# 5-4079-01-P1

# RIGHT-OF-WAY COST ESTIMATING TOOL USER MANUAL

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*TxDOT Project 5-4079: Implementation of ROW Acquisition Cost Estimating Planning Tool*

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# Tool Introduction

This document is the user manual for the Right-of-Way (ROW) Acquisition Cost Estimating Planning Tool developed to help appraisers evaluate and analyze ROW acquisition costs. This tool is an interface between a set of regression equations and the users. It can also help manage the ROW takings information database. Once this software is installed on a computer, it allows the user to input the data collected from properties from different projects and then to see the analysis results and the estimated cost of any given property.

## 1.1 System Requirements

This application was written on the excel platform using Visual Basic for Application (VBA), a programming language. Excel is the most widely used spreadsheet program and VBA is a powerful language that can implement a wide variety of tasks in Excel. So any computer running Microsoft Office is capable of using this tool. The only thing to be done before using it is to have a copy of this tool anywhere on the user's computer.

## 1.2 Programming Structure

In this tool, all the user input will be stored in worksheets within the workbook in which the tool is based. The tool contains a total of 12 worksheets as showed in Fig. 1-1. They are Parcel, Project, LandUse, TxDOTDistrict, County, Sheet1_backup, Sheet1, ROWIS, Report, Parcel_Print and HPI.

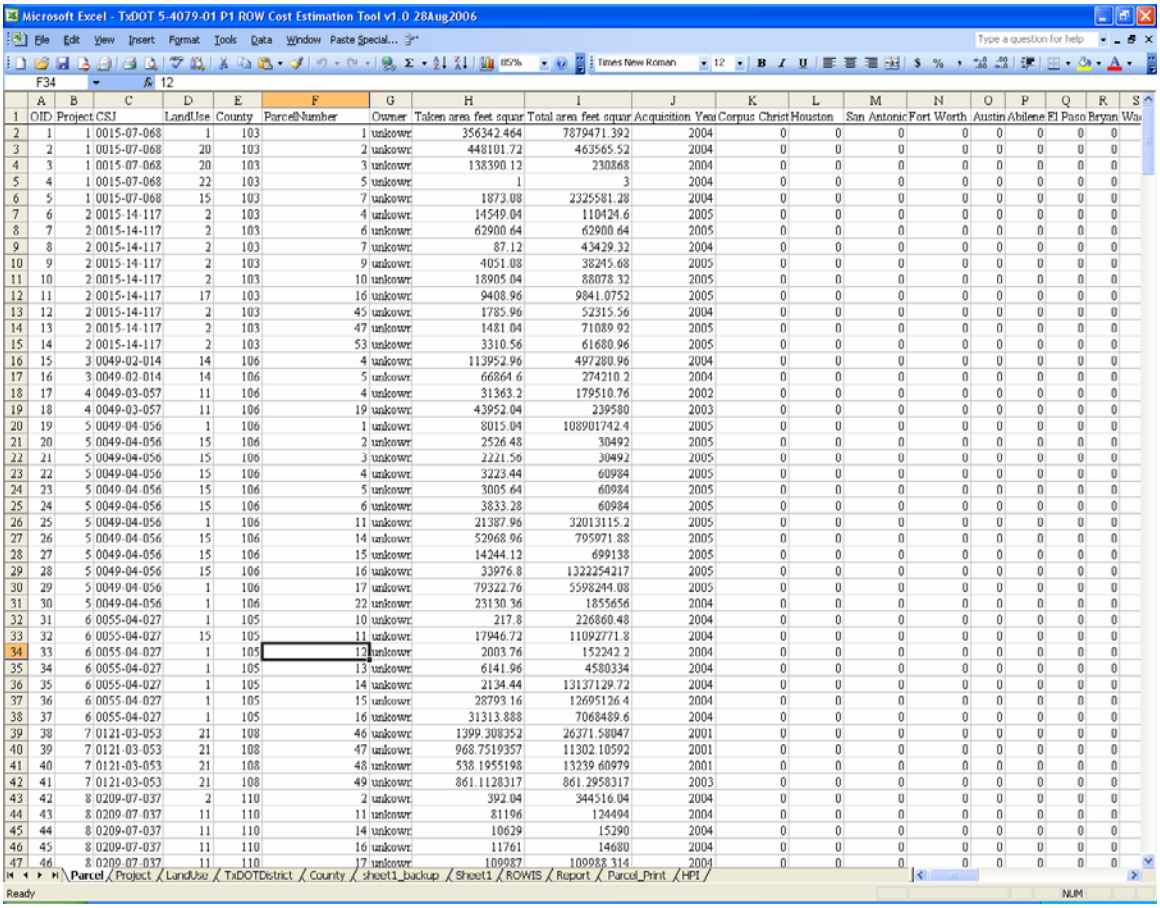



**Figure 1-1 Worksheets in this Tool**

Within the Parcel worksheet, each row represents a single parcel, while columns contain all the characteristics of the parcel that the user has entered, such as the location and parcel number. The estimated costs of parcels that have been calculated are also included in this worksheet. The OID column is used to identify each parcel in the program and is meaningless for the user. Detailed explanations of the characteristics are provided in Appendix B. The Project worksheet provides information about the parcels within in a given project; each row represents one project, each column gives the name, ROW CSJ, estimation costs, etc. The LandUse gives a parcel's twenty-two possible land use types. The TxDOTDistrict worksheet provides information about the districts including the name, DistrictNumber and password. The passwords were written in a white-colored font and are initially all set to be 'abc.' How to use these passwords will be explained in next chapter. The County worksheet provides the names of each Texas county, its population density, and the district to which it belongs. The Sheet1_backup and Sheet1 worksheets are only for programming purposes. The ROWIS worksheet contains information about over 10,000 historical ROW records used to provide the most similar cost and average cost to a new parcel later in the tool. The Report worksheet is the final estimation result formatted for the printout. It summarizes the results in a table. The Parcel_print worksheet provides information of newly input parcels that can be directly printed. In the HPI worksheet conveys each year's Housing Price Index.

The code was written in 13 Userforms, 2 Modules and 5 Class Modules as shown in Fig. 1-2.

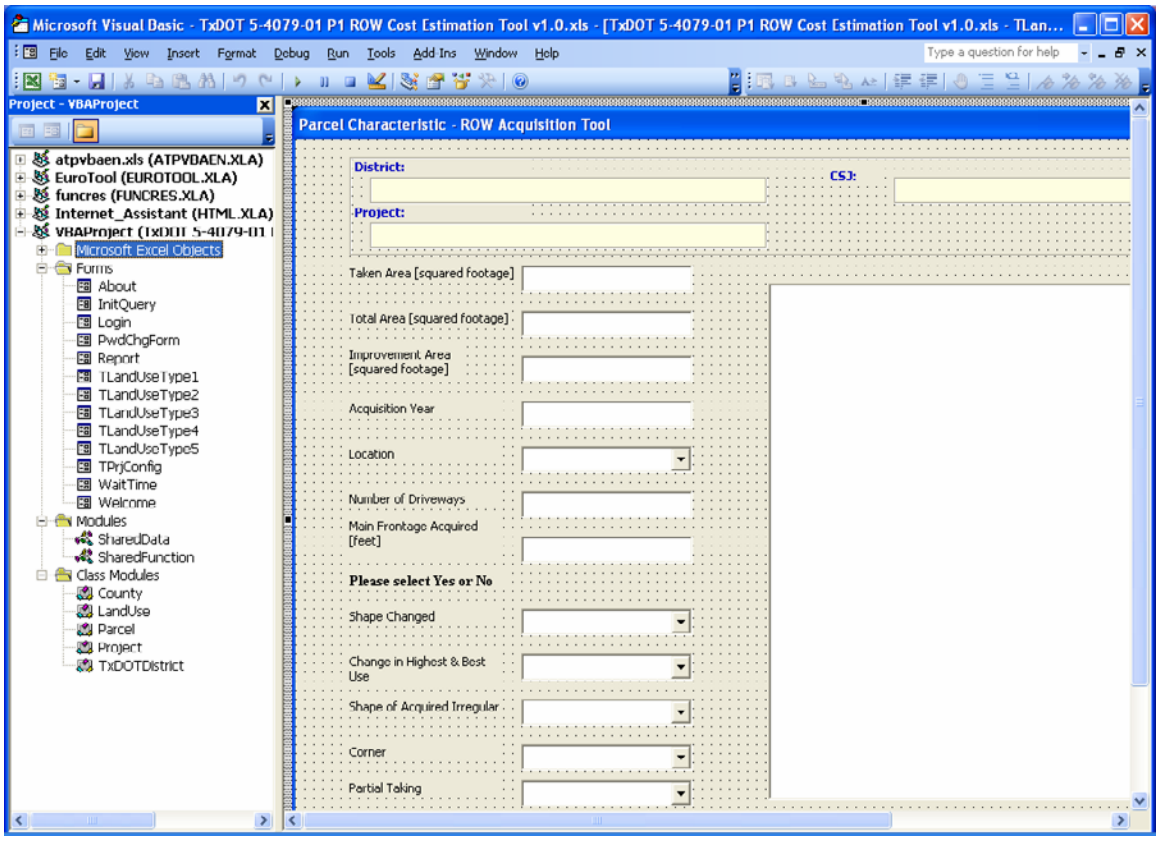



**Figure 1-2 Programming Structure**

# Using the Cost Estimating Tool

This chapter describes how to use the ROW Cost Estimating Tool from the user's perspective. Step by step instructions are given for all the processes. A project consisting of nine parcels in the Bryan district is used throughout this example.

## 1.3 Before running the tool - Security Level

The first step is to find the location of the tool file as shown in Fig. 1-3.

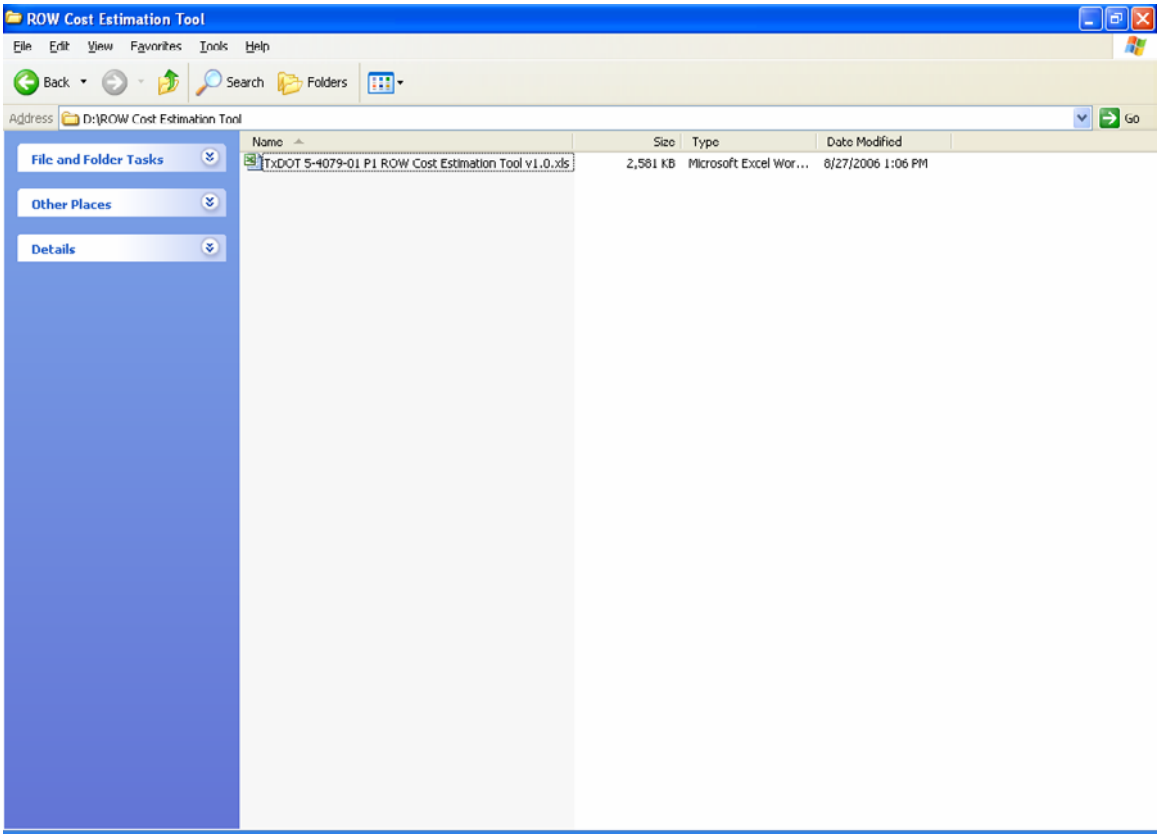



**Figure 1-3 Location of the Tool**

By double clicking on "TxDOT 5-4079-01 P1 ROW Cost Estimation Tool v1.0.xls" a Welcome page will automatically pop up (Fig. 1-4)

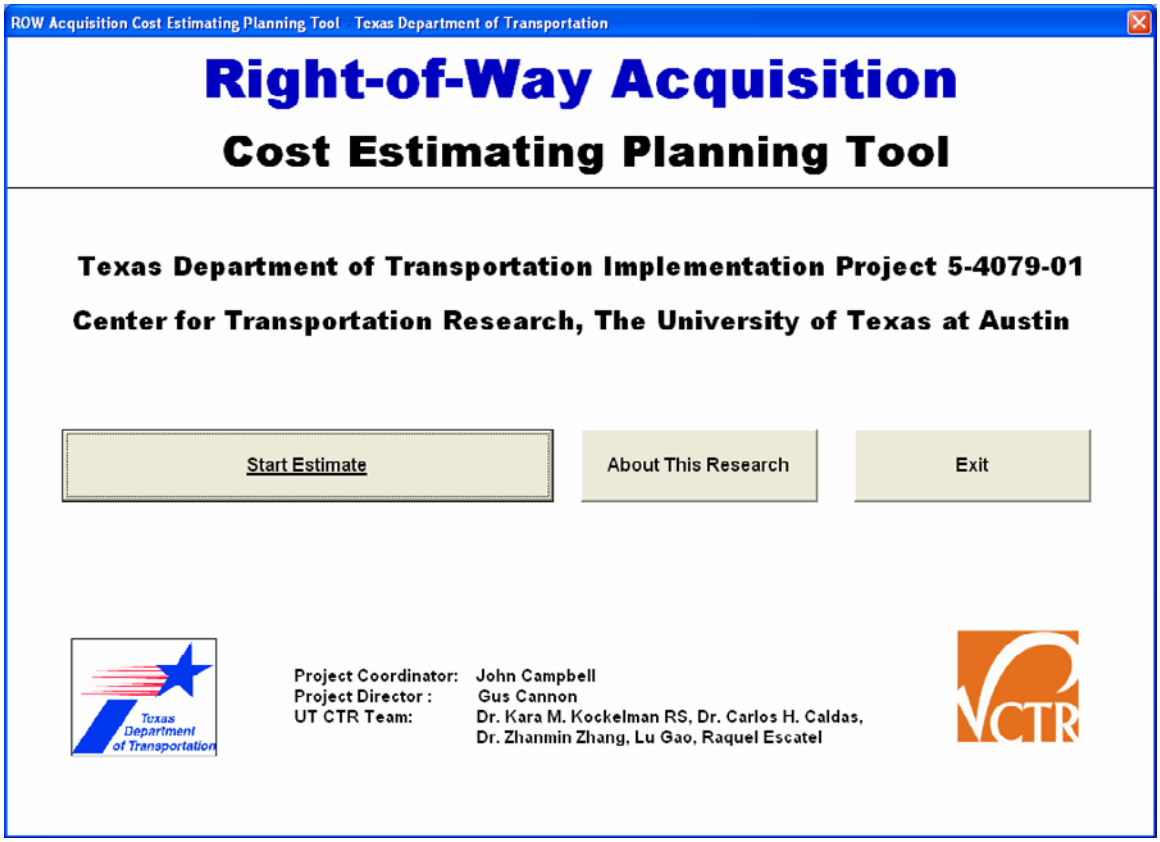



**Figure 1-4 Welcome Page**

Some users may not be able to see this Welcome page the first time due to the high Macro Security Level in their Excel configuration. If the user happens to see the pop-up in Fig. 1-5 instead of the Welcome page in Fig. 1-4, the application settings will have to be changed. This is done by clicking OK in the pop-up, going to the tool bar, and selecting Tool → Macro → Security. The Security Level should then be changed to Low (Fig. 1-6). By exiting the Excel (File→Exit) and then double clicking on the "TxDOT 5-4079-01 P1 ROW Cost Estimation Tool v1.0.xls", the user will see the Welcome page (Fig. 1-4)

**Figure 1-5 Security Pop-up**

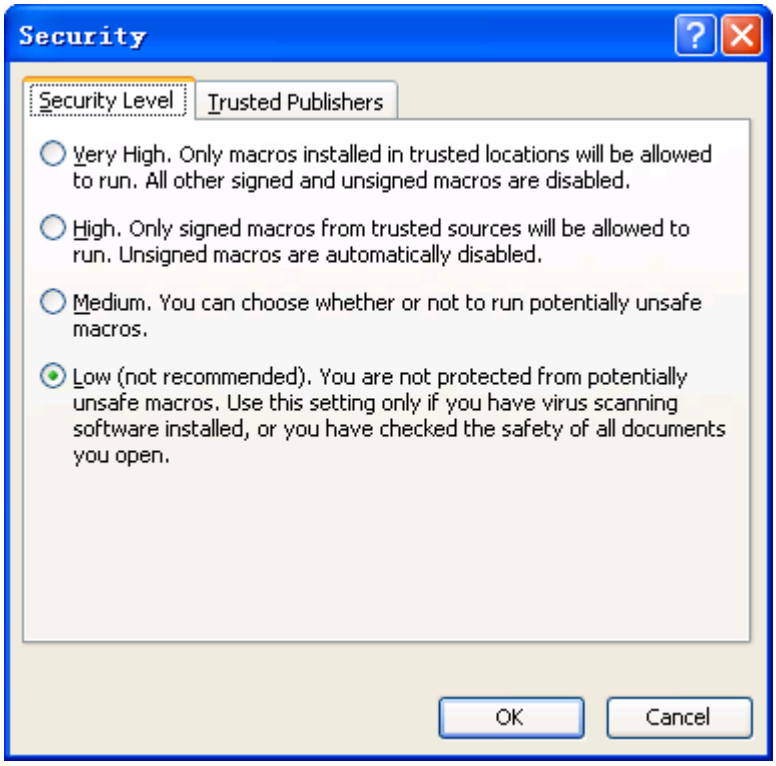



**Figure 1-6 Security Resetting**

## 1.4 Logging on to the Estimation Tool

There are three buttons in the Welcome page (Fig 1-4). By clicking on 'Exit' the user will close the program and the worksheets used in this tool will be displayed. Clicking on 'About This Research' will provide some details about this implementation project. Clicking the "Start Estimate" button will allow the user to start the process. Once the user clicks the "Start Estimate" button another window will pop up (Fig. 1-7) asking the user to input the District ID and Password.

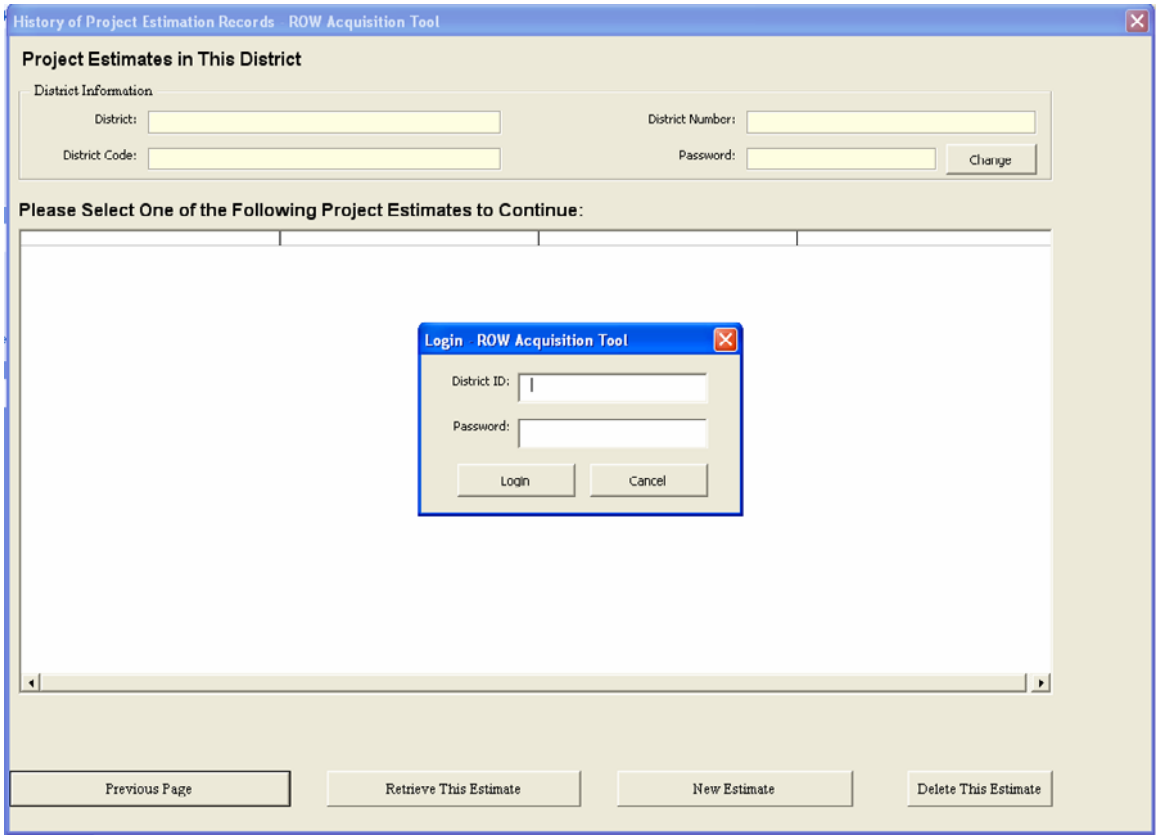



**Figure 1-7 Login Page**

Each district's ID is the 'DistrictNumber' column found in the TxDOTDistrict worksheet (See also Appendix A). Each district's password has been set to be 'abc' initially. The user can change the password directly in the password cell of the corresponding district in the TxDOTDistrict worksheet or change it in the next page of the tool. In this example, enter the district of Bryan's ID: 17, the password 'abc', and then click login. A new page titled 'History of Project Estimation Records' will then pop up (Fig. 1-8).

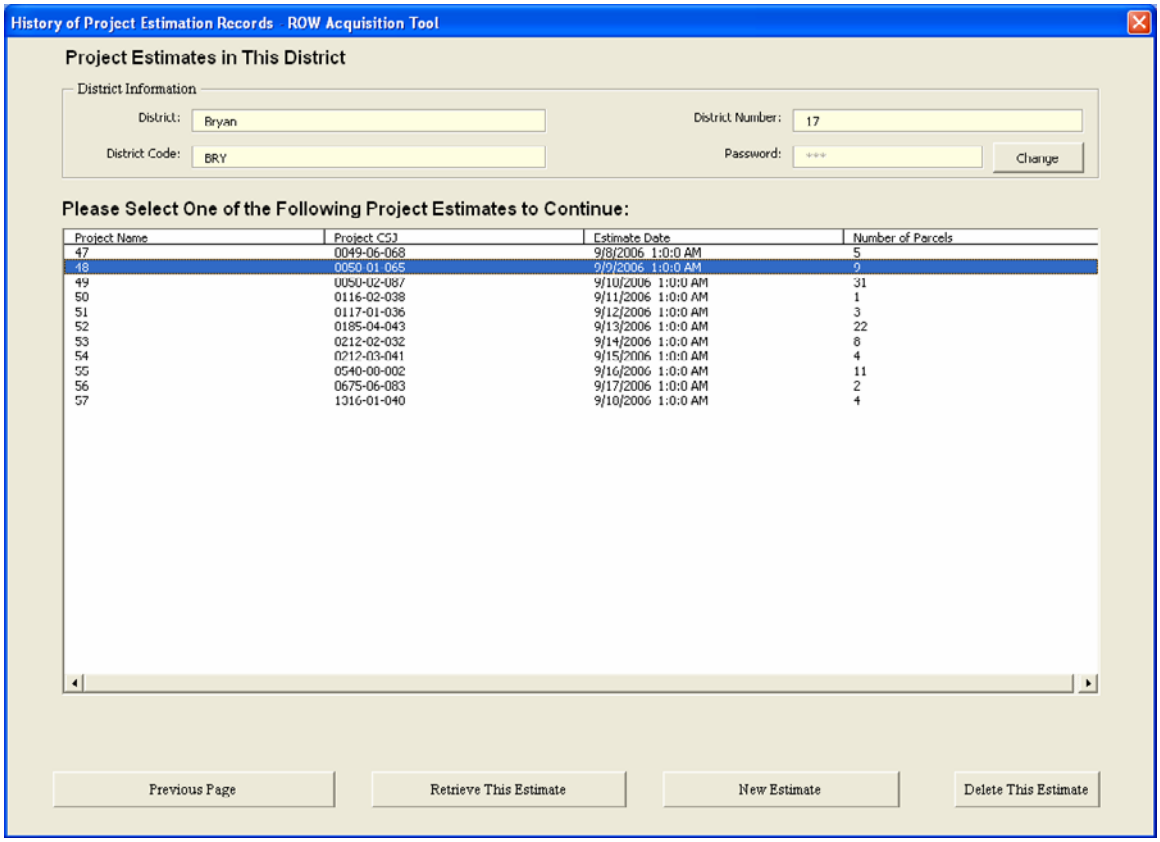



**Figure 1-8 History of Project Estimation Records Page**

## 1.5 New Estimate

In this page, there are four buttons from which the user can select. The first is the 'Previous Page' button, which will take the user back to the 'Welcome' page. This button is useful in case the user wants to switch to another district. If the user wants to retrieve an estimate that has already been entered into the tool, select the project by clicking on its Project Name until it becomes highlighted in blue, and click the 'Retrieve This Estimate' button. In this example, some projects have already been created from historical ROW acquisitions. If the user wants to delete a project that has already been entered into the tool, select the project and click on the 'Delete This Estimate' button. In this example, we chose to create a new estimate, which can be done by clicking the 'New Estimate' button prompting a new page to pop up (Fig. 1-9).

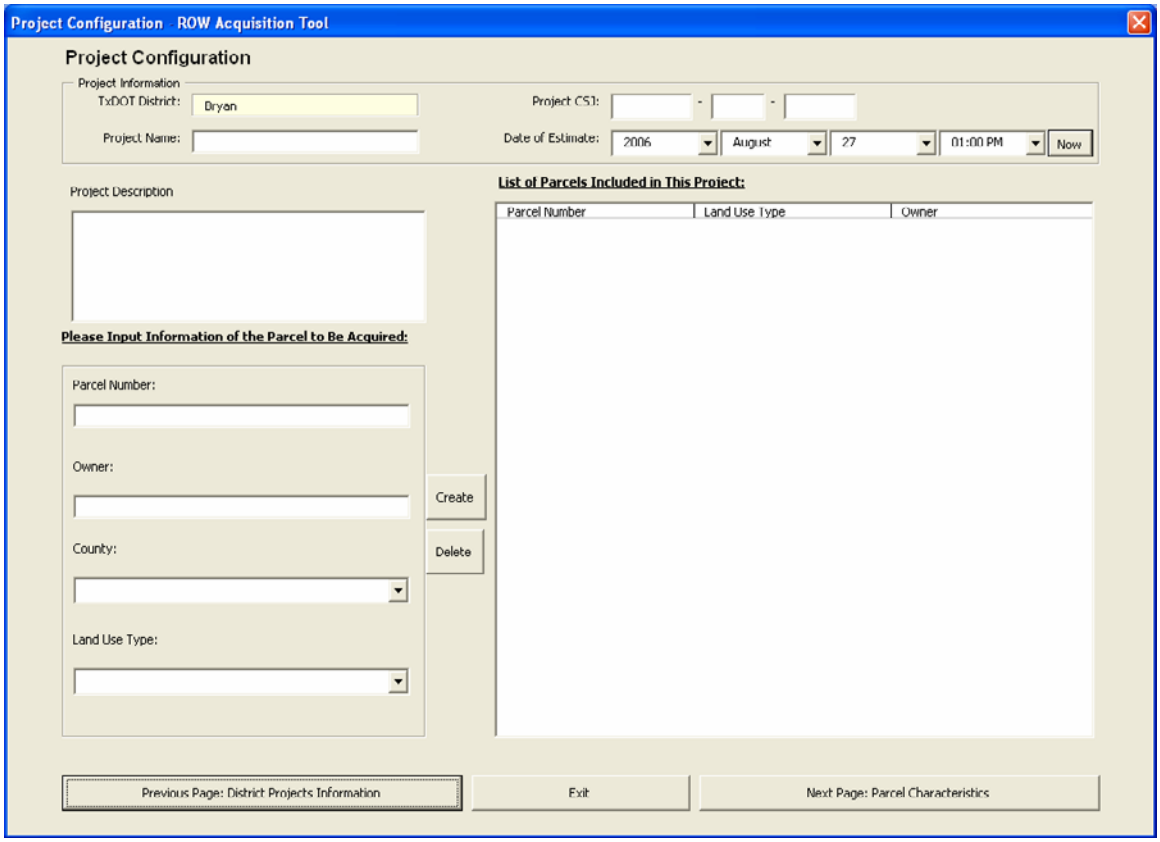



**Figure 1-9 Project Configuration Page**

## 1.6 Project Information

In this page (Fig 1-9), the user must input the following project information: Project Name, ROW CSJ, Date of Estimate, and Project Description. Parcel Number, Owner, County and Land Use Type option pertaining to the parcel in question. Input the information for the parcel and click the 'Create' button in the center of this page to add it to the project. If the user needs to input more than one parcel, continue entering the information pertaining to the parcel and click the 'Create' button to add them to the same project. To delete a parcel, select it by clicking on the parcel number until it becomes highlighted in blue, and then click the 'Delete' button. In this example, nine parcels from Brazos County were added. (Figure 1-10).

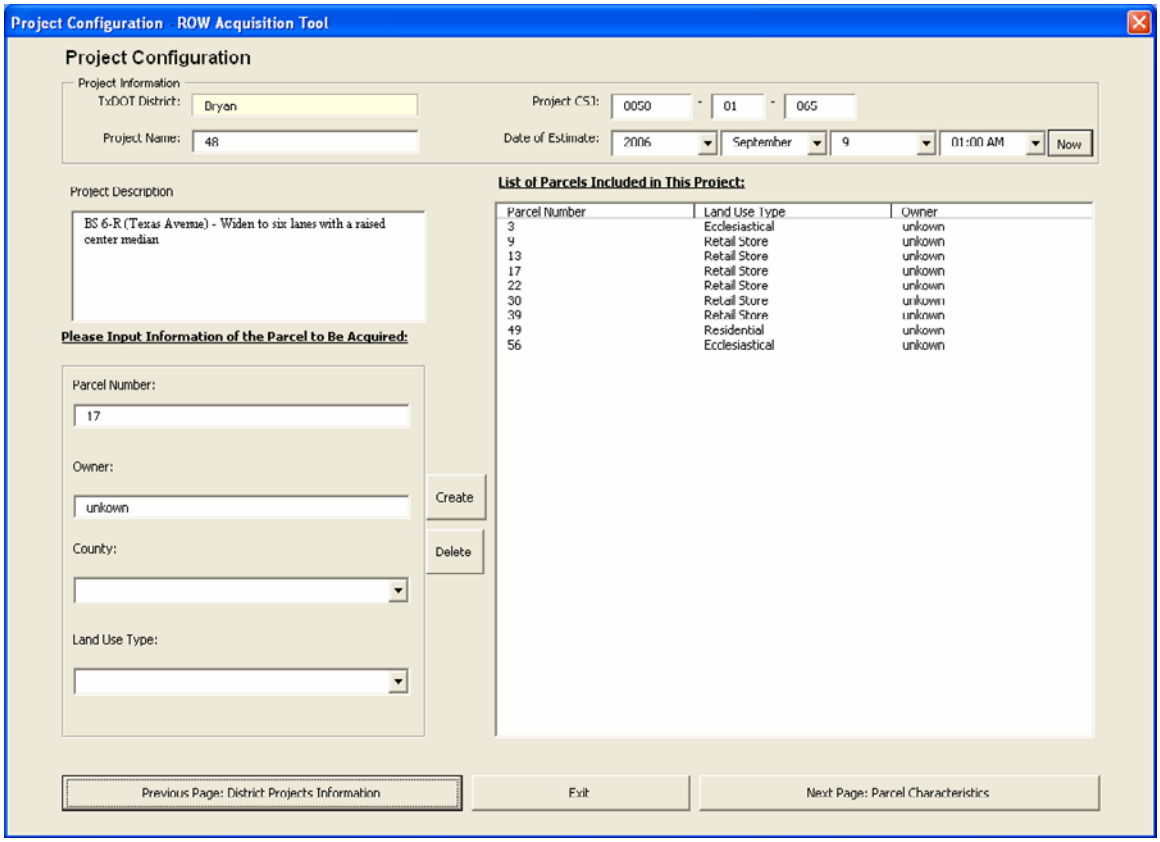



**Figure 1-10 Project Configuration Page**

Once the user has finished adding the parcels pertaining to a project, click on the 'Next Page: Parcel Characteristics' button to proceed with the cost estimating process (Fig. 1-11).

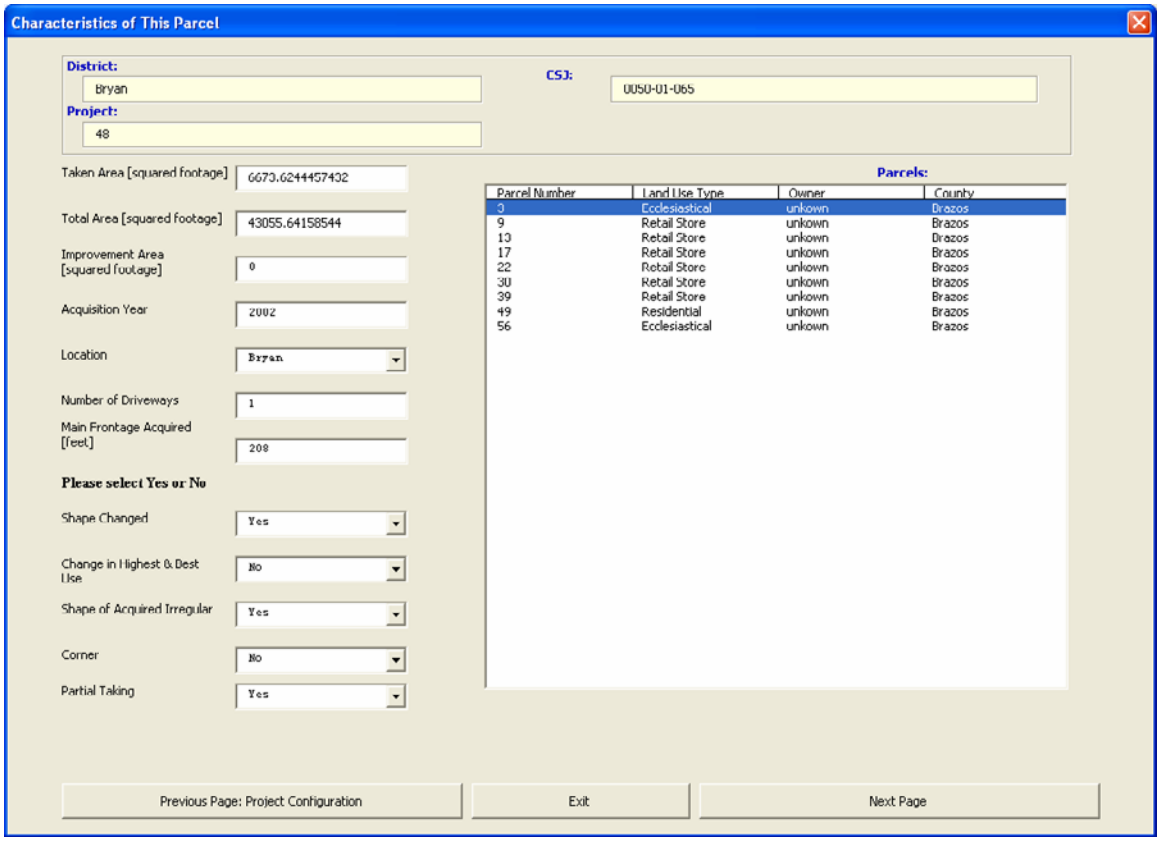



**Figure 1-11 Characteristics of Parcel Page**

## 1.7 Parcel Characteristics

In this page (Fig. 1-11), the user is to input the parcel data required for calculating the cost estimation. Detailed descriptions of the variables required can be found in Appendix B. Once the user finishes the data input for the first parcel then click the 'Next Page' parcel proceed to the next parcel in question (Fig. 1-12).

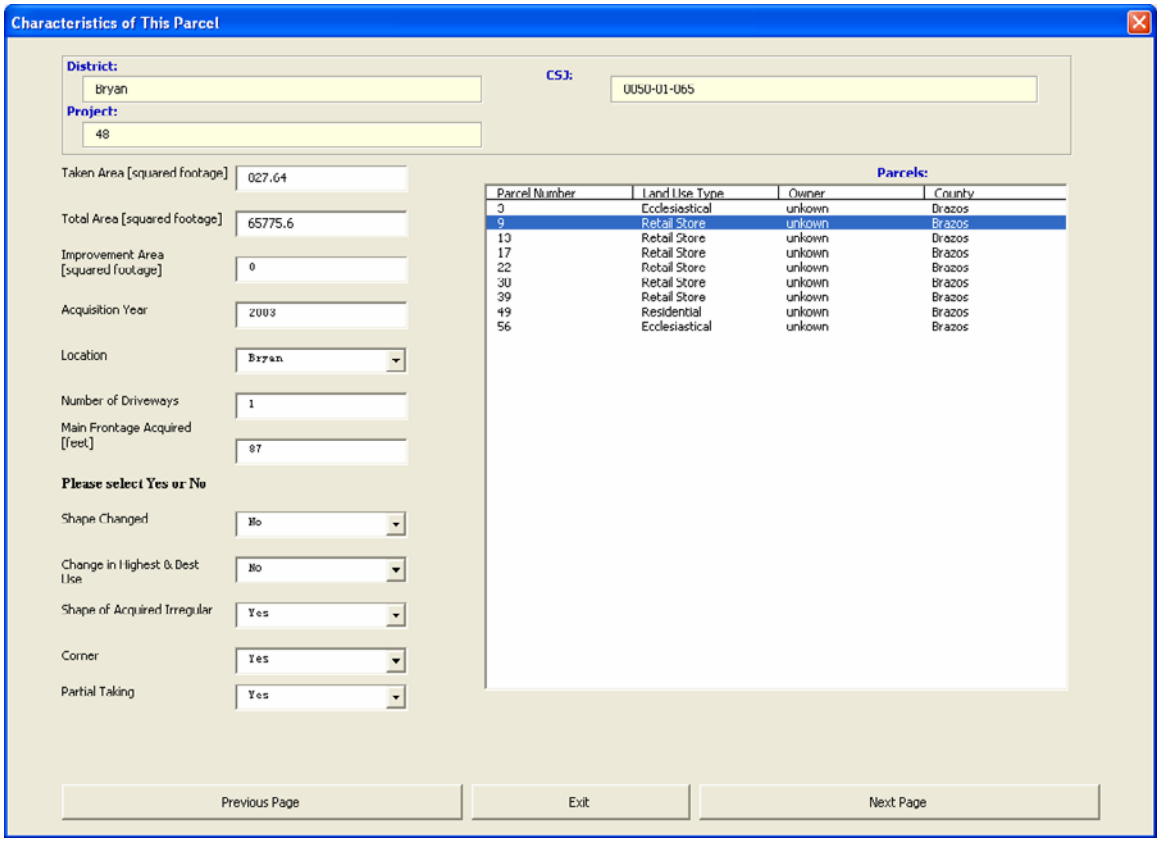



**Figure 1-12 Characteristics of Parcel Page**

## 1.8 Estimation Report

When the user reaches the last parcel input page (Fig. 1-13), click the 'Next Page: Summary Report of This Estimate' button to see the estimation report of this project (Fig. 1-15).

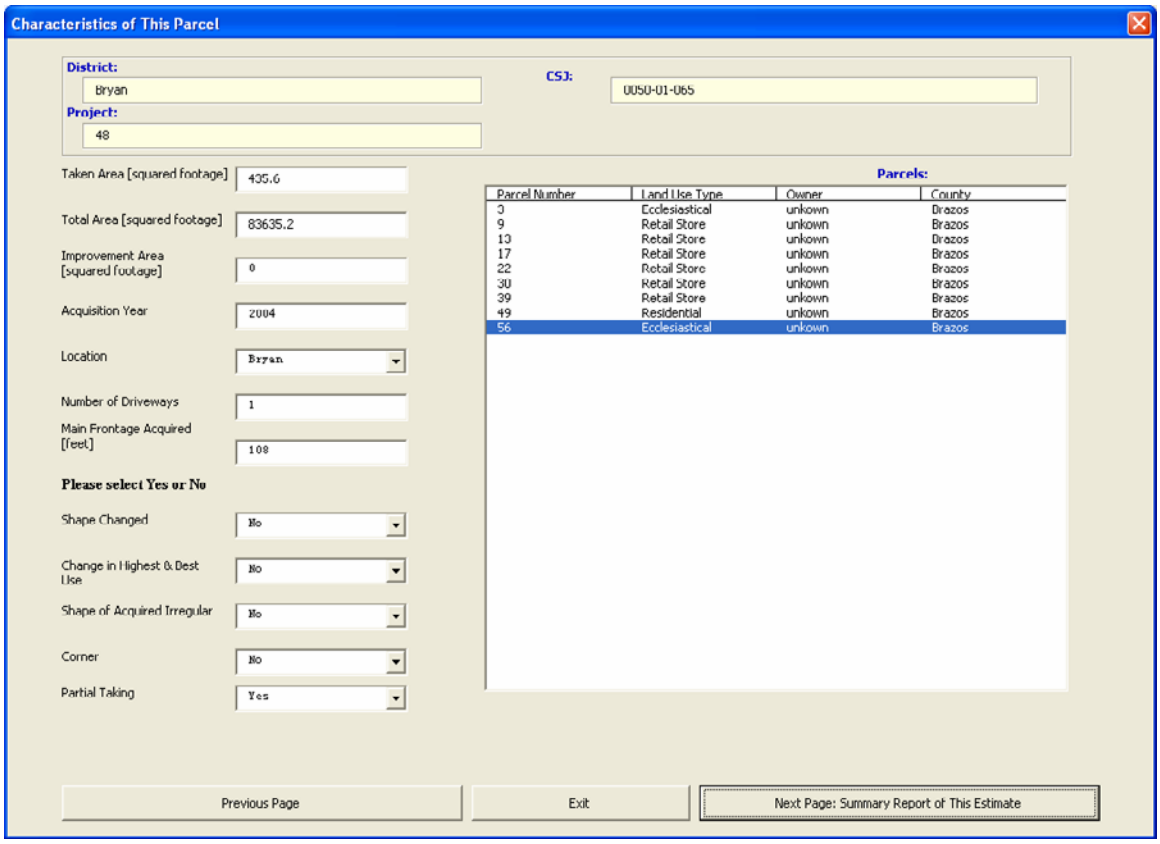



**Figure 1-13 Characteristics of Parcel Page (last parcel in the project)**

Since the calculation process normally takes several minutes, or even longer if more parcels are in the current project, a waiting page will pop up (Fig. 1-14) to show the possible remaining time before the final report.

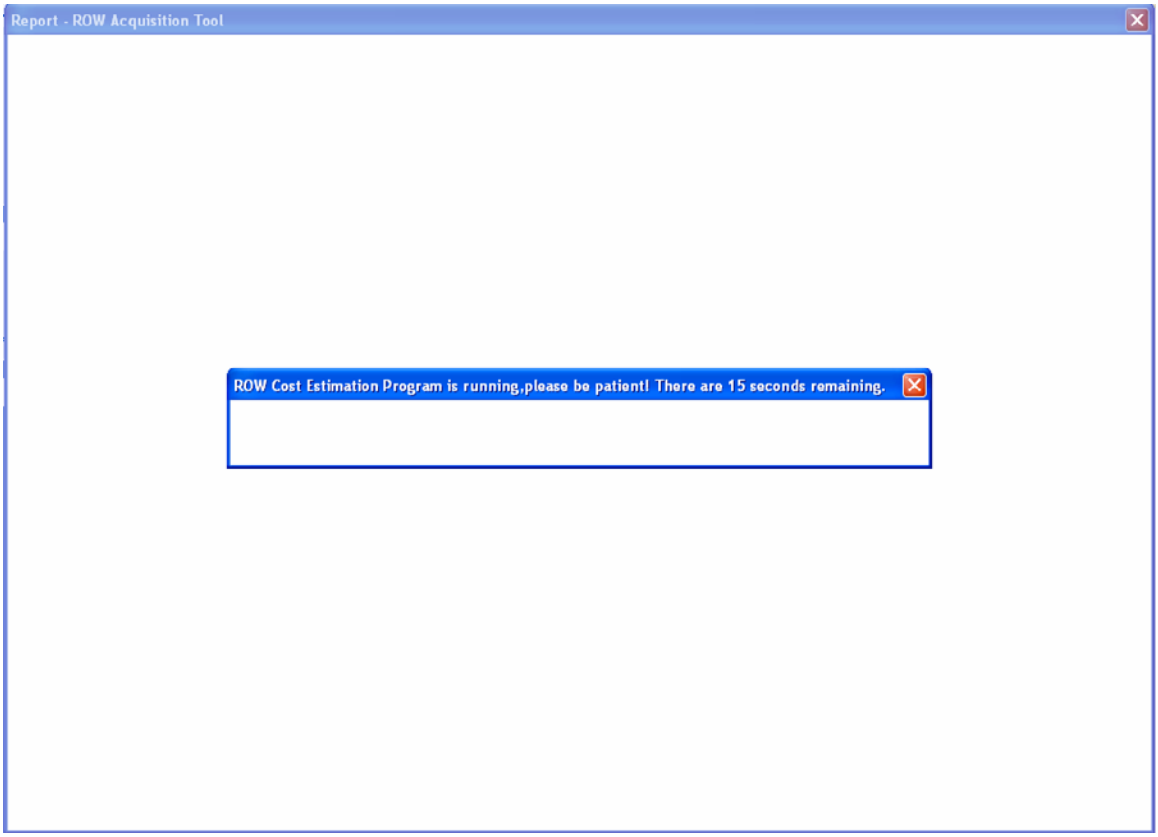



**Figure 1-14 Waiting Page**

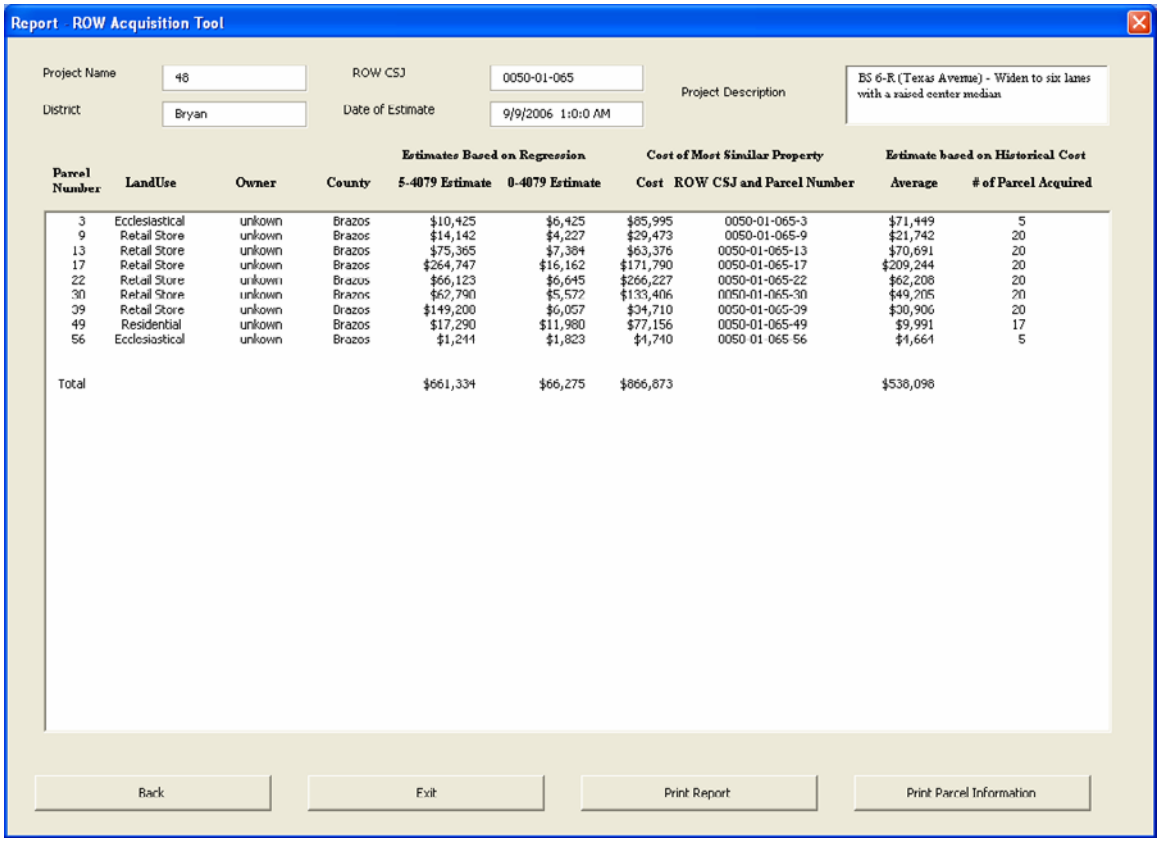



**Figure 1-15 Estimation Report Page**

On the Report page, there are four cost estimate results for each parcel as well as for the whole project. Two of the cost estimates are based on regression models, one is based on historical costs, and the last is based on the adjusted cost of historical acquisitions with similar properties to the parcel in question. Clicking the 'Back' button will take the user back to the characteristics of the parcel page. The option to print the report, which can be done by clicking the 'Print Report' button, is also available (Fig. 1-16). The data entered by the user can be reviewed by clicking the 'Print Parcel Information' button, which will print the data entered for all the parcels within the project (Fig. 1-17). The 'Exit' button allows the user to close the cost estimating process. To go back to the tool from the printable worksheets, click the 'Back' button on the right upper part of the report worksheet (Fig. 1-18).

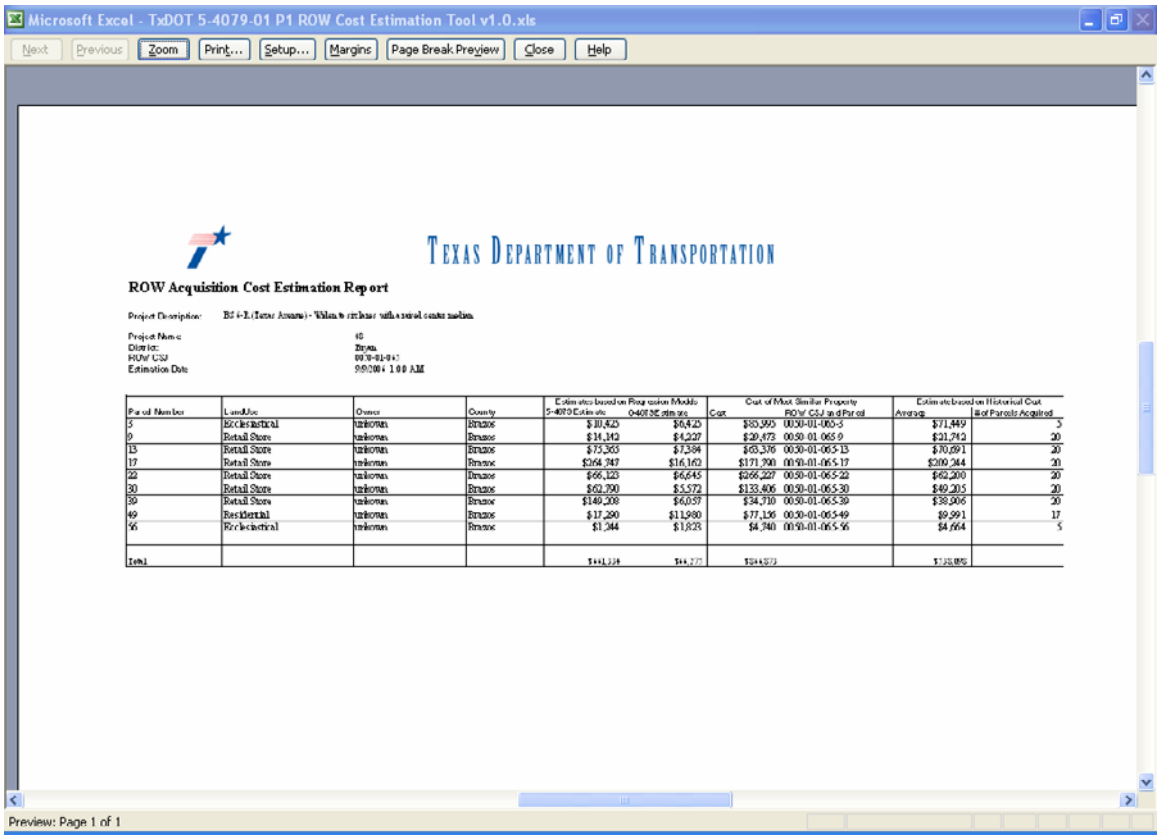



**Figure 1-16 Print the Report**

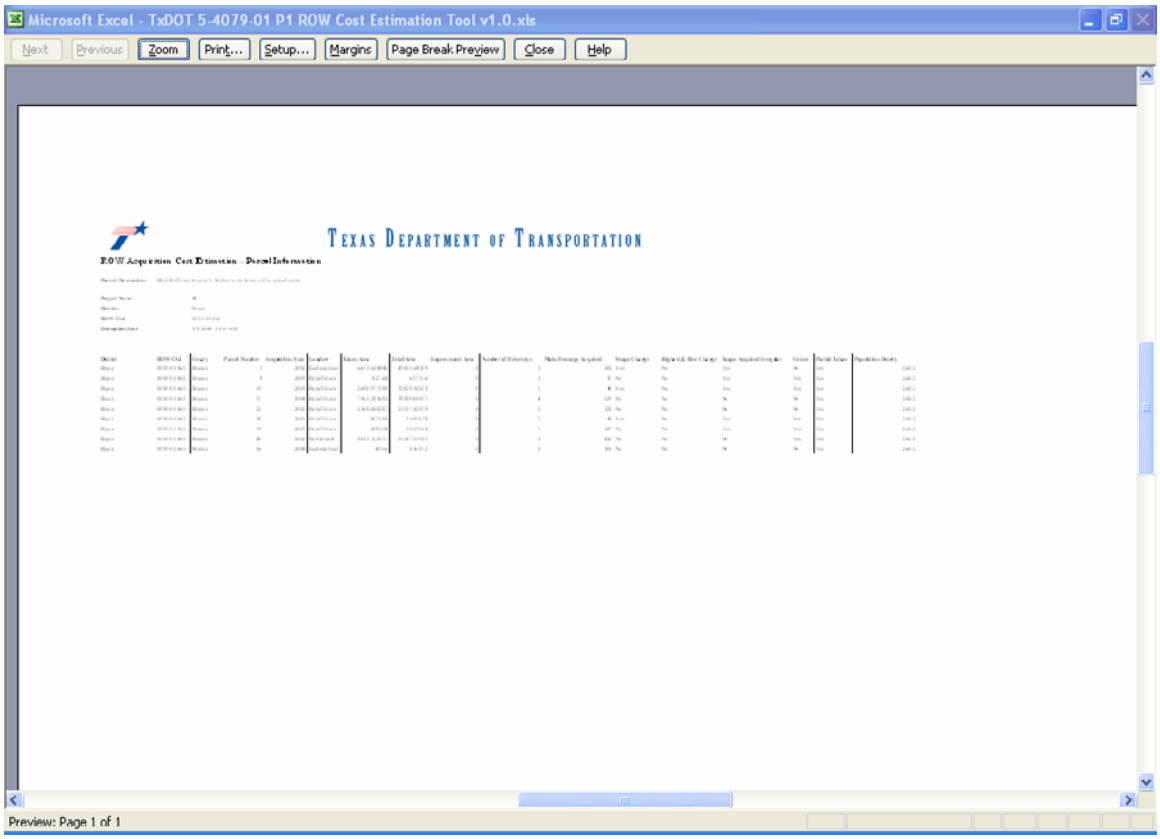



**Figure 1-17 Print Parcel Information**

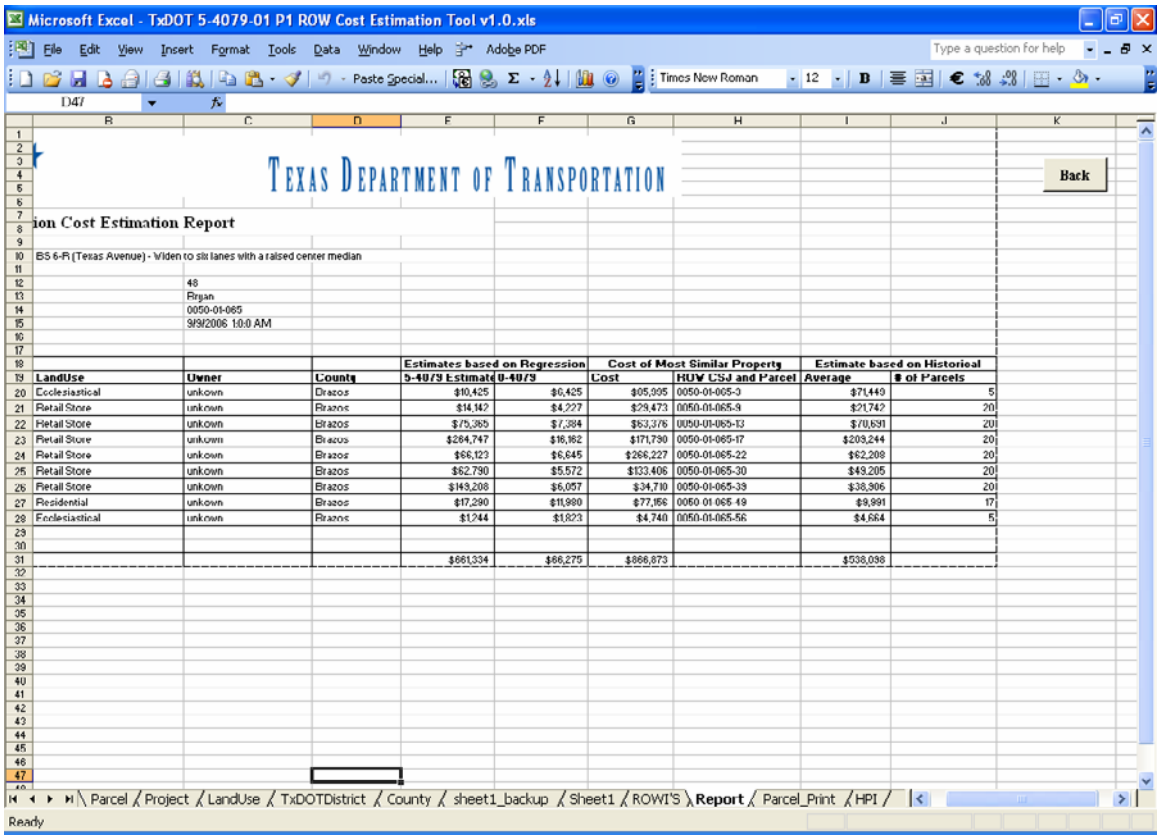
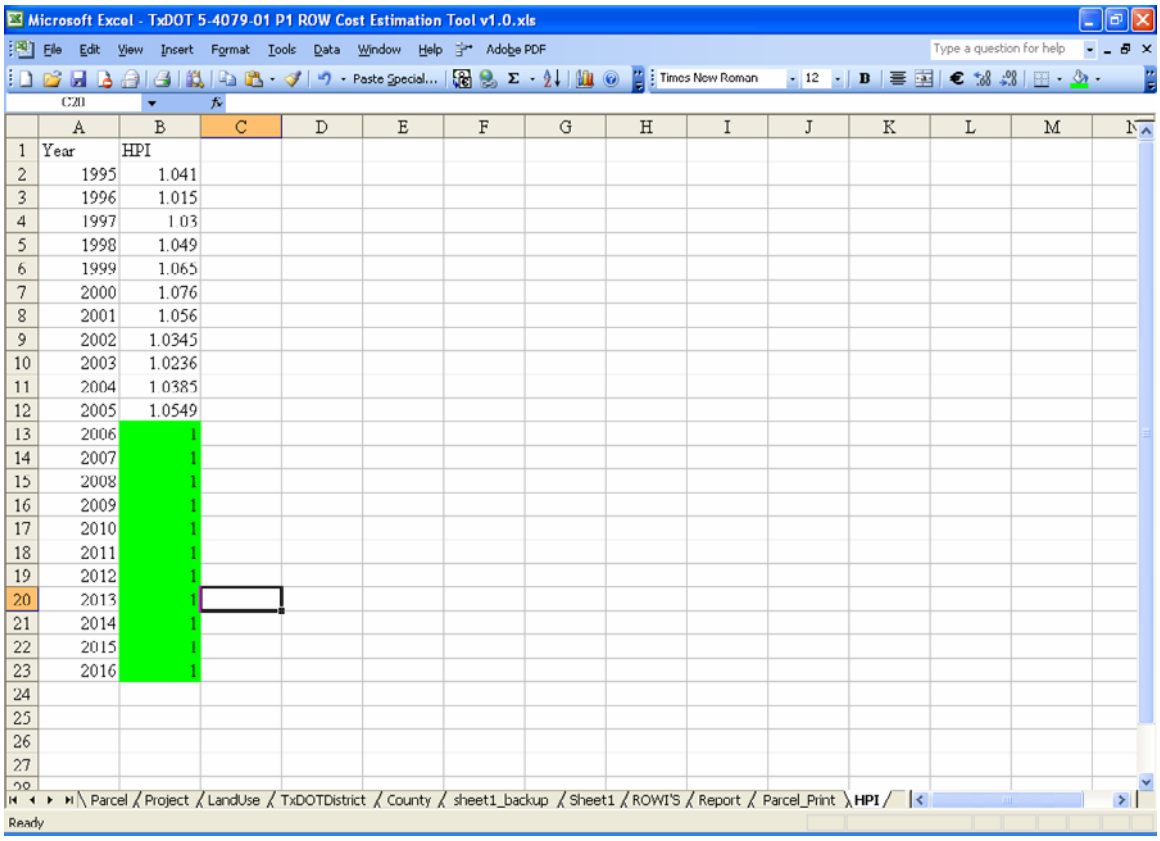



**Figure 1-18 Back Buttton**

## Future Update

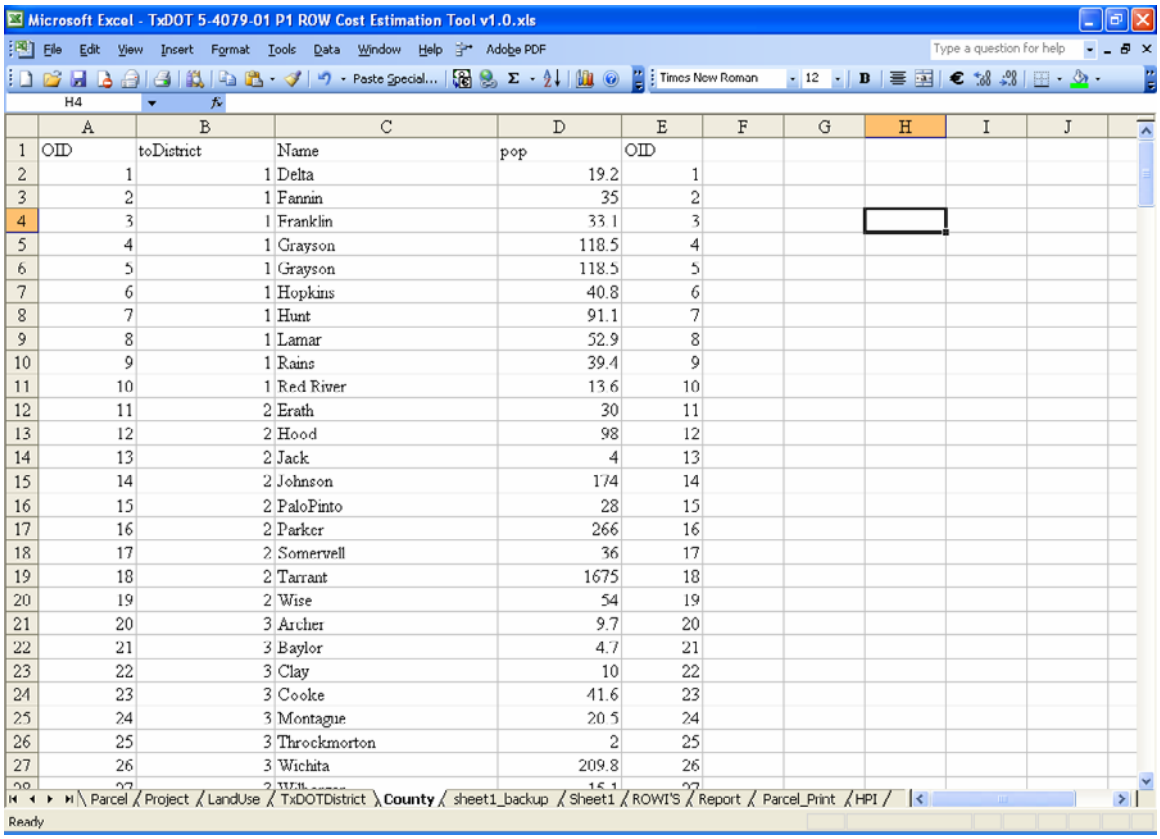
The estimates require the use of two variables, which will need to be updated annually. These two variables are the Housing Price Index (HPI) and the population density. For the HPI variable, future years' value can be added after the existing ones in the HPI worksheet (Fig. 1-19). If the code cannot find the current year's HPI, it will automatically assume it to be 1.




| | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Year | HPI | | | | | | | | | | | |
| 2 | 1995 | 1.041 | | | | | | | | | | | |
| 3 | 1996 | 1.015 | | | | | | | | | | | |
| 4 | 1997 | 1.03 | | | | | | | | | | | |
| 5 | 1998 | 1.049 | | | | | | | | | | | |
| 6 | 1999 | 1.065 | | | | | | | | | | | |
| 7 | 2000 | 1.076 | | | | | | | | | | | |
| 8 | 2001 | 1.056 | | | | | | | | | | | |
| 9 | 2002 | 1.0345 | | | | | | | | | | | |
| 10 | 2003 | 1.0236 | | | | | | | | | | | |
| 11 | 2004 | 1.0385 | | | | | | | | | | | |
| 12 | 2005 | 1.0549 | | | | | | | | | | | |
| 13 | 2006 | 1 | | | | | | | | | | | |
| 14 | 2007 | 1 | | | | | | | | | | | |
| 15 | 2008 | 1 | | | | | | | | | | | |
| 16 | 2009 | 1 | | | | | | | | | | | |
| 17 | 2010 | 1 | | | | | | | | | | | |
| 18 | 2011 | 1 | | | | | | | | | | | |
| 19 | 2012 | 1 | | | | | | | | | | | |
| 20 | 2013 | 1 | | | | | | | | | | | |
| 21 | 2014 | 1 | | | | | | | | | | | |
| 22 | 2015 | 1 | | | | | | | | | | | |
| 23 | 2016 | 1 | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |

**Figure 1-19 HPI Worksheet**

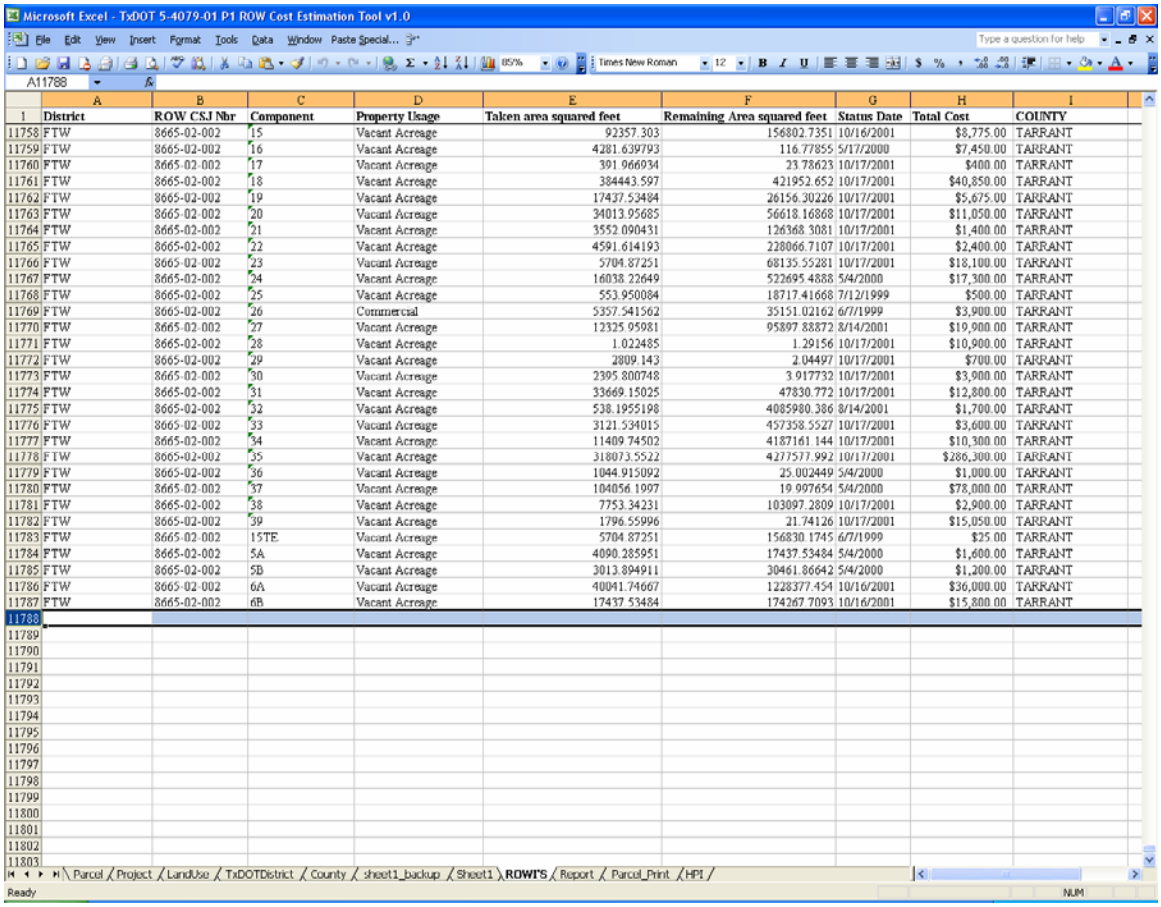
If the population densities change in the future, the user should also update the figure in the County worksheet in column D (Fig. 1-20).




| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | OID | toDistrict | Name | pop | OID | | | | | |
| 2 | 1 | 1 | Delta | 19.2 | 1 | | | | | |
| 3 | 2 | 1 | Fannin | 35 | 2 | | | | | |
| 4 | 3 | 1 | Franklin | 33.1 | 3 | | | | | |
| 5 | 4 | 1 | Grayson | 118.5 | 4 | | | | | |
| 6 | 5 | 1 | Grayson | 118.5 | 5 | | | | | |
| 7 | 6 | 1 | Hopkins | 40.8 | 6 | | | | | |
| 8 | 7 | 1 | Hunt | 91.1 | 7 | | | | | |
| 9 | 8 | 1 | Lamar | 52.9 | 8 | | | | | |
| 10 | 9 | 1 | Rains | 39.4 | 9 | | | | | |
| 11 | 10 | 1 | Red River | 13.6 | 10 | | | | | |
| 12 | 11 | 2 | Erath | 30 | 11 | | | | | |
| 13 | 12 | 2 | Hood | 98 | 12 | | | | | |
| 14 | 13 | 2 | Jack | 4 | 13 | | | | | |
| 15 | 14 | 2 | Johnson | 174 | 14 | | | | | |
| 16 | 15 | 2 | PaloPinto | 28 | 15 | | | | | |
| 17 | 16 | 2 | Parker | 266 | 16 | | | | | |
| 18 | 17 | 2 | Somervell | 36 | 17 | | | | | |
| 19 | 18 | 2 | Tarrant | 1675 | 18 | | | | | |
| 20 | 19 | 2 | Wise | 54 | 19 | | | | | |
| 21 | 20 | 3 | Archer | 9.7 | 20 | | | | | |
| 22 | 21 | 3 | Baylor | 4.7 | 21 | | | | | |
| 23 | 22 | 3 | Clay | 10 | 22 | | | | | |
| 24 | 23 | 3 | Cooke | 41.6 | 23 | | | | | |
| 25 | 24 | 3 | Montague | 20.5 | 24 | | | | | |
| 26 | 25 | 3 | Throckmorton | 2 | 25 | | | | | |
| 27 | 26 | 3 | Wichita | 209.8 | 26 | | | | | |

**Figure 1-20 County Worksheet**

Moreover, if more ROW records are available in the future, they can be added to the end of the ROWIS worksheet (Fig. 1-21), which is the pool for the most similar cost and average cost estimates. In the ROWIS worksheet, each row stands for one record. In order to be consistent with the existing data, each characteristic of the new records must be input exactly into the corresponding columns, e.g., county's name must be put in column 'I'.



Microsoft Excel - TxDOT 5-4079-01 P1 ROW Cost Estimation Tool v1.0

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | District | ROW CSJ Nbr | Component | Property Usage | Taken area squared feet | Remaining Area squared feet | Status Date | Total Cost | COUNTY |
| 11758 | FTW | 8665-02-002 | 15 | Vacant Acreage | 92357.303 | 156802.7351 | 10/16/2001 | $8,775.00 | TARRANT |
| 11759 | FTW | 8665-02-002 | 16 | Vacant Acreage | 4281.639793 | 116.77855 | 5/17/2000 | $7,450.00 | TARRANT |
| 11760 | FTW | 8665-02-002 | 17 | Vacant Acreage | 391.966934 | 23.78623 | 10/17/2001 | $400.00 | TARRANT |
| 11761 | FTW | 8665-02-002 | 18 | Vacant Acreage | 384443.597 | 421952.652 | 10/17/2001 | $40,850.00 | TARRANT |
| 11762 | FTW | 8665-02-002 | 19 | Vacant Acreage | 17437.53484 | 26156.30226 | 10/17/2001 | $5,675.00 | TARRANT |
| 11763 | FTW | 8665-02-002 | 20 | Vacant Acreage | 34013.95685 | 56618.16868 | 10/17/2001 | $11,050.00 | TARRANT |
| 11764 | FTW | 8665-02-002 | 21 | Vacant Acreage | 3552.090431 | 126368.3081 | 10/17/2001 | $1,400.00 | TARRANT |
| 11765 | FTW | 8665-02-002 | 22 | Vacant Acreage | 4591.614193 | 228066.7107 | 10/17/2001 | $2,400.00 | TARRANT |
| 11766 | FTW | 8665-02-002 | 23 | Vacant Acreage | 5704.87251 | 68135.55281 | 10/17/2001 | $18,100.00 | TARRANT |
| 11767 | FTW | 8665-02-002 | 24 | Vacant Acreage | 16038.22649 | 522695.4888 | 5/4/2000 | $17,300.00 | TARRANT |
| 11768 | FTW | 8665-02-002 | 25 | Vacant Acreage | 553.950084 | 18717.41668 | 7/12/1999 | $500.00 | TARRANT |
| 11769 | FTW | 8665-02-002 | 26 | Commercial | 5357.541562 | 35151.02162 | 6/7/1999 | $3,900.00 | TARRANT |
| 11770 | FTW | 8665-02-002 | 27 | Vacant Acreage | 12325.95981 | 95897.88872 | 8/14/2001 | $19,900.00 | TARRANT |
| 11771 | FTW | 8665-02-002 | 28 | Vacant Acreage | 1.022485 | 1.29156 | 10/17/2001 | $10,900.00 | TARRANT |
| 11772 | FTW | 8665-02-002 | 29 | Vacant Acreage | 2809.143 | 2.04497 | 10/17/2001 | $700.00 | TARRANT |
| 11773 | FTW | 8665-02-002 | 30 | Vacant Acreage | 2395.800748 | 3.917732 | 10/17/2001 | $3,900.00 | TARRANT |
| 11774 | FTW | 8665-02-002 | 31 | Vacant Acreage | 33669.15025 | 47830.772 | 10/17/2001 | $12,800.00 | TARRANT |
| 11775 | FTW | 8665-02-002 | 32 | Vacant Acreage | 538.1955198 | 4085980.386 | 8/14/2001 | $1,700.00 | TARRANT |
| 11776 | FTW | 8665-02-002 | 33 | Vacant Acreage | 3121.534015 | 457358.5527 | 10/17/2001 | $3,600.00 | TARRANT |
| 11777 | FTW | 8665-02-002 | 34 | Vacant Acreage | 11409.74502 | 4187161.144 | 10/17/2001 | $10,300.00 | TARRANT |
| 11778 | FTW | 8665-02-002 | 35 | Vacant Acreage | 318073.5522 | 4277577.992 | 10/17/2001 | $286,300.00 | TARRANT |
| 11779 | FTW | 8665-02-002 | 36 | Vacant Acreage | 1044.915092 | 25.002449 | 5/4/2000 | $1,000.00 | TARRANT |
| 11780 | FTW | 8665-02-002 | 37 | Vacant Acreage | 104056.1997 | 19.997654 | 5/4/2000 | $78,000.00 | TARRANT |
| 11781 | FTW | 8665-02-002 | 38 | Vacant Acreage | 7753.34231 | 103097.2809 | 10/17/2001 | $2,900.00 | TARRANT |
| 11782 | FTW | 8665-02-002 | 39 | Vacant Acreage | 1796.55996 | 21.74126 | 10/17/2001 | $15,050.00 | TARRANT |
| 11783 | FTW | 8665-02-002 | 15TE | Vacant Acreage | 5704.87251 | 156830.1745 | 6/7/1999 | $25.00 | TARRANT |
| 11784 | FTW | 8665-02-002 | 5A | Vacant Acreage | 4090.285951 | 17437.53484 | 5/4/2000 | $1,600.00 | TARRANT |
| 11785 | FTW | 8665-02-002 | 5B | Vacant Acreage | 3013.894911 | 30461.86642 | 5/4/2000 | $1,200.00 | TARRANT |
| 11786 | FTW | 8665-02-002 | 6A | Vacant Acreage | 40041.74667 | 1228377.454 | 10/16/2001 | $36,000.00 | TARRANT |
| 11787 | FTW | 8665-02-002 | 6B | Vacant Acreage | 17437.53484 | 174267.7093 | 10/16/2001 | $15,800.00 | TARRANT |

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Ready

**Figure 1-21 ROWIS Worksheet**

## Appendix A: Table of Districts' IDs

| OID | Name | ShortName | DistrictNumber | Initial Password |
|---|---|---|---|---|
| 1 | Paris | PAR | 1 | abc |
| 2 | Fort Worth | FTW | 2 | abc |
| 3 | Wichita Falls | WFS | 3 | abc |
| 4 | Amarillo | AMA | 4 | abc |
| 5 | Lubbock | LBB | 5 | abc |
| 6 | Odessa | ODA | 6 | abc |
| 7 | San Angelo | SJT | 7 | abc |
| 8 | Abilene | ABL | 8 | abc |
| 9 | Waco | WAC | 9 | abc |
| 10 | Tyler | TYL | 10 | abc |
| 11 | Lufkin | LFK | 11 | abc |
| 12 | Houston | HOU | 12 | abc |
| 13 | Yoakum | YKM | 13 | abc |
| 14 | Austin | AUS | 14 | abc |
| 15 | San Antonio | SAT | 15 | abc |
| 16 | Corpus Christi | CHP | 16 | abc |
| 17 | Bryan | BRY | 17 | abc |
| 18 | Dallas | DAL | 18 | abc |
| 19 | Atlanta | ATL | 19 | abc |
| 20 | Beaumont | BMT | 20 | abc |
| 21 | Pharr | PHR | 21 | abc |
| 22 | Laredo | LRD | 22 | abc |
| 23 | Brownwood | BWD | 23 | abc |
| 24 | El Paso | ELP | 24 | abc |
| 25 | Childress | CHS | 25 | abc |

# Appendix B: Table of Variables

| Variable Name | Explanation |
|---|---|
| Taken Area | Area of the land acquired |
| Total Area | Total land area of this parcel |
| Improvement Area | Area of the improvement of this parcel |
| Acquisition Year | Year in which parcel is acquired |
| Number of Driveways | Number of driveways of this parcel |
| Main Frontage Acquired | Frontage acquired in the main side |
| Shape Changed | If the shape of the land of this parcel was changed by acquisition, select Yes. |
| Change in Highest & Best Use | If the Highest & Best Use of this parcel was changed by acquisition, select Yes. |
| Shape of Acquired Irregular | If the shape of the acquired land is Irregular, select Yes. |
| Corner | If this parcel is located at the corner, select Yes |
| Partial Taking | If this acquisition only takes part of the whole property, select Yes. |
| Corpus Christi, Houston, San Antonio, Fort Worth, Austin, Abilene, EL Paso, Bryan, Waco and Wichita Falls | Location |
| HPI | Cumulative Housing Price Index to current year |
| 5-0479 Estimate | Estimation result from regression equations developed in project 5-0479. |
| 4-0479 Estimate | Estimation result from regression equations developed in project 0-0479. |
| Cost of Most Similar Property | Adjusted cost of historical acquisitions with similar properties to the parcel in question |
| Estimate based on Historical Cost | Estimate cost by using the historical data |