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User's Manual **TELUS for the PC**

TELUS National Version 4.0

A State-of-the-Art Transportation Information System for the 21st Century



User's Manual

TELUS for the PC

TELUS National Version 4.0

A State-of-the-Art Transportation Information System for the 21st Century

Developed by:

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1. Introduction

Overview

When the U.S. Congress passed the Intermodal Surface Transportation and Efficiency Act (ISTEA) in 1991, a new federal, state and metropolitan partnership was born. Elected officials representing local governments that comprise the nation's metropolitan areas were given substantially greater responsibility for making transportation investment decisions to provide the facilities and services required to meet the mobility needs of their citizens, businesses, and industries.

The Act requires Metropolitan Planning Organizations (MPOs) to engage annually in a process of updating their Transportation Improvement Program (TIP). The TIP identifies every highway, transit, bridge, safety, and other surface transportation project selected by an MPO to receive funds over the ensuing five (5) years. The Act requires this process to:

- Be open to, and highly participatory by, citizens and stakeholder groups;
- Consider the impacts of projects on the economy, land use, environment, and historical and cultural resources;
- Result in a “financially constrained” TIP; and
- Identify projects that are in “conformity” with applicable standards of the Clean Air Act.

This new direction in transportation planning was carried forward in the Transportation Equity Act for the 21st Century (TEA-21) and reconfirmed in a reauthorizing legislation known as Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), signed by President Bush in August 2005.

SAFETEA-LU Planning Objectives

In the SAFETEA-LU, the Congress identified the following eight objectives to guide the expenditure of federal dollars under the program:

1. Support the economic vitality of the metropolitan area especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase the accessibility and mobility options available to people and for freight;
5. Protect and enhance the environment, promote energy conservation, and improve quality-of-life;
6. Enhance the integration and connectivity of the transportation system across and between modes for people and for freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system.

Brief History of the System Development

TELUS — Transportation, Economic, & Land-use System — is an information-management and decision-support system designed specifically to help MPOs fulfill their legislative responsibilities described above.

- With its graphic, user-friendly interface and its comprehensive report feature, TELUS significantly improves an MPO's ability to meet its public-information obligation under the federal legislation.
- The information-management feature of TELUS allows for quick and efficient evaluation of alternative project scenarios and the financial implications of each, thus enhancing an MPO's ability to produce a financially constrained TIP and one that conforms to air quality standards.
- Finally, all the components of TELUS are designed as informational and decision-support features to augment an MPO's decision-making process, not to supplant it.

Between 1996 and 1998, the New Jersey Institute of Technology, the lead institution in the development of TELUS, worked in partnership with the Center for Urban Policy Research (CUPR) of Rutgers University and the North Jersey Transportation Planning Authority (NJTPA), the fourth largest MPO in the nation, to develop the initial design of the system. The design of the system was guided largely by the NJTPA staff and NJTPA's project steering committee, thus ensuring that the product met the needs of the MPO and fulfilled the mandates of ISTEA.

When TEA-21 was passed by Congress, the Act included funding for further development and deployment of TELUS. In 1998, NJIT hosted a meeting in Newark, New Jersey, of a representative group of 13 MPOs drawn from every region of the country. This "focus group" of MPOs and the TELUS staff engaged in extensive discussions of MPO needs for automation of the TIP process, project scoring techniques, economic and land-use impact analyses, freight modeling, and other issues. The results of that meeting largely shaped the work program for TELUS over the next several years.

Since 1998, the TELUS team has been working with 12 to 15 MPOs and several state DOTs serving as beta testers for the system. The beta participants have been meeting annually, and the participating MPOs represent large, medium and small agencies from all regions of the country.

In June 2000, TELUS National Version 1.0 was sent license-free to approximately 340 MPOs nationwide and to 50 state DOTs. Following this deployment, the TELUS team envisioned making some necessary minor modifications during the fall and issuing an interim release – version 1.1 by the end of that year. Based on the users' feedback of these releases, TELUS team keeps improving the design and functionality of the system in the subsequent years. As events unfolded, a number of major modifications have been made, justifying the releases of TELUS National Versions 2.0 and 2.1; TELUS National Versions 3.0 in 2003. The most recent release of TELUS National is Version 4.0, released in January 2006.

TELUS is currently available in two platforms: TELUS for the PC and TELUS for the Web. Both systems have similar functionality. TELUS for the PC is intended for use by a single agency, either as an application on individual personal computers or as a shared network application.

TELUS for the Web is designed for a multi-agency scenario. This manual accompanies the release of the TELUS National Version 4.0 for the PC. For more information about TELUS for the Web please refer to our website, http://www.telus-national.org/products/telus_web.htm.

The following section describes the major changes in TELUS for the PC, Version 4.0.

Major Improvements in TELUS National Version 4.0

- **New and improved User Interface:** A new look-and-feel has been introduced to Desktop TELUS version 4.0. The screens are more efficient and user-friendly.
- **GIS Review:** Initially, the user was limited to using the polygon tool in the GIS module to select projects in an area. The TELUS Version 4.0 allows the user to select a list of projects and then display the selection geographically. (This is discussed in Chapter 14)
- **List of Selected Projects:** A new feature, the Project List View (Chapter 14), shows a list of all selected projects.
- **Tool Tips:** This utility assists users in easy navigation of the system.
- **Long Range Plan:** As requested by the users, this option allows for the inclusion of the MPOs long-range projects apart from TIP, Non-TIP and Pre-TIP project categories.
- **Checking the Budget Limit:** A checkbox is provided in the Customization Module for the users to verify how well they are allocating the available funds among the projects. This option informs the user when the budget limit has been violated. (This is discussed in Chapter 5)
- **Import Customizations:** This feature enables the users to import all customizations that they made in their Version 3.0 of the software. No additional work is required for them to start using Version 4.0. (This is discussed in Chapter 11)
- **Project Picture:** This feature allows the user to upload a project picture, a video, or a drawing for each project. (This is discussed in Chapter 14)
- **Flexible Score Codes:** Previously, TELUS provided four score codes ranging from 0 (no effect) to 3 (Major effect). Version 4.0 allows users to Edit/Add/Delete score codes as per their needs. (This is discussed in Chapter 8)

- **New Economic Factors:** In addition to the fiscal impacts of earnings, jobs, income, and taxes, Version 4.0 provides impacts for business revenues (cash register receipts), profit/other and indirect business taxes. (This is discussed in Chapter 15)
- **Input-Output Model Reports:** In addition to viewing the I/O Model results on the screen, users can generate pre-formatted I/O reports. (This is discussed in Chapter 15)

System and Software Requirements

Minimum System Requirements

In order to install the TELUS software, your computer system must meet the following minimum system requirements:

- Pentium 133 or higher processor
- 32 mb of memory
- 200 mb of free hard disk space
- CD-ROM drive
- SVGA Monitor (256 color minimum; Best with 16-bit High Color)
- Windows 98, 2000, NT, XP, Server 2003 or more advanced operating system

Software Requirements

There is no additional software required to run TELUS. The TELUS software runs on a MS Access 2000™ / 2003™ platform; however for users who do not have this software, a free runtime version of MS Access 2000™ is included on the installation CD. To take full advantage of the database software, it is suggested that the user install the full version of MS Access 2000/ 2003 prior to installing TELUS.

2. Quick Start Guide

Overview

Welcome to the TELUS National Version 4.0 ‘Quick Start Guide’. This guide introduces you to the key steps for starting to build your TIP with TELUS. In this chapter you will learn how to get TELUS up and running; customize the system specifically for your agency; and enter, view, and analyze your project data. While this chapter is designed to give you an overall view of the system, it is not a substitute for reading the entire user’s manual. Also, the user should go to the TELUS National website at <http://www.telus-national.org/general/QandA.html> periodically for updated information on the system, including the “Frequently Asked Questions”, TELUS team contact information, and latest system improvements and revisions.

Installing and Opening TELUS for the First Time

Before installing TELUS, a “TELUS administrator” should be designated by your agency. This is the individual who will have total control over TELUS, including customizing features of the program, assigning levels of access to the system among staff and other potential users, full data management privileges, etc. This is also the person who should install the software (with assistance, if necessary) and open it the first time.

Please go to the TELUS website at www.telus-national.org and enter the information requested in order to become a “registered user” (registration requires no fee or commitment). When you have finished entering the information, you will be given a “Serial Number” that will allow you to install TELUS. The TELUS installation program will ask you for this Serial Number during the installation process. If your agency does not have Microsoft Access 2000 OR 2003, be sure to install “MS Access 2000 Runtime”, which is included on the Installation CD.

Upon successful installation of TELUS, the TELUS administrator should go to the TELUS icon on the desktop and double click on it with the left mouse button. As the program loads, you will

be asked to enter your User ID and Password. (These are given to you when you register.) After entering the program, select “Utilities” and then “System Security”. The administrator can change User IDs and Passwords to whatever you wish. Also, user IDs and Passwords for other users can be entered at this time, or later.

If you have any problems installing or using TELUS, or if you encounter error messages during the use of TELUS, please contact TELUS technical support on our website at www.telus-national.org.

Hints on Getting Started Using TELUS

Spend some time running through the various modules of TELUS so you become familiar with its features and formats. Make notes about the data requirements of different modules.

Go to “Data Input” and see what data you will need for each project. Pay particular attention to how “TELUS Classifications” breaks down into five levels and how the project scheduling/funding section works. Understanding the data input requirements for projects is very helpful in customizing the system to meet your particular needs.

Go to the Customization module in the Utilities Component and become familiar with the items that can be customized. Write down the types of information you will need in order to customize each item (e.g., what categories do you want to enter for item of “User Categories”; what phases of work do you want to include under the four broad phases already included in TELUS; etc.). Starting off with a well conceived plan for customization will lessen the need to come back later to change data that you have entered before.

Collect and organize all the data you need to enter for each project before you start entering them. With all the drop-down menus and default options available in TELUS, data entry will go quickly if you have the information readily available.

Installation

To install TELUS, either you must have MS Access 2000/2003 installed or you must install MS Access 2000 Runtime edition provided on the TELUS installation disk (To use the TELUS Report

Wizard, you must have MS Access 2000 installed). Next you must decide whether the Stand Alone or the Network installation is best suited for your agency. The Stand-Alone option installs all the TELUS program files in one location on one machine. With this option TELUS (and the TIP) is only accessible from this location. The network option splits the TELUS program files into server files and client files. The server files are installed on one centrally-accessible machine and hold the TIP data. The client files are installed on each user's machine providing the user interfaces and links to the TIP data on the server, thus enabling accessibility from multiple locations.

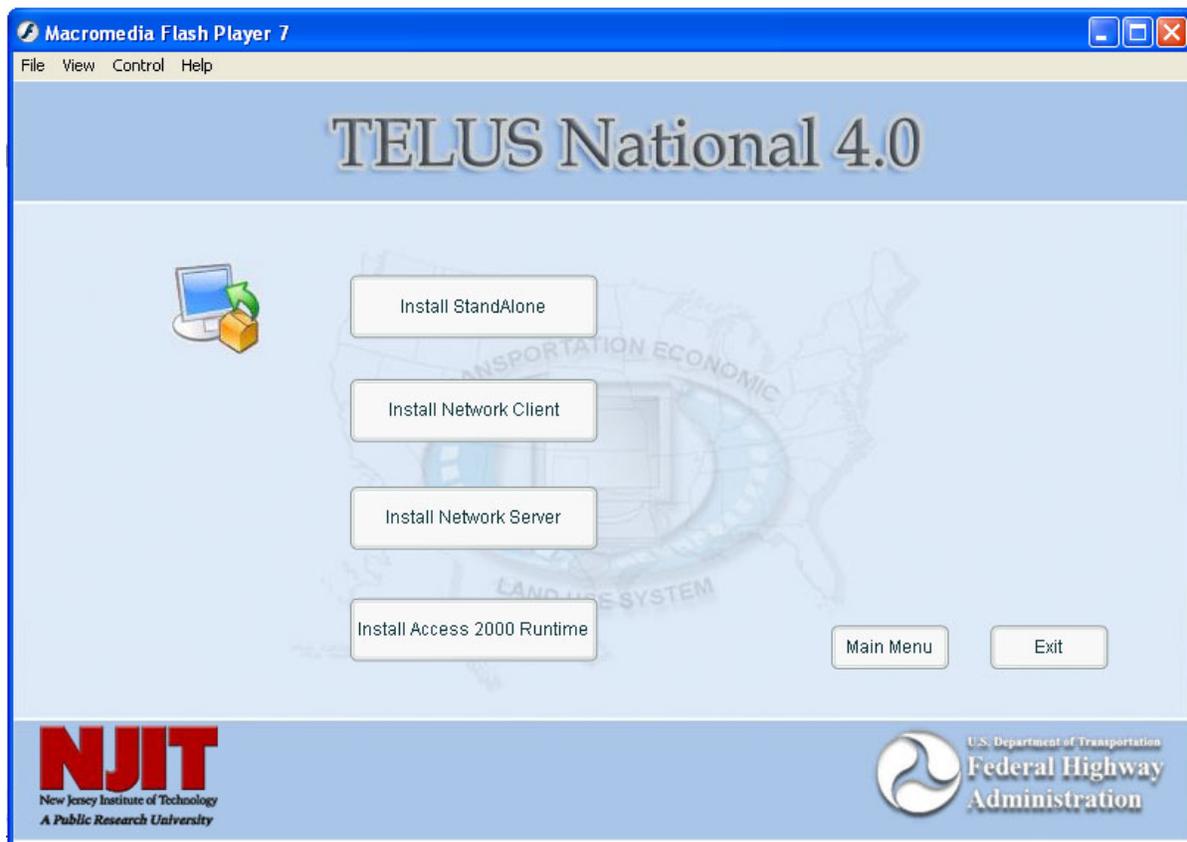


Figure 2.1: TELUS National 4.0 Installation Screen

When ready, insert the TELUS installation disk into your PC and the *Install TELUS/TELUM Main Menu* screen will appear. Selecting “Install TELUS” will launch the *TELUS National 4.0 Installation* screen where the user is given the opportunity to install TELUS and MS Access 2000 Runtime. If installing as a Stand-Alone, click the “Install StandAlone” button which will launch

the installation wizard. Continue to follow the on screen instructions. Be sure to note your installation path, as it will be needed in the next step.

If installing on a network, from the server machine select the “Install Network Server” button and make a note of the installation path. Then on the client machine(s), select the “Install Network Client” button, again noting the installation path. Detailed installation instructions are found in Chapter 3, *Installing TELUS National*.

System Setup

Before you can use TELUS, a connection must be established between the interface program and the data tables. On the Windows desktop, double click on the TELUS National 4.0 icon. At the *login* screen, login as “administrator” with password “telusadmin” (case sensitive). You will then be presented with the *TELUS welcome* screen, as shown in the Figure 2.2.

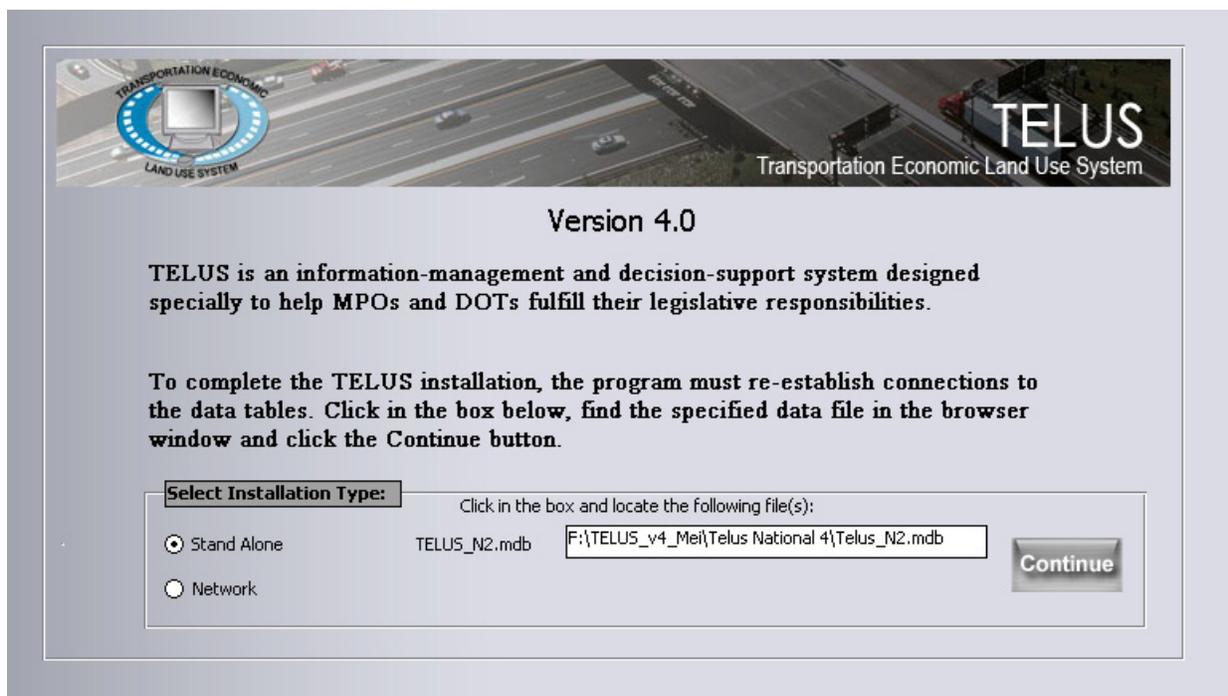


Figure 2.2: TELUS Welcome Screen

Select your installation type, either “Stand Alone” or “Network”. If installed as “Stand Alone”, you must locate the “TELUS_N4.mdb” file. The file will be located in the installation directory path identified in step one. (If you used the default installation location, you will find the file in

“C:\ProgramFiles\Telus National 4”). If installed as “Network”, you must locate the ‘TELUS_N4.mdb’ file (which will be on the client machine) and the ‘TIP_DATA4.mdb’ file (which will be on the server machine). Press the “Continue” button to complete the setup process. The *TELUS Main Menu* screen (Figure 2.3) will appear. Congratulations! TELUS has been installed and set up successfully. Detailed instructions for system setup are found in the *System Setup* section of Chapter 3, *Installing TELUS National*.

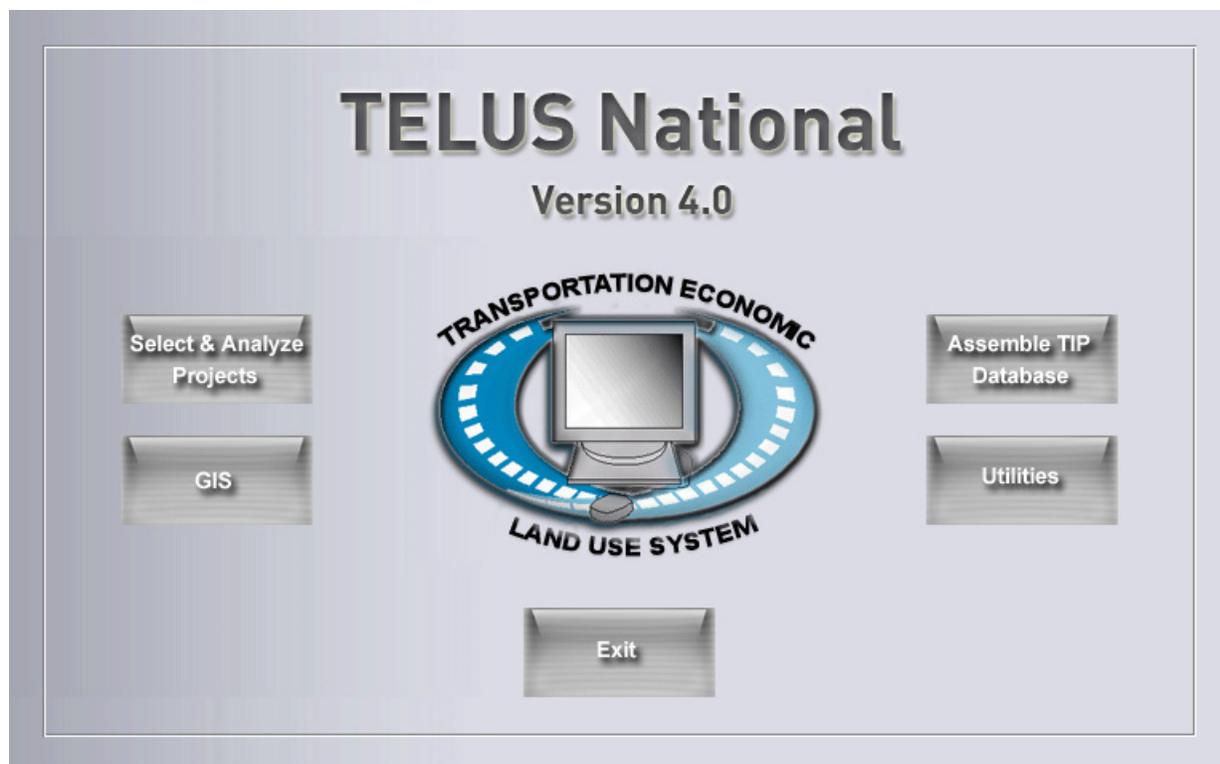


Figure 2.3 : TELUS Main Menu Screen

Security

TELUS provides three levels of security. At the lowest level, the *users* group can only view project information. The second level, the *managers* group, can view and edit project information. Finally, at the highest level, the *admins* group can view and edit project information, customize TELUS, and manage user accounts.

TELUS comes with three default user accounts. The ‘administrator’ account is a member of the *admins* group. The ‘TIPmanager’ account is a member of the *managers* group, and the

'TIPviewer' account is a member of the *users* group. The passwords for these accounts are provided in the letter which accompanied the installation disk. (Please note that user names and passwords are case-sensitive). It is suggested that after installation, either new user accounts are established, or the passwords of default accounts are changed.

To change user accounts, on the *TELUS Main Menu* screen click the "Utilities" button and then click the "Security" button on the *Utilities menu* screen to open the *TELUS Security* screen (shown in Figure 2.4). On the security screen, new users can be added and assigned to security level groups; existing users can be deleted; and users' passwords can be changed. Only members of the *admins* group can access this screen. All other users are limited to only changing their own passwords. Additional details on TELUS Security can be found in Chapter 4, *System Security*.



Figure 2.4 : TELUS Security Screen

Customization

The customization module allows each MPO to tailor TELUS to its unique needs. This is accomplished by incorporating agency terminology, establishing user choices, and assigning default values. Taken together, these features help reduce the time required for data entry, minimize errors, and increase the overall effectiveness of the TELUS System.

The customization module is accessed by clicking the “Utilities” button on the *TELUS Main Menu* screen. On the *Utilities Menu* screen, click the “Customize” button to open the *Customize Fields* screen, shown in Figure 2.5.

From this screen, TELUS fields can be assigned a unique Field Alias Name to reflect agency terminology (e.g., ProjectID1 can be renamed to MPO ID, ProjectID2 can be renamed to State ID, etc.). In order to minimize data entry time, certain fields can be assigned with default values. For example, if an agency is a bi-state MPO, the user could identify one of the states as its default state, and enter all the project data in that state. When complete, the user could switch the default state to another state’s name and enter relevant data in the second state. Meanwhile, known values can be entered for defined fields, such as listing all the county names in the agency jurisdiction.

Also from this screen, a Tip Length of three or five years can be selected. Subsequently, a “prior” and a “post” year are automatically added to the selected length. An option to check the budget for users’ to verify how well they are allocating the available funds among the projects is also available. In addition, the unit values and the number of decimal places for the financial information can be specified here. Finally, up to ten new fields can be added to the TELUS database. These customized fields can be used to manage additional information that may be needed in the TIP management.

Properly customizing TELUS is critical. Detailed consideration, overall thinking and methodical review of each field and its customization options are very important before entering project data so that you will not have to change, delete, switch and/or re-enter data due to improper initial customization. Detailed instructions for this module can be found in Chapter 5, *Customizing TELUS*.

Figure 2.5: Customize Fields Screen

Assemble TIP Database

TELUS is designed to store a vast amount of an agency's TIP-related data. This includes project details, scoring, interrelationships, and the overall budget information. To access the *Data Input Module* (Figure 2.6), click on the "Assemble TIP Database" button on *TELUS Main Menu* screen.

The "Data Input" button allows the user to enter detailed project information, including description, location, cost and status data. The interface (Figure 2.7) is composed of text boxes and drop-down boxes. In text-boxes, the user may enter the appropriate text or number. In drop-down boxes, the user's input is limited to the items listed. The *Data Input* screen reflects the customization from the previous step.

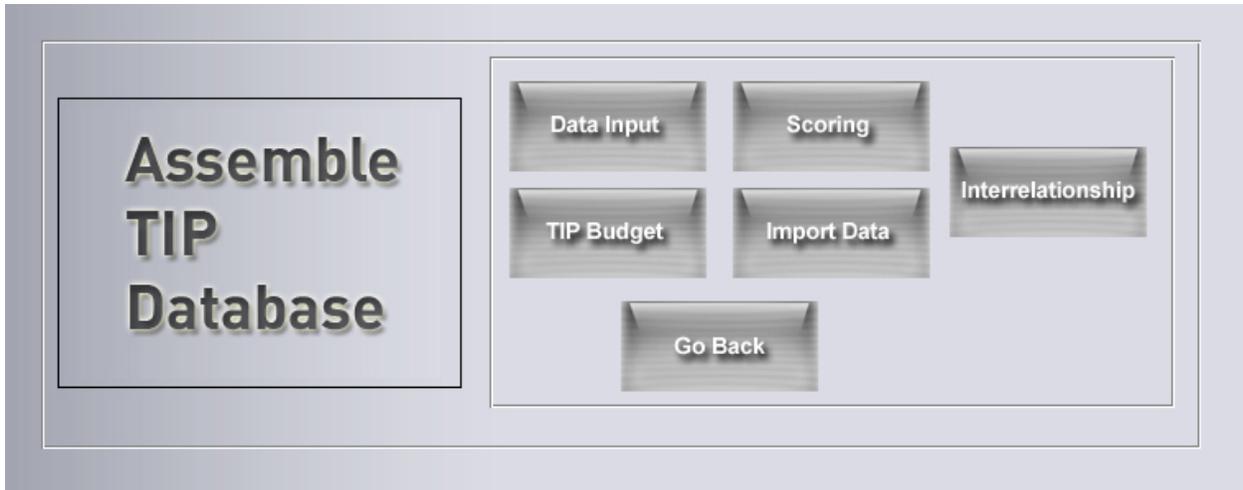


Figure 2.6: Data Input Module Screen

Data Entry

Go to: County: ProjectID1: Rev:

Only show latest project revisions ProjectID1: REVISION: TIP YEAR: -

Project ID2: Project ID3: Project Name:

Lead Agency: Contact: Phone:

TIP Status: Mode: User Cat.:

Description: Air Quality Status:

EIS Status:

Classification: (REQUIRED)

 1. System: 2. Project Type: 3. Functional Class:

 4. Category: 5. Subcategory:

Remarks:

Limits:

Route 1: Route 2:

Project Termini: (From) (To)

Length: Corridor:

State: County:

Municipality:

Districts: District 1: District 2: District 3: District 4:

Upload Project Picture: Please click on the text box to add/change picture for this project.

Figure 2.7: Data Input Screen

In addition to project information, the *Data Input Module* allows for scoring and relating projects, importing project information, and establishing the TIP budget by funding source and fiscal years. The full capabilities of the module are discussed in the *Assemble the TIP Database* section of the user's manual.

Selecting and Analyzing Projects

After establishing the TIP database, TELUS allows for various analysis of TIP projects. Clicking the “Select and Analyze Projects” button on the *TELUS Main Menu* screen launches the *Projects Selection* screen (Figure 2.8).

Figure 2.8: Projects Selection Screen

Select relevant fields' values to build a query statement that will be displayed in the textbox at the left-bottom corner of the screen. After building the query, click the “Select Projects” button to open the *Project Information* screen, as shown in Figure 2.9. This series of screens present the information for selected projects.

Project Information

TIP Year: 2004 - 2008 Goto: DA1500101 1 of 15 Go Back

ProjectID1: DA1500101 Revision: 1 Project Name: Saylorville Drive

Project Details

Identity | Description | Location | Custom Fields | Project Picture

IDENTIFICATION

ProjectID1: DA1500101 Project ID2: 15 Project ID3: 00101

Project Name: Saylorville Drive

CONTACT INFO

Lead Agency: Polk County

Contact: Kurt Bailey Phone: (515) 875-5500

Figure 2.9: Project Information Screen

In addition to viewing the information on the screen, the *TELUS Report Wizard* (Figure 2.10) allows the user to create, edit, print, and export pre-formatted reports.

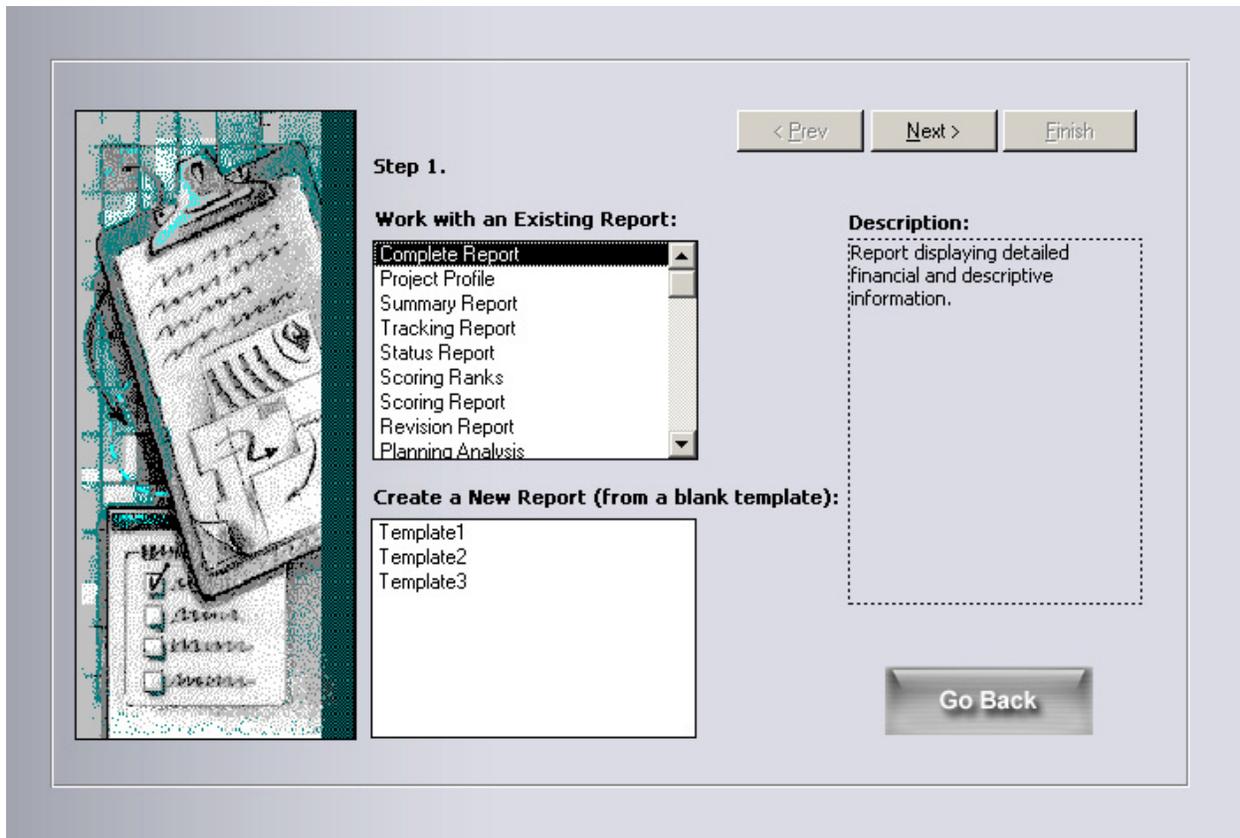


Figure 2.10: TELUS Report Wizard

Geographic Information System

TELUS has a built in *Geographic Information System* (GIS) (Figure 2.11), based on ESRI MapObjects software. The GIS module shows the location of TIP projects, displays selected projects, creates thematic maps, and allows for further analysis of selected projects.

The GIS is designed to give the user a spatial perspective of the MPO's TIP. GIS analysis in TELUS enables the display of TIP projects in relation to other transportation layers such as roads, rail lines, land use areas, or other layers the user chooses as a visual clue to the project's location in reference to other features. Setting up and utilizing the GIS module is discussed in Chapter 17.

3. Installing TELUS National

Installation

For detailed installation instructions please refer to the TELUS for the PC Installation Guide. The installation guide can be downloaded from the TELUS website at <http://www.telus-national.org/products/TELUSv4installguide.pdf>

Linking TIP Files

The TELUS interface files must be manually linked to the TIP database files. This is accomplished the first time TELUS National is run and does not have to be repeated (unless the TELUS database files are moved). Therefore, the following initialization steps must be performed before the system will run properly. Note that for Network installations, these steps must be performed from every client location.

1. During installation, a “shortcut” icon entitled “TELUS National 4.0” was placed on the desktop. Double-click on this icon to launch the TELUS software.
2. A *logon* screen appears, prompting for a user name and password. In the “user name” box, type “*administrator*” and press the “Tab” key. In the “password” box, type the password provided in the letter accompanying the TELUS-National installation disk. (Assigning user names and passwords are discussed later in Chapter 4, *System Security*.) Press the “Enter” key. The *TELUS Welcome* screen, shown in Figure 3.3, will appear prompting the user to reestablish linkages between the interface and database files.

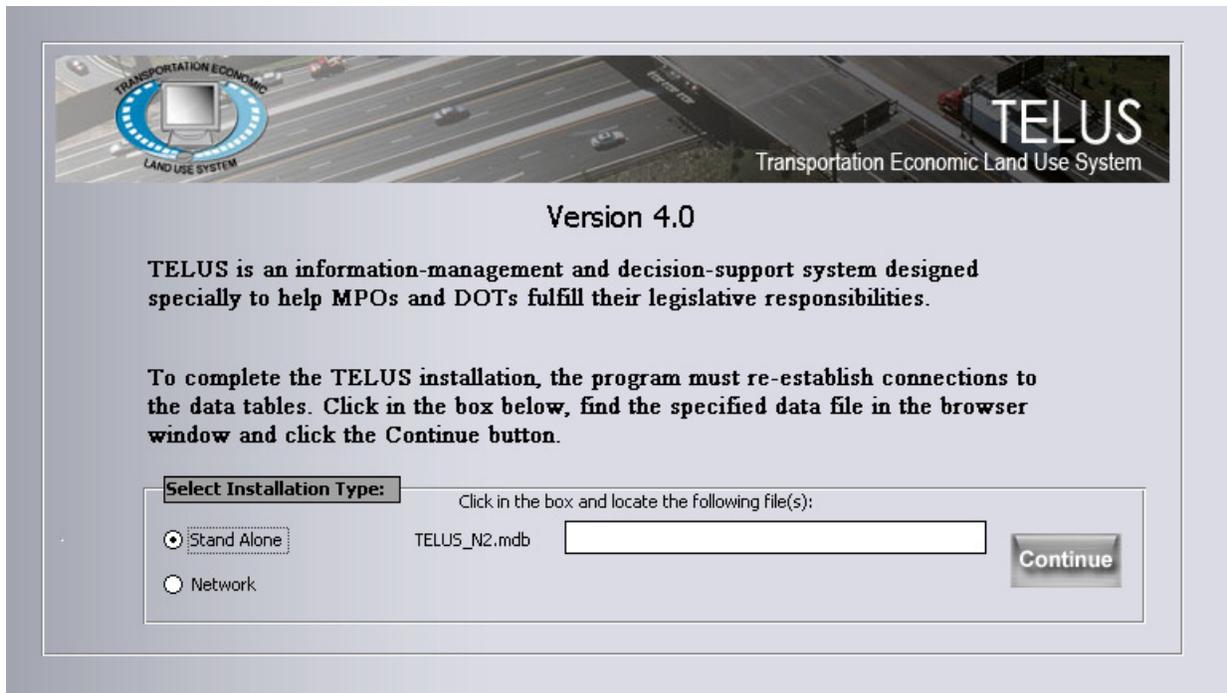


Figure 3.3: TELUS Welcome Screen

At the bottom of the screen, select your installation type, either “Stand Alone” or “Network”. If installed as “Stand Alone”, locate the “TELUS_N4.mdb” file from local machine. The file should be located in the “TELUS National 4.0” installation directory. If installed as “Network”, users must locate the “TELUS_N4.mdb” file from their client machine(s) and the “Tip_Data4.mdb” file from the server machine. The path to both of these files should have been recorded in earlier setup steps. After linking the database, click the “Continue” button to finish the initialization process. Once the database connections are reestablished, the *TELUS Main Menu* screen (Figure 3.4) will appear. TELUS has been installed and set up successfully.

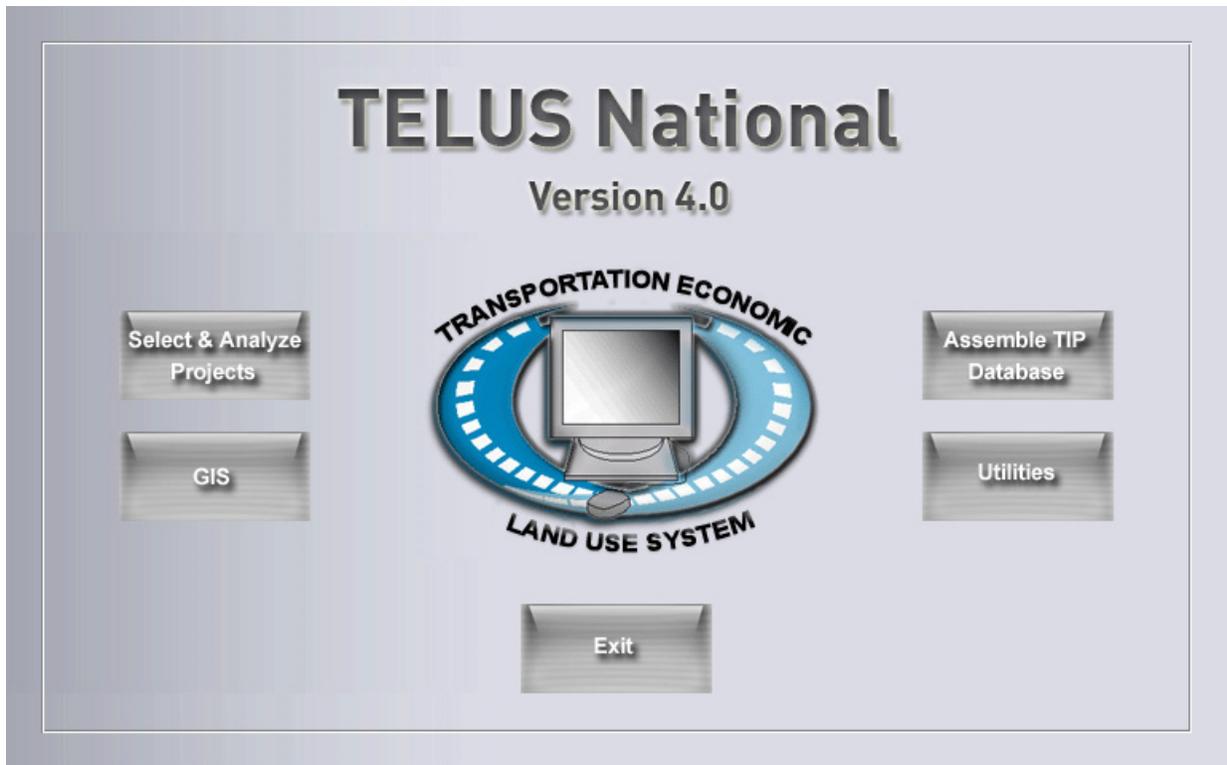


Figure 3.4: TELUS Main Menu Screen

Subsequent Setup Steps

The TELUS administrator should now setup system security by adding users, assigning their access levels and setting passwords. Follow the instructions in Chapter 4, *System Security*, to perform these functions.

TELUS is designed to allow an MPO to customize the software for its unique needs. This includes customizing field names, populating drop-down boxes, and assigning default values. Instructions for customizing TELUS are described in Chapter 5, *Customizing TELUS*.

4. System Security

Overview

To properly enable the security features discussed in this chapter, TELUS National should always be started from the “TELUS National 4.0” icon on Windows Desktop. The icon is linked to the security system and will prompt users for their username and password. If the software is started without using the icon, the security is set to the minimum (users) level, not allowing any changes to the project information and restricting access to certain areas of the program.

The *System Security Module* provides for three levels of security: Administrators (“*admins*”), Managers (“*managers*”), and Users (“*users*”).

1. *Admins*: It is recommended that only one staff member, and perhaps a backup, be assigned as “*admins*”. The *admins* level has full access to the TELUS software, except, of course, the source code and system programming. The primary responsibility of the *admins* is to control the level of access by others to the program and to the TIP database. The *admins* needs to decide, for example, which users will be allowed to edit the TIP database as opposed to simply viewing it and printing reports. The *admins* level also is the only security level that can add or remove users and assign user names other than the defaults. The *admins* can perform all functions described below for *managers* and *users*.
2. *Managers*: Members of the *managers* group are primarily responsible for maintaining the TIP database through the Data-Input Module, including, for example, adding, removing, and updating TIP project information. The *managers* can change their own password and can perform all the functions and activities described below for *users*.
3. *Users*: The *users* group can view TIP project information, perform sorts and queries, generate reports and otherwise use the full features of TELUS National. The *users* cannot edit project information. They have no security authorization other than that of changing their own password.

To access the Security module, click on the “Utilities” button on the *TELUS Main Menu* screen. Then, click on the “Security” button on the *Utilities menu* screen.



Figure 4.1: Utilities Menu Screen

Existing Accounts

Each level of security described above has a system “account”. User accounts can be accessed from any location where the program is installed. The system accounts are listed below.

Account (User) Name	Security Level	Password
Administrator	Admins	*see transmittal letter
TIPmanager	Managers	*see transmittal letter
TIPviewer	Users	Read-only

The *admins* security group member may set up additional accounts for individual users.

Adding/Deleting Users

Only the *admins* security level can add or remove new users through the *TELUS Security* screen (see Figure 4.2). To add a new user, the administrator types in a new user name, selects a level of security, and assigns a temporary password. The password needs to be entered a second time in the “Confirm” box to prevent spelling errors. (New users should change the password the first time they log on, as described below.) Once all the information is entered, click the “Add” button.

Figure 4.2: TELUS Security Screen

To remove a user, the administrator selects the appropriate name from the drop-down box and clicks the “Delete” button. The administrator can also change the password for any account.

Changing User Passwords

A user may change his/her password by clicking the “Change Password” button on the *Change Password* window, reflected in Figure 4.3.

Figure 4.3: Change Password Screen

After typing or selecting their account name in the “User” box, the old and new passwords must be entered. The new password must be entered a second time in the “Confirm” box to prevent spelling errors. Once all the information is entered, click on the “Change Password” button.

Access Levels

The security levels discussed earlier restrict access to certain features of TELUS for some users. The following table lists the features that are accessible at each security level.

TELUS Features	Admins	Managers	Users
Security	X		
Customization	X		
Assemble TIP Database	X	X	
Select & Analyze Projects	X	X	X
GIS	X	X	X

5. Customizing TELUS

Overview

The Customization module allows each MPO to tailor TELUS to its unique needs. This is accomplished by customizing a number of field names with the MPO's terminology, populating drop-down boxes with specific information such as county and municipality names, and assigning default values for certain fields. Together, these features help to reduce errors when entering project information into the system and increase common understanding when viewing and analyzing project information.

The Customization module is accessed by clicking the "Utilities" button on the *TELUS Main Menu* screen. On the *Utilities Menu* screen (shown in the previous section, Figure 4.1), clicking on the "Customize" button opens the *Customize Fields* screen, shown in Figure 5.1. Only users with *admins* security privileges (see Chapter 4, *System Security*) can access the customization module.

From the *Customize Fields* screen, the user can apply three customization features, including:

- *Field Alias Name*: recognizing that most agencies have their own unique terminology, TELUS allows the database administrator to enter unique names for certain fields. The name entered by the administrator will then automatically be reflected throughout the system on all screens, reports and printouts. For example, the generic fields Project ID1, Project ID2, and Project ID3 may be customized as MPO ID, State ID, and Local ID, respectively.
- *Possible Values*: This feature allows for the creation of a list of possible values for the field. This list then appears as a drop-down on the data entry form.
- *Default Value*: To aid in the process of data entry, the administrator may enter a value, which will appear automatically when entering a new project into the TIP database. For example, a Tennessee MPO may desire to use TN as the default value for the State field.

A multi-state MPO would list its states (e.g., MO and KS) and choose MO as default when entering Missouri data and change it to KS when entering Kansas data.

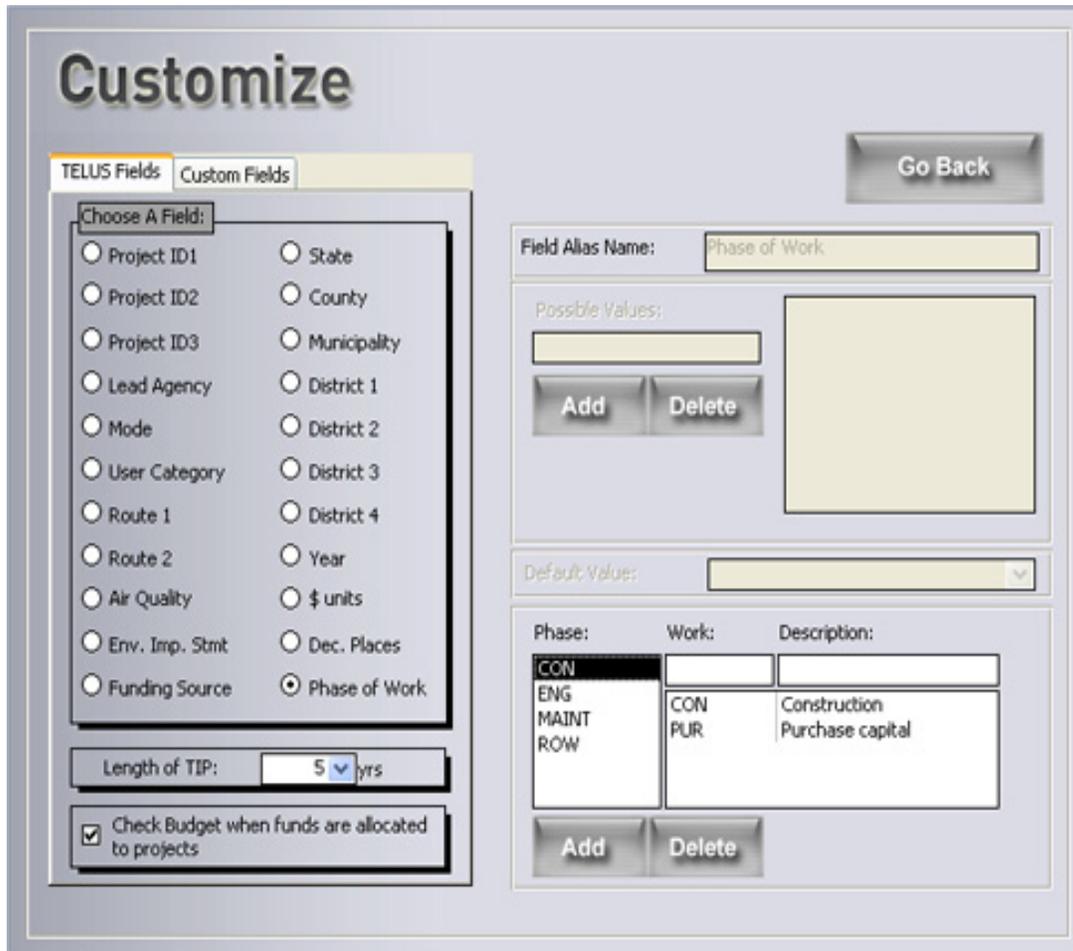


Figure 5.1: Customize Fields Screen

TELUS Fields

The table below shows the customization options available for the database fields.

Field Name	Description	Field Alias	Default Value	Multiple Values	Example
Project ID1	Project Identifier	X			MPO ID
Project ID2	Project Identifier	X			State ID
Project ID3	Project Identifier	X			Local ID
Lead Agency			X	X	NJ DOT
Mode			X	X	Transit
User Category	User classification schema		X	X	Bike/Ped
Route 1		X			Hwy 119
Route 2		X			Northeast Corridor Rail Line
Air Quality			X	X	Exempt
Env. Imp. Stmt	Environmental Impact Statement		X	X	In-Progress
State			X	X	NJ
County			X	X	Middlesex
Municipality			X	X	Highland Park
District 1	Any geographic classification schema	X	X	X	School Districts
District 2	Any geographic classification schema	X	X	X	City Council Districts
District 3	Any geographic classification schema	X	X	X	Legislative Districts
District 4	Any geographic classification schema	X	X	X	Congressional Districts
Years	TIP Years		X	X	2006
\$ Units	Financial Units		X		\$ x 1,000
Dec Places	Number of decimal places for financial data		X		2

Phase of Work/Funding Source

In addition, there are two special customization fields: Phase of Work and Funding Source. In order to summarize the TIP data for reporting purposes according to Federal/State formats and for analysis purposes, some data must be reported in general terms. However, since many agencies use more specific breakdowns, TELUS records the more specific breakdown in a second field under each of the general terms.

After selecting one of these fields, the major breakdowns will appear, as shown in Figure 5.2. When a user selects one of the major categories, the possible breakdowns will appear to the right. A user may then add a new subcategory, or delete one of the existing subcategories.

The major breakdowns for Phase of Work include Construction (CON), Engineering (ENG), Maintenance (MAINT), and Right-of-Way (ROW). Funding Sources can be split into Federal and Non-Federal sources.

Phase:	Work:	Description:
CON		
ENG	CON	Construction
MAINT	PUR	Purchase capital
ROW		

Add Delete

Figure 5.2: Major Breakdown Customization

Financial Information

The TIP can be customized for either 3 or 5 fiscal years. TELUS automatically adds a “Prior” and a “Post” year to each. All TELUS screens, reports, and project data are then formatted accordingly. The figure below shows the length of the TIP with the two options.

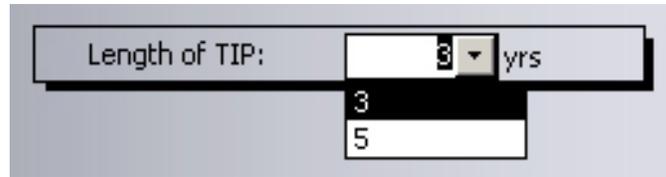


Figure 5.3: Length of TIP Drop-down Box

In addition, the dollar units of the financial data may be specified with the “\$ Units” option, such as \$Millions or \$ x 1,000. Users must enter data using the dollar units specified (if choosing to show units in \$ x 1,000, enter \$100,000 as \$100). The number of decimal spaces displayed on the screens and reports may be indicated with the “Dec Places” option.

Figure 5.4 shows the checkbox provided for the users to verify how well they are allocating the available funds among the projects. This option informs the user when the budget limit has been violated. By default, this option is checked. The user can uncheck it at any time.

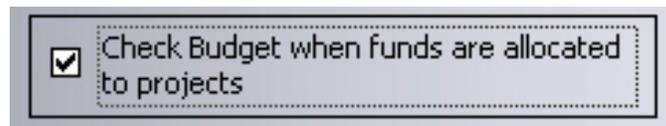


Figure 5.4: Check Budget

Custom Fields

In response to user requests, TELUS now provides up to ten custom fields to be defined by the user. Each of these Custom Fields can also have a field alias name, a default value and multiple possible values. Figure 5.5 shows an example of a custom field, specified as “Environmental Status”.

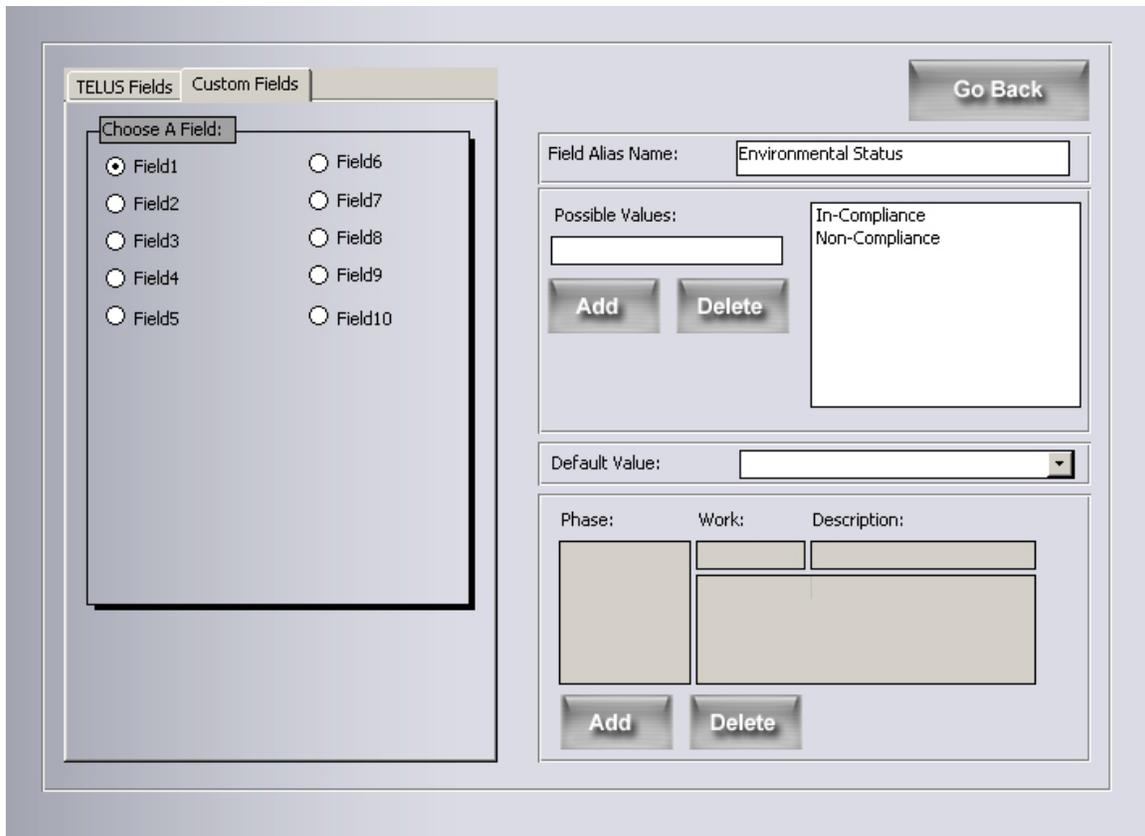


Figure 5.5: Custom Fields Screen



6. Technical Support

If any technical difficulties arise during the installation or use of the TELUS National 4.0 software, help can be obtained by visiting the TELUS National website at:

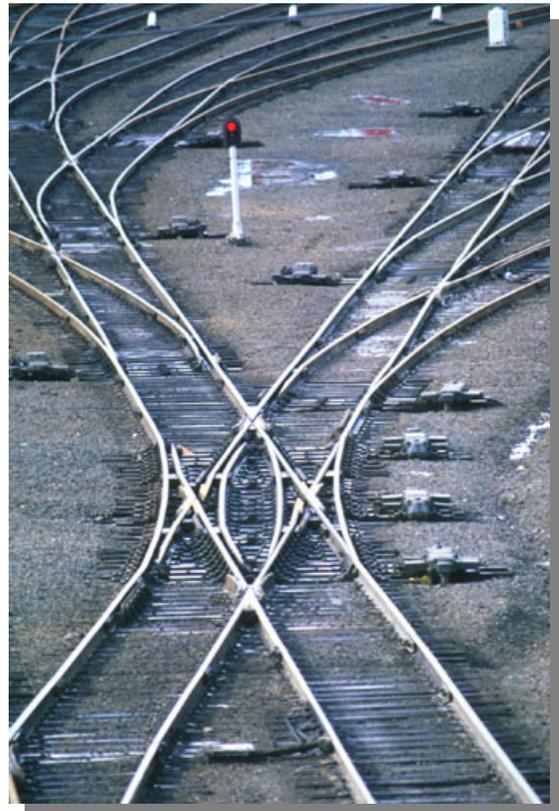
<http://www.telus-national.org/support/support.html>

From the webpage, you will be able to access the technical support knowledge base. Also, you will be provided with a list of Frequently Asked Questions and Answers, latest contact information, and the latest revisions and corrections to the user's manual.

When contacting the technical support team, be sure to include a detailed description of the problem, as well as your contact information. A technical support staff member will respond quickly, usually within 24 hours.

Assemble the TIP Database

7. *Entering TIP Project Information*
8. *The Project Scoring Module*
9. *The Project Interrelationships Module*
10. *TIP Budget*
11. *TIP Tables*
12. *Importing TIP Data from External Sources*



7. Entering TIP Project Information

Overview

From the TELUS National Main Menu, selecting “Assemble TIP Database” will take the user to the *TIP Data Assembly* Screen as shown in Figure 7.1.

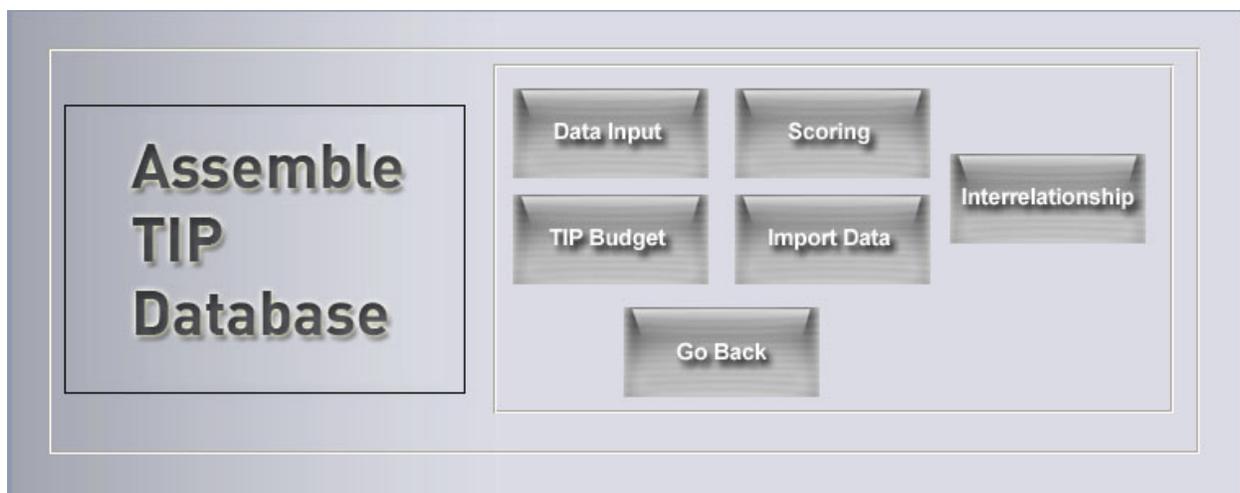


Figure 7.1: TIP Data Assembly Screen

Data Entry

From this screen the user can begin assembling the TIP database. By clicking the “Data Input” button, the user enters the Data Input Module. This *Data Entry* screen prompts the user to enter project information, including description, location, cost, and status data (Figure 7.2). The module interface is composed of text boxes and drop-down boxes that reflect all preferences entered in the customization module. In the text boxes, the user may enter an appropriate text or number. In some text boxes, such as dollar amounts, the user is allowed to enter only numeric data. When entering numerical data, the user should not enter dollar signs or commas. In drop-down boxes, the user’s input is limited to the items listed. If it is a customizable field and an item is needed that is not included in the drop-down menu, the item must be added in the customization module.

Data Entry

Go to: County: [] ProjectID1: STP200298 Rev: 0

Only show latest project revisions
 ProjectID1: STP2002103 REVISION: 0 TIP YEAR: 2004 - 2008

Project ID2: 20 Project ID3: 02103 Project Name: Southwest Connector
 Lead Agency: West Des Moines Contact: Larry Read Phone: (515) 222-3544
 TIP Status: TIP Mode: Roadway User Cat.: []
 Description: Army Post Road to First Street Air Quality Status: []
 EIS Status: []

Classification: (REQUIRED)
 1. System: Roadway 2. Project Type: Other Federal-Aid Highway 3. Functional Class: Urban Minor Arterial
 4. Category: New Construction 5. Subcategory: New Road

Remarks: Grade and Pave

Limits: [] Route 1: [] Route 2: []
 Project Termini: (From) [] (To) []
 Length: 1.8 Corridor: SWConnector
 State: Iowa County: Warren
 Municipality: West Des Moines
 Districts: District 1: [] District 2: [] District 3: [] District 4: []

Upload Project Picture: Project Picture Address Needs to be Updated. Please click on the text box to add/change picture for this project.

Figure 7.2: Data Entry Screen

Descriptive Data

This descriptive data fields, found at the top section of the *Data Entry* screen, allows the user to enter a wide variety of data concerning the project, as shown in Figure 7.3. This screen includes fields for project identification, description and classification.

Only show latest project revisions
 ProjectID1: STP1001004 REVISION: 1 TIP YEAR: 2004 - 2008

Project ID2: 10 Project ID3: 01004 Project Name: Iowa 44 (First Street)
 Lead Agency: Grimes Contact: Scott Renaud Phone: (515) 233-0000
 TIP Status: TIP Mode: Roadway User Cat.: []
 Description: South Trail Ridge Road to Iowa 141 Air Quality Status: []
 EIS Status: []

Classification: (REQUIRED)
 1. System: Roadway 2. Project Type: National Highway System 3. Functional Class: Rural Minor Arterial
 4. Category: Major Road Widening and/or Resurfacing 5. Subcategory: Major Widening: (AC <\$15 mil)

Remarks: Widening, ACC Overlay

Figure 7.3: Descriptive Data Entry Fields

Identification Fields

The Identification Fields are used for the most central information about the projects, including the ID numbers and contact information.

Field	Description	Data Type	Database Field Name
Project ID1	The project identifier. Each project should have a unique project number, which may be composed of text and numbers. While a project may have multiple ID numbers, this field should contain the main (MPO) identifier.	Text	DBNum
Revision	If project has undergone significant change in its planning, design, scheduling, or other stage, an updated record can be entered into the TIP database using the same project number but a different revision number. The default entry for this field is “0”. Use the “New” button to create a new version.	Numeric	Rev
Project ID2	A second project identifier. This field may be customized, for example as the State Project ID.	Text	DBNum2
Project ID3	A third project identifier. This field may be customized, for example as the Local Project ID.	Text	DBNum3
Project Name	The name of the project.	Text	Proj_Name
Lead Agency	The agency in charge of the project.	Text	Lead_Agency
Contact	The person in charge of the project.	Text	Proj_Contact
Phone	The phone of the person in charge of the project.	Numeric	Proj_PhNum

Descriptive Fields

The Descriptive Fields are used to provide additional information about the project including its status and the status of pertinent regulatory requirements. This is also where a narrative description is may be included.

Field	Description	Data Type	Database Field Name
Project Type	The status of a project: <u>TIP</u> : in the current TIP <u>Pre-TIP</u> : being considered for the current or future TIP. <u>Non-TIP</u> : Not in the current or future TIP (e.g., a locally funded project).	Drop-down	Project_Type
Mode	The transportation mode the project addresses, selected from a list (e.g., Air, Bike/Walk, Highway, Rail, Water, Intermodal, etc.).	Drop-down	Mode
User Category	Using the customization module, the agency can enter their classification scheme into the TELUS system.	Text	MPO_CAT
Description	A full, descriptive account of the project activities.	Text	Descript
Air Quality	Does project meet air quality requirements	Drop-down	Air_Quality
EIS	Status of the Environmental Impact Statement	Drop-down	EIS

Classification Fields

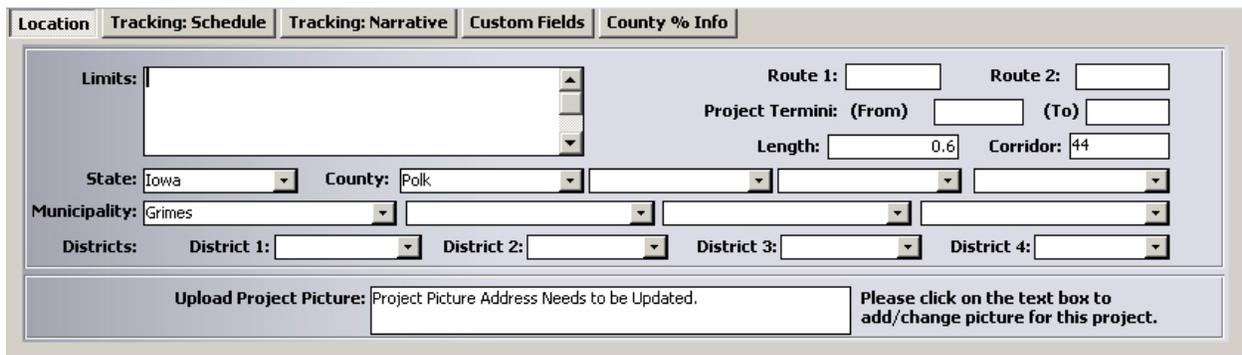
These required fields are used to categorize TIP projects for analysis and reporting by the TELUS. The user may be satisfied with these categories and not need the user category field.

Field	Description	Data Type	Database Field Name
System	See chart in Appendix 1.	Text	MODECat
Project Type	See chart in Appendix 1.	Text	Project_Type
Functional Class	See chart in Appendix 1.	Text	FUNCCat
TELUS Cat.	See chart in Appendix 1.	Text	FHWACat
TELUS Subcat.	See chart in Appendix 1.	Text	PROJCAT

Appendix 1 shows the classification scheme for bridge, roadway, transit, and other project types. (Please note that in the data entry drop-down menu for subcategory, the term “AC” means “Added Capacity”).

Location Data

The location tab found at the bottom half of the *Data Entry* screen (Figure 7.4) is used to enter geographic information about the project.



The screenshot displays a software interface with the following elements:

- Tabs:** Location (selected), Tracking: Schedule, Tracking: Narrative, Custom Fields, County % Info.
- Limits:** A large empty text box with a vertical scrollbar.
- Route 1:** An empty text box.
- Route 2:** An empty text box.
- Project Termini:** (From) [empty] (To) [empty]
- Length:** 0.6
- Corridor:** 44
- State:** Iowa (dropdown)
- County:** Polk (dropdown)
- Municipality:** Grimes (dropdown)
- Districts:** District 1, District 2, District 3, District 4 (each with a dropdown menu).
- Upload Project Picture:** Project Picture Address Needs to be Updated. Please click on the text box to add/change picture for this project.

Figure 7.4: Location Data Entry Fields

Field	Description	Data Type	Database Field Name
Limits	A short, descriptive account of the geographic limits where the TIP project is located.	Text	Limits
Route 1 Route 2	The specific highways, routes, or rail line on which the project is located. Two text boxes are provided for projects located on multiple routes.	Text	Route 1 Route 2
Project Termini: (From) (To)	Since many transportation projects on major thoroughfares are geo-referenced by milepost, the first and last milepost of the first Route identified delineating the extent of the project.	Numeric	M_POSTS_from M_POSTS_to
Length	The length of the transportation improvement.	Text	Length
State	The state in which the project is located.	Drop-down	State
County (1,2,3,4)	Up to four counties in which the project is located.	Drop-down	County1 County2 County3 County4
Districts: District 1 District 2 District 3 District 4	Up to four user customized districts in which the project is located. These may be different districting levels (i.e. legislative, congressional, etc.) or multiple districts for one districting level (i.e. legislative1, legislative2, etc.).	Drop-down	LegDist1 LegDist2 LegDist3 LegDist4

Tracking Data

There are a number of tracking fields which are divided among two tabs: Schedule and Narrative. Schedule Tracking is where a user would input information regarding the funding allocated for the project. The information entered here includes the amount of funds, the usage of the funds, the funds disbursement, and the sources of the funds.

Location	Tracking: Schedule		Tracking: Narrative		Custom Fields	County % Info					
	Planned		Actual		Phase	Work	Type	Source	Funding (In millions)		
	Start	End	Start	End					Allocated	Obligated	
Year	2006	2006	Year	2006	2006	CON	CON	Federal	MPO	250.00	0.00
Qtr	1	4	Qtr	1	4						
Year	2007	2007	Year	2007	2007	MAINT	MAINT	Federal	STP	100.00	0.00
Qtr	1	4	Qtr	1	4						
Year	2005	2005	Year	2005	2005	CON	CON	Federal	STP	495.00	0.00
Qtr	1	4	Qtr	1	4						
Year	2008	2008	Year	2008	2008	MAINT	MAINT	Federal	BRIDGE	300.00	0.00
Qtr	1	4	Qtr	1	4						
Year	2006	2006	Year	2006	2006	ENG	ENG	Federal	MPO	46.00	0.00
Qtr	1	4	Qtr	1	4						
Year	2007	2007	Year	2007	2007	CON	CON	Federal	BRIDGE	125.00	0.00

Figure 7.5: Schedule Tracking Data Entry Fields

Field	Description	Data Type	Database Field Name
Planned	The planned start and end year and fiscal quarters.	Numeric	Plan_begin_year Plan_end_year
Actual	The actual start and end year and fiscal quarters (can be amended as project ensues).	Numeric	Actual_beginyea r Actual_end_year
Phase	The phase of work for the project, including Construction (CON), Engineering (ENG), Right of Way (ROW), Maintenance (MAINT)	Drop-down	Phase
Work	The work field is a customized breakdown of each Phase field. See the Customization discussion in Chapter 5.	Drop-down	Work
Funding Type	Select whether the funding is from Federal or Non-Federal sources.	Drop-down	Funding
Funding Source	The funding source field is a customized breakdown of each Funding Type field. See the Customization discussion in Chapter 5.	Drop-down	Source
Allocated Amount	The amount, to the closest dollar, of the expenditure allocated on the phase of work. Do not enter dollar signs or commas.	Currency	Amount
Obligated Amount	The amount of the expenditure that has been obligated. Do not enter dollar signs or commas.	Currency	Actual_funding

Narrative Tracking Data

The Tracking: Narrative tab (see Figure 7.6) provides an opportunity for the user to input descriptive, narrative information about the status and scheduling of the project.

The screenshot displays a software interface for entering narrative tracking data. At the top, there are five tabs: 'Location', 'Tracking: Schedule', 'Tracking: Narrative' (which is active), 'Custom Fields', and 'County % Info'. Below these tabs is a secondary set of tabs: 'P and E', 'ROW', 'Construction', 'Maintenance', 'Environmental', 'Air Quality', and 'Community'. The main content area is divided into two sections. On the left, a vertical label reads 'Comments on Planning and Engineering Issues'. To its right is a large text input field containing the text 'The design phase has been completed.'. On the far right of this section is a 'Situation' panel with three checkboxes: 'Routine' (checked), 'Serious', and 'Critical'.

Figure 7.6: Narrative Tracking Data Entry Screen

From this screen, narrative project-status information can be entered about:

- Planning and Engineering
- Right of Way
- Construction
- Maintenance
- Environmental
- Air Quality
- Community

Also, with a checkbox, each of these issues can be classified as Routine, Serious, or Critical.

Custom Fields

The Custom Fields tab on the *Data Input* screen (Figure 7.7) is where the user enters information concerning the fields that were customized by the user.

Figure 7.7: Custom Fields Data Entry Fields

Project Revisions

When the user wants to make major changes in the project, he/she can create a new revision of the project. The “New Revision” button (Figure 7.8) creates a copy of the current project information. The project revision number is incremented to the next number.



Figure 7.8: “New Revision” Button

The *Revision Update* screen (Figure 7.9) pops up when the user clicks on the “New Revision” button. The current date and a new revision number will be automatically assigned. The user can enter the purpose of new revision in the space given. TELUS maintains a historical record of each project revision for tracking purposes; the user must then actually make the revisions to the project information.

Revision Update

ProjectID1 **Fiscal Year:**

Revision_Old: **Date:**

Revision_New:

Purpose of New Revision:

Figure 7.9: Revision Update Screen

The user can choose to view only the latest projects revisions by checking the box for “Only show latest project revisions” near the top of the *Data Input* screen (see Figure 7.2). Otherwise, a record will appear for every revision of a project enabling the user to review any changes that may have been made to subsequent revisions.

Financial Module

Clicking on the “Financial Module” button at the top of the *Data Entry* screen (see Figure 7.2) allows the user to view the *Total TIP Expenditures* screen (Figure 7.10). The financial module breaks down all TIP project expenditures by the funding source and the fiscal year. On the next line, the module shows the budgeted amount for that funding source in that fiscal year. Funding allocated before the first TIP year are aggregated in the “Prior” column and funding after the length of the TIP (3 or 5 years) are recorded in the “Post” column. Total funds allocated and budgeted for each year are displayed at the bottom of the screen. With a check box at the top of the screen, the user may choose to view both TIP and Pre-TIP projects. Otherwise, only TIP projects will appear.

Total TIP Expenditures

Include TIP and Pre-TIP Projects Go Back

By Funding Source and Year (millions)

Source	Prior	2004	2005	2006	Post	TOTAL	% of \$		
Allocated: CMAQ	0.00	0.00	0.00	150.00	0.00	150.00	1.28		
Budget:	0.00	0.00	0.00	0.00	0.00	0.00	1.28		
Allocated: MPO	0.00	0.00	0.00	450.00	0.00	450.00	3.84		
Budget:	0.00	0.00	0.00	0.00	0.00	0.00	3.84		
Allocated: NHS	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Budget:	0.00	200.00	0.00	300.00	0.00	500.00	0.00		
Allocated: STATE	0.00	0.00	600.00	0.00	0.00	600.00	5.12		
Budget:	0.00	0.00	0.00	0.00	0.00	0.00	5.12		
TOTAL		Year0	Year1	Year2	Year3	Year4	Year5	Year9	TOTAL
ALLOCATED:		7,916.85	3,095.00	600.00				100.00	11,711.85
BUDGETED:		0.00	210.00	500.00	300.00			0.00	1,060.00

Figure 7.10: Financial Expenditures Screen

8. The Project Scoring Module

Overview

The selection of projects for inclusion in the Transportation Improvement Plan (TIP) is one of the major processes undertaken by MPOs and other agencies. The scoring module in TELUS is designed to aid in this process.

In most scoring systems, projects are scored on the basis of a set of criteria. The TELUS Project Scoring Module incorporates the following eight objectives:

1. Support the economic vitality of the metropolitan area especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized uses;
3. Increase the security of the transportation system for motorized and non-motorized uses;
4. Increase the accessibility and mobility options to people and freight;
5. Protect and enhance the environment, promote energy conservation, and improve quality of life;
6. Enhance the integration and connectivity of the transportation system across and between modes for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system.

Project Scoring Module

Some MPOs may already have well developed scoring processes that they wish to continue using, while other MPOs are seeking to initiate new, or modify existing, scoring processes. The TELUS Project Scoring Module has been designed to accommodate these situations. The *Scoring Main Menu* screen of the TELUS Project Scoring Module is shown in Figure 8.1.

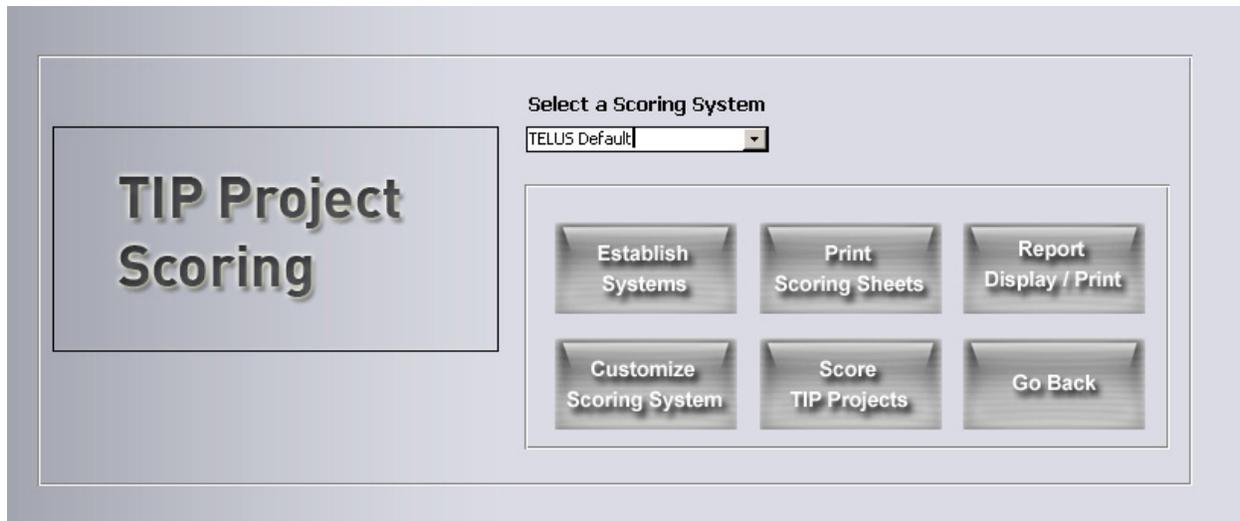


Figure 8.1: Scoring Main Menu Screen

The TELUS scoring module is based on one or more scoring systems. Each scoring system is assigned a maximum number of points – the system score. Each system is broken down into several categories. Categories represent general policy or goal statements. Then, the categories are weighted by their relative importance (measured as % against the system score) and each category receives a certain number of scoring points, calculated by the weighting percentages, as the category score. The sum of the category scores must be equal to the system score of the scoring system. Further breaking down within each category, there are a number of factors. Factors are the specific measures on which the projects are scored. The category scoring points are then distributed among its factors by weighting the factors with specified rates.

The factor weighting rates are defined as follows:

- 0 for no effect (receiving no points)
- 1 for minor effect (receiving 1/3 of the factor's points)
- 2 for moderate effect (receiving 2/3 of the factor's points)
- 3 for major effect (receiving all the factor's points)

TELUS 4.0 allows users to Add/Delete/Edit the factor weighting rates. This is provided in the Score TIP Projects Module. Clicking the Edit Score Code button in the *TIP Scoring Form* screen

(Figure 8.7) opens up the Add/Delete/Edit Score Code form (Figure 8.2). Any changes to the codes will be reflected in the drop-down list for scores in the TIP Scoring Form.

The screenshot shows a window titled "Add/Delete Edit Score Codes". Inside the window, there are two input fields. The first is labeled "Code" and contains the value "3", with the text "(Numbers only)" to its right. The second is labeled "Code Description" and contains the text "Major". Below these fields, there are five buttons arranged in two rows. The top row contains "Add", "Delete", and "Go Back". The bottom row contains two arrow buttons, one pointing left and one pointing right.

Figure 8.2: Edit Score Code Form

TELUS provides a pre-programmed 'TELUS-default' set of categories, reflecting the eight SAFETEA-LU planning objectives, and their corresponding factors (these are given in the TELUS Default Scoring System section below.). Agencies that do not currently have a scoring system, or would like to augment their present scoring system, should use the 'TELUS-default' system. Users have the option, however, of re-creating their existing scoring system, whether paper- or computer-based, in TELUS. Users also have the option of creating multiple scoring systems for different types of projects, for example: rural projects and urban projects; CMAQ and STP projects; etc. Different projects can use different scoring systems. A single project, however, can use one scoring system only.

The five steps in using the TELUS Project Scoring Module are:

1. Establish the scoring system.
2. Develop and Customize scoring criteria.
3. Print blank scoring forms.
4. Process and entry scores.
5. View project scores and print scoring reports.

The user is encouraged to experiment and explore these features before deciding how to proceed.

Establish the Scoring System

The first step of the scoring process is to establish the possible scoring systems. By clicking on the “Establish Systems” button from the *Scoring Main Menu* (Figure 8.1), the user is given the opportunity to view all existing systems and to create new systems, as shown in Figure 8.3.

Figure 8.3: Edit Scoring Systems Screen

At the bottom of this screen, the user may create a new system by entering its name, a description, and the maximum number of points for that system. The categories and factors for the new system must be based upon either an existing system or be ‘blank’, as selected from the drop-down box shown in Figure 8.4.

Figure 8.4: Drop-Down Box

If an existing scoring system is selected, all the categories and factors for that system are copied into the new system, which can then be edited. If “blank” is selected, the user must create all the categories and factors from scratch.

Develop/ Customize Scoring Criteria

The development or customization of the scoring criteria for the scoring systems is the next step. After selecting the desired scoring system to work with from the *Scoring Main Menu* screen, the user clicks on the “Customize Scoring System” button.

From the *Setup Scoring Categories and Factors* screen (Figure 8.5), the user can add, delete, or adjust the weights for both the categories and factors of the selected system. (Please note that only the weights of the ‘TELUS-default’ system can be altered. To change other fields, one must create a new scoring system based on the ‘TELUS-default’ system first, and then edit the fields within the new system.)

Setup Scoring Categories & Factors

Score System: WFRPC Max. Score: 1000 [Go Back](#)

[Edit Categories and Weights](#) [Edit Factors and Weights](#)

Adjust Scoring Categories (Use TAB key to navigate.)

Category	Description	Weights	Points	
1 Economic Vitality	Support the economic vitality of the metropolitan area especially by enabling global competitiveness, productivity, and efficiency.	10 %	100 pts	Delete
2 Security	Increase security of the transportation system for motorized and nonmotorized uses.	10 %	100 pts	Delete
3 Accessibility and Mobility	Increase the accessibility and mobility options to people and freight.	12 %	120 pts	Delete
4 Environmental/Environment/Quality of Life	Protect and enhance the environment, promote energy conservation, and improve quality of life.	10 %	100 pts	Delete
5 Integration and Connectivity	Enhance the integration and connectivity of the transportation system across and between modes for people and freight.	12 %	120 pts	Delete
6 Efficient System Management	Promote efficient system management and operation.	12 %	120 pts	Delete
7 System Preservation	Emphasize the preservation of the existing transportation system.	10 %	100 pts	Delete
8 Safety	Increase safety of the transportation system for motorized and nonmotorized uses.	12 %	120 pts	Delete
9 Local/Regional Factors	Factors of local or regional importance	12 %	120 pts	Delete
TOTAL		100 %	1000 pts	

Add New Category

Figure 8.5: Setup Scoring Categories and Factors Screen

Edit Categories

In the customization process, the categories should first be edited. Remove any existing categories that are not desired and add new categories as needed. Next, distribute the weights among the categories. Remember that the weights must total 100 percent. Once the categories have been finalized, select a category and click the “Edit Factors and Weights” button.

Edit Factors

The *Adjust Scoring Factors* screen, Figure 8.6, shows a selected scoring category, with a list of its factors that should be considered. For example, under the ‘Economic Vitality’ category, the user will find the factors “Promotes general economic development” and “Enhances welfare-to-work trips”, etc. The factors provide a basis for the assessment of the transportation project under each category. Similar to the scoring categories, factors may be added, deleted, and their weights re-distributed. Remember that the sum of all assigned factor weights under a given category must total 100 percent.

Setup Scoring Categories & Factors

System: MaxScore: Go Back

Edit Categories and Weights | **Edit Factors and Weights**

Adjust Scoring Factors

Category ID: Category:

Description:

Weighting

% pts ◀ ▶

Adjust Scoring Factors: Use TAB key to navigate.

Factor ID	Factor Description	Weight	Points	
<input type="text" value="A"/>	<input type="text" value="Promotes general economic development"/>	<input type="text" value="11"/> %	<input type="text" value="13.75"/>	<input type="button" value="Delete"/>
<input type="text" value="B"/>	<input type="text" value="Specifically improves or enhances tourism"/>	<input type="text" value="11"/> %	<input type="text" value="13.75"/>	<input type="button" value="Delete"/>
<input type="text" value="C"/>	<input type="text" value="Specifically improves or enhances the movement of freight and services"/>	<input type="text" value="11"/> %	<input type="text" value="13.75"/>	<input type="button" value="Delete"/>
<input type="text" value="D"/>	<input type="text" value="Improves or enhances the movement of workers"/>	<input type="text" value="11"/> %	<input type="text" value="13.75"/>	<input type="button" value="Delete"/>
<input type="text" value="E"/>	<input type="text" value="Provides new access to jobs and opportunities"/>	<input type="text" value="11"/> %	<input type="text" value="13.75"/>	<input type="button" value="Delete"/>
Total:		<input type="text" value="100"/> %	<input type="text" value="125"/>	

Add New Factor:

Figure 8.6: Adjust Scoring Factors Screen

The TELUS Default Scoring System

Pre-loaded in the software is the TELUS-default scoring system. This system reflects the eight objectives of SAFETEA-LU plus the MPO defined objective. The categories and factors of this system are listed below. Remember, they can be customized to meet the agencies needs by creating a new system based on the TELUS Default Scoring System.

Category 1 – Economic Vitality

Support the economic vitality of the metropolitan area especially by enabling global competitiveness, productivity, and efficiency.

- Promotes general economic development
- Specifically improves or enhances tourism
- Specifically improves or enhances the movement of freight and services
- Improves or enhances the movement of workers
- Provides new access to jobs and opportunities
- Improves the value of residential or nonresidential properties
- Enhances welfare to work trips
- Improves access to terminal (sea, air, multimodal)
- Enhances the ability of the freight system to support product exports/imports.

Category 2 –Security

Increase the security of the transportation system for motorized and non-motorized uses.

- Denies unauthorized access to the system
- Assists the monitoring or patrolling of the system
- Enhances monitoring of access to and movement of hazardous materials
- Provides transportation system redundancy in the event of emergency response
- Improves the utility of the highway system to respond and recover
- Reduces the risk of the transportation system being used as means of attack

- Enhances detection of materials and activities linked to terrorism at highway and rail facilities, ports, airports, as well as intermodal systems/facilities.

Category 3 – Safety

Increase the safety of the transportation system for motorized and non-motorized uses.

- Reduces vehicular accidents
- Increases access to accident incidences and/or disabled motorists
- Enhances or adds to the system of bike lanes and sidewalks
- Enhances the public safety of pedestrians
- Contributes to a reduction in traffic volume
- Improves the handling of hazardous materials movement
- Separates vehicular or non-vehicular traffic

Category 4 – Accessibility and Mobility

Increase the accessibility and mobility options to people and freight.

- Provides enhanced or new capacity or mobility to the transportation system to move people
- Provides enhanced or new accessibility to the transportation system to move people
- Provides enhanced or new capacity or mobility to the transportation system to move freight
- Provides enhanced or new accessibility to the transportation system to move freight
- Enhances the range of freight service options available to local businesses
- Ameliorates size and weight restrictions for freight vehicles

Category 5 – Environmental/Energy/QOL

Protect and enhance the environment, promote energy conservation, and improve quality of life.

- Reduces vehicle emissions
- Reduces vehicle noise

- Decreases fuel consumption
- Adds to the convenience or efficiency of the system
- Specifically protects wetlands or other natural habitats
- Decreases air or water pollution
- Promotes non-motorized travel
- Promotes traffic calming
- Supports cultural and/or historic property retention or development
- Supports community cohesion and design
- Promotes environmental equity
- Enhances development of brownfields

Category 6 – Integration and Connectivity

Enhance the integration and connectivity of the transportation system across and between modes for people and freight

- Improves intermodal connectivity for non-freight vehicular traffic
- Improves the integration/connectivity for non-freight vehicular traffic
- Improves intermodal connectivity for the freight transportation system
- Improves the integration/connectivity within a freight-serving mode
- Enhances the information/telecommunications networks that integrate non-freight-serving modes
- Enhances the information/telecommunications networks that integrate freight-serving modes

Category 7 – Efficient System Management

Promote efficient system management and operation.

- Uses ITS technology
- Reduces transportation system cost
- Offers value (congestion) pricing

- Contributes to better vehicle tracking
- Enhances administrative productivity/efficiency
- Enhances electronic processing of vehicle information

Category 8 – System Preservation

Emphasize the preservation of the existing transportation system

- Contributes to better system maintenance
- Emphasizes system rehabilitation rather than expansion
- Incorporates new technologies
- Maximizes existing capacity
- Provides technologies to alert motorists and public to road-conditions/alternate-routing
- Optimizes use of existing infrastructure to enhance level of service

Category 9 – MPO Defined Factors

Factors of local importance

- Conformance with regional or state plan
- Project ready for implementation
- Provides benefits for multiple jurisdictions
- Advances smart growth objectives

The user may wish to include a particular factor under several objectives if it is felt that the factor is pertinent to more than one objective.

Printing Scoring Sheets

This step is designed to facilitate the scoring process within the agency by allowing the user to print blank scoring forms, which can be then distributed to people doing the rating. The scoring forms will reflect the customization of categories and factors within the scoring system. Some agencies distribute scoring sheets to their board members and they average each member's score. Others reach consensus and arrive to one set of scores, while some simply assign the task of

scoring to only one individual. However the agency desires to implement the scoring, TELUS will accept and record the project scores for each factor.

The user can print scoring forms by selecting the desired scoring system and clicking on this option from the *Scoring Main Menu* screen in the scoring module. Upon clicking on this selection, TELUS will display and print out a scoring form. A single form may have several pages long, displaying the factors under each of the categories in the system.

Process Scoring Information

Once the agency has scored its projects, the user can enter the scores into TELUS. As shown in Figure 8.6, the *TIP Scoring Form* screen, the user selects the project that is being scored. If the project has been previously scored, the scores will be displayed, or else a blank scoring form is displayed.

TIP Score Entry

TIP YEAR: 2003

PROJECT# 2002103 REVISION 0 PROJ.TYPE TIP

Army Post Road to First Street

Go to Project: 2002103 Rev #: 0

Use the Following Scoring System: TELUS Default

Go Back

Edit Score Codes

Integration and Connectivity | Efficient System Management | System Preservation | Safety | Local/Regional Factors

Economic Vitality | Security | Accessibility and Mobility | Environmental/Energy/QOL

Category 1 Economic Vitality

Support the economic vitality of the metropolitan area especially by enabling global competitiveness, productivity, and efficiency.

		Maximum Points	Score
A	Promotes general economic development	13.8	3
B	Specifically improves or enhances tourism	13.8	2
C	Specifically improves or enhances the movement of freight and services	13.8	0
D	Improves or enhances the movement of workers	13.8	2
E	Provides new access to jobs and opportunities	13.8	0
F	Improves the value of residential or nonresidential properties	13.8	2
G	Enhances welfare to work trips	13.8	0
H	Improves access to terminal (sea, air, multimodal)	13.8	3
I	Enhances the ability of the freight system to support product exports/imports.	15.0	0

Accept Scores

Figure 8.7: TIP Scoring Form Screen

For projects that have not been scored, the next step is to assign a scoring system to the project. From the drop-down box, shown in Figure 8.8, select one of the available scoring systems.



Figure 8.8: Select the Scoring System

The categories and factors of the Scoring Data Entry screen will consequently update to reflect the selection of scoring systems. For each factor under a category, the user either enters 0 (no effect), 1 (minor effect), 2 (moderate effect), or 3 (major effect) as the factor weighting rates. These factor weighting rates can be modified as per the users requirements (See Figure 8.2). The TELUS system will then calculate the factor scores based on the system’s total points and the weight distributions among categories and factors. After entering all the factor scores for the first category, click on the next category from among the tabs. Continue to enter the factor scores for the remaining categories.

When finish entering the required data for the project, click on “Accept Scores” button, which will save the scores. The “Accept Scores” button must be pressed or else changes will not be saved. When finished entering all the scoring forms for all the projects, click on the “Go Back” button to exit this step and return to the *Scoring Main Menu* screen of the Project Scoring Module.

Display and Print Reports

After the scores have been recorded, the user can view and generate scoring reports. Clicking on the “Report Display/Print” button will open the *Project Selection* screen. On the *Project Selection* screen, the user can select one or more projects from the TIP database. A detailed discussion of selecting and analyzing projects as well as generating reports can be found in *Viewing Project Information* section of the manual (Chapter 14).

9. The Project Interrelationships Module

Overview

TELUS provides users with the capability of identifying and reviewing potential relationships among transportation projects. These interrelationships can be identified for projects in the TIP and projects under consideration for inclusion in the TIP (as long as they are included in the TELUS database).

Transportation projects can be related in several ways:

1. Commonalities, in terms of location, mode, funding source, phase-of-work (i.e., construction) and project purpose.
2. “Disturbance” interrelationships, which indicates that two or more projects could potentially interfere with one another. For example, a delay or stoppage of one project could trigger delays in other transportation projects.
3. “Planning” interrelationships, whereby a pre-TIP project and a project already in the TIP are related. These projects could be related in terms of commonalities or a disturbance relationship.
4. “Functional” interrelationships, where projects can potentially reinforce or detract from each other in terms of allowing an entire route to be more efficient. These projects can be in the same corridor, on the same route or rail line, and involve the same mode.

Commonality

Some interrelationships among transportation projects are based on characteristics that the projects have in common. For example, location-related projects are physically situated in the same municipality, county, transportation corridor, or legislative district. The commonality is the location of the projects.

Transportation projects may also serve the same objectives or modes. These objectives can include transportation elements (such as new capacity or safety) or public policy elements (such as congestion mitigation or economic development). Commonality in mode means that the projects serve or affect the same transportation mode – aviation, highway, transit, railroad, or maritime.

Funding source can be another commonality. Transportation projects may depend on the same source of funding. Such sources can include federal, state, local and private funds. This grouping can be particularly crucial – if a project is delayed or canceled, it may be possible to transfer the funds to other projects relying on the same source. Similarly, if a particular pool of funds is affected, either positively or negatively, it is important to ascertain which projects would be affected.

Commonalities can easily be identified through the use of the *Query and Sort* screen in TELUS. The *Query and Sort* screen is located in the Project Information Module, rather than in the Interrelationships Module. For more about the Project Information Module please see Chapter 14. Queries and sorts are considered a database management feature, allowing the user to quickly answer questions regarding the transportation projects stored in TELUS. Questions regarding commonalities will most likely require a specific one-time query or sort.

Commonalities can easily be identified through the use of the *query and sort* screens in the Database Management Module. The Project Interrelationships Module focuses on identifying and clarifying potential disturbance, planning and functional interrelationships. These are interrelationships that require an initial intensive querying and sorting of transportation projects in TELUS and then are refined through the Interrelationships Module. Once these interrelationships have been identified, analyzed and refined, they are stored in TELUS and can be called up easily through the various modules in the system.

The *Project Interrelationship Main Menu* screen of the Project Interrelationships Module, shown in Figure 9.1, provides access to the module. TELUS only permits an automated interrelation search. The pre-defined automatic search is designed to identify potential disturbance, planning, and functional relationships among projects in the database. Also, the user must verify if such a relationship found actually exists. The Module contains a three-step process:

1. Search for potential interrelationships;
2. Clarify interrelationships;
3. Report Display / Print



Figure 9.1: Project Interrelationships Main Menu Screen

Search for Potential Interrelationships

A search for potential interrelationships should be done after all projects have initially been entered into the TELUS database. The search should be repeated each time additional projects have been entered into the system. The searching process, which analyzes all projects in the database for potential disturbance, planning, and functional interrelationships, may take several minutes to complete depending on the size of the database. Thus, when the user clicks on the “Search for Interrelationships” button, a message will prompt the users to confirm the search (see Figure 9.2). If the user clicks on “Yes”, the search will proceed. Otherwise, the search will stop and the user is returned to the *Project Interrelationship Main Menu* screen.

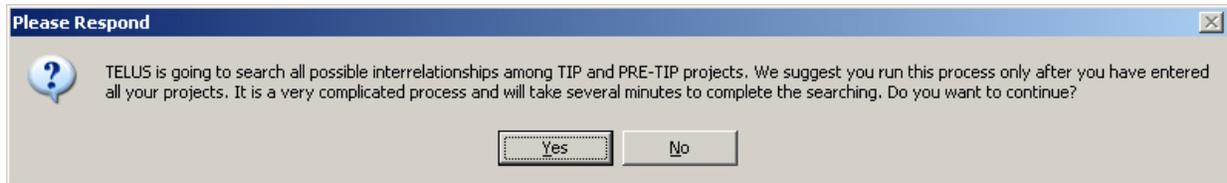


Figure 9.2. Permission to Proceed with Search

Disturbance relationship search

The search for potential disturbance interrelationships involves a set of linked queries that identify projects that are in the same TIP, county and municipality; involve the same mode; and are in the construction phase.

Planning relationship search

The TELUS search for potential planning relationships uses the same linked queries as the disturbance search but expands the search to both projects in the TIP and projects under consideration for the TIP. For a potential planning relationship to be identified at least one project must already be in the TIP and one must be in the pre-TIP stage.

Functional relationship search

The linked query set triggered in this search looks for projects that are in the same corridor, on the same route or rail line, and involve the same transportation mode.

Clarifying Interrelationships

Once these searches are completed, the user has the option of clarifying the interrelationships. In this step, a user, with the appropriate security clearance, can review and refine the potential interrelationships identified during the preceding step. This review allows the user to:

- Add additional information regarding the interrelationship, including the degree of the interrelationship and comments;
- Delete a potential interrelationship from the list (when the user has ascertained that a true interrelationship between the two projects does not exist); and
- Add additional interrelated projects to the list. For example, the user may know of an interrelationship that was not identified during the automatic search.

After clicking on the “Clarify Interrelationships” button, the *Interrelationships Data Entry* screen will appear, as shown in Figure 9.3. The top of the screen allows the user to specify the Year and project ID. Once the user has made these specifications, the project information is displayed on the top half of the screen. A list of projects in the database related to the selected project is shown on the lower half of the screen.

TIP Interrelationship

Fiscal Year: Go to Project:

PROJECT# REVISION PROJ. TYPE MODE MAP REF.

LIMITS ROUTE/RAILLINE CORRIDOR
MILE POST FROM/TO LENGTH

DESCRIPTION

REMARKS

MAJOR OBJECTIVE LEGISLATIVE DISTRICT

CATEGORY MPO CATEGORY

STATE COUNTY

MUNICIPALITY

RELATIONSHIP				
Related to:	Project Name	Interrelationship	Degree	Comments

Figure 9.3. Interrelationships Data Entry Screen

Adding Additional Information on the Interrelationship

The user can enter additional information about an interrelationship – the degree of the interrelationship and comments. The “Degree” drop-down menu allows authorized users to select none, mild, moderate and severe for the degree of the interrelationship:

- A designation of “none” indicates that only a superficial relationship exists between the highlighted project and the main project. In this situation, the user may also select the delete this project from the list. This is accomplished by clicking on the “Delete” button on the same line as the project.
- A designation of “mild” indicates that relationship between the highlighted project and the main project is slight. A change in the status of one of the projects may have a limited impact on the other.
- A designation of “moderate” indicates that the relationship between the highlighted project and the main project is important but not critical. A change in the status of one of the projects does impact the other. As such, if there is a change in the status of one of the projects, the other project should also be reviewed.
- A designation of “severe” indicates that the relationship between the highlighted project and the main project is critical. A change in the status of one project has a significant impact on the other project. As such, if there is a change in the status of one of the projects, the other project must also be reviewed.

An authorized user can also add comments to further explain the interrelationship by moving the cursor to the “Comment” box and typing such information. The “Comment” box can hold several lines of text for each project.

Deleting an Interrelationship

To delete an interrelationship listed under a tab, the user should go to the line for the project and click on the “Delete” button.

Adding an Interrelationship

To add an interrelationship to the list under a tab, the user should go to the blank line at the bottom on the list. First the user would select the new project related to the Main Project by selecting the Project ID in the left column. The user can then enter the relationship types and degree using the pull-down menus, as well as additional information in the “Comment” box. After the information is added, a new blank line will appear at the bottom of the list.

To return to the *Project Interrelationship Main Menu* screen, the user clicks the “Go Back” button. TELUS will automatically save the new information and changes made.

View Interrelationships

After the potential interrelationships have been identified and the user has, if desired, clarified the interrelationships, the user can view the interrelationships. To view the interrelationships, the user clicks the “Report Print/Display” button.

The user will see a *Project Selection* screen. The user utilizes this screen to identify the one or more projects that the user would like to review. Once the user completes the project selection, the user can view the interrelated projects by clicking on the “Select Projects” button.

The *Project Information* screen (Figure 9.4) displays each selected project. The user can move among the selected projects by clicking on the back and forward arrows. From this screen the user can view project interrelationships, and generate reports. The *Project Information* screen is discussed in detail in Chapter 14.

Project Information

TIP Year: 2004 - 2008

Goto: STP200295

7 of 15

Go Back

ProjectID1: STP200295

Revision: 0

Project Name: Iowa 160 (Oralabor Road)

- Projects List
- Project Details
- Cost Details
- Tracking Schedule
- Tracking Narrative
- Project Scoring
- Project Relationships
- Input Output Model
- GIS Overview
- Reports

Project Interrelationships

Related to	Project Name	Relationship Type	Degree	Comments
STP200495	State Street	Disturbance	Severe	
STP200204	Corporate Woods Drive	Disturbance	Moderate	
STP21102003	US 69	Disturbance	Moderate	
STP200495	State Street	Planning	Severe	
STP200204	Corporate Woods Drive	Planning	Moderate	
STP21102003	US 69	Planning	Moderate	

Figure 9.4: Project Information Screen

10. TIP Budget

Overview

The TIP Budget screen allows the user to input the dollar amounts for each funding source and TIP year identified in the Customization Module. These amounts then show up in the Financial Module as the budgets for each funding source by year, and these budgeted amounts are compared with the amounts allocated to all projects. Differences between “budgeted” and “allocated” amounts in the Financial Module for a funding source in any year indicate that either the full amount budgeted for that year has been allocated or that more funds have been allocated than were budgeted.

Clicking on the “Assemble TIP Database” button from the *TELUS Main Menu* accesses the TIP Budget Module. From the *TIP Data Assembly Menu* screen, click on the “TIP Budget” button to open the *TIP Budget* screen, as shown in Figure 10.1.

TIP Budgets Go Back

By Funding Source and Year

TIP Year: 2004 - 2008 (millions)

Funding Type	Funding Source	Prior	2004	2005	2006	2007	2008	Post	TOTAL	% of \$	
Federal	CMAQ	0.00	20.00	0.00	200.00	0.00	10.00	0.00	230.00	17.97	Delete
Non-Federal	LOCAL	0.00	0.00	300.00	0.00	250.00	0.00	0.00	550.00	42.97	Delete
Federal	NHS	0.00	200.00	0.00	300.00	0.00	0.00	0.00	500.00	39.06	Delete
		0.00	0.00	0.00	0.00	0.00	0.00	0.00			Delete
Totals:		0.00	220.00	300.00	500.00	250.00	10.00	0.00	1,280.00		Budget Report

Figure 10.1: TIP Budget Screen

The user should remember that using the project “Revision” feature on the *Data Input* screen to reallocate funds among projects will require going to the TIP Budget screen to alter budgets for sources of funds and years if the reallocations are the result of changes in these budgets.

To build the TIP, the user should first select the TIP year from the drop-down box at the top of the screen. This is the year of the TIP, for example, the Year 2006 TIP. If set up as a 3-year TIP in the customization module, funding information can be entered for years 2006, 2007, and 2008.

Next, the user can enter the type and source of funding (see Figure 10.2). The possible types of funding include “Federal” or “Non-Federal”. The sources of funding reflect the choices which the user entered in the customization module under “Funding Sources”. To the right of the “Funding Source” boxes, the user can enter the budgeted funds for each year of the TIP. Also, a final “Post” year is available for any additional funding.

Funding Type	Funding Source	Prior	2004	2005	2006
Federal	CMAQ	0.00	20.00	0.00	200.0
	CMAQ	Congestion Management Air Quality			
Non-Federal	ENHANCE	Enhancements Program			0.0
	ITS	Intelligent Transportaion System			
	MPO	Metropolitan Planning (Highway Plannig and Transit Met)			
Federal	NHS	National Highway System			0.0
	NTC/CBI	National Trade Corridor Planning and Developmet Progr			
	SAFETY	Safety Infrastructure Program			0.0
	STP	Surface Transportation Program			

Figure 10.2: Specifying type and source of funding

The far right of the screen automatically calculates the total for each funding type and corresponding percentage of the total budget (Figure 10.3). Also, the delete button can be used to remove a row from the budget.

Finally, the bottom of the screen shows the budgeted amount totaled by year (Finure 10.4).

TOTAL	% of \$	
230.00	17.97	Delete
550.00	42.97	Delete
500.00	39.06	Delete
		Delete

Figure 10.3: Display of the calculated total per funding source

Totals:	0.00	220.00	300.00	500.00	250.00	10.00	0.00	1,280.00
---------	------	--------	--------	--------	--------	-------	------	----------

Figure 10.4: Display of the total budget funding by year

Import Data Between TIP Years

Select the option to import data between TIP years (Figure 11.2). Then Select the year, which contains the TIP data in the “From TIP Year” combo-box. Then, select the year where the data should be copied in the “TO TIP Year” combo-box (Figure 11.3). All the projects in the TIP database for the selected “From YIP Year” appear in the “Select Projects” list (Figure 11.4).

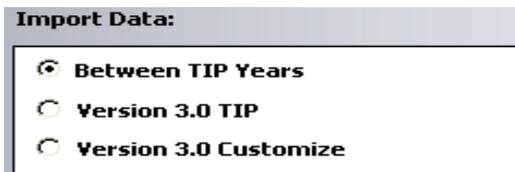


Figure 11.2: Options to Import Data
Between TIP Years

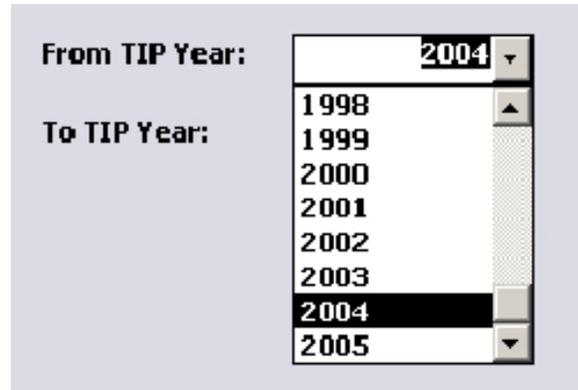


Figure 11.3: Specify From and To Years

Project ID1:	Project Name:
STP1103106	Euclid Avenue
STP1202206	NW 70th Avenue
STP1402906	12th Avenue
STP1602706	NW 6th Drive & NW 16th Stre
STP1702306	Hickman Road
STP1702506	Douglas Avenue
STP1902006	University Avenue
STP701606	ML King Jr Parkway East Ext
STP702406	E 21st Street
STP702606	Second Avenue
STP702806	University Avenue
STP903006	MTA

Figure 11.4: “Select Projects” List



Figure 11.5: Project Selection Buttons

Highlight a project in the “Select Projects” list and then click the “Add >” button. Or, to select all projects click the “Add All >>” button. Individual or all selected projects can be removed using the “< Remove” or “<< Remove All” buttons, respectively (Figure 11.5).

The “Projects to be copied:” list shows all the selected projects (Figure 11.6). When ready, click the “Execute” button from the list of Project Selection buttons. All the selected projects, including their descriptive information, their financial data, scoring, and revision history will be copied into the new TIP year.

Projects to be copied:	
Project ID1:	Project Name:
STP1103106	Euclid Avenue
STP1202206	NW 70th Avenue
STP1402906	12th Avenue
STP1602706	NW 6th Drive & NW 16th Stre
STP1702306	Hickman Road
STP702806	University Avenue
STP903006	MTA

Figure 11.6: Projects to be copied

Import TIP Data From Previous TELUS Versions

Select the option to import data from version 3.0 TIP (Figure 11.7).

Import Data:
<input type="radio"/> Between TIP Years
<input checked="" type="radio"/> Version 3.0 TIP
<input type="radio"/> Version 3.0 Customize

Figure 11.7: Option to Import TIP Data from TELUS 3.0

Click in the box and locate the TELUS v3.0 database file named: TIPdata2.mdb (Figure 11.8).

Click below to browse for Version 3.0 TipData2.mdb
<input type="text"/>

Figure 11.8: Locate TIPdata2.mdb file

Only one year can be imported at a time, so in the “From TIP Year” combo-box select the year whose data you wish to import. No “To TIP Year” needs to be selected because the imported data will be copied into the same TIP year of TELUS Version 4.0 (Figure 11.9).

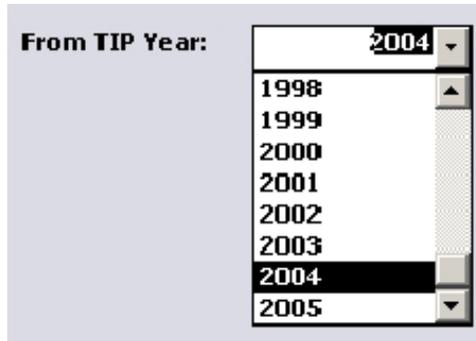


Figure 11.9: Specify TIP Year

Project ID1:	Project Name:
STP1103106	Euclid Avenue
STP1202206	NW 70th Avenue
STP1402906	12th Avenue
STP1602706	NW 6th Drive & NW 16th Stre
STP1702306	Hickman Road
STP1702506	Douglas Avenue
STP1902006	University Avenue
STP701606	ML King Jr Parkway East Extri
STP702406	E 21st Street
STP702606	Second Avenue
STP702806	University Avenue
STP903006	MTA

Figure 11.10: Select Projects List

Highlight a project in the “Select Projects” list and then click the “Add>” button. Or, to select all projects click the “Add All>>” button. Individual or all selected projects can be removed using the “<Remove” or “<<Remove All” buttons, respectively (Figure 11.11).

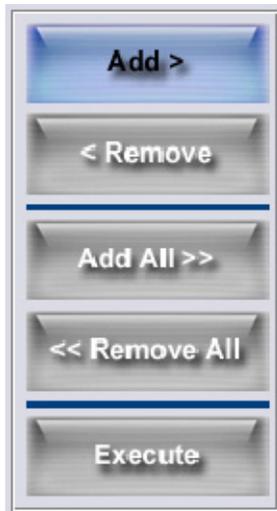


Figure 11.11: Project Selection Buttons

Projects to be copied:	
ProjectID1:	Project Name:
STP2001204	SW 9th Street
STP200204	Corporate Woods Drive
STP2002103	Southwest Connector

Figure 11.12: Projects to be copied

The “Projects to be copied:” list shows all the selected projects (Figure 11.12).

When ready, click the “Execute” button from the list of Project Selection buttons. All the selected projects, including their descriptive information, their financial history, scoring, and revision history is copied into TELUS Version 4.0.

Importing Customizations From Previous TELUS Versions

All user customizations from TELUS version 3.0 can be imported to version 4.0. Select the option to import customizations from version 3.0 (Figure 11.15).

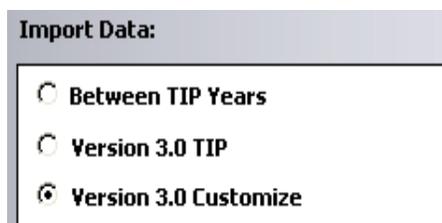


Figure 11.13: Option to Import TIP Customizations from TELUS Version 3.0

Click in the box and locate the TELUS Version 3.0 customization file named: Customize2.mdb (Figure 11.14).

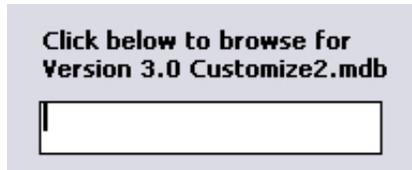


Figure 11.14: Locate customize2.mdb file

Once you locate the customize2.mdb file, TELUS will automatically import all your customizations from Version 3.0 into Version 4.0.

12. Importing TIP Data from External Sources

Overview

Many MPOs have already assembled their TIP information in a spreadsheet or database format. It is likely that this data can be imported directly into the TELUS TIP database, eliminating the need to re-enter all the information. To import data, however, the user should be knowledgeable of MS Access software and with database structures in general. While this chapter provides a brief overview of the importing process, users are encouraged to read the MS Access help files on linking tables and building append queries. In addition, the user should create backups of all files before attempting the process.

Importing External Data

Importing MPO data involves three steps:

1. Opening the TELUS TIP database in MS Access.
2. Linking the MPO's data file to the TELUS TIP database.
3. Building and executing an append query to import the MPO data into the TELUS TIP database.

Opening the TELUS TIP Database

The installation process described in Chapter 3 installed both the TELUS software and the TIP database. The location of these files was determined by the installer and should have been written down. If the installer chose a stand-alone installation, all these files are in the same location on the user's local hard drive. If the installer chose a network installation, these files are located in separate locations: the TELUS interface is located on the local machine, while the TIP database is located on a network drive.

To open the TIP database, first start MS Access. Select “Open an Existing File” and click the “OK” button (see Figure 12.1).

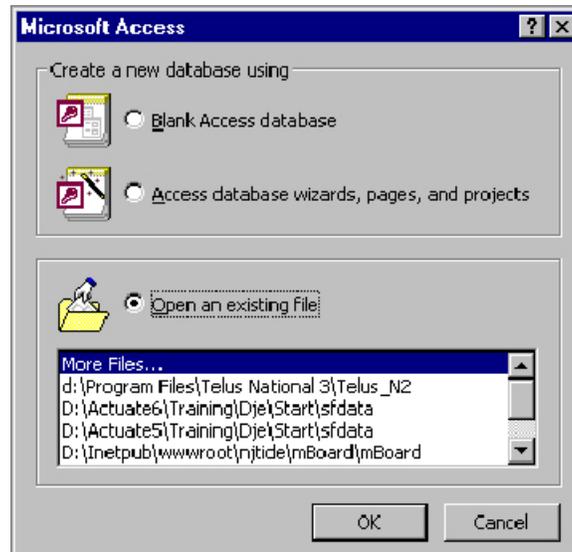


Figure 12.1: Opening an Existing Database

In the file dialog box that appears (Figure 12.2) find the TIPData.mdb file from the installation path that was recorded earlier. Click on the “Open” button.

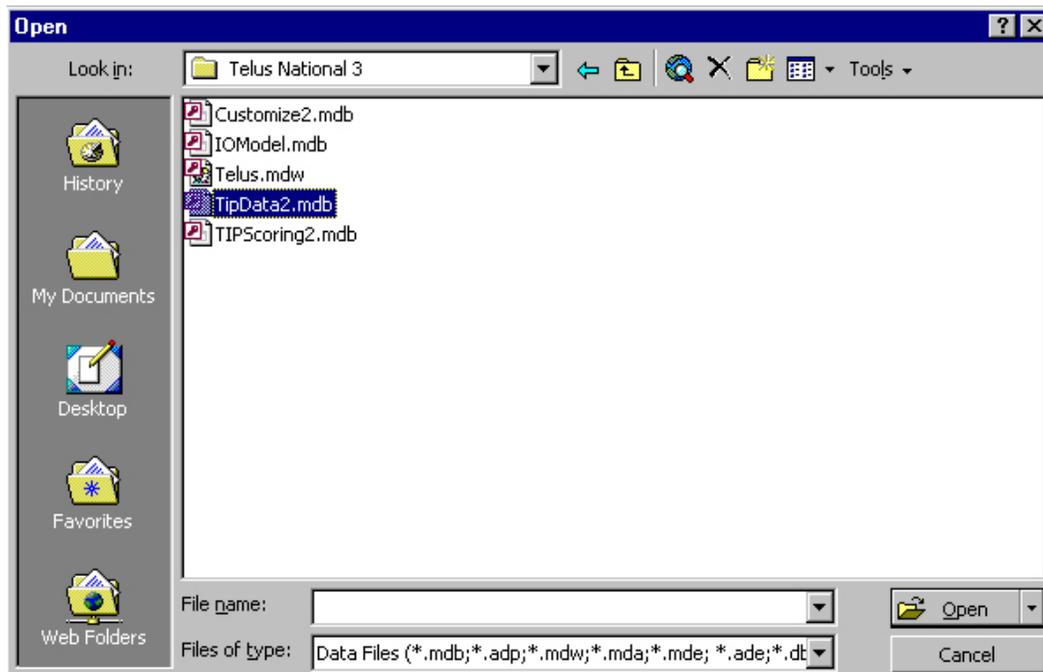


Figure 12.2: Locating TIPData.mdb in the File Dialog Box

The TIPData2.mdb database file will open in MS Access. As shown in Figure 12.3, the database is composed of several tables. The table below describes these tables.

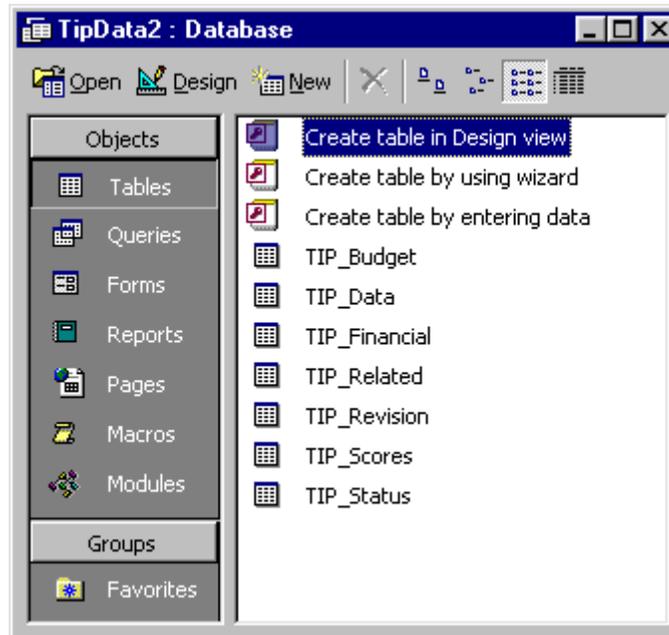


Figure 12.3: Tables Composing the TIPData.mdb Database

TIPData4.mdb Access Tables:

Field Name	Description	Additional Information
TIP_Data	Descriptive Information	Chapter 7, Entering Tip Project Information
TIP_Financial	Financial Information	Chapter 7, Entering Tip Project Information
TIP_Status	Project Status	Chapter 7, Entering Tip Project Information
TIP_Revision	Project Revision History	Chapter 7, Entering Tip Project Information
TIP_Scores	Project Scoring	Chapter 8, The Project Scoring Module
TIP_Related	Project Interrelationship	Chapter 9, The Project Interrelationship Module
TIP_Budget	Budget Information	Chapter 10, TIP Budget

Linking the MPO's Data File

The user can now link their spreadsheet or database file to the TIP database. MS Access can link many different formats, including other MS Access files, dbase files, MS Excel files, and others. In the case of MS Excel files, however, the user should be sure that the first row contains field names, and subsequent rows contain individual project data (i.e., records). Often, MS Excel files are used to organize information in formatted tables, such as in the example shown in Figure 12.4 below. This type of layout does not lend itself well to data conversion. This data would need extensive reorganization to fit the table and column structure of a database. In this case, it may be simpler to re-enter the project information.

FISCAL YEARS 2000-2002 TRANSPORTATION IMPROVEMENT PROGRAM											
Route/Street County	Item No	Location	Length (Miles)	Type of Work	TOTAL COST			Sponsor	FEDERAL-AID		
					2000	2001	2002		2000	2001	2002
I-80		Termini: 1 mile W of West Des Moines		Rest Area	\$ 75,000	\$ 700,000	\$ -	IDOT	\$ -	\$ -	\$ -
		Waukee City Sewer Connection		Improvement				MPO Share	\$ -	\$ -	\$ -
		City:									
		Project:									
Dallas County		Remarks: None									
		Bridge: None									

Figure 12.4: MS Excel Spreadsheet in Tabular Format

To create the link, select the “Link Tables” option in the File Menu (see Figure 12.5).

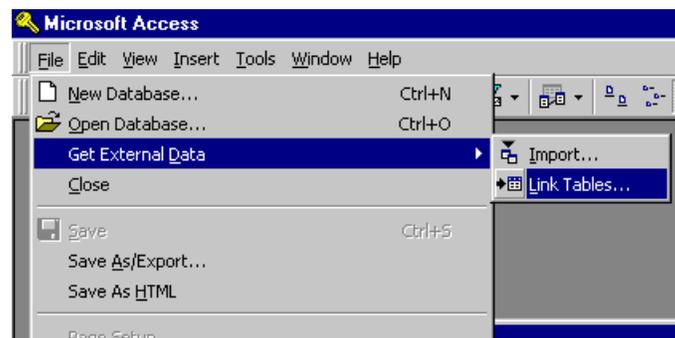


Figure 12.5: Linking to the External Table

In the link-dialogue box (see Figure 12.6), select the appropriate type of file from the choices at the bottom left. Then, using the file browser, find your database file containing the TIP project information. Click on the “Link” button.

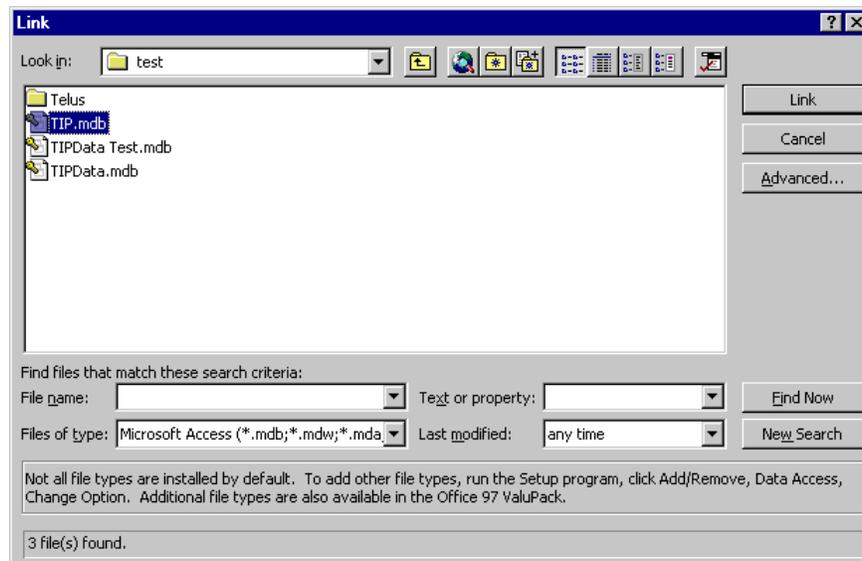


Figure 12.6: Finding the External TIP Data in the Link Dialog Box

Once linked, the data file will appear in the list of tables (see an example in Figure 12.7) of the Access database window. In the list, it will have an arrow, indicating that it is a linked file. The accompanying icon will also indicate what type of file is linked. In this case, the first linked file is a dbase file; the second is an MS Access file.

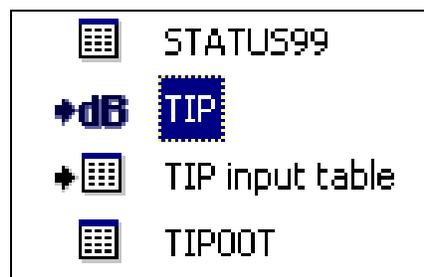


Figure 12.7: External Databases Linked to the TELUS Database

Building and Executing the Append Query

Once linked to the MPO's data file, the user can import the data from the linked file into the TELUS TIP data table using an Append Query. Selecting the "Queries" tab in the database windows and clicking the "New" button will open the new query pop-up window (see Figure 12.8). Select Design View and click the "OK" button. Then, select the table that you want to append to and bring it into the Query Designer.

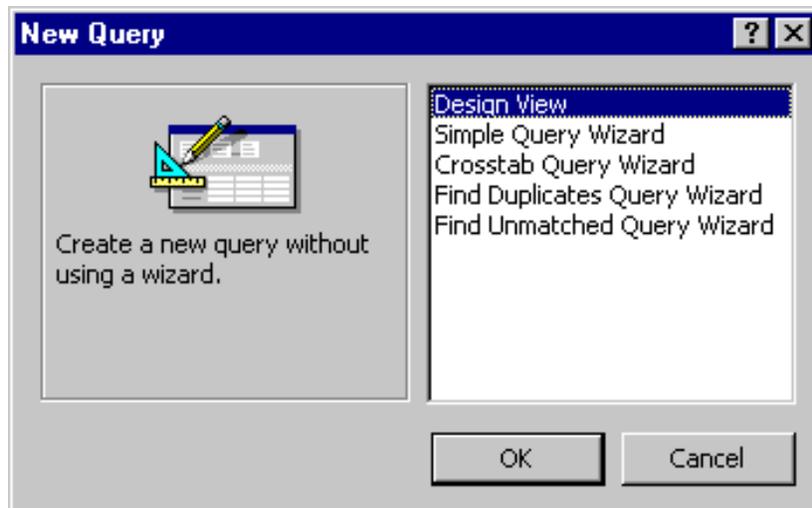


Figure 12.8: New Query Creation Options

When prompted, choose the linked table that contains the MPO's TIP information. Then, from the toolbar, choose Append Query (see Figure 12.9).

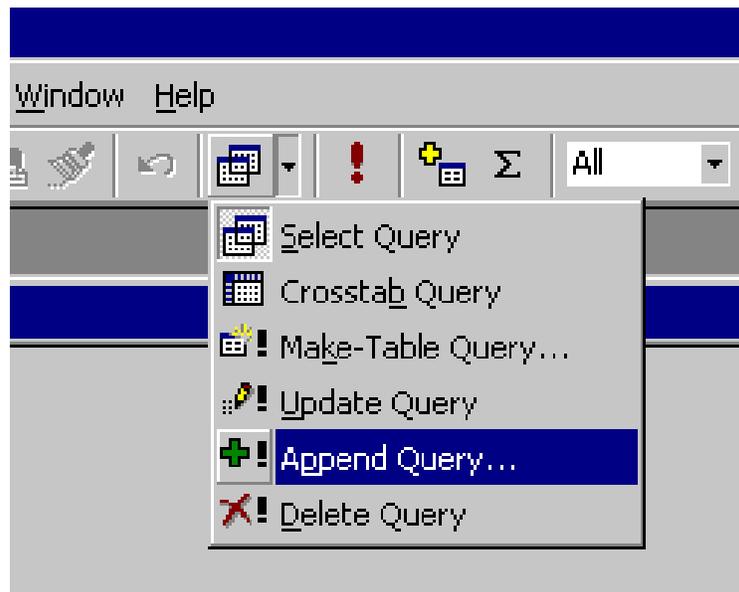


Figure 12.9: Choose Append Query

Choose the appropriate TELUS TIP data table (see Figure 12.10). This is the table to which the information from the external data source will be copied.

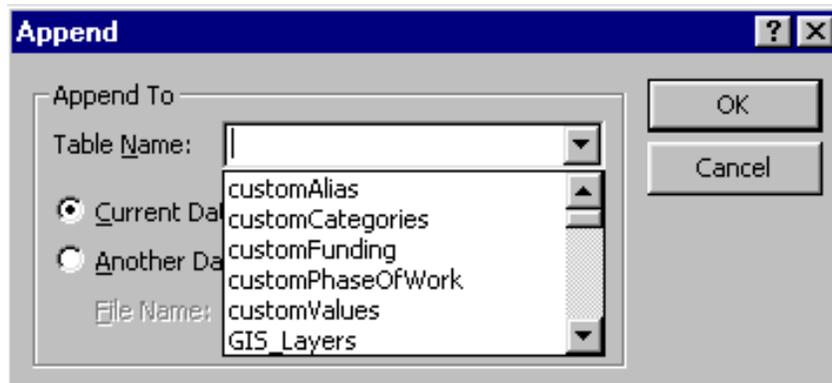


Figure 12.10: Choose the Append Table

Match the field names from the MPO’s linked table to the field names in the TELUS TIP database table, as reflected in Figure 12.11. You must select a field with unique values to match with DBNUM field (each record must have a unique value). Do not append to the Objective, Category, Mode, Project Type, and Funding Source fields. These fields have pre-defined values and feed into other modules of the TELUS system.

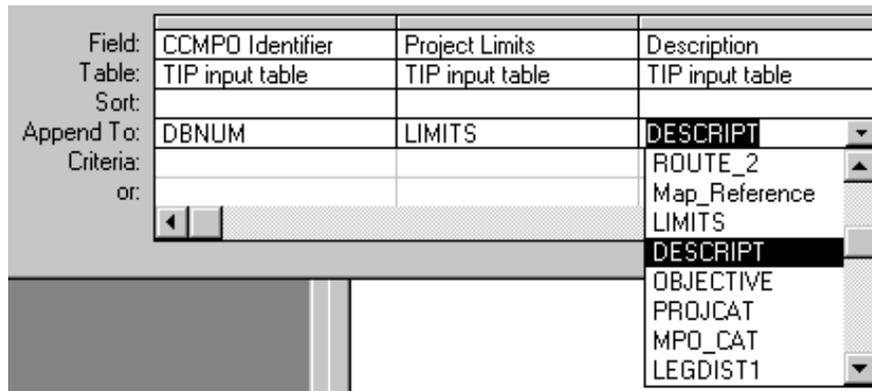


Figure 12.11: Match Field Names between the TIP Table and the Linked Table

Execute the query by clicking the “Run” button (see Figure 12.12). The data and records from the linked table are added to the end of the target TELUS TIP database table.



Figure 12.12: Execute the Query

Selecting and Analyzing Projects

- 13. Querying TIP Projects*
- 14. Reviewing Project Information*
- 15. Input-Output Model*
- 16. Generating Reports*
- 17. TELUS GIS*



13. Querying TIP Projects

Overview

After establishing the TIP database, TELUS allows for the analysis of the TIP in multiple ways. Clicking on the “Select and Analyze Projects” button from the *TELUS Main Menu* screen launches the *Projects Selection* screen, displayed below in Figure 13.1. This screen allows the user to select projects by their identity, description, location or funding source.

Figure 13.1: Project Selection Screen

Querying TIP Projects

Selecting Projects to be Retrieved

The Project Selection screen allows the user to build sophisticated queries. Using this screen, the user can view project information for all or for particular group of projects selected by their identity, description, location or funding source.

View all Projects for a Particular Year

To view all projects for a particular year, choose the Fiscal Year from the “Fiscal Year” drop-down box. Click the check box next to “Select ALL TIP Projects in Fiscal Year”, seen in Figure 13.2. Then, click the “Select Projects” button.



Figure 13.2: Select ALL TIP Projects in Fiscal Year

View Selected Projects

To view particular group of projects based on their identity, description, location, or funding source, make selections by clicking on a drop-down box that contains a list of possible choices for a criterion field (e.g., TIP Status field, as shown in Figure 13.3).

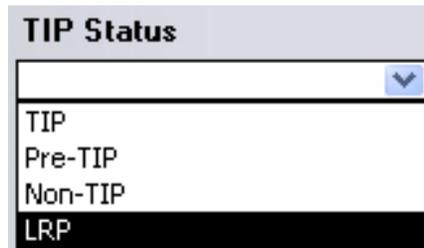


Figure 13.3: TIP Status Drop-Down List

The user can also use the “AND” and “OR” logical operators (Figure 13.4) to create logical query statements. For example, only projects which match both criteria in the query: *County = ‘Middlesex’ AND Project Type = ‘TIP’* will be selected. However, projects only need to match one of the criteria in the logical query: *County = ‘Middlesex’ OR Project Type = ‘TIP’*. Please be sure that the logical operator used will create valid query statements. For example, *Project Type = ‘TIP’ OR Project Type = ‘Non-TIP’* is a valid statement. However, *Project Type = ‘TIP’ AND Project Type = ‘Non-TIP’* is not.



Figure 13.4: Query Linking Options

As the user makes selections the query statement displays in a text box at the bottom of the screen (Figure 13.5). Review this query statement to make sure it is accurate and reasonable. For example, in the query: *County* = 'Middlesex' AND *Municipality* = 'Highland Park,' the user would want to make sure that the municipality is, in fact, in the selected county. To correct an erroneous selection, simply click the drop-down box list again and make a proper selection. Check the query statement and make sure that the previous selection has been replaced with your new choice.

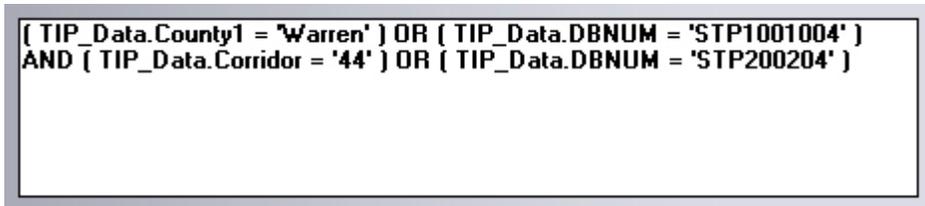


Figure 13.5: The Query Expression

Clearing a Query

If you wish to re-build the query, just click on the “Clear All” button. The “Clear All” button clears all queries including any single criterion queries the user assembled.

Advanced Query

Overview

The “Advanced Query” button on the *Project Selection* screen launches the *Project Selection Advanced* screen, displayed below in Figure 13.6. The Select Data drop-down menu displays the two types of Data that can be queried, Descriptive and Financial. The Advanced Query allows a user to build more complicated queries to retrieve specific information needed. The following section discusses how to use this function to build queries.

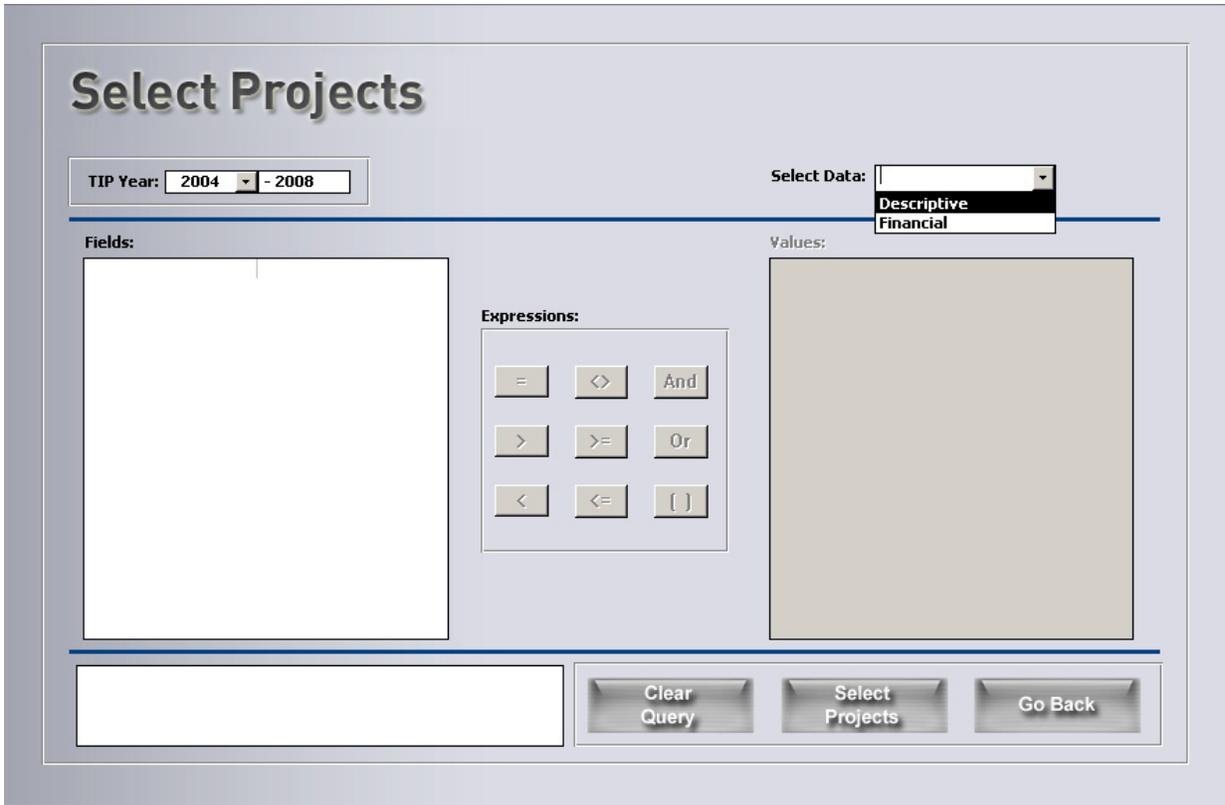


Figure 13.6: Project Selection Advanced Screen

Building Queries

Simple Queries

Select the type of data that you want to query, i.e., Descriptive or Financial. A list of fields will appear in the Fields box. Select the year from the TIP Year drop-down box. Double-click on the field of interest to show its values in the Values box. Select the type of comparison you would like to make from the logical operator expressions section. For example, to select projects that are in the “ENG Phase”: select data type “Financial”; double-click the “Phase” field; click on the logical operator “=” and double-click on the Value “ENG”. A statement “(TIP_financial.PHASE = ‘ENG’)” will be displayed in the text box in the left-bottom corner of the screen (see Figure 13.7). To run the query click the “Select Projects” button. The *Project Information* screen will pop up, displaying information matching the criteria of the built query.

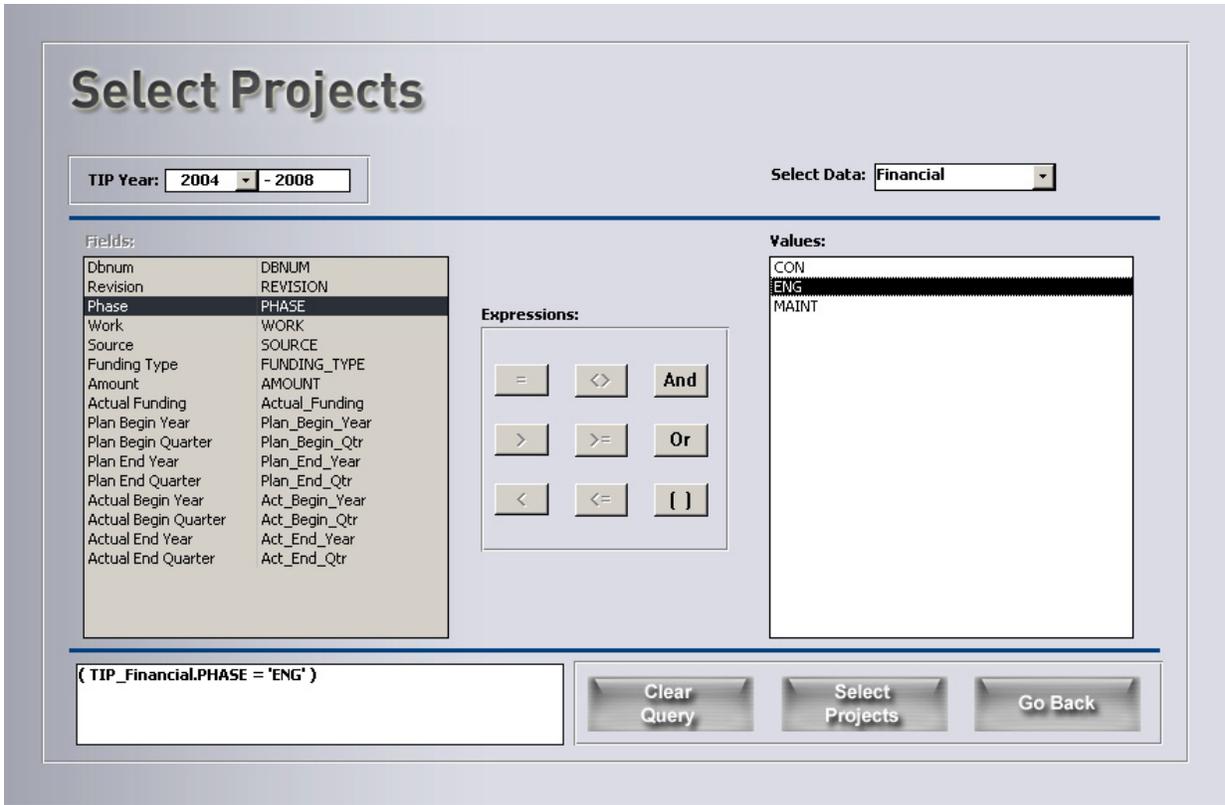


Figure 13.7: Project Selection Advanced Screen – Simple Queries

Complex Queries

To create complex queries, use “AND”, “OR”, and “[]” operators from the expressions section to group selection statements together. For example, to select projects that are in the “ENG Phase” and their lead agency is not “Polk_County” select “Financial” data type; double-click the “Phase” field; click on the “=” button; double-click the “ENG” value; then, click on the “AND” button; select “Descriptive” data type; double-click the “Lead Agency” field; click on the “<>” (not equals) button; and, finally, double-click the “State” value. The built statement will display as “(TIP_financial.PHASE = ‘ENG’) AND (TIP_Data.Lead_Agency <> ‘Polk_County’)” (Figure 13.8). To run the query click the “Select Projects” button on the screen.

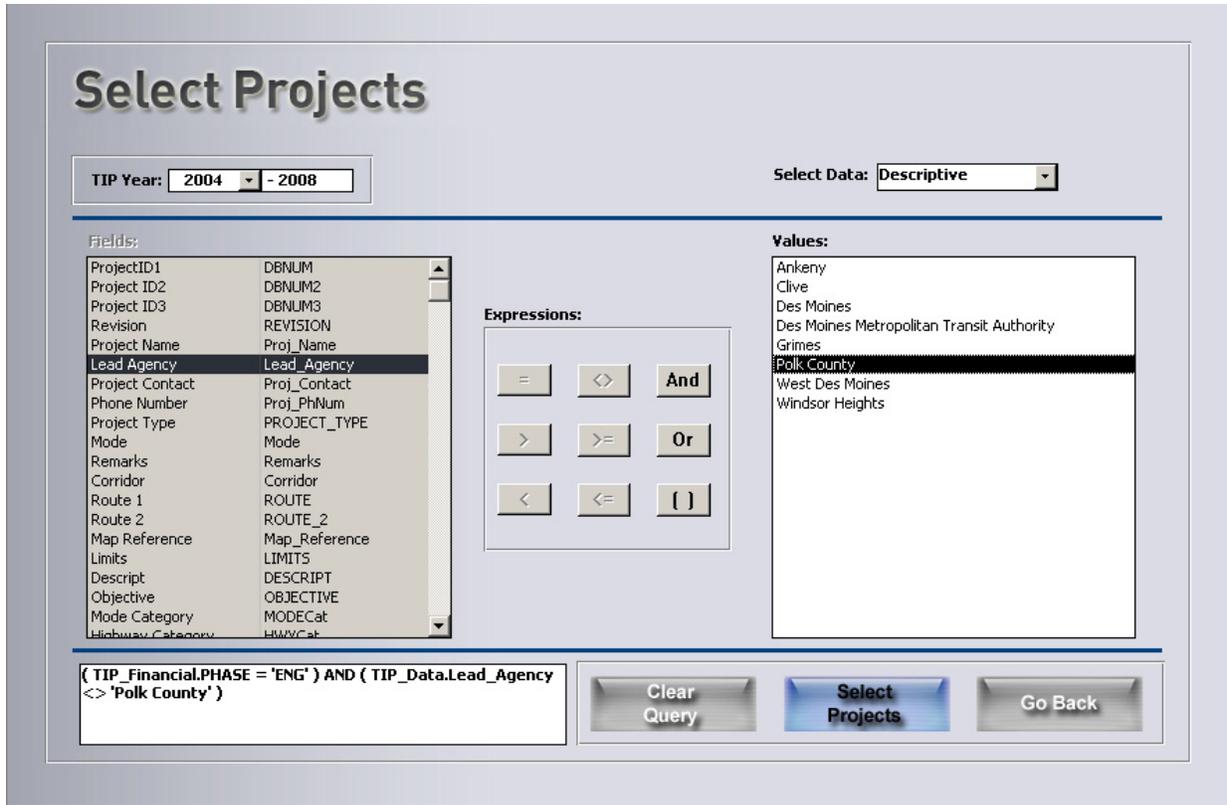


Figure 13.8: Project Selection Advanced Screen – Complex Queries

14. Reviewing Project Information

Overview

The *Project Information* screen, shown below in Figure 14.1, provides detailed information on individual projects that meet the user's criteria.

The screenshot displays the 'Project Information' interface. At the top, there is a 'TIP Year' filter set to '2004 - 2008'. A 'Goto' section includes a dropdown menu with 'DA1500101', navigation buttons for previous and next items, and a '1 of 15' indicator. A 'Go Back' button is also present. Below this, a summary bar shows 'ProjectID1: DA1500101', 'Revision: 1', and 'Project Name: Saylorville Drive'. On the left, a vertical menu contains buttons for 'Projects List', 'Project Details', 'Cost Details', 'Tracking Schedule', 'Tracking Narrative', 'Project Scoring', 'Project Relationships', 'Input Output Model', 'GIS Overview', and 'Reports'. The main area is titled 'Project Details' and has tabs for 'Identity', 'Description', 'Location', 'Custom Fields', and 'Project Picture'. The 'Identity' tab is active, showing 'IDENTIFICATION' fields: 'ProjectID1' (DA1500101), 'Project ID2' (15), 'Project ID3' (00101), and 'Project Name' (Saylorville Drive). Below this is 'CONTACT INFO' with 'Lead Agency' (Polk County), 'Contact' (Kurt Bailey), and 'Phone' ((515) 875-5500).

Figure 14.1: Project Information Screen

At the top of the screen, the total number of projects queried is displayed. Only one project is displayed on the screen at a time. The user may bring up each of the selected projects by using the navigation buttons at the top of the screen (Figure 14.2).



Figure 14.3 Subview Opening Buttons

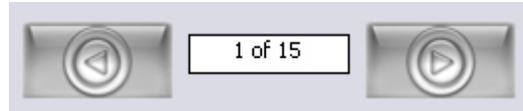


Figure 14.2: Project Navigation Buttons

Along the left column of the Project Information screen, are the subview opening buttons (Figure 14.3). Through these subviews, the user is provided with a great deal of specified information for the selected projects, including: project and cost details, tracking, scoring, input-output impacts, project geographic information system (GIS) maps, and project interrelationships. The last button in the column, “Reports”, allows the user to generate formatted reports. Each of these subviews will be discussed in detail in the following sections of the current chapter as well as in subsequent chapters.

Along the left column of the Project Information screen, are the subview opening buttons (Figure 14.3). Through these subviews, the user is provided with a great deal of specified information for the selected projects, including: project and cost details, tracking, scoring, input-output impacts, project geographic information system (GIS) maps, and project interrelationships. The last button in the column, “Reports”, allows the user to generate formatted reports. Each of these subviews will be discussed in detail in the following sections of the current chapter as well as in subsequent chapters.

Projects List View

The Projects List view presents the users with a list of all the projects selected. (Figure 14.4). Clicking on a project in this list will bring up details for that project

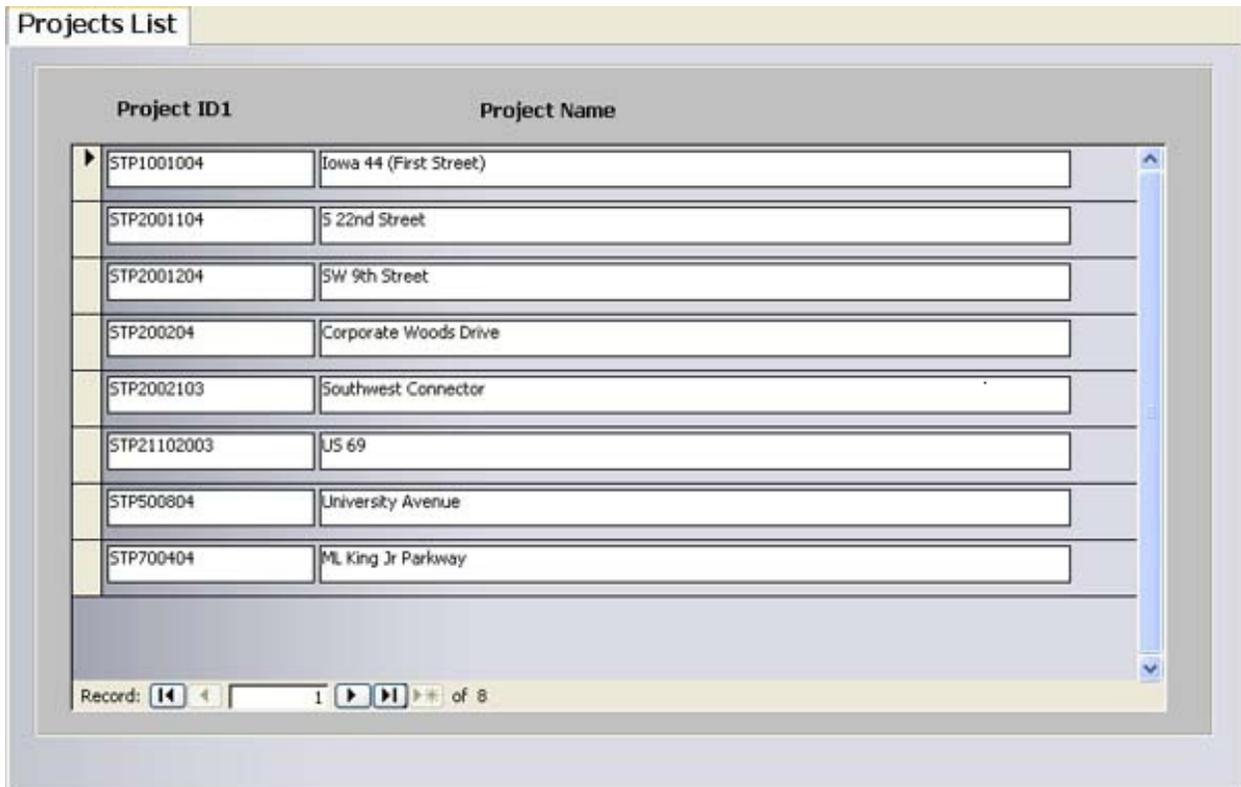
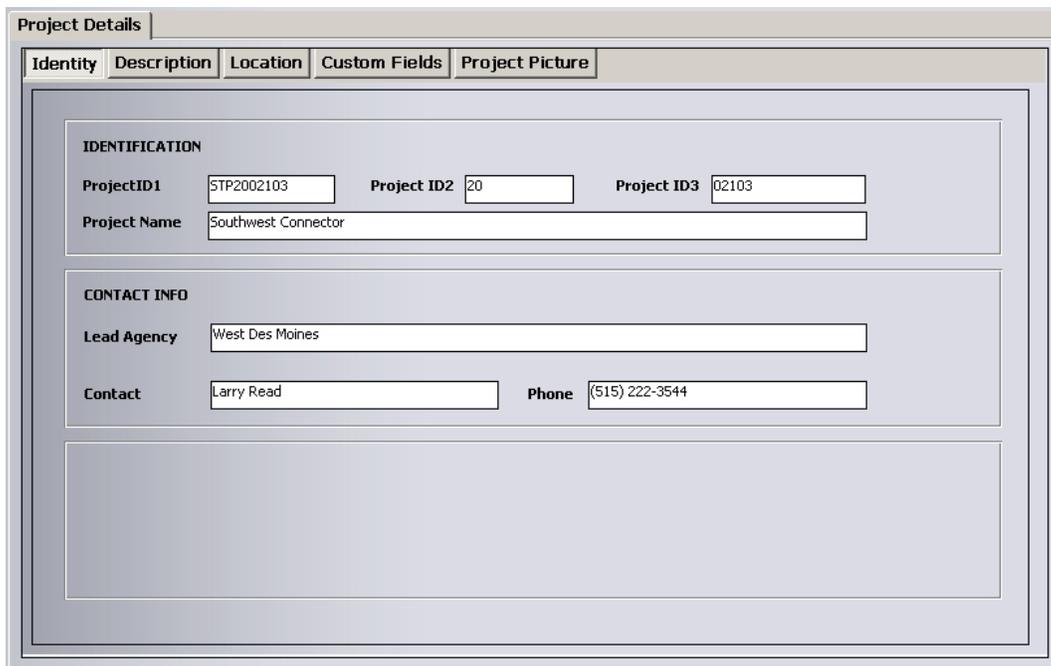


Figure 14.4 Projects List View

Project Details View

The Project Details view presents the descriptive data recorded for each project, including five subviews: identity, description, location, additional custom information, and project picture frame. These five subviews are accessed by clicking on their page tabs along the top of the Project Details view.

Clicking on the “Identity” tab displays the project IDs and contact information for the project (Figure 14.5).



The screenshot shows a web application window titled "Project Details". At the top, there are five tabs: "Identity", "Description", "Location", "Custom Fields", and "Project Picture". The "Identity" tab is selected and active. Below the tabs, the form is organized into sections. The first section is titled "IDENTIFICATION" and contains three input fields for "Project ID1" (containing "STP2002103"), "Project ID2" (containing "20"), and "Project ID3" (containing "02103"). Below these is a single input field for "Project Name" containing "Southwest Connector". The second section is titled "CONTACT INFO" and contains two input fields: "Lead Agency" (containing "West Des Moines") and "Contact" (containing "Larry Read"). To the right of the "Contact" field is a "Phone" field containing "(515) 222-3544". There is a large empty rectangular area at the bottom of the form.

Figure 14.5: Project Details Subview

Clicking on the “Description” tab provides the user with the project’s description and its classification (Figure 14.6).

Project Details

Identity | **Description** | Location | Custom Fields | Project Picture

DESCRIPTION

Army Post Road to First Street

MPO Category TIP Status

Mode Air Quality Environmental Impact Statement

Remarks

TELUS CLASSIFICATION

System Project Type

Functional SubCategory

Project Type

Figure 14.6: Description Subview

The “Location” tab shows the project’s geographical context including its limits and its location (Figure 14.7).

Project Details

Identity | Description | **Location** | Custom Fields | Project Picture

LOCATION:

State Corridor

District 1 District 2

District 3 District 4

Route 1 Route 2

Limits

Counties:

Polk

Municipalities:

Ankeny

Project Termini:

From To

Length

Figure 14.7: Location Subview

The “Custom Fields” tab shows any additional information that is recorded for the project based upon the user’s custom fields (Figure 14.8).

CUSTOM FIELDS:	
Environmental Status	None
Field3	
Field5	October 1994
Field7	September 1995
Field9	
Field2	BRM-8477(1)-8N-77
Field4	
Field6	94-75
Field8	Major Construction
Field10	

Figure 14.8: Custom Fields Subview

If the user has uploaded a picture for the project in the Data Entry Module, the “Project Picture” tab displays the image (Figure 14.9). If the user has not associated any picture with the project, a default TELUS logo will appear here.

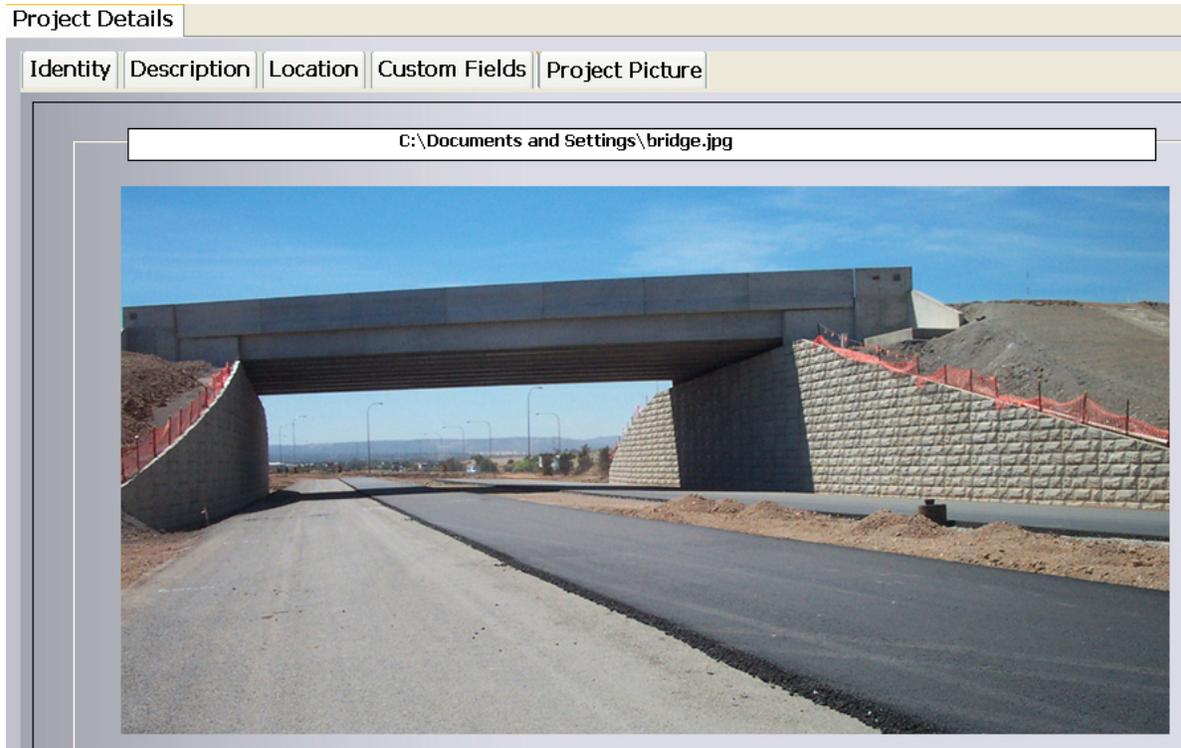


Figure 14.9: Project Picture Subview

Cost Details View

The *Cost Details* view (Figure 14.10) provides a breakdown of the phase of work, source of funds and programming of dollars for the project. The table charts the planned and actual distribution of funds by fiscal year.

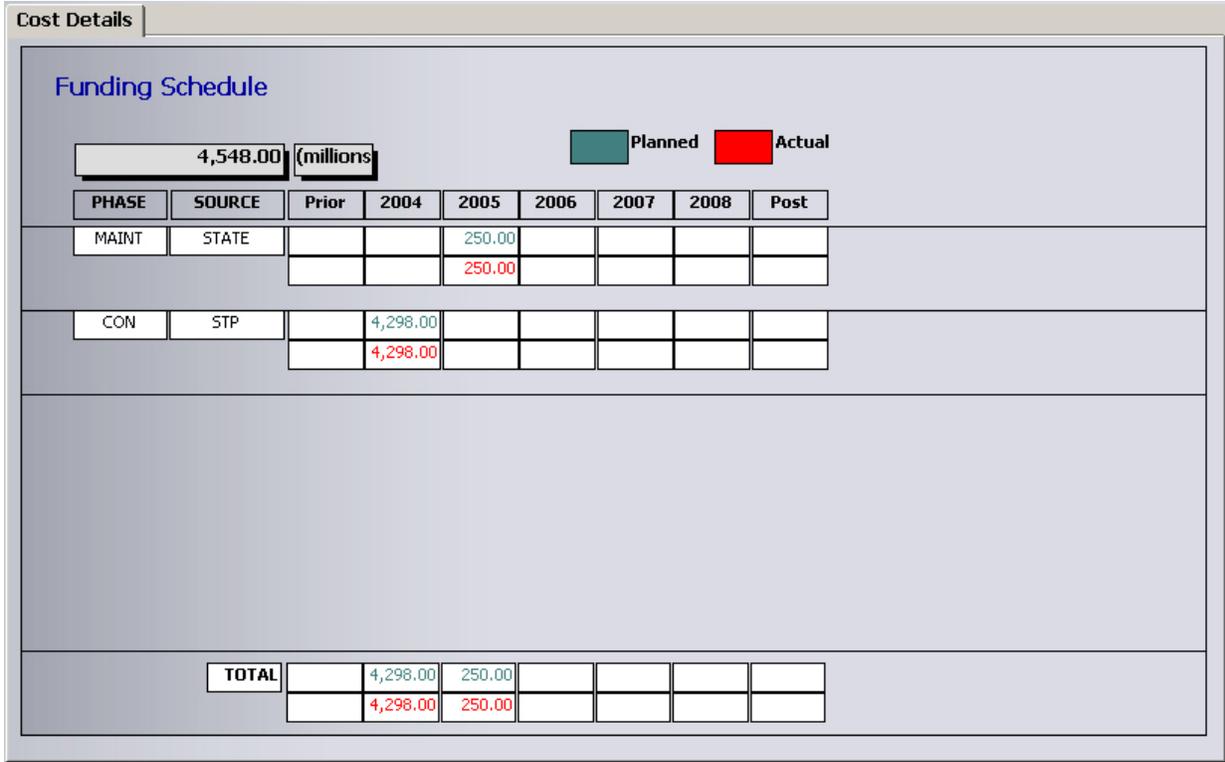


Figure 14.10: Cost Details

Tracking Schedule View

The *Tracking Schedule* view graphically displays the scheduling and funding for the project. The “Scheduling Tracking” tab (Figure 14.11) displays a Gantt chart showing the planned versus actual scheduling. The “Funding Tracking” tab (Figure 14.12) provides a bar chart displaying the allocated versus obligated funding.

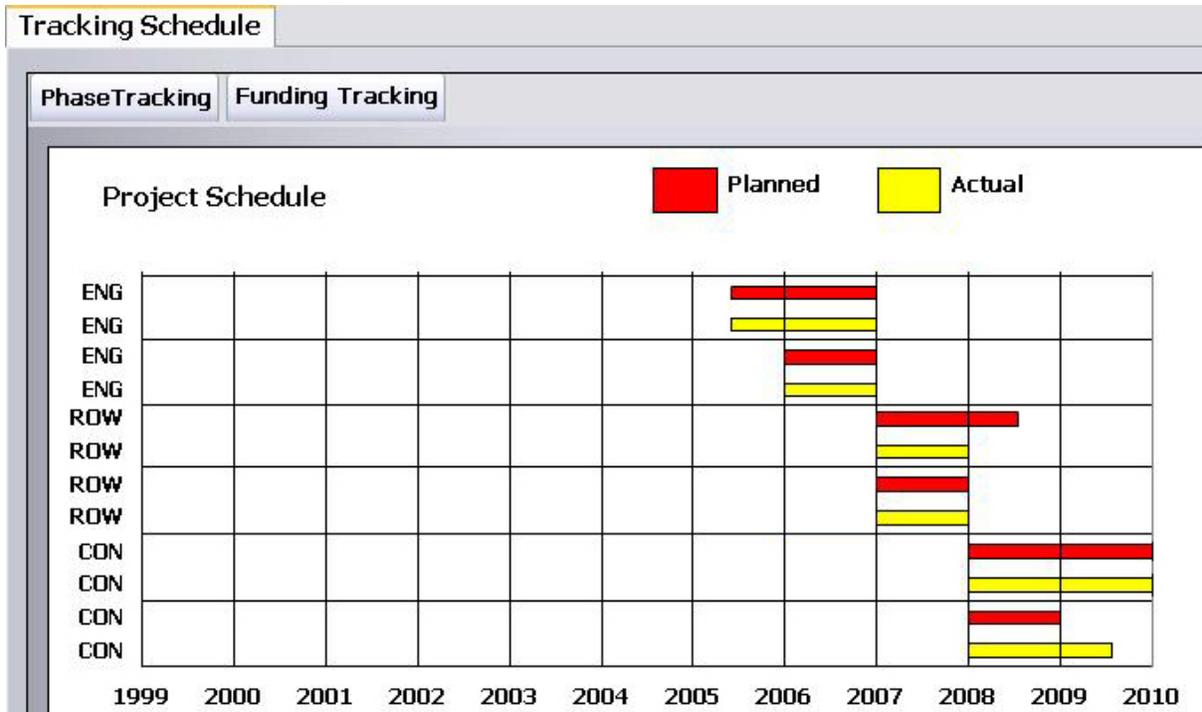


Figure 14.11: Scheduling Tracking

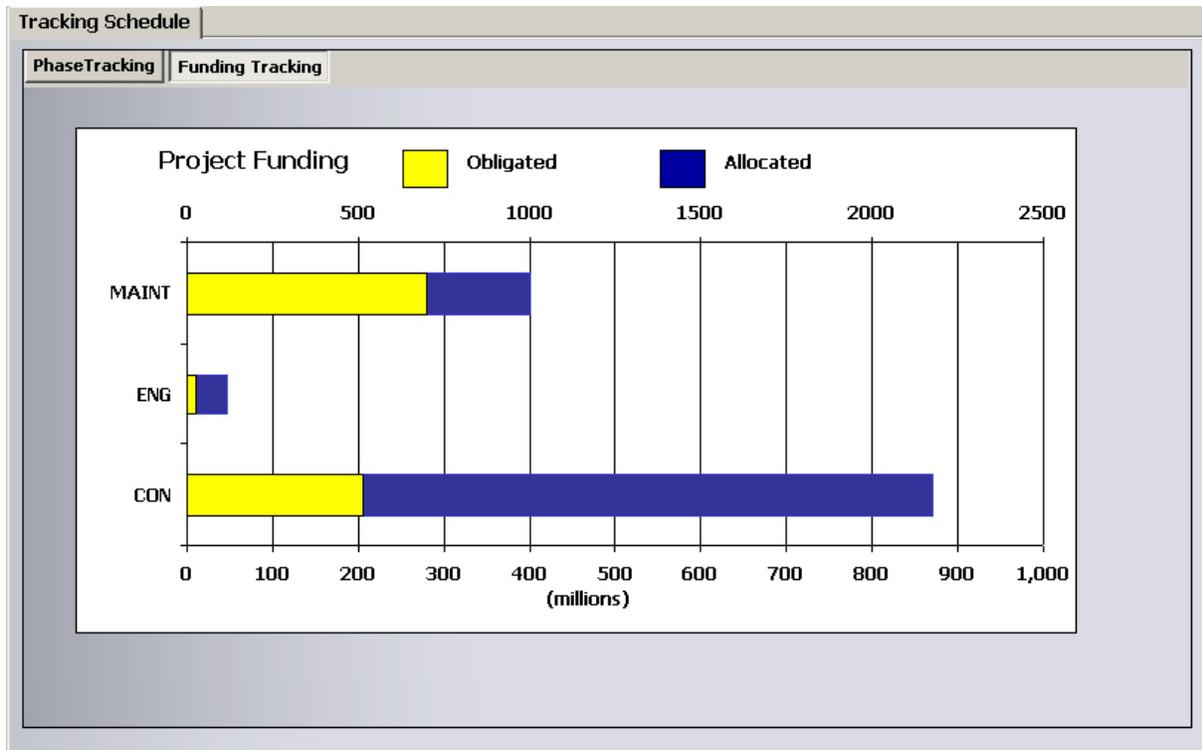


Figure 14.12: Funding Tracking

Tracking Narrative View

The *Tracking Narrative* view (Figure 14.13) presents the users' comments on Planning and Engineering, Right of Way, Construction, Maintenance, Environment, Air Quality, and the Community. This screen is also colored to reflect the seriousness of the situation: green reflects a routine situation, yellow reflects a serious situation, and red reflects a critical situation.

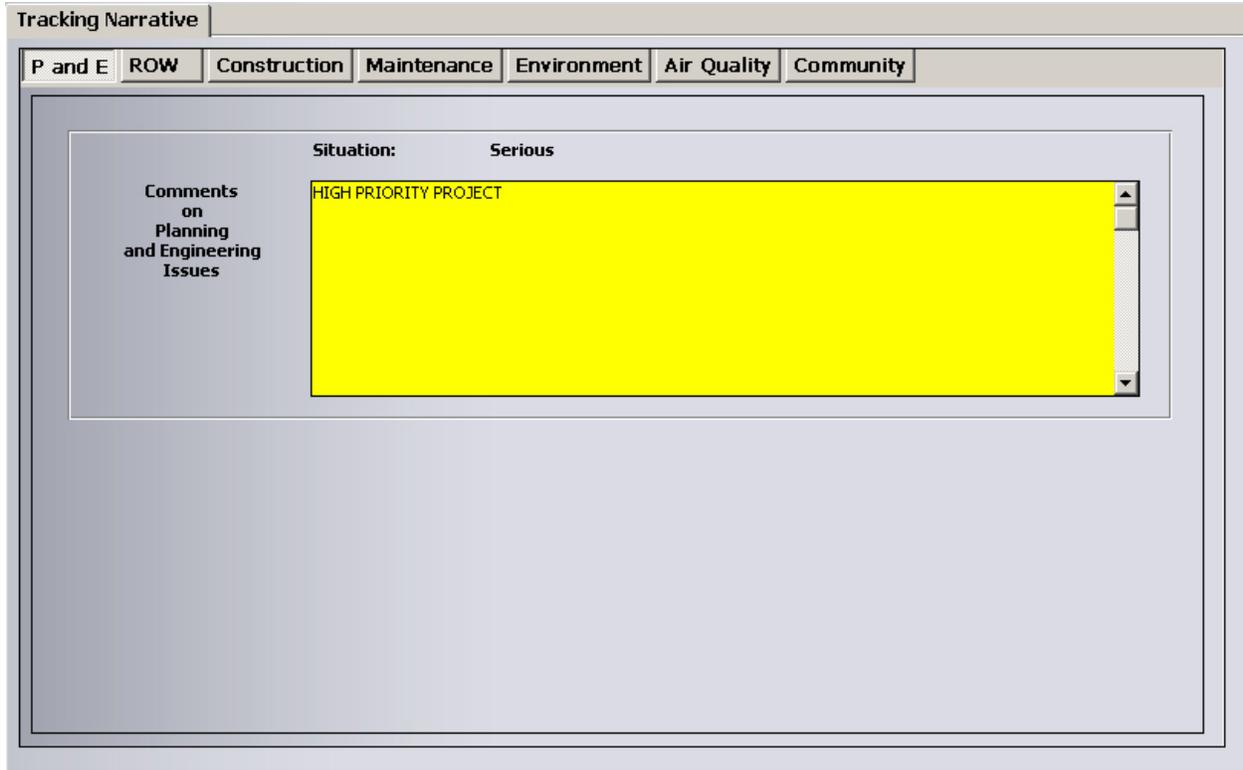


Figure 14.13: Tracking: Narrative View

Scoring View

The *Scoring* view (Figure 14.14) presents the totaled scores for each project. The scores for the project are aggregated both at the category level and at the scoring system level. The score distribution is also reflected in the accompanying pie chart.

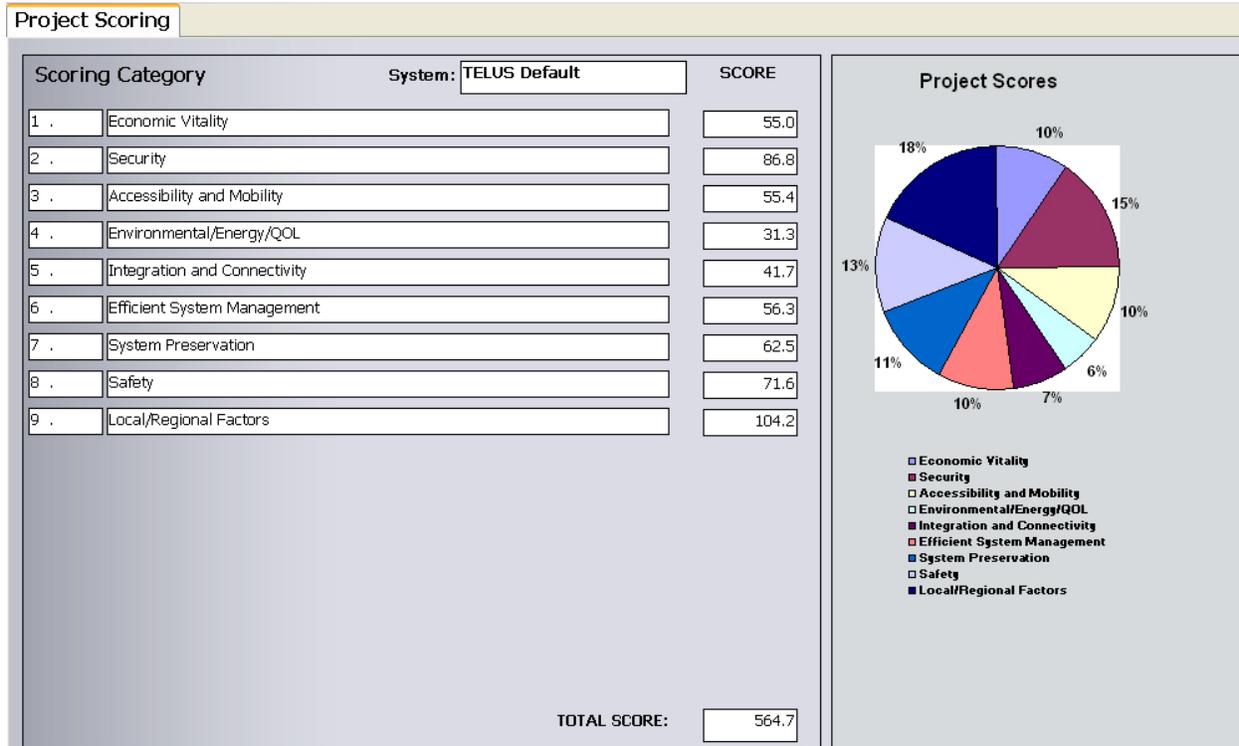


Figure 14.14: Project Scoring

Project Interrelationships View

The *Project Interrelationships* view (Figure 14.15) lists the projects that may be related in terms of disturbance, planning, or functional relationships. The view also shows the degree of the relationship, and any additional comments about the interrelationship.

Related to	Project Name	Relationship Type	Degree	Comments
STP200295	Iowa 160 (Oralabor Road)	Disturbance	Severe	
STP200204	Corporate Woods Drive	Disturbance	Moderate	
STP21102003	US 69	Disturbance	Moderate	
STP200295	Iowa 160 (Oralabor Road)	Planning	Severe	
STP200204	Corporate Woods Drive	Planning	Moderate	
STP21102003	US 69	Planning	Moderate	

Figure 14.15: Project Interrelationships View

Input Output View

This is discussed in Chapter 15.

GIS Overview

GIS Overview (Figure 14.16) provides the user with a geographic view of all the projects selected. In order to view the selection geographically, the user needs to setup the GIS module in TELUS by adding the required shape files. After the user queries the database using the Project Selection Module, TELUS will look for the corresponding GIS files. If any corresponding GIS files for the projects selected are found, TELUS will create a new layer “LayerName-SELECTEDPROJS” as

shown in Figure 14.16. If TELUS does not find any GIS files, a message will be displayed informing the user to update the GIS module.

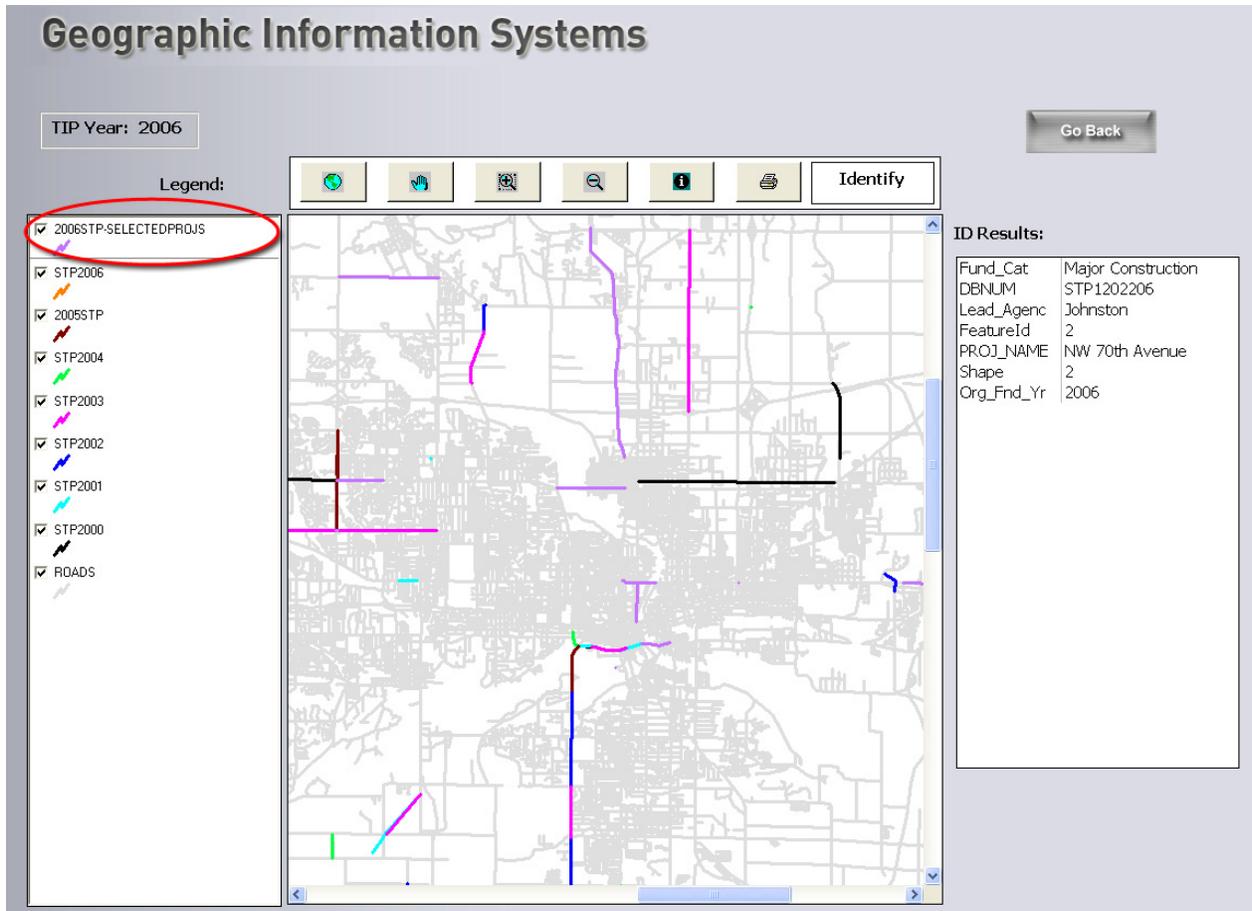


Figure 14.16: GIS Overview

Further discussion on using GIS in TELUS can be found in Chapter 17.

Planning Analysis

The Planning Analysis Module, Figure 14.17, accessed through the “Analysis” menu bar, displays the distribution of selected projects according to the eight SAFETEA-LU planning objectives (or categories). It distributes the selected projects according to planning ratios determined by a group of TELUS experts, generally knowledgeable about how a typical project fulfills the planning criteria. The user can alter the ratios by clicking on the “Update Planning Ratios”

buttons. The Planning Analysis module shows how the projects meet the SAFETEA-LU criteria, by the number of projects and by the dollar amounts of the projects.

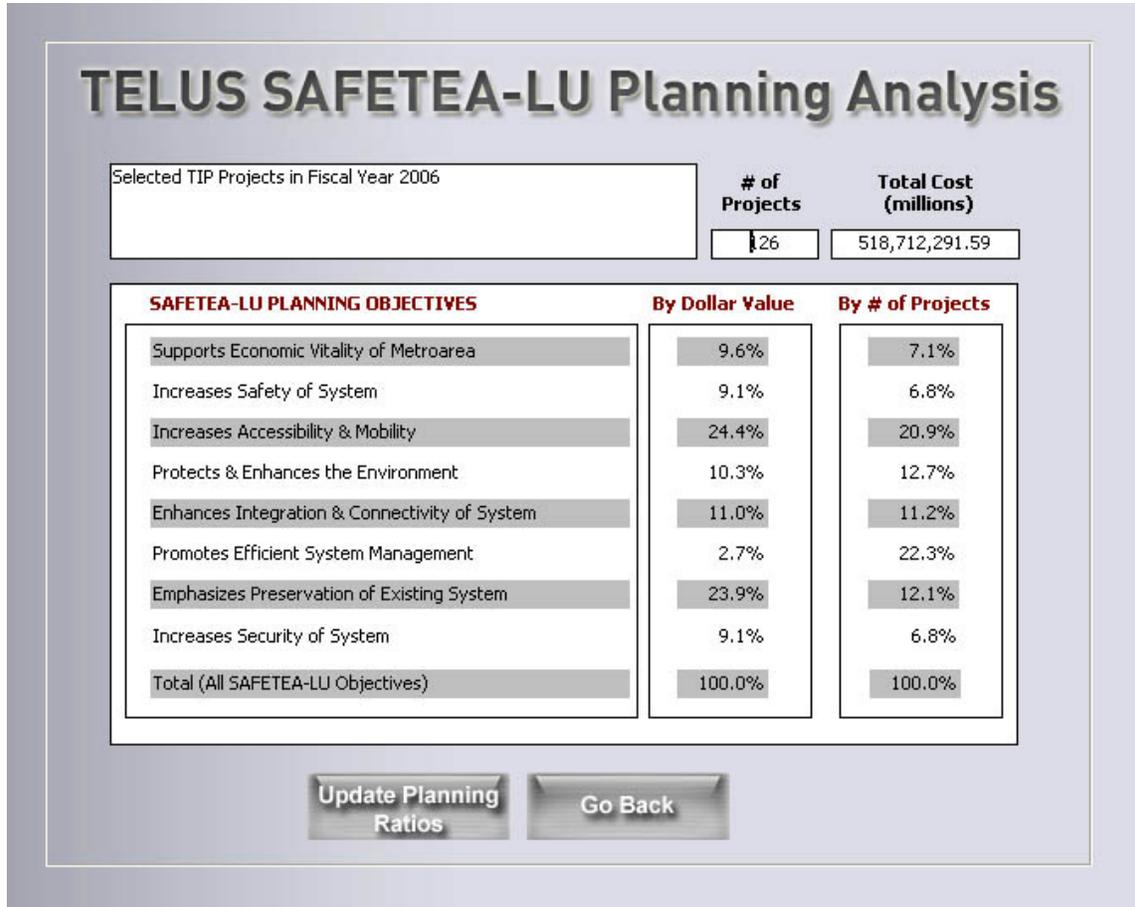


Figure 14.17: Planning Analysis Module

15. Input-Output Model

Overview

An important objective of TELUS is to provide local government officials with information on the regional economic impact of transportation projects; and the TELUS Input-Output (I-O) model allows users to do just that, estimating and displaying associated job, income, and fiscal impacts of a selected project or projects. Impacts are displayed with sector specificity, over the TIP's five-year planning horizon, and against a background of projected overall jobs, incomes, and tax revenues. The user can easily import economic impact tables for presentation to elected officials, planners and other transportation project decision makers.

About the TELUS I-O Model

Regional scientists developed I-O models to capture the interconnectedness of regional economies.¹ The name refers to the fact that the output of one industry feeds the input needs of other industries. Households account for much of a region's economic interconnectedness; as wage earners draw income from one set of industries and spend these moneys as consumers at other industries. The interconnectedness of a regional economy means that transportation projects that inject money into one part of an economy will have predictable ripple effects throughout the economy. Tracking these ripple effects (often called *multiplier effects*) is what I-O analysis is all about.

The I-O model in release 3.0 of TELUS accesses a database of economic information unique to each host MPO. The database includes detail on jobs, earnings, indirect business tax, business revenues, profits and value added (gross state product) for the current year, and projections of

¹ An in depth presentation of regional I-O model methods and workings can be found in Miller and Blair, 1985, *Input-Output Analysis: Foundations and Extensions*. Englewood Cliffs, NJ: Prentice Hall. The TELUS I-O model is a multiregional model. Miller and Blair discuss multiregional I-O in chapter 3 of said volume.

the same through the fifth year of the five-year TIP. These data appear with Standard Industrial Classification (SIC) System major-division detail, for each MPO county, and for the remaining portion of the host state or states.² A parallel set of tables provides current and five-year projections of local, state and federal tax collections.³

During the initial assembly of the TIP database,⁴ users are asked to classify transportation project types according to the classification scheme appearing in Appendix 1. All told, Appendix 1 displays 100 different project types. Behind the scenes of the TELUS I-O model is a complex set of translators or *recipes* for each of the 100 TELUS transportation project types shown in Appendix 1. Translators show the labor, raw materials, manufactured goods, services, and other inputs needed to complete a given transportation project, or to deliver a given transportation service (e.g., to operate a rail line or to provide for law enforcement). The translators underlying the TELUS I-O model were constructed in an involved process that disaggregated representative transportation project plans and bid specifications, priced these out using transportation project costing data and software, and then bridged the resulting project items to the industries of the I-O model.⁵

The TELUS I-O model works as follows. The user selects a project, collection of projects, or the entire TIP. The I-O model then converts these projects into direct industry requirements according to the input needs indicated by the appropriate TELUS translators. Finally, direct requirements are fed into the inter-industry model, which estimates the associated multiplier

² SIC major division jobs and earnings data are obtained from the U.S. Department of Commerce, Regional Economic Information System (REIS). Value added estimates are obtained by applying value added-earnings ratios from the U.S. National I-O model, controlled in such a way that the so-computed value added sums to reported estimates of gross state product. Job and earnings projections are obtained in the usual fashion as the dampened extrapolation of historic trend.

³ Government revenue data are obtained from the U.S. Department of Commerce, *Census of Government*. Out-year projections assume a constant tax-to-local earnings ratio.

⁴ See chapter 7 of the *TELUS-National Users Manual* (Version 2.1, June 2001).

⁵ The TELUS translators take into consideration price differences among inputs as indicated in project costing data and software. Accordingly, the translator for a bridge in Iowa will differ from the translator for the same bridge in Vermont. Specifics on the assembly of TELUS I-O model translators can be found in the paper: Translator Documentation, available in pdf format on the TELUS-National website.

effects. The final report shows the impacts of selected project(s), where these impacts will occur (i.e., specific MPO counties and the rest-of-state), and how these impacts stack up against background trend projections of overall area job, income, and tax receipts.

Selecting Projects for I-O Analysis

Projects are selected for I-O analysis following the same selection procedure used in other TELUS analyses. From the *Main Menu*, click the button labeled “Select and Analyze Projects.” This brings up the *Projects Selection* screen shown in Figure 15.1.

Figure 15.1: Project Selection Screen

From there, users can select projects according to a varied set of characteristics; individual projects, projects by year, projects by location, projects by funding source, and others, including all TIP projects taken together. Step-by-step direction on the use of the *Projects Selection* screen

is found in Chapter 13, “Querying TIP Projects.” The user concludes the project selection process by clicking the lower right corner button labeled “Select Projects” (Figure 15.1). This brings up the *Project Information* screen shown in Figure 15.2, which allows the user to individually browse the selected projects.

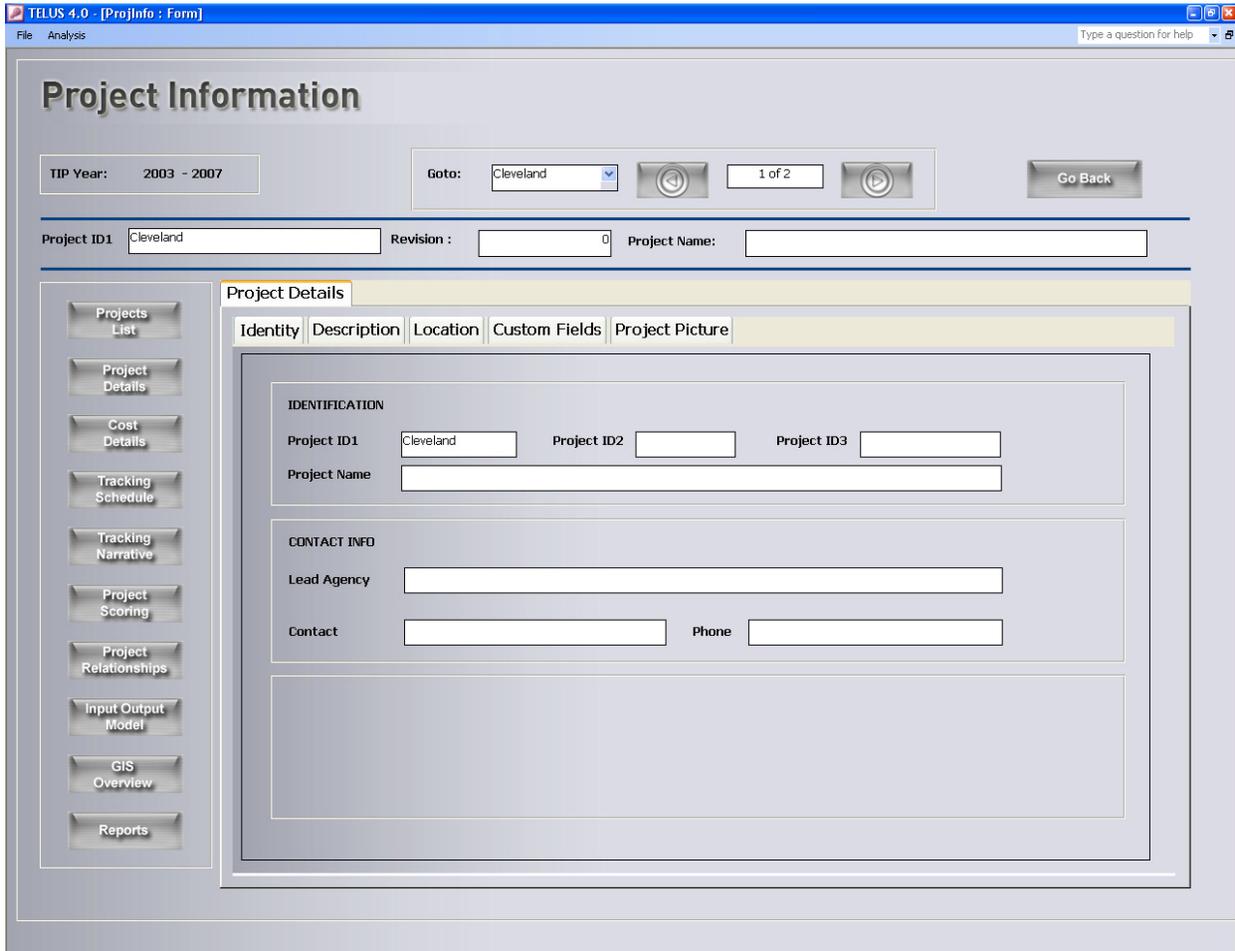


Figure 15.2: Project Information Screen

A detailed discussion of the *Project Information* screen and its uses is found in Chapter 14, “Reviewing Project Information.”. Clicking the button labeled “I-O Model” brings up the *Input Output Model: Summary of Results* screen, of which Figure 15.3 is an example.

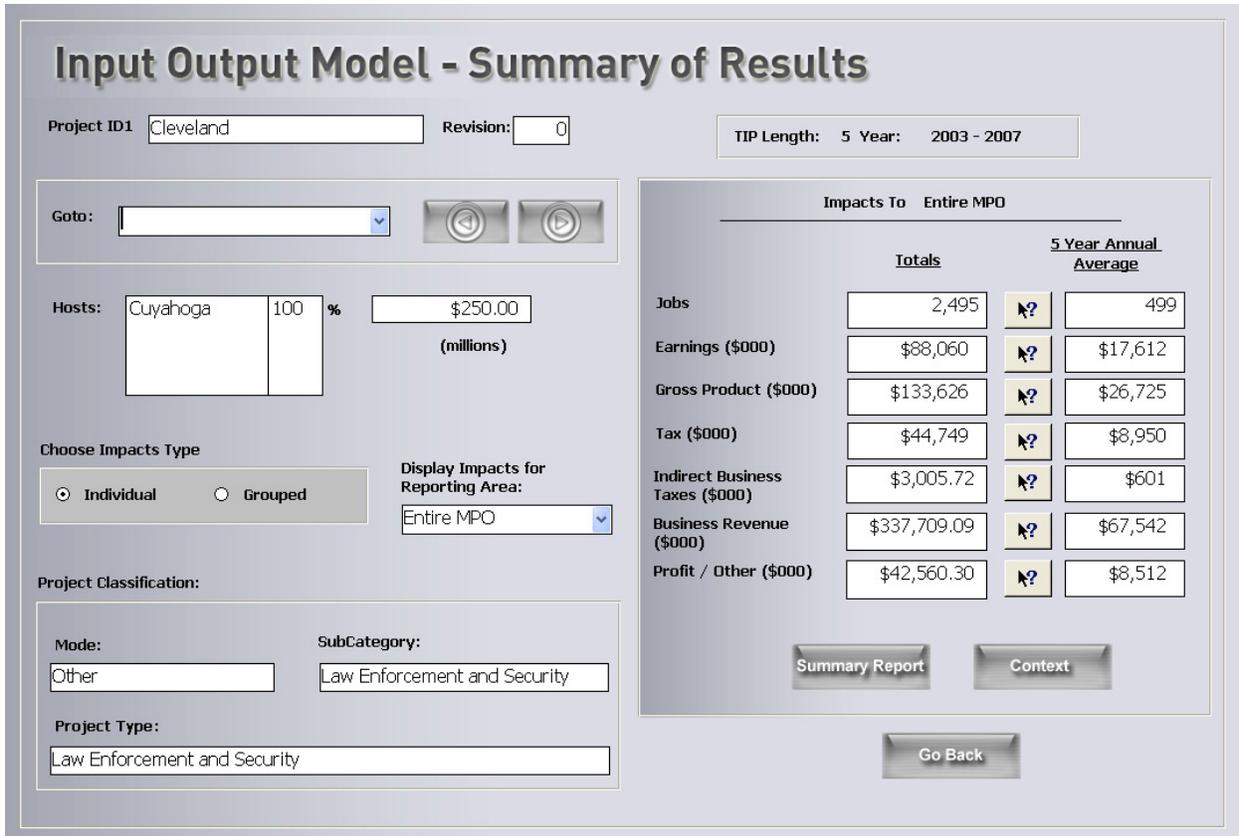


Figure 15.3: I-O Model Results Screen

This screen shows totals for the seven categories of impacts, and thus summarizes the I-O model. Clicking the “Context” button at the bottom-right of this screen takes the user to the *I-O Model Results* screen, which is more detailed than the summary screen. Figure 15.4 is an example of the *I-O Model Results* screen.

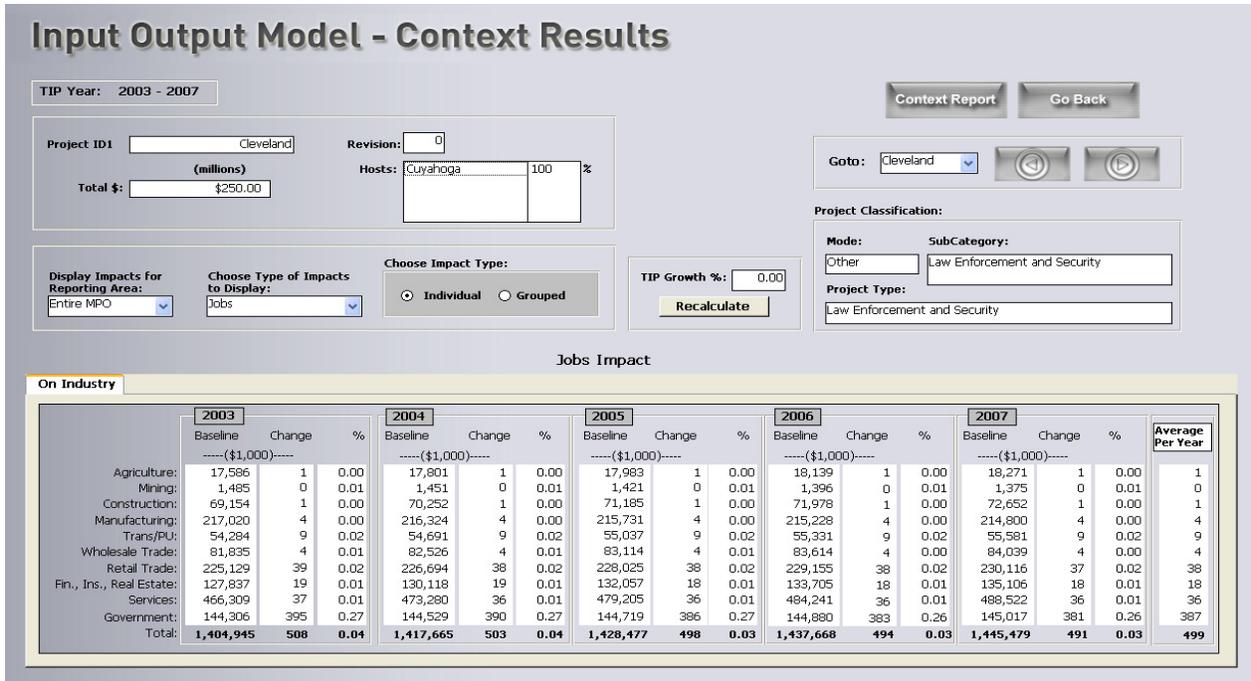


Figure 15.4: I-O Model Results Screen

The left and right arrows in the upper-right portion of the screen allow the user to browse the projects selected on the *Projects Selection* screen. The box labeled “Total \$” shows the all-years combined total cost of a given project. The project shown in Figure 15.3 spends a hypothetical \$50 million per year on law enforcement in Cuyahoga County, one of the counties of the Cleveland, Ohio MPO. With this yearly expenditure from 2003 to 2007 the total cost of this project is \$250 million, as shown in “Total \$.”

Interpreting I-O Model Results

Two projects were selected during our project selection stage, and these will serve to illustrate the use and interpretation of I-O model results. The first, already mentioned and active in Figure 15.4, reflects a hypothetical \$50 million per year spending on law enforcement in Cleveland (Cuyahoga County). The second considers a \$300 million new highway project in Lake County, Ohio, one of the lesser-developed counties in the Cleveland MPO.

Return now to Figure 15.4 and notice in the upper-center of the *I-O Model Results* screen a dropdown box with the label “Display Impacts For Reporting Area;” the default shows “Entire

MPO.” A click in this box presents the area options for displaying TELUS I-O model results, namely:

1. Entire MPO (default).
2. Individual MPO counties.
3. Rest of the state (beyond the MPO).
4. Entire state (including the MPO).

Where the MPO spans more than one state, the display choices include the rest of each state, and each state separately, including, of course, member counties of the MPO.

Figure 15.4 shows impacts for the entire MPO. The selected project is the \$50 million per year expenditure on law enforcement in Cleveland. The broad table across the bottom of the screen presents the economic impacts. Industry detail is shown according to the following ten industries:

1. Agriculture
2. Mining
3. Construction
4. Manufacturing
5. Transportation and Public Utilities
6. Wholesale Trade
7. Retail Trade
8. Finance, Insurance and Real Estate (FIRE)
9. Services
10. Government.

These are the ten “Major Division Industries” of the SIC System.

An elongated box directly above the impact results table directs the user to “Choose Type of Impact Display.” The choices are: Jobs, Earnings, Gross Product, Tax Collections, Indirect

Business Tax, Business Revenues, and Profit. Figure 15.4 shows the “Jobs” button selected, and the table accordingly displays jobs impacts by industry.

The Impact on Jobs

Refer now to the three columns in Figure 15.4 displayed beneath each year. The first column, labeled “Baseline,” for the first year 2003, shows SIC Major Division Industry job detail for the combined counties of the Cleveland MPO as reported for 2002 by the U.S. Department of Commerce.⁶ The purpose of the baseline is to provide a backdrop for viewing the *relative* impact of transportation projects. The baseline could be viewed as the figures that would occur absent the project being considered.

The middle column, labeled “Change,” presents the impact estimated by the I-O model, i.e., the jobs in the MPO that will be created as a result of the \$50 million per year expenditure on law enforcement in Cleveland. All told, the model estimates that in 2003 the expenditure of \$50 million on law enforcement will create 508 new jobs in the Cleveland MPO. The column labeled “%” shows the newly created jobs as a percent of baseline employment – the relative economic impact of the project under consideration. An expenditure of \$50 million in 2003 on law enforcement in Cleveland would be expected to increase overall employment in the MPO by approximately 0.04 percent. Government employment in the MPO would be expected to increase by 0.27 percent. Other sectors experience relative impacts as indicated.

Notice the breakdown of industries affected by the hypothetical expenditure on law enforcement. Government, not surprisingly, accounts for the bulk of the new jobs, 395 of the 508 total new jobs in 2003. These would be mainly the newly hired officers and associated support personnel in state and/or local government. Other notably affected industries include services, with 37 new jobs, and retail trade, with 39. Many of these jobs result from the economic stimulus of newly created consumer income; the bulk of law enforcement spending goes directly to wages, and a large share of these are spent directly on consumer goods and services.

⁶ U.S. Department of Commerce data generally run two to three years behind the current year. The data conveyed in the TELUS I-O model are actually Commerce Department data projected forward in the usual fashion as the dampened extrapolation of historic trend.

Looking ahead to future years, note that the jobs created by the \$50 million per year expenditure declines – from 508 in 2003 to 491 by 2007. The gradual decline in job impacts stems from projected wage increases over time. With wages going up, a given expenditure (\$50 million in the present case) will employ progressively fewer people.⁷

Changing the geographic report from the entire MPO, shown in Figure 15.4, to Cuyahoga County (where Cleveland is located) creates the report shown in Figure 15.5. To make this change, the user simply clicks on the drop-down box labeled “Display Impacts for Reporting Areas,” and selects “Cuyahoga.”

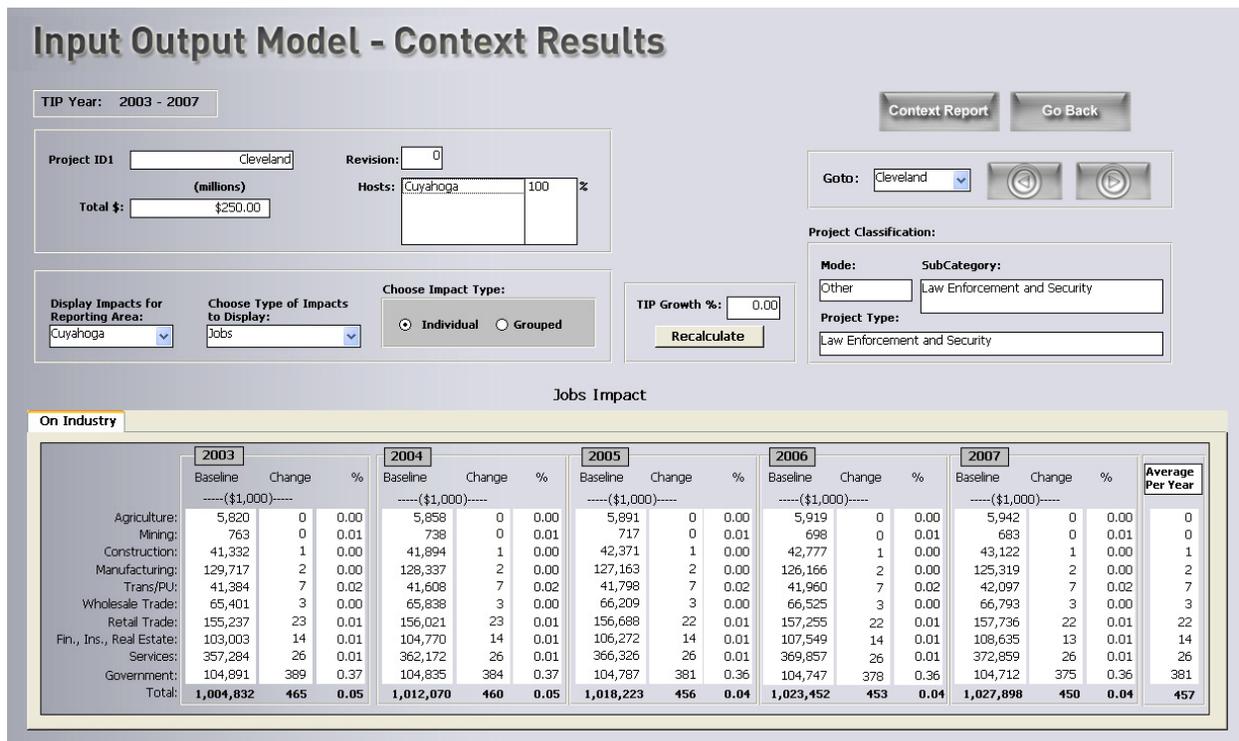


Figure 15.5: Cuyahoga County Results

⁷ As described in previous footnotes, out-year job and earnings estimates embedded in the TELUS I-O model are obtained by projecting historic job and earnings estimates into the future. The projected change in earnings-per-worker is therefore simply a projection of recent past increases in earnings-per-worker.

Comparing Figures 15.4 and 15.5 indicates that, as would be expected, the bulk of the newly created jobs stemming from this project are located in Cuyahoga County wherein the new moneys (\$50 million) are spent. Note that project spending in one county will create jobs in other counties because of inter-county trade and associated spillover multiplier effects.⁸

Figure 15.6 shows job impacts from the statewide perspective. This view is obtained by selecting “State of OH” from the drop-down box labeled “Display Impacts for Reporting Areas.” Comparison of job effects shown in Figure 15.6 with those shown in Figures 15.4 and 15.5 illustrates further the action of spillover multiplier effects. Spending in Cleveland produces multiplier effects that ripple to other MPO counties and beyond to other parts of the state.

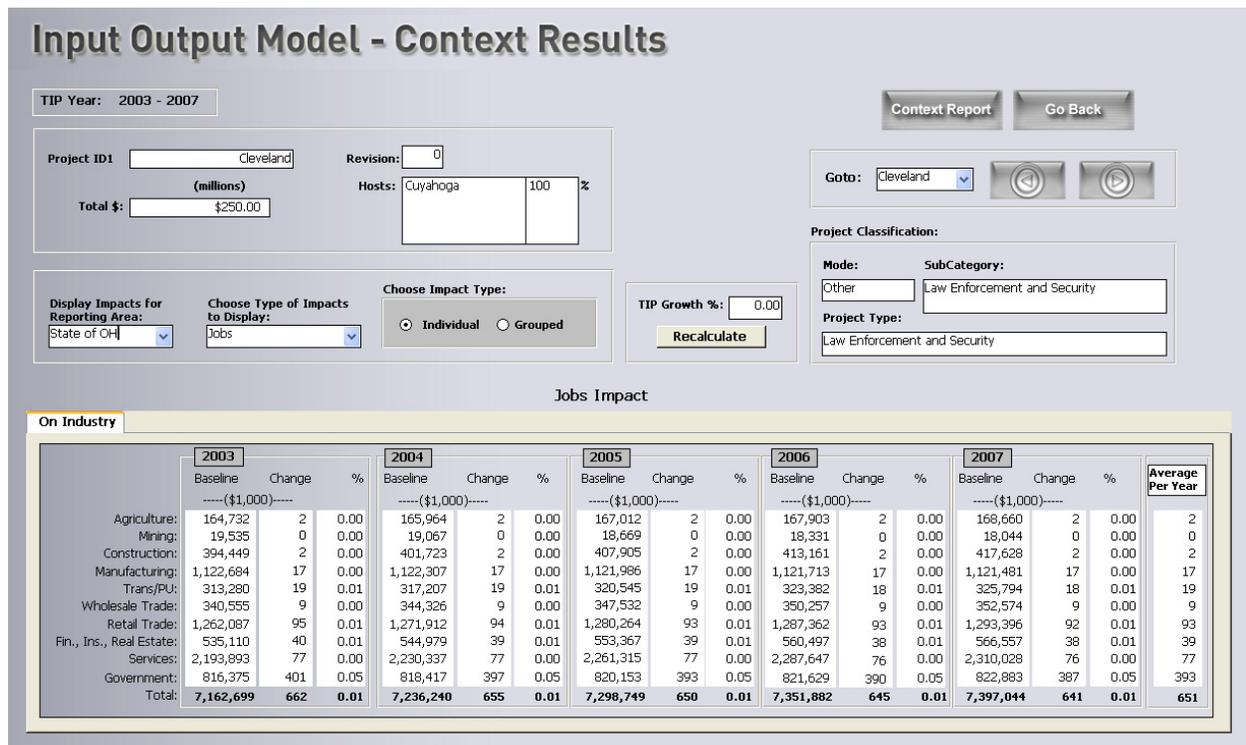


Figure 15.6: State of Ohio Results (first project)

⁸ Multiplier effects will spill beyond the boundaries of even the most highly closed urban economy and often result from residents who live in neighboring counties and commute to work in the urban area.

Second Project Results

Figure 15.7 shows the job impacts of a hypothetical \$300 million new highway project in Lake County, Ohio. Shifting from the Cleveland law enforcement project to the Lake County new highway construction project may be accomplished by clicking the scroll arrows located in the upper right of the *I-O Results* screen. In general, these arrows allow for a quick review of the economic impacts of all projects selected on the *Projects Selection* screen (Figure 15.1). The impacts displayed in Figure 15.7 are for Lake County, selected using the drop-down box labeled “Display Impacts for Reporting Areas.”

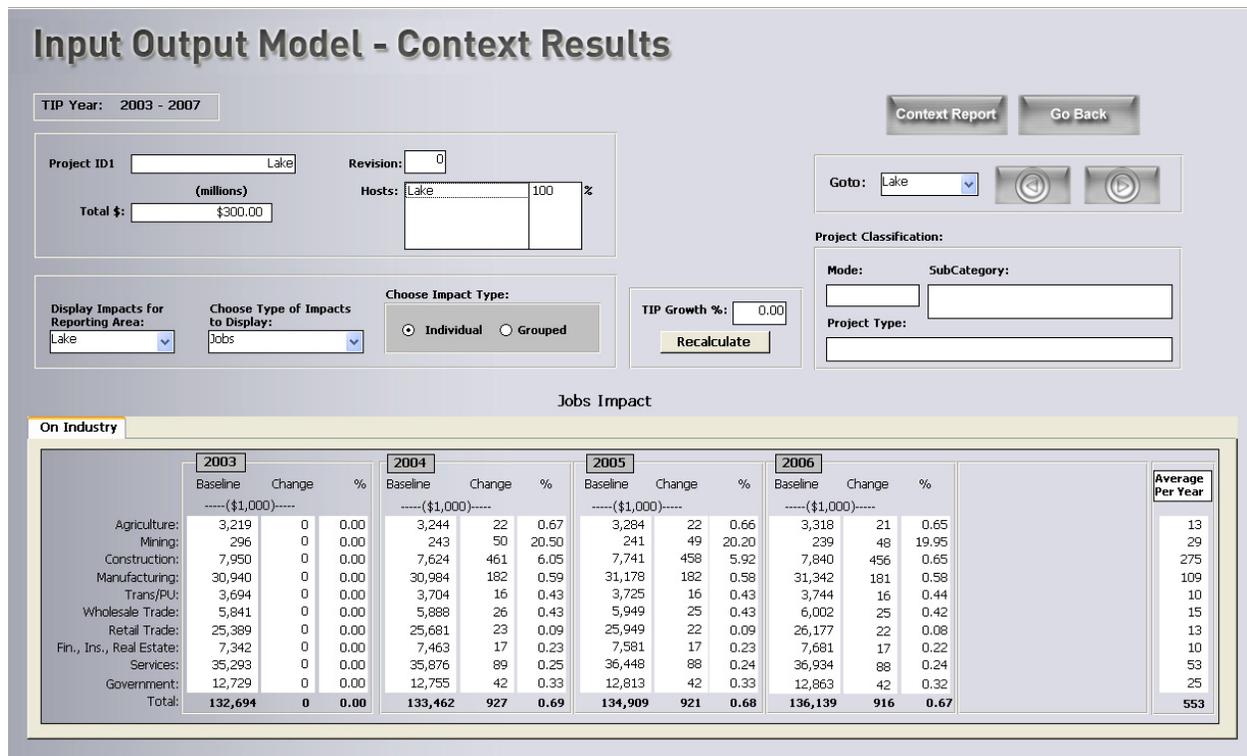


Figure 15.7: Lake County Results

The new highway construction project starts in 2004 and entails the expenditure of \$100 million per year over three consecutive years. Note that no impacts are shown for the year prior to project commencement. Note also the decline in jobs per year, reflecting the projected increased cost per job over the three years of the project. As would be expected with a project of this type, the bulk of the new jobs occur in the construction sector, with notable impacts as well in the services, retail trade, and manufacturing sectors. Many of the jobs in the services and retail trade

sectors occur due to the spending of new consumer incomes. New manufacturing jobs largely reflect direct-project related items such as paving mixtures, ready-mix, and an assortment of other manufactured building materials.

The conventional approach for reporting regional economic statistics is by place of work (e.g., the U.S. Department of Commerce, Regional Economic Information System), and the TELUS I-O model follows this convention. At the same time, it is recognized that particularly large construction projects often draw workers great distances, and this has the effect of shifting, perhaps, a large portion of the household income effect away from the project site and to the place of worker residences. The TELUS I-O model recognizes this and has a built-in sub-model that captures this pattern of construction worker commuting.⁹ Accordingly, while construction jobs are reported by place of work (Lake County in the case of Figure 15.7), much of the construction worker income and associated spending will leak out of Lake County and back to the counties where the construction workers reside; this has the effect of spatially dispersing larger construction project impacts.

Figure 15.8 is obtained by selecting “State of Ohio” from the drop-down box labeled “Display Impacts for Reporting Areas.” Comparison of total jobs for Ohio (Figure 15.8) and total jobs for Lake County (Figure 15.7) shows that roughly one-fourth of the jobs created in Ohio by the Lake County project actually occur outside Lake County, the result of construction worker commuting and other spillover effects.¹⁰

⁹ The pattern of construction worker commuting is built on the basis of a spatial dispersion model residing behind the scenes in the TELUS I-O model. Accordingly, the number of construction workers drawn from a given county is a decreasing function of the distance between the worker-resident county and the project-site county, and an increasing function of the number of construction workers residing in the worker-resident county. Additional detail on the construction worker spatial dispersion model can be found in TELUS I-O documentation available for download in pdf format from TELUS National website.

¹⁰ Spillover effects will generally be greatest where the county hosting a construction project is a rural county. The reason is, compared to more-urban counties; rural counties offer a narrower range of business and consumer goods and services. A large share of incomes created in a rural area will therefore leak to a nearest urban county (i.e., to the nearest economic center), to obtain goods and services that are simply not available in the rural county. This is not to say that there will be no spillover from urban to rural counties. However, these will most often occur as a result of commuting, where the rural county serves as a bedroom community for the urban county.

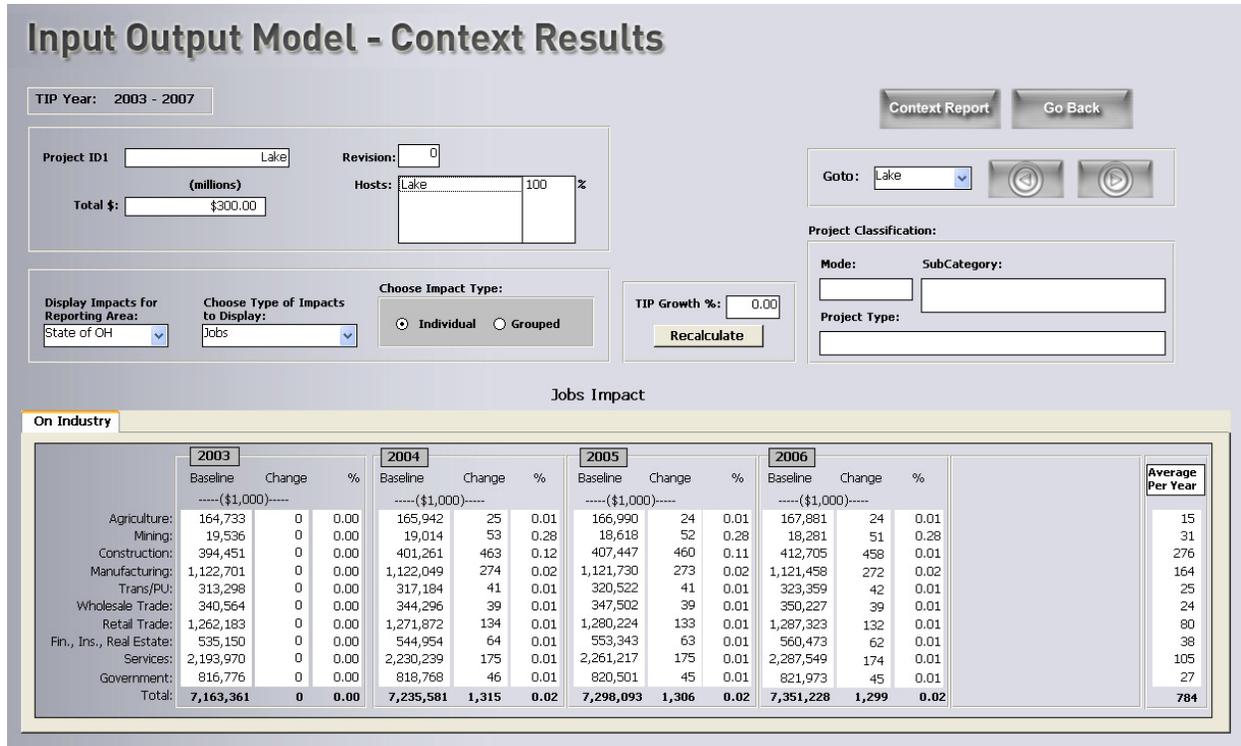
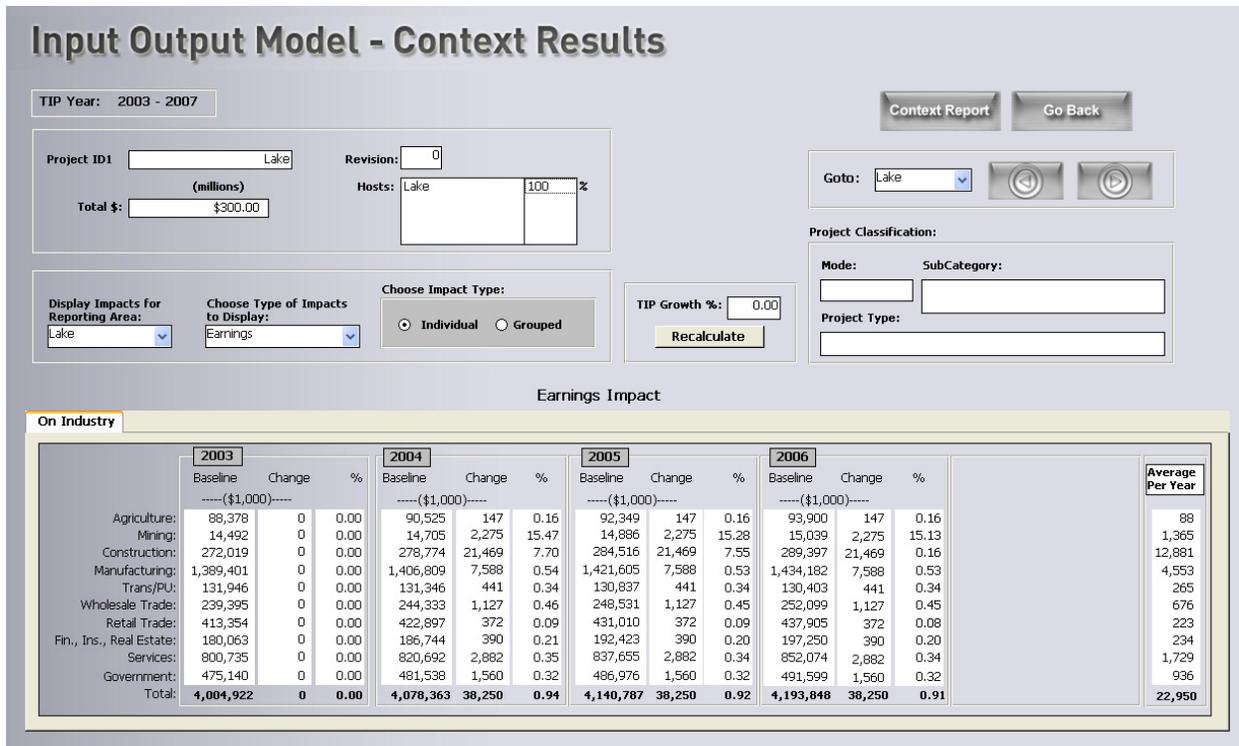


Figure 15.8: State of Ohio Results (second project)

The Impact on Earnings

Earnings are defined as wages, salaries and proprietors' income.¹¹ Figure 15.9 shows the impact of the Lake County new construction project on overall earnings in that county.

¹¹ The definition of economic categories used in the TELUS I-O model, particularly "jobs," "earnings" and "gross state product" are those employed by the U.S. Department of Commerce and utilized particularly in their Regional Economic Information System (REIS). In general, the Commerce Department has evolved these definitions through the post-WWII era of regional data reporting and regional economists today generally accept them as standard.



The *I-O Results* screen shown in Figure 15.9 is obtained first by selecting Lake County from the drop-down box labeled “Display Impacts for Reporting Areas,” and then by clicking the button labeled “Earnings” in the mid-sheet box labeled “Choose Type of Impact to Display.”

As shown in the impacts display, the Lake County economy is projected to create gross earnings of roughly \$4 billion in 2003, \$4 billion in 2004, \$4.1 billion in 2005, and \$4.2 billion in 2006. At the same time, the \$100 million per year new highway construction project is estimated to create \$38.25 million in Lake County earnings in each of the three years. Note that while the earnings impacts remain constant through time, we know from Figure 15.7 that total job impacts diminish due to increasing earnings-per-worker. We can anticipate, therefore, that a given expenditure of funds year-after-year will purchase progressively less overall construction activity due to the general effects of inflation, not only on labor income, but on other inputs as well.¹²

¹² While the TELUS I-O model includes a projection of wage inflation, obtained by extrapolating the trend indicated in U.S. Department of Commerce REIS data, similar projections for the sale price of non-labor inputs do not exist. Accordingly, our procedure assumes that the relative price of inputs, e.g., the price of labor relative to say sand and gravel, remains constant through time. The expenditure of \$100

The Impact on Gross State Product

Earnings measure labor income and therefore provide the dollar parallel to jobs. Decision makers are interested in job and earnings impacts because these immediately affect the working public. Gross state product, on the other hand, provides decision makers with a broader view of regional income impacts. Gross state product includes earnings, but adds property and other non-labor income. Generally speaking, gross state product equals the sum of earnings, profits, rental, and interest income.¹³

Figure 15.10 shows the impact of the Lake County new construction project on the formation of gross state product in that county. Figure 15.10 is obtained by clicking the button labeled “Gross Product” in the mid-sheet box labeled “Choose Type of Impact to Display.”

The difference between gross state product impacts indicated in Figure 15.10 and earnings impacts indicated in Figure 15.9 equal non-labor income. Services and the construction sector (both heavily labor intensive) indicate gross state product relatively close to earnings. In contrast, the finance, insurance and real estate (FIRE) sector indicates a difference between earnings and gross state product. Finance, insurance and real estate involves borrowed funds and investment in property, and incomes in the businesses comprising this sector must be shared with these non-labor contributors to production.

Decision makers tend to be interested in gross state product impacts because tax revenues are generated on more than simply labor income. Tax revenues from property and corporate

million for roadwork will thus have the same earnings effect through time, though it is understood that these earnings purchase less labor, and non-labor expenditures purchase less non-labor inputs.

¹³ Technically speaking, gross state product equals the sale price of all commodities produced in the state less the cost of the produced inputs that go into making those commodities. A farmer, for example, would subtract the cost of seed, fertilizer, pesticides, fuels, and other “produced” (i.e., non-labor) inputs. What is left is the value added to the produced inputs by the actions of the farmer; his (or her) land, capital equipment, and hired labor. Gross state product is thus the sum of all value added, and appears as the state-level parallel to gross domestic product. Note that gross state product includes allowances made for the depreciation of long-lived capital equipment. “Net state product,” a measure that is rarely published, would deduct the value of depreciated capital goods.

sources can be significant at the state and local level, and except for federal grants and any other out-of-state sources, state and local tax revenues originate in gross state product.

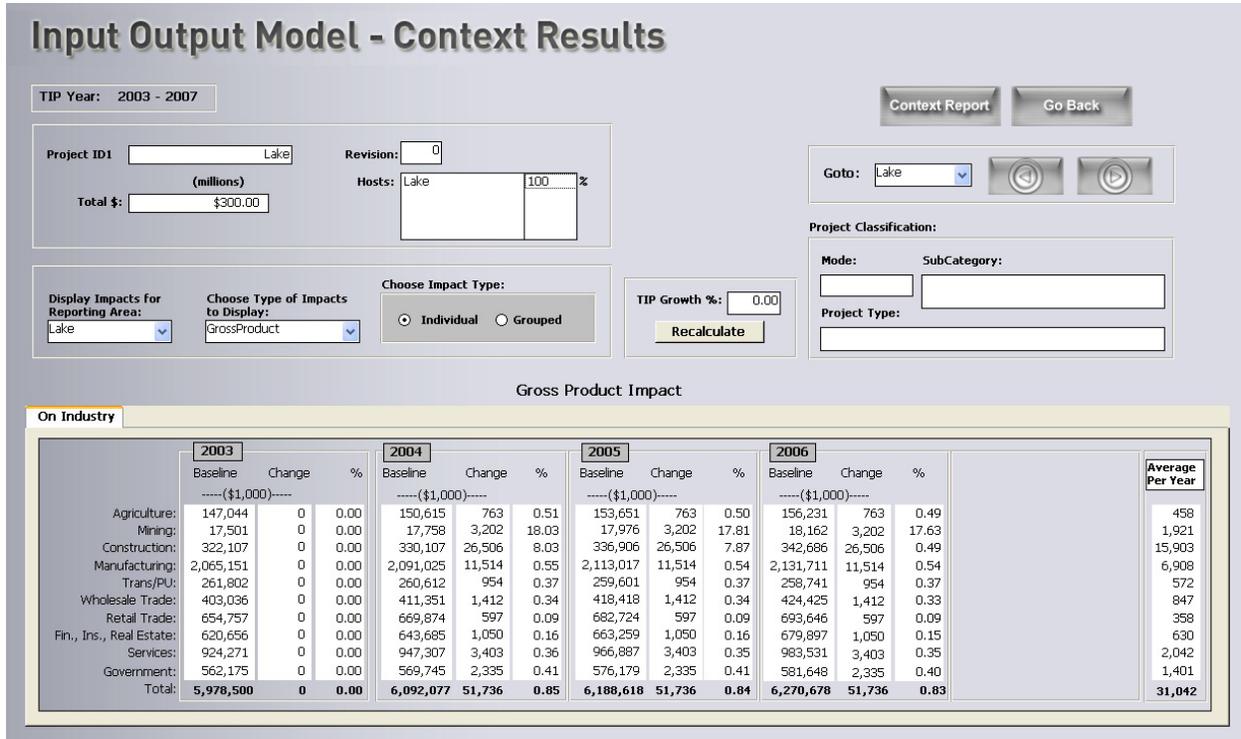


Figure 15.10: Gross State Product in Lake County (second project)

The Impact on Tax Collections

Figure 15.11 shows the impact of the Lake County new construction project on local, state and federal tax collections in that county.¹⁴ The *I-O Results* screen shown in Figure 15.11 was obtained by clicking the button labeled “Tax Collections” in the mid-sheet box labeled “Choose Type of Impact to Display.”

¹⁴ Baseline tax collections are obtained from the U.S. Department of Commerce, *Census of Governments*. Tax revenue-to-earnings ratios are formed for reported years, and forecast forward assuming that these ratios will remain constant, and based on the earnings projections explained in previous footnotes. Ultimately, tax revenue-to-value added ratios are formed, and tax revenue impacts are derived by applying these ratios to the indicated impacts on value added (i.e., impacts to gross state product). The assumption is that gross state product is the source of all tax revenues, state, local and federal, and that the ratio of tax revenues to gross state product is stable.

Decision makers are naturally interested in the state and local tax implications of construction projects because these are moneys that might be used to mitigate any negative construction phase impacts of the projects, or they might be used to fund other worthwhile projects. New spending comes to an MPO through mainly federally funded transportation projects. As these moneys are spent, they generate incomes, both labor and non-labor.

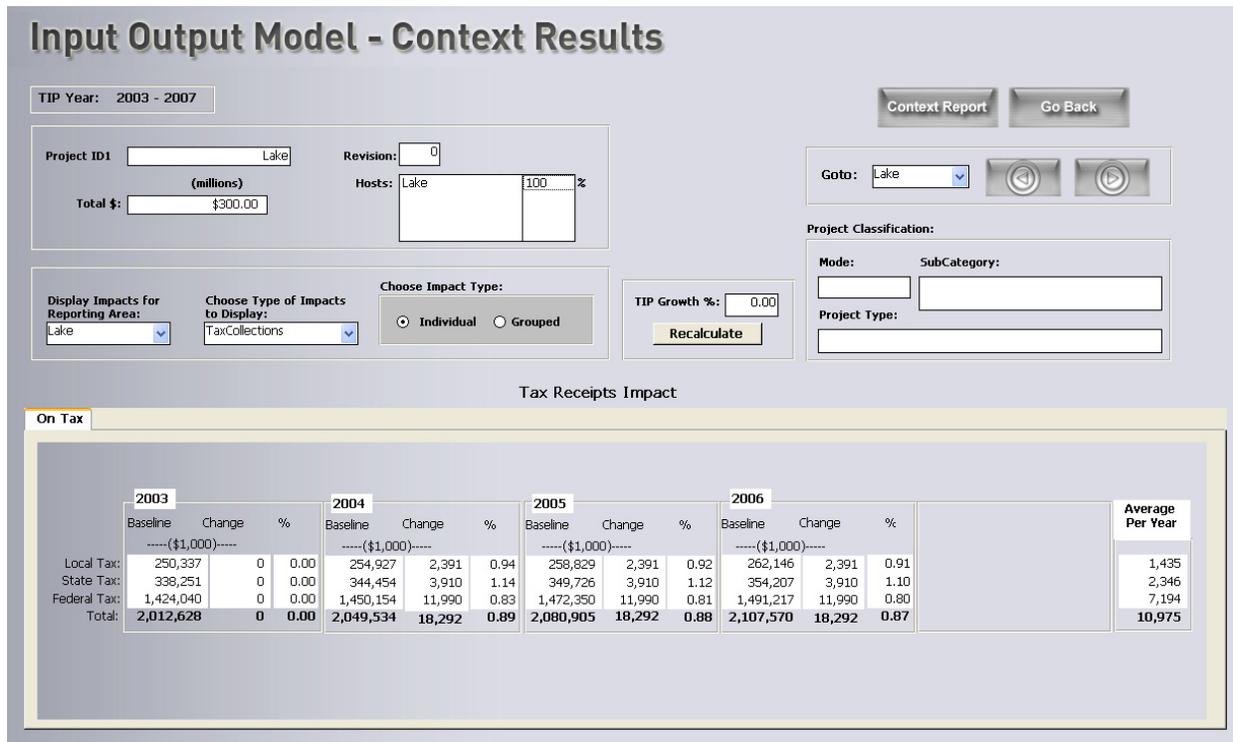


Figure 15.11: Tax Collections in Lake County (second project)

As these incomes are in turn spent, i.e., on consumer goods, new *sales tax* revenues are generated. More tax revenues are then collected as *income tax*. And finally, the increase in incomes and associated spending leads to increased property values, both personal and commercial, and these are taxed, as *property tax*. The TELUS I-O model estimates these various additions to state, local and federal tax revenues and reports them as shown in Figure 15.11.

The Impact on Indirect Business Tax

Selecting “Indirect Business Taxes” displays the indirect business taxes generated by the new construction project in Lake County (Figure 15.12). Indirect business taxes represent only a small

portion of gross state product and are mainly comprised of: non-personal property taxes, licenses, non-tax liabilities, sales and gross receipt taxes, and federal indirect business taxes.

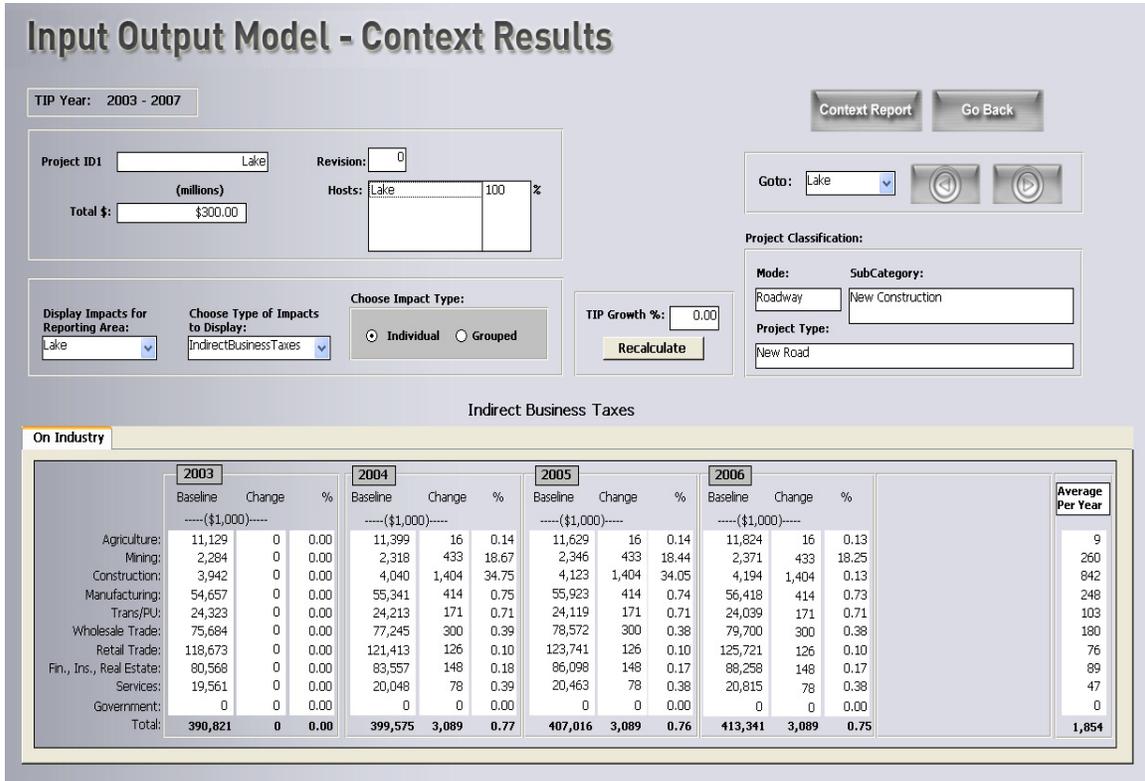


Figure 15.12: Indirect Business Tax (second project)

Selecting “Business Revenue” displays the business revenues generated by the new construction project in Lake County (Figure 15.13). This value is by far the largest as it represents all of the revenue generated by the selected project, as opposed to just the value added by each business, shown as gross state product.

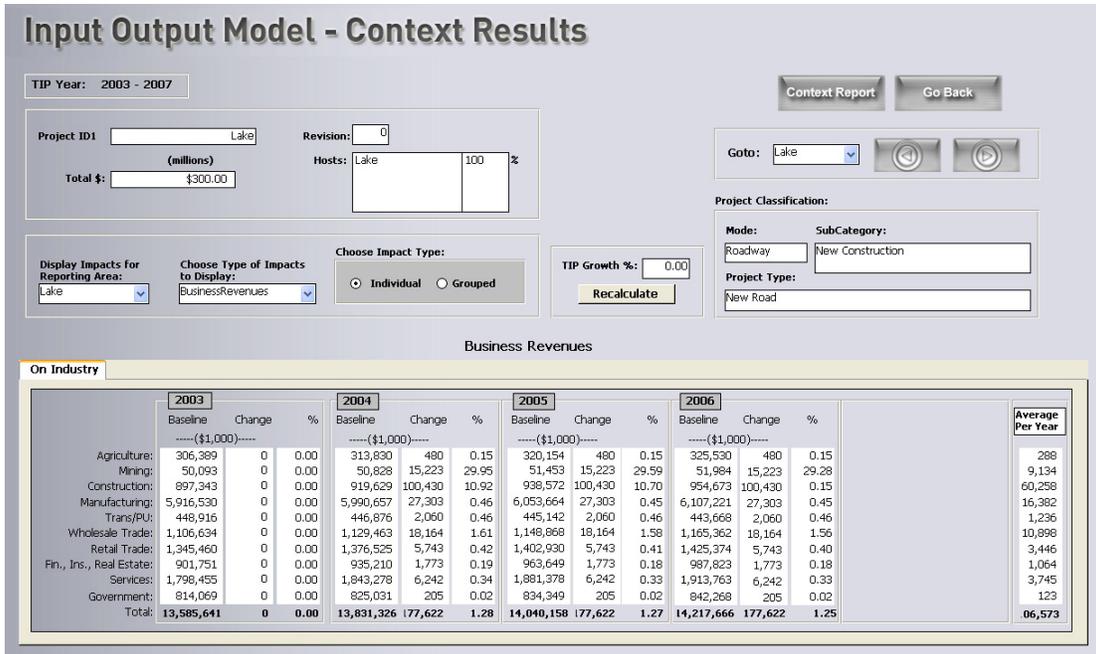


Figure 15.13: Business Revenue (second project)

Selecting “Profits” displays the profits in each industry generated by the new construction project in Lake County (Figure 15.14). This is essentially the industry earnings less any taxes or other costs.

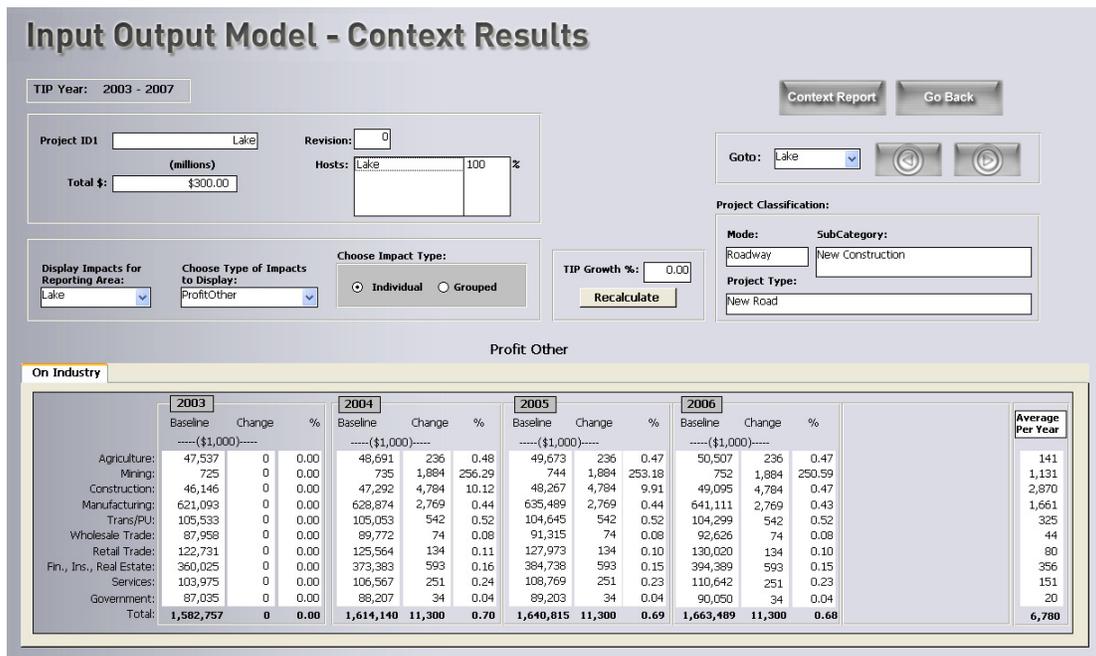


Figure 15.14: Profits (second project)

Examining Impacts for Groups of Projects

Thus far we have explored the workings of the *I-O Results* screen by looking at two hypothetical projects in the Cleveland MPO. While individual project analyses such as these will be an important use for the TELUS I-O model, perhaps more often the analyst (and decision maker) will be more interested in the economic impact of a collection of projects.

As discussed earlier, the *Projects Selection* screen (Figure 15.1) provides a flexible tool for collecting multiple TIP projects for analysis, including the selection of the entire five year TIP (i.e., all projects with data entered in the TELUS TIP). From the *I-O Results* screen, the user clicks on the button labeled “Grouped” (under the label “Choose Impact Type”) to examine the combined economic impact of a selected collection of projects. Accordingly, Figure 15.12 shows the combined job impact on Cuyahoga County of the two projects selected in our example TELUS I-O model run (i.e., the \$50 million per year five-year law enforcement project in Cuyahoga County, and the \$100 million three-year highway building project in Lake County).

Note that for Figure 15.12 we have chosen to display impacts in terms of jobs (by selecting “Jobs” from the drop-down box labeled “Choose Type of Impact Display”). Figure 15.12 and Figure 15.5 both display job impacts in Cuyahoga County. Note that differences in impacts do not begin until 2003, the year when the new highway construction project begins in Lake County. All the differences between these two figures are attributable to the spillover impacts on Cuyahoga County of the construction in Lake County.

The grouped impact table illustrated in Figure 15.12 is of limited interest in itself because it only covers the two projects we built into the model for this presentation. In actual use of the TELUS I-O model, grouped impacts will likely be one of the more important uses for the model.

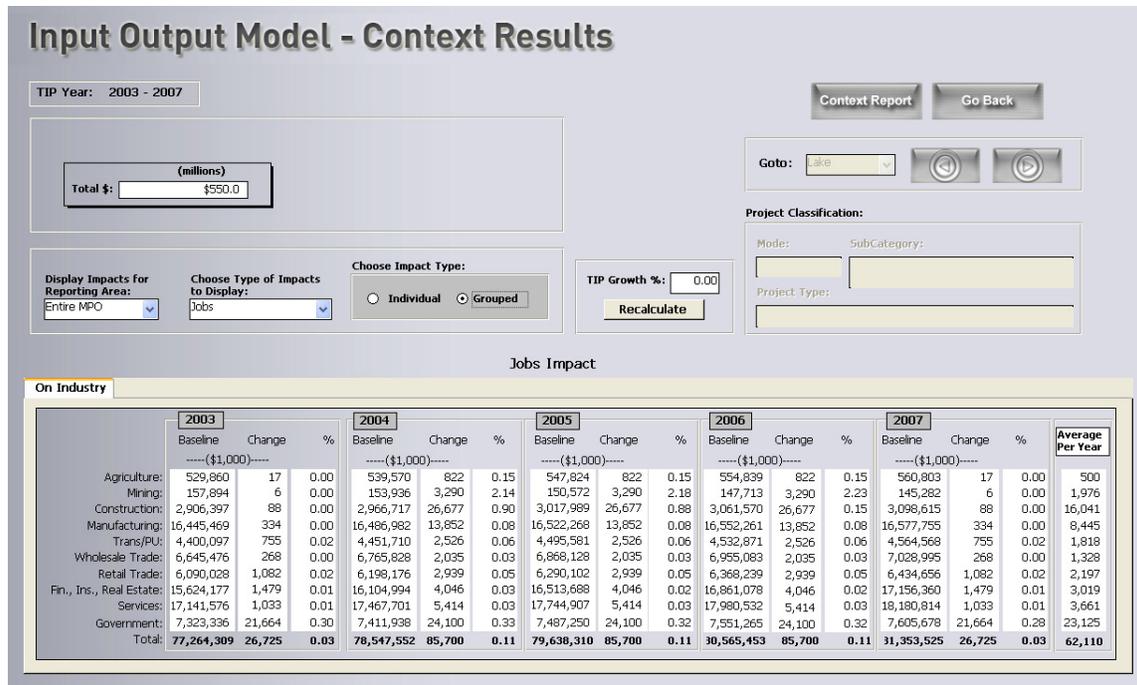


Figure 15.12: Cuyahoga County Results (both projects)

16. Generating Reports

Overview

The TELUS Report Wizard allows the user to view, edit, and create reports. Clicking the “Reports” button from the *Project Information* screen takes the user to the *TELUS Report Wizard* screen (Figure 16.1). The first screen of the wizard allows the user to view and edit existing reports or to create new reports based on a blank template.

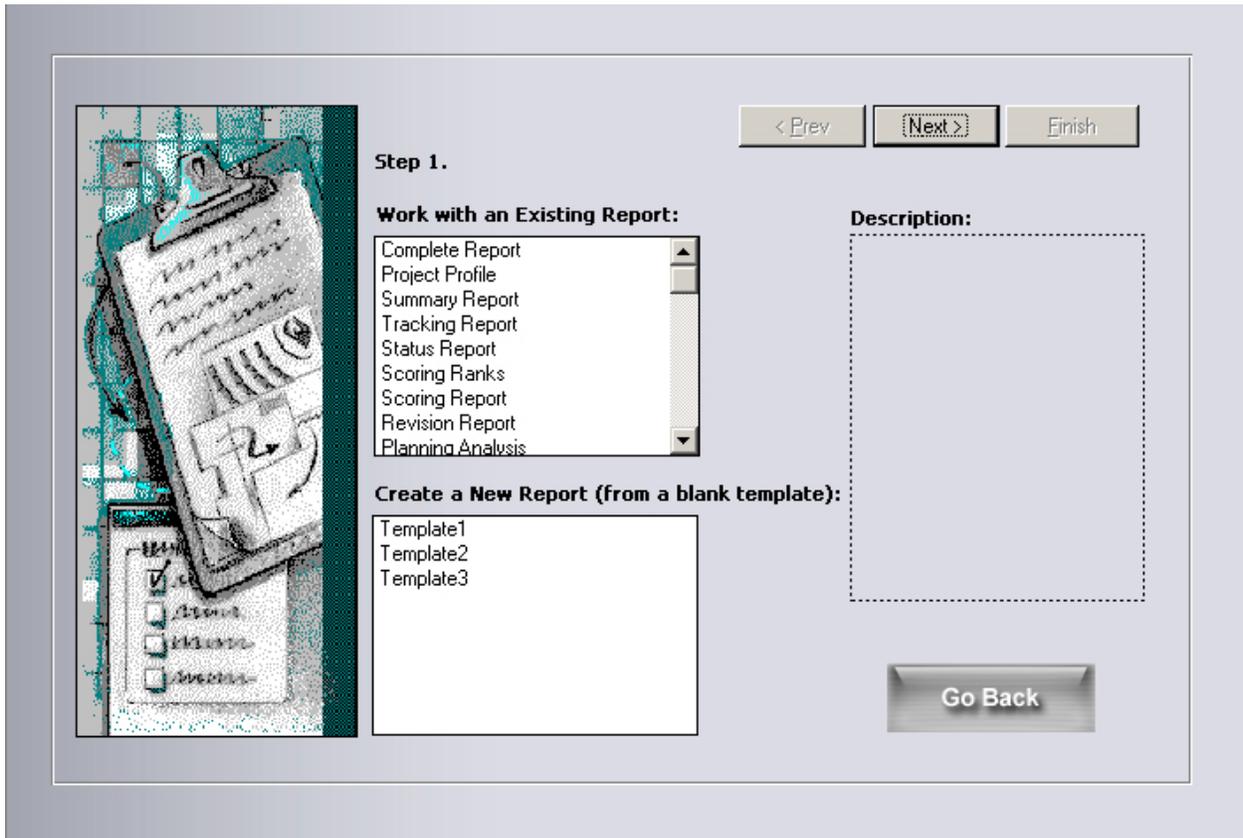
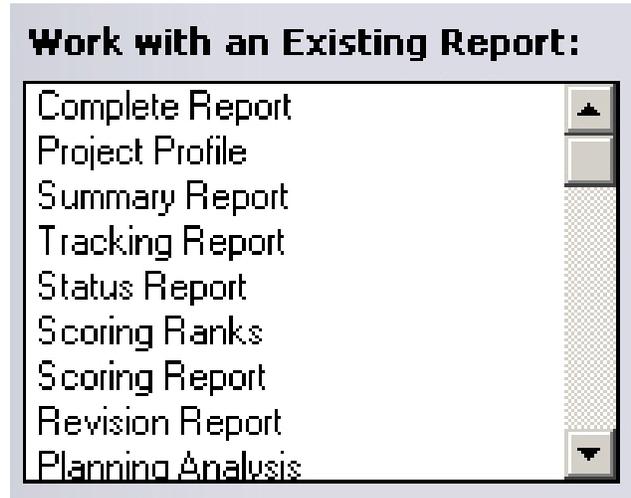
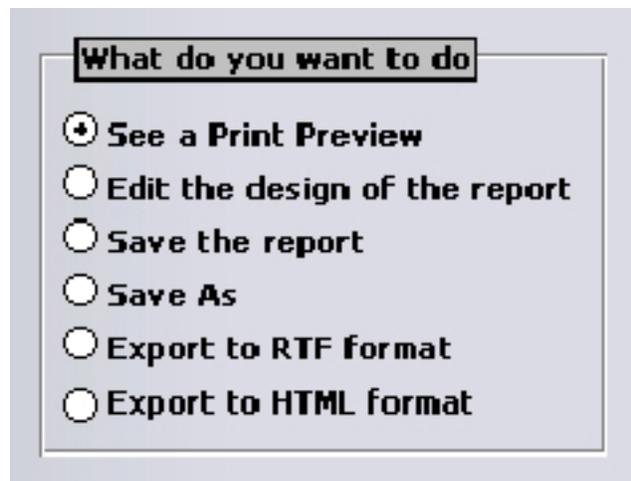


Figure 16.1: TELUS Report Wizard Screen

Working with an Existing Report



Select the existing report that you wish to work with. A brief description of the report appears to the right. Click on the “Next” button.



Several options are available to work with the selected report. The user may:

- Preview and print the report
- Edit the design of the report
- Save the report under a different name
- Save the report
- Export to Rich Text Format
- Export to HTML Format

Preview and Print the Report

Select the “Preview and Print the Report” option and click the “Finish” button. A *print preview* of the report will appear on the screen. Using the menu bar, the report can be printed.

Edit the Design of the Report

Reports can only be edited using the full version of MS Access 2000/2003. (It is strongly suggested that the user read the Microsoft Access Documentation concerning reports before attempting to edit the TELUS reports.) This option is not available when using MS Access 2000 MS Access 2000 Runtime.

To edit the selected report, choose the “Edit the Design of the Report” option and click the “Finish” button. The selected report opens in *design view*, as shown in Figure 16.2. Also, two additional tool bars appear: The “Report Design” toolbar and the “Toolbox” toolbar. These toolbars provide the functionality to edit reports.

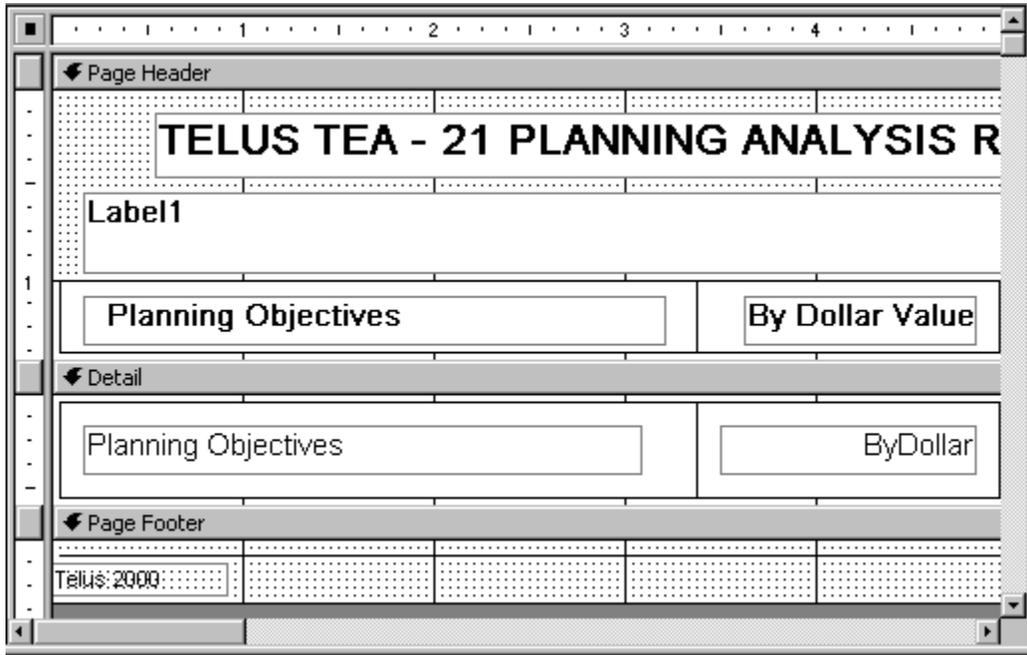


Figure 16.2: Design View



Editing/Creating Report Labels and Titles

To change the text of existing labels and titles, click on the desired label with the mouse. The label will be selected, click again inside the selected label and begin editing the text.

To create a new label, select the “Label” button  from the “Toolbox” toolbar. Click and drag the Label Button from the toolbar into the report to create a new label. Then enter the desired text into the toolbar. Changing labels in the reports does not change the labels in the TELUS database.

Changing the Formatting of Labels and Titles

The size, font, or style of a label can also be changed. Double-click on the desired label and the *Properties* window appears. From the “Format” tab, all the text properties can be adjusted to meet the user requirements.

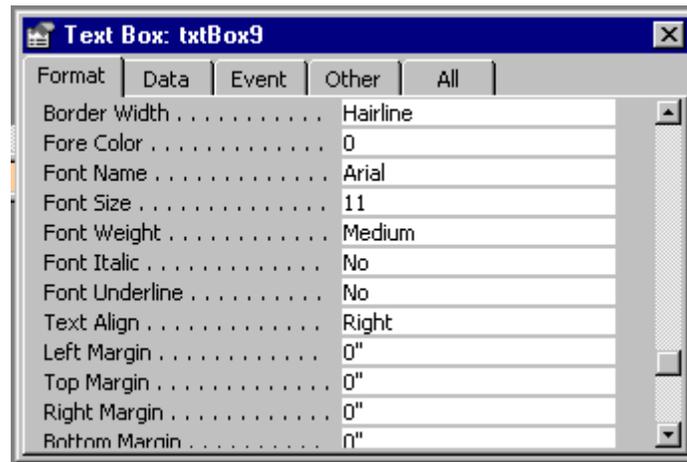


Figure 16.3: Properties Window

Adding/Deleting Data Fields

To delete a data field, select the data text box and press delete.

To add a data field, press the “Field List” button from the “Report Design” tool bar. A new window appears, showing all the available data fields for the current report. Although the data field names may be a bit cryptic, they have been described previously in the user’s manual.

Select the “Text Box” button  from the “Toolbox” toolbar and click and drag a new text box on the report in the desired location. Next, the new text box must be assigned to one of the available data fields. Double click on the newly created text box to bring up the *Properties*

window (or click on the “Properties” button on the “Report Design” toolbar). Be sure you have selected the correct text box on the report. In the *Properties* window, go to the “Data” tab and enter the desired field name next to “Control Source”. Text font, style, and color can be adjusted as discussed above.

Save the Report

The Report Wizard provides two save options: “Save as” and “Save the report”.

- “Save as” option allows you to save a report under a file name that you choose, or save an existing report under a different name.
- “Save the report” option allows you to save changes to an existing report under the same name.

Export the Report

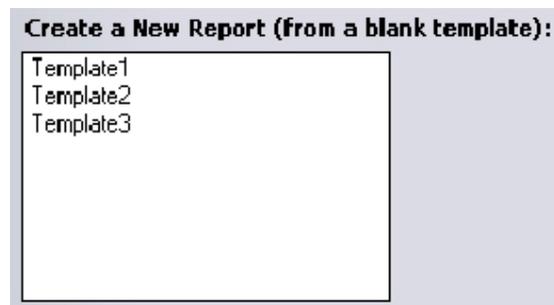
The Report Wizard provides two export options, including:

- Export to Rich Text Format (for MS Word files)
- Export to HTML (for Web Browser files)

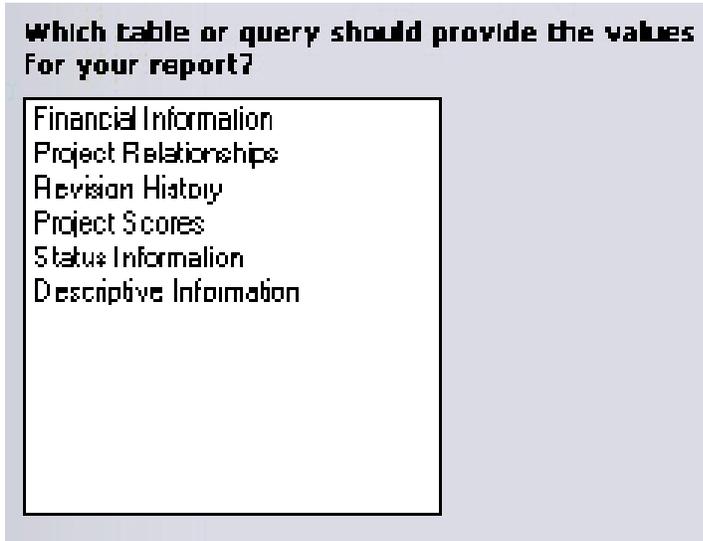
Please note that due to export format limitation, not all formatting and graphics are exported correctly.

Create a New Report

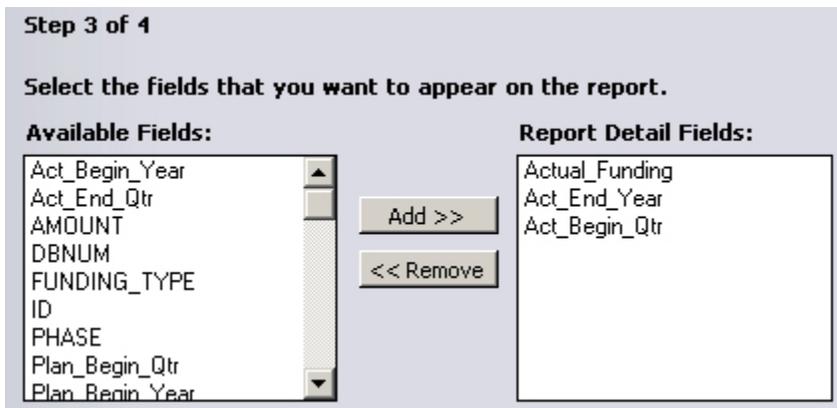
Select an existing template with which you wish to work. A brief description of the template appears to the right. Click on the “Next” button.



Select the data source for the project. Multiple sources are available, providing access to different aspects of the TIP database.



Select the fields to include in the report. Select the field in the “Available Fields” list, and then press the “Add >>” button. The field will appear in the “Report Detail Fields” list. To remove a field from the report, select the field and click the “<< Remove” button.



As shown in Figure 16.4, the user should then enter a name and description for the report. Also, fill in the reports title and subtitles (if any). The user will still have choices to see a print preview, edit the design of the report, save the report, or export the report as discussed previously.

Final Step:

What do you want to do

- See a Print Preview
- Edit the design of the report
- Save the report
- Save As
- Export to RTF format
- Export to HTML format

Report Name:

Description:

Choose or edit the titles for this report.

Company Name Title:

Report Title 1:

Report Title 2:

Report Title 3:

Figure 16.4: Final Options Selection Screen

17. TELUS GIS

Overview

TELUS has a built-in Geographic Information System (GIS) (see Figure 17.1). The GIS module shows the location of TIP projects and displays the location of projects selected through the project selection function. It allows the user to build simple queries and display matching projects on the map and to retrieve project information geographically.

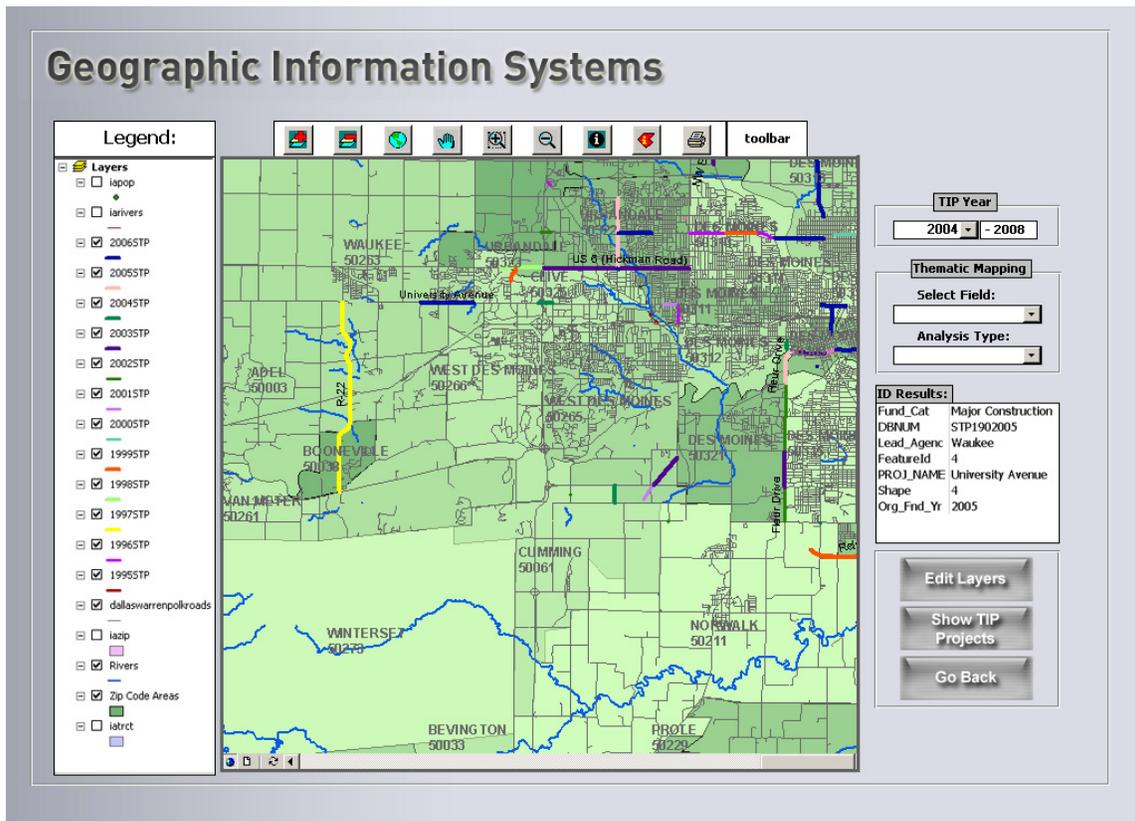


Figure 17.1: Geographic Information System Window

The GIS is designed to give the user a spatial perspective of the MPO's TIP. TELUS GIS analysis involves displaying TIP project locations and bringing up analysis overlays (such as roads, rail-lines, land use, etc.) as a visual clue to the project's impacts.

Entering the Geographic Information System

There are two ways to start the GIS system.

1. Start from the *TELUS Main Menu* screen by clicking on the “GIS” button. When you start the GIS in this manner, TELUS will display the base map showing the MPO’s boundaries.
2. Start from the *Project Information* screen by clicking on the “GIS Overview” button.

Elements of the GIS Screen

In addition to the *map display* window, the *GIS* screen is composed of multiple components, including:

1. the Legend Key,
2. the Tool Bar buttons,
3. the Thematic Mapping tools.

The Legend Key

Located to the left of the map display window, the legend key (Figure 17.2) displays the coverages, symbols, shapes, and colors which are used in the current map display. Clicking within the check boxes will make those layers visible. Clicking on a layer name will make that layer “Active”. In the figure below, the “INTERMODAL” Layer is the active layer as it is shown as a raised box. Only one layer may be active at a time and only the currently active layer is available for the mapping and selecting functions discussed later in this chapter.

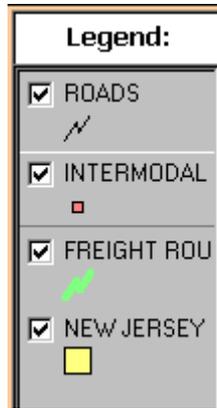


Figure 17.2: Legend Key

The Tool Bar

The GIS module has the tools needed to spatially analyze retrieved projects. These features are conveniently accessed by clicking the appropriate buttons on the tool bar (see Figure 17.3).

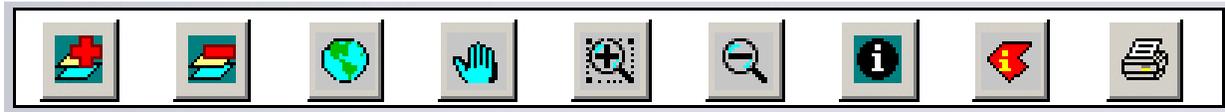


Figure 17.3: Tool Bar

Add Layer

Clicking the “Add Layer” button (left-most) opens the *Add Layer* (Figure 17.4) window. From this window, the user can specify the GIS file path, graphic color, size, and style for the layer to be added. After filling in the information, click the “Add” button. The GIS map will reappear, with the added layer.

Important! TELUS for the PC reads only ESRI shape files. If your GIS files are stored in any other format they would need to be converted to ESRI shapes. Most of the GIS software packages have built-in conversion tools to convert GIS data to ESRI shape format. [Appendix 2](#) provides step-by-step instructions for converting TransCAD files to ESRI shape files.

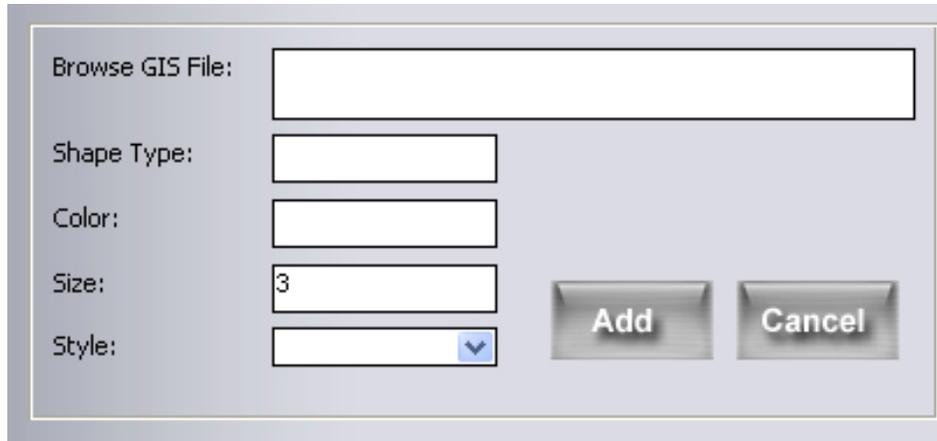


Figure 17.4: Add Layer Window

Remove Layer

The “Remove Layer” button (second from left) removes the selected active layer from the map.

Map Extent

The “Map Extent” button (third from left) returns the Map Display to the full geographic extent of the MPO boundary.

Pan

The “Pan” button (fourth from left) on the Tool Bar is used to move the displayed map around within the *map* window. When this button is clicked, the cursor becomes a hand. Simply click on any area of the map and hold down the left mouse button. The Pan Tool will “grab” the map and allow the user to “drag” it in any direction by moving the mouse.

Zoom-In

The “Zoom-In” button (centermost on the tool bar) permits the user to magnify the map. Click the “+” button on the Tool Bar. When you do this the cursor becomes a magnifying glass with a “+” inside. Click anywhere on the map. TELUS will enlarge the map view by a factor of two, centering on the area selected. The user can use this tool also to zoom into a specific area of the map. Click the “+” button on the Tool Bar, then click and hold down the left mouse button on a point in the map and drag it diagonally across the area. An outline will appear, giving the user an

indication of the target area being expanded. TELUS will fill the *map* window with the area selected.

Zoom-Out

The “Zoom-Out” button (fourth from right) permits the user to shrink the map so that more of it can be displayed in the *map* window. Click the “-” button on the Tool Bar, and the cursor becomes a magnifying glass with a “-” inside. Then, click anywhere on the map and TELUS will shrink the map view by a factor of two, centering on the area where the user clicked within the *map* window.

Identify

The “Identify” button (third from right) will retrieve information on a feature of an active layer that is displayed on the map. For example, if the user is displaying bridge projects in a particular county on the map, clicking on one of the bridge features will display the GIS database information associated with the selected feature in the “ID Results” window, as shown in figure 17.5.

ID Results:	
Fund_Cat	Major Construction
DBNUM	STP1902005
Lead_Agenc	Waukee
FeatureId	4
PROJ_NAME	University Avenue
Shape	4
Org_Fnd_Yr	2005

Figure 17.5: Identify Results Window

Report

The “Report” button (right-most) creates a map report which can be printed out. The GIS Report is a color map, with titles, and legends showing the current display on the *GIS* screen.

The Geographic Query Tools

Projects can be geographically queried while in the GIS module. The user queries the map for projects or areas where projects may be located. If any projects are found, TELUS will open the *Project Information* screen. In this window, the user is able to review the retrieved projects, print reports, and study their interrelationships. The tools available to retrieve projects include the Identify Tool and the Polygon Query Tool. The user will be returned to the GIS when the “Go Back” button in the *Project Information* screen is clicked.

Polygon Query

The Polygon Query Tool (second from right on the Tool Bar) enables the user to draw a polygon around an area of the map to retrieve projects from the active layer. TELUS permits the user to select projects and view them geographically on the map or the user may select projects by querying an area on the map. In the first situation, the user would have entered the GIS from the *Project Information* screen and TELUS is displaying the retrieved projects. Clicking on the GIS Overview button on the Project Information Screen will let the user view the selected projects on the map. In the second situation, the user may wish to query an area of the map currently displaying projects. Click the “Polygon Query” button on the Tool Bar. The cursor will become a Polygon Query Tool. Left-Click at least four times to define a polygon boundary around the projects. Next, right-click to set the polygon. TELUS will open the *Project Information* screen displaying information on the retrieved projects. Use the Polygon Query Tool to define the area, and TELUS will begin looking for projects. If projects are found, TELUS will open the *Project Information* screen displaying information on the retrieved projects.

Thematic Mapping Tools

The GIS can also create thematic maps of the active layer. Several type of thematic maps can be created.

- The *dot density map* represents a way of symbolizing quantities by displaying dots on polygon features of an active layer. Each dot represents a uniform, specified value in the “Select Field” drop-down box.
- The *value map* represents a way of symbolizing features of the active layer by displaying a different symbol for each unique data value in the “Select Field” drop-down box

- The *graduated symbol map* represents a way of symbolizing quantities of the active layer by drawing a different size symbol for a range of values in the “Select Field” drop-down box
- The *standard deviation map* represents a way of symbolizing features of the active layer by breaking the range of values in the “Select Field” drop-down box into standard deviations around the mean.

To create a thematic map, first select the layer from the legend window you would like to map and make it the active layer by clicking on its name. Next, select the field from the “Select Field” drop-down box on which to base the thematic mapping. Finally, select the type of thematic map to create. Figure 17.6 displays a value map of the counties in the State of New Jersey.

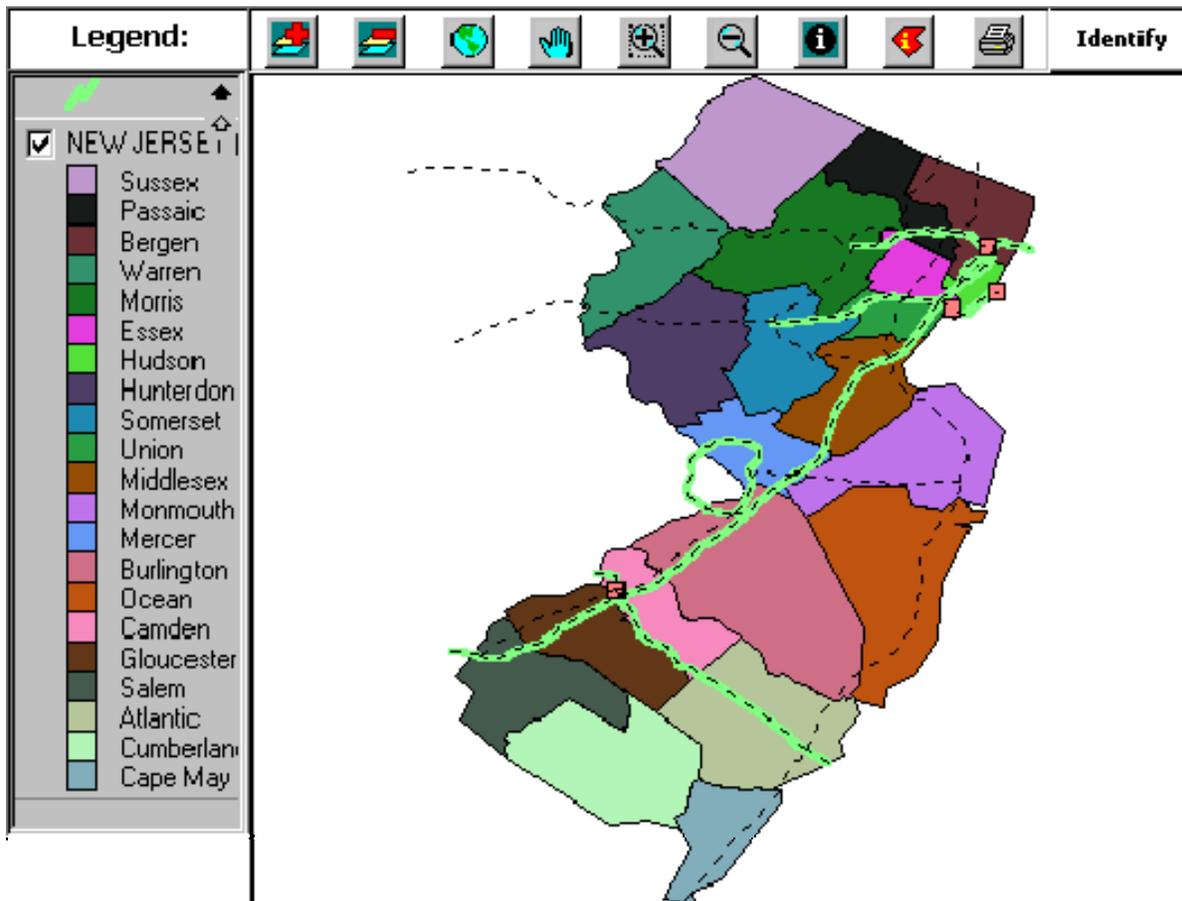


Figure 17.6: Thematic Map of New Jersey Counties

Set Up and Edit GIS Layers

While GIS layers can be loaded using the “Add Layer” button from the toolbar, it would be much more convenient to preload the most commonly used GIS layers into the GIS. These layers would then appear every time the user enters the GIS module. Clicking on the “Edit Layers” button on the GIS screen sets these settings.

From the *Set GIS Layers* screens, layer settings can be specified. Layers can be specified as boundary, base, or TIP. Boundary layers are the bottom most layers on the map. They include layers such as the MPO or county boundaries. Base layers can be other transportation layers, such as roads, rail lines, or facility locations. TIP layers are layers, which correspond to TIP projects. TIP layers need to be assigned to a TIP year, and must have a field which corresponds to the TIP project number in the TELUS database. The TIP year and project id should be specified in their respective drop-down boxes. Boundary and Base layers do not need to be assigned a year or a “project id” field.

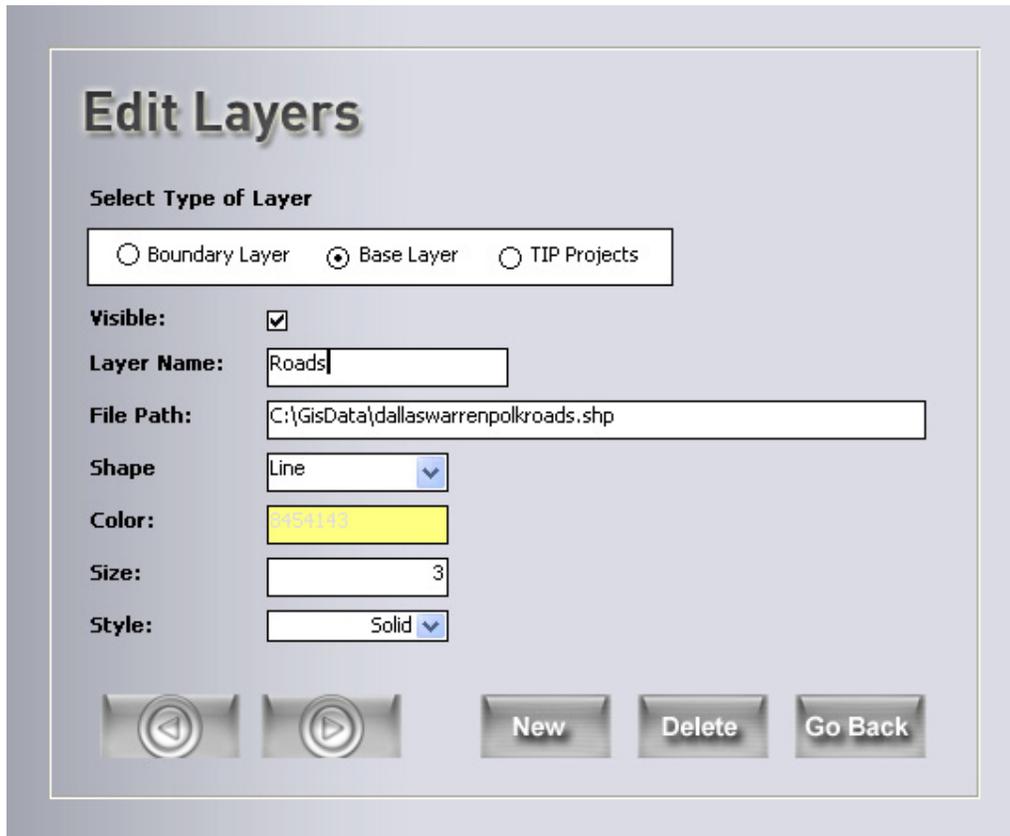


Figure 17.7: Set GIS Layers Window

Other settings specified on this window include whether the layers should be visible or not, the name and file path of the layers, and the color, size, and style of the layers' display.

Appendix I

TELUS Classification Fields

Bridge Projects
Right-of-Way
Engineering
Construction:
New Bridge
Bridge Replacement:
Bridge Replacement: Added Capacity
Bridge Replacement: No Added Capacity
Bridge Rehabilitation:
Major Bridge Rehab
Minor Bridge Rehab
Other
Roadway Projects
Right-of-Way
Engineering
Construction:
New Road Construction:
New Road
Road Relocation
Road Reconstruction:
Interchange Improvement: Added Capacity <\$15 million

Interchange Improvement: No Added Capacity <\$15 million
Interchange Improvement: Added Capacity >\$15 million
Interchange Improvement: No Added Capacity >\$15 million
Intersection Improvement: Added Capacity <\$15 million
Intersection Improvement: No Added Capacity <\$15 million
Intersection Improvement: Added Capacity >\$15 million
Intersection Improvement: No Added Capacity >\$15 million
Remove and Replace Pavement: > \$15 million
Remove and Replace Pavement: < \$15 million
AC Road Reconstruction:
Remove and Replace Pavement: > \$15 million
Remove and Replace Pavement: < \$15 million
Major Road Widening and/or Resurfacing:
Major Widening: Added Capacity: <\$15 mil
Major Widening: Added Capacity: >\$15 mil
Major Widening and Resurfacing: Added Capacity: <\$15 mil
Major Widening and Resurfacing: Added Capacity: >\$15 mil
Resurfacing Only >\$15 mil
Resurfacing Only <\$15 mil
Minor Road Widening and/or Resurfacing:
Minor Widening and Resurfacing: No Added Capacity: <\$15 mil
Minor Widening and Resurfacing: No Added Capacity: >\$15 mil
Resurfacing Only >\$15 mil
Resurfacing Only <\$15 mil
Road Restoration & Rehabilitation
Safety Features/Devices:
Shoulder Improvement
Lighting

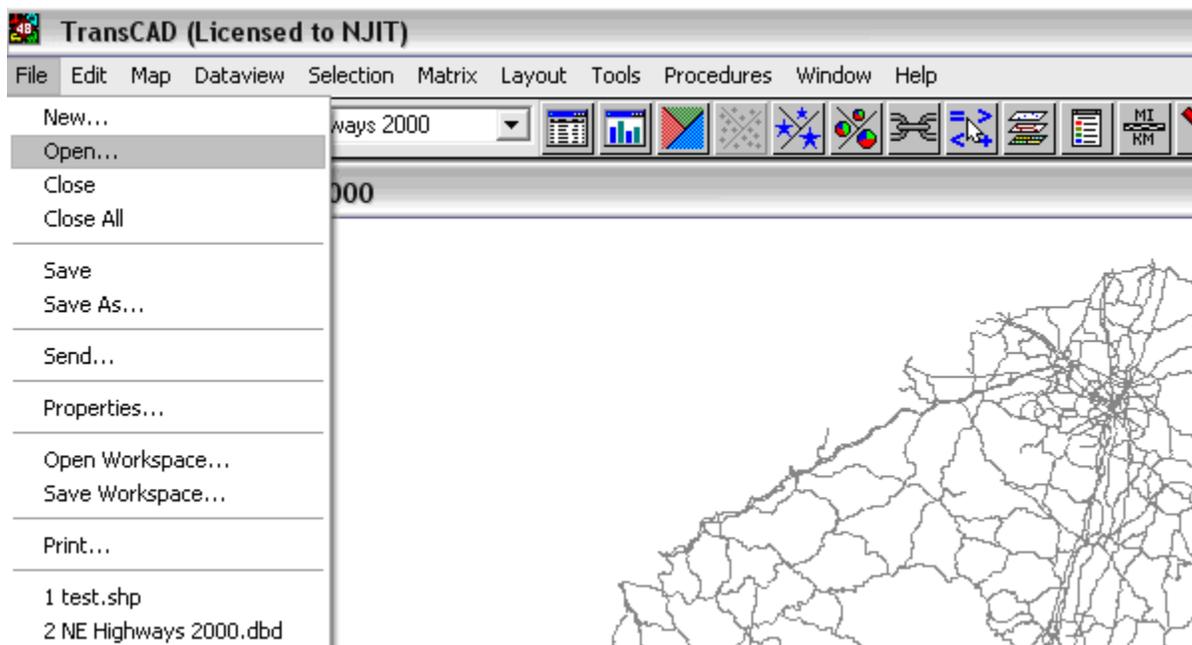
Lane Separation
Guard Rails
Rail-Crossing Improvement
Security Systems/Facilities/Personnel
Other
Traffic Management/Engineering:
Intelligent Transportation Infrastructure
Signage
Signalization & Computerization
Other
Environmental, Scenic, Historic:
Runoff & Erosion Control
Wetlands Mitigation
Scenic/Historic Protection
Noise Barriers
Landscaping
Demolition/Removal
Other
Non-motorized Travel:
Pedestrian and/or Bike Ways
Sidewalks
Other
Travel/Maintenance/Service Facilities:
Rest Areas w/Commercial
Rest Areas w/o Commercial
Parking (Other than Rest Areas)
Weigh Stations
Toll Facilities

Bus Shelters
Maintenance Sites/Buildings
Administration Buildings
Other
Intermodal Facilities (Not Elsewhere Classified)
Hov Lanes (Not Elsewhere Classified)
Other (Not Elsewhere Classified)
General Administration
Law Enforcement And Security
Planning, Misc: State DOT
Planning, Misc: MPO
Planning, Misc: Other
Transit Projects
Capital Outlay
Rolling Stock:
Automated Guideway
Cable Car
Commuter Rail
Demand Response
Ferryboat
Heavy Rail
Inclined Plane
Jitney
Light Rail
Bus
Trolleybus
Vanpool
Other

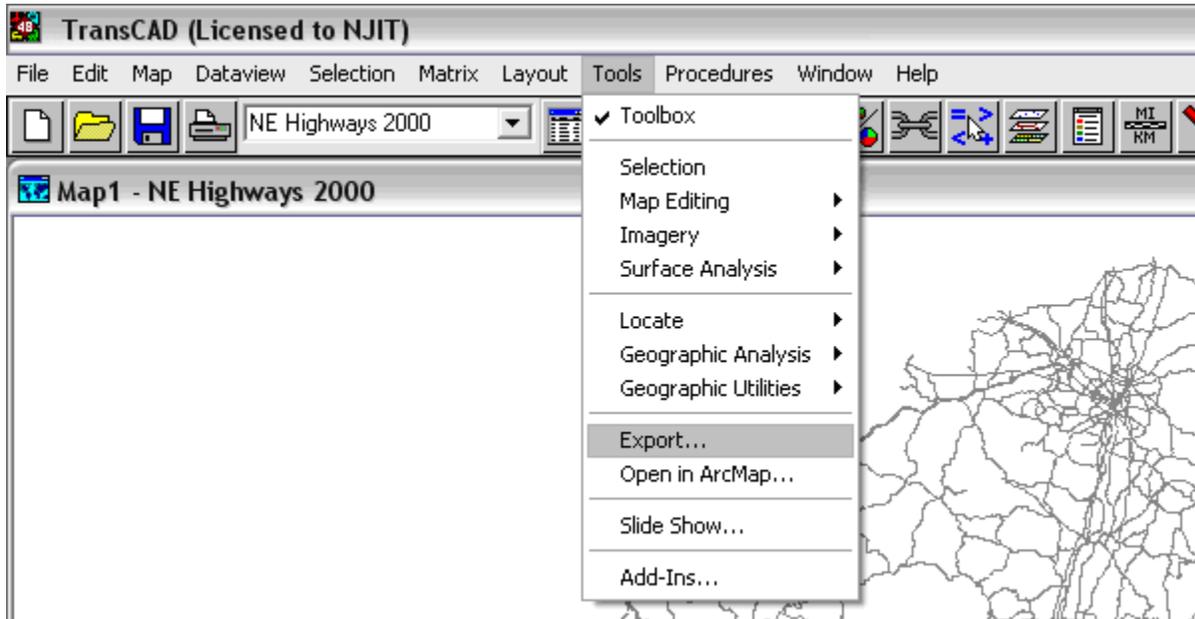
Facilities:
New Track
New Station
Commercial Areas
Parking
Intelligent Transportation Facilities/Equipment
Administration Buildings
Other
Operations & Maintenance
Vehicle Operations:
Rail
Bus
Other
Maintenance:
Vehicles
Non-vehicles
Safety and Security
Signalization & Computerization
Other
Global Other

Appendix II Instructions for Converting TransCAD Files (.dbd) to ESRI Shape Format (.shp)

STEP 1. Click **File** in the main menu bar and select **Open** from the drop-down menu to open your TransCAD geographic file (.dbd)

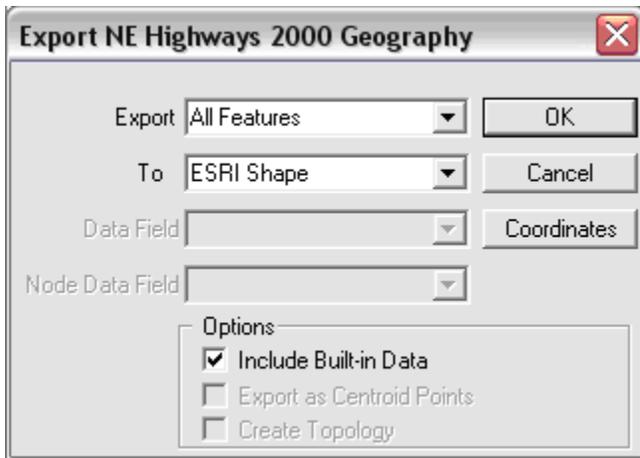


STEP 2. Click **Tools** in the main menu bar and select **Export** from the drop-down menu.



STEP 3. In the **Export** dialog-box please do the following:

- Select **All Features** from the **Export** drop-down list
- Select **ESRI Shape** from the **To** drop-down list
- In the **Options** menu-box, check off the box next to **Include Built-in-Data**
- Click **OK**



STEP 4. In the *Save As* dialog-box specify the **File Name** and location of the new file (type of file will be **ESRI Shape** and will have extension .shp). Click **Save**. The file is now ready to be used with TELUS.

