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Advanced Acquisition of Right-of-Way: Best Practices and Corridor Case Studies

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Advanced Acquisition of Right-of-Way: Best Practices and Corridor Case Studies

Final Report

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Executive Summary

There is mounting pressure on state transportation agencies to expand road capacity to keep up with demand. The most expensive part of many transportation projects, especially roadway expansions, can be acquiring the rights-of-way (Williams and Frey, 2004). From 1988 to 2008, the Minnesota Department of Transportation (Mn/DOT) spent nearly \$800 million acquiring rights-of-way (ROW). When and how Mn/DOT acquires ROWs to expand roadways is an issue with important financial and non-financial ramifications.

One approach for acquiring ROW is a process called advanced acquisition. Advanced acquisition is acquiring land prior to project design approval, which is the traditional trigger for ROW acquisition (Mn/DOT, 2008). Recently, Barnes and Watters (2005) conducted a study that questioned the wisdom of advanced acquisition. The study examined the primary financial benefits of advanced acquisition, specifically lower ROW costs. They concluded that the growth rate of property values is *not* high enough to support advanced acquisition as a general strategy. They placed this in context by showing that the interest rate on a medium-term bond is greater than the average appreciation rate of real estate. The significance of this is that state transportation agencies would receive a better return on their money by investing in bonds than buying property early (Barnes and Watters, 2005). Barnes and Watters highlighted the need for a more detailed analysis that would go beyond evaluating county-wide appreciation rates. They suggested examining property adjacent to transportation corridors since these properties are more likely to be intensely developed.

The goal of this report is to evaluate Mn/DOT's current advanced acquisition practices and investigate the appreciation rate of parcels adjacent to transportation corridors. This report will address three major issues related to advanced acquisition. First, we assessed current advanced acquisition practices at Mn/DOT by surveying Mn/DOT district offices. Second, we conducted a survey of cities state-wide about the use of preservation tools to acquire ROW and strategies to improve the ROW process. Third, we investigated the claim that parcels adjacent to transportation corridors appreciate at a significantly different rate than the average parcel. We accomplished this by collecting property assessment data and calculating the appreciation rate for parcels adjacent to three corridors and comparing this to the appreciation rate of randomly selected parcels in the same county. We then used statistical analysis to evaluate which property characteristics are helpful in predicting properties that appreciate over 25% per year. Lastly, the findings from the two surveys and three corridors case studies were integrated into two recommendations.

Findings

Preservation Tools and the Need for Guidelines

We surveyed the eight Mn/DOT districts about advanced acquisition practices including: 1) the number of right-of-way purchases and reconveyances, 2) the use of preservation tools, and 3) the non-financial benefits. Reconveyance is the process used by the government to resell land that was purchased for ROW but not used. A general survey of all methods through which ROW can be preserved was necessary because the wisdom of advanced acquisition depends on substitutes.

Many of these substitutes are various tools that attempt to preserve right-of-way without purchasing it early.

There were three key findings. First, the amount of money spent in each district for right-of-way compared to the amount of ROW reconveyed by each district is skewed. Although the Metro District spends \$426 million, or 54% of all the money spent in Minnesota acquiring ROW, they reconveyed nearly 68% of the parcels. The number of parcels reconveyed in the Metro District suggests the need to investigate methods to acquire land more efficiently and minimize reconveyances. A caveat to these findings is that more investigation is needed to determine the reason for reconveyance. Land can be reconveyed due to excess takings (businesses wanting Mn/DOT to purchase their entire parcel) or purchasing more land than was needed. The database that was used for this analysis, REALMS, does not distinguish between these two types of reconveyance, and thus further analysis is recommended.

The second finding is that four out of eight districts use official mapping. Official mapping is the practice of denoting where future roadways are planned in zoning maps. The frequency with which this tool was used varies from three official maps in the last 20 years to three official maps in the last ten years. Despite this infrequent level use, five out of eight districts believe that if official mapping were implemented on a wider basis advanced acquisition would be more effective. The third finding is that five out of eight districts believe it would be beneficial to have guidelines about the use of preservation tools. Districts believe these guidelines would enable consistency in tool use between districts, provide steps on how to use the tool, and discuss pros and cons of each tool. The guidelines could also detail the stage of project development the tool can be used, such as during environmental review or project design phases.

Communication Between Mn/DOT and Cities

A second survey was sent to 34 cities and two counties in the state of Minnesota. From the surveys that were sent, 21 were returned, for a response rate of 68%. The major finding of this survey is the need for improved communication and coordination in the right-of-way process between cities, counties, and Mn/DOT. Out of the twenty-three respondents surveyed, nine were contacted by Mn/DOT about advanced acquisition. All of these nine respondents felt that the communication was cooperative and that there was a partnership between the city and Mn/DOT. Despite this positive finding, when respondents were asked for strategies to improve coordination on advanced acquisition, seven respondents cited better communication as their primary strategy. Many respondents suggested that communication should occur as early as possible, such as during initial roadway planning. This finding suggests that while there is good communication between the cities and Mn/DOT, communication could be enhanced to streamline the process.

Transportation Corridor Case Studies

To assess the wisdom of buying property through advanced acquisition, three case studies were developed. These case studies assessed the appreciation of properties adjacent to transportation corridors and compared it with a random sample of properties in the county. The case studies included Highway 36 in Washington County, Highway 52 in Olmstead County, and Highway 10 in Becker County.

The case study of Highway 36 included 380 properties adjacent to Highway 36 and 208 properties not adjacent. Properties adjacent to Highway 36 appreciated only slightly more than those not adjacent – 9% compared to 7.9%. Despite this small difference in average growth, the aggregate value of properties adjacent to Highway 36 is three times more than those in the control group in both 1996 and 2007. In 2007, for example, the total value of properties adjacent to Highway 36 was \$186.8 million whereas the value of properties not adjacent to Highway 36 was only \$66.6 million. Although adjacent properties appreciated more in the Highway 36 case, the Highway 52 and Highway 10 case studies yielded different results. In both Highway 52 and Highway 10, properties that were *not adjacent* to the corridor had a higher average growth rate than adjacent properties. Along Highway 52, adjacent properties appreciated 6.2% while non-adjacent properties appreciated 12%. A similar result was found along Highway 10, with adjacent properties appreciating 8.6% and non-adjacent appreciating 13.7%. These results show that being adjacent does not seem to be an important factor in determining the rate of growth. Although these numbers show the growth rate of each group, it is valuable to look at this data in finer detail. We restricted this finer grain analysis to Highway 36 because this is the only corridor with easily accessible information on subdivided properties and other covariates, such as acres and land use. Since these details are necessary for a finer level of analysis, Highway 52 and Highway 10 were not subjected to further analysis.

We analyzed the distribution of returns to further evaluate the appreciation of the properties in the Highway 36 case study. From 1996 to 2007, the 588 parcels in the Highway 36 case study appreciated \$154 million as a group. The top 25% of these parcels accounted for nearly 68% of the total dollar appreciation, or \$104 million dollars. Therefore the distribution of these properties is not normal, but skewed toward the right since a few properties make up a bulk of the appreciation. To better understand the characteristics of these 147 properties we used a binomial logit model, which examined the characteristics that are associated with properties that appreciate above 25% per year. The model had only one variable significant at the 1% level, which was whether a property had subdivided. The significance of this finding is that properties that are about to subdivide or undergo land use changes are the properties that should be purchased because they are likely to undergo rapid appreciation.

Recommendations

From the two surveys and three corridor case studies that were conducted, we have two recommendations for Mn/DOT regarding advanced acquisition. The first recommendation is to develop guidelines for the use of preservation tools. Currently, there is not a specific set of preservation tools that are used in all districts. Four out of the eight districts have no district specific guidelines or criteria regarding the use of certain preservation tools. Five out of eight districts believe it would be beneficial to have general guidelines about the use of preservation tools. Brief guidelines could be developed to increase awareness about numerous preservation tools that are available and when they should be used.

The second recommendation is to develop a monitoring program to keep track of subdivisions and land use changes along transportation corridors. This program will need to monitor parcels adjacent to transportation corridors in the Minneapolis-St. Paul Metro Area that are planned for expansion in the next 10-15 years. Tracking the zoning of these parcels would allow Mn/DOT to know if a developer or property owner is attempting to subdivide a parcel, providing the

opportunity to buy the parcel before it is developed. This tracking and purchasing of properties with high potential appreciation will help to avoid higher right-of-way costs later. This recommendation is supported by the Highway 36 binomial logit model which showed subdivision as the only significant variable in predicting appreciation over 25% per year. Empirical evidence is only available for Minneapolis-St. Paul, but theoretically it would make sense to implement a monitoring program throughout Minnesota. Further study would help to determine the usefulness of a monitoring program in areas outside the Twin Cities.

1 Introduction

1.1 Historical Background

As congestion increases in major metropolitan areas, there is mounting pressure on state transportation agencies to expand road capacity to keep up with demand. The most expensive part of many transportation projects, especially roadway expansions, can be acquiring the right-of-way (Williams and Frey, 2004). From 1988 to 2008, Mn/DOT spent nearly \$800 million acquiring rights-of-way (ROW). When and how Mn/DOT acquires ROWs to expand roadways is an issue with important financial and non-financial ramifications.

One approach for acquiring ROW is through a process called advanced acquisition. Advanced acquisition is the process of acquiring land prior to project design approval, which is the traditional trigger for ROW acquisition (Mn/DOT, 2008). If the necessary, advanced acquisition can even occur before environmental review is completed. Advanced acquisition can be used when the project schedule needs to be accelerated or for projects that involve a total taking of property. Figure 1.1, in contrast to advanced acquisition, shows the regular ROW acquisition process:

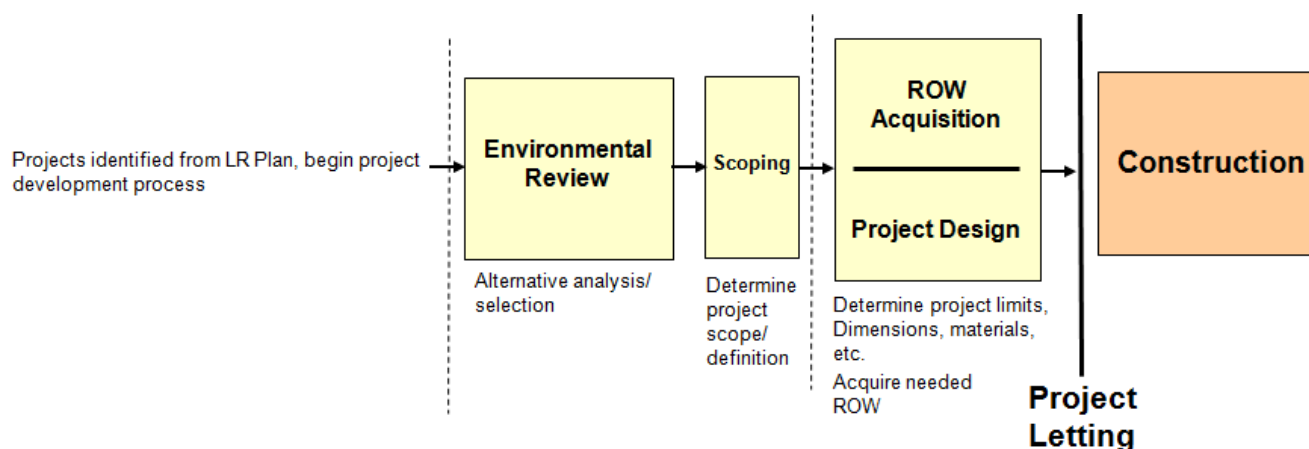


Figure 1.1: Mn/DOT Project Development Process

Source: Mn/DOT, 2008a

Recently, Barnes and Watters (2005) conducted a study that questioned the wisdom of advanced acquisition. The study examined the primary financial benefits of advanced acquisition, specifically lower ROW costs. They concluded that the growth rate of property values is *not* high enough to support advanced acquisition as a general strategy. They placed this in context by showing that the interest rate on a medium-term bond is greater than the average appreciation rate of real estate (Barnes and Watters, 2005). The significance of this is that state transportation agencies would receive a better return on their money by investing in bonds than buying property early. Their findings were based on evaluating county-wide appreciate rates in the state of Minnesota. These findings are highlighted in Table 1.1 on the next page, which show that from 1960 to 1990, home prices and farmland appreciated less, on average, than the bond rate and return from the stock market:

Table 1.1: Historical Returns on Housing and Other Assets

Source: Barnes and Watters, 2005

	1960s	1970s	1980s	1990s	Average
Inflation adjusted house price increase	0.9%	4.3%	-1.1%	2.6%	1.7%
Nominal house price increase	3.8%	8.3%	4.5%	6.7%	5.8%
Nominal US farmland	5.3%	14.2%	-0.8%	4.8%	5.7%
Nominal federal 5-year bond rates	5.1%	7.8%	10.7%	6.1%	7.4%
Nominal stock market total returns (S&P 500)	7.8%	6.2%	16.4%	18.4%	12.1%

Barnes and Watters highlighted the need for a more detailed analysis that would go beyond evaluating county-wide appreciation rates. Parcels adjacent to transportation corridors may appreciate at a different rate than the average parcel. Adjacency to a transportation corridor may affect development patterns and increase the likelihood of intensive development. A study that contradicts Barnes' results comes from a recent analysis of the Right-of-Way Acquisition Loan Fund (RALF) in the Minneapolis-St. Paul metropolitan area. A 2008 analysis of this revolving loan fund found that the loan fund generated \$33 million in savings by decreasing the cost of ROW acquisition (Detrick, D. Estimating Savings from RALF Program in Metro Area. Metropolitan Council. January 11, 2008). Barnes' findings suggest that buying property early does not pay off, but the RALF study shows that advanced acquisition might be effective at reducing costs of ROW acquisition. These contradictory results led us to conclude that further analysis is needed to determine if advanced acquisition is beneficial.

1.2 Research Goals

The goal of this report is to evaluate Mn/DOT's current advanced acquisition practices and investigate the appreciation rate of parcels adjacent to transportation corridors. The first goal in this analysis was to develop a careful accounting of the costs and benefits of advanced acquisition. The most important benefits include potentially reduced ROW costs, fewer forced sales and a simplified planning process. The appreciation rate of property should be compared to the opportunity cost of capital when making purchasing decisions. A proxy for the opportunity cost of capital is the bond rate. Therefore, the benefit of reduced ROW costs only exist if the rate of appreciation for purchased land is greater than the bond rate. These pros and cons of advanced acquisition are discussed further in section 1.3 on costs and benefits of advanced acquisition. The second goal in this analysis was to understand Mn/DOT's current and historic practices. Evaluating historic and current right-of-way practices was achieved by administering two surveys, one to Mn/DOT districts and one to cities and counties in Minnesota. The third step in this analysis was to develop a set of case studies to evaluate appreciation rates of parcels along transportation corridors in Minnesota. We will also examine what property characteristics contribute to rapid appreciation with statistical analysis. Lastly, the findings from the two surveys and three corridors case studies are integrated into a set of two recommendations.

1.3 Costs and Benefits of Advanced Acquisition

A general discussion of the costs and benefits of advanced acquisition is needed before delving into the survey results and corridor case studies. The primary benefit of advanced acquisition is that it can reduce the cost of acquiring right-of-way. This is especially true if land can be bought before it has been improved, such as buying a vacant parcel before it is developed into a

commercial property (Barnes and Watters, 2005). Another benefit is that by purchasing ROW early or having it controlled, project delivery can be accelerated and opposition can be minimized.

There are, however, three important costs to advanced acquisition. First, if the rate of land appreciation is less than the bond rate then buying a parcel early is more expensive than buying it later. In this case, advanced acquisition would increase ROW acquisition costs. Second, a parcel purchased for right-of-way must be managed and maintained until used. Unless construction is imminent, the city is usually the interim property manager. Third, if the project that required ROW is cancelled or changed significantly, the ROW may need to be sold to the previous owner or city. This reconveyance often occurs at a much lower price than was paid for the land, and often the land is reconveyed for free. Thus, there is a probability that the potential benefits of advanced acquisition may be negated by project changes or cancellation.

A major constraint to advanced acquisition can be funding. To help ameliorate funding issues, the Minnesota Legislature created a program called the Right-of-Way Acquisition Loan Fund (RALF). This revolving loan fund is administered by the Metropolitan Council to provide funding to localities for acquiring land in advance of when it would be needed for highway expansion. The RALF is funded through a regional property tax in the seven county Minneapolis-St. Paul metropolitan area (Metropolitan Council, 2000). The idea behind the RALF was to allow localities to buy property before it became intensely developed. The RALF recently went through an evaluation which showed that \$54.2 million was loaned to 16 communities between 1983 and 2007. The estimated future value of the land acquired through the RALF program from 1983 to 2007 totaled \$87.7 million, which implies a total savings of \$33.5 million. These savings were estimated by subtracting the original loan amount for land acquisition from the estimate of the land's future value. Specific properties that were acquired under RALF were not analyzed. To estimate changes in the value of land acquired with RALF loans, increases in market values were measured for each community using 1995 and 2007 parcel data. Thus savings estimates were based on property appreciation by community, specifically increases in market values for communities with RALF loans. This method differs from the county-wide appreciation rates used by Barnes and Watters. The significance of the RALF program is that it allows communities to engage in more proactive planning by borrowing money to ensure that rights-of-way are preserved. The benefits of this are that communities do not have to wait till they have the money to purchase rights-of-way, which, as the study shows, saves money (Detrick, D. Estimating Savings from RALF Program in Metro Area. Metropolitan Council. January 11, 2008). In addition to the RALF, there are numerous other preservation tools that can be used to preserve ROW which are discussed briefly in Appendix A.

1.4 Economic Rationale for Advanced Acquisition

The wisdom of advanced acquisition depends on the strength of the theoretical rationale. The theoretical rationale for advanced acquisition is based on the efficiency of markets and the ability of markets to rapidly incorporate new information into prices. These views are best summarized by Princeton economist Burton Malkiel (1973) in his book [A Random Walk Down Wall Street](#). The basic argument, for which there is empirical evidence in several markets, is that, without special knowledge, it is almost impossible for an individual to consistently earn returns above the market average. In the case of advanced acquisition, this would mean that it is extremely hard, if

not impossible, for the average person to consistently buy properties that will appreciate in value faster than the regional average. This point is consistent with Barnes' findings that the appreciation rate of the average parcel is below the medium-term bond rate (Barnes and Watters, 2005). Malkiel's findings are also echoed by a transportation researcher who points out that the problem with transportation improvements is that once knowledge of the improvements becomes public, the land market begins to adjust (McDonald, 1995). The implication of this is that as soon as new information is available, it is immediately incorporated into the price of a property, making it difficult to "beat the market." Since economic theory dictates that the information is immediately incorporated into the price, it was difficult to investigate ROW price increases in the various phases of project development. In summary, Barnes' findings and the conventional economic wisdom raise doubts about the merits of advanced acquisition.

That said, Mn/DOT is not the average market participant described in Malkiel's book. Unlike the average market participant, Mn/DOT has information about which roads will be expanded. It is this knowledge that provides a rationale for using advanced acquisition. To effectively make predictions, Mn/DOT decision makers need a careful understanding of how roadway expansions and distance from a highway affects the property values of different types of land uses. Also, Mn/DOT needs to have a careful and consistent plan for deciding when to use advanced acquisition for properties if they are to consistently do better than the market average. The surveys and corridor case studies in this paper will discuss whether a consistent methodology for advanced acquisition already exists.

Currently, Mn/DOT has broad discretion about how far in advance of construction to acquire a right-of-way. Mn/DOT has a right-of-way manual that describes the policies and procedures involved in advanced acquisition, such as direct purchases, negotiations, closing and payment and condemnation (Mn/DOT, 2007). While the manual sets out *how* to conduct advanced acquisition, it does not provide guidance for *when* its use is advisable. There are some guidelines in the Highway Project Development Process Handbook, but these guidelines do not help decision makers weigh the importance of various factors, such as property type and dollar savings (Mn/DOT, 2008a). This lack of a detailed method for dealing with advanced acquisition decisions is another impetus to investigate the current practices and potential costs and benefits of advanced acquisition.

1.5 Structure of Report

This report will address three major issues related to advanced acquisition with separate chapters devoted to each. The first chapter will investigate current advanced acquisition practices at Mn/DOT. This is accomplished by surveying the eight Mn/DOT district offices. In addition to documenting current practices, the efficacy of these practices will be evaluated by identifying what fraction of ROWs acquired through advanced acquisition were reconveyed to former property owners or cities. The second chapter will investigate preservation tools that are used by cities to acquire ROW and strategies for improving the ROW process. A sample of 34 cities and two counties in Minnesota were surveyed about the most effective preservation tools and strategies to improve coordination in advanced acquisition. The third and final chapter examines three transportation corridors to see if adjacent properties do appreciate more rapidly than those not adjacent to a highway. Statistical analysis was conducted to develop a systematic way for Mn/DOT to identify which parcels, if any, are good candidates for advanced acquisition.

2 Survey of Mn/DOT Districts

The goal of this chapter is to survey of Mn/DOT Districts to assess current practices and investigate if there are any problems or areas where improvements are possible. For Mn/DOT to select properties that appreciate rapidly, they need to be careful and consistent in evaluating and purchasing properties with advanced acquisition. We surveyed the eight Mn/DOT districts about advanced acquisition practices, including the number of right-of-way purchases and reconveyances, use of preservation tools, and non-financial benefits. All eight Mn/DOT districts responded to the original survey, sent via e-mail on February 8, 2008 and a follow-up survey was sent out on June 30, 2008. A copy of these surveys is available in Appendix B. A map of the location of the eight districts is shown in Figure 2.1.

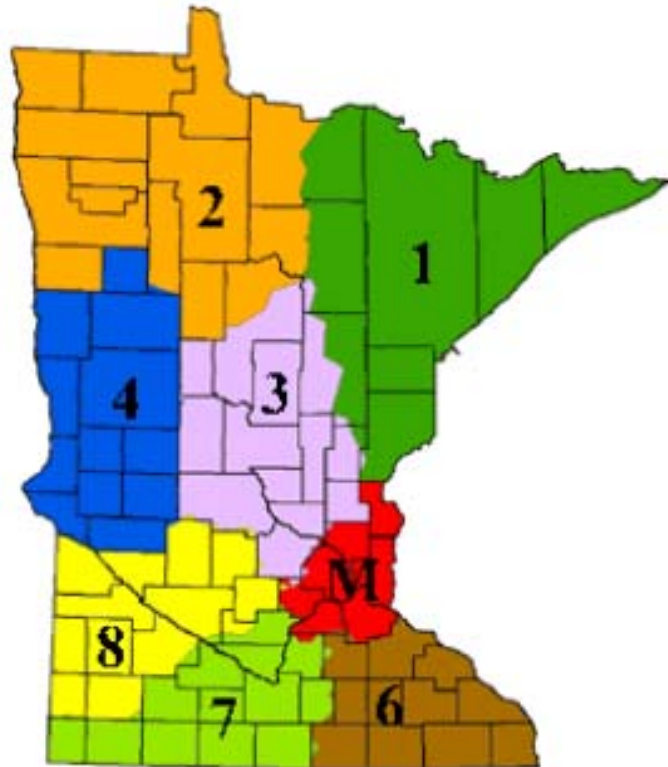


Figure 2.1: Map of Mn/DOT Districts

Source: Minnesota Department of Transportation, 2008b

2.1 Right-of-Way Purchases and Reconveyances

One of the goals of the survey was to summarize right-of-way activity in the state of Minnesota over the past 20 years and to assess the number of reconveyances. A reconveyance is a process where land that was purchased for ROW is resold to the original landowner or the city that has jurisdiction. Reconveyances occur because ROW that was acquired is no longer needed due to project cancellations or because excess ROW was acquired. Projects documented in the survey were completed between January 1988 and December 2007, and ranged in size from over \$2-3 million dollars in urban areas and over half a million in rural areas. The data on these projects was obtained from the Mn/DOT Right-of-Way Plats and Maps Database (REALMS). The data obtained from REALMS shows the number and dollar value of rights-of-way purchased, districts

where ROW was acquired, the number of projects per districts, the percentage of total ROW costs spent in each district and the average ROW costs per project over the last twenty years. This information is summarized in Table 2.1.

Table 2.1: Right-of-Way Statistics, January 1988 – December 2007

Source: Mn/DOT REALMS Database

District	Number of Projects	ROW Costs	Percentage of Total ROW Costs	Average. ROW Costs Per Project
1	16	\$34,778,458	4.4%	\$2,173,654
2	3	\$5,198,190	0.7%	\$1,732,730
3	38	\$121,633,284	15.3%	\$3,200,876
4	6	\$22,659,318	2.8%	\$3,776,553
6	18	\$128,840,083	16.2%	\$7,157,782
7	10	\$23,648,467	3.0%	\$2,364,847
8	6	\$32,515,829	4.1%	\$5,419,305
Metro	56	\$425,984,309	53.6%	\$7,606,863
Total	153	\$795,257,937	100%	\$5,197,764

The table summarizes projects where the right-of-way was acquired and the project was completed. Table 2.1 highlights that nearly 54% of all ROW funds are spent in the Metro District. The other two districts that comprise a majority of the spending are District 6 Rochester/Owatonna and District 3 Baxter/St. Cloud with approximately 16.2% and 15.3%, respectively. Another observation is that District 6 and the Metro District have approximately the same average right-of-way costs per project at \$7.1 million for District 6 and \$7.6 million for the Metro District. These results are unexpected since there is a large difference in population between the largest city in these districts – the Twin Cities in the Metro District has 3 million more people than Rochester in District 6.

Another important component of advanced acquisition is reconveyance. Reconveyance is important to analyze because it is indicative of how well Mn/DOT's current purchase practices are at evaluating parcels for advanced acquisition. This information was collected to evaluate the magnitude of reconveyances and their spatial concentration. As discussed earlier, reconveyances occurs because ROW that was acquired is no longer needed due to project cancellations or because excess ROW was acquired. Reconveyance information from 1993 to 2007 was collected from the REALMS database. Since 1993, 68% of all reconveyances took place in the Metro District and thus are spatially concentrated in the Minneapolis-St. Paul metropolitan area. This finding is unexpected since the Metro District only comprises 54% of the total expenditures on ROW. A similar finding is true for District 3, which accounts for 15.3% of all the funding for ROW and reconveyed 22.6% of the total number of parcels. We focused on further analyzing the Metro District since this district had the largest discrepancy between money spent and number of parcels reconveyed.

Most of the property that was reconveyed in the Metro District is from projects that have already been completed, so the remnant parcels were sold back to avoid maintenance and put land back on the tax rolls. The number of parcels reconveyed in the Metro District suggests that the parcels

that are bought for highway projects may be too large or that many projects are cancelled. A caveat to these findings is that more investigation is needed to determine if the difference between where the money is spent and where land is reconveyed is due to excess takings or purchasing more land than was needed. Excess takings occur when businesses sell their whole property to Mn/DOT rather than the amount needed. This is different from when Mn/DOT purchases more land than is necessary and has to reconvey the extra land. The database that we used for this analysis, REALMS, did not distinguished between these two types of reconveyance, and thus further analysis is recommended. Another factor to take into account is that land is more likely to be reconveyed in the Metro District than other districts in Minnesota. This is due to the price premium of land in the metro area, which encourages land to be reconveyed for other uses. In many of the rural districts, there is not as much pressure to reconvey land since there is not a price premium. Table 2.2 below summarizes the reconveyance data by district:

Table 2.2: Reconveyance Statistics, 1993 to 2007

Source: Mn/DOT REALMS Database

District	Number of Parcels Reconveyed	Total Dollars	Percentage of Total Number of Parcels Reconveyed
1	9	\$180,838	3.6%
2	0	\$0	0.0%
3	57	\$644,917	22.6%
4	0	\$0	0.0%
6	3	\$65,160	1.2%
7	6	\$32,500	2.4%
8	5	\$53,000	2.0%
Metro	172	\$8,224,060	68.3%
Total	252	\$9,200,475	100.0%

We wanted to further investigate why the Metro District only accounts for 54% of the right-of-way expenditures and nearly 68% of the parcels reconveyed. To analyze this trend we examined the three projects in the Metro District that reconveyed the greatest number of parcels. These projects are listed in Table 2.3. The three projects are County-State Aided Highway (CSAH) 6 to Wayzata Blvd, CSAH 4 to .25 miles of Wallace Road and the Hiawatha Light Rail Line. These projects reconveyed 72, 29, and 12 parcels, respectively. This is 113 parcels, or 66% of the properties that were reconveyed in the Metro District over this time period. This finding suggests that not every project in the Metro District reconveys a significant number of parcels, but that these three projects are skewing the average.

Table 2.3: Metro District- Projects with Reconveyed Parcels, 1993 to 2007

Source: Mn/DOT REALMS Database

Project SP	Trunk Highway	R/W Costs	County	Location	Number of Parcels Reconveyed
2713-75	12	\$52,485,546	Hennepin	CSAH 6 to Wayzata Blvd	72
2762-12	312	\$6,768,408	Hennepin	CSAH 4 to 0.25 Mi W of Wallace Rd.	29
2724-111	55	\$8,418,665	Hennepin	Hiawatha Corridor Mass Transit	12

2.2 Analyzing Preservation Tools

The second goal of this survey was to document all the methods through which ROW can be preserved since the wisdom of advanced acquisition depends on the usefulness of alternatives to advanced acquisition. This is important because we wanted to see how and if Mn/DOT is using alternatives to advanced acquisition, and also document different tools that are used, variation by district and the pros and cons of each tool. These preservation methods were summarized in the research conducted by Barnes and Watters (2005) on the financial benefits of early right of way acquisition. The tools that can be used to preserve right-of-way are generally known as corridor preservation strategies. “‘Corridor Preservation,’ or CP, refers to any techniques that state and local governments use to protect existing transportation corridors or planning corridors from inconsistent development, in an effort to minimize negative environmental, social, or economic impacts” (FHWA, 2000).

The preservation tools discussed in the survey fell into three major groups: planning/zoning, access management and acquisition. The most frequently described tool in the planning/zoning category is official mapping, which was described by five out of the eight Mn/DOT districts. Official mapping is denoting in zoning maps where future roadways are planned. This is beneficial because it gets government agencies, cities, counties, and private developers on the same page about the future transportation network. The Mn/DOT districts thought that the benefits of this tool range from local zoning and government support, to clearer expectations if a corridor has been mapped, gives landowner notice of future plans, opportunity for a protective buy, and less future conflict. While the benefits of official mapping can be great, they are not without costs. Some of the costs that Mn/DOT districts highlighted are projects being delayed or cancelled, and tying up money needed for other projects. A property can be officially mapped, but a local government or the state must have funding to purchase “officially mapped property” when it becomes available. If funding is not available, the money and effort spent on an official map produced no benefit. Also, creating an official map may mean that a local agency may need to acquire land earlier than planned. The reason for this unplanned acquisition is that if a developer wants to develop a parcel that is officially mapped, Mn/DOT has 90 days to buy land from the developer if it wants to preserve the land. Often local governments are willing to create an official map, but they want a guarantee from Mn/DOT that if they acquire land using the official map, they will be reimbursed in a relatively short period of time, usually within a year. Other risks in adopting an official map can involve changing Mn/DOT priorities, which can create issues of trust and follow-through on the part of cities and counties. As the section on reconveyance discussed, one major disadvantage of official mapping is that the projects may never be completed, which means the property needs to be reconveyed.

Another frequently mentioned preservation tool in the survey is dedicating rights-of-way in plats. This tool, which falls into the planning/zoning category, helps local developers and communities share in responsibility of growth, impacts from growth, and infrastructure needs. Although all cities have subdivision regulations that require dedication of ROW, this tool was only discussed by two districts. These regulations help maintain clear expectations of what land will be acquired if a highway gets built. The use of this tool varied from seven times per year in one district to ten times per year in another district.

The second set of tools discussed in the survey is those dealing with access management. These tools include incorporating access management principles (e.g., intersection spacing, median opening spacing and driveway allowance) into corridor plans, the driveway permitting process, and the acquisition of access rights (or access control). Access control “is a ‘*property*’ right Mn/DOT acquires from adjacent landowners that restricts ingress or egress from the abutting property to the trunk highway” (Mn/DOT, 2008a). The advantages of these tools are that they allow coordination with local agencies and developers. The acquisition of access rights was mentioned by two districts and the use varies from six parcels a year in one district to two parcels per year in another district.

The third set of tools discussed in the survey is those dealing with acquisition. These tools range from using the RALF, advanced purchases of ROW, to protective buys. A protective buy is also known as a hardship acquisition, which is when there is an undue burden on a property owner. These were the tools that were least mentioned on the survey. Other tools that were only mentioned once were modifying highway design, using the footprint concept, and using overlay districts.

Four out of eight districts described preservation tools that are only used in certain situations, such as for early acquisition and hardship acquisition. A hardship acquisition is early acquisition of property when it causes an undue burden on the property owner. This burden must be documented on the basis of health, safety, or financial reasons (Mn/DOT, 2007). An advantage of this type of acquisition is that ROW is available early and Mn/DOT is able to assist landowners who want to sell early in the process or are in a difficult financial situation. The limitation to this tool is that it requires an approved layout. Another tool only used in specific situations is an overlay district, which is only used in interchange areas and for protective buys when there is a hardship request. Overlay ordinances have also been used on corridors to address changes in land use over time (e.g., City of Hutchison). Many of the preservation tools discussed in this report, such as access management and various zoning and planning tools are used on a case by case basis. The frequency of tool usage varies because getting buy in from cities and locals is crucial to effectively using preservation tools.

Through this survey we found that the most important factor that determines the variety and frequency of tool use is the number of projects with ROW components. The four Mn/DOT districts that have completed at least 10 projects with a ROW component over the past twenty years use a greater variety of preservation tools than those districts that have completed less than ten projects over this time period.

2.3 Preservation Tools to Implement on Wider Basis

Five out of the eight districts believe that if official mapping were implemented on a wider basis, the advanced acquisition process would be more effective. The districts believe that wider use and implementation of this tool would enable preservation of rapidly developing corridors. If the use of official mapping were to be expanded, there would need to be a clear guide on how to use the tool, priorities to help allocate funding and funding to purchase land as it becomes available. Both local government and developers can benefit from official mapping because it enables cities to plan for the future and for developers to get an idea what the transportation system will be like in the future. Out of the eight Mn/DOT districts, three districts have officially mapped one project since 1998 and one district has mapped three projects. Although many districts would like to see wider implementation of official mapping, a caveat many districts made is that the effectiveness and usage of official mapping depends on the level of funding.

Another tool one district discussed that could be implemented on a wider basis is the footprint template concept. This concept is similar to officially mapping in that the amount of land needed for a future transportation expansion or upgrade is estimated. The footprint template concept defines the amount of ROW needed for an interchange or roadway expansion, but is flexible so that additional ROW is not necessary. This tool allows the ROW acquisition process to start earlier in the design phase of the project development process (Stehr, R. Mn/DOT Guidelines for Determination of Construction Limits by using a “Footprint Template Concept” during the Project Development Process. Mn/DOT. January 7, 2002). Using this tool also allows more time to acquire property and for landowners to consider offers and plan relocations. Despite the similarities between official mapping and the footprint template concept, there are some differences. Official mapping is primarily used for future planning so that government agencies, cities, counties, and private developers can be on the same page about the future roadway expansions. The footprint template concept is used for current highway projects to estimate the size of ROW needed so acquisition can proceed more rapidly during the design phase of a project.

A majority of districts, four out of the eight, have no district specific guidelines or criteria regarding the use of certain preservation tools. One district develops guidelines or criteria for various tools on a case by case basis. Other districts have guidelines regarding overlay districts, official mapping, and RALF. When asked if it would be helpful if the Mn/DOT Central Office created general guidelines regarding the use of preservation tools, five out of eight districts said yes. These guidelines would enable consistency in tool use between districts, a guide on how to use the tool, and pros and cons of each tool. The guidelines could also describe in which phase of project development the tool could be used, such as in environmental review or project design. Many districts discussed how such guidelines should be generic enough to handle the difference between the Minneapolis-St. Paul metropolitan area and rural areas, and in handling special cases involving agriculture and tourism. There was an emphasis that these guidelines should present options and not be directives, and should allow districts to decide which of the various preservation tools to use.

2.4 Non-Financial Benefits

The third goal of the survey was to evaluate the non-financial benefits of advanced acquisition. These benefits are important because they are not always considered in the cost-benefit analysis.

Some examples of non-financial benefits include reducing risk and uncertainty, both for the government and for residents and businesses along the corridor. Another example is the government designating land in an official map that they intend to use for right of way. This helps direct private investment to land not included in the official map.

The four most frequently cited benefits that various districts consider when making decisions about advanced acquisition are positive community relations, simplified political process, less local disruption, and more control over project schedule. Other factors that were mentioned are environmental mitigation, aiding in complex relocation, and allowing more time to assist with the hardships of citizens. These are important benefits of advanced acquisition because even though they cannot be put into a cost-benefit analysis, they remain important factors to consider.

2.5 Future Challenges and Conclusion

When asked to describe the biggest challenge facing advanced acquisition, four out of the eight districts cite funding. One district highlighted the importance of funding tradeoffs, and the competition that occurs between a funding a project now and buying right-of-way for unfunded future projects. The two other categories of concern were environmental studies and existing state laws that limit advanced acquisition in certain situations. Environmental studies can slow down the right-of-way acquisition process and reduce the ability of districts to spend ROW resources to protect land from development. Other concerns that were not mentioned as frequently are obtaining layout approval and partnering with local governments.

The major finding of this survey is that there does not seem to be one set of preservation tools that is used in each district and that preservation tools could be better utilized. This finding is echoed in corridor preservation research that found “most communities lack a systematic program for preserving right-of-way that uses the full range of governmental powers and tools to their maximum advantage” (Williams and Frey, 2004). One action that would improve the use of preservation tools is to create guidelines for districts so they can better understand the uses for different tools.

3 Survey of Cities and Counties

This chapter summarizes the results from a survey that was sent to cities and counties in Minnesota. Cities and counties are important partners in the advanced acquisition process because they manage the property from the time of early acquisition until construction begins. Through the survey we were able to thoroughly documented tools that localities use for ROW acquisition and property management, and the nature of communication between different government entities. Cities were surveyed to give us their perspective on property management and corridor preservation strategies. The respondents of this survey were from a variety of specialties – from City Planners to Public Works Directors and Engineers.

This survey was sent to 34 cities and two counties in the state of Minnesota, with 24 from the Minneapolis-St. Paul metropolitan Area and 12 from the greater Minnesota. Since the survey requires some knowledge of long-term planning and transportation improvements, we only contacted select cities if they had an engineering, public works, and/or planning department. This requirement influenced the cities that were selected since some small towns do not have an engineering, public works or planning department. Most of the surveys were conducted by mail; however a few were telephone interviews. From the surveys that were sent, 23 were returned, for a response rate of 68%. Of the cities and counties that responded, 17 are located in the Minneapolis-St. Paul metropolitan area and 6 are from greater Minnesota. A copy of this survey is available in Appendix C.

3.1 Communication and Negotiation in Advanced Acquisition

Out of the twenty-three respondents surveyed, only nine respondents had been contacted by Mn/DOT regarding Advanced Acquisition. The respondents were eight cities that have at least 50,000 residents and one county. All nine respondents felt that the communication was cooperative and that there was a partnership between the respondents and Mn/DOT. These respondents that had been contacted about advanced acquisition said they had been given advanced notice. A caveat is that respondents are only given advanced notice if the project is in their jurisdiction. All nine also commented that they felt that the communication was cooperative and that there was a partnership.

3.2 Tools for Advanced Acquisition

3.2.1 Comprehensive Plans

Fifteen out of twenty-three respondents surveyed have a section in their comprehensive plan about roadway expansion. Most respondents agreed that the primary advantage of this is to encourage planning and increase communication. The comprehensive plan helps to identify where regional capacity improvements are needed but not necessarily planned for. Comprehensive plans also guide dedication of ROW and remind staff of the need for developer dedication. It also helps cities and counties communicate with Mn/DOT when a developer wants to develop property. Having a section in the comprehensive plan about roadway expansion can also be used to help maintain/preserve areas of planned corridor expansion, but this only works when development activity is in that city's or county's jurisdiction.

Although comprehensive plans are very effective in developing communities, they play a different role in communities that are fully built-out. Since fully developed communities are no longer growing in a way where they can acquire ROW through subdivision of land, they focus on redevelopment. As land is redeveloped, a city planning official tries to ensure that new development does not conflict with planned future roadway projects

3.2.2 Official Mapping

Official mapping is denoting on zoning maps where future roadways are planned, which allows Mn/DOT to be notified if parcels in proposed ROW are being purchased. This allows Mn/DOT 90 days to buy the parcel, and if they choose not to buy it the developer can continue with his or her development plan. This tool allows Mn/DOT and cities to acquire land before it gets developed, which is usually at a lower price.

Respondents were asked how extensively official mapping is used and how effective it is at preserving right-of-way. Fifteen out of the twenty-three respondents surveyed said they only periodically use official mapping. Out of 15, only one city commented that official mapping was used frequently and is effective. Respondents cited numerous reasons why official mapping is only used occasionally, such as lack of available funds, developers can demand acquisition causing acquisition for an unscheduled improvement, and the tool can preserve proposed roadways but land rights are still needed. One jurisdiction believed that official mapping is only slightly better than the notification process and another commented that the RALF is not adequate for purchasing property early. Another city commented that official mapping only discourages development, but does not prevent it. Also if a parcel is officially mapped, the price goes up because investors and speculators know improvements will be made there. Out of 15 respondents, three cities had never used official mapping. The reason this tool is not used is some of the communities surveyed are fully developed and some are fringe communities that are not yet feeling the pressure of development.

3.2.3 Land Development and Subdivision Regulations

Most cities and counties have subdivision regulations to implement their comprehensive plan and promote growth and development of necessary infrastructure. Subdivision regulations are valuable since the regulation *may* require a reasonable dedication of ROW for future road expansion. The dedication must be in proportionality to the impact of the development. This proportionality or essential nexus between the regulation and the legitimate public interest has not been clearly defined with regards to developers dedicating land for future Trunk Highway expansions. The benefit of the new, wider highway may not be a benefit to the developer. See *Dolan v. City of Tigard* and *Nollan v. California Coastal Commission*.

To assess the degree that subdivision regulations help preserve ROW we asked respondents to describe the benefit of this tool and methods to improve these regulations. Nine out of the twenty-three respondents surveyed described land development and subdivision regulations as their primary tool to preserve right-of-way. These communities varied from small towns and fringe communities to those with populations of at least 50,000. One jurisdiction noted that land development and subdivision regulations greatly help in preserving ROW, but it could help if minimum standards were established. One issue with subdivision regulations is that a city can get a “reasonable” dedication, but it is difficult to know what is reasonable. A fully-built out city

commented that these tools do not contribute much to preservation in fully developed areas since there is no land left to subdivide.

3.3 Role of Cities and Counties in Advanced Acquisition Process

The role that cities and counties have in facilitating the advanced acquisition process is not one-sided, but includes regulations, coordinating with Mn/DOT, facilitating negotiations, and proactive planning. We asked various jurisdictions to list the steps they would take to coordinate the acquisition of Right-of-Way and avoid force sales. The three most frequent responses were:

- **Regulations:** Require dedication of ROW from property owners being approved for subdivision and proper amount of ROW in redevelopment.
- **Proactive Planning:** Be proactive and contact property owners early about voluntary sale. Cities should also be aware when land becomes available on the open market.
- **Communication:** Foster open communication between government entities and affected property owners. Cities can help to facilitate communication between property owner and Mn/DOT and work with Mn/DOT on design reviews, public meetings and council approval.

3.4 Tax Losses

To understand how the respondents felt about tax losses from advanced acquisition, we asked them to discuss how concerned they are about these tax losses. Tax loss can be a real concern for jurisdictions since land purchased for right-of-way becomes tax-free. This removes money from local government coffers because the land that was producing taxes is no longer on the tax rolls. One limitation of this survey is that we only surveyed cities and counties and did not survey entities that would receive these tax dollars, such as schools.

The attitude towards tax loss varied greatly among the twenty-three jurisdictions that were surveyed, but the majority of respondents were not concerned with the tax loss. Eleven respondents were not concerned about the tax loss because of the overriding good of building a new highway. Other reasons that were cited for not being concerned were having a strong tax base and thus ROW has minimal impact, tax losses not anticipated to be significant, and tax loss being minimal when compared to present day savings in time and acquisition costs. Only four respondents were concerned about tax losses, but thought that these losses were offset by the good. Two respondents were very concerned about the tax losses from advanced acquisition properties, but did not elaborate on why they were very concerned. The other six respondents did not answer this question.

Although many jurisdictions are not concerned about the tax loss, they offered numerous strategies to mitigate tax loss associated with advanced acquisition properties. These suggestions included renting or leasing the property, evaluating redevelopment options, and platting and informed site design. Another option is to hold and manage property as a business venture to maximize the revenues until the parcel is needed for the project. This would be beneficial because the city would continue to make money on the parcel until it is needed as right-of-way.

3.5 Strategies to Improve Future Coordination

Better communication was cited by eight respondents as the primary strategy for improving coordination between Mn/DOT, cities, and counties. This included frequent communication and information sharing that is early in the advanced acquisition process. Also, all affected parties should be involved in roadway planning and the design process early on. Many respondents could not stress enough that this was their primary concern. One respondent commented that Mn/DOT should spend more time on preliminary alignments and include local agencies in this process because it results in better planned developments and saves acquisition funds. Better communication also involves improving communication on planning for future roadways. If there are roadways with a definite need for right-of-way within 20 years, this should be communicated to the city since they are the first contact for any land clearance.

The second most frequently cited strategy to improve future coordination on advanced acquisition was funding. Three cities cited this as a strategy because it is difficult to plan, communicate and deliver projects with minimal public impacts without dedicated funding. One city stated that there needs to be money to purchase property before development pressures reach the area.

3.6 Conclusion

This chapter sought to summarize the survey results from a survey that was sent to cities and counties. The survey asked cities and counties about property management and corridor preservation strategies that relate to advanced acquisition. There are four findings to highlight from this chapter. A very frequent preservation tool that is used is the comprehensive plan, which is very effective in developing communities. Fifteen out of twenty-three respondents surveyed have a section in their Comprehensive plan about roadway expansion. Another finding is the difference in opinion on official mapping between cities/counties and Mn/DOT. In this survey, fifteen out of the twenty-three respondents surveyed said they only periodically use official mapping. Out of 15, only one city commented that official mapping was used frequently and is effective. This seems to contrast with the Mn/DOT survey, which found that five out of eight districts believe it would be beneficial to implement official mapping on a wider basis. A third finding, which was unanticipated, is that most of the cities are not concerned with the tax losses from advanced acquisition. Only two cities said that they were very concerned about tax loss, while another 15 respondents said they are not concerned because the benefit of the roadway outweighs any tax losses. The fourth and last noteworthy finding is the belief that the best way to improve coordination on ROW is more communication *earlier* in the road planning process.

4 Growth in Property Values Along Transportation Corridors

This chapter has two objectives. First, we test whether properties adjacent to transportation corridors appreciate at a different rate than the average parcel. Second, we want to determine what factors are correlated with large appreciation rates. We accomplished this by examining case studies Highway 36 in Washington County, Highway 52 in Olmstead County, and Highway 10 in Becker County. Figure 4.1 shows the location of the case study counties and highways.



Figure 4.1: Location of Case Study Counties and Corridors

4.1 Literature Review

There is a vast literature on the appreciation rates of parcels adjacent to highways. Numerous studies of land appreciation rates along major transportation corridors have proved inconclusive. These studies typically focus on how a property's distance from the highway affects its value and

appreciation rate (Carey, 2003; Ryan, 1999). The answer to this question depends on the type of land uses being examined and the distance to the transportation corridor. One study showed that the effects of freeways can either be positive or negative depending on the land use (Carey 2003). Carey found that the proximity to a freeway had a positive effect on multifamily housing, but a negative effect on single family housing. A second study, conducted by Ryan (1999), was a meta analysis of research on the relationship between transportation facilities and property values. Ryan found four decades of inconsistent results. Ryan analyzed ten studies that were conducted from 1959 to 1982 and found that four out of the ten studies found a negative relationship between distance to freeway and property values while six others found a positive relationship. The significance of this literature review is that other researchers have investigated the effects of transportation corridors and have found inconclusive results. Some land uses that are adjacent to transportation corridors, such as multi-family, appreciate rapidly whereas other land uses are negatively affected. The results from this literature review suggest that the wisdom of advanced acquisition may depend on the land uses surrounding the transportation corridor. We will add to the literature by conducting a similar analysis of transportation corridors in Minnesota. In addition to analyzing the growth rate of properties, we will also develop a statistical model that will help Mn/DOT identify property characteristics that are correlated with parcels that rapidly appreciate.

4.2 Selecting Transportation Corridors

As discussed in the introduction, the three corridors under study in this chapter are Highway 36 in Washington County, Highway 52 in Olmstead County, and Highway 10 in Becker County. These three corridors were chosen due to data availability. We first explored the possibility of using Multiple Listing Service (MLS) data to evaluate various corridors. Although MLS is market data and is usually a more accurate measure of appreciation, we chose to use property assessment data. Property assessment data was chosen because we wanted to have two groups, a group of adjacent properties along the corridor and a group of randomly selected properties. Since MLS data includes houses that were sold over a given period of time, we would not have had enough parcels sold that were adjacent to a corridor and could not ensure random selection of a control group. Another limitation is that MLS data has little data on commercial and agricultural properties.

Since MLS data would not help us to accomplish our research goals, we choose to do case studies in counties that had electronic assessment information as well as data available in a Geographic Information System (GIS), which is a mapping software. Many counties had either a fee for their assessment information, had paper assessment records, or did not have GIS files. Another criterion for choosing counties for the case studies was the availability of electronic assessment information spanning multiple years. Numerous counties only had electronic assessments for the past two years, which was too short a time horizon for this type of study. It was based on these criteria that we chose the three case study corridors of Highway 36, Highway 52, and Highway 10.

4.3 Methods

In each case study, we selected a set of properties adjacent to the transportation corridor and a random set from within the county. For each of the three transportation corridors that are examined, two sample groups were created. A group of adjacent parcels was defined as those

properties located within 100 meters (328 feet) of a transportation corridor. A group of non-adjacent parcels, or a control group, was defined as a random sample of parcels drawn from the entire county. These two groups were then compared to test our hypothesis that land adjacent to transportation corridors appreciates more rapidly than land that is not adjacent to a corridor. We also wanted to evaluate if the appreciation rates are above the bond rate, which would provide support for advanced acquisition. The property values that were collected for these analyses included the land value and the improvement values and were the assessed values, not market data. This data will also be used in a binomial logit model that will help us determine what characteristics are associated with rapid appreciation. The subsequent paragraphs detail how the adjacent and control groups were created for each corridor.

The first corridor under study is Highway 36. Highway 36 is 17 miles long and runs from Interstate 35W in Roseville, MN to Stillwater, MN. For this analysis, only the part of Highway 36 that is located in Washington County was examined. To create the group of adjacent parcels, parcels within 100 meters (328 feet) of Highway 36 were identified using ArcGIS. To create a group of non-adjacent parcels, or control group, parcels were randomly selected from all 98,375 parcels in Washington County (maps of the adjacent and non-adjacent parcels can be found in the Appendix D). Parcels owned by the government, such as public hunting grounds, city property, and Mn/DOT right-of-way were excluded from the analysis. After these parcels were removed, tax assessor data for the remaining parcels was downloaded from the Washington County Tax Assessor website. To standardize the period of analysis, parcels were removed if they did not have eleven years of assessments from 1996 to 2007. Removing parcels with less than eleven years of assessments yielded 306 properties in the adjacent group and 156 in the non-adjacent, or control, group. In order to increase the number of properties in the adjacent and non-adjacent groups, data on properties that had been subdivided and had missing values were researched at the Washington County Taxpayer Services Office in Stillwater, Minnesota. The research conducted in Stillwater increased the adjacent sample to 380 parcels and the non-adjacent sample to 208 parcels.

The second corridor under study is Highway 52. Highway 52 is 377 miles long, running from Moorhead, Minnesota through the Twin Cities to the Iowa Border at Prosper, MN. From Moorhead to St. Paul the road is labeled as I-94, but from St. Paul to Prosper the Highway is signed exclusively as Highway 52. Parcels that are adjacent to Highway 52 were defined as those within 100 meters (328 feet). The group of non-adjacent parcels was created by randomly selecting parcels from the 63,576 parcels in Olmstead County. As with the Highway 36 analysis, all government property was removed from the analysis before assessments were collected. The assessment information was collected from the Rochester-Olmstead Planning Department. After the assessments were collected, we standardized the period of analysis by removing parcels that did not have ten years of assessments from 1998 to 2008. This yielded 389 properties in the adjacent group and 561 in the non-adjacent group.

The third corridor under study is Highway 10. Highway 10 enters Minnesota on the western edge of the state near Fargo, North Dakota and through to St. Cloud and the Twin Cities. The road continues southeast away from the Twin Cities until the Wisconsin border. Parcels that are adjacent to Highway 10 were defined as those within 100 meters (328 feet). To create a group of non-adjacent parcels, we randomly selected parcels from all 32,521 parcels in Becker County. As

with the Highway 36 analysis, all government property was removed from the analysis before assessments were collected. The assessment information was collected from the Becker County Assessment Office. After the assessments were collected, we standardized the period of analysis by removing parcels that did not have twelve years of assessments from 1996 to 2008. This yielded 512 properties in the adjacent group and 723 in the non-adjacent group. Maps of all adjacent and non-adjacent parcels are provided in Appendix D.

4.4 Findings

Our findings, like many in the literature review, proved to be inconclusive. In Highway 36, adjacent properties appreciated slightly more than non-adjacent properties. In Highway 52 and Highway 10, the non-adjacent parcels appreciated more than the adjacent parcels. The growth rate for each corridor was calculated for both adjacent and non-adjacent groups. The average growth rate, also known as the compound annual growth rate, is calculated using the formula in Equation 1:

$$1.) \text{ Compound Annual Growth Rate} = (\text{End Value}/\text{Starting Value}) ^{(1/\text{Number of Years})-1}$$

The growth rate was calculated to compare whether properties adjacent to transportation corridors appreciate more rapidly than those parcels from a random sample. This hypothesis was confirmed from our Highway 36 results and rejected in Highway 10 and Highway 52. In the case of Highway 36, adjacent properties appreciated 9% while non-adjacent properties appreciated only 7.9%. Also, the aggregate value of properties adjacent to Highway 36 is three times more than those not adjacent to Highway 36 in both 1996 and 2007. In 2007, for example, the total value of properties adjacent to Highway 36 was \$186.8 million whereas the values of properties not adjacent to Highway 36 were \$66.6 million. These findings are summarized in Table 4.1 and 4.2:

Table 4.1: Three Corridors - Total Number of Properties and Average Growth Rate

	Total Number of Properties		Average Growth Rate	
	Adjacent	Non-Adjacent	Adjacent	Non-Adjacent
Highway 36	N = 380	N=208	9.0%	7.9%
Highway 52	N = 389	N=561	6.2%	12.1%
Highway 10	N = 512	N=723	8.6%	13.7%

Table 4.2: Three Corridors - Total Value and Appreciation

	Aggregate Beginning Value*		Aggregate End Value*	
	Adjacent	Non-Adjacent	Adjacent	Non-Adjacent
Highway 36	\$72,286,161	\$28,814,796	\$186,824,700	\$66,566,307
Highway 52	\$121,084,200	\$33,519,000	\$220,204,100	\$104,611,900
Highway 10	\$47,817,121	\$31,707,651	\$118,067,847	\$130,605,297

NOTE:

* Starting and Ending years for Highway 36 are 1996 and 2007

* Starting and Ending years for Highway 52 are 1998 and 2008. The time period is slightly shorter than the other two corridors due to available data.

* Starting and Ending years for Highway 10 are 1996 and 2008

In both Highway 52 and Highway 10, properties that were *not adjacent* to the corridor had a higher average growth rate than adjacent properties. Along Highway 52, adjacent properties appreciated 6.2% while non-adjacent properties appreciated 12%. One reason that properties adjacent to 52 may not have appreciated as much as those in the Highway 36 case study is that major construction was occurring on 52 during our study period from 1998 to 2008. Thus, appreciation on the land may have already occurred prior to construction by those anticipating the increased accessibility. Also, the appreciation rates were probably negatively impacted by construction, and thus were lowered during our study period when compared to random parcels. A similar result was found along Highway 10, with adjacent properties appreciating 8.6% and non-adjacent appreciating 13.7%.

These case studies show that being adjacent to a transportation corridor creates mixed results, higher appreciation of adjacent parcels in Highway 36 and higher appreciation of non-adjacent parcels in Highway 52 and Highway 10. The average appreciation rate for many of these adjacent and non-adjacent groups is higher than in Barnes and Watters (2005), which calculated an average increase of 5.8% on nominal house price and 5.7% on nominal US farmland. The reason that appreciation in these three corridor case studies is higher than Barnes' study is that our period of analysis is during the real estate boom, so we would expect the property assessments to be higher during this time period. Although these numbers show the growth rate of each group, it is valuable to look at this data in finer detail. We restrict this finer grain analysis to Highway 36 because this is the only corridor with easily accessible information on subdivided properties and other covariates, such as acres and land use. Since these details are necessary for a finer level of analysis, Highway 52 and Highway 10 were excluded. The next section will analyze the distribution average growth rates.

4.4.1 Predicting Rapidly Appreciating Properties

The previous section focused on the growth rate of properties and compared entire groups of properties. Although this analysis helped to answer the question of whether adjacent properties appreciate more than non-adjacent properties, it did not answer the question of what property characteristics are most important when predicting which properties will appreciate rapidly. The overall growth rate of adjacent and non-adjacent groups obscures what is happening at the parcel

level. If we can learn the characteristics of rapidly appreciating properties, then we can better know what to look for when acquired property early.

The importance of learning the characteristics correlated with rapidly appreciating property is shown in the growth rate of *individual* properties in the three case studies. There is a large difference between properties with the lowest and highest *annual* appreciation in each corridor. In Highway 36, the lowest appreciating property depreciated by 17% and the highest appreciation rate was 72%. In Highway 52, one property depreciated by 20.6%, while the highest appreciated 97.7%. In Highway 10, one property depreciated by 25.4%, while the highest appreciated 71.3%. The large gap between the lowest appreciating property and the highest appreciating property shows a need to go beyond measures like annual growth rate and investigate what characteristics contribute to the rapidly appreciating properties.

The first step in this analysis is to examine the distribution of appreciation rates to see if it is skewed. If the distribution is normally distributed then advanced acquisition should not be pursued because there are very few properties that appreciate rapidly. If the distribution is heavily skewed toward the right, this means that advanced acquisition should target the group of property that appreciates rapidly. Table 4.3 shows the 588 properties in our sample and describes whether they are in the top 1%, 5%, 25% or 50% in terms of the number of dollars they appreciated between 1996 and 2007. It is clear from the table that our sample is not normally distributed. This table highlights two significant findings. First, there are a small number of properties that account for a large percentage of the total dollar appreciation over this time period. The top 5% of properties in our sample, or 30 properties, appreciated \$58 million dollars from 1996 to 2007. During this time all 588 parcels appreciated \$154 million. This means that the 29 properties in the top 5% account for nearly 38% of the appreciation during this time period. The second important finding is our data sample is very skewed. This is shown with the top 50% of the properties, or 294 properties, account for 86% of the appreciation that occurred during this time period. Therefore the distribution of these properties is not normal, but skewed toward the right since so few properties make up a bulk of the appreciation. The significance of this is that there are only certain properties – those that appreciate rapidly – that should be acquired early. The results are summarized in Table 4.3:

Table 4.3: Distribution of Properties in Various Quantiles

Percentile	Number of Properties	Total Assessed Value	Percentage of Total Dollar Appreciation	Average Price Per Parcel	Average Growth Rate
Top 1%	6	\$21,628,700	14.0%	\$3,604,783	16.3%
Top 5%	29	\$39,973,080	37.7%	\$1,378,382	18.7%
Top 25%	147	\$51,094,053	67.9%	\$347,579	13.9%
Top 50%	294	\$39,928,873	86.0%	\$135,812	11.3%
All Properties	588	\$154,068,008	100.0%	\$262,020	10.4%

This distribution is skewed towards the right, which means that there are a few properties that are the bulk of the appreciation. These are the properties that Mn/DOT should focus its advanced

acquisition resources on. In order to evaluate which characteristics are correlated with rapid appreciation, and thus which characteristics Mn/DOT should watch for, a binomial logit model was conducted. This will help us assess the characteristics correlated with properties in the top 1% and 5%. The model is discussed in the next section.

4.4.2 Binomial Logit

To examine if there are any significant factors that can predict rapid appreciation, a binomial logit model was developed. The dependent variable is a dummy variable, also known as a binary variable. The dependent will equal zero when the average growth rate is below 25% and will equal one when the average growth rate is above 25%. We choose 25% because this is approximately triple the bond rate, and will give us a good idea of the characteristics of properties that rapidly appreciate. The reason this type of statistical model was chosen is that a binomial logit model is preferable to researchers because it more closely resembles real-world phenomenon (Studmund, 1970). The binomial logit model includes six variables – Acres, Acres², Residential, Agricultural, Adjacent to Highway 36 and Subdivided. The variables that are included in this model are summarized in Table 4.4:

Table 4.4: Variables Included in Binomial Logit Model

Variable Name	Description
Acres	Acres of land
Acres ²	Acres of land squared
Residential	Dummy Variable for Residential Land Use
Agricultural	Dummy Variable for Agricultural Land Use
Adjacent to Highway 36	Properties that are within 100 meters (328 feet) of Highway 36
Subdivided	Whether a property has subdivided since 1997

The number of observations included in this binomial logit is 572. The results from the binominal logit regression are shown in table 4.5.

Table 4.5: Results of Binomial Logit Model

N = 572				
Pseudo R ² = 0.1171				
Dependent = Average Growth Rate > 25%				
Growth Rate	Coeff.	Std. Err.	T	P> T
Acres	0.000	0.054	-0.010	0.994
Acres ²	0.000	0.001	0.070	0.947
Residential	0.051	0.376	0.140	0.892
Agricultural	1.287	0.854	1.510	0.132
Adjacent	-0.441	0.391	-1.130	0.259
Subdivided***	2.385	0.498	4.790	0.000
Constant	-2.609	0.405	-6.440	0.000

Notes:

*** = variable is statistically significant at p < 0.01 level

The subdivided variable is significant at the 1%. This shows that a parcel that has subdivided is strongly correlated with an appreciation rate above 25% per year. Although subdivided represents a past condition of something that has already occurred, this strong correlation can be useful in guiding advanced acquisition into the future. Since subdivided is the only significant variable, this is the characteristic that Mn/DOT should look for in going forward with advanced acquisition – properties on the verge of subdivision or land use change. No other variables in this model are significant at the 5% or the 10% level. The coefficients from table 4.6 are not directly interpretable. We therefore look at the marginal effects after the logit for interpretation. These results are shown in Table 4.6:

Table 4.6: Marginal Effects After Binomial Logit

N = 572				
Dependent = Average Growth Rate > 25%				
Growth Rate	Coeff.	Std. Err.	T	P> T
Adjacent	-0.027	0.025	-1.070	0.285
Acres	0.000	0.003	-0.010	0.994
Acres ²	0.000	0.000	0.070	0.947
Agricultural	0.126	0.128	0.990	0.324
Residential	0.003	0.021	0.140	0.892
Subdivided*	0.333	0.110	3.040	0.002

Notes:

* = variable is statistically significant at p < 0.10 level

The interpretation of these coefficients is the number of percentage points more likely (or less likely) that a property will appreciate above 25% per year. The only variable that is significant is

subdivided. What this means is that a property being subdivided increases the probability that a property will appreciate rapidly (25% per year) by 33.3 percentage points. It is significant to note here that this is 33.3 percentage points, not 33%. The difference is that 33% is a relative measure from one point to another, whereas 33 percentage points is an absolute measure. The significance of this result is that whether a property has subdivided since 1997 is the only significant factor in properties that appreciated more than 25% per year.

4.5 Conclusion

Gary Barnes and Sarah Watters (2008) sought to answer the question of whether the average parcel should be acquired through advanced acquisition. They concluded that the growth rate of property values is *not* high enough to support advanced acquisition as a general strategy. We built upon their analysis and sought to answer two questions. First, if the average parcel should not be acquired, what about parcels adjacent to transportation corridors? Our conclusion to this is that adjacent parcels should not be acquired early because of the slight difference in growth rate in the Highway 36 and the inconclusive results with the Highway 52 and Highway 10 analysis. The second question we sought to answer is if the average parcel should not be acquired, and average adjacent parcels should not be acquired, are there properties with certain characteristics that should be acquired? The answer to this is a resounding yes. The binomial logit model developed in this paper showed that the only characteristic important is predicting whether parcels appreciated 25% per year is whether they undergo subdivision. Therefore, we recommend that Mn/DOT develop a monitoring program to watch for parcels that may go undergo subdivision or land use changes in areas where Mn/DOT is planning roadway expansions.

5 Recommendations and Conclusions

The goal of this report was to evaluate Mn/DOT's current advanced acquisition practices and investigate the appreciation rate of parcels adjacent to transportation corridors. This analysis was completed through administering two surveys and analyzing three corridor case studies. There were numerous important findings. First, there was a disagreement on usefulness of official mapping between cities and Mn/DOT. The Mn/DOT survey found that five out of eight districts believe it would be beneficial to implement official mapping on a wider basis. This is very different from the result in the City and County survey where fifteen out of the twenty-three respondents surveyed said they only periodically used official mapping. Out of 15, only one city commented that official mapping was used frequently and is effective.

Another key finding is that there are some problems with current advanced acquisition practices as shown by the data on reconveyances. Since 1993, the Metro District received 54% of the funding but reconveyed 68% of total number of reconveyed parcels. A similar trend was found in District 3, which accounts for 15.3% of all the funding for ROW and reconveyed 22.6% of the total number of parcels. This finding highlights the need to further analyze why there is a large discrepancy, especially in the case of the Metro District, between the funds expended and the number of parcels reconveyed. Future analysis of this issue would need to collect acreage data on the reconveyed parcels, which was not available for this analysis. Another limitation to advanced acquisition that was highlighted by the Mn/DOT survey is the lack of guidelines for use of preservation tools. Many districts did not have guidelines on how to use these tools or during which phase of project development to use various tools.

The first recommendation is to develop guidelines for all Mn/DOT districts so they can consistently use corridor preservation tools. Currently there is not a specific set of preservation tools that are used in all districts. Four out of the eight districts have no district specific guidelines or criteria regarding the use of certain preservation tools. Five out of eight districts believe it would be beneficial to have general guidelines about the use of preservation tools. The desire for guidelines is most likely due to the wealth of preservation tools available and the uncertainty about when and how to use them. Brief guidelines could be developed to increase awareness about numerous preservation tools that are available and when they should be used.

In addition to the two surveys, we also developed three case studies to test whether adjacent parcels appreciate more rapidly than a control group of properties. The results indicate that the effect of being adjacent seems to be heterogeneous across the three corridors. We then examined the distribution of growth rates and found the distribution to be skewed, which means there a small number of parcel that comprise a majority of the appreciation. From this we concluded that our findings are consistent with Barnes and Watters' finding that the majority of parcels should not be acquired with advanced acquisition. To further examine this skewed distribution, we ran a binomial logit model to identify the factors that would help Mn/DOT identify these parcels. The only significant variable was subdivided.

The second recommendation is to develop a monitoring program to keep track of subdivisions and land use changes along transportation corridors. This program will need to monitor parcels adjacent to transportation corridors in the Minneapolis-St. Paul Metro Area that are planned for

expansion in the next 10-15 years. Tracking the zoning of these parcels would allow Mn/DOT to know if a developer or property owner is attempting to subdivide a parcel, providing the opportunity to buy the parcel before it is developed. This tracking and purchasing of properties with high potential appreciation will help to avoid higher right-of-way costs later. This recommendation is supported by the Highway 36 binomial logit model which showed subdivision as the only significant variable in predicting appreciation over 25% per year. Empirical evidence is only available for Minneapolis-St.Paul, but theoretically it would make sense to implement a monitoring program throughout Minnesota. Further study would help to determine the usefulness of a monitoring program in areas outside the Twin Cities.

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Appendix A:
Techniques for Preserving Right-of-Way

There are many techniques for preserving right-of-way ranging from acquisition of property rights, to regulations of land use and negotiations with landowners. The most expensive preservation method is purchasing land, which is valuable despite the cost because the project can be accelerated and conflicts can be minimized when the property is under control of the transportation agency. In addition to outright purchase, other types of purchases are hardship acquisition, protective acquisition, and early acquisition (Barnes and Watters, 2005). All three of these techniques involve the acquisition of land but under different circumstances. A hardship acquisition is when land is acquired because it caused an undue burden on the property owner. This burden must be documented on the basis of health, safety, or financial burdens (Mn/DOT, 2007). A protective acquisition is acquiring land in anticipation of coming development and higher appreciation rates. Lastly, an early acquisition is acquiring land early in the project development process because of any number of factors, such as a project that need to be accelerated or a total taking of property.

A second group of preservation tools are regulatory tools which are under the control of cities. One of these tools is official mapping which is denoting on zoning maps where future roadways are planned. This allows Mn/DOT to be notified if parcels in the proposed ROW are being purchased. Although this tool can preserve proposed roadways, land rights are still needed to effectively preserve the land. Land development and subdivision regulations are another set of preservation tools. These tools require developers to dedicate land for ROW when subdivisions are approved. This is the primary tool that cities use to preserve ROW, but is only effective in cities that are still growing since fully-built up cities have no land left to subdivide.

Appendix B:

Survey to Mn/DOT Districts

This appendix contains the survey that was sent out to the eight Mn/DOT districts in early spring of 2008 and the follow-up survey sent out and received during the summer of 2008.

B.1. Original Survey

Survey for Mn/DOT District Offices

The goal of this survey is to collect information that will assist the researchers in developing a decision making model for advanced acquisition. The ultimate goal of this project is to help Mn/DOT allocate resources more efficiently.

I. Proposed Roads vs. Built Roads

1. Please list the name of the corridor project, the amount of money for the ROW component, the county in which this project occurred, and whether or not the project was completed. Please only list those projects that have a significant ROW component, in rural areas this is ½ million and in urban areas 2-3 million, and were completed from January 1988 to December 2007.

Name of Project	ROW Cost	County	Completed: Y/N

Note: We are as interested in projects that were completed as projects that weren't completed. Please use the attached sheet if you need more space or attach a separate print out.

1A. What is the total number of projects that were **completed** from January 1988 to December 2007 that had significant Right-of-Way (ROW) component? Significant is defined as more than ½ million in rural areas and more than 2-3 million in urban areas.

_____ Projects

2. In cases where land was acquired but the project was NOT completed, please rank the importance of factors for the project not moving forward.

- _____ Lack of coordination and support from local government
- _____ Funding dried up
- _____ Public opposition
- _____ Change in priorities
- _____ Project not needed any more
- _____ Other, Please Specify _____
- _____
- _____

3. Of the projects that were not completed, are there still futures plans to complete this project?

II. Preservation Tools

Preservation techniques for acquisition of right-of-way are strategies used to minimize the cost to government and the impact on the landowner. The most common technique is acquisition, but there are other techniques that utilize land use regulations and negotiations with land owners to minimize acquisition costs.

1. Please specify some of the preservation tools that are used in your district and the advantage of using that particular tool.

Tool: _____
Advantage: _____

Tool: _____
Advantage: _____

Tool: _____

Advantage: _____

2. How often would you say that each of these tools are used per year?

Tool: _____

___ 0-3

___ 4-7

___ 8-11

Tool: _____

___ 0-3

___ 4-7

___ 8-11

Tool: _____

___ 0-3

___ 4-7

___ 8-11

3. If different tools are used only in certain situations, please specify.

4. Which tool do you think if implemented on a wider basis, would make the advanced acquisition process more effective?

Preservation Tool: _____

Reason: _____

5. Does your district have guidelines or criteria regarding the use of certain preservation tools?

III. Accounting for Non-Financial Benefits

1. Which of the following benefits do you consider when making decision about advanced acquisition:

- ____ Simplified political process
- ____ Less local disruption
- ____ More control over project schedule
- ____ Environmental mitigation
- ____ Other, Please Specify _____
- _____
- _____

What do you consider the biggest challenge facing advanced acquisition in the future?

☐

Please check this box if you would like the results of the survey

B.2 Follow-up Survey

1. In the original survey there was a question that asked your district to quantify how often a preservation tool was used. Many districts wrote responses such as “Official Mapping” and checked the box for 0-3 uses. I have attached your original responses to this e-mail and would like you to elaborate on them:
 - a. For each of your answers on a specific preservation tool, can you specify the exact number of times the tool was used (e.g. 0, 1, 2 or 3)?
 - b. Can you specify if by one “use” you mean the tool was used on one project or one parcel of land? We want to know the frequency and magnitude that different tools are used, so it’s important to differentiate between one project and one parcel.
2. What are the risks for local agencies to adopt official maps?
3. Can you describe how the timeline of advanced acquisition fits in with the overall schedule for a project?
4. Many districts stated that there are no district specific guidelines or criteria regarding the use of various preservation tools. Would it be helpful if the Central Office made general guidelines regarding the use of these tools?
☐ No
☐ Yes, Please Elaborate: _____

5. What projects have you officially mapped since 1998?

Appendix C:
City and County Right-of-Way Survey

Right of Way (ROW) Survey

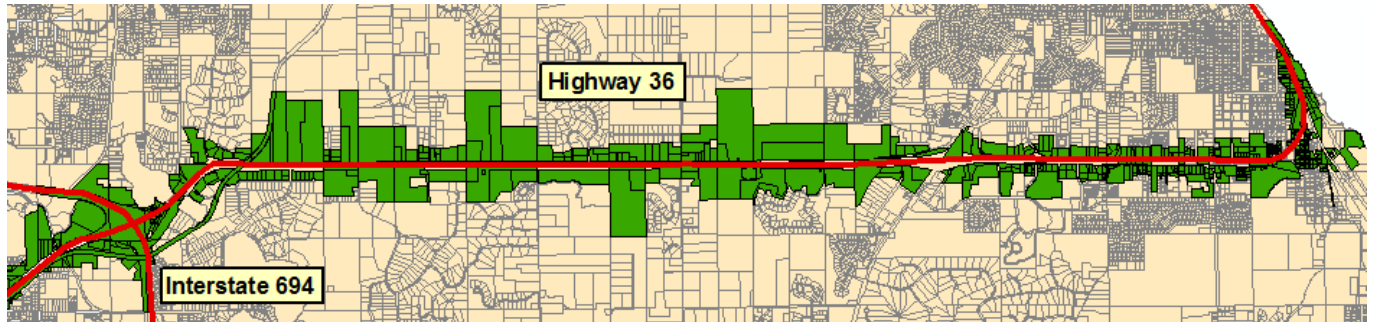
1. Has Mn/DOT ever contacted you about Advanced Acquisition?
☐ No
☐ Yes
 - a. How would you describe the nature of the communication?
 - b. Are you given advanced notice when Mn/DOT is contemplating acquiring ROW in your jurisdiction?
2. Have you ever contacted Mn/DOT about pursuing an advanced acquisition project?
☐ No
☐ Yes, Please Elaborate
3. Is there a section in the comprehensive plan for your jurisdiction about potential roadway expansion?
 - a. If Yes, do you feel like this encourages corridor preservation in your jurisdiction?
4. Hypothetically speaking, if Mn/DOT contacted you regarding the expansion of (a highway within the City or County boundaries) in the next 5 to 10 years, what steps would you take, if any, to coordinate acquisition of ROW and avoid forced sales?

5. How concerned is the (This City or County) with the tax loss associated with advanced acquisition properties?
- a. Are there any strategies that can be used to mitigate these losses?
6. Please rank the following planning and zoning tools in order of their frequency of use in preserving a transportation corridor that may be expanded.
- _____ Developer dedication
 - _____ Zoning ordinances
 - _____ Transfer of Development Rights
 - _____ Corridor is part of official local government street plan
 - _____ Land Development and Subdivision Regulations
 - _____ Other, Please Specify:
7. How extensively is official mapping (zoning) used and how effective is it at preserving ROW?
8. How much do land development and subdivision regulations help to preserve ROW? Is there any way these regulations could be improved to better preserve ROW?
9. Do you have any suggestions that could be used to improve coordination between Mn/DOT, cities and counties for advanced acquisition of ROW?

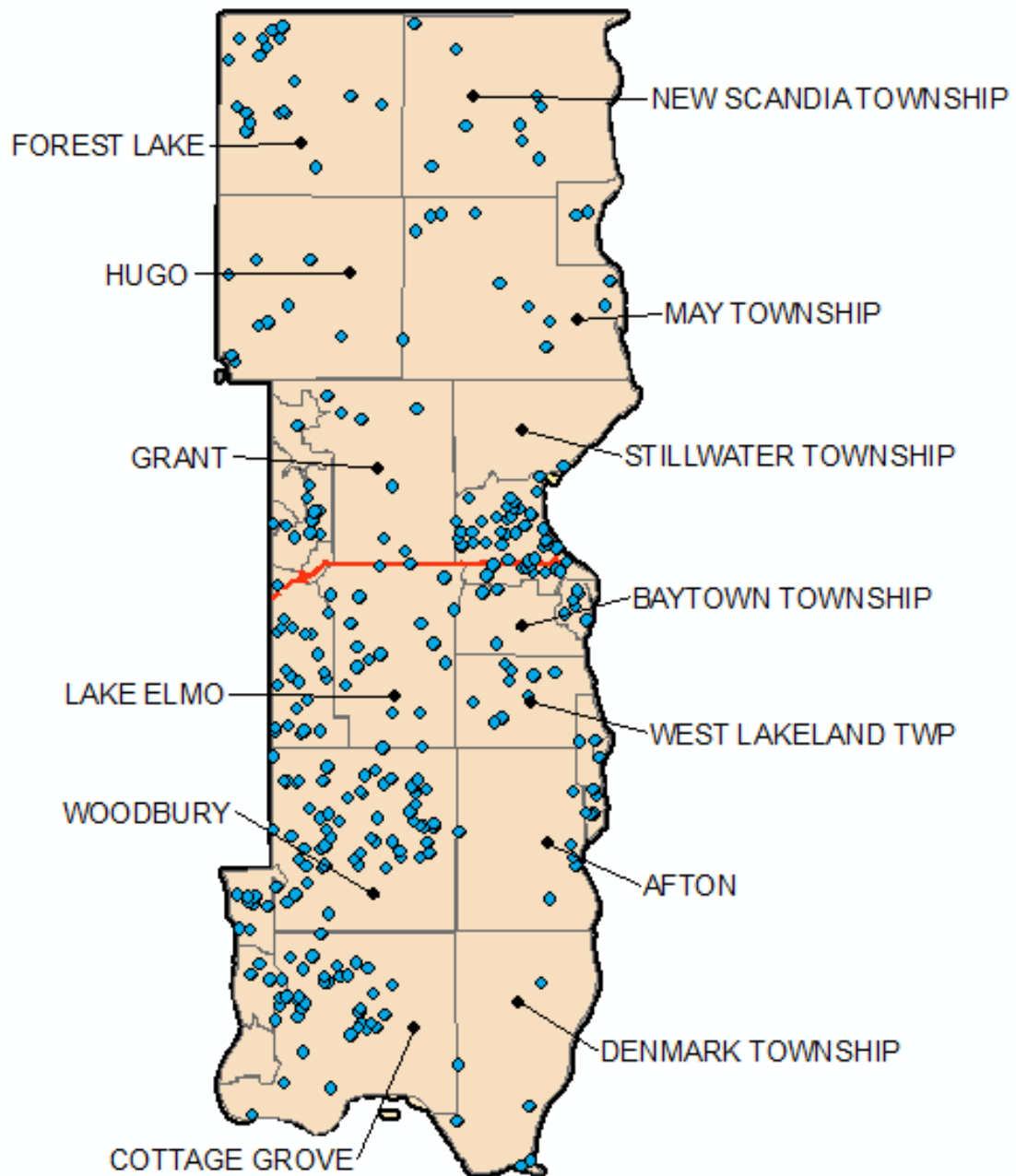
Appendix D:

Maps of Transportation Corridor Case Studies

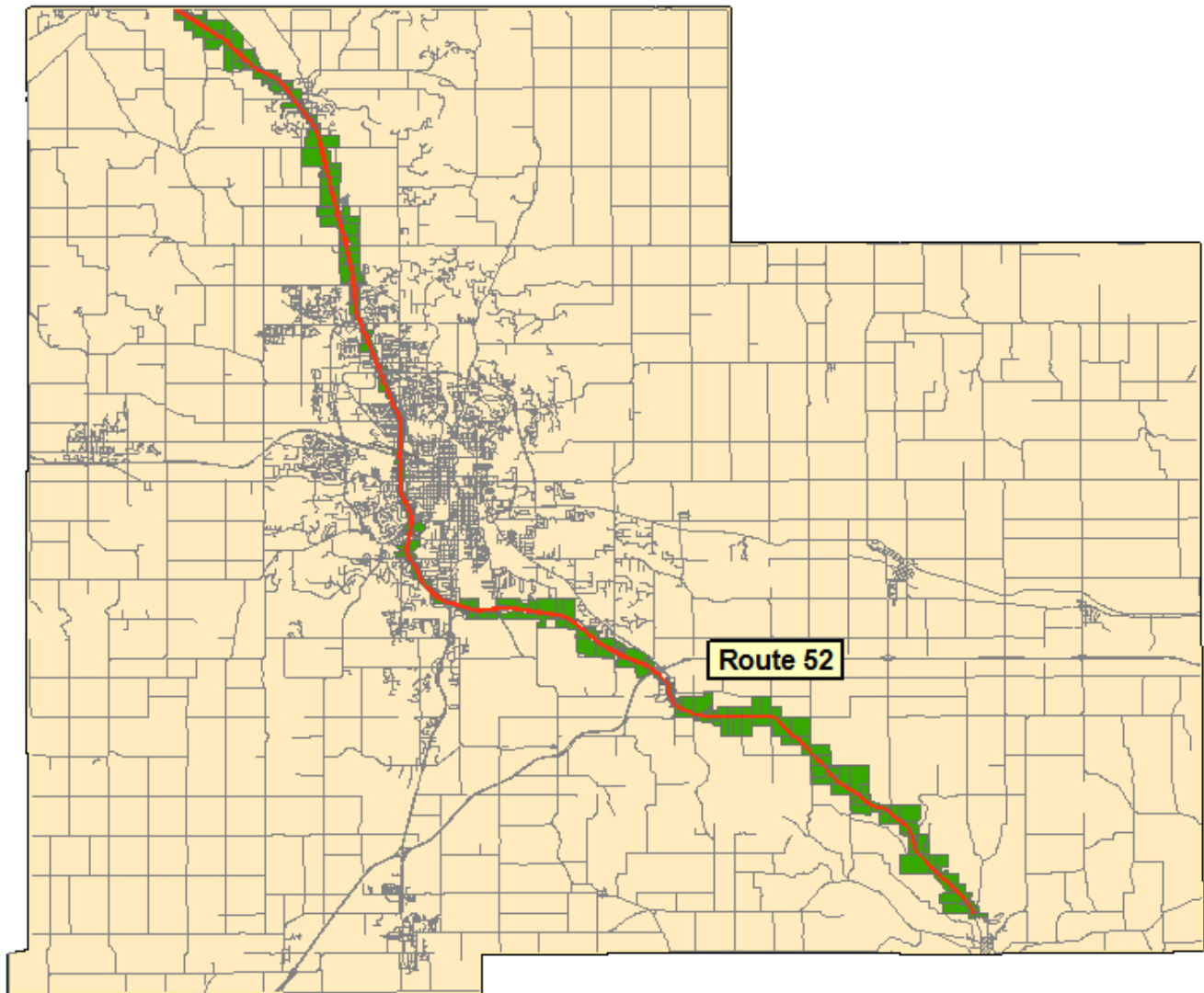
Map of Adjacent Parcels in Washington County, Minnesota



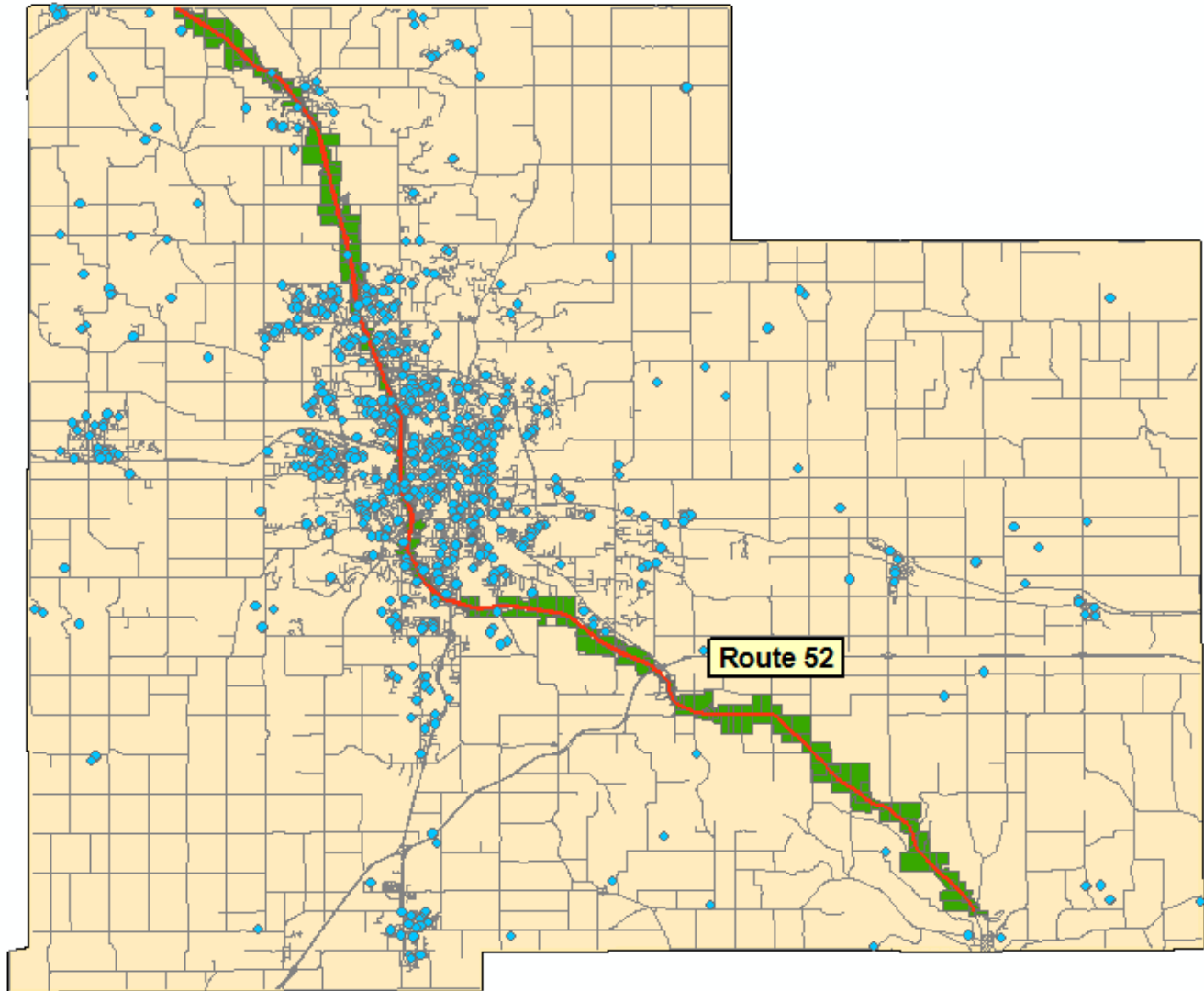
Map of Non-Adjacent Parcels in Washington County, Minnesota



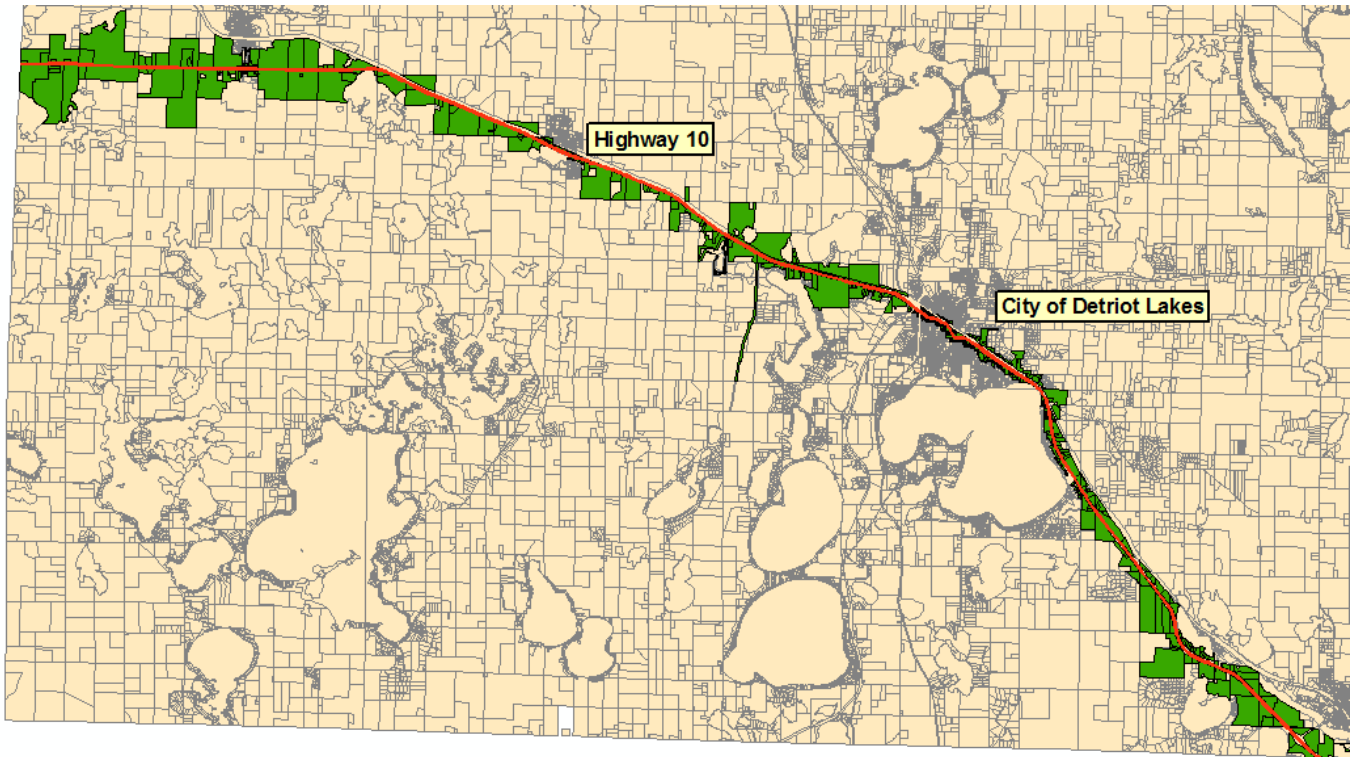
Maps of Adjacent Parcels Olmstead County, Minnesota



Maps of Non-Adjacent Parcels Olmstead County, Minnesota



Maps of Adjacent Parcels in Becker County Minnesota



Maps of Adjacent Parcels in Becker County Minnesota

