \$9,101. From a cost/benefit perspective, the cost of each showing of the PSA was approximately \$0.12.

City staff also noted utilizing local media to raise awareness about illegal dumping investigation, areas identified as chronic illegal dumpsites and community clean-up events has historically been a very cost-effective strategy for the City. City staff commonly contacts a reporter from a local newspaper or television station, informing

them about the problem, investigation or event. City staff has found the reporters are very appreciative of the information and often cover the story. This type of publicity is of no direct cost to the City.

The special projects coordinator, through a grant from NCTCOG, has erected “STOP Illegal Dumping” street signs around the City. Two members of the City’s Sign Crew apportion five percent of their time to putting up these signs around the City. The City hopes that placing street signs along City roads will discourage illegal dumping in these areas.

City staff stated that more could be done from a regional and sub-regional perspective to advertise the various programs which have been established to combat illegal dumping. City staff believe that coordination at the COG level with regional news broadcasters to develop a series of stories on the various illegal dumping enforcement programs could be a very cost effective way to gain exposure to the problem of illegal dumping.

Key Findings and Recommendations

1. The City reaches the targeted 16 – 24 year old illegal dumper audience effectively through the movie theater PSA program. RS&Y believe that the City should continue to the movie theater PSA program and could expect reductions in the cost of the program since the PSA design has been created.
2. Grant funding for the development of educational materials will expire in 2004. The City has a need to continue funding to provide the City with illegal dumping educational materials. RS&Y recommends that the City look into funding the entire program through the City Manager’s Office or Solid Waste Department in the future. The City could also look into obtaining supplementary funding through grants or awards such as:
 - Texas Department of Transportation Governor’s Community Achievement Awards
 - Various Keep Texas Beautiful Awards
 - NCTCOG Solid Waste Implementation Projects
3. Since the City staff has developed a strong professional relationship with various members of local news agencies, they would be qualified candidates to assist in the creation of a sub-regional illegal dumping media campaign.
4. The City has placed street signs along various roads throughout the area. To measure of the effectiveness of these street signs in curbing illegal dumping in those areas, Drainage/ROW crews and the code enforcement officer could monitor illegal dumping in those areas. RS&Y believes that the City and region could benefit from the results of the data over time.

PROGRAM BUDGET

The City of Grand Prairie dedicates approximately \$231,159 to its illegal dumping cleanup, enforcement and education/outreach efforts. Approximately 54 percent of that budget is directed at clean-up activities, 22 percent of the budget is dedicated to environmental enforcement, and 24 percent of the budget is applied to education and outreach activities, as described in Table CS2.4.

RS&Y believes there is a distinct possibility that the City of Grand Prairie would not only see a reduction in future illegal dumping, but could also present an opportunity to reduce the costs associated with clean-up activities if more resources were allocated to enforcement and education/outreach programs. While RS&Y acknowledges that cleanup is a valid and necessary component to an illegal dumping prevention and response program, we believe redirecting more resource to other areas of the program could be more cost-beneficial to the City.

Table CS2.4 – Illegal Dumping Program Budget

Task	Annual Cost Allocated to Illegal Dumping	Percentage of Total Budget
Cleanup	\$ 125,607	54 %
Enforcement	\$ 50,654	22 %
Education and Outreach	\$ 54,898	24 %
TOTAL	\$ 231,159	

KEY CONTACTS

Table CS2.5 – Illegal Dumping Contact List

Category	Department	Personnel Contact	Phone
Cleanup	Public Works Department	Mr. Ronnie Bates	972-237-8526
Enforcement	Code Enforcement Department	Mr. Joe Graves	972-237-8049 (Office/Hotline)
Education and Outreach	City Manager's Office	Ms. Tammy Chan	972-237-8152

Cleanup

Page 1

Case Study # 2 - City of Grand Prairie Schedule CS2

Enforcement					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Code Services Department Code Enforcement Officer	Conducts all illegal dumping investigations and develops cases for prosecution	\$ 52,000	80%		\$ 41,600
	SUBTOTAL	<u>\$ 52,000</u>			<u>\$ 41,600</u>
Equipment					
Truck	4 wheel drive, 1/2 ton pickup truck used to transport personnel	\$ 42,300	80%	7	\$ 4,834
Digital Camera	Used to capture images of dumped material for case files	\$ 500	100%	5	\$ 100
Surveillance System	Camera system that is hidden near chronic illegal dumpsites	\$ 5,800	100%	5	\$ 1,160
Surveillance System	Camera system that is hidden near chronic illegal dumpsites	\$ 5,800	100%	5	\$ 1,160
Maintenance		\$ 800	100%		\$ 800
Fuel		\$ 1,000	100%		\$ 1,000
	SUBTOTAL	<u>\$ 56,200</u>			<u>\$ 9,054</u>
	TOTAL	<u>\$ 108,200</u>			<u>\$ 50,654</u>

Case Study # 2 - City of Grand Prairie Schedule CS2

Education and Outreach

Education and Outreach					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Code Services Department					
Code Enforcement Officer	Developed movie theater PSA	\$ 52,000	5%		\$ 2,600
City Manager's Office					
Special Projects Coordinator	Coordinates various illegal dumping awareness activities	\$ 53,352	35%		\$ 18,673
Street Division					
Sign Crew Level 2	Set up illegal dumping awareness street signs	\$ 51,522	5%		\$ 2,576
Sign Crew Level 3	Set up illegal dumping awareness street signs	\$ 44,262	5%		\$ 2,213
SUBTOTAL		\$ 201,136			\$ 26,062
Equipment					
Code Services Department					
Truck	4 wheel drive, 1/2 ton pickup truck used to transport personnel	\$ 42,300	5%	7	\$ 302
Laptop	Used during presentations on illegal dumping	\$ 2,278	100%	5	\$ 456
Digital Projector	Used during presentations on illegal dumping	\$ 5,000	100%	5	\$ 1,000
SUBTOTAL		\$ 49,578			\$ 1,758
Materials					
Code Services Department					
Public Service Announcement	Movie theather screen shots	\$ 12,600	100%		\$ 12,600
City Manager's Office					
Advertisement	Vinyl signs located throughout the city	\$ 200	100%		\$ 200
Advertisement	Illegal dumping awareness Street signs located on city roads	\$ 10,000	100%		\$ 10,000
Promotional Materials	T-shirts	\$ 800	100%		\$ 800
Promotional Materials	Door prizes at community cleanup events	\$ 300	100%		\$ 300
Promotional Materials	Magnets given to residents, includes Illegal Dumping Hotline	\$ 850	100%		\$ 850
Promotional Materials	Vinyl decals	\$ 844	100%		\$ 844
Promotional Materials	Seed packets	\$ 950	100%		\$ 950
Promotional Materials	Binders given to students at various events	\$ 534	100%		\$ 534
SUBTOTAL		\$ 14,478			\$ 27,078
TOTAL		\$ 265,192			\$ 54,898

CASE STUDY #3 - COLLIN COUNTY

INTRODUCTION

Collin County is located in the northern region of the NCTCOG region and has a population of 429,276. Collin County borders densely populated Dallas and Rockwall counties in the south, Denton in the east, and Hunt County in the west.¹ While approximately half of the County is made up of the cities of Richardson, Plano, Allen and McKinney, the rest of the County is currently unincorporated and less densely populated. A major land feature includes Lake Lavon in the southeastern quadrant of the County.

Based on interviews with County staff, there are currently an estimated 59 known illegal dumpsites in Collin County. County staff stated that in a given year there are as many as 120 illegal dumpsites, approximately half would be considered chronic illegal dumpsites. County staff believes that in the past five years there has been a significant increase in the discovery of new dumpsites. Reasons for the increase in illegal dumping are lack of affordable disposal options for County residents, a lack of knowledge regarding existing illegal dumping laws and regulations, as well as the significant growth the County has experienced in the last five years.

Enforcement efforts by Collin County Constable's officers are decentralized and operated in each of the four Constable's precincts. Each of the four Constable's precinct operate independently, and are elected based on areas defined by precinct lines². Constable's data included in this case study was based on Collin County Constable's Office - Precinct 3, which County staff identified as a precinct that is very active in the enforcement of illegal dumping sites. For example, in 2003 Precinct 3 obtained a NCTCOG grant for five surveillance systems. Cleanup and Education/Outreach data is representative of the entire County.

CLEANUP

Illegal dumping clean-up efforts are based in the Collin County Public Works Department - Road and Bridge Division. The program has been in existence since 1988 and is currently under the direction of the Road and Bridge Superintendent. A portion of cleanup efforts are currently funded through the general fund, however the majority of funding is derived from NCTCOG grant funds. In Fiscal Year (FY) 2003, the County received a \$75,000 NCTCOG grant. This grant was used to fund illegal dumping cleanups in Collin County within the Road and Bridge Division.

¹ Only counties in NCTCOG planning region are listed.

² Constable's have countywide jurisdiction, however as a rule each precinct operates primarily in their own precinct. Constable's also have jurisdiction in adjacent counties during civil cases, and statewide jurisdiction during criminal cases.

Personnel

Two Full Time Equivalents (FTEs) dedicate a percentage of their time to illegal dumping. These individuals are responsible for fielding citizen complaints and cleanup of illegal dumpsites. One FTE is dedicates 40 hours per week to performing the illegal dumping cleanups. The second dedicates approximately eight hours per week of his/her time and is solely responsible for any administrative activities associated with cleanup duties. The total salary allocated to illegal dumping clean-up efforts is approximately is \$52,655 annually, detailed in Schedule CS3.

Clean-up staff allocate time in two specific areas including 30 percent of the time cleaning up illegal dumpsites and 70 percent of the time to transporting waste to the North Texas Municipal Water District – McKinney Landfill, in McKinney, Texas. Illegal dumpsites are identified by citizen complaints and information provided by Sheriff's Office and Constable's Office – Precinct 1 staff. Cleanups are performed both manually and with the use of a backhoe loader. The material, once collected, is then transported to the McKinney Landfill.

Equipment

Collin County allocates 100 percent of a dump truck, backhoe/loader and trailer to illegal dumping cleanups. The time dedicated to illegal dumping for the use of this equipment is proportional to the amount of time spent by the Road and Bridge Crew staff member in the cleanup of illegal dumping. The annual cost of clean-up equipment, including vehicle fuel and maintenance costs, are approximately \$18,255 annually, as detailed in Schedule CS3.

County staff stated that equipment is utilized regularly for clean-up activities since Collin County dedicates one FTE to illegal dumping cleanups. Clean-up staff stated that since illegally dumped material often consists of bulky items or C&D debris the potential for injury is great, and the use of heavy equipment reduces that risk.

Table CS3.1 describes the various pieces of equipment employed by the illegal dumping cleanup program.

Table CS3.1 – Illegal Dumping Cleanup Equipment

Item	Quantity	Description
Dump Truck	1	12 yard, tandem axel, dump truck
Backhoe/Loader	1	Loads equipment in truck for transportation to disposal facility
Trailer	1	Backhoe is placed on trailer for transportation to dumpsite

Disposal

Based on interviews with County staff, Collin County collects approximately 1,345 tons of illegally dumped material annually. Rural residents and illegal landfills produce the majority of the material collected, as detailed in Table CS3.2. This material is disposed of at the McKinney Landfill at a rate of \$32.22 per ton. The disposal costs incurred by the County are approximately \$43,335, as detailed in Schedule CS3.

The McKinney landfill is located in the north central area of Collin County and may take the Road and Bridge Crew staff member up to an hour to travel roundtrip to dispose of illegally dumped materials. County staff reports that since much of the illegal dumping occurs in unincorporated areas of the County around Lake Lavon³ in the southeastern quadrant, travel to the landfill is difficult and often requires the Road and Bridge Crew staff member to travel around the lake to reach his destination.

Table CS3.2 describes the various types of illegal dumping that occur in Collin County.

Table CS3.2 – Types of Illegal Dumping

Type of Illegal Dumping	Number of Sites	Quantity of Material
Rural residents	> 72	800 Tons
Urban/suburban residents	> 28	545 Tons
Private/commercial haulers	Unknown	Unknown
Contractors/remodelers	20	240 Cu. Yd.
Drug labs	16	24 Cu. Yd.
Businesses	4	100 Cu. Yd.
Illegal solid waste facilities	2	1,100 Cu. Yd.

Key Findings and Recommendations

1. Based on interviews with County staff, there is a need to reduce the time it takes to transport materials to be disposed of at the landfill. The County may, store materials in smaller storage containers temporarily at the Road and Bridge Division facility until an enough material has been collected to fill larger storage containers in order to transport to the landfill. By storing illegally dumped material at the Road and Bridge Division facility, it would provide the County with the benefit of not requiring staff to haul waste to the landfill until a later date, allowing staff to concentrate on illegal dumpsite cleanups thereby allocating their time in the most efficient manner possible.

³ County staff has identified illegal dumping most heavily occurs around the Cities of Princeton, Weston and Copeville.

2. The County utilizes a backhoe/loader as the primary piece of equipment dedicated to illegal dumping. The County may wish to purchase equipment more appropriate for light to moderate illegal dumping cleanups, such as a brush truck. The County could potentially realize a reduction in annual equipment costs for equipment dedicated to illegal dumping. In addition, the County could observe a reducing the number of trips to the landfill for cleanup staff. For example, a typical brush truck has a capacity of between 20 and 40 cubic yard capacity, depending on the truck specifications.
3. Based on interviews and data provided by County staff, there is a need to address illegal dumping produced by residents in unincorporated areas of Collin County. RS&Y recommends that the County investigate the feasibility of a establishing an organized solid waste collection services program.
4. RS&Y recommends that the County explore the expansion of personnel responsible for conducting illegal dumping cleanups. The County could benefit from hiring an additional crew member stationed in the southern part of the County or explore utilizing County Jail Trustees to perform manual cleanup activities.

ENVIRONMENTAL ENFORCEMENT

The environmental enforcement program in Collin County is housed in both the Collin County Sheriff's Office and in the Collin County Constable's Office – Precinct 3. The Collin County Sheriff's Office has been actively involved in illegal dumping investigations since 1992 and the Constable's Office - Precinct 3 since 2000⁴. Each department concentrates efforts in unincorporated areas of the county and works to investigate illegal dumping violations and enforce illegal dumping laws in those areas.

Each program is primarily funded through the general fund; however, each program has secured NCTCOG grant funds in the past five years to purchase equipment for illegal dumping investigations. Table CS3.3 describes the NCTCOG grants that the environmental enforcement programs have received in the past five years.

⁴ The Constable's Office in Precinct 3 only has jurisdiction in a single precinct in Collin County. Precinct 3 was chosen to participate in this study because it was identified as a precinct that was very active in environmental enforcement activities. Based on interviews with County staff, no other precincts have dedicated a significant percentage of an officer's time to environmental enforcement efforts.

Table CS3.3 – Environmental Enforcement Grant Funds

Department	Fiscal Year	Grant Amount	Description	Source
Sheriff's Office	2001	\$ 5,000	Used to purchase 1 surveillance equipment system	NCTCOG
Constable's Office	2003	\$ 50,000	Used to purchase 5 surveillance equipment systems for all precincts, digital cameras, TV/VCR combinations, and educational items	NCTCOG
TOTAL		\$ 55,000		

Personnel

One FTE within the Sheriff's Office dedicates approximately 40 hours per week to illegal dumping enforcement efforts. The annual personnel cost for the Sheriff's Office is \$32,760, as detailed in Schedule CS3. Table CS3.4 describes the allocation of their time for illegal dumping enforcement.

Table CS3.4 – Allocation of Sheriff's Office Time to Illegal Dumping Enforcement

Task	Percentage of Time
Investigations	50%
Stakeouts	10%
Developing cases for prosecution/filing	40%

The Sheriff's Officer will often identify illegal dumpers in three primary methods. The first is apprehending an illegal dumper in the act of dumping. The second is by searching dumped material for evidence linking an individual to the material. The third is by using surveillance cameras strategically placed near a chronic illegal dumpsite. The officer intends to find multiple pieces of evidence including names and addresses off of magazine subscription labels or envelopes.

After locating the illegal dumper, the officer will confront the individual(s) and either issue a written warning, write a citation or make an arrest. The officer noted that he predominately issues written warnings when he catches the illegal dumper in the act. The officer usually requires that the individual collect all dumped materials and properly dispose of it. Additionally, the individual must follow-up with the officer by providing him a dump ticket proving that the material was properly disposed.

The Constable's Office – Precinct 3 and Sheriff's Office both have a strong relationship with the District Attorney who prosecute cases involving large illegal dumping violations. The Collin County District Attorney's Office stated that the District Attorney would support the creation of a law enforcement environmental crimes unit to specifically handle all illegal dumping cases.

The Constable's Office - Precinct 3 dedicates a percentage of two FTEs to illegal dumping enforcement efforts. The chief deputy dedicates approximately four hours per week to illegal dumping activities, while the deputy dedicates approximately 20 hours per week. The total personnel cost for the Constable's Office – Precinct 3 is approximately \$35,490 annually, as detailed in Schedule CS3.

The Constable's Office - Precinct 3 stated that the deputy allocates approximately 90 percent of his environmental enforcement activities to illegal dumping investigations. The time is spent in the field performing activities such as setting up surveillance cameras, issuing citations, gathering evidence and creating case files. The remaining 10 percent of his time is dedicated to testifying in court against illegal dumpers. The Constable's Office – Precinct 3 noted that in cases against illegal dumpers, the deputy is often the State's only witness.

The chief deputy allocates approximately 80 percent of his environmental enforcement activities to the administrative functions of the program. That time includes working with other County staff on the Illegal Dumping Task Force and supervising the cases against illegal dumpers. The remaining 20 percent of the time, the chief deputy devotes to activities in the field, such as investigating illegal dumpsites.

Both the Sheriff's Office and Constable's Office have jurisdictional authority in unincorporated areas of the County. In the past, due to jurisdictional overlapping, Sheriff's officers and Constable's officers have ended up pursuing or investigating the same illegal dumping cases. However, through their participation in the Illegal Dumping Task Force both departments have began to coordinate efforts to eliminate this problem. The Task Force consists of various County departments who dedicate a portion of their staff to illegal dumping cleanup, enforcement and education/outreach. Members of the Task Force include Collin County Constable's Office⁵, Fire Marshall's Office, Public Works Department, Sheriff's Office, and the Public Information Officer.

The members of the Task Force have discussed the feasibility of charging the Constable's Office – Precinct 3 with keeping track of investigations, prosecutions and convictions of illegal dumpers, which could potentially be used in a media awareness campaign for the County. Based on interviews with Constable's Office – Precinct 3, Precinct 3 staff would be open and willing to assume that responsibility in the future.

Equipment

Collin County uses a variety of equipment to assist in illegal dumping investigations. These pieces of equipment have been paid for by grant funds as well as general funds appropriated for the program. Table CS3.6 illustrates the equipment commonly used for illegal dumping enforcement by the Sheriff's Office.

⁵ Includes participation by all four precincts.

Table CS3.6 – Sheriff’s Office Illegal Dumping Enforcement Equipment

Item	Quantity	Description
Sport utility vehicle	1	Primary mode of transportation for Sheriff’s personnel
Surveillance camera	1	Motion Detection surveillance system used in chronic illegal dumpsites
Laptop computer	1	Located in the sport utility vehicle with wireless connectivity
Digital camera	1	2.0 MegaPixel digital camera used to photograph illegally dumped material
Software	1	GPS and tracking software installed on the laptop computer used to track illegal dumpsites
Trailer	1	6’ x 4’ trailer used to haul illegally dumped materials

The Sheriff’s Office stated that the laptop installed with GPS and tracking software is one of the most invaluable pieces of equipment currently available to the program. Along with wireless connectivity linking the laptop to the Texas Crime Institute Center (TCIC) and National Crime Institute Center (NCIC) databases, the Officer has a “mobile office” and can conduct virtually all of his administrative and investigating activities from his sport utility vehicle. The officer stated since his environmental enforcement responsibilities encompass the entire County⁶, being able to stay in the field while not having to sacrifice any of the benefits associated with the Sheriff’s Office is an objective he works to achieve.

The officer also noted that having a sport utility vehicle as opposed to other vehicles commonly used by environmental enforcement officers such as sedans or trucks, allows him to:

- Store all of his enforcement equipment⁷ in his vehicle safely
- Store equipment in the back of the vehicle, allowing him ample space to perform administrative activities.
- Tow his trailer used to haul illegally dumped materials.
- Perform investigations off-road where sedans could have difficulty reaching.

The entire Collin County Constable’s Office utilizes five surveillance systems throughout the county that are placed near chronic illegal dumpsites. These systems, purchased through a NCTCOG grant, have been distributed to each of the four Constable’s precincts in Collin County. Precinct 3 was awarded two of the surveillance systems, since they were responsible for obtaining the grant.⁸

⁶ Collin County is approximately 885.9 square miles.

⁷ The total cost of equipment dedicated to environmental enforcement is approximately \$46,100, as detailed in Schedule CS3.

⁸ For the purposes of this study, only two of the five surveillance systems used by the Collin County Constable’s Office have been detailed in Schedule CS3.

Constable's Office – Precinct 3 sets up surveillance equipment in an inconspicuous area with an unobstructed view of the dumpsite. The equipment is then left to monitor the area for an undetermined period of time.

The officer will then check the area periodically during his patrol of the County. If the officer notices that new material has been dumped, he will replace the digital video cassette with a new one and take the film to the office for examination. The officer then examines the tape to identify a license plate or an individual's face. If an illegal dumper can be identified, charges are filed against the individual. During the trial, the officer would then replay the tape in court. Precinct 3 staff noted that to date, the County has not used this equipment during the trial, since all violators have pleaded guilty to the charges.

Staff noted that identifying hidden areas to place equipment while maintaining an unobstructed view of the area has been challenging for the deputy. In two months surveillance equipment have been used approximately 100 hours.

Constable's Office Precinct 3 staff believe that when these systems are implemented and utilized in the correct manner, it could potentially:

- Eliminate the need for manned stakeout activities.
- Provide visual evidence of illegal dumping activities and when it occurs.
- Identify illegal dumpers as they commit the crime.

From a cost/benefit perspective, the cost-savings realized by the County is approximately \$27,640, as shown by Table CS3.5. An additional benefit for the County to consider is that by utilizing surveillance systems, the officer's time traditionally dedicated to stakeouts can be reallocated to other investigative activities.

Table CS3.5 – Cost Savings from Surveillance Systems

Description	Annual Cost/Benefit
Cost: Use of motion detection surveillance system ⁹	\$ (960)
Savings: Environmental Enforcement Officer's time committed to stakeouts at chronic illegal dumpsites ¹⁰	\$ 28,600
Net Benefit	\$ 27,640

Investigations and Convictions

The number of investigations and convictions made by the Sheriff's Office has significantly increased in the past year, and County staff believe that this trend will continue in the future. Many of the investigations have not led to prosecution because the

⁹ Based on the use of motion detection surveillance systems placed at chronic illegal dumpsites.

¹⁰ Based on approximately 50 percent (1200 hours) of Collin County Constable's Office – Precinct 3 deputy's salary and benefits.

illegal dumpers will choose to cleanup the area instead of being prosecuted. Table CS3.7 & CS3.8 illustrate the number of investigations and convictions that have been made by Collin County environmental enforcement staff in 2002 through 2003 (projected).

Table CS3.7 – Illegal Dumping Investigation and Conviction Data: Sheriff’s Office

Year	Investigations	Prosecutions	Convictions	Resulting in Jail Time	Resulting in Fines
2002	60	3	Pending	Pending	Pending
2003	95	15	Pending	Pending	Pending

Table CS3.8 – Illegal Dumping Investigation and Conviction Data: Constable’s Office – Precinct 3

Year	Investigations	Prosecutions	Convictions	Resulting in Jail Time	Resulting in Fines
2002	12	11	11	0	11
2003	16	16	16	0	16

The Constable’s Office – Precinct 3 noted that there were approximately 15 more investigations in 2002 where the Constable’s Office – Precinct 3 did not feel there was strong enough evidence against the suspect. These individuals were however, confronted about the illegal dumping and subsequently cleaned the area without penalty.

Most of the illegal dumping prosecutions are in Justice of the Peace Court as Class C Misdemeanors. These violators traditionally are issued fines between \$200 and \$500 and are required to clean the illegally dumped material. This money is then distributed to the general fund.

Key Findings and Recommendation

1. Through participation in the Illegal Dumping Task Force the County has identified a potential measure to become more efficient in environmental enforcement. From a cost/benefit perspective, the Sheriff’s Office and Constable’s Office, through the Task Force, could identify scenarios when it may be beneficial to work together on an illegal dumping investigation.
2. The Constable’s Office – Precinct 3 has taken an active role in environmental enforcement. From a cost/benefit perspective, the Constable’s Office – Precinct 3 may investigate possibility of coordinating all of the Constable’s Office environmental enforcement activities through Precinct 3. For example, the Harris County Constable’s Office – Precinct 3 has countywide jurisdiction and coordinates all environmental enforcement activities for all Constable’s Offices.
3. Based on interviews and data provided by County staff, there is a need for greater enforcement efforts in the southeast quadrant of the County. Additional

environmental enforcement efforts could be provided by hiring another environmental enforcement officer or training non-environmental enforcement Sheriff's Office staff or Constable's Office – Precinct 3 staff in other precincts concerning the enforcement of illegal dumping laws or Countywide solid waste collection.

4. Based on data provided, in 2002 County staff collected approximately 1,100 cubic yards of materials collected from illegal landfills. There is a need for increased enforcement of these entities in Collin County. RS&Y recommends that enforcement officers focus additional efforts to investigate and potentially prosecute these individuals.
5. The Sheriff's Officer uses an SUV as his primary mode of transportation, as a way to not only protect valuable equipment in his possession, but to travel off-road when needed. RS&Y believes that this is an effective use of a enforcement vehicle and would recommend the County allocate SUV or pickup trucks to all environmental enforcement officers. RS&Y has observed that SUVs used in rural settings, when officers must patrol large areas and are in the field for long periods of time, may allow the officer to operate with greater efficiency and security versus pickup trucks.
6. While no felony illegal dumping cases have been prosecuted by Collin County, environmental enforcement staff believe that some will occur in the future. RS&Y recommends that during the investigation of a felony illegal dumping case, enforcement staff work closely with District Attorney's staff and TCEQ Regional Office staff to ensure that procedures are followed correctly.

EDUCATION AND OUTREACH

The illegal dumping education and outreach program in Collin County is a relatively new facet to the overall environmental enforcement program within the county. As of January 2003, the County created the position of Public Information Officer to coordinate and carry out all educational and outreach campaigns regarding illegal dumping.

The public information officer receives the majority of her funding from the commissioner's court budget. Additional funding for the development of educational materials is derived through a \$2,000 FY 2003 NCTCOG grant from the Collin County Constable's Office¹¹.

¹¹ The Public Works Department has discussed dedicating approximately \$5,000 to the development of educational materials derived from a FY 2003 NCTCOG grant. At this time, the County is examining the feasibility of rewriting the interlocal agreement between the County and NCTCOG to reallocate cleanup funds for educational materials.

Personnel

The public information officer is the only FTE dedicated to illegal dumping education and outreach activities. The total personnel costs associated with illegal dumping are approximately \$7,800 annually, as detailed in Schedule CS3. The public information officer approximates that she spends four hours per week on educational and outreach activities. Table CS3.9 describes the allocation of time for the public information officer to illegal dumping.

Table CS3.9 – Allocation of Time for Illegal Dumping Activities

Task	Percentage of Time
Presentations to community organizations (neighborhood and civic associations, etc.)	10%
Development of media campaigns	30%
Development of materials (brochures, videos, presentations, etc.)	40%
Organizing meetings	20%

The public information officer stated that over 70 percent of her time is dedicated to the development of various materials and projects because prior to 2002 illegal dumping education and outreach efforts did not exist in Collin County.

The public information officer in Collin County has also built several good relationships with various members of the media. Writers for the *Dallas Morning News – Collin County Edition*, *McKinney Courier-Gazette*, and the *Plano Star-Courier* will contact the public information officer for potential stories regarding illegal dumping.

Collin County is currently in the development of a media campaign to raise awareness about illegal dumping. Working with the Collin County Illegal Dumping Task Force, the public information officer will be developing a media campaign focusing on the achievements of the environmental enforcement efforts in Collin County. More specifically the campaign will spotlight unsolved cases still “at-large”, chronic illegal dumpsites, and cases that have resulted in fines or jail time.

The public information officer has assisted in establishing the Collin County Illegal Dumping Task Force. The Task Force is made up of representatives from the Sheriff’s Office, Constable’s Office, Fire Marshal’s Office, Public Works Department, District Attorney’s Office, and County Commissioner’s. The goal of the Task Force is to create a media awareness plan for illegal dumping. The Task Force program is operated at no direct cost to the County.

Equipment and Materials

Since this program was created mid-year, no monies have been appropriated in the general fund for added costs incurred by the public information officer in 2003, such as

equipment or the development of educational materials. However, the public information officer has utilized a NCTCOG grant to assist in the creation of materials.

A portion of the \$2,000, secured a NCTCOG grant, has been used to publish brochures on illegal dumping. The brochures give an overview of fines, health and environmental hazards associated with illegal dumping as well as phone numbers to the Collin County Illegal Dumping Hotline. These brochures will be distributed at various events held throughout the year in Collin County and will be available at the public works department offices. The cost of these materials was \$600, as detailed in Schedule CS3. Brochures have been developed by the public information officer using desktop publishing software as a cost saving measure due to budget constraints placed on the program. There was no direct cost to the County associated with the creation of the brochures.

In addition, the public information officer has recently ordered 5,000 NCTCOG brochures, which will be modified to include information about Collin County.

In the future, Collin County would like to explore the development of a radio Public Service Announcement (PSA) campaign that focuses on the negatives associated with illegal dumping. These PSAs will discuss the penalties associated with illegal dumping. The PSAs will use real case data from investigations and prosecution of individuals. Through contacts developed at various radio stations, the public information officer hopes to produce and air radio PSAs at a relatively low cost.

Key Findings and Recommendations

1. Since the education and outreach program in Collin County is in its infancy, and is devoting a substantial percentage of time to developing educational materials, the public information officer could benefit from using materials which have been already been created and implemented. For example, the County could meet with the City of Allen's Solid Waste/Recycling/HHW coordinator to discuss various strategies, materials and events which have been established by the City of Allen in the past.
2. The public information officer is currently in the process of developing a radio PSA campaign for Collin County. RS&Y recommends that the public information officer invite other communities in the region, such as the Cities of Allen, Frisco, Plano, Richardson and McKinney to participate in this campaign.
3. As a way to coordinate and educate different departments within the County, the public information officer coordinates the Illegal Dumping Task Force. RS&Y recommends that the County could potentially expand the membership of the task force to include Justice of the Peace and County Judges.
4. Since the Illegal Dumping Task Force currently does not receive direct funding, the County may wish to explore providing members of the Task Force with

funding for the purchase of equipment such as two way radios or educational materials.

5. The public information officer should continue to explore and develop educational campaigns involving illegal dumping. RS&Y recommends that the public information officer could look to identify other community activities to educate individuals or utilize the media to raise awareness on illegal dumping.
6. Grant funding for the development of educational materials will expire in FY 2003 and is in need of funding to continue to provide the County with illegal dumping educational materials. RS&Y recommends that the County look into funding the entire program through the County's Public Works Department or County Commissioner's Office in the future. The County could also look into obtaining supplementary funding through grants or awards such as:
 - Texas Department of Transportation Governor's Community Achievement Awards
 - Various Keep Texas Beautiful Awards
 - NCTCOG Solid Waste Implementation Projects
7. The format of the radio PSA will be on actual illegal dumping cases which have occurred in Collin County. Research based on other PSA campaigns indicates that this type of approach has been effective in changing attitudes and behaviors in individuals.

PROGRAM BUDGET

Collin County dedicates approximately \$222,735 to its illegal dumping cleanup, enforcement and education/outreach efforts. Approximately 53 percent of that budget is directed at clean-up activities, 42 percent of the budget is dedicated to environmental enforcement, and five percent of the budget is applied to education and outreach activities, as described in Table CS5.8.

While cleanup is a valid and necessary component to an illegal dumping prevention and response program, RS&Y believes that additional resources could be dedicated to environmental enforcement and education and outreach programs. There is a possibility that Collin County would not only see a reduction in future illegal dumping, but could also present an opportunity to reduce the costs associated with clean-up activities.

Table CS3.10 – Illegal Dumping Program Budget

Task	Annual Cost Allocated to Illegal Dumping	Percentage of Total Cost
Cleanup	\$ 114,245	53 %
Enforcement ¹²	\$ 88,410	42 %
Education and Outreach	\$ 10,165	5 %
TOTAL	\$ 212,280	

KEY CONTACTS

Table CS3.11 – Illegal Dumping Contact List

Category	Department	Personnel Contact	Phone
Cleanup	Public Works Department	Mr. Mike McClatchy	972-548-3700
Enforcement	Collin County Sheriff's Office Collin County Constable's Office – Precinct 3	Sergeant James Henry Chief Deputy Lonnie Simmons	972-547-5100 972-424-1460 ext. 3070
Education and Outreach	County Commissioner's Office	Ms. Leigh Hornsby	972-548-4772

¹² Enforcement costs for this analysis only reflect cleanup activities in Precinct 3. Enforcement costs for the Collin County could be higher when other Precinct cleanup costs are included. Cleanup and Education and Outreach costs reflect activities for the entire County.

Case Study # 3 - Collin County Schedule CS3

Cleanup					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Public Works Department					
Road and Bridge Crew	Operates equipment and performs manual cleanups	\$ 47,507	100%		\$ 47,507
Administrative Assistant	Fields citizen complaint calls	\$ 23,400	22%		\$ 5,148
		SUBTOTAL			\$ 52,655
Equipment					
Public Works Department					
Backhoe/Loader	Used in bulky item or large volume dumpsite cleanup	\$ 70,000	100%	10	\$ 7,000
Dump Truck	Transports waste and personnel	\$ 60,000	100%	13	\$ 4,615
Trailer	Pulls backhoe to various illegal dumpsite cleanups	\$ 6,000	100%	25	\$ 240
Maintenance		\$ 5,000			\$ 5,000
Fuel		\$ 1,400			\$ 1,400
		SUBTOTAL			\$ 18,255
Other					
Public Works Department					
Disposal	Costs to dispose of illegally dumped materials	\$ 43,335			\$ 43,335
		SUBTOTAL			\$ 43,335
		TOTAL			\$ 114,245

Case Study # 3 - Collin County Schedule CS3

Enforcement ¹					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Constable's Office - Precinct 3	Investigates illegal dumpsites in cities and county, writes grants to acquire enforcement equipment				
Chief Deputy		\$ 68,900	10%		\$ 6,890
Deputy		\$ 57,200	50%		\$ 28,600
Sheriff's Office	Health and safety deputy dedicated to environmental enforcement investigations				
Sheriff's Deputy		\$ 32,760	100%		\$ 32,760
		SUBTOTAL			\$ 68,250
Equipment					
Constable's Office - Precinct 3					
Sedan	Primary mode of transporting enforcement personnel	\$ 23,000	10%	5	\$ 460
Sedan	Primary mode of transporting enforcement personnel	\$ 23,000	50%	5	\$ 2,300
Surveillance Camera	Remote surveillance recording equipment	\$ 4,800	100%	5	\$ 960
Surveillance Camera	Remote surveillance recording equipment	\$ 4,800	100%	5	\$ 960
Surveillance Camera Tapes	Digital tapes used in surveillance equipment	\$ 100	100%	5	\$ 20
Television/VCR	Used to replay surveillance camera footage in court	\$ 900	100%	5	\$ 180
Television/VCR	Used to replay surveillance camera footage in court	\$ 900	100%	5	\$ 180
Digital Camera	Used to capture images of dumped material for case files	\$ 900	100%	5	\$ 180
Digital Camera	Used to capture images of dumped material for case files	\$ 500	100%	5	\$ 100
Sheriff's Office					
Sport Utility Vehicle	Primary mode of transporting enforcement personnel	\$ 46,600	100%	10	\$ 2,500
Surveillance Camera	Surveillance camera equipment	\$ 5,800	100%	5	\$ 1,160
Laptop Computer	Used to track illegally dumped materials and report	\$ 1,800	100%	5	\$ 360
Digital Camera	Used to capture images of dumped material for case files	\$ 500	100%	5	\$ -
Digital Camera	Used to capture images of dumped material for case files	\$ 500	100%	5	\$ 100
Software	GPS and data tracking software installed on laptop	\$ 13,000	100%	5	\$ 2,600
Trailer	6' x 4'	\$ -	100%		
		SUBTOTAL			\$ 12,060
Fuel		\$ 3,600	100%		\$ 3,600
Maintenance		\$ 4,500	100%		\$ 4,500
		SUBTOTAL			\$ 8,100
		TOTAL			\$ 88,410

¹ Constable's Office data taken from only Precinct 3, Cleanup and Education/Outreach data applies to entire county

Case Study # 3 - Collin County Schedule CS3

Education and Outreach

Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
County Commissioner's Court Public Information Officer	Coordinates illegal dumping educational efforts in County	\$78,000	10%		\$7,800
		SUBTOTAL			\$7,800
Materials					
County Commissioner's Court Publications	5,000 brochures developed in house on illegal dumping penalties	\$600	100%		\$600
Promotional Items	10,000 magnets	\$1,200	100%		\$1,200
Promotional Items	5000 stickers	\$540	100%		\$540
Design Fee	Design fee for magnets and stickers	\$25	100%		\$25
		SUBTOTAL			\$2,365
		TOTAL			\$80,365

CASE STUDY #4 - KAUFMAN COUNTY

INTRODUCTION

Kaufman County is located in the southeastern region of the NCTCOG. It is bordered by Dallas, Ellis, Rockwall and Hunt counties.¹ The County had a population of 69,687 in 2000², and is considered predominately rural. Cities include the City of Terrell, Kaufman, Kemp, Crandall, Mabank, and Forney.

There are between 400 and 500 illegal dumpsites that are discovered in Kaufman County annually. County staff attribute the problem of illegal dumping due to a lack of convenient and affordable disposal facilities and collection services, as well as a lack of understanding by the citizens of Kaufman County on the hazards of illegal dumping. Currently, there are approximately 40 chronic illegal dumpsites throughout Kaufman County. However, County staff believe the overall number of new illegal dumpsites has decreased over the past five years.

Clean-up efforts in Kaufman County are decentralized and operate in each of the four commissioner's precincts as well as each city. Each of the four commissioner's precinct operate independently, and each has exclusive jurisdiction to areas defined by precinct lines. The data that is reflected in this case study has been obtained through interviews with County staff in Precinct 1. Enforcement and Education/Outreach data is representative of the entire County.

CLEANUP

Precinct 1 operates its illegal dumping clean-up program under the supervision of the County Commissioner. Some funding for the clean-up program is derived from the general fund. The bulk of the cost, however, comes directly from the Commissioner's road budget. Precinct 1 has operated its illegal dumping clean-up program since 1991.

Personnel

Precinct 1 dedicates a portion of 12 Full Time Equivalents (FTEs) to illegal dumping clean-up activities. These cleanups are conducted by the Road Crew, Operations staff and environmental enforcement personnel. Total personnel costs for illegal dumping clean-up activities in Precinct 1 are approximately \$48,425 annually, as detailed in Schedule CS4.

The primary responsibility for illegal dumpsite cleanups rests with the Road Crew. The Road Crew consists of three FTEs who each dedicate approximately 8 hours per week to clean-up activities. Approximately 90 percent of the Road Crew's time is allocated to performing cleanups, while 10 percent is dedicated to transporting waste to the disposal

¹ Counties in the NCTCOG Region

² Source: 2000 Census

facility. Based on interviews with County staff, the Road Crew performs manual cleanup of small volume illegal dumpsites and utilizes heavy equipment in scenarios where manual cleanup would be inefficient such as large C&D or municipal solid waste dumpsites.

Operations staff assist in large illegal dumpsite cleanups one day per month and perform manual cleanup of illegally dumped materials. Illegal dumping cleanups usually occurs when Operations staff are unable to perform their regular duties due to inclement weather or in scenarios which require immediate cleanup.

An example of a scenario that would require immediate attention would be a large item (e.g. vehicle or appliance) dumped in a river or creek bed. Based on their experiences, the County has recognized the need to remove these materials as soon as possible. For instance, several years ago, a County bridge had to be replaced at a cost of \$25,000 due to an illegally dumped vehicle that struck a bridge during a flood, and compromised its structural integrity.

In addition, clean-up activities are performed by environmental enforcement officers who dedicate approximately 8 hours per week to clean-up efforts. Officers, during their patrols, manually cleanup illegal dumping and transport the materials in the bed of their pickup to a commissioner's facility. From a cost/benefit perspective, incorporating clean-up activities in the enforcement officer's schedule of responsibilities provides the County with additional personnel who can provide assistance to the illegal dumping clean-up program.

Equipment

Members of the Road Crew utilize various heavy equipment such as backhoe loaders, tracked excavators, and dump trucks during the conduct of heavy illegal dumpsite cleanups. Road Crew utilizes this equipment infrequently since, large illegal dumpsites cleanups seldom occur in Precinct 1. The time dedicated to illegal dumping for the use of this equipment is proportional to the amount of time spent by Road Crew staff in the clean-up of illegal dumping.

The total annual equipment costs for equipment dedicated to illegal dumping is \$48,849 annually, as detailed in Schedule CS4.

Disposal

Illegally dumped materials are collected and stored at Commissioner's barns. Since there is no landfill or transfer station in Kaufman County, it is cost prohibitive to transport materials daily to the nearest disposal facility in Dallas or Ellis County. Precinct 1 has adopted this measure as a cost-saving strategy. Materials stored at the barn are placed in a 30 cubic yard roll-off containers until enough material can be picked up by a waste hauler for disposal. The annual cost for the roll-off containers is approximately \$7,800, as described in Schedule CS4.

Key Findings and Recommendations

1. Since the Road Crew does not have heavy clean-up equipment dedicated to illegal dumping, they must rely on the Operations staff to provide the needed equipment whenever it is available. Operations staff is certainly capable of serving this function, but because of responsibilities requiring the usage of the same pieces of equipment, weeks can pass before a site is cleaned, which can allow for additional dumping to occur.
2. Based on the analysis of Road Crew clean-up measures, RS&Y believes that the County could explore the purchase of a brush collection vehicle to be dedicated to the Road Crew. This measure could eliminate the need for large dumpsite cleanups involving all Operations staff and equipment. RS&Y acknowledges, however, that certain large volume illegal dumpsites may require the use of additional manpower or equipment from the Operations staff.
3. By storing illegally dumped material within Kaufman County at the commissioner's barn, it provides the County with the benefit of not requiring Road Crew staff to haul waste to the landfill outside the County. Thus, allowing staff to concentrate on illegal dumpsite cleanups thereby allocating their time in the most efficient manner possible.
4. While clean-up events serve a necessary function of the County's clean-up efforts, that fund could potentially be reallocated to cover the cost of purchasing a brush truck for cleanups or additional enforcement equipment for environmental enforcement staff. It might be advisable for the County and Cities, which now share the cost of operating convenience stations at a fee to citizens, to look at the cost/benefit of operating those facilities at no-cost to the public in lieu of having one costly clean-up event each year.

ENFORCEMENT

The environmental enforcement program in Kaufman County is housed in the Public Works Department and receive their peace officer commission through the Fire Marshall's Office³. This program was created in 1990 and is primarily funded by the Public Works Department budget in the general fund. The program concentrates primarily on environmental enforcement in the unincorporated areas of the County.

In addition, NCTCOG grant funds have been secured twice in the past five years to purchase equipment for the environmental enforcement program. Table CS4.1 shows the grants received from NCTCOG allocated to illegal dumping enforcement.

³ Prior to May 2003, the environmental enforcement officers received their peace officer commissions through the District Attorney's Office. The County has chosen to relocate the commission because a significant portion of the peace officer's time not dedicated to illegal dumping is allocated to investigating open burning crimes.

Table CS4.1 – Illegal Dumping Enforcement Grants

Year	Amount	Description	Source
1997	\$ 21,000	Purchase of enforcement truck	NCTCOG
2002	\$ 4,000	Laptop computers and portable printers	NCTCOG
TOTAL	\$ 25,000		

Personnel

Two FTEs dedicate an estimate 30 hours per week to illegal dumping enforcement efforts. The total personnel cost associated with illegal dumping is \$56,550 annually, as detailed in Schedule CS4. Table CS4.2 illustrates the various tasks assigned to the enforcement officers.

Table CS4.2 – Illegal Dumping Enforcement Officer Allocation of Time

Task	Percentage of Time
Investigations	55 %
Stakeouts	10 %
Developing cases for prosecution	30 %

Environmental enforcement staff make use of various equipment to help investigate and document cases involving illegal dumping. Some of the equipment is specialized due to the rural nature of the County. For example, environmental enforcement staff stated that illegal dumping often occurs off of County roads. Many times these areas are pasture land with unpaved roads and require enforcement staff to investigate areas difficult to reach by standard enforcement vehicles.

Environmental enforcement staff respond to citizens' complaint regarding illegal dumping as well as visible illegal dumpsites identified on patrol. County staff noted that since the recent promotion of illegal dumping hotline in Kaufman County the number of sites discovered through tips from the hotline has increased dramatically.

Investigations and prosecutions against violators occur primarily through catching illegal dumpers in the act of dumping as well as locating materials such as an envelope with the name of an individual on it. After information about the individual is gathered and staff documents the dumpsite (including photographs), a case is submitted for prosecution.

Officers stated that the success of a prosecution is dependant on the commitment of the District Attorney to prosecuting illegal dumping cases. Kaufman County currently possesses a District Attorney who is committed prosecuting illegal dumping. Table CS4.4 illustrates the number of investigations and prosecutions brought forth by environmental enforcement officers since 1999.

Equipment

Environmental enforcement staff employ vehicles, a 35mm camera, and laptop computers during the investigation and development of cases against illegal dumpers. County staff noted that since Kaufman County covers over 806 square miles, enforcement staff are required to spend a significant portion of their time in their vehicles. Environmental enforcement staff regularly write reports in the field on their laptop computers while the information is fresh in their mind. From a cost/benefit perspective, providing enforcement officers the opportunity to immediately produce a report from a remote location increases the accuracy of the report and allows the officer a degree of mobility.

Total equipment costs including fuel and maintenance, is \$17,017 annually, as detailed in Schedule CS4. Table CS4.3 depicts the various types of equipment utilized by enforcement staff.

Table CS4.3 –Enforcement Equipment Profile

Item	Quantity	Description
Truck	2	Primary transportation for officers and is used to transport illegally dumped materials
Laptop Computer	2	Used to develop cases and store information
Printer	2	Portable printer used to print pictures of illegal dumpsites
35mm Camera	1	Used to document illegal dumping for prosecution
Surveillance System	1	Does not work and is not in use by enforcement staff

The environmental enforcement program also incurs supplemental expenses utilized during the course of investigations and patrol. These include the purchases of:

- \$2,500 for supplies such as film and miscellaneous office supplies
- \$600 for uniforms for environmental enforcement staff
- \$200 for association dues
- \$1,000 for environmental enforcement training fees
- \$1,000 used for laboratory testing fees during scenarios where illegally dumped materials may be unknown or potentially hazardous.

Investigation and Convictions

Since 1999, the number of investigations performed by environmental enforcement staff has steadily increased. Table CS4.4 describes the number of investigations and convictions performed by the environmental enforcement program.

Table CS4.4 – Illegal Dumping Investigations and Convictions

Year	Investigations	Prosecutions	Convictions	Convictions Leading to Jail Time	Convictions Leading to Fines
1999	407	166	80	4	80
2000	528	145	70	4	70
2001	587	193	90	4	90
2002	506	116	50	4	50

Environmental enforcement staff stated that the number of prosecutions reflect only those cases that have been taken to Justice of the Peace or County Court. The number of prosecutions for Kaufman County could be higher when cases pending in court are included. Environmental enforcement staff noted that a significant number of investigations lack enough evidence to be tried in court. For example, illegal dumpers in Kaufman County commonly remove all names and addresses from illegally dumped materials prior to dumping. This prevents environmental enforcement officers from establishing a connection between the materials and individual, therefore the case lacks enough evidence to be taken to prosecution.

Environmental enforcement staff noted that the County prosecution to conviction ratio is approximately 47 percent from 1999 to 2002. County staff stated that often cases against suspected illegal dumpers will be dismissed when the individual shows the Justice of the Peace proof they subscribe to solid waste collection services. For instance, a few years ago, several cases against suspected illegal dumpers were tried for offense which occurred on the same day were tried in Justice of the Peace Court. Each individual was able to show the court proof of subscription to the same solid waste collection service provider, and charges were eventually dropped. The County believes that several “fly-by-night” waste haulers are not properly covering their loads on their disposal vehicles, therefore material is flying off as they drive down the highway. The County has not investigated or prosecuted any waste haulers at this time.

Most of the fines that have been the result of convictions are typically \$250. Few of these cases are Class B Misdemeanor or higher, which are fines greater than \$700. The fines collected from illegal dumping are sent to the general fund. In cases where criminal penalties are sought, the fine amount is divided between the State and the County.

Key Findings and Recommendations

1. Environmental enforcement officers has implemented the use of laptop computers to perform administrative activities remotely, however there may be a need to track illegal dumpsites or reports of illegal dumping on a County map. RS&Y recommends that the County purchase Geographic Information System (GIS) software, the County could benefit from this through the various detailed reports and trend analyses available to be used to track illegal dumping.

2. The County would benefit from equipping laptop computers used by environmental enforcement officers with wireless connectivity. This would allow the officers remote access to the Texas Crime Institute Center (TCIC) and National Crime Institute Center (NCIC) databases, whereby officers could access the background of suspected illegal dumpers. This would provide the officers the ability to spend more time in the field without sacrificing benefits associated with their offices.
3. The County does not currently utilize surveillance equipment in their environmental enforcement activities. The County may benefit from the purchase of additional surveillance cameras which would allow the enforcement officer more time to dedicate to investigation activities. RS&Y recommends that the County look to alternative funding resources for the purchase of these one time goods.
4. Based on prosecution and conviction data collected in other surveyed cities and counties, the conviction rate in Kaufman County does not compare in relation to other conviction rates from other surveyed entities. RS&Y recommends that environmental enforcement officers focus more time investigating the various waste haulers who provide services to the County. Officers should make sure that the private waste haulers are adhering to all operational standards set forth by the State of Texas in Section 364 of the Health and Safety Code.

EDUCATION AND OUTREACH

The education and outreach program is operated by the Kaufman County Project Coordinator, located in the Kaufman County Solid Waste Management Cooperative. This position was created in 1998 and has been very active in establishing an active illegal dumping education and outreach program.

Since 1998, the County has provided the basic funding for the program. The program receives \$50,000 annually from the County. Additional funding from NCTCOG, City of Terrell, Terrell I.S.D., Kaufman I.S.D. and occasionally from private donations, has allowed the program to grow and reach out countywide. Table CS4.5 illustrates alternative funding sources for the education and outreach program for Kaufman County.

Table CS4.5 – Alternative Education and Outreach Funding Sources

Year	Grant Amount	Source
1998 - 1999	\$ 212,000	NCTCOG
1999	\$ 109,000	NCTCOG
2000 - 2001	\$ 169,000	NCTCOG
2001	\$ 20,000	NCTCOG
2002	\$ 201,000	NCTCOG
2002	\$ 14,000	City of Terrell
2003	\$ 4,253	Terrell & Kaufman I.S.D.

Personnel

Currently, the environmental education specialist, under the direction of the project manager, manages the education and outreach program in Kaufman County. The environmental education specialist is a contracted position through grant funding and dedicates 40 hours per week to education and outreach program efforts.

Additionally, environmental enforcement officers in Kaufman County dedicate approximately two hours per week to educational efforts in schools. The total personnel costs for the education and outreach efforts are \$75,270 annually, as detailed in Schedule CS4. The environmental education specialist allocates time to various activities including public speaking engagements as well as program administration. Table CS4.6 illustrates a breakout of the environmental education specialist's time.

Table CS4.6 – Environmental Education and Outreach Time Allocation

Task	Percentage of Time
Presentation to community organizations	10 %
Public awareness campaign	35 %
Development of media campaign	15 %
Special events (cleanups, training)	30 %
Development of materials	10 %

For example, the program manager and environmental education specialist currently works with Terrell I.S.D. and Kaufman I.S.D, through a contract for services, to provide at the elementary level, materials and lesson plans regarding issues such as illegal dumping. Terrell I.S.D. teachers under a NCTCOG grant recently wrote the lesson plans and materials incorporated into the curriculum in each I.S.D. The project manager believes that the involvement in area schools and by providing students materials and information about illegal dumping has an effect on the behavior of their parents and their own actions in the future.

The project manager observed some skepticism from the school district during the initiation of the program, because school district staff did not immediately see the benefit of the program. The project coordinator is pleased to report now the school district staff have embraced the program and continue to develop a good working relationship between the two parties.

The program has been very successful, in part because these two districts were willing to contract with the Solid Waste Cooperative allowing for unlimited access to deliver materials and programs to both teachers and students. This contract for \$1 per student in grades Pre-K – 6th grades coincides with the “Stop Illegal Dumping” curriculum. These contracts have provided a total of \$4,253 for the 2002-2003 school year and are anticipated to be renewed for the 2003-2004 school year. As a result of a second Terrell I.S.D. produced curriculum, it is expected that the contract would be expanded to include all students in grades Pre-K – 12th grade.

Other efforts by the project coordinator include:

- Establishment of Adopt-a-County Road
- Coordination of County Pride Recognition Program
- Participation in the Keep Texas Beautiful “Train the Trainer” program
- Training judges and prosecutors on laws governing illegal dumping

Equipment and Materials

The environmental education specialist distributes materials at various public speaking events and community cleanups throughout the year. In addition, Public Service Announcements (PSA) have been developed and distributed through the media as well as in the form of banners which advertise the NCTCOG Illegal Dumping Hotline. Table CS4.7 describes the various efforts initiated by the education and outreach program in Kaufman County.

Table CS4.7 – Education and Outreach Materials and PSA

Category	Description
Brochures	Provides information related to the hazards of illegal dumping.
Newsletter	Providing information related to clean-up events and activities to combat illegal dumping.
Website	The website informs residents about the Stop Illegal Dumping Hotline.
Banners	200 banners located throughout the County advertising the NCTCOG Illegal Dumping Hotline.
Newspaper Advertisement	Advertisements in local papers which focus on illegal dumping, recycling, and citizen collection stations.

Kaufman County has received a tremendous response from the community regarding the various methods of educational and outreach efforts implemented over the past year. For example, County staff stated that in the first two years of the NCTCOG Illegal Dumping Hotline, there were fewer than five reports of illegal dumping in Kaufman County. Since the development and placement of the banners that display the NCTCOG Illegal Dumping Hotline on fences and near County roads, the County has received over 15 reports of illegal dumping in approximately four months.

The cost of developing 200 banners was approximately \$5,000. The County expects that since these banners are made of a durable plastic and secured with rope, the current supply should last for awhile.

County staff stated that individuals who have reported illegal dumping noted that they saw the hotline number on a Stop Illegal Dumping banner throughout the County. From a cost benefit perspective, the benefit of making citizens aware of the crime of illegal dumping and how to report it; far outweighs the costs associated with the development of banners.

In addition to banners, Kaufman County has utilized NCTCOG developed brochure templates. County staff reformat the brochures to meet the needs of Kaufman County.

County staff believe that the establishment of an environmental educator's network would be a cost-effective strategy that could be implemented at the regional or sub-regional level. This would benefit other communities by providing them with information on successes and failures observed of other programs. This would also establish a working relationship between communities that may be beneficial for future campaigns. Kaufman County staff noted they would be willing to share information about their program and feel it would be of especially valuable to other rural counties.

Based on the success of the program in Kaufman County, staff believe it would be beneficial for NCTCOG to develop a Stop Illegal Dumping curriculum for the high school, middle school, and elementary school students for the entire region. County staff believe that an illegal dumping program can be offered to schools to be incorporated into the environmental education curriculum. Staff noted that education regarding illegal dumping is currently focused intently at the elementary level, however, targeting an older audience to reinforce these messages may prove beneficial in the long run.

Key Findings and Recommendations

1. Kaufman County works with area school districts to provide them with educational information and materials on illegal dumping. Since many educational and outreach programs are in need of a facet to their program like this, Kaufman County may wish to coordinate with NCTCOG to provide materials to other communities in the region.

2. Based on data received from County staff, there may be a need for more education and training of prosecutors and judges within the County. The project coordinator may want to provide additional resource materials on illegal dumping such as *Local Control of Illegal Dumping* to these individuals.
3. Grant funding for the educational program will expire in August 2003 and is in need of funding to continue to provide the County will illegal dumping educational materials. RS&Y would recommend that Kaufman County fund its program through a permanent funding source in the future. To accomplish this, the County could consider the development of a more organized solid waste collection system that would include a franchise fee for private haulers. This fee could be used to fund various illegal dumping abatement programs.

PROGRAM BUDGET

Kaufman County dedicates approximately \$375,568 to its illegal dumping cleanup, enforcement and education/outreach efforts. Approximately 55 percent of that budget is directed at clean-up activities, 21 percent of the budget is dedicated to environmental enforcement, and 24 percent of the budget is applied to education and outreach activities, as described in Table CS5.8.

While cleanup is a valid and necessary component to an illegal dumping prevention and response program, RS&Y believes that additional resources could be dedicated to environmental enforcement and education and outreach programs. There is a possibility that Kaufman County would not only see a reduction in future illegal dumping, but could also present an opportunity to reduce the costs associated with clean-up activities.

Table CS4.8 – Illegal Dumping Program Budget

Task	Annual Cost Allocated to Illegal Dumping	Percent of Total Budget
Cleanup ⁴	\$ 205,074	55 %
Enforcement	\$ 78,867	21 %
Education and Outreach	\$ 91,627	24 %
TOTAL	\$ 375,568	

⁴ Cleanup costs for this analysis only reflect cleanup activities in Precinct 1 and Countywide cleanup events. Cleanup costs for the Kaufman County could be higher when other Precinct cleanup costs are included. Enforcement and Education and Outreach costs reflect activities for the entire County.

KEY CONTACTS

Table CS4.9 – Illegal Dumping Contact List

Category	Department	Personnel Contact	Phone
Cleanup	Kaufman County - Precinct 1	Commissioner Rhea Fox	972-932-3684
Enforcement	Kaufman County Public Works Department	Ms. Kathy Paget	972-932-4331 ext. 143
Education and Outreach	Kaufman County Solid Waste Management Cooperative	Ms. Charlotte Gilmore	972-932-7954

Case Study # 4 - Kaufman County Schedule CS4

Cleanup ¹					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (Years)	Annual Cost
Personnel (Salaries and Benefits)					
Precinct 1					
Road Crew	Primary responsibility for illegal dumpsite cleanups	\$ 35,100	20%		\$ 7,020
Road Crew		\$ 35,100	20%		\$ 7,020
Road Crew		\$ 35,100	20%		\$ 7,020
Precinct 1	Only used for heavy equipment (7 FTE) one day per month				
Operations Crew - All Staff		\$ 245,700	5%		\$ 12,285
Public Works Department	Performs small manual dumpsite cleanups during course of patrol				
Environmental Enforcement Officer		\$ 37,700	20%		\$ 7,540
Environmental Enforcement Officer		\$ 37,700	20%		\$ 7,540
SUBTOTAL		\$ 426,400			\$ 48,425
Equipment					
Public Works Department					
Truck	1/2 ton, Primary mode of transportation for enforcement staff	\$ 25,000	20%	7	\$ 714
Truck	1/2 ton, Primary mode of transportation for enforcement staff	\$ 25,000	20%	7	\$ 714
Precinct 1					
Truck ²	Trucks used to transport Road Crew staff during weekly cleanups	\$ 17,420	100%	N/A	\$ 17,420
Heavy Equipment ²	Gradall, front-end loader, and disposal trucks used during heavy cleanups	\$ 30,000	100%	N/A	\$ 30,000
SUBTOTAL		\$ 97,420			\$ 48,849
Other					
Community Cleanups	Annually held cleanup event	\$ 100,000	100%		\$ 100,000
Disposal	Disposal of illegally dumped material	\$ 7,800	100%		\$ 7,800
SUBTOTAL		\$ 107,800			\$ 107,800
TOTAL		\$ 534,200			\$ 205,074

¹ Cleanup data taken from only Precinct 1, Enforcement and Education/Outreach data applies to entire county.

² This estimated cost is based on data provided by County staff, and is based on the total annual cost for the usage of this equipment on illegal dumping activities

Case Study # 4 - Kaufman County Schedule CS4

Enforcement					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (Years)	Annual Cost
Personnel (Salaries and Benefits)					
Public Works Department	Primary unit to investigate and develop illegal dumping cases in County				
Environmental Enforcement Officer		\$ 37,700	75%		\$ 28,275
Environmental Enforcement Officer		\$ 37,700	75%		\$ 28,275
		SUBTOTAL			\$ 56,550
Equipment					
Public Works Department					
Truck	Primary mode of transportation for enforcement staff	\$ 25,000	75%	7	\$ 2,679
Truck	Primary mode of transportation for enforcement staff	\$ 25,000	75%	7	\$ 2,679
Laptop Computer	Used in the field to create case files or access illegal dumping data	\$ 1,800	100%	5	\$ 360
Laptop Computer	Used in the field to create case files or access illegal dumping data	\$ 1,800	100%	5	\$ 360
Portable Printer	Used to print reports or files in the field	\$ 200	100%	5	\$ 40
Portable Printer	Used to print reports or files in the field	\$ 200	100%	5	\$ 40
35mm Camera	Used to capture images of dumped material for case files	\$ 100	100%	10	\$ 10
Surveillance Camera	Is not in use, however has been purchased by the County	\$ 4,000	100%	10	\$ 400
Fuel		\$ 10,000	95%		\$ 9,500
Maintenance		\$ 1,000	95%		\$ 950
		SUBTOTAL			\$ 17,017
Other					
Public Works Department					
Supplies	Supplies used during the course of investigations (i.e.Film, Rubber Gloves, etc.)	\$ 2,500	100%		\$ 2,500
Uniforms		\$ 800	75%		\$ 600
Association Dues		\$ 200	100%		\$ 200
Training	Environmental enforcement training seminars	\$ 1,000	100%		\$ 1,000
Laboratory Fees	Soil samples are sent to laboratories for testing of hazardous material	\$ 1,000	100%		\$ 1,000
		SUBTOTAL			\$ 5,300
		TOTAL			\$ 78,867

Case Study # 4 - Kaufman County
Schedule CS4

Education and Outreach					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (Years)	Annual Cost
Personnel (Salaries and Benefits)					
Solid Waste Management Cooperative Environmental Education Specialist	Coordinates events, creates educational materials and makes presentations at public schools	\$ 71,500	100%		71,500
Public Works Department Enforcement Officer	Educates residents and makes presentations at public schools	\$ 37,700	5%		1,885
Enforcement Officer		\$ 37,700	5%		1,885
	SUBTOTAL	\$ 146,900			75,270
Equipment					
Public Works Department Truck	Primary mode of transportation for enforcement staff	\$ 25,000	5%	7	\$ 179
Truck	Primary mode of transportation for enforcement staff	\$ 25,000	5%	7	\$ 179
	SUBTOTAL	\$ 50,000			\$ 357
Materials					
Solid Waste Management Cooperative Publications	Brochures regarding the various aspects of illegal dumping	\$ 6,000	100%		\$ 6,000
Advertisement	Banners with information about the illegal dumping hotline	\$ 5,000	100%		\$ 5,000
Advertisement	Newspaper advertisements regarding community cleanup events	\$ 5,000	100%		\$ 5,000
PSA	Radio PSA, airtime and production was donated	\$ -	100%		\$ -
PSA	Billboard PSA, donated by billboard owner	\$ -	100%		\$ -
PSA	Public access programming on illegal dumping	\$ -	100%		\$ -
	SUBTOTAL	\$ 16,000			\$ 16,000
	TOTAL	\$ 212,900			\$ 91,627

CASE STUDY #5: TARRANT COUNTY

INTRODUCTION

Tarrant County is the second largest County by population in the NCTCOG region with approximately 1,435,186 people, and is adjacent to Dallas, Parker, Wise, Denton, and Johnson counties. Tarrant County, centrally located in the NCTCOG region, is predominately made up of approximately 36 incorporated municipalities including the cities of Fort Worth, Arlington, Haltom City, Grapevine, North Richland Hills and Southlake.

Based on interviews with County Staff, the number of known illegal dumpsites in unincorporated areas of Tarrant County is approximately 20 to 30,¹ of those approximately 16 are considered chronic illegal dumpsites. Based on interviews with County Staff, illegal dumping trends in Tarrant County have been increasing slightly over the past five years. In addition, efforts to curb illegal dumping have increased in recent years.

County Staff believe that illegal dumping continues to occur due to an under educated public regarding the hazards and penalties of illegal dumping as well as the public perception that if you dump trash out of your car on a County or city road, the County will be responsible for cleaning it up.

Tarrant County operates separate clean-up programs through each of the four commissioner's precincts. Each precinct's Right of Way Maintenance Crew and Road Crew coordinate road and bridge maintenance efforts and monitor and clean up illegal dumping along public property. The focus of this case study was based on Tarrant County Precinct 1 (Precinct 1), which County Staff identified as a precinct that is very active in the clean-up of illegal dumping sites. For example, Precinct 1 has operated an illegal dumping clean-up program since 1985. Other data, included in this case study, regarding the enforcement and education/outreach programs, focus on programs for the entire County.

CLEANUP

Precinct 1 operates its illegal dumping clean-up program through the Right of Way Maintenance Crew and Road Crew under the supervision of the Director of Operations. Funding for the clean-up program is entirely from the general fund. This program has been in existence since 1985.

Personnel

Precinct 1 dedicates a percentage of time for 40 Full Time Equivalents (FTE) to illegal dumping clean-up efforts. The Precinct 1 staff are members of the Right of Way

¹ Precinct 1 reported that crews cleanup a total of approximately 130 incidents of illegal dumping annually.

Maintenance Crew and Road Crew. The six members of the Right of Way Maintenance Crew are primarily responsible for all small dumpsite clean-ups that occur on public rights of way². The 34 Road Crew staff provides supplemental assistance during heavy or large dumpsite cleanups. Road Crew staff is responsible for the operation of any heavy machinery used during the course of the cleanup.

All members of Right of Way Maintenance Crew, depending on personnel level, dedicate between 15 and 18 hours per week to illegal dumping cleanups. This time is primarily spent conducting clean-ups, with a small percentage of time used to transport waste for storage and finally to the Arlington Landfill. Clean-up activities are primarily performed manually in the following types of locations:

- Along roads with dense tree lines
- Low traffic roads
- Unincorporated areas with lower median household income levels

In Tarrant County there are an estimated 137 miles of County road that is the responsibility of the Right of Way Maintenance and Road Crew. The Right of Way Maintenance and Road Crew do not have jurisdiction for illegal dumping that occurs on private property. Members of the staff explained that illegal dumping occurs not only on public property, but adjacent to private property. Right of Way Maintenance Crew staff have observed that areas where illegal dumping on adjacent private property is present, the likelihood the area will gather more illegally dumped materials is higher than areas free of any illegal dumping.

Right of Way Maintenance Crew staff also utilizes Tarrant County Jail Trustees to perform illegal dumpsite cleanups throughout the County. The Right of Way Maintenance Crew supervisor holds a Jailer's License³ and routinely coordinates County Jail Trustee cleanups. Clean-up areas are described by County Staff as small dumpsites usually consisting of residential and commercial wastes and C&D debris. To obtain the use of the trustees, the Right of Way Maintenance Crew supervisor picks-up the trustees and takes them to the field, where manual clean-up activities occur for several hours. At the end of the day, the supervisor will return the trustees to the jail. This typically occurs five days per week throughout the year, which provides the Precinct with a steady supply of inexpensive labor. Since these trustees are able to use illegal dumpsite cleanups as a method of repayment of fines or outstanding debt, the County does not incur any direct costs for the use of these individuals. The only cost associated with this labor is the time for the supervisor. From a cost/benefit perspective, the net benefit to the County is approximately \$100,035 annually, as shown in Table CS5.1.

² In general, the public right of way refers to 15 feet of property on either side of roads within the county.

³ Jailer's Licenses may be obtained upon completion of the necessary course required by the State of Texas. County Jail Trustees must be supervised by a licensed jailer at all times during cleanups.

Table CS5.1 – Cost/Benefit Analysis for Use of County Jail Trustee Cleanups

Description	Cost/Benefit Amount
Cost: Right of Way Maintenance Crew supervisor's time spent overseeing trustees ⁴	\$ (26,325)
Benefit: Use of Tarrant County Jail Trustees ⁵	\$ 126,360
Net Benefit	\$ 100,035

The 34 members of the Road Crew staff dedicate approximately one day per month to perform illegal dumping cleanups. Road Crew staff provide supplemental assistance during heavy or large dumpsite cleanups. Road Crew staff is responsible for the operation of any heavy machinery used during the course of the cleanup.

When a large illegal dumpsite is identified, Precinct 1 reserves a date when Road Crew staff will participate in the cleanup. County Staff stated that it is often difficult to establish a dumpsite clean-up date when the entire Road Crew can participate. RS&Y observed that in the event of a cancellation due to rain, it may take additional time to reset the clean-up date when all clean-up parties can attend. During this time, additional materials can be dumped by individuals at the dumpsite.

The total personnel costs dedicated to illegal dumping cleanups for Precinct 1 is approximately \$153,530 annually, as detailed in Schedule CS5.

Equipment

Precinct 1 uses both heavy equipment and motor vehicles to cleanup illegal dumping. The time dedicated to illegal dumping for the use of this equipment is proportional to the amount of time spent by Precinct 1 staff in the clean-up of illegal dumping. The total equipment cost allocated to illegal dumping is approximately \$5,829 annually. Additional costs include fuel and maintenance which are approximately \$32,012 annually and rental equipment which is \$1,250. The total annual equipment cost is \$62,840, as detailed in Schedule CS5.

County Staff stated that heavy equipment is used to cleanup large illegal dumpsites which traditionally contain materials such as bulky items, brush, scrap tires, residential waste, and C&D debris. All heavy equipment used in dumpsite cleanups is allocated to the Road Crew. Table CS5.2 illustrates the various equipment employed by illegal dumpsite clean-up personnel.

⁴ Based on 45 percent of supervisor's salary and benefits.

⁵ Based on use of five trustees per day each week, with value based on salary of a Level 1 County maintenance employee.

Table CS5.2 – Clean-up Equipment Profile

Item	Quantity	Description
Pickup Truck	2	<ul style="list-style-type: none"> Heavy duty extended cab pickup truck is used to transport jail trustees, jailer and manually cleaned up material Heavy duty extended cab pickup truck is used to transport Right of Way Maintenance Crew staff and haul illegally dumped materials
Heavy Equipment	4	<ul style="list-style-type: none"> Equipment includes an excavator, tracked loader, backhoe, and rubber tire loader used in the cleanup of large illegal dumpsites
Rental Equipment	N/A	<ul style="list-style-type: none"> Funds are set aside annually in the event of an unforeseen maintenance problem.

Approximately five percent of the rental equipment fund is allocated annually in the event of an unforeseen maintenance problem, including illegal dumping cleanups. For example, illegal dumping might be present in hard to access locations like narrow roads, ravines or creeks. In that situation, Road Crew equipment may be unable to handle the clean-up of that site, thus requiring County Staff to rent equipment better suited for that scenario, such as a knuckleboom to retrieve illegally dumped material from a ravine.

Disposal

In 2002, Precinct 1 collected an estimated 393 tons⁶ of illegally dumped material annually. Waste is collected and then stored at the Precinct 1 facility, where it is then transported to the City of Arlington Landfill in Arlington, Texas. Transportation to the landfill only occurs after a large quantity of material is collected. Based on conversations with County Staff, the estimated travel time for disposing of this material at the landfill is approximately two hours roundtrip.

Precinct 1 also disposes of illegally dumped materials in dumpsters at the Precinct 1 facility. The two dumpsters are serviced twice per week and by a contracted waste hauler. The cost of this service and maintaining the dumpster is \$1,250 annually, as detailed in Schedule CS5.

The distance to the landfill is approximately 25 miles from the Precinct 1 offices. County Staff estimates that travel to the Arlington Landfill to dispose of materials would take approximately one and a half hours. The tipping fee of \$30 per ton is waived for all illegally dumped materials collected in Precinct 1. Based on an annual 393 tons of material collected, the cost-savings to Precinct 1 is approximately \$11,790 annually.

⁶ Precinct 1 only records tonnage data for illegally dumped materials sent to the landfill. Illegally dumped materials disposed of in dumpsters at the Precinct 1 facility and transported by the waste hauler have not been accounted for in the tonnage data. Therefore, it can be inferred that Precinct 1 collects more than 393 tons of illegally dumped material annually.

Clean-up Events

Additional illegal dumping clean-up efforts include park clean-up events that are held throughout the year. Precinct 1 staff are responsible for performing clean-up activities at these events. Tasks include the cleanup of illegally dumped materials that are located within the park and rehabilitation of certain areas of the park. The goal of the cleanups is to prevent additional dumping by keeping these potential dumpsites clean.

Based on interviews with County Staff, \$5,100 is budgeted annually for park clean-up events, as detailed in Schedule CS5.

Key Findings and Recommendations

1. The Right of Way Maintenance Crew works diligently to cleanup illegal dumping throughout the precinct. However, their effectiveness is reduced due to staff having to do their daily clean-up activities manually.
2. Since the Right of Way Maintenance Crew does not have clean-up equipment, they must rely on the Road Crew to provide needed equipment. While the Road Crew is certainly capable of serving this function, their availability is limited. As a result, weeks can pass before a site is cleaned, which can allow for additional dumping to occur.
3. The use of County Jail Trustees as a source of supplementary personnel to conduct manual cleanup activities is an effective cost-saving clean-up strategy for Tarrant County. Precinct 1 would benefit from obtaining jailer certification training for another Right of Way Maintenance Crew staff member. By training another staff member, Precinct 1 would be able to potentially use more County jail trustee labor for the manual cleanup of dumpsites.
4. By relying on trustees to conduct manual illegal dumpsite cleanups, this would allow the precinct to shift the responsibilities of Right of Way Maintenance Crew on tasks that would involve the use of equipment involved in large illegal dumpsites cleanups.
5. Based on the analysis of Precinct 1 clean-up measures, RS&Y believes that Precinct 1 could explore the purchase of a brush collection vehicle to be dedicated to the Right of Way Maintenance Crew. This measure could eliminate the need for large dumpsite cleanups involving Road Crew staff and equipment. RS&Y acknowledges, however, that certain large volume illegal dumpsites may require the use of additional manpower or equipment from the Road Crew staff.
6. By storing illegally dumped material within Precinct 1 at the Precinct 1 facilities provides the County with the benefit of not requiring Precinct 1 staff to haul waste

to the landfill, allows staff to concentrate on illegal dumpsite cleanups thereby allocating their time in the most efficient manner possible.

ENFORCEMENT

Tarrant County houses its environmental enforcement program within the Tarrant County Sheriff's Office's, Patrol Division. This program, once housed in the County Constable's Office was relocated to the Sheriff's Office in October 2001. There are currently four FTE responsible for all environmental enforcement and investigations throughout the 897 square mile County. The environmental enforcement program is predominately funded through the general fund, but received NCTCOG grants in Fiscal Year 2002 to purchase surveillance equipment.

Personnel

The environmental enforcement program is currently coordinated by a sergeant, who is responsible for the supervision of three officers. The sergeant estimates that each officer and supervisor dedicates approximately 32 hours per week to environmental enforcement activities. The approximate total personnel (salary and benefits) costs associated with environmental enforcement activities are \$122,304. Table CS5.3 illustrates the personnel costs associated with the environmental enforcement program.

Table CS5.3 – Enforcement Personnel Profile

Personnel	Number of Personnel	Percentage of Time for Illegal Dumping
Supervisor	1	80 %
Officer	3	80 %

Based on interviews with Sheriff's Office staff, the focus of the environmental enforcement program is in all unincorporated areas of Tarrant County. To ensure all areas of the County are patrolled, one officer is responsible for the northern region, one officer is responsible for the southern region, and another is considered a rover who canvasses the entire County. The roving officer's patrol area is traditionally dependant on where the highest volume of illegal dumping is occurring.

Officers allocate approximately 50 percent of their time to illegal dumping investigations. This includes responding to citizen's reports of illegal dumping and catching illegal dumpers in the act during patrols of the area. Approximately 30 percent of their time is dedicated to stakeouts and surveillance of chronic illegal dumpsites. County Staff described this strategy as the most beneficial way to catch illegal dumpers, since the use of surveillance equipment relieves the officers from sitting in their vehicles waiting for an illegal dumper to approach. Staff noted that over 40 percent of all cases brought against illegal dumpers are a result of surveillance video and stakeouts. Approximately 20

percent of officer's time is dedicated to administrative duties including the development of cases for prosecution.

Equipment

The Sheriff's Office utilizes a variety of equipment during the course of illegal dumping investigations. The annual equipment costs for environmental enforcement is approximately \$2,673. Additional costs include vehicle fuel and maintenance, which are approximately \$8,100 annually, as detailed in Schedule CS5. Table CS5.4 provides an overview of all equipment used in illegal dumping investigations.

Table CS5.4 – Enforcement Equipment Overview

Item	Quantity	Description
Pickup Truck	1	Transportation for officer during patrol and off-road investigations. It is also used to store and haul scale system
Sedan	2	Primary mode of transportation for officers during patrol of County
Scale System	1	Mobile scale system is used to weigh illegally dumped material at dumpsite
Surveillance Camera	3	Motion detection surveillance system
Digital Camera	2	2.0 MegaPixel camera
Laptop Computer	3	Installed in each vehicle with GPS mapping software and wireless connectivity

The sergeant stated that proper equipment is imperative to the conduct of illegal dumping investigations, since many environmental enforcement programs must investigate, gather evidence and build a strong case for prosecution by the District or County Attorney. For example, laptop computers located in each vehicle are linked with wireless connections with remote access the Texas Crime Institute Center (TCIC) and National Crime Institute Center (NCIC) databases. These databases house the criminal record of individuals convicted of felony crimes and misdemeanors, including illegal dumping violations. The Sheriff's Office remarked that this gives the officer access a person's background and search for outstanding warrants or prior illegal dumping violations.

Additionally these laptops are equipped with Global Positioning System (GPS) software, which allows the officer to electronically identify and mark chronic illegal dumpsites. This software enables the environmental enforcement program to analyze overall trends in illegal dumping as well as identify chronic illegal dumpsites that might be candidates for surveillance.

Sheriff's Office staff is responsible for investigating and developing all illegal dumping cases which are to be tried in Justice of the Peace Court and District or County Court. Sheriff's Officers stated that judges and prosecutors are often unfamiliar with environmental crimes cases, and are regularly reintroduced to that area of the law by the

Sheriff's Office. During the course of more severe illegal dumping investigations, the Sergeant is in frequent contact with Texas Commission on Environmental Quality (TCEQ) staff and NCTCOG staff to ensure that laws are being interpreted and enforced correctly. Sheriff's Office staff also noted that all district and county attorneys as well as County and justice of the peace courts have been extremely supportive of the environmental enforcement program in Tarrant County.

Investigations and Prosecutions

Since 2001, the number of investigations and prosecutions has steadily risen, and is projected to nearly double in 2003. Table CS5.5 illustrates the investigation and conviction data from 2001 to 2003 (projected) provided by the Sheriff's Office. The majority of convictions resulting in fines averaged \$200, the maximum fine allowed through the Justice of the Peace court. Money collected through fines is distributed back into the general fund.

Table CS5.5 – Illegal Dumper Investigation and Conviction Data

Year	Investigations Conducted	Prosecutions	Convictions	Convictions Resulting in Jail Time	Convictions Resulting in Fines
2001	230	111	111	None	111
2002	249	117	117	None	117
2003	398	198	198	Unknown	Unknown

Key Findings and Recommendations

1. Environmental enforcement staff have increased the number of investigations conducted and prosecutions filed over the past three years. From a cost/benefit perspective, the acquisition and implementation of surveillance equipment in illegal dumping stakeouts and investigations has allowed Sheriff's Office staff more time to perform investigations, educate prosecutorial staff, and develop strong cases against illegal dumpers to be prosecuted by the County.
2. Environmental enforcement prosecutors have experienced a 100 percent conviction success rate for illegal dumping prosecutions in the past three years. This can be attributed to the use of appropriate evidence collection techniques such as the use of digital cameras and portable scale systems to capture images and measure illegally dumped materials. RS&Y would recommend that the County consider increasing the number of mobile scale systems or acquire another digital camera to ensure each officer is able to gather accurate evidence of illegal dumping in the field.

3. Sheriff's Office staff needs to maintain lines of communication with district/County attorneys' office, TCEQ regional office staff, and judges. Sheriff's Office staff may want to provide additional resource materials on illegal dumping such as Local Control of Illegal Dumping to these individuals.
4. Based on interviews with Precinct 1 staff, there is a need for additional environmental enforcement activities in this area of the County. Additional environmental enforcement efforts could be provided by hiring another environmental enforcement officer or training non-environmental enforcement Sheriff's Office staff concerning the enforcement of illegal dumping laws.
5. Based on interviews with Precinct 1 staff, there is a need for Sheriff's Officers to take action against private property owners who allow illegally dumping to occur on their property. RS&Y recommends that the Sheriff's Office work with Precinct 1 to identify the location of these properties and owners as well as require that action be taken to resolve the dumping or face penalties.

EDUCATION AND OUTREACH

Tarrant County houses its illegal dumping education and outreach program within the Tarrant County Sheriff's Office, Patrol Division, under the direction of the sergeant. This program relocated to the Sheriff's Office in October 2001. There are currently four FTE responsible for all the educational and outreach efforts throughout the County.

Personnel

Based on interviews with Sheriff's Office staff, all four environmental enforcement staff dedicate an estimated eight hours per week to illegal dumping education and outreach activities. This portion of the salary is entirely funded through the general fund, an amount of approximately \$30,576 annually, as described in Schedule CS5. The program received a \$4,000 NCTCOG grant in FY 2003 for the promotion of education and outreach events.

Sheriff's Office staff conduct a variety of educational and outreach activities designed to inform the public of the hazards and penalties of illegal dumping. Table CS5.6 reflect the typical educational and outreach tasks conducted by the Sheriff's Office.

Table CS5.6 – Education and Outreach Activities

Task	Percentage of Time
Presentations to community organizations (neighborhood associations)	5 %
Public awareness educational programs in local schools	5 %
Presentation to commercial organizations (builders associations and developers) ⁷	10 %

⁷ Educating developers usually occurs on a one on one basis regarding proper C&D debris disposal. Usually, after a citizen complains about C&D debris illegally dumped in the area.

Development of media campaign	0 % ⁸
Development of materials (brochures, promotional items)	20 %
Educating violators or residents (block walking)	60 %

Sheriff's Office staff described an effective public awareness activity currently provided by officers is block walking specific neighborhoods. Customarily, officers will travel door to door introducing themselves to residents, informing residents about the hazards associated with illegal dumping, educating residents about proper disposal options, and distributing illegal dumping related materials. Neighborhoods are chosen through the use of data gathered through the GIS mapping software, where officers identify those neighborhoods near chronic illegal dumpsites, or areas observed by officers on patrol as illegal dumping hotspots.

Equipment and Materials

Equipment used during educational and outreach consists of vehicles that carry the officer and educational brochures or promotional items. The annual equipment costs associated with illegal dumping education and outreach are \$4,133, as detailed in Schedule CS5.

The Sheriff's Office is actively engaged in the development of educational publications and promotional items. These materials are distributed to the public during various presentations, block walking activities, and during stops of suspected illegal dumpers. Tarrant County Sheriff's Office have developed and printed 5,000 educational brochures, 3,000 refrigerator magnets, 5,000 litter bags, and 5,000 bumper stickers to educate residents about illegal dumping. These items are distributed during block walking activities and during community cleanups.

Sheriff's Office staff believes that television or radio Public Service Announcements (PSA) campaigns would be most cost effective on a regional or sub-regional level. Due to the significant expenses associated with the development and broadcast of radio and television PSA, it is often impractical for an individual County, even a County as large as Tarrant County, to commit to such a campaign.

Key Findings and Recommendations

1. Sheriff's Office staff has worked carefully to reach out on a "one-on-one" basis to build relationships with individuals in areas in the vicinity of chronic illegal dumping. As a more cost-effective way to reach communities neighboring chronic illegal dumpsites, the Sheriff's Office could look for opportunities to educate individuals in a small group setting.

⁸ Currently, there has been no media campaign established, however the sergeant noted that this is an area of interest to the county and a program that may be explored in the future.

2. The practice of educating illegal dumpers at the point of their offense has been a successful tactic implemented by Sheriff's Office staff. To monitor the effectiveness of this campaign, the Sheriff's Office could look to keep track of these individuals through an online electronic database.
3. The Sheriff's Office should continue to explore and develop other educational campaigns involving illegal dumping. RS&Y recommends that the Sheriff's Office could look to identify other community activities to educate individuals or utilize the media to raise awareness on illegal dumping.
4. From a cost/benefit perspective, the Sheriff's Office could potentially look to other departments or resources within Tarrant County or NCTCOG for additional resources to assist in the operation and development of an illegal dumping educational and outreach program.

PROGRAM BUDGET

Tarrant County dedicates approximately \$387,899 to its illegal dumping cleanup, enforcement and education/outreach efforts. Approximately 51 percent of that budget is directed at clean-up activities, 39 percent of the budget is dedicated to environmental enforcement, and 10 percent of the budget is applied to education and outreach activities, as described in Table CS5.8.

While cleanup is a valid and necessary component to an illegal dumping prevention and response program, RS&Y believes that additional resources could be dedicated to environmental enforcement and education and outreach programs. There is a possibility that Tarrant County would not only see a reduction in future illegal dumping, but could also present an opportunity to reduce the costs associated with clean-up activities.

Table CS5.8 – Illegal Dumping Prevention and Response Program Budget

Task	Annual Cost Allocated to Illegal Dumping	Percentage of Total Budget
Cleanup ⁹	\$ 198,970	51 %
Enforcement	\$ 151,077	39 %
Education and Outreach	\$ 37,851	10 %
TOTAL	\$ 387,899	

⁹ Cleanup costs for this analysis only reflect cleanup activities in Precinct 1. Cleanup costs for the Tarrant County could be higher when other Precinct cleanup costs are included. Enforcement and Education and Outreach costs reflect activities for the entire County.

KEY CONTACTS

Table CS5.9 – Illegal Dumping Contact List

Category	Department	Personnel Contact	Phone
Cleanup	Tarrant County - Precinct 1	Mr. T.C. Webster Mr. Clarence Lyons	817-615-4050
Enforcement	Tarrant County Sheriff's Office	Sgt. Jerry Brown	817-740-4354
Education and Outreach	Tarrant County Sheriff's Office	Sgt. Jerry Brown	817-740-4354

Case Study #5 - Tarrant County Schedule CS5

Cleanup ¹					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Precinct 1 - Right of Way Maintenance Crew	Crew has primary responsibility for clean-ups, performs manual cleanups				
Right of Way Maintenance Crew - Supervisor		\$ 58,500	45%		\$ 26,325
Right of Way Maintenance Crew - Level 3		\$ 50,700	30%		\$ 15,210
Right of Way Maintenance Crew - Level 2		\$ 42,900	30%		\$ 12,870
Right of Way Maintenance Crew - Level 2		\$ 42,900	30%		\$ 12,870
Right of Way Maintenance Crew - Level 1		\$ 35,100	30%		\$ 10,530
Right of Way Maintenance Crew - Level 1		\$ 35,100	30%		\$ 10,530
Precinct 1 - Road Crew	Only provides supplemental assistance for clean-ups, consists of 34 FTE				
Road Crew Staff - All Staff		\$ 1,303,900	5%		\$ 65,195
SUBTOTAL		\$ 1,569,100			\$ 153,530
Equipment					
Precinct 1 - Right of Way Maintenance Crew					
Truck	Used to transport personnel and dumped materials	\$ 21,000	40%	7	\$ 1,200
Truck	Used to transport personnel and dumped materials	\$ 21,000	40%	7	\$ 1,200
Precinct 1 - Road Crew					
Heavy Equipment	Gradall, track loader, backhoe, rubber tire loader	\$ 480,000	5%	7	\$ 3,429
Maintenance		\$ 578,991	5%		\$ 28,950
Fuel		\$ 61,236	5%		\$ 3,062
Heavy Equipment Rental	Used for unforeseen maintenance and bridge projects	\$ 25,000	5%		\$ 1,250
SUBTOTAL		\$ 1,187,227			\$ 39,090
Other					
Precinct 1					
Supplies					
Dumpster Service	Temporary disposal of dumped materials in dumpster	\$ 2,500	50%		\$ 1,250
Community Clean-ups	Annual parks cleanup and rehabilitation	\$ 17,000	30%		\$ 5,100
SUBTOTAL		\$ 19,500			\$ 6,350
TOTAL		\$ 2,775,827			\$ 198,970

**Case Study #5 - Tarrant County
Schedule CS5**

Cleanup Non-Costs					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel					
County Jail Personnel	Low risk, incarcerated individuals who manually cleanup illegal				
County Jail Trustee	dumpsites	\$ 35,100	72%		\$ 25,272
County Jail Trustee		\$ 35,100	72%		\$ 25,272
County Jail Trustee		\$ 35,100	72%		\$ 25,272
County Jail Trustee		\$ 35,100	72%		\$ 25,272
County Jail Trustee		\$ 35,100	72%		\$ 25,272
SUBTOTAL		<u>\$ 175,500</u>			<u>\$ 126,360</u>
Other					
Disposal	Dumped materials are disposed of at no cost at landfill	\$ 11,790			\$ 11,790
SUBTOTAL		<u>\$ 11,790</u>			<u>\$ 11,790</u>
TOTAL		<u>\$ 175,500</u>			<u>\$ 138,150</u>

¹ Cleanup data taken from only Precinct 1, Enforcement and Education/Outreach data applies to entire county.

**Case Study #5 - Tarrant County
Schedule CS5**

Enforcement					
Item	Description	Total Cost	% of Time for Illegal Dumping	Equipment Life (years)	Annual Cost
Personnel (Salaries and Benefits)					
Sheriff's Office	Primary unit to investigate illegal dumping in County				
Sergeant	Supervisor	\$ 54,600	80%		\$ 43,680
Deputy	Patrol units	\$ 32,760	80%		\$ 26,208
Deputy	Patrol units	\$ 32,760	80%		\$ 26,208
Deputy	Patrol units	\$ 32,760	80%		\$ 26,208
SUBTOTAL		<u>\$ 152,880</u>			<u>\$ 122,304</u>
Equipment					
Sheriff's Office					
Truck	1/2 ton pickup, used during off-road investigations	\$ 22,000	80%	3	\$ 5,867
Sedan	Standard sedan, primary transportation for officers	\$ 20,000	80%	3	\$ 5,333
Sedan	Standard sedan, primary transportation for officers	\$ 20,000	80%	3	\$ 5,333
Scale System	Mobile scale system used to weight illegal dumping	\$ 42,000	100%	20	\$ 2,100
Surveillance Camera	Surveillance camera equipment	\$ 4,000	100%	10	\$ 400
Surveillance Camera	Surveillance camera equipment	\$ 5,000	100%	10	\$ 500
Surveillance Camera	Surveillance camera equipment	\$ 5,000	100%	10	\$ 500
Digital Camera	2.0 Mega pixel camera used to photograph dumped materials	\$ 200	100%	10	\$ 20
Digital Camera	2.0 Mega pixel camera used to photograph dumped materials	\$ 200	100%	10	\$ 20
Laptop Computer	Installed in vehicles, with GPS mapping software	\$ 2,000	100%	10	\$ 200
Laptop Computer	Installed in vehicles, with GPS mapping software	\$ 2,000	100%	10	\$ 200
Laptop Computer	Installed in vehicles, with GPS mapping software	\$ 2,000	100%	10	\$ 200
Fuel		\$ 4,500	100%		\$ 4,500
Maintenance		\$ 3,600	100%		\$ 3,600
SUBTOTAL		<u>\$ 132,500</u>			<u>\$ 28,773</u>
TOTAL		<u><u>\$ 285,380</u></u>			<u><u>\$ 151,077</u></u>

Case Study #5 - Tarrant County Schedule CS5

Education and Outreach

Personnel (Salaries and Benefits)

Sheriff's Office	Coordinates events, creates educational materials and makes				
Sergeant	presentations to dumpers and community groups	\$	54,600	20%	\$ 10,920
Deputy		\$	32,760	20%	\$ 6,552
Deputy		\$	32,760	20%	\$ 6,552
Deputy		\$	32,760	20%	\$ 6,552
		SUBTOTAL	\$	152,880	\$ 30,576

Equipment

Sheriff's Office					
Truck	1/2 ton pickup, primary transportation for officers	\$	22,000	20%	3 \$ 1,467
Sedan	Standard sedan, primary transportation for officers	\$	20,000	20%	3 \$ 1,333
Sedan	Standard sedan, primary transportation for officers	\$	20,000	20%	3 \$ 1,333
		SUBTOTAL	\$	62,000	\$ 4,133

Materials

Sheriff's Office					
Publication	Brochure	\$	694	100%	\$ 694
Promotional Item	Magnets	\$	630	100%	\$ 630
Promotional Item	Litter bags	\$	678	100%	\$ 678
Promotional Item	Bumper stickers	\$	1,140	100%	\$ 1,140
		SUBTOTAL	\$	3,142	\$ 3,142
		TOTAL	\$	218,022	\$ 37,851

APPENDIX B – OVERVIEW OF COMMONLY ILLEGALLY DUMPED MATERIALS

APPENDIX B – OVERVIEW OF COMMONLY ILLEGALLY DUMPED MATERIALS

COMMON ILLEGALLY DUMPED MATERIALS

The following discussion focuses on the various illegally dumped materials commonly found at both large and small volume dumpsites. This list was based primarily on the survey results from NCTCOG *Targeted Illegal Dumper Study* completed in August 2001. Included in each of the category description are:

- General descriptions of illegally dumped materials.
- Discussion of the most appropriate personnel and equipment used in illegal dumpsite cleanups.
- Health and safety concerns that personnel involved in dumpsite cleanups should be aware of.
- Examination of legal disposal methods and recycling options.

RESIDENTIAL AND COMMERCIAL MUNICIPAL SOLID WASTES³¹

General Description

Residential solid waste originates from homes and multi-family residences; it is also known as household or domestic waste. Residential waste can be composed of mail, food waste, newspaper, packaging material, etc. Commercial wastes are described as solid wastes from businesses, office buildings, stores, markets and institutional facilities. Commercial wastes can be composed of mail, waste paper, old corrugated containers, fabrics, and plastics.

These items are commonly found illegally dumped in plastic bags or scattered over large areas. The volume and breadth of dumpsites often varies and most directly affects proper clean up personnel and equipment. For example, bags that are scattered over a one mile stretch of roadway may be approached differently than a single high volume dumpsite.

Preferred Personnel

Litter, small volume sites: County trustee labor, public works staff, enforcement officers, and community/volunteer groups.

Large volume sites: Public works staff and county trustee labor. Using more experienced personnel is recommended for higher waste volumes.

Appropriate Equipment

Litter, small volume: Manual clean up. Use of plastic gloves, plastic bags, reflective vests and gigs are recommended. Transportation and disposal of material can be achieved through the use of a pickup truck.

³¹ For the purposes of this profile, residential and commercial wastes shall be grouped due to the similarities in the clean-up approach.

Large Volume: Heavy equipment with coordinated manual clean up efforts. The following is recommended:

- Use of brush truck with dump body, front-end loader with jaw or excavator.
- Roll-off or dump trucks of 30-cubic yards or greater can be used for the transportation of material.
- Pickup trucks equipped with a hydraulic lifting device or tailgate in order for materials to be loaded and unloaded more rapidly.

Health and Safety Concerns

Contents of bagged material are often unknown and can potentially contain sharp or heavy materials. Clean-up crews should be reminded of the potential dangers of picking up foreign materials. Only trained or experienced staff members should operate heavy equipment.

Disposal Option

Type I Landfill. In the event that recyclable materials, such as newspaper, aluminum, steel, tin or old corrugated containers are dumped, efforts can be made to separate material for recycling. Disposal costs for Type I landfills in the North Central Texas region range between \$28 and \$32 per ton.

CONSTRUCTION AND DEMOLITION DEBRIS (C&D)

General Description

Construction and demolition debris includes solid waste resulting from the construction or demolition of buildings and other structures. C&D debris generally includes materials such as metals, wood, gypsum, asphalt shingles, roofing, concrete, rocks, rubble, and soil. The volume and breadth of dumpsites often varies and most directly affects proper clean-up personnel and equipment. For example, roof shingles in a pile would need to be approached differently than an illegal landfill with large volumes of C&D debris.

Preferred Personnel

Small volume sites: Public works staff and county trustee labor.

Large volume sites: Experienced public works staff, trained or experienced heavy equipment operators. Public works staff should be available to manually cleanup excess or blown away material that might be left over. Personnel that are trained in the operation or have a working knowledge of heavy machinery must be onsite to operate such machinery if necessary.

Appropriate Equipment

Small volume: Manual clean-up. Use of shovels, leather gloves, protective clothing, and reflective vests are recommended. Disposal trucks equipped with a hydraulic tailgate are also recommended. Manual clean-up efforts are recommended due to the maneuverability and capability that public works staff and county trustee labor possess.

Large volume: Coordinated efforts between heavy equipment and manual clean-up. The use of a brush truck with dump body is recommended during cleanup. In scenarios where a brush truck is not available, a knuckleboom, front-end loader with jaw, or tracked excavator with grapple can be used as needed. In the event that a brush truck with dump body is not available, the use of 30-cubic yard or greater roll-off, or dump trucks can be used for the storage and transportation of materials.

Health and Safety Concerns

Direct skin exposure to sharp objects in debris can potentially pose serious health hazards leading to skin lacerations and susceptibility to dangerous bacteria or chemicals.

Disposal Options

Type I or IV Landfills. If possible, public works staff should separate and recycle all salvageable C&D debris. The most common material to be recycled includes steel, aluminum, and wood. Salvageable debris can be separated and taken to local reuse or recycling facility. Disposal costs for C&D materials at landfills in the North Central Texas region range between \$5 and \$13 per cubic yard depending on the type of material.

BULKY ITEMS AND WHITE GOODS

General Description

Bulky items are large illegally dumped materials such as furniture (i.e. couches, tables or chairs) and appliances/white goods (i.e. washers, dryers, or refrigerators). Bulky items are characterized as heavy and of considerable size; therefore, clean-up options are determined by the quantity of material in a specific area.

Preferred Personnel

Small volume sites: Public works staff, county trustee labor. Personnel must be able to assist lifting heavy objects, however, it is recommended that staff work together to lift material.

Large volume sites: Experienced public works staff. Must be able to operate heavy machinery as well as lift heavy objects if needed.

Appropriate Equipment

Small volume sites: Manual clean up. Use of dollies, leather gloves, protective clothing, reflective vests and large disposal trucks and trailers equipped with hydraulic tailgates are recommended.

Large volume sites: Coordinated effort between heavy equipment and manual clean up. The use of a brush truck with dump body is recommended during cleanup to remove the bulky items and white goods. In scenarios where a brush truck is not available, a knuckleboom or a front-end loader with jaw can be used as needed. In the event that a brush truck with dump body is not available, the use of 30-cubic yard or greater roll-off, or dump trucks can be used for the storage and transportation of materials.

Health and Safety Concerns

Lifting heavy objects improperly can result in injury. White goods and bulky items also have the potential to act as a habitat for rats or other pests.

Disposal Options

Type I or IV Landfill. If material is reusable, it should be donated to local reuse facility. Otherwise white goods should be taken to recycling facility where they can be processed for recycling.³² Disposal costs for bulky items and white goods at landfills in the North Central Texas region range between \$28 and \$32 per ton.

SCRAP TIRES

General Description

Scrap tires are described as car/truck, semi-truck, or heavy equipment/agricultural tires that have been discarded illegally. The size of the tire, quantity and breadth of dumpsite area are all factors that directly influence clean-up strategies. Substantial scrap illegally disposed tire dumpsite are not uncommon in rural or unincorporated areas of counties.

Preferred Personnel

Areas throughout the State of Texas have seen an increase in the number of illegally dumped tires. Illegally disposed tire dumpsites often require large clean-up efforts from road crews and trained equipment operators. The following table will provide information on the types of commonly illegally dumped tires and the recommended personnel to handle varying quantities of illegally dumped tires.

Table B.1 – Recommended Tire Clean-up Personnel

Tire Type	Quantity	Personnel
Car (Approximately 20 lbs.)	<50	Road crew
	50-1,000	Road crew, trained equipment operators
	1000+	Road crew, trained equipment operators
Semi-Truck (Approximately 100 lbs.)	<50	Road crew, trained equipment operators
	50-1,000	
	1,000+	
Equipment/Agricultural (Approximately 150 lbs.)	<50	Road crew, trained equipment operators
	50-1,000	
	1,000+	

Appropriate Equipment

Equipment used for clean-up and disposal efforts with regard to illegally dumped tires are outlined in the following tables:

³² Prior to disposal or recycling of refrigerators, CFC's should be properly removed by a trained individual.

Table B.2 – Recommended Tire Clean-up Equipment

Tire Type	Quantity	Clean-up Equipment
Car (Approximately 20 lbs.)	<50	Manual cleanup
	50-1,000	Front-end loader with bucket and jaw
	1,000+	Tracked excavator with grapple
Semi-Truck (Approximately 100 lbs.)	<50	Front-end loader with bucket and jaw
	50-1,000	Front-end loader with bucket and jaw
	1,000+	Tracked excavator with grapple
Equipment/Agricultural (Approximately 150 lbs.)	<50	Front-end loader with bucket and jaw
	50-1,000	Front-end loader with bucket and jaw
	1,000+	Tracked excavator with grapple

Table B.3 – Recommended Tire Disposal Equipment

Tire Type	Quantity	Disposal Equipment
Car (Approximately 20 lbs.)	<50	Pick up truck
	50-1,000	Roll-off truck
	1,000+	Semi-truck
Semi-Truck (Approximately 100 lbs.)	<50	Roll-off truck
	50-1,000	Roll-off truck
	1000+	Semi-truck
Equipment/Agricultural (Approximately 150 lbs.)	<50	Roll-off truck
	50-1,000	Semi-truck
	1,000+	Semi-truck

Health and Safety Concerns

The mismanagement of used tires can create significant environmental and human health problems for the local area. Tire fires are often difficult to extinguish and can cause air pollution and respiratory problems. In addition, tire piles are a haven for mosquitoes and rodents which can stimulate the onset of disease in local populations. Safety measures should always be taken when loading tires, because lifting heavy objects improperly can often result in back injury.

Disposal Options

All scrap tires should be disposed of at an authorized tire disposal facility or landfill. One alternative for local governments to address existing tire dumps is to use the State of Texas contract with RTG in Baytown to recycle tires that have been illegally disposed. This contract, which is available to local governments, became effective in September 2001 and expires August 31, 2005.

The contract price ranges from \$1.25 for a light duty passenger type tires to \$35.00 for a tractor/motor grade type tire. A minimum order of \$700 is required. The contract price includes pick up and transportation services. Once RTG receives the tires, the steel is removed and returned to the steel markets for reuse. The rubber component of the tires is shredded and granulated into two inch chips, which are then sold for use as tire derived fuel. In the fall of 2002, RTG expanded operations to include crumb rubber manufacturing. Some of the rubber derived from waste tires is now used to generate crumb rubber for resale.

BRUSH

General Description

Brush is generated from the clearing of trees or other naturally occurring woody objects. Examples of this include tree limbs and stumps, leaves, yard clippings, and bushes. Disposal options will vary based on the density of material dumped.

Preferred Personnel

Yard waste and brush: Road crew, county trustee labor, or volunteer/community groups

Tree limbs and stumps: Road crew with experience with heavy lifting and trained operators of heavy machinery.

Appropriate Equipment

Yard waste and brush: Manual clean up is the most appropriate for small volume sites. The use of protective clothing and eyewear, leather gloves, reflective vests, and work boots are recommended. Brush truck with dump body should be used in case of large volumes.

Tree limbs and stumps: Coordinated heavy equipment and manual pick up. Use of a brush truck with dump body should be used to pick up debris such as tree limbs or stumps. Manual cleanup of smaller debris should be separated for mulching in a wood chipper.

Health and Safety Concerns

Large tree stumps should be handled by heavy machinery whenever possible. Flying branches can be harmful to eyes. If chipper is operational onsite, damage to eyes could result from excess flying debris. Additionally, poisonous plants (e.g. poison ivy) can often be found in brush piles, leading to skin irritations or rashes for those in direct contact with these materials.

Disposal Options

Brush should be disposed of in a Type IV landfill. If debris is clean and separated, it should be sent to a nearby mulching/composting facility where the material can be ground in a wood chipper. Disposal costs for brush at landfills in the North Central Texas region range between \$5 and \$15 per cubic yard depending on width of material.

MEDICAL WASTE AND HAZARDOUS MATERIAL³³

General Description

Medical Waste: Wastes from hospital and health care facilities and include infectious materials, human pathological wastes, human blood products and used needles. Medical waste is also referred as pathological or infectious wastes.

³³ These types of wastes are grouped together due to the similar clean up approach that must be taken.

Hazardous Waste: Solid waste with properties that make them dangerous or capable of having a harmful effect on human health and the environment. Under federal law, hazardous wastes are specifically defined as wastes that exhibit a specific characteristic (toxicity, flammability, ignitability or infectious) or are specifically listed as a hazardous waste in the Subtitle D regulations. Hazardous wastes can be generated from households or businesses.

Preferred Personnel

Medical and hazardous wastes should be handled with extreme care due to the volatility of the material. Trained hazardous materials (Haz-Mat) personnel should be notified of any illegally dumped material.

Appropriate Equipment

Equipment will vary with the quantity of material at a dumpsite. Experienced and trained hazardous material staff should make the determination of appropriate equipment to be used.

Health and Safety Concerns

Direct skin contact with hazardous materials and medical wastes should be avoided. Materials may be unstable and could release toxic fumes. Inhaling gases released from chemicals or materials should be avoided at all times. All personnel should be notified of the risks associated with exposure prior to cleanup, and provided the appropriate safety equipment.

Disposal Options

All hazardous or medical wastes should be properly disposed of at a TCEQ authorized disposal facility. During the storage and/or transportation of hazardous materials, materials should be stored in a cool, dry and well ventilated area away from acids or other chemicals that may have an adverse reaction.

A listing of medical waste disposal facilities can be accessed on the TCEQ website at http://www.tnrc.state.tx.us/permitting/r_e/eval/we/med_waste.html.

LIQUID WASTES

General Description

A solid, semisolid, or liquid wastes generated from a wastewater treatment plant³⁴, restaurant or other businesses. In many scenarios described by city/county staff, it is common for biosolids, grease or grit trap wastes to be directly pumped onto a rural or county roadside. Moreover, biosolids, grit and grease traps are also frequently dumped in 55-gallon drums or other containers.

Preferred Personnel

Contained: Public works staff.

³⁴ Biosolid is another term for sewage sludge.

Liquid Discharge: Trained or experienced equipment operators, public works staff.

Appropriate Equipment

Contained: Manual cleanup. All personnel should wear protective clothing and gloves. Keeping liquid waste in its container is essential to the success of a liquid waste clean-up operation. After containers are removed, soil should be tested for any excess hazardous or liquid wastes resulting from runoff or splatter during illegal discharge.

Liquid Discharge: After identifying the illegal dumpsite, front-end loaders with buckets should be immediately used to create a levee separating contamination from stormwater systems. Excavators or other earth moving equipment can be used to remove materials. Anti-bacterial solvents and deodorizers should be used after contaminated materials are removed.

Health and Safety Concerns

Non-toxic liquid wastes pose a threat, because liquid wastes, either contained or discharged. They are often unknown and the potential for hazardous chemicals to be present is high.

For example, during the cleanup of a large illegal dumpsite, Tarrant County – Precinct 1 came into contact with a red, jelly like liquid waste located in four-gallon buckets. The Road Crew staff could not identify the material and called the Haz-Mat staff. Once the material was determined to be non-hazardous the Road Crew proceeded with the cleanup.

Disposal Options

All liquid wastes should be sent to a registered liquid solid waste facility, where those liquids can be turned into solid waste for proper disposal at a landfill. The average cost associated with grit and grease trap disposal is approximately \$0.15 - \$0.23 per gallon for grit trap waste and \$0.12 - \$0.15 per gallon for grease trap waste.

JUNKED VEHICLES

General Description

Junked vehicles are characterized as vehicles which have been abandoned by owner, illegal chop shop, or by third party hauler. Most often these vehicles are immobile or damaged in some manner.

Preferred Personnel

Road crew supervisor and tow truck operator.

Appropriate Equipment

Tow trucks vary with size of the vehicle. Standard size tow trucks should be used only for sedans or small trucks, flat bed tow trucks should be used for larger or four wheel drive trucks, semi-sized tow trucks should be used for school buses, recreational vehicles or larger vehicles.

Other considerations, which may affect equipment, include where vehicles are located. Based on our interviews with city and county staff, vehicles have been found in ravines, creek beds, or large ditches. These locations may impede the ability for a standard tow truck to remove vehicles. In these cases, larger semi-sized tow trucks with greater towing capacities should be used to retrieve vehicles.

Health and Safety Concerns

Health and safety concerns surrounding the cleanup of junked vehicles are minimal; when using proper equipment and safety procedures, however, one should proceed with caution when first approaching a junked vehicle since animals or other pests might be there.

Disposal Options

Vehicles, which have been removed, must be impounded for 30 days by the towing facility, after that time the towing facility has the ability to take the vehicle to a scrap dealer in the area.

USED MOTOR OIL

General Description

Oil that is derived from crude oil, as well as synthetic oil including those from coal, shale, or a polymer-based starting material; and non-polymeric synthetic fluids used as hydraulic or heat transfer fluids. Synthetic oils and crude derived oils are generally used for the same purpose and have relatively the same level of contamination after use.

Typically, used motor oil is illegally dumped in 55-gallon drums off rural roadsides. Based on interviews with city and county staff, motor oil is rarely discharged directly on to soil. For example, used motor oil is usually leaked from trucks or illegally dumped in containers.

Preferred Personnel

Contained: Public works staff, county trustee labor

Liquid Discharge: Public works staff, hazardous materials team

Appropriate Equipment

Contained: Manual cleanup. Use of protective clothing and eyewear, leather gloves, and reflective vests are recommended. Transportation and disposal of material can be achieved through the use of a pickup truck or trailer.

Liquid Discharge: After dumpsite is identified, front-end loaders should be used to levee the area to prevent contamination of stormwater systems.

Health and Safety Concerns

Public works crews should practice extreme caution when transporting used motor oils in vehicles. It is also important that clean-up crews not hose down areas where motor oil

dumping has occurred, because of the threat of pollution in nearby lakes, rivers and groundwater supplies may occur.

Disposal Options

All used motor oil should be disposed of at a TCEQ registered motor oil disposal facility.³⁵ The cost of disposing of small amounts of used motor oil in the North Central Texas region is at no charge up to a certain amount. Larger amounts of used motor oil may range up to \$0.72 per gallon at various facilities.

ASHES

General Description

Ashes are the results of burned organic or inorganic material including woody debris, residential and commercial wastes, construction and demolition debris.

Preferred Personnel

Public works staff, volunteer/community groups.

Appropriate Equipment

Manual cleanup. Use of shovels, bags, gloves, long sleeved shirts, goggles, reflective vests and steel toe boots are recommended to be worn at all times.

Health and Safety Concerns

Since the burned material is often unknown, it is difficult to judge the dangers associated with ashes. We recommend, however, clean up crews wear protective material at all times of the disposal process.

Disposal Options

Ashes may be disposed of at a Type I landfill. Disposal costs for ashes at landfills in the North Central Texas region range between \$28 and \$32 per ton.

DEAD ANIMALS

General Description

Any animal deceased and decomposing, including household pets, animals bred for fighting, cattle and deer carcasses derived from slaughterhouse operations.

Preferred Personnel

Experienced public works staff.

Appropriate Equipment

Manual cleanup. Use of protective clothing, shovels, gloves, and reflective vests. Leak proof disposal trucks or bags should always be used when transporting dead animals.

³⁵ A listing of these facilities can be found on the TCEQ website: <http://www.tnrc.state.tx.us/permitting/wasteperm/iwperm/>

Health and Safety Concerns

Dead animals should always be handled with proper safety equipment. Direct contact with dead animals may expose clean-up crews to bacteria dangerous to humans.

Disposal Options

Animal carcasses must be properly disposed of at a Type I landfill. Disposal costs for animal carcasses at landfills in the North Central Texas region range between \$28 and \$32 per ton.

ELECTRONIC WASTE (E-WASTE)

General Description

Electronic waste refers to discarded electronic equipment including computers, monitors, printers, televisions, stereo systems, video cassette recorders, and other electronic periphery.

Preferred Personnel

Public works staff, community/volunteer personnel.

Appropriate Equipment

Manual cleanup. Use of gloves, protective clothing and eyewear, and reflective vests are recommended. Disposal trucks or trailers should be used to transport all waste to landfills.

Health and Safety Concerns

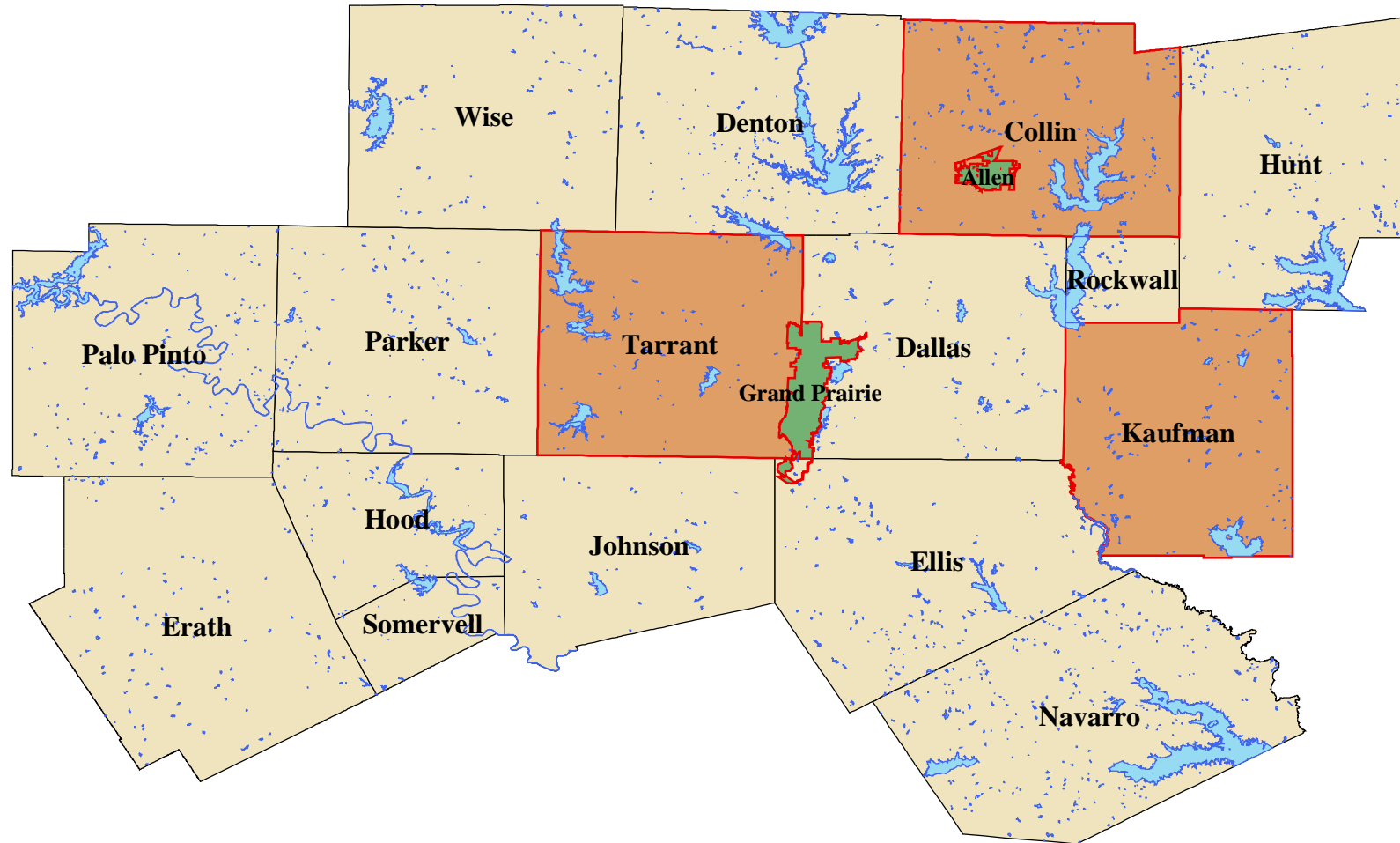
Health concerns related to short-term exposure to e-waste is negligible. During the disposal process however, there are many safety concerns workers need to be made aware of. This includes the possibility of direct exposure to sharp objects or chemicals.



Disposal Options

Type I Landfill. However, if material can be salvaged clean-up crews should separate good material and deliver it to an electronic reuse or recycling facility. Disposal costs for e-waste at landfills in the North Central Texas region range between \$28 and \$32 per ton.

APPENDIX C –CASE STUDY MAP

Appendix C - Case Study Map



-  Case Study Cities
-  Case Study Counties