



SMART GROWTH INDEX[®]

A Sketch Tool for Community Planning

Getting Started Guide

July 2001

Prepared for the

U.S. ENVIRONMENTAL PROTECTION AGENCY

by

Criterion Planners\Engineers

CONTENTS

	<u>Page</u>
Welcome to Smart Growth INDEX	1
Install Smart Growth INDEX	3
Prepare the Database	4
Create and Use Maps	9
Snapshot Sketch	11
Develop a Sketch	12
Define Sketch Boundary	18
Run the Model	22
View the Results	37
Forecast Sketch	42
Develop a Sketch	42
Define Sketch Boundary	46
Run the Model	43
View the Results	46
After the Getting Started Guide	49

Welcome to Smart Growth INDEX

Smart Growth INDEX (SGI) is a sketch model for simulating alternative land-use and transportation scenarios and evaluating their outcomes using indicators of environmental performance. It is intended as a planning support tool that can be applied in any community that has a geographic information system.

SGI performs sketch-level analysis in two basic modes of operation: 1) spatial “forecasts” of community growth over time; and 2) “snapshots” of community conditions at a single point in time. The forecast mode allows an exogenous growth forecast to be spatially allocated for up to 20 years according to user-defined land-use controls, transportation system capabilities, and environmental protection policies. The snapshot mode allows the same land-use, transportation, and environmental parameters to be specified for a given point in time. Both forecast and snapshot outcomes are measured by indicators of environmental performance such as land consumed, travel generated, and pollution emitted.

Applications

SGI is intended to be a sketch tool for collaborative planning among stakeholders engaged in the following kinds of applications:

Forecast Sketches

- Regional growth management plans.
- Comprehensive land-use plans.
- Large area master plans.
- Regional transportation plans (sketch-level analysis of policy alternatives).
- Environmental impact statements (sketch-level ranking of alternatives).

Snapshot Sketches

- Neighborhood plans.
- Land development proposal evaluations.
- Transportation corridor studies.
- Environmental reviews (relative ranking of alternatives).

- Special projects, e.g. brownfield vs. greenfield development comparisons; transit station area plans.

Additional information about applying SGI in community planning processes is given in the SGI Reference Guide.

What Smart Growth INDEX Is Not

As a sketch tool, SGI has limitations that need to be clearly understood by users. It is not a highly technical model such as URBANSIM or TRANUS that attempt to simulate integrated land-use/transportation dynamics with considerable precision. SGI does not attempt to predict future conditions exactly, but instead estimates what would happen if clearly defined policy choices are made and assumptions concerning the future prove to be correct. SGI uses a very simplified “gravity” method of modeling growth that does not take into account such factors as land prices, household income and relocation, and freight movement. It is not a calibrated transportation planning model suitable for evaluating major investments or demonstrating regulatory compliance. Nor is it a traffic engineering or highway design model. SGI does borrow or adapt certain elements and methods from these and other place-making tools, but its limitations need to be recognized.

Using Help

The Getting Started Guide is intended to guide users through installation and an example application of SGI in each of its modes of operation. It is the companion document to two other resources: the SGI Reference Guide, and the software’s online help system. For detailed descriptions of the SGI modeling framework, it is necessary to refer to both of those sources. This Getting Started Guide refers to the online help system frequently, and users should become familiar with the online system as the help resource of first choice.

Install Smart Growth INDEX

Prepare for Installation

You must be running Microsoft Windows 95, 98, 2000, NT 4.0 or later to install SGI.

1. Close all running programs.
2. Close or disable virus-protection software, to prevent installation conflicts.
3. To install SGI on Microsoft Windows NT, you must have administrator rights.

Install from CD

On most Windows systems, installation starts automatically when you insert the SGI CD into your CD-ROM drive.

If installation does not start automatically when you insert the SGI CD, you can install SGI using the following steps:

1. Insert the SGI CD into your CD-ROM drive.
2. From the Start menu, choose Run.
3. Type *d:\setup*, where *d* is the letter assigned to your CD-ROM drive.
4. Click OK.

Once the setup program begins it will guide you through the installation process. When prompted, be sure to choose Typical installation (not Compact or Custom) so that you install the SGI program files and sample data necessary for this *Getting Started Guide*.

Install from Download

After downloading the current release of SGI:

1. Unzip the file into an empty folder using the required password. If you do not have the correct password, please contact Criterion.
2. From the Start menu, choose Run.
3. Browse to the folder that SGI was unzipped into.
4. Click Open.
5. Click OK.

Once the setup program begins it will guide you through the installation process. When prompted, be sure to choose Typical installation (not Compact or Custom) so that you install the SGI program files and sample data necessary for this *Getting Started Guide*.

To run SGI, navigate to Start\Programs\Smart Growth INDEX, and click on Smart Growth INDEX. The first screen gives the program title and developer name, and offers three options: Database, Grid-Based Forecast Sketch, and Parcel-Based Snapshot Sketch. In addition, Help and Exit buttons lead to the online help system and program exit respectively.

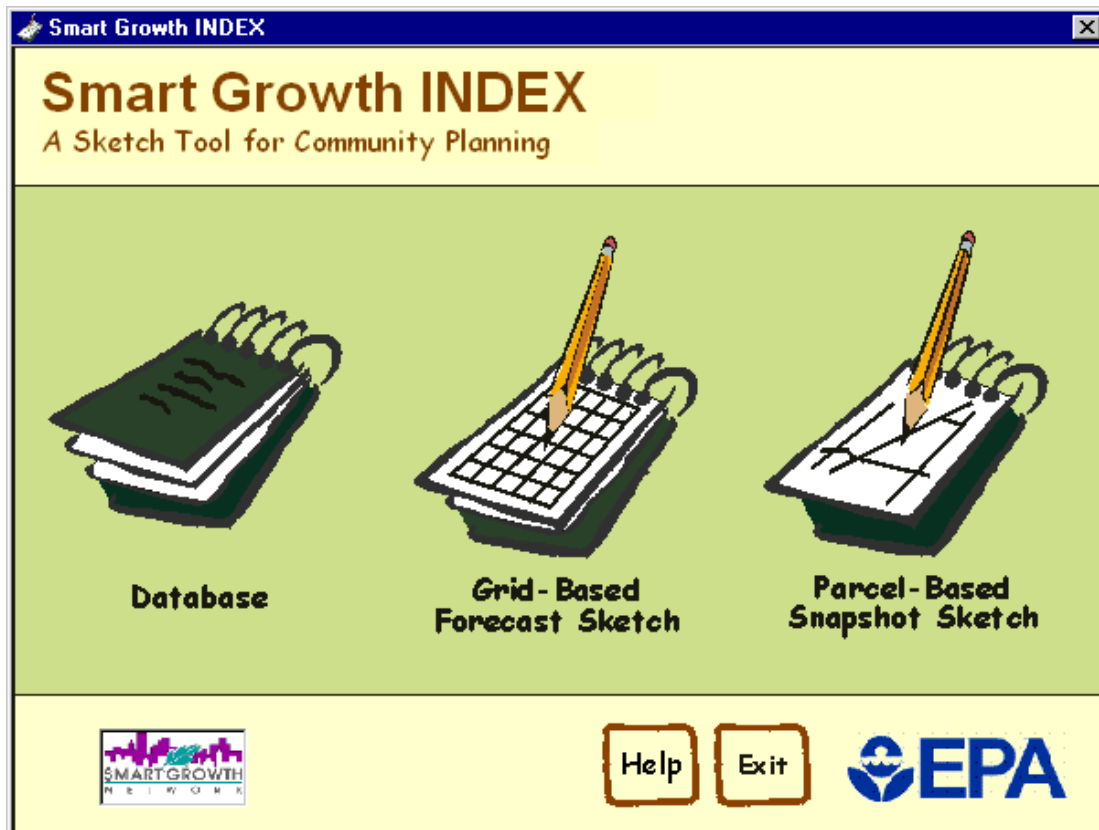
Prepare the Database

SGL stores information about your various data files, for all your projects, in a single database. After you install SGL, the next step is to populate the database with shapefiles. SGL comes with sample data for use with this *Getting Started Guide*. The sample data is contained in the Program Files\Criterion\Smart Growth\Sample Data directory.

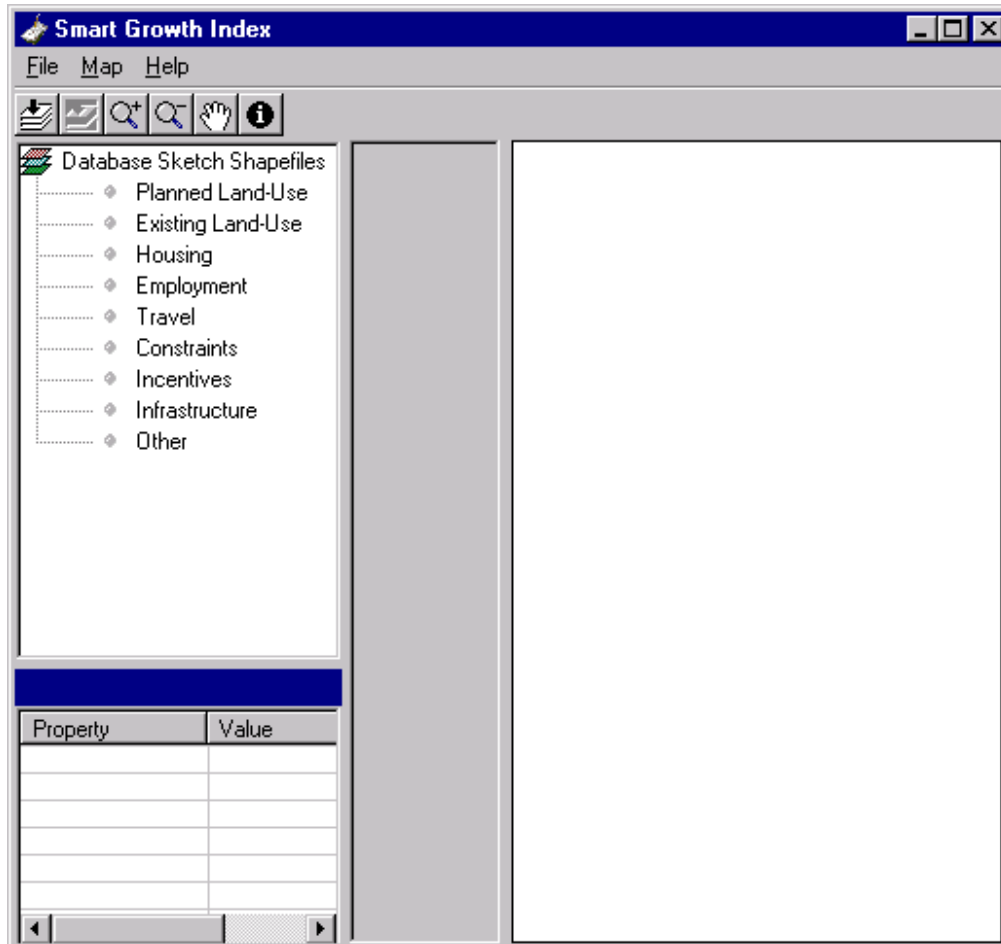
Following the steps in this *Getting Started Guide* you will add a minimum number of shapefiles which will allow you to create both a snapshot sketch and a forecast sketch, and then run models for those sketches. (For details see *Overview (Snapshot Sketches)* and *Overview (Forecast Sketches)* in the *Help file*.) To access the Help file from SGL, click on the menu Help\Contents.

Open the Database

Start SGL. The SGL startup screen will appear:



2. Click the Database icon. The Database module will open:

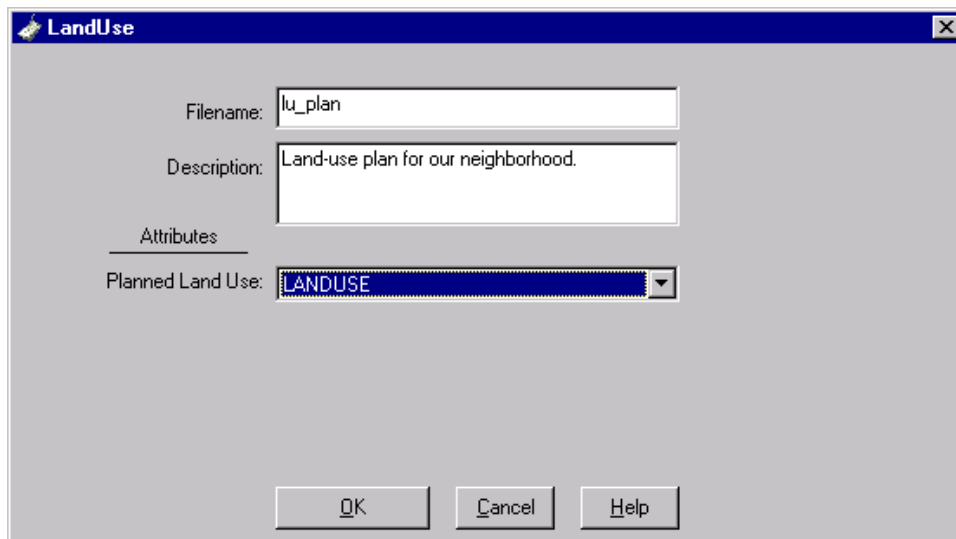


Populating the Database

Since you have not previously added shapefiles to the database, the database is empty. You need to add shapefiles before you can create a sketch. (For details see *Populating the Database in the Help file*.) The following list is presented sequentially, but you can add files to your database in any order.

1. Double-click the Planned Land-Use node, located on the tree in the upper-left of the SGI window. The Open dialog box will appear.

2. Navigate to the Program Files\Criterion\Smart Growth\Sample Data directory. There you will find the file lu_plan.shp. Double-click this file to add it to the database.
3. A dialog box will appear, and it will prompt you to choose a description and land-use type. Enter "Land-use plan for our neighborhood" in the Description box.
4. From the Land-Use box choose LANDUSE. *(Note that your data may not always have labels that correspond as directly as in this Getting Started Guide. For example, in the sample data the Land-Use category has a field labeled LANDUSE. Your jurisdiction could use different vocabulary.)* The Land-Use attribute must classify land by single-family or multi-family residential use, or by more detailed categories. Planned Land-Use shapefiles should generally consist of polygons (zones) in which specific development types are permitted. In general, the polygons will be larger than parcels.



5. Click OK. This shapefile has been added to the database.

Next, add a shapefile to the Existing Land-Use data category.

1. Double-click the Existing Land-Use node.

2. Navigate to the Program Files\Criterion\Smart Growth\Sample Data directory. There you will find the file par_apt.shp. Double-click this file to add it to the database.
3. Choose DU_Type for DU Type, DU for DU Count, and ELU for Existing Land-Use. Leave the Description box blank. *(As noted in the example above for Land-Use, this data may not always have labels that correspond as directly as in this Getting Started Guide. Your jurisdiction could use different vocabulary. SGI expects data here for DU (dwelling unit), but your jurisdiction could use another label for this kind of data.)* Existing Land-Use shapefiles should generally consist of polygons, where each polygon is an existing independent parcel.
4. Click OK. The shapefile is now in the database.

Next, add a shapefile to the Housing data category.

1. Double-click the Housing node, browse to the Program Files\Criterion\Smart Growth\Sample Data directory, and choose the housing.shp shapefile. Housing shapefiles consist of individual residential locations, represented as points. The DU Type attribute classifies them as single-family or multi-family, and the DU Count attribute contains the number of dwelling units represented by that point.
2. In the DU Type box choose ELU, and in the DU Count box choose DU.
3. Click OK. The shapefile is now in the database.

Next, add a shapefile to the Employment data category.

1. Double-click the Employment node, browse to the Program Files\Criterion\Smart Growth\Sample Data directory, and choose the emps.shp shapefile. Employment shapefiles consist of individual business locations, represented as points. The Employment Type attribute classifies them as service, retail, or all other, and the Employment Count attribute contains the number of jobs represented by that point.
2. In the Employment Type box choose Emp_Type, and in the Employment Count box choose EMP_TOTAL.

3. Click OK. The shapefile is now in the database.

Next, add three shapefiles to the Travel data category.

1. Double-click the Travel node, browse to the Program Files\Criterion\Smart Growth\Sample Data directory, and choose the st_apt.shp shapefile.
2. For Length choose LENGTH. For Functional Class choose CLASS. For Number of Lanes choose NONE. For Existing Traffic Counts choose NONE. For Sidewalk Count choose SIDEWALK. Choose the Street Centerlines option button on the right.
3. Click OK. The shapefile is now in the database.

Next, add the transtp shapefile to the Travel data category.

1. Double-click the Travel node, browse to the Program Files\Criterion\Smart Growth\Sample Data directory, and choose the transtp.shp file.
2. Choose the Transit Stops option button on the right. For Classification choose NONE. The Length, Functional Class, Number of Lanes, Existing Traffic Counts and Sidewalk Count boxes will be unavailable.
3. Click OK. The shapefile is now in the database.

Next, add the tranrte shapefile to the Travel data category.

1. Double-click the Travel node, browse to the Program Files\Criterion\Smart Growth\Sample Data directory, and choose the tranrte.shp file.
2. Choose the Transit Routes option button on the right. For Classification choose NONE. The Length, Functional Class, Number of Lanes, Existing Traffic Counts and Sidewalk Count boxes will be unavailable.

3. Click OK. The shapefile is now in the database.

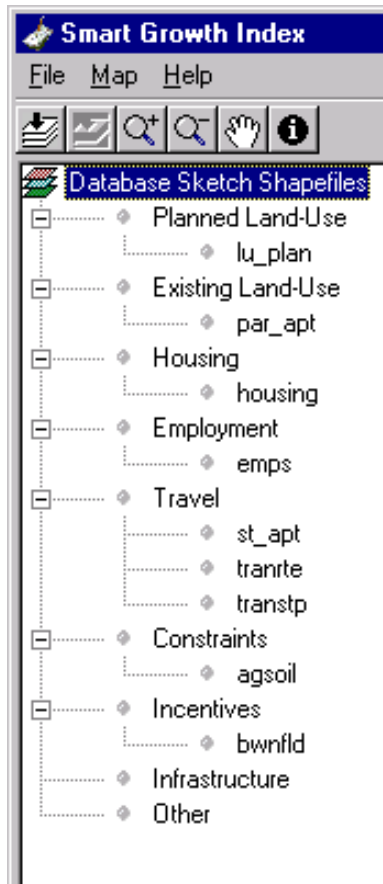
Next, add the agsoil shapefile to the Constraints data category.

1. Double-click the Constraints node, browse to the Program Files\Criterion\Smart Growth\Sample Data directory, and choose the agsoil.shp file.
2. For Classification choose SOILTYPE.
3. Click OK. The shapefile is now in the database.

Next, add the bwnfld shapefile to the Incentives data category.

1. Double-click the Incentives node, browse to the Program Files\Criterion\Smart Growth\Sample Data directory, and choose the bwnfld.shp file.
2. For Classification choose LANDUSE.
3. Click OK. The shapefile is now in the database.

Expand all the nodes in the Database tree. Click the plus (+) signs to expand the nodes. The Database tree should now look like this:



Remove a Shapefile from the Database

If you make a mistake while choosing the appropriate attributes for the fields of a shapefile, you must delete the shapefile from the database, then add it again and configure it.

1. Expand the Data Category node by clicking the plus sign (+) or the name of the Data Category (for example, *Planned Land-Use*).
2. Click the shapefile you would like to remove.

3. From the File menu choose Delete. Or, right-click the shapefile and choose Delete.

Viewing Attributes

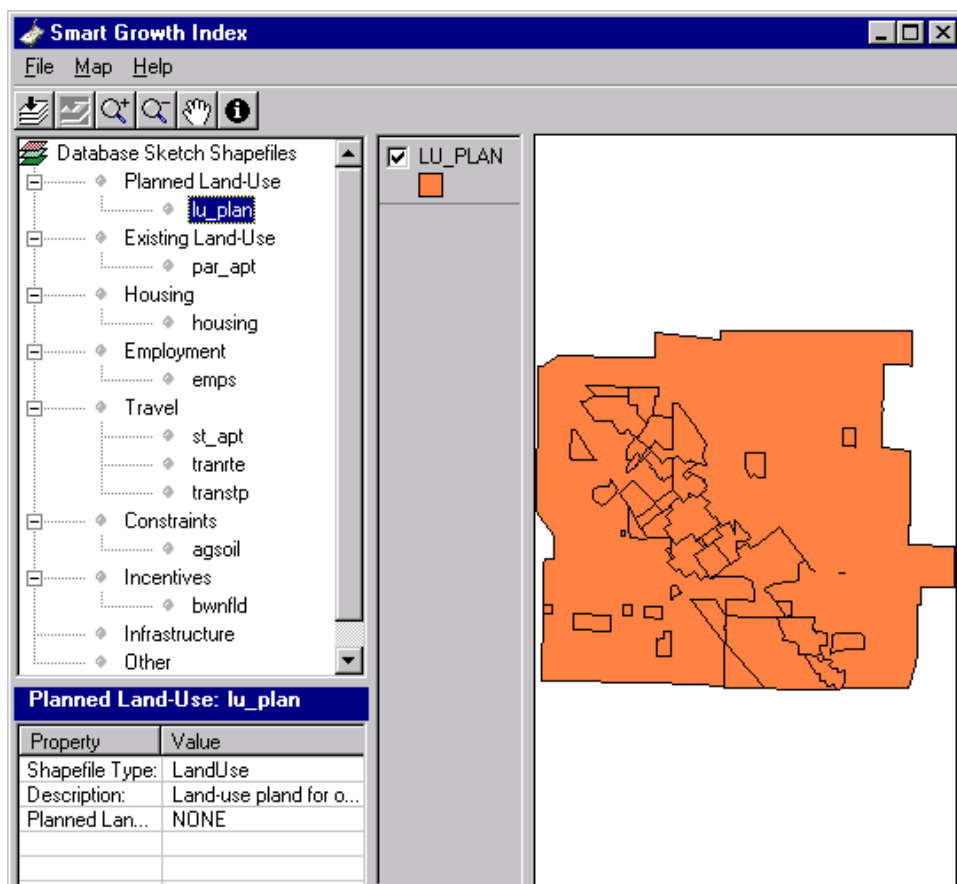
If you want to view the attribute fields and values for a shapefile in the database, you highlight it in the Database tree view and select File\View Attributes from the menu. If you want to view the attribute field names that you configured in the database, highlight a file name in the Database tree and its information appears in the lower left pane of the SGI window.

Create and Use Maps

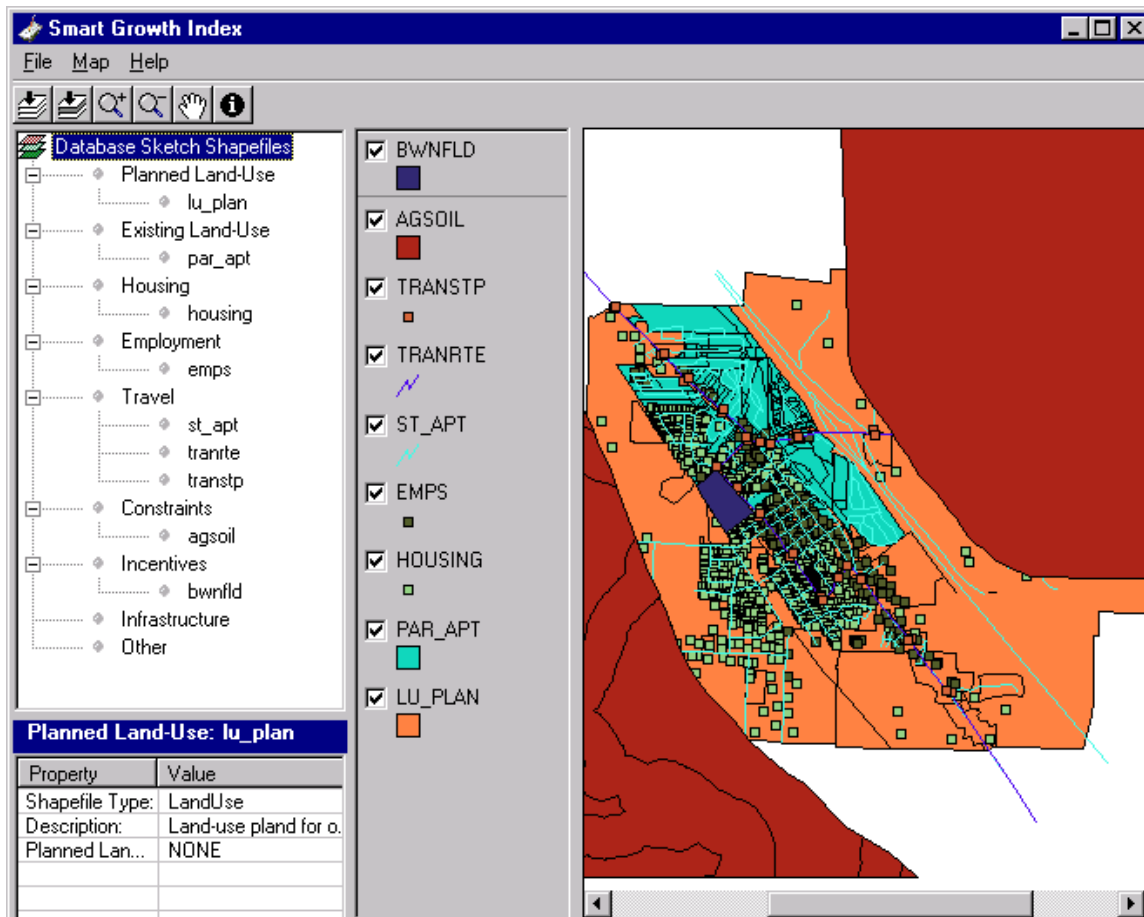
Now that you have added shapefiles to the database, the next step is to apply those shapefiles to the map as map layers.

Add a Layer to the Map

1. Click the lu_plan shapefile, located under the Planned Land-Use node.
2. Hold the mouse button down, and drag it over the legend pane.
3. Release the mouse button. The lu_plan layer should now appear on the legend pane. Click its checkbox to add it to the map as a map layer.



4. Drag the other shapefiles (par_apt, emps, housing, st_apt, tranrte, transpt, agsoil, and bwnfld) onto the legend pane, then click their checkboxes to see them represented as map layers.



5. You may want to change the order of legends on the legend pane. A layer can be invisible on the map because it is beneath another layer.

Click on whichever legend is at the bottom of the legend pane, drag it to the top, and release the mouse button. You will see the map change. Try this a few times, and then put the PAR_APT layer on top. This will be explained in more detail later, in the Define Sketch Boundary section. (See *Arranging Shapefiles in the Help file for more details.*)

Later in this *Getting Started Guide* you will save default legends for each shapefile, as well as maps composed of a collection of legends and layers.

Close the Database

1. From the File menu choose Exit. This returns you to the SGI startup screen.

The next step is to create a sketch, using the data you have added to the database.

Snapshot Sketch

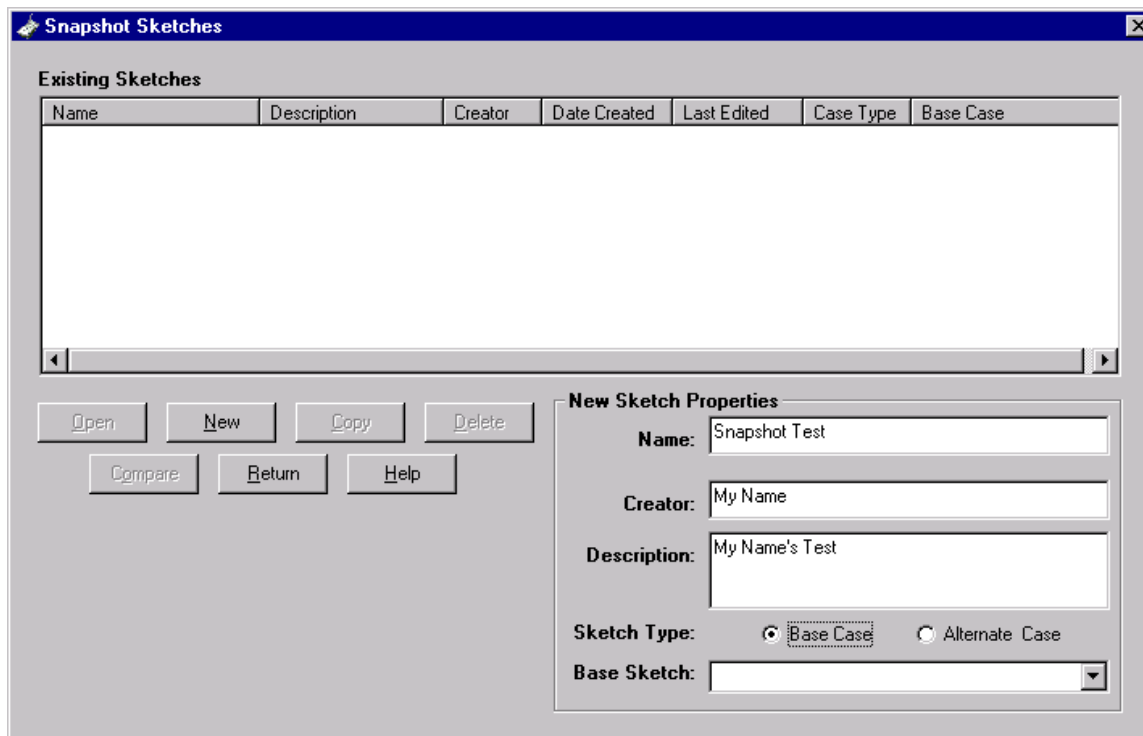
SGI can create two types of sketches: snapshots and forecasts. This section describes snapshot sketches, which are static (single point in time) evaluations of a study area using parcels as the smallest geographic unit for indicator measurements. *(For details see Overview (Snapshot Sketches) and Overview (Forecast Sketches) in the Help file.)*

Since you have just exited the database you should now be back at the SGI startup screen, which displays the Database, Grid-Based Forecast Sketch and Parcel-Based Snapshot Sketch icons. If this is not open, start SGI and this screen will appear.

Create a Snapshot Sketch

1. Click the Parcel-Based Snapshot Sketch icon. The Sketch Management window will appear.

2. You are going to create a test sketch, so enter data in the Name, Creator and Description boxes as shown below. Notice that you should choose Base Case as your sketch type. The Base Sketch list box can remain empty. (For details on case types see *Overview (Base and Alternate Sketches)* in the *Help* file.)

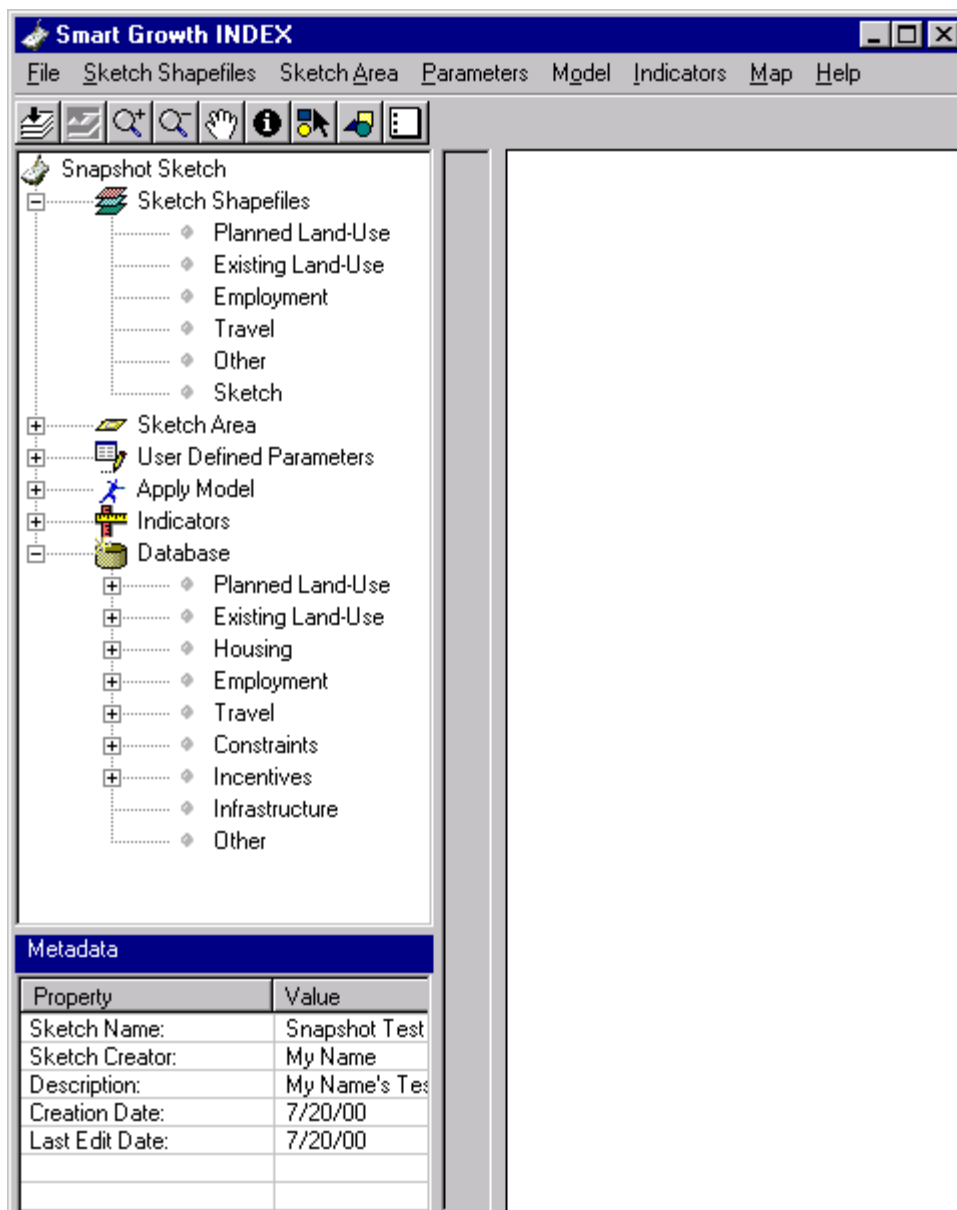


3. The New button will become active. Click it.
4. Click Open to open the new sketch.

Develop a Sketch

You should now be in the snapshot sketch you created. The Sketch tree of a snapshot sketch contains the Sketch Shapefiles, Sketch Area, User-Defined Parameters, Apply Model, Indicators and Database nodes.

If this is not open, go to the Sketch Management window for snapshot sketches and open your sketch.



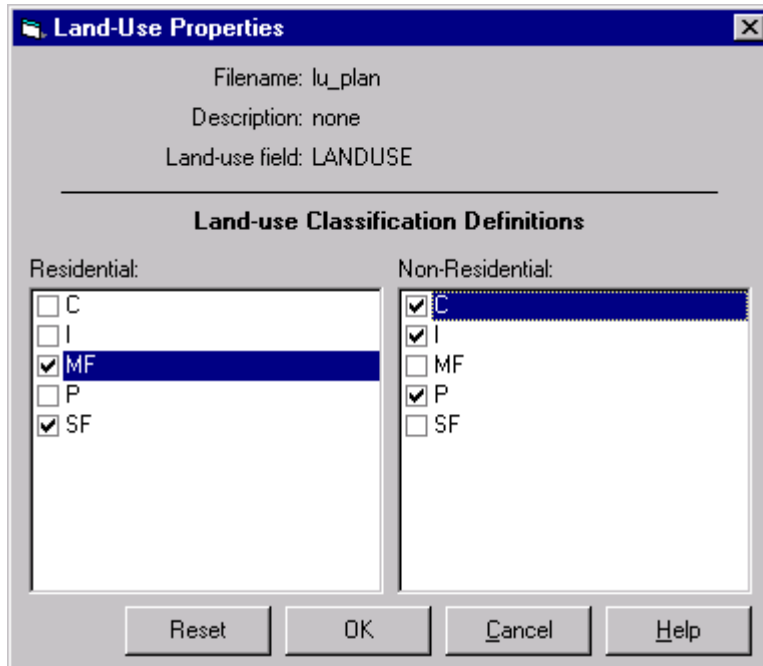
The SGI Sketch tree is designed to organize your data and to create a logical workflow. It is designed to encourage you to start at the top of the tree and work down, from Sketch Shapefiles to Indicators. At the bottom of the tree is the Database node. It contains all the shapefiles added to SGI during the database setup.

The Database node displays the same information you saw when you first populated the database with shapefiles. If you expand the Database node you will see that the Planned Land-Use, Existing Land-Use, Housing, Employment, Travel, Constraints and Incentives nodes contain sub-nodes. Expand these and leave them expanded.

Adding Shapefiles to the Sketch

1. Collapse the Sketch Area, User-Defined Parameters, Apply Model and Indicators nodes. Expand the Sketch Shapefiles and Database nodes. (Clicking the plus sign (+) will expand a node, which clicking the minus sign (-) will collapse a node.)
2. With the Sketch Shapefiles node and Database nodes expanded you can now add shapefiles from the database to this sketch. Under the Database\Planned Land-Use node, click the lu_plan shapefile. Hold the mouse button down, drag it over the Sketch Shapefiles\Planned Land-Use node, and release the mouse button.

- The Land-Use Properties dialog box will appear. At this point SGI requires that you classify the land-use field in the shapefile for use in this sketch. Configure it like this:



- Click OK. The Land-Use Properties dialog box will disappear, and the shapefile is now in this sketch.
- Click the shapefile under the Sketch Shapefiles\Planned Land-Use node and drag it onto the legend pane. Click the checkbox next to its entry in the legend to map the Planned Land-Use.

Add a shapefile to the Existing Land-Use node.

- Drag the par_apt shapefile from Database\Existing Land-Use to Sketch Shapefiles\Existing Land-Use.
- It will prompt you to classify the housing type and existing land-use fields. Under Single Family Housing check SF, and under Multi-Family Housing check MF. Under Open Space check OS, and under Park check Park. Leave the other check boxes unchecked.

3. Click OK.
4. Click the shapefile under the Sketch Shapefiles\Existing Land-Use node and drag it onto the legend pane. Click the checkbox next to its entry in the Legend to map the Existing Land-Use.

Next, add the Employment shapefile.

1. Drag the emps shapefile from Database\Employment to Sketch Shapefiles\Employment.
2. It will prompt you to classify the employment type field. Under Retail Employment check Retail, under Service Employment check Service, and under Other Employment check Other.
3. Click OK.
4. Click the shapefile under the Sketch Shapefiles\Employment node and drag it onto the legend pane. Click the checkbox next to its entry in the Legend to map Employment.

Add the st_apt and transtp shapefiles to the Travel node.

1. Drag the st_apt and transtp shapefiles from the Database\Travel to the Sketch Shapefiles\Travel node. Neither of these requires classification, so they will not prompt you.
2. Click the shapefiles under the Sketch Shapefiles\Travel node and drag them onto the legend pane.

If you think that you classified the fields of a shapefile incorrectly when you added it to the sketch, you can check it by double-clicking it in the Sketch tree. For example, if you double-click Sketch Shapefiles\Existing Land-Use\par_apt, the shapefile configuration dialog box will appear again. *(For more information see Configuring Shapefiles in the Help file.)*

Saving>Loading Maps and Saving Default Shapefile Legends

Now that you have added the layers to this map you will save this map, then reload it. This feature is very useful as you use SGI on a day-to-day basis. You will want to view maps with certain layers repeatedly, view the layers layered in a particular way repeatedly, or save particular changes you have made to the way the data is symbolized.

Save a Map

1. From the Map menu choose Save Map.
2. Enter the name "Test Map" in the New Map text box.
3. Click Save.

Load a Map

Next, load the map you just saved.

1. From the Map menu choose Remove All Layers. All layers will be removed from the legend pane and map pane.
2. From the Map menu choose Load Map.
3. Click the Test Map file you created.
4. Click Load. (Be sure to leave the map with all these layers displayed, so that you can use it as you work through the *Getting Started Guide*.)

Saving Default Shapefile Legends

Another useful feature is the ability to change how a shapefile is displayed as a map layer, then save this as the default.

When you previously added shapefiles to the map, SGI used only one, randomly chosen color, to symbolize the data of that shapefile as a map layer. However, you can configure a shapefile so that it is always displayed the same way on the map.

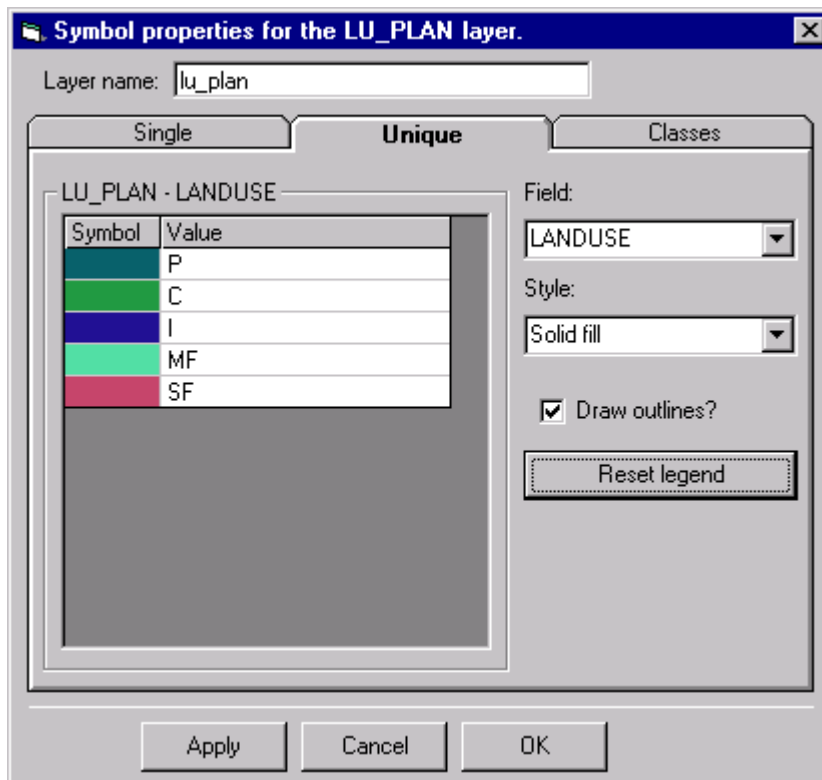
For example, many jurisdictions customarily use yellow to symbolize single-family parcels and brown to symbolize multi-family parcels. If you save these settings as the defaults, whenever you add the shapefile to a map SGI will automatically symbolize the data of the layer in this way.

It is important to notice that when you add a shapefile SGI will use your default settings only if you drag the shapefile onto the legend pane. If you drag a shapefile onto the map pane the shapefile's values will be displayed in a single, randomly chosen color.

Creating Unique Values for Symbolizing Data

The Symbol Properties dialog box allows you to configure how you symbolize a shapefile's color and style. (For details see *Symbol Properties in the Help file.*)

1. Double-click the LU_PLAN layer on the legend pane.
2. The Symbol Properties dialog box will appear. Click the Unique tab.
3. In the Field box choose LANDUSE.
4. Click Reset legend. The legend will update:



5. Click Apply for the changes to be reflected on the map pane and the legend pane.

Change Colors for Each Value

It is here that you choose the exact colors and styles you want.

1. With the values still displayed on the legend of the Unique tab, click any of the colors in the Symbol column (to the left of the values P, C, I, MF and SF).
2. The Color dialog box will appear. Choose a new color and click OK.
3. Click Apply to see the changes reflected on the legend pane and map pane.
4. Repeat for other values.
5. Click OK to close the dialog box.

Save Default Shapefile Legend.

Now that you have made these changes you can save these as the default, to be used whenever you add this shapefile to a map.

1. On the legend pane, the LU_PLAN layer should be the active layer. The active layer is indicated by its raised edges. If it is not the active layer, single-click the shapefile on the legend pane. (If you double-click a shapefile the Symbol Properties dialog box will open.)
2. From the Map menu, choose Save Default Shapefile Legend. This will save the settings you just made, setting them as defaults.
3. From the Map menu choose Remove Layer. The LU_PLAN layer will disappear from the legend pane.
4. Click the lu_plan shapefile, located under Sketch Shapefiles\Planned Land-Use on the Sketch tree. Drag it over the map pane, then release the mouse button. Notice that it has been added to the map pane and the legend pane, but *without* the default settings you just created.

5. From the Map menu choose Remove Layer. The LU_PLAN layer will disappear from the legend pane.
6. Drag the lu_plan shapefile over the legend pane, then release the mouse button.
7. Notice that it has been added to the map pane and the legend pane, this time *with* the default settings you just created.

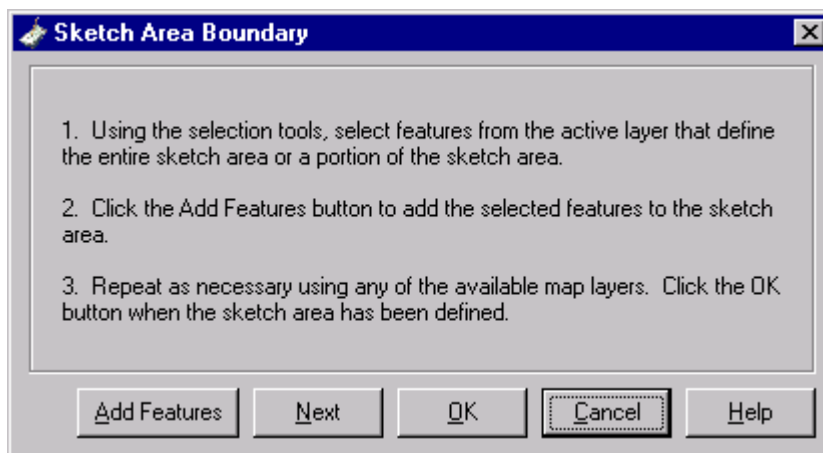
Define Sketch Boundary



The next step is to create a sketch boundary. All indicators use the sketch boundary as the outer limit for calculations. Snapshot sketches may be prepared for any size of study area, from an individual neighborhood up to a metropolitan region.

You will use the LU_PLAN shapefile to define the sketch boundary. If it is not currently displayed, go to the Map menu and choose Load Map, to load the map you created previously. Alternately, drag the LU_PLAN shapefile onto the legend pane from the Sketch Shapefiles\Existing Land-Use node.

Define a Sketch Area Boundary

1. Expand the Sketch Area node and double-click the Sketch Boundary sub-node. The Sketch Area Boundary dialog box will open. This allows you to add features incrementally to the sketch area boundary. When you define a sketch area boundary, and then run indicators based on that boundary, SGI will use attributes from all layers in the sketch that fall within that boundary.

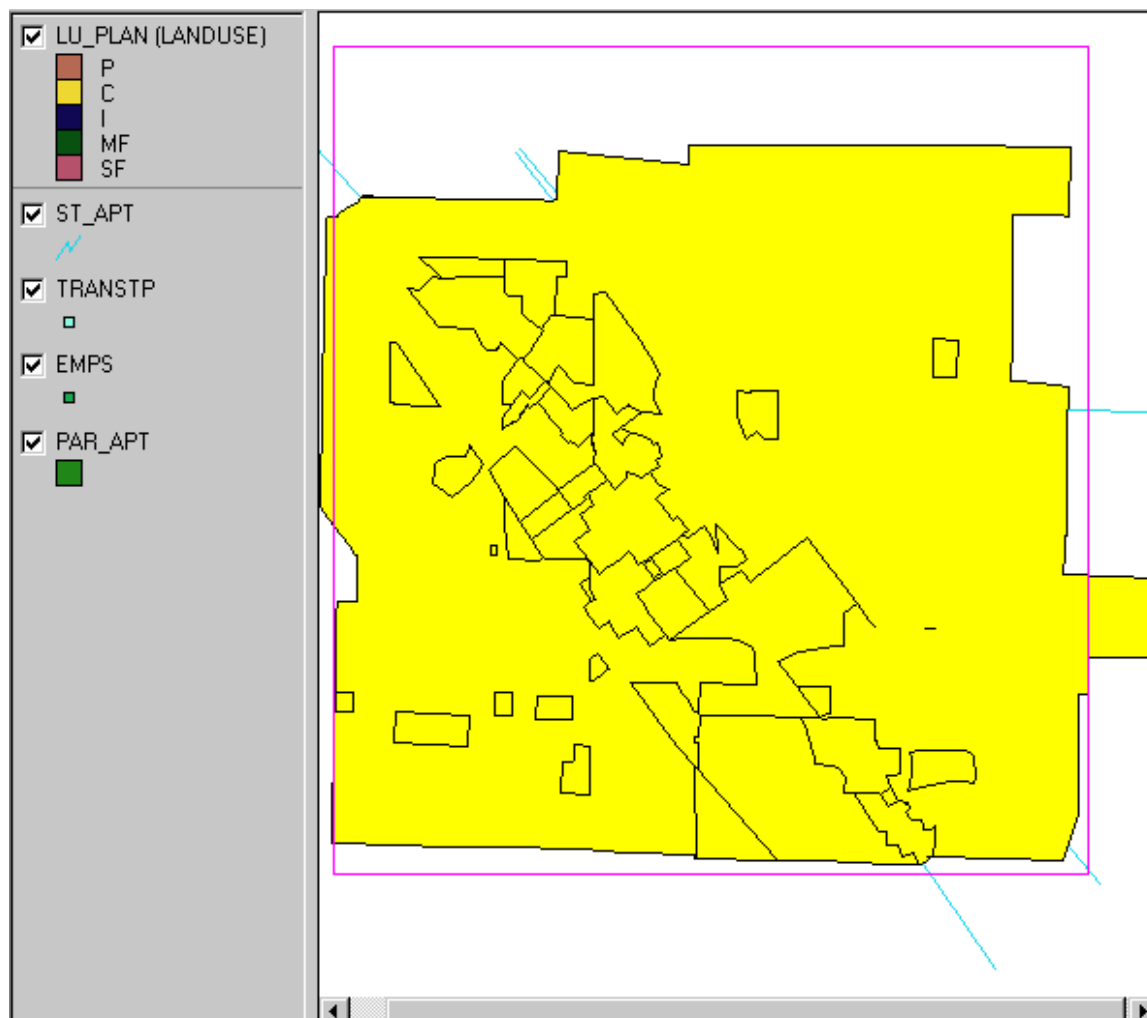



2. Select the features that define the study area boundary. Click the Select Features Tool icon on the toolbar. 
3. Click the selection tool that will enable you to select the desired features. The tools include a point, a line, a rectangle and a polygon. 

All the tools allow you to select any kind of layer, but some tools make it easier to choose individual or groups of features. You will use the Rectangle tool (second from the right). Click it now.

4. You may need to change the order of layers on the legend pane. A layer can be active but invisible on the map because it is beneath another layer, and this could make it difficult to see what you are selecting.
5. If the LU_PLAN layer is not on top of the other map layers, click and hold it in the legend pane and drag it to the top of the pane. (*See Arranging Shapefiles in the Help file for more details.*)
6. You can choose features that define the sketch area boundary from the active layer only, so this is why it is important to make the LU_PLAN layer active. A layer is active if it appears with raised edges on the legend pane. Single-click a layer to make it active. (If you double-click the layer the Symbol Properties dialog box will appear.)

- To select features for your model, you will click-and-drag over them. Put the cursor in the upper left corner of the map pane, click the left mouse button, and drag towards the middle. Drag so that the polygon surrounds the LU_PLAN layer, and then release the mouse button. You will see that the selected features in the active layer have changed to yellow.



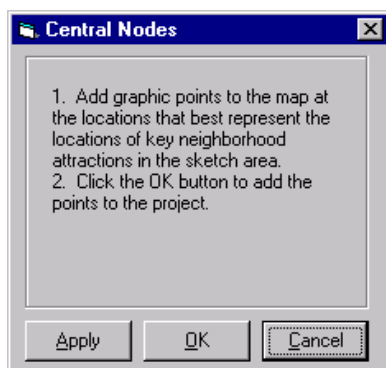
8. If you want to try again, or you made a mistake while dragging, click the Clear icon.  You can then create a new sketch boundary.
9. Now that you have selected a feature, click Add Features on the Sketch Area Boundary dialog box. These features are added to the sketch boundary. When working with your data you may be adding features from multiple layers, and using the Add Features button repeatedly. For this *Getting Started Guide*, however, you are just selecting features from one layer.
10. Click Next on the Sketch Boundary dialog box.




An alternative way to define the Sketch Boundary is the use a single polygon from an existing shapefile. To illustrate this, go back to the Database step and under Other add the sample file studarea.shp. Then add it to your Snapshot Sketch under Sketch Shapefiles\Other, and select its single polygon using the same method outlined above.

Adding Central Nodes

Now that you have created the sketch boundary, the next step is to add central nodes. Central nodes are destinations used in the pedestrian route directness indicator. A central node is any important destination that acts as a focus of activity. Examples include transit stations, critical street intersections, or major facilities that have popular functions. A sketch must have at least one central node, but it can have more. You add central nodes after you create a sketch boundary.

1. The Central Nodes dialog box should be open right now. If it is not open, open it by clicking the Sketch Area\Central Nodes node. Notice that you are working your way down the Sketch tree.



2. When the Central Nodes dialog box appears, click the Graphic Tool icon  located to the right of the Select Tool icon. Important: make sure you select the Graphic Tool and not the similar-looking and adjacent Select Tool.
3. Click the Point Graphic Tool icon.  (The other tools are used to draw and write on the map.)
4. With the Point Graphics tool, click near the center of the map. A small triangle will appear where you click. For the purpose of this *Getting Started Guide* it is not important where you place the central node. However, when using your data you will place the central nodes at strategic destinations.
5. Just as you could when creating the sketch boundary, you can click the Clear icon  to clear your selection if you make a mistake.
6. Click Apply to add the point to central nodes collections.
7. Click OK when finished.

The next step is to add population data. The next node on the Sketch tree is User-Defined Parameters, and you will work your way down to its sub-nodes. Notice that you are still working your way down the Sketch tree.

Configuring User-Defined Parameters

1. Double-click the User-Defined Parameters\Population node. This opens the Population dialog box.
2. For Regional Population enter 340000. For Regional Employment enter 260000. Leave the default values in the Single Family Persons Per Household and Multi-Family Persons Per Household boxes. *(For details see Population in the Help file.)*
3. Click OK.
4. Double-click the Resources and Emissions node. This opens the Resources and Emissions dialog box. For purpose of this *Getting Started Guide* there is no need to change any data, but look at the data on each of the tabs to familiarize yourself with the default data provided by SGI. When you use your own shapefiles you can either use this default data, or enter your data for more locally accurate results. *(For details see Resources and Emissions in the Help file.)*
5. Click OK.

The next node on the sketch tree is Apply Model, and you will work down to its sub-nodes.

Run the Model

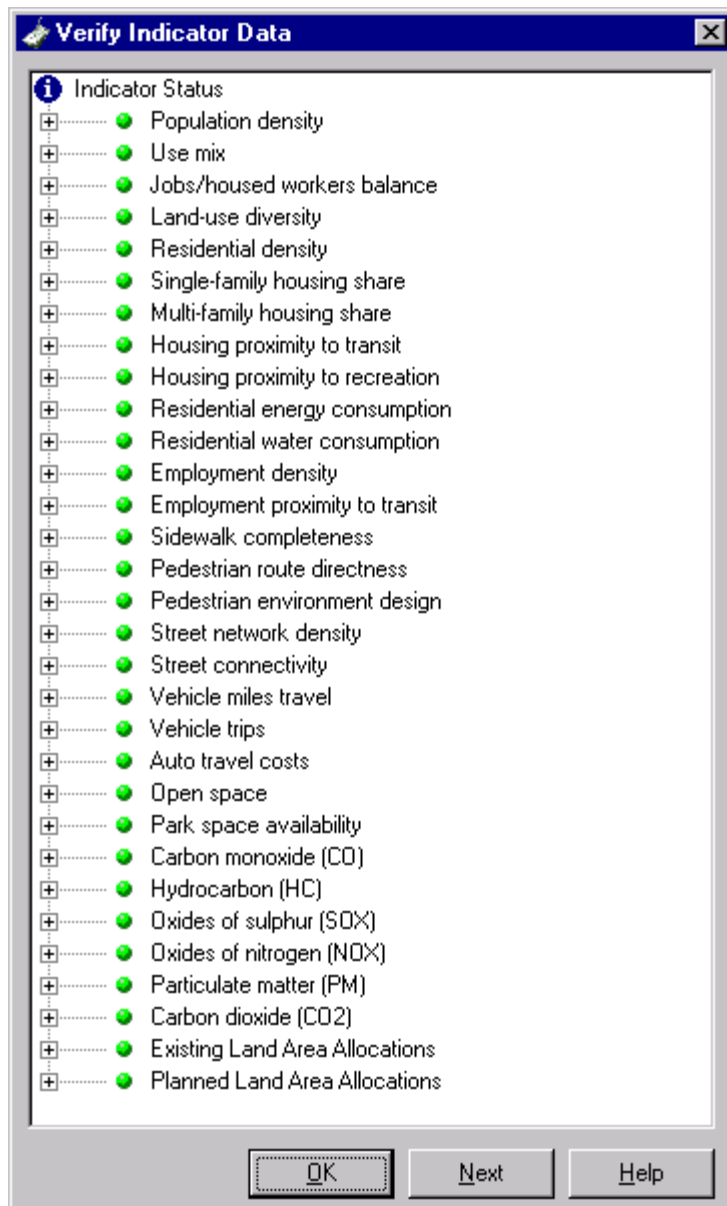
Verify Inputs

The Verify Inputs function determines which indicators are ready to be calculated, based upon the data in the sketch.

The Indicator Status window displays a list of all the indicators. There is a green dot next to indicators which are ready to be calculated. There is a red dot next to indicators which are not ready to be calculated. Clicking the plus sign (+) at an indicator displays the shapefiles required by the indicator. Clicking the plus sign (+) on a shapefile displays the required fields for the shapefile. Shapefiles and fields shown with a black checkmark are configured correctly. Shapefiles and fields shown with a red X are improperly configured or require more data, and will prevent the indicator from running.

Open Verify Inputs

1. Double-click the Apply Model\Verify Inputs node.
2. All indicators should be configured properly, so the window will look like this:

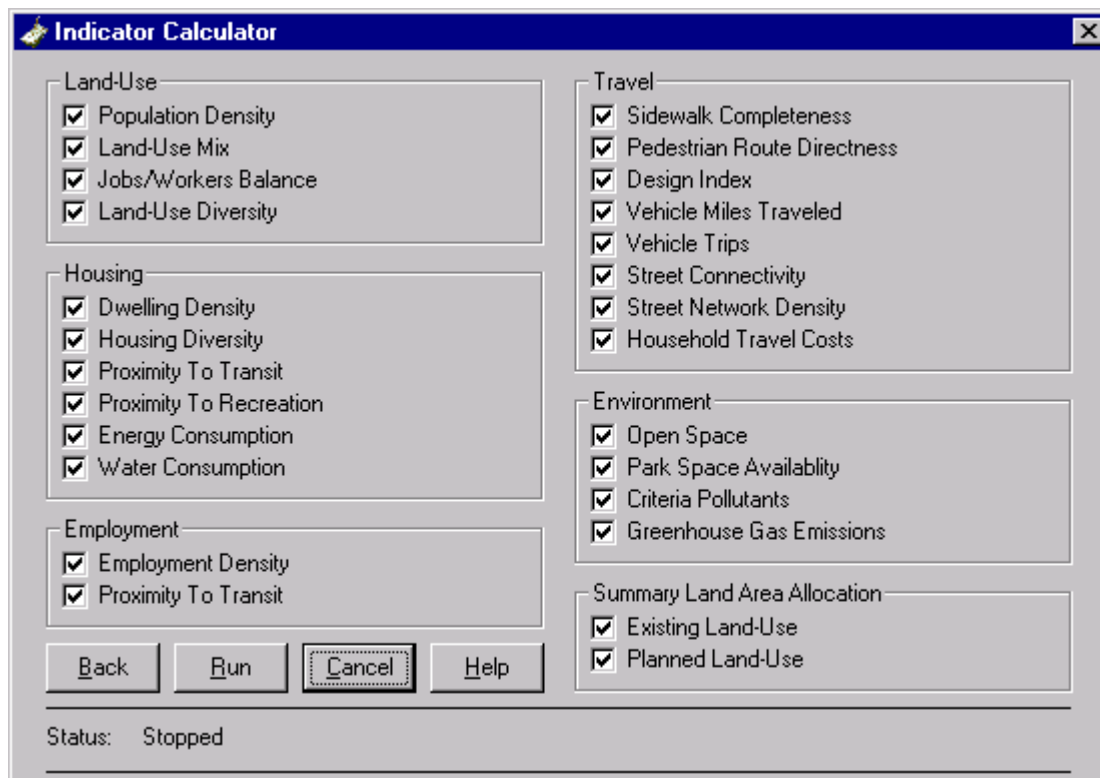


3. Click OK to close this window and move to the next step, Run Model. (For details see *Verify Inputs and Troubleshooting Verify Inputs in the Help file.*)

Run Model\Indicator Calculator

After Verify Inputs, Run Model is the next node on the Sketch tree.

1. Prior to running the indicators, it is recommended that you remove all layers from the map. Go to the Map menu and choose Remove All Layers. If you wish to preserve your current map, go to the Map menu and choose Save Map. After saving the map, remove all the map layers.
2. Double-click the Apply Model\Run Model node. This will open the Indicator Calculator dialog box.



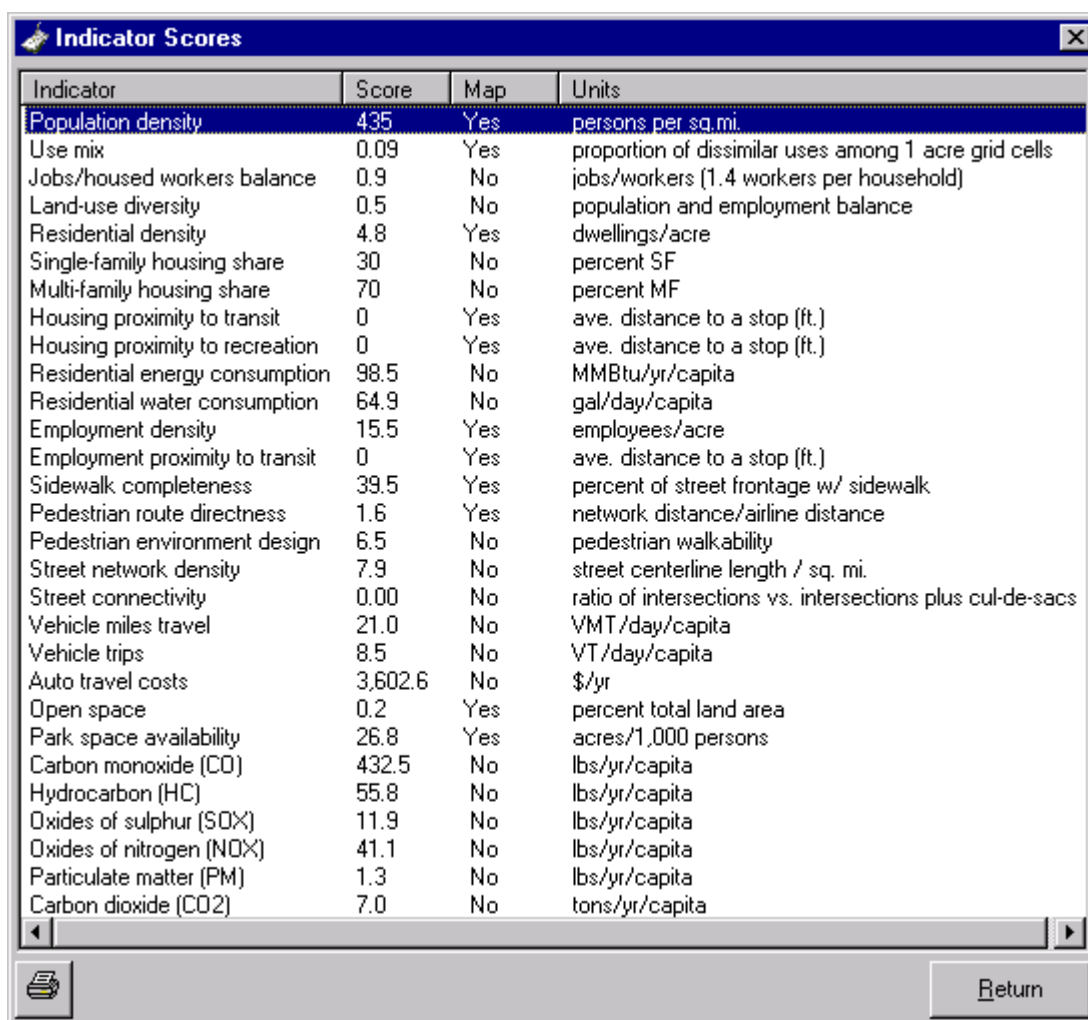
3. The Indicator Calculator dialog box displays all indicators that can be calculated by model runs. By default, all indicators that can be calculated are checked. If an indicator is unavailable it is because that indicator is configured improperly or requires more data. If an indicator is unavailable you can click Back to return to the Verify Inputs window.
4. To toggle all the available indicators on or off, press CTRL-SHIFT, and then click any indicator check box. To toggle all the available indicators in each grouping, press SHIFT, and then click any indicator check box in that grouping. Individual indicators are toggled on or off by clicking the indicator's checkbox. All indicators should be checked for purposes of this *Getting Started Guide*.
5. Click Run. This will run the model.
6. The Status Indicator at the bottom of the dialog box will display which indicator calculation is running. The Indicator Calculator dialog box will close when all the chosen indicators have been calculated. This process may take several minutes. (*For details see Indicator Calculator and Run Model in the Help file.*)

View The Results

After the model runs, you can analyze the results. Working down the Sketch tree, the next node is Indicators.

View Indicator Scores and Maps

To view the indicator results, double-click the Indicator\Indicator Scores node. The Indicator Scores window opens and displays each indicator by Indicator, Score, Map and Units.



Indicator	Score	Map	Units
Population density	435	Yes	persons per sq.mi.
Use mix	0.09	Yes	proportion of dissimilar uses among 1 acre grid cells
Jobs/housed workers balance	0.9	No	jobs/workers (1.4 workers per household)
Land-use diversity	0.5	No	population and employment balance
Residential density	4.8	Yes	dwellings/acre
Single-family housing share	30	No	percent SF
Multi-family housing share	70	No	percent MF
Housing proximity to transit	0	Yes	ave. distance to a stop (ft.)
Housing proximity to recreation	0	Yes	ave. distance to a stop (ft.)
Residential energy consumption	98.5	No	MMBtu/yr/capita
Residential water consumption	64.9	No	gal/day/capita
Employment density	15.5	Yes	employees/acre
Employment proximity to transit	0	Yes	ave. distance to a stop (ft.)
Sidewalk completeness	39.5	Yes	percent of street frontage w/ sidewalk
Pedestrian route directness	1.6	Yes	network distance/airline distance
Pedestrian environment design	6.5	No	pedestrian walkability
Street network density	7.9	No	street centerline length / sq. mi.
Street connectivity	0.00	No	ratio of intersections vs. intersections plus cul-de-sacs
Vehicle miles travel	21.0	No	VMT/day/capita
Vehicle trips	8.5	No	VT/day/capita
Auto travel costs	3,602.6	No	\$/yr
Open space	0.2	Yes	percent total land area
Park space availability	26.8	Yes	acres/1,000 persons
Carbon monoxide (CO)	432.5	No	lbs/yr/capita
Hydrocarbon (HC)	55.8	No	lbs/yr/capita
Oxides of sulphur (SOX)	11.9	No	lbs/yr/capita
Oxides of nitrogen (NOX)	41.1	No	lbs/yr/capita
Particulate matter (PM)	1.3	No	lbs/yr/capita
Carbon dioxide (CO2)	7.0	No	tons/yr/capita

2. If you double-click an indicator which has a Yes under the Map column, the appropriate map will appear.
3. Click Return to close the Indicator Scores window.

To print a table of indicators, use the printer button in the lower left corner. This produces an Adobe .pdf file and displays it in a file viewer, from which you can save, export, or print to a printer.

Viewing Land Area Allocations

The next node on the Sketch tree is Land Area Allocations. The Land Area Allocations window displays a summary of the land-use for the current sketch. These summaries are calculated when you check Existing Land-Use and Planned Land-Use in the Summary Land Area Allocation section on the Indicator Calculator dialog box.

View Land Area Allocations

1. Double-click the Land Area Allocations node.

The screenshot shows a window titled "Land Area Allocations" with three main sections:

Planned Land-Use Allocations

Use Type	Land-Use	Area(acres)	%
Residential	MF	171	20
Residential	SF	274	33
Res. Subtotal		445	53
Non-Residential	C	219	26
Non-Residential	I	149	18
Non-Residential	P	29	3
Non-Res. Subtotal		397	47
Mixed-Use Subtotal		0	0
Grand Total		842	100

Existing Land-Use Allocations

Land-Use	Area (acr...)	%
COM	49	12
IND	28	7
INST	6	1
MF	24	6
OS	37	9
PARK	7	2
PARKING	5	1
SF	47	11
VAC	207	50
Grand Total	410	100

Existing Housing by Type

Type	DUs	%
SF	175	30
MF	416	70
Total	591	100

At the bottom of the window, there are three buttons: a printer icon, "Return", and "Help".

2. Click Return to close this window.
3. Choose File, Exit to close this sketch and return to the SGI startup screen.

Printing works as described for indicators above.

Compare Snapshot Sketches

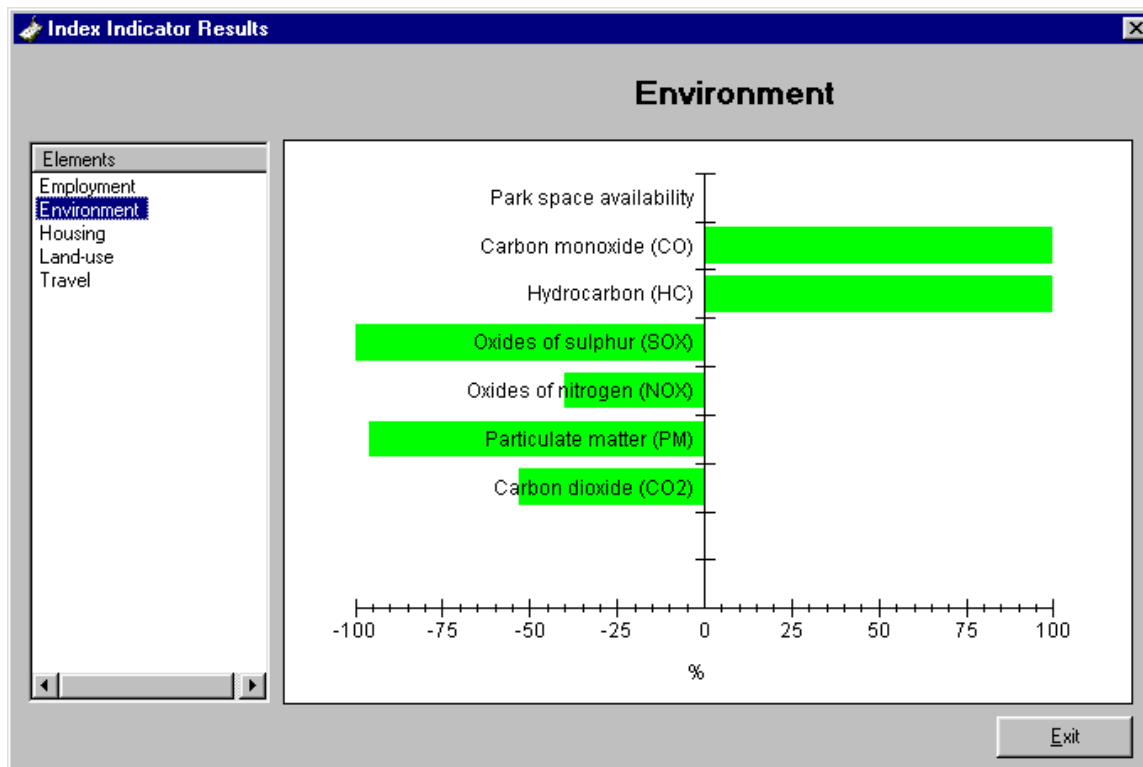
One of SGI's most important features is to compare sketches. The next step is its capability to create a copy of the sketch you created, then compare them.

1. From the SGI startup screen click the Parcel-Based Snapshot Sketch icon. The Sketch Management window will open
2. You must enter a Name, Creator and Description of the new sketch. Enter Copy of Snapshot Test, My Name and Testing Copying, respectively.
3. In the list of Existing Sketches above, click Snapshot Test. Notice that the Copy button is now available.
4. Click the Copy button.
5. Copy of Snapshot Test will now appear in Existing Sketches.
6. Hold the CONTROL key down, and then click Snapshot Test and Copy of Snapshot Test.
7. Click the Compare button. The Sketch Comparison window will appear.

Sketch Comparison Window and Comparison Chart

The Sketch Comparison window is a side-by-side display of indicator results for two snapshot sketches. You can also view the differences displayed graphically with the Comparison Chart. It uses green bars to denote indicator score changes between sketches.

1. Click the Comparison Chart button. The INDEX Indicator Results window will appear.
2. Notice the indicator categories in the Elements box on the left-hand side: Employment, Environment, Housing, Land-Use and Travel. Click each of these to view the comparison chart. Since your two sketches are identical the chart will not display any differences. Here is an example of a chart that does display differences in environment indicators:



3. Click Exit to return to the Sketch Comparison window.

4. Click Return to return to the Sketch Management window.
5. Click Return to return to the SGI startup window.

(For details see Compare Snapshot Sketches in the Help file.)

Forecast Sketch

The second type of sketch that can be created by SGI is a forecast sketch. In contrast to a snapshot sketch that represents a single point in time, forecast sketches are dynamic simulations of change over a future time period. Another primary difference between snapshot and forecast sketches is that instead of parcels as the basic geographic reference unit, forecast sketches use a uniform grid of cells for geographic calculations.

Create a Sketch

1. From the initial SGI startup window, click the Grid-Based Forecast Sketch icon. The Sketch Management window will appear.
2. Enter Forecast Test in the Name text box, My Name in the Creator text box, and My Name's Test in the Description text box.
3. The New button will become active. Click it.
4. Click Open to open the new sketch.

Develop a Sketch

The forecast sketch you created should now be open. The Sketch tree of a forecast sketch contains Sketch Shapefiles, Sketch Area, User-Defined Parameters, Apply Model, Indicators and Database nodes. If this sketch is not open, go to the Sketch Management window for forecast sketches and open your sketch.

Just as with snapshot sketches, the Sketch tree for forecast sketches is designed to organize your data and create a logical workflow. The intention is that you start at the top of the tree and work down, from Sketch Shapefiles to Indicators. The Database node is at the bottom of the tree. It contains all the shapefiles added to SGI during the database setup.

Adding Shapefiles to the Sketch

Add a shapefile to Planned Land-Use.

1. Collapse the Sketch Area, User-Defined Parameters, Apply Model and Indicators nodes. Expand the Sketch Shapefiles and Database nodes. (Clicking the plus (+) will expand a node, which clicking the minus (-) will collapse a node.)
2. With the Sketch Shapefiles node and Database nodes expanded you can now add shapefiles from the database to this sketch. Under the Database\Planned Land-Use node, click the lu_plan shapefile. Hold the mouse button down, drag it over the Sketch Shapefiles\Planned Land-Use node, and release the mouse button.
3. The shapefile is now in the database. Notice that at this point you do not have to configure the land-use shapefile in the forecast sketch, even though you had to configure it in the snapshot sketch. This is because classification of the land-use shapefile fields is more detailed in a forecast sketch, and you will do it as part of the user-defined parameters.
4. Click the shapefile under the Sketch Shapefiles\Planned Land-Use node and drag it onto the legend pane. Click its checkbox to make it appear as a map layer on the map pane.

Add a shapefile to Housing (note that Forecast sketches do not require Existing Land-Use shapefiles, but instead rely on Housing points).

1. Drag the housing shapefile from Database\Housing to Sketch Shapefiles\ Housing.
2. It will prompt you for configuration. Under Single Family Housing check SF, and under Multi-Family Housing check MF. Click OK.
3. Click the shapefile under the Sketch Shapefiles\ Housing node and drag it onto the legend pane. Click its checkbox to make it appear as a map layer on the map pane.

Add a shapefile to Employment.

1. Drag the emps shapefile from Database\Employment to Sketch Shapefiles\Employment.
2. It will prompt you for configuration. Under Retail Employment check Retail, under Service Employment check Service, and under Other Employment check Other. Click OK.
3. Click the shapefile under the Sketch Shapefiles\Employment node and drag it onto the legend pane. Click its checkbox to make it appear as a map layer on the map pane.

Add two shapefiles to Travel.

1. Drag the st_apt (street centerlines) shapefile from the Database\Travel node to the Sketch Shapefiles\Travel node.
2. It will prompt you for configuration. Under Local Streets choose Local, under Arterials choose Arterial, and under Freeways choose Freeway.
3. Drag the tranrte (transit routes) shapefile from the Database\Travel node to the Sketch Shapefiles\Travel node. It does not require any setup.
4. Click both the shapefiles under the Sketch Shapefiles\Travel node and drag them onto the legend pane. Click its checkbox to make it appear as a map layer on the map pane.

Add a shapefile to Constraints (an agricultural soil coverage is used as an example constraint that would prohibit development in certain areas).

1. Drag the agsoil shapefile from the Database\Constraints node to the Sketch Shapefiles\Constraints node.
2. It will prompt you for configuration. Click both A and B, the soil types used as constraint fields.
3. Click OK.

4. Click the shapefile under the Sketch Shapefiles\Constraints node and drag it onto the legend pane. Click its checkbox to make it appear as a map layer on the map pane.

Add a shapefile to Incentives (a brownfield coverage is used as an example incentive where redevelopment would be encouraged).

1. Drag the bwnfld (brownfield) shapefile from the Database\Incentives node to the Sketch Shapefiles\Incentives node.
2. It will prompt you for configuration. Click the MF box under Zone. Using the Weight Adjustment slider change the weight to 125 percent. Click OK. *(For more information see Incentives (Forecast) in the Help file.)*
3. Click the shapefile under the Sketch Shapefiles\Incentives node and drag it onto the legend pane. Click its checkbox to make it appear as a map layer on the map pane.

If you think that you configured a shapefile incorrectly when you added it to the sketch you can check it by double-clicking it in the Sketch tree. For example, if you double-click Sketch Shapefiles\Incentives\bwnfld, the shapefile configuration dialog box will appear again. *(For more information see Configuring Shapefiles in the Help file.)*

Saving\Loading Maps and Saving Default Shapefile Legends



Now that you have added the shapefiles to this sketch you can work with the maps just as you did in the snapshot sketches. You can save and load maps, save default shapefile legends, create unique values for symbolizing data, and change colors for each value.


Define Sketch Boundary

The next step is to create a sketch boundary. Once you have selected a sketch boundary for your forecast sketch SGI will use this boundary to create the gridded cells that will be used for the growth allocation and indicator calculations.

You will use the LU_PLAN shapefile to define the sketch boundary. First, make sure the LU_PLAN shapefile is on the map. If it is not, drag it to the legend pane. Any other shapefile that will be useful in identifying the sketch boundary should also be added. For our test project, no other shapefiles are required.

Define a Sketch Area Boundary

1. Expand the Sketch Area node and double-click the Sketch Boundary sub-node. The Sketch Area Boundary dialog box will open. This allows you to add features incrementally to the sketch area boundary.
2. Select the features that define the study area boundary. Click the Select Features Tool icon on the toolbar. 
3. Click on the selection tool that will enable you to select the desired features. The tools include a point, a line, a rectangle and a polygon. 
4. All the tools allow you to select any kind of shapefile, but some tools make it easier to choose a larger or smaller area. You will use the Polygon tool (second from the right). Click it now.
5. You may need to change the order of layers on the legend pane. A layer can be active but invisible on the map because it is beneath another layer, and this could make it difficult to see what you are selecting.

6. If the LU_PLAN layer is not on top of the other map layers, click the layer in the legend pane and drag it to the top. (See *Arranging Shapefiles in the Help file for more details.*)
7. You can choose features from the active layer only, so this is why it is important to make the LU_PLAN layer active. A layer is active if it appears with raised edges on the legend pane. Single-click a layer to make it active.
8. To select features for your sketch, you will click-and-drag over them. Put the cursor in the upper left corner of the map pane, click the left mouse button, and drag towards the middle. Drag so that the polygon surrounds the LU_PLAN layer, and then release the mouse button. You will see that the selected features in the active layer have changed to yellow.
9. If you want to try again, or you made a mistake while dragging, click the Clear icon.  You can then create a new sketch boundary.
10. Now that you have selected features, click Add Features on the Sketch Area Boundary dialog box. These features are added to the sketch boundary. When working with your data you may be adding features from multiple layers, and using the Add Features button repeatedly. For this *Getting Started Guide*, however, you are selecting features from only one layer.
11. Click Next on the Sketch Boundary dialog box. The Grid Cells dialog box will open.

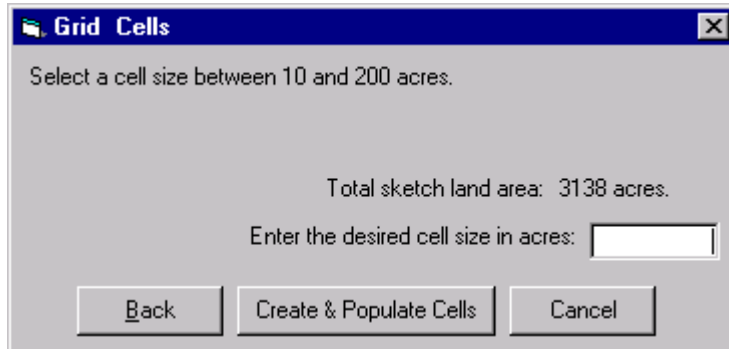
Set Cell Size

Now that you have created the sketch boundary, the next step is to set the size of the cells that will be created within that boundary. Information from shapefile features inside the sketch boundary will be populated in the cells.


You may select a cell size of between 10 and 200 acres. Ten acres is a minimum, intended to keep the model at a sketch level of analyses, whereas 200 acres is considered a maximum that will produce sufficient spatial detail and results. Once you select the cell size, the model automatically measures the acreage of each land-use class within each cell.

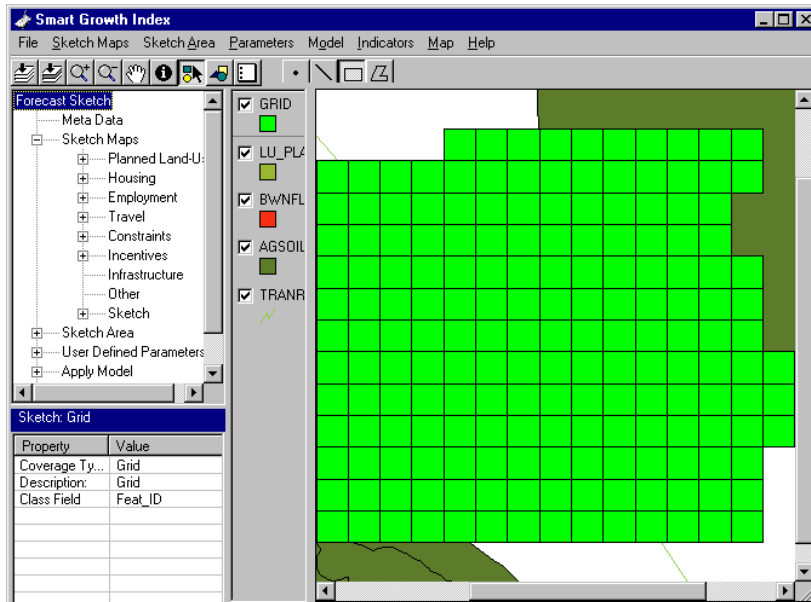
Choose Cell Size


1. If the Grid Cells dialog box is not open, double-click the Sketch Area\Sketch Grid node. The Grid Cells dialog box will open.

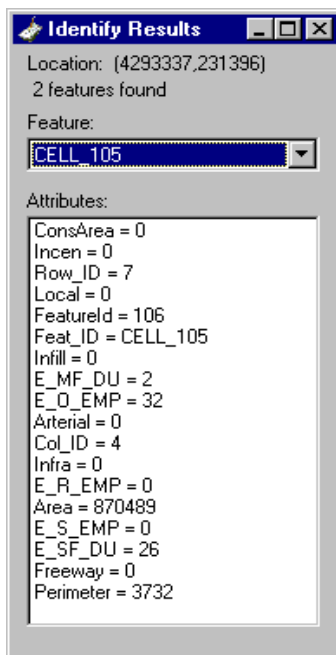


2. In the text box, enter 20 as your desired cell size in acres. Click Create and Populate Cells to create the cells.
3. The Grid Cells dialog box will close when SGI has finished creating the grid and populating the cells.
4. A new shapefile call Grid will appear under the Sketch Shapefiles\Sketch node. Drag the file to the legend pane to view it on the map.

- Click the Active Layer Extent icon  (second from the left on the toolbar), to view the extent of the grid on the map pane.



- Click the Identify icon , and then click any cell on the grid. The Identify Results dialog box will appear:



Configuring User-Defined Parameters

Now that you have created the sketch boundary and grid, the next step is to configure the user-defined parameters in the Population, Land-Use, Transportation and Resources and Emissions nodes.

Population

You must enter several population and employment estimates for a sketch. The estimates are required for each interval year up to a horizon year (maximum 20 years). The population forecast requires total population as well as single-family dwelling units and multi-family dwelling units. The employment forecast requires that the employment projections be categorized as retail, service or other.

Regional Population

1. Double-click the User Defined Parameters\Population node. The Population dialog box will appear.
2. Enter 75000 for Commuteshed Population.
3. The commuteshed population is the population within a 40-mile radius of the sketch boundary and is assumed to contain 95 percent of sketch area travel. It is used in the transportation submodel's estimation of trip distribution.
4. Select <50,000 for Urban Size (Region). This information is used to set default values for household profiles (number of vehicles by persons per household), mode choice, and trip production rates.

Sketch Area Population

1. Click the Sketch Area Population tab.

The base year sketch area population totals displayed in this dialog box come from the housing and employment shapefiles in your sketch. Information from the housing shapefile is used for dwelling units and population; and information from the employment shapefile is used for retail, service, and all other employment.

The base year population estimate is based on the existing dwelling unit count multiplied by 2.2 persons per household. This is a general benchmark against which you can compare your data. It will not be used for actual calculations. When SGI runs indicators it will use the current year's persons per household (population\total dwelling units) to calculate indicators.

Using the Growth Table

1. Enter 2000 in the Base Year text box.
2. Enter 2 in the No. of Years text box. This is the number of years beyond the base year that SGI will forecast growth.
3. Click the Build Growth Table button. The Growth Table will appear below.
4. Enter the data as shown here:

The screenshot shows a dialog box titled "Population" with a tab for "Sketch Area Population". The dialog displays the following information:

Base Year Sketch Area Population Totals

Dwelling Units: 1072 Service Employment: 168
 Retail Employment: 306 Other Employment: 264

Base year population estimate based on the existing dwelling unit count and 2.2 persons/household: 2358

Base Year: No. of Years:

Year	Population	SF DUs	MF DUs	Retail Emps.	Service Emp.	Other Emps.
2001	2500	700	380	350	175	325
2002	2700	800	480	400	200	350

At the bottom of the dialog are buttons for "OK", "Cancel", "Apply", and "Reset".

5. After entering the last value, click an arrow key or the tab key to update the value.
6. Click OK to accept these settings and close the Population dialog box. (*For details see Population in the Help file.*)

Land-Use

Now that you have entered the population data for a sketch, the next step is to set land-use densities. These density settings control how much growth can be allocated to a cell, based on planned land-use type.

Open the Land-Use Dialog Box

1. Double-click the User Defined Parameters\Land-Use node. The Land-Use dialog box will open. You must set land-use densities for each of the land-use types. (Except for P (parks), as explained later.)

Assign Land-Use Types for C (commercial)

1. Click C in the land-use type box. Set the use type to Mixed-Use by clicking the Mixed-Use option button. Set the densities and types as shown here:

The screenshot shows the 'Planned Land-Use' dialog box. On the left, a list of land-use types includes 'C', 'I', 'MF', 'P', and 'SF', with 'C' selected. Below the list are four radio buttons: 'Residential', 'Non-Residential', 'Mixed-Use' (which is selected), and 'Non-Buildable'. To the right of the dialog, there are three sections: 'Residential', 'Non-Residential', and 'Mixed'. The 'Residential' section contains 'Maximum Density (DU/ac): 20' and 'Infill (Max. %): 90', with radio buttons for 'Single Family', 'Multi-Family', and 'Both' (selected). The 'Non-Residential' section contains 'Maximum Floor Area Ratio: 2' and 'Floor Area (sq. ft.) / Employee: 400'. The 'Mixed' section contains 'Non-Res Floor Area (sf.ft.)/DU: 1000'. At the bottom right, there are four buttons: 'Reset', 'OK', 'Cancel', and 'Apply'.

Assign Land-Use Types for SF (single family)

1. Click SF in the land-use type box.
2. Choose Residential in the option buttons in the left corner of the dialog box. Notice that your choice here affects which options are active or inactive on the right side of the dialog box (Residential, Non-residential or Mixed-Use).
3. In the Residential box on the right, enter 8 for Maximum Density, 90 for Infill, and choose the Single Family option button.

Assign Land-Use Types for MF (multi-family)

1. Click MF in the land-use type box.

2. Choose Residential in the option buttons in the lower-left corner of the dialog box
3. In the Residential box in the upper-right corner, enter 25 for Maximum Density, 90 for Infill, and choose the Multi-Family option button.

Assign Land-Use Types for I (industrial)

1. Click I in the land-use type box.
2. Choose Non-Residential in the option buttons in the lower-left corner of the dialog box.
3. In the Non-Residential box on the right of the dialog box, enter 2.0 for Maximum Floor Area Ratio, and 800 for Floor Area (sq. ft.)\Employee.

Assign Land-Use Types for P (park)

1. Choose Non-Residential in the options buttons in the lower left corner of the dialog box.
2. For non-developable land-use types, there is no need to set land-use densities.
3. Click OK to close the dialog box.

Transportation

Now that you have entered the necessary information for the population and land-use parameters, the next step is to define transportation parameters.

Open the Transportation dialog box.

1. Double-click the Transportation node. The Transportation dialog box will open.

Household Profiles

1. Click the Household Profiles tab. The Household Profiles dialog box contains national default percentages of household size and number of vehicles owned based upon urban area size. You

may modify the defaults with local data for the sketch boundary as long as row and column matrix totals equal 100 percent.

2. For purposes of this *Getting Started Guide* you will not change this information.

Mode Choice

1. Click the Mode Choice tab. The Mode Choice dialog box is used to assign person-trips to auto driver, auto passenger, walk\bike, or transit modes.
2. SGI uses population and average distance to transit data, as well as the presence or absence of regional commuter rail, to adjust mode split default values from national averages. For purposes of this *Getting Started Guide* you will not change this information.

Trip Generation

1. Click the Trip Generation tab. The Trip Generation dialog box displays the number of person-trips generated (produced and attracted) by each household within the sketch boundary. Defaults are provided for daily person-trips by household size and number of vehicles owned, based on the Nationwide Personal Transportation Survey. For purposes of this *Getting Started Guide* you will not change this information.
2. Click OK to close the Transportation dialog box.

Mode Performance

The Mode Performance dialog box displays changes in the relative performance characteristics of transit, high occupancy vehicle, and drive-alone modes. You can specify either real or hypothetical modal travel time and trip costs.

The base year and number of forecast years displayed in the left column are from the growth table you built on the Sketch Area Population dialog box. For each year displayed you must enter data for VTT (average travel time in vehicle minutes), OVTT (average walk, wait, transfer time in minutes), and COST (average trip cost, including parking in dollars).

1. Click the Mode Performance tab. Enter data as shown below.

Transportation

Household Profiles Mode Choice Trip Generation

Mode Performance Level of Service Street Centerlines

Year	Auto			HOV			Transit		
	VTT	OVTT	Cost	VTT	OVTT	Cost	VTT	OVTT	Cost
2001	10	3	8	10	1	3	20	10	1.5
2002	11	3	9	11	1	4	22	10	1.5

VTT - average travel time in vehicle in minutes.
 OVTT - average walk, wait, transfer time in minutes.
 Cost - average trip cost including parking in dollars and cents.

OK Cancel Apply Reset

2. Click the text box you want to edit, then enter your data. Use the mouse, arrow keys or the Enter key to move between the boxes. Do not use the tab key.

Level of Service

The Level of Service dialog box displays percentages of actual or estimated average level of service ratings for arterials and freeways within the sketch boundary. These ratings are used to estimate congestion and vehicle hours of delay.

1. Click the Level of Service tab. Enter the data like this:

Transportation

Household Profiles Mode Choice Trip Generation
Mode Performance **Level of Service** Street Centerlines

Percent of street type by average level of service.

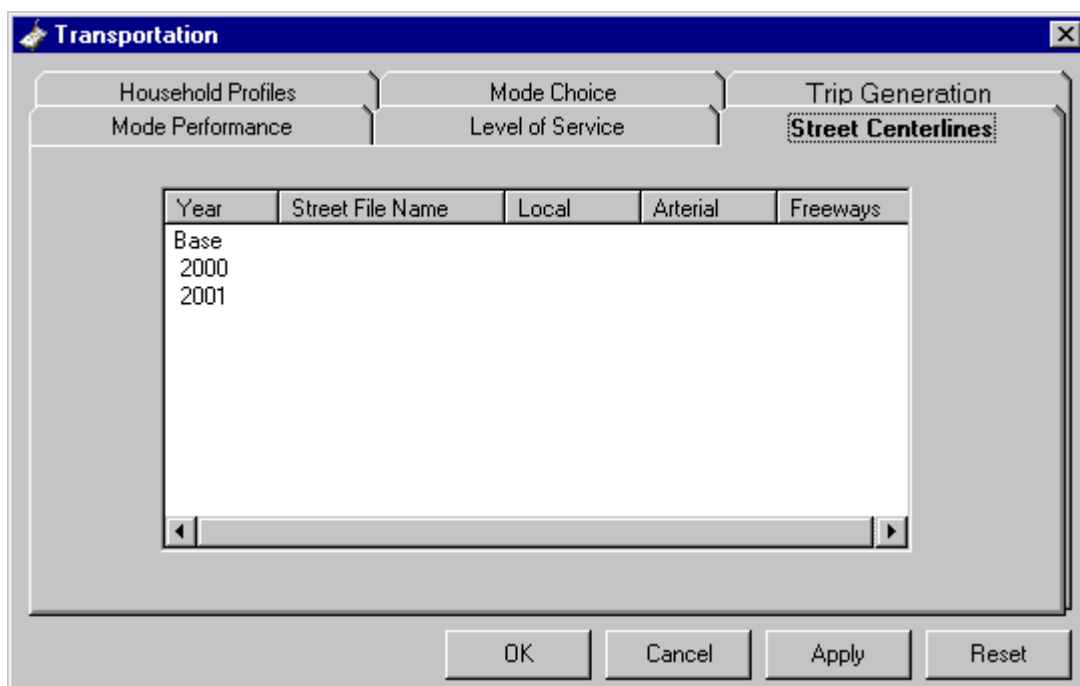
Street Type	A	B	C	D	E	F
Arterial, On Peak	10	10	10	50	10	10
Freeway, On Peak	10	10	50	10	10	10

OK Cancel Apply Reset

Street Centerlines

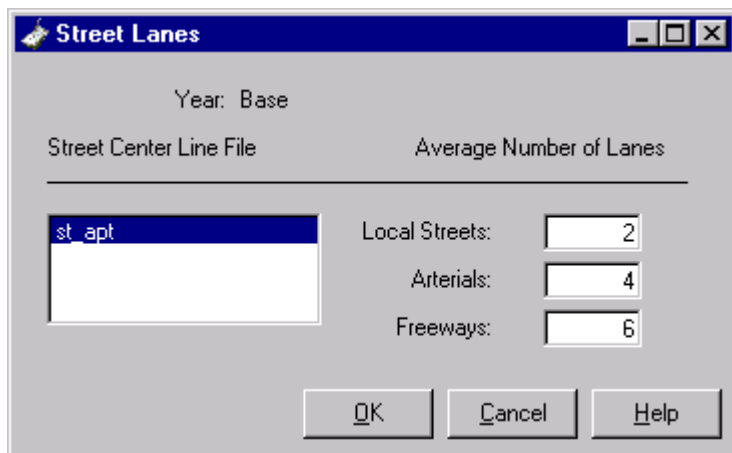
The Street Centerlines dialog box is used to assign attributes to street centerline files within your sketch boundary, in order to describe existing street networks and expansion of those networks in future interval years. The model requires future street alignments in order to gauge changing accessibility conditions for future land-uses. The base year and number of forecast years are from data you entered in the Sketch Area Population dialog box.

1. Click the Street Centerlines tab. The Street Centerlines dialog box will appear.



2. Under the Year column, double-click the word Base. The Street Lanes dialog box will appear.
3. Click st_apt.

4. Enter the average number of lanes in the Local Streets, Arterials and Freeways text boxes as shown below:



5. Click OK to accept your entries and return to the Street Centerlines dialog box.
6. Repeat for the next years (2000 and 2001) in Year column.
7. Click the OK button.

Street Lines

Click the file in the Street Centerline file window that corresponds to the street alignment for the current year. In our test sketch we will use the same file for all years.

Residential Resources and Emissions

Now that you have entered the necessary data for the population, land-use, and transportation parameters, the next step is to define residential resource and emission parameters. These are divided into energy, transportation, emissions, and water categories. Each category is populated with default data, which we will use for purposes of this *Getting Started Guide*. (See *Resources and Emissions in the Help file for more information.*)

Energy

1. Click the User Defined Parameters\Resources & Emissions node. The Resources and Emissions dialog box will open.
2. Click the Energy tab.
3. Choose the Under 2k CDD, 5.5k-7kHDD option button. Notice that the MMBtu\DU\yr text box will change on the right. Use this value, as well as the default values under % Electricity and % Natural Gas.
4. *Climate Zone Note:* When you use your own data you will need to view the U.S. Climate Zone Map to determine your area's climate zone. (See Resources and Emissions in the Help file for more information.)

Transportation

1. Click the Transportation tab.
2. Transportation coefficients include estimated light vehicle fuel efficiency in miles per gallon, and estimated light vehicle operating expense in dollars per mile. Use default data for purposes of this *Getting Started Guide*. Defaults are national averages based on USDOE data.

Emissions

1. Click the Emissions tab.
2. Emission coefficients are based on building energy consumption and light vehicle fuel consumption. Use default data for purposes of this *Getting Started Guide*. Defaults are national averages based on USEPA data.

Water

1. Click the Water tab. Water usage is expressed in gallons per household per day. Use default data for purposes of this *Getting Started Guide*. Defaults are national averages based on American Water Works Association (AWWA) data.
2. Click OK to close the Resources and Emissions dialog box. (*For more details see Resources and Emissions (Forecast) in the Help file.*)

The next node on the sketch tree is Apply Model, and you will work down to its sub-nodes.

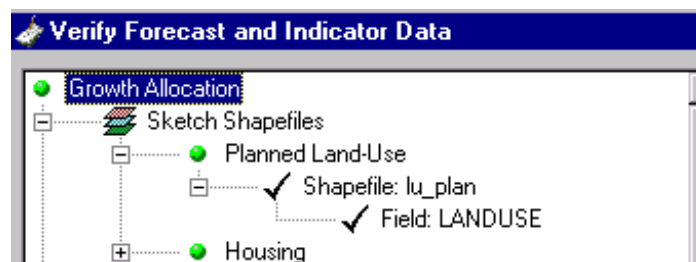
Run the Model

The next step is to verify that your data and shapefiles are sufficient to run the model.

Verify Forecast and Indicator Data

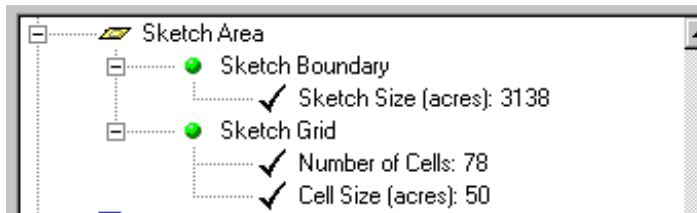
Growth Allocation

1. Double-click the Apply Model\Verify Inputs node.
2. The Verify Forecast and Indicator Data window will open
3. There should be a green dot to the left of Growth Allocation. This indicates that everything is defined properly for the growth allocation to run. This includes necessary shapefiles, a sketch area and user-defined parameters.
4. Expand the Sketch Shapefiles\Planned Land-Use\Shapefile node, inside the Verify Forecast and Indicator Data window. Notice that it indicates that the lu_plan shapefile is in the sketch and that the LANDUSE field has been properly classified.



Sketch Area

1. Expand the Sketch Area\Sketch Boundary and Sketch Area\Sketch Grid nodes. Notice that the Sketch Boundary node displays the sketch size (in acres) of your sketch boundary, and that the Sketch Grid node displays the number of cells and cell size (in acres) of your grid.

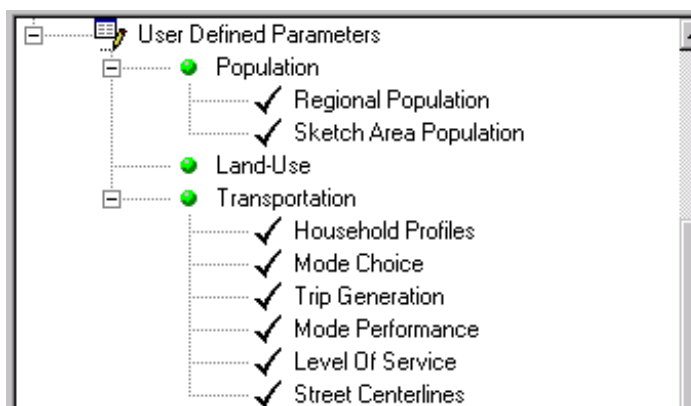


User Defined Parameters

1. Expand the User Defined Parameters\Population and User Defined Parameters\Transportation nodes

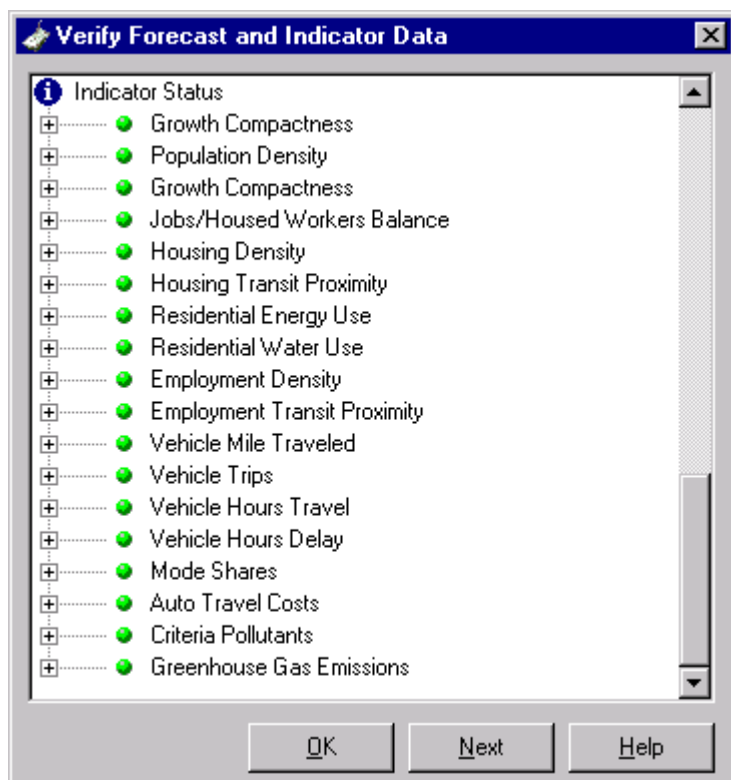
These nodes indicate whether the population, land-use and transportation parameters have been defined. There should be a green dot to the left of these nodes, since everything should be defined properly.

Notice that there is no Resources and Emissions node. This is because this data is optional, and SGI can perform a growth allocation without it:



Indicator Status

1. Look at the indicators under the Indicator Status node. There should be a green dot to the left of all of them, since they should all be configured properly.



(For more information about each of the indicators see Indicators (Forecast) in the Help file.)

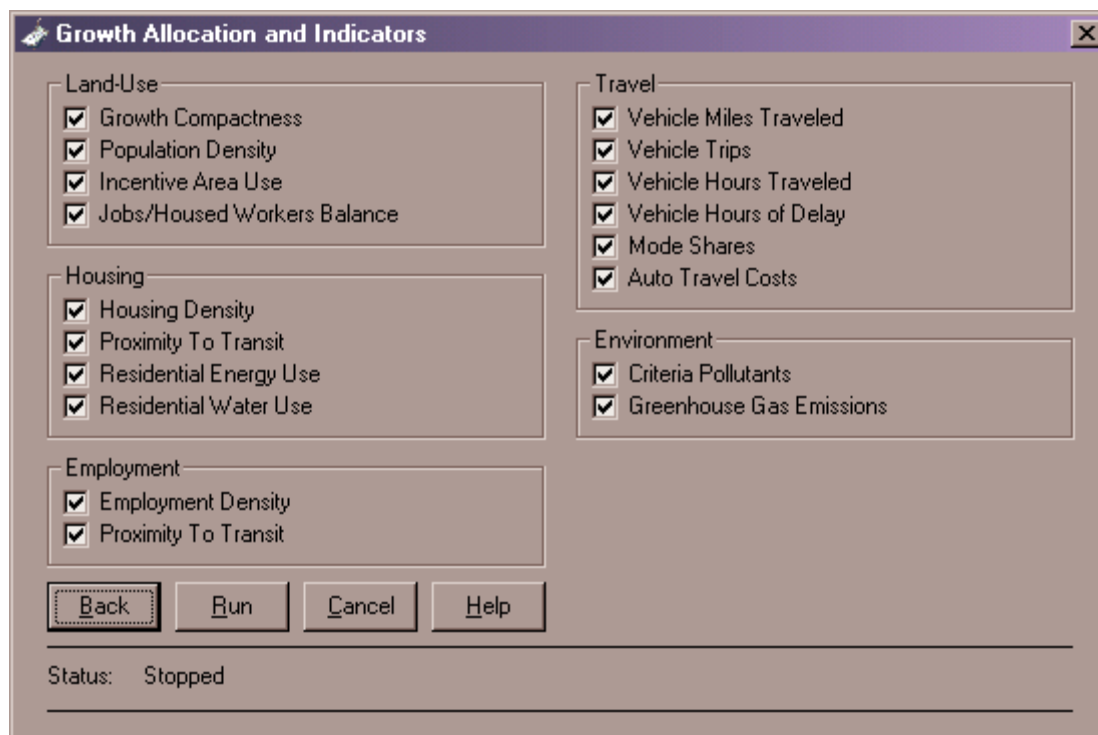
2. Click OK to close the window. *(For more information see Verify Inputs (Forecast) in the Help file.)*

Run Model

Now that you have verified that the forecast and indicator data are all valid, the next step is to choose which indicators to run.

1. Click the Apply Model\Run Model node. This will open the Growth Allocation and Indicators dialog box. By default, all indicators that can be calculated are checked. If an indicator is unavailable it is because that indicator is not configured properly or the required data is not in

the sketch. If an indicator is unavailable you can click the Back button to return to the Verify Forecast and Indicator Data window to see what data is required for the indicator to run.



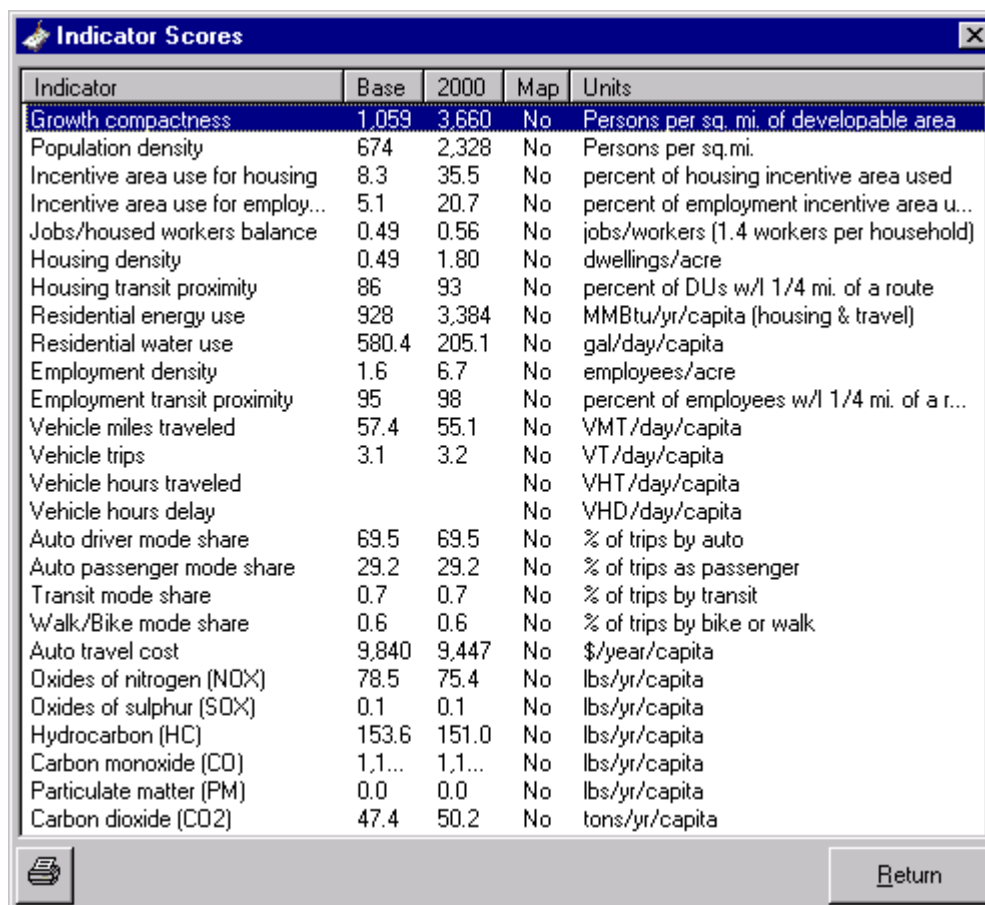
2. For purposes of this *Getting Started Guide* you will calculate all the indicators. Click the Run button. SGI creates the growth allocation first, then calculates the indicators. *(For more information see Growth Allocation in the Help file.)*
3. The status indicator at the bottom of the dialog box will display which indicator is being calculated. The dialog box will close when all the chosen indicators have been calculated. This process may take several minutes or more. *(For more information see Growth Allocation and Indicators and Run Model (Forecast) in the Help file.)*

View The Results

After the model runs, you can view the results. Working down the Sketch tree, the next node is Indicators.

View Indicator Scores and Maps

- To view the indicator results, double-click the Indicator\Indicator Scores node. The Indicator Scores window opens and displays each indicator by Indicator, Score (by year), Map and Units.



Indicator	Base	2000	Map	Units
Growth compactness	1,059	3,660	No	Persons per sq. mi. of developable area
Population density	674	2,328	No	Persons per sq.mi.
Incentive area use for housing	8.3	35.5	No	percent of housing incentive area used
Incentive area use for employ...	5.1	20.7	No	percent of employment incentive area u...
Jobs/housed workers balance	0.49	0.56	No	jobs/workers (1.4 workers per household)
Housing density	0.49	1.80	No	dwellings/acre
Housing transit proximity	86	93	No	percent of DUs w/l 1/4 mi. of a route
Residential energy use	928	3,384	No	MMBtu/yr/capita (housing & travel)
Residential water use	580.4	205.1	No	gal/day/capita
Employment density	1.6	6.7	No	employees/acre
Employment transit proximity	95	98	No	percent of employees w/l 1/4 mi. of a r...
Vehicle miles traveled	57.4	55.1	No	VMT/day/capita
Vehicle trips	3.1	3.2	No	VT/day/capita
Vehicle hours traveled			No	VHT/day/capita
Vehicle hours delay			No	VHD/day/capita
Auto driver mode share	69.5	69.5	No	% of trips by auto
Auto passenger mode share	29.2	29.2	No	% of trips as passenger
Transit mode share	0.7	0.7	No	% of trips by transit
Walk/Bike mode share	0.6	0.6	No	% of trips by bike or walk
Auto travel cost	9,840	9,447	No	\$/year/capita
Oxides of nitrogen (NOX)	78.5	75.4	No	lbs/yr/capita
Oxides of sulphur (SOX)	0.1	0.1	No	lbs/yr/capita
Hydrocarbon (HC)	153.6	151.0	No	lbs/yr/capita
Carbon monoxide (CO)	1.1...	1.1...	No	lbs/yr/capita
Particulate matter (PM)	0.0	0.0	No	lbs/yr/capita
Carbon dioxide (CO2)	47.4	50.2	No	tons/yr/capita

Indicator	Score	Map	Units
Population density	2,801	Yes	persons per sq.mi.
Use mix	0.43	Yes	proportion of dissimilar uses among 1 acre grid cells
Jobs/housed workers balance	0.38	No	jobs/workers (1.4 workers per household)
Land-use diversity	0.51	No	population and employment balance
Residential density	8.5	Yes	dwellings/acre
Single-family housing share	27	No	percent SF
Multi-family housing share	73	No	percent MF
Housing proximity to transit	879	Yes	ave. distance to a stop (ft.)
Housing proximity to recreation	732	Yes	ave. distance to a park (ft.)
Residential energy consumption	98.4	No	MMBtu/yr/capita
Residential water consumption	120.1	No	gal/day/capita
Employment density	7.3	Yes	employees/acre
Employment proximity to transit	1,149	Yes	ave. distance to a stop (ft.)
Sidewalk completeness	48.9	Yes	percent of street frontage w/ sidewalk
Pedestrian route directness	1.5	Yes	network distance/airline distance
Pedestrian environment design	6.5	No	pedestrian walkability
Street network density	21.4	No	street centerline length / sq. mi.
Street connectivity	0.83	No	ratio of intersections vs. intersections plus cul-de-sacs
Vehicle miles travel	21.0	No	VMT/day/capita
Vehicle trips	8.5	No	VT/day/capita
Auto travel costs	3,602.6	No	\$/yr
Open space	8.7	Yes	percent total land area
Park space availability	6.1	Yes	acres/1,000 persons
Carbon monoxide (CO)	432.5	No	lbs/yr/capita
Hydrocarbon (HC)	55.8	No	lbs/yr/capita
Oxides of sulphur (SOX)	11.9	No	lbs/yr/capita
Oxides of nitrogen (NOX)	41.1	No	lbs/yr/capita
Particulate matter (PM)	1.3	No	lbs/yr/capita
Carbon dioxide (CO2)	7.0	No	tons/yr/capita

- If you double-click an indicator, which has a Yes under the Map column, the appropriate map will appear.
- Click Return to close the Indicator Scores window.

Comparing Forecast Sketches

Before we can compare the two sketches we need to run the model with the new sketch.

1. Open the new sketch.
2. Click Apply Model.
3. Double-click Run Model.
4. Click Run.
5. After the model has completed running, close it and return to the sketch management window.

Sketch Comparison Window

Now that you have two sketches you can compare them.

1. Hold the CONTROL key down and click both sketches.
2. Click the Comparison button. The Sketch Comparison Window will appear.
3. Notice that it lists each sketch, the indicators, units for the indicators, and whether or not you can view a map for a particular indicator.
4. Click the word Yes for one of the indicators.
5. The map will appear. Since your sketches are copies the maps will be identical, or nearly identical. Click ALT + F4 to close the map.
6. Repeat for other indicators.
7. In the Sketch Comparison window click Return to close and return to the Sketch Management window.

(For details see Comparing Forecast Sketches in the Help file.)

After the Getting Started Guide

Removing Shapefiles After Running the *Getting Started Guide*

Now that you have finished the *Getting Started Guide* you may want to remove the sample data from your database. From the SGI startup screen, choose the Database icon. Remove the lu_plan shapefile under Planned Land-Use, par_apt under Existing Land-Use, housing under Housing, emps under Employment, st_apt, tranrte and transtp under Travel, agsoil under Constraints, and bwnfld under Incentives.

Remove Shapefile

1. Click the shapefile you would like to remove.
2. From the File menu choose Delete.
3. The shapefile will be removed from the database. However, it is still in the sketch you created. You can delete the sketches from the Sketch Management window. *(For details see Depopulating the Database and Overview (Sketch Management) in the Help file.)*

Delete Sketch

1. From the SGI startup screen, click the Parcel-Based Snapshot Sketch icon. This loads the Sketch Management window.
2. Highlight the sketch you created (*Snapshot Test*).
3. Choose Delete, and then click OK.
4. Close the Sketch Management window.
5. From the SGI startup screen, click the Grid-Based Forecast Sketch icon.
6. Highlight the sketch you created (*Forecast Test*).
7. Choose Delete, and then click OK.