Trade Area Analysis and Site Selection without Customer Data: Part 2

Defining and analyzing trade areas to select the best site

—by Fred L. Miller

Introduction

Problem

Janice Brown and Steven Bent plan to open a new home center in the Minneapolis-St. Paul area. The center, called *Living in the Green Lane*,[1] will offer a variety of environmentally friendly building products, home improvement products, and construction technologies. They have identified their target market as "green consumers"—some motivated by environmental concerns and others seeking savings in energy costs resulting from green technologies (Schaefer 2007). As these customers generally have higher levels of income, education, and home value than the general population in the United States (Kannan 2007), these factors have been chosen to evaluate the market *area* and specific sites.

As *Living in the Green Lane*'s business geographic information system (GIS) analyst, you are working with Janice and Steven to complete the firm's business plan. This process is nearing completion. The business model is clearly defined, the target customers identified, and their distinctive characteristics profiled. In the environmental scanning process, you have identified concentrations of target customers in the Twin Cities area as well as attractive potential locations within it. You also examined *Living in the Green Lane*'s competitive environment by exploring the distribution of shopping centers and competitive home centers relative to the Minneapolis-St. Paul transportation infrastructure.

You will now turn your attention to the final element in the business plan, the selection of a specific location for the company's first store. Janice and Steven are seeking an existing, freestanding retail

[1] The organizations and people in this SpatiaLAB are fictional. Any resemblance to actual individuals or organizations is coincidental.

Keywords: marketing; business GIS; business; site selection; geocoding; market area analysis; geodemographics; demographic

facility of 40,000 to 60,000 square feet. This is a relatively compact size for a home center, but Janice and Steven believe that a smaller store size is consistent with their environmental vision and would serve a smaller but more attractive market area.

Janice and Steven also require ample display and warehousing capabilities and substantial space for parking and outdoor demonstrations. Specifically, they wish to have four or five parking spaces per 1,000 square feet of retail floor space. They plan to convert the facility to a green building with green parking. This would illustrate the benefits of their business concept and create a comparatively modest footprint for a retail site, improving opportunities for replicating the facility in other neighborhoods. These criteria will guide your selection.

Your objective, then, is to recommend a site for the first store and design map documents that support your conclusions and recommendations.

Location

Minneapolis-St. Paul core-based statistical area

Time to complete the lab

Five to seven hours

Prerequisites

An understanding of the importance of trade area analysis and site selection in retail management

Access to Esri Business Analyst™ Desktop Premium 10

Data used in this lab

- Demographic and consumer spending data at various levels of geography
- Major highways and streets
- Business listings
- Shopping center listings

Student activity

Your task in *Trade Area Analysis and Site Selection without Customer Data: Part 1* and *Part 2* is to identify the most favorable location for the first store from a list of available properties supplied by a commercial real estate agency. You must match these sites to the criteria established by Janice and Steven and seek the site with the best location for serving targeted customers and competing successfully. You will use the market area creation and reporting functions of business GIS software to accomplish this task in six steps. The first three steps are covered in part 1 and the last three in part 2:

1. Add the list of available properties to your project and geocode the locations to display them on a map. You will then examine the attributes of each location and identify the ones that meet Janice and Steven's selection criteria.
2. Use customer prospecting and market area functions to compare the locations of available properties with concentrations of attractive customers and the competitive environment of the area.
3. Create equal probability trade areas around competing home centers and create *Market Locator Reports* for each available potential site to explore the competitive environment of each.
4. Create drive-time polygon trade areas around each available property and create a set of reports for each. You will select reports relevant to the enterprise's target customer profile, as well as consumer expenditure and *Tapestry™ Segmentation* lifestyle segmentation patterns in the market area of each qualified location.
5. Use the maps and reports you have created to select the site for the first store offering the most attractive combination of proximity to targeted customers within a favorable competitive environment.
6. Use GIS layout capabilities to design map documents for the business plan report that will support your conclusions and recommendations.

At the conclusion of this lab, you may be required to submit written answers to the questions in this exercise or prepare a written project that covers the site selection decision process in *Trade Area Analysis and Site Selection without Customer Data: Part 1* and *Part 2.*

Conventions used in the data

CBSA Core-based statistical area

CY Current-year data

FY Future-year projections, which are five years beyond the current year

HH Household

Prepare your workspace

This lab uses Business Analyst™ Desktop Premium 10 software to perform the analysis. To prepare for it, you should confirm that this software is available on your workstation.

CREATE DRIVE-TIME TRADE AREAS FOR AVAILABLE SITES AND GENERATE REPORTS

Janice and Steven wish to define the trade area for their *Living in the Green Lane* store using a drive-time approach. They reason that home centers in the market area are located near major highways to maximize their convenience. Drive-time polygons are a more appropriate approach to trade area definition if natural barriers and/or transportation infrastructure are significant factors, as they are here.

In addition, they wish to define compact trade areas. While they believe that *Living in the Green Lane*'s approach creates benefits for which consumers would be willing to drive some distance, they also wish to develop the concept as a local neighborhood resource with a concentrated consumer base. Thus, they wish to use three- and six-minute drive times as the thresholds for drive-time polygons. Using these settings, you will create drive-time polygon trade areas for the available sites and generate reports on their comparative characteristics.

1. If you have not already done so, copy the *LITGL Minneapolis St Paul* project folder to the *C:\My Output Data\Projects* folder on your hard drive.

2. Click *Start » Programs » ArcGIS » Business Analyst » BusinessAnalyst.mxd* to run ArcMap, load *Business Analyst Extension*, and then load *Business Analyst Message Center*.

3. Click *LITGL Minneapolis St Paul* under *Recent Projects* to select this project and load the GIS extension's default map.

4. Click *File* and click *Open*. Navigate to *C:\My Output Data\Projects\LITGL Minneapolis St Paul\CustomData\ChapterFiles\Chapter5\LITGLFirstStore.mxd*. Click the map file to open it.

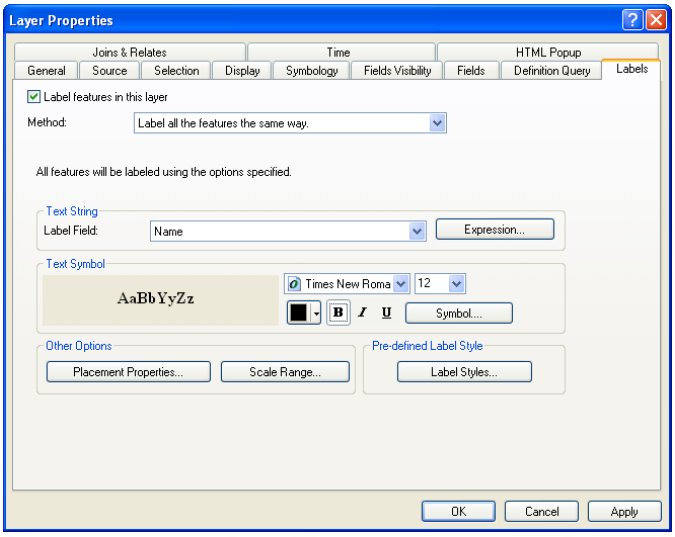
   This map displays several data layers, including some that report the results of previously performed trade area analyses.

   Note the Total Shelter Threshold Rings, Customer Prospecting, Huff Equal Probability, and layers just below the Businesses layer. You will use these layers later in this lab. Note as well that many of the layers in the map are turned off to make the Available Properties layer and the trade areas you will create around it more visible.

5. Right-click the *Available Properties* layer and click *Zoom to Layer*. Open the *Layer Properties* window for this layer. Click the *Labels* tab at the top of the window.

6 Select the *Label features in this layer* option, designate *Name* in the *Label Field* box, and select *Times New Roman* as the font and *12* as the font size. Select the *Bold* option.

The *Layer Properties* window should look like the one below:



7 Click *OK* to close the window, apply the settings, and add the labels to the map.

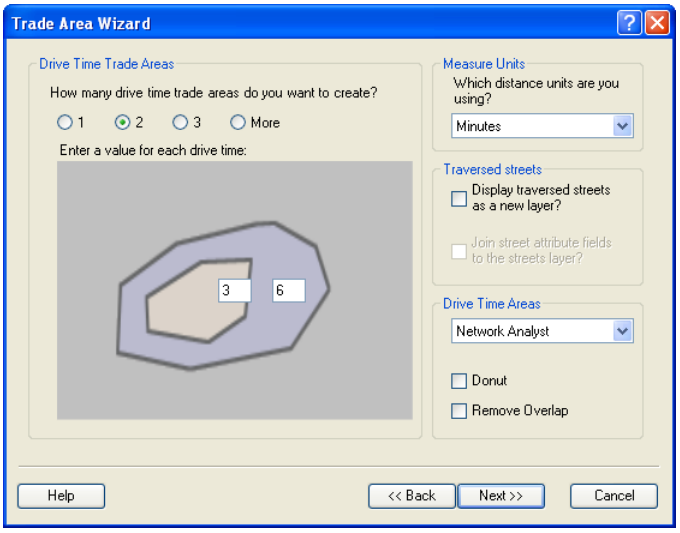
8 Click the drop-down arrow on the toolbar and then click *Trade Area*.

9 Select *Create New Trade Area* and then click *Next*. Select *Drive Time Areas* and then click *Next*. Select *Available Properties* as the store layer and *ID* as the ID field.

This designation will make the reports easier to match with the sites on the map. Select the *All Stores* option and then click *Next*.

10 In the resultant window, select *2* as the number of drive-time trade areas, select *Minutes* in the distance units box, and then enter ***3*** as the value for the inner polygon and ***6*** as the value for the outer polygon.

11 Confirm that *Network Analyst* is selected in the *Drive Time Areas* box and that the window looks like the one below. Click *Next.*



12 In the resultant window, enter ***Available Properties Drive Time Areas*** as the name of the new trade area. Select the *Create Reports* option.

13 Click *Next*, select the *For Individual Features* option, and click *Next* to open the *Report Templates* window.

If your system generates an error message at this stage, click the* Options *button below the templates box on the left side of the screen. In the resultant window, use the drop-down box at the top of the window to select* Standard BA Data *as the layer to summarize and then click* OK*. When given the option to set this as the default layer for reports, click* Yes*. You will return to the* Reports *box with the available report templates listed in the box on the left.

SELECT A REPORT

The *Report Templates* window lists the available report templates in the box on the left.

1 To select a report, simply move it from the box on the left to the box on the right with the arrow keys between the two boxes.

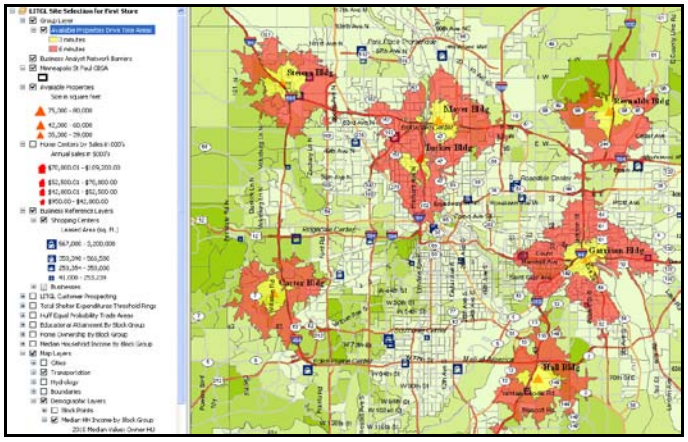
2 Click *Market Profile Report* to select it and then click the right arrow between the boxes to move it to the box on the right and order this report. Click *Next*.

The *Market Profile Report* contains data on all the characteristics of the green consumer profile. Other reports would be more appropriate for different segmentation schemes. Because reports can be very lengthy, it is useful to use the most relevant report(s) as the initial screening tool

and use other reports to gather more detailed information on the sites that remain in contention as the screening process proceeds.

3 In the final window, select only the *View reports on screen* option. (You can export a report to a data file in several formats after your initial reading.) Click *Finish*.

The software creates three- and six-minute drive-time trade area polygons for each available site, calculates the values for the report, adds the trade areas to the *table of contents*, displays them on the map, and opens a window to display the *Market Profile Report* for each of the available sites. Your map should resemble the one below:



The report is displayed in a new window. You may view it there and export it to a format of your choice to have it available for future reference. This report will be your first source of information in selecting a site for *Living in the Green Lane*'s store.

4 Save the map to *LITGLFirstStore2.mxd* in *C:\My Output Data\Projects\LITGL Minneapolis St Paul\CustomData\ChapterFiles\Chapter5* to preserve your work.

Use Maps, Market Profile Report, and Locator Reports to screen available sites

There is no single method for integrating the range of data and maps you have generated into your site selection decision. The following approach focuses on trade area population characteristics, home-related expenditure data, and competitive considerations to identify the most attractive sites. It then uses additional business GIS reports to incorporate more information into the analysis to reach a conclusion and recommendation. You will begin by comparing the population characteristics of the available sites with the characteristics of the green consumer profile.

Remember that green consumers tend to exhibit above-average levels of education, income, and homeownership. The *Market Profile Report* contains data on each of these characteristics for the drive-time polygon trade areas you created for each available site. You will use this data to identify the most attractive locations.

1 Use the data from the *Market Profile Report* to record data on trade area characteristics in the table below. Enter current-year values for the six-minute polygon for each site.

Trade area	Total households	Median HH income	% owning home	% college degree *	Median home value
Garrison 6th Street					
Reynolds Highway 96E					
Mayer 57th Avenue					
Steiers Grove Drive					
Hall Lone Oak Road					
Carter Highway 7					
Tucker Lyndale Avenue					
* % college degree is the sum of the associate, bachelor, and graduate/professional degree percentages					

Table 1: Population characteristics of available trade areas

Question 1: *Compare the values for the available sites. Which sites most closely match the characteristics of the green consumer profile?*

2 Use the data from the *Market Profile Report* to record data on trade area characteristics in the table below. Enter current-year values for the six-minute polygon for each site.

Trade area	HH furnishings expenditures			Shelter expenditures		
	Total $ (millions)	Per HH	Index	Total $ (millions)	Per HH	Index
Garrison 6th Street						
Reynolds Highway 96E						
Mayer 57th Avenue						
Steiers Grove Drive						
Hall Lone Oak Road						
Carter Highway 7						
Tucker Lyndale Avenue						

Table 2: Home-related expenditures in available trade areas

Total $ (millions) reports the total level of spending on this category in the trade area. *Per HH* (household) reports the average spending per household. *Index* compares average household spending in each category to the national average. Thus, an index of 150 means that average spending on the category in the trade area is 50 percent higher than the national average, while a value of 75 means it is 25 percent lower.

Question 2: *Which available properties display the most attractive spending patterns?*

3 Toggle the *Home Centers by Sales Volume*, *Shopping Centers*, and *Huff Equal Probability Trade Areas* layers one at a time to compare them. Note the locations of available properties relative to these features and the transportation infrastructure of the area.

Question 3: *How are available sites positioned relative to shopping centers that attract retail traffic and the transportation infrastructure that facilitates it?*

Question 4: *How are available sites positioned relative to competing home centers and the boundaries of Huff equal probability trade areas?*

The *Home Centers Locator Report* and the *Shopping Centers Locator Report* for the available properties are attached to this lab as appendixes A and B.[2]

Trade area	Attractors Shopping centers within 6 minutes		Competitors Home centers within 10 minutes	
	Number of centers	Number of stores	Number of competitors	Sales $ (millions)
Garrison				
Reynolds				
Mayer				
Steiers				
Hall				
Carter				
Tucker				

Table 3: Shopping center and home center drive-time distances from available sites

Question 5: *Based on the maps and Locator Reports, which sites have the most favorable competitive environment? The most unfavorable? Explain.*

Recall that Janice and Steven wish to purchase a retail facility with 40,000 to 60,000 square feet of floor space with four or five parking spaces per 1,000 square feet of retail space. They are willing to consider larger or smaller facilities if they serve highly desirable trade areas.

4 Right-click the *Available Properties* layer and then click *Open Attribute Table* to view the layer's attributes. Compare the attributes of each site with Janice and Steven's criteria.

Question 6: *Which sites meet the selection criteria?*

Question 7: *Based on population characteristics, home-related expenditures, competitive factors, and site characteristics, which two sites are the most favorable? Explain why.*

[2] The procedures for generating these reports are covered in *Trade Area Analysis and Site Selection without Customer Data: Part 1*.

USE DETAILED REPORTS TO SELECT THE SITE FOR THE FIRST *LIVING IN THE GREEN LANE* STORE

Janice and Steven agree with your conclusion that the Steiers and Carter buildings appear to be the most favorable sites available. They ask you to explore them further and recommend one of the sites. In that process, they ask you to address four questions:

- The Carter site's median age is higher than the Steiers site's, and its average household size is lower. Do these factors reflect differences in the age, employment, and family composition of the two sites? If so, how might these factors affect *Living in the Green Lane*'s sales in these trade areas?
- Are the favorable income, homeownership, and home value characteristics of these sites projected to continue through the next five years? Which site will have the greatest growth in population? In households?
- Both sites have high spending indexes for general home-related expenditures. Is this also true for more detailed categories of expenditures in this area? What implications do these indexes have for *Living in the Green Lane*'s market potential?
- Do the age and household size differences between these two sites reflect underlying differences in lifestyle segments as well? If so, how might these differences affect *Living in the Green Lane*'s marketing strategy in these trade areas?

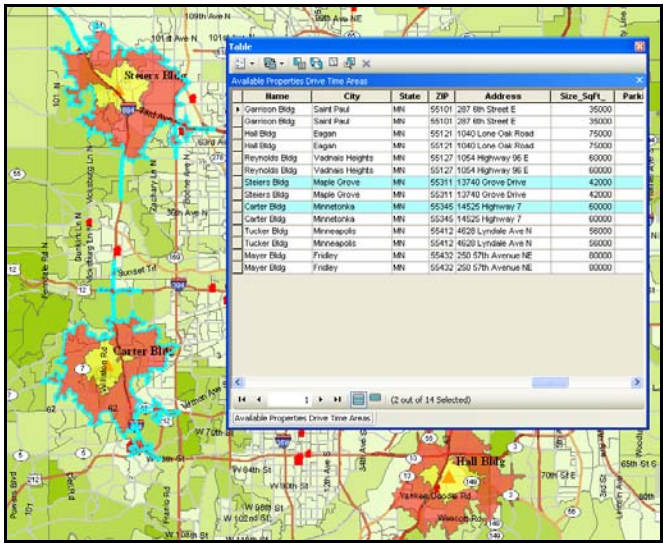
Some of the information you need to answer these questions is available in the *Market Profile Report* you have created. However, you must create additional reports to answer some of the other questions. Specifically, the *Retail Expenditure Report* is necessary for the third question, and the *Tapestry Segmentation Area Profile Report* for the fourth. As you need these reports only for the Carter and Steiers sites, you will select those two trade areas and order the necessary reports for them.

To open the layer's attribute table, right-click the *Available Properties Drive Time Trade Areas* layer and then click *Open attribute table*.

1 Click the small gray boxes to the left of the features with *Area_ID 4.2* and *6.2* to select them.

  These are the six-minute trade areas for the Steiers and Carter sites. When you select them, they will be highlighted in the attribute table, and the corresponding trade areas will be highlighted on the map as well.

Your map should resemble the one below:



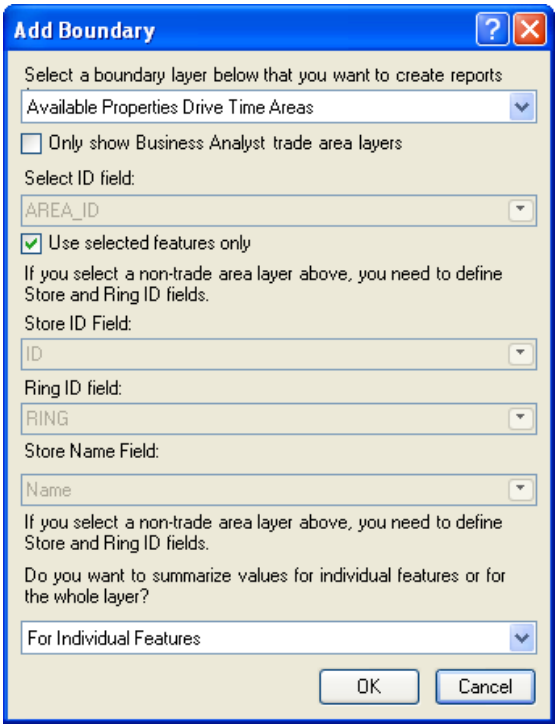
2 Click the drop-down arrow on the toolbar and then click *Reports* to open *Report Wizard*. Click *Run reports* and then click *Next*.

3 Select *Run Summary/Demographic Reports* and click *Next*.

4 In the resultant window, click the *Add Other Polygon Layers* button  to open the *Add Boundary* window.

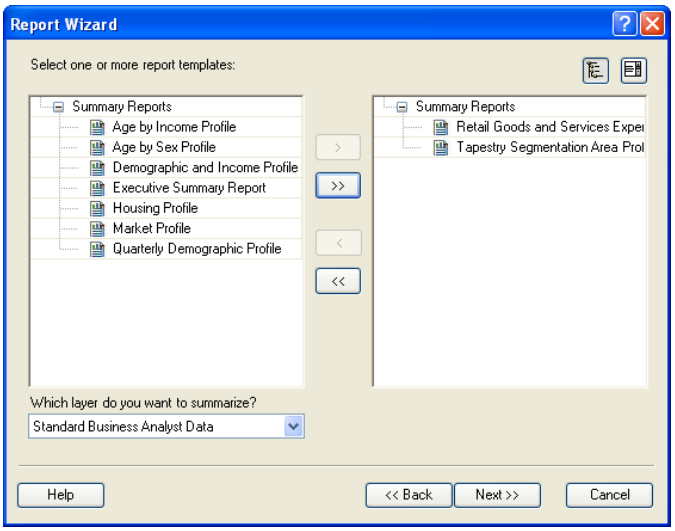
5 Select the *Available Properties Drive Time Trade Areas* layer and confirm that the *Use selected features only* check box is checked and the *For Individual Features* option is selected.

6 When your window resembles the one below, click *OK*.



7 In the resultant window, select the *For Individual Features* option and then click *Next*.

8 In the next window, remove *Market Profile Report* from the selected window and then move *Retail Goods and Services Expenditures Report* and *Tapestry Segmentation Area Profile* from the box on the left to the box on the right using the arrow keys between the boxes. The window should resemble the one below. When it does, click *Next*.



9 In the final window, select the *View reports on screen* and *Create single report file* options. Click *Finish*.

The software calculates the necessary values, prepares the reports, combines them into a single document, and displays them in the *Report Window.* You may use the *Export* function in the upper left corner of the window to export the combined reports to a format and location of your choice. The reports are now ready for you to use in answering Janice and Steven's questions.

Question 8: *The Carter site's median age is higher than the Steiers site's, and its average household size is lower. Do these factors reflect differences in the age, employment, and family composition of the two sites? If so, how might these factors affect Living in the Green Lane's sales in these trade areas?*

The *Market Profile Report* provides the information you need to answer this question. Begin by completing the following table for the six-minute drive-time trade areas of the two sites. The first two rows are the statistics Janice and Steven mention in this question. Use the values in the table to answer question 8.

Population characteristic	Steiers building Grove Drive 6-minute drive time	Carter building Highway 7 6-minute drive time
Median age	36.4	44.2
Average household size	2.71	2.48
Not in labor force, 2000		
Households with related children, 2000		
Households with persons 65+, 2000		
Median year moved into present house, 2000		
Median year structure built, 2000		

Table 4: Population characteristics of Steiers and Carter trade areas

Question 9: *Are the favorable income, homeownership, and home value characteristics of these sites projected to continue through the next five years? Which site will have the greatest growth in population? In households?*

The *Market Profile Report* provides the data necessary to answer question 9.

Question 10: *Both sites have high spending indexes for general home-related expenditures. Is this also true for more detailed categories of expenditures in this area? What implications do these indexes have for Living in the Green Lane's market potential?*

The *Market Profile Report* includes only two general expenditure categories for *Household Furnishings and Equipment* and *Shelter*. As referenced in the question, the Carter and Steiers trade areas have high spending indexes for both categories. The *Retail Expenditures Report* includes these categories but also several subcategories within each. It also reports the spending index of each trade area for these subcategories. Review these values for the Steiers building six-minute trade area and the Carter building six-minute trade area. High spending indexes across the subcategories would obviously be favorable to *Living in the Green Lane*. Use this information to answer question 10.

Question 11: *Do the age and household size differences between these two sites reflect underlying differences in lifestyle segments as well? If so, how might these differences affect Living in the Green Lane's marketing strategy in these trade areas?*

The *Tapestry Segmentation Neighborhood Segmentation* system classifies block groups in the United States into 65 distinct lifestyle segments. Lifestyle segments differ in demographics, values, housing characteristics, activities, and purchasing patterns. Those differences can be crucial in selecting appropriate sites and crafting marketing strategies to serve customers well.

The variations between the Steiers and Carter sites in age, employment, household size, and housing patterns suggest that each may contain different *Tapestry Segmentation* segments. The *Tapestry Segmentation Area Profile Report* provides the data to make that determination. In that report, *Tapestry Segmentation* segments are organized by *Life Mode* and *Urbanization groups*. Segments within the same Life Mode or Urbanization group share some common characteristics. Within this structure, the report lists the number of households in each *Tapestry Segmentation* segment for each of the two trade areas. It also provides a segment index, which compares the percentage of trade area households in the segment to the corresponding percentage of national households in that segment. Higher values for this index indicate greater concentrations of that segment in the trade area.

Use the data in the *Tapestry Segmentation Area Profile* report to identify the five most common *Tapestry Segmentation* segments in each six-minute trade area, recording the percentage of trade area households and index of each.

Steiers trade area Grove Drive			Carter trade area Highway 7		
Segment number and name	% of HHs	Index	Segment number and name	% of HHs	Index
Total		xx	Total		xx

Table 5: Major Tapestry Segmentation segments by trade area

Compare the general characteristics of the dominant segments in each trade area by using the *Tapestry Segmentation Summary Table* at the URL listed below.

10 In your browser, navigate to the URL below to open the *Tapestry Segmentation Summary Table*.

`http://www.downloads2.esri.com/support/whitepapers/other_/2010_Tapestry_and_Group_Summary_Tables.pdf`

This table provides an overview of the core characteristics of each *Tapestry Segmentation* segment. Review the entries for the dominant segments in each trade area. The more closely these values reflect those of the green consumer profile, the more attractive the segment is for *Living in the Green Lane.*

Use the data from this report and the two tables to answer question 11.

Question 12: *Based on your earlier analysis and your answers to these four questions (8–11), which location—Steiers or Carter—will you recommend as the site of Living in the Green Lane's first store? Explain your reasoning.*

USE LAYOUT VIEW TO DESIGN A MAP DOCUMENT TO SUPPORT YOUR CONCLUSIONS AND RECOMMENDATIONS

Janice and Steven have decided on the Steiers location as the site for their first store. They wish to include two maps in their business plan to communicate their decision process and support the recommendation. The first map will display the concentration of the most attractive customers in the Twin Cities area relative to available locations. The second will display the Steiers trade area and its competitive environment. You will use *Layout* tools to create these maps.

Begin by reviewing the layers of your map and determining which you wish to display in the map document. For the first map, you will use the *Educational Attainment by Block Group* layer as the basemap, with the major highways, *Available Properties*, *Total Shelter Expenditures Threshold Rings*, *Home Centers by Sales in 000's*, and *LITGL Customer Prospecting* layers displayed above it. Turn those layers on and the remaining layers off. Be sure that the labels for the *Available Properties* layer are displayed and turn them on if they are not.

1. On the main menu bar, click *Select* and then *Clear Selected Features* to unselect the Steiers and Carter stores.

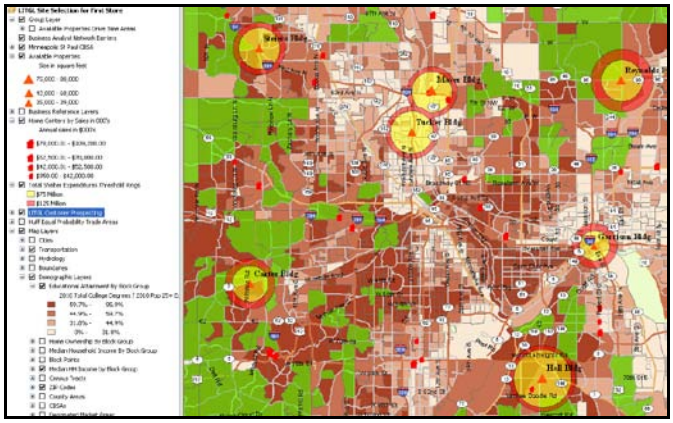
2. Right-click the *Total Shelter Expenditures Threshold Rings* layer and then click *Zoom to Layer* to set the extent of the map to include all the features of this layer.

3. Open the *Layer Properties* window for this layer; click the *Symbology* tab; and, in the *Labels* column directly under the *Color Ramp* box, replace 75000000 with ***$75 Million*** and 125000000 with ***$125 Million***. Click *OK*.

   The* LITGL Customer Prospecting *layer obscures the features beneath it. You will increase the transparency of this layer to correct this.

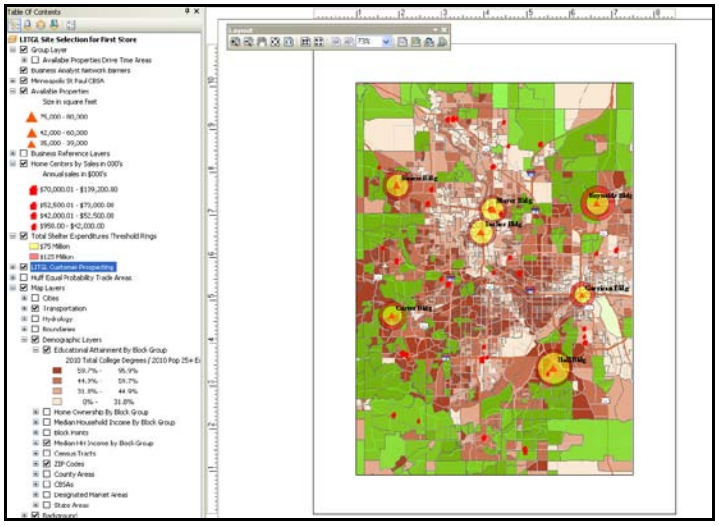
4. Turn on the *LITGL Customer Prospecting* layer and open its *Layer Properties* window. Click the *Display* tab and enter ***40*** in the *Transparent* box to set the transparency for this layer to 40 percent. If necessary, turn off the drive-time trade areas layer and adjust the symbol size of the *Available Properties* layer.

Your map should resemble the one below. When it does, you are ready to start working with layout view.

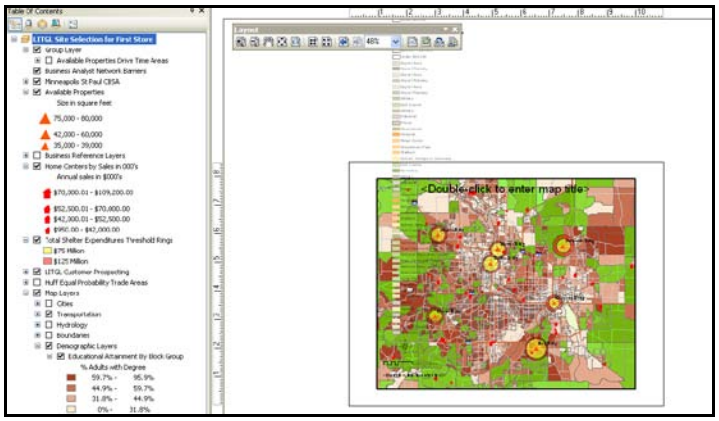


5 Click *View* and then click *Layout View* (or click the *Layout View* button at the bottom left of the map) to open layout view.

The software switches to layout view and opens the *Layout* toolbar. Your screen should resemble this:



6 Click the *Change Layout* button  at the right of the *Layout* toolbar to open the *Select Template* window. Click the *Traditional Layouts* tab to view this set of templates. Select them one at a time to preview them. Select *LetterLandscape.mxd* and then click *Finish* to close the window and integrate map content into this template. It should resemble this:



The map appears properly, but the legend is far too large. You will adjust it by editing its properties.

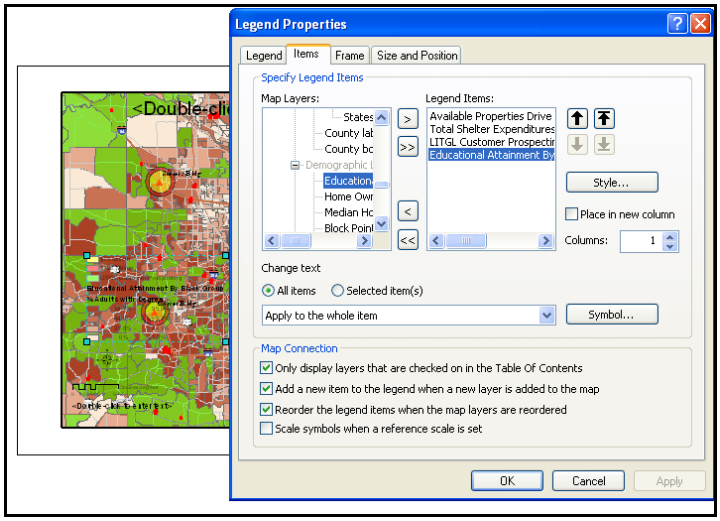
7 Click on the legend until a box with a dashed blue line boundary appears around it. Right-click and then click *Properties* to open the *Legend Properties* window. On the *Legend* tab, delete the default title *Legend*. Click the *Items* tab, and then click the double left arrow between the *Map Layers* box and the *Legend Items* box to move all items to the left and empty the *Legend Items* box.

8 Click *Apply* to see the effect.

9 Select the four layers you wish to include in the legend (*Available Properties*, *LITGL Customer Prospecting*, *Total Shelter Expenditures Threshold Rings*, and *Educational Attainment by Block Group*). Using the right arrow buttons between the boxes, move them to the *Legend Items* box.

10 Click *Apply* to see the changes.

The *Legend Properties* box and map legend should resemble the image below. When they do, click the *Legend* tab, delete *Legend* in the *Title* box, and then click *OK* to apply the changes.



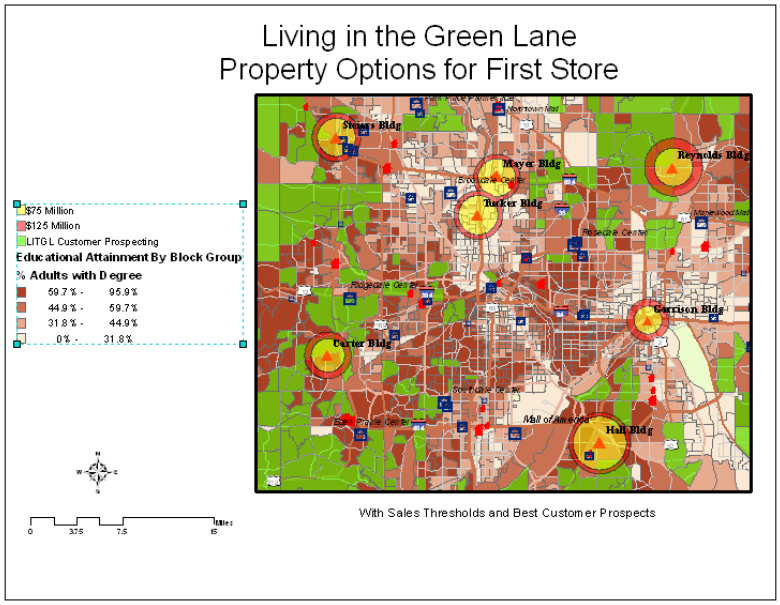
You may resize the legend and map by clicking them and moving the anchors at each corner. Adjust them so that the legend appears to the left of the map.

11 Double-click the scale bar and select *Properties*. Change *Division Units* to *Miles.*

12 Double-click the text that reads *<Double-click to enter map title >* and then enter ***Living in the Green Lane Property Options for First Store*** in the *Text* box. Separate this title into two lines using the *ENTER* key. Click *OK*. Move and resize the title if necessary.

13 Double-click the text field below the scale bar to edit it, then enter ***With Sales Thresholds and Best Customer Prospects*** as the text. Click *OK*. Move this text to the right, just under the map, where it serves as a subtitle.

Your layout should resemble the image below. When it does, you are ready to export the map for inclusion in *Living in the Green Lane*'s business plan.



14 On the menu bar, click *File* and then *Export Map* to open the *Export Map* window. Select *jpg* as the file type, enter ***LITGLAvailableProperties*** as the file name, navigate to the folder *C:\My Output Data\Projects\LITGL Minneapolis St Paul\CustomData\Chapter5*, and click *Save*. The map document is now ready to be inserted in *Living in the Green Lane*'s business plan.

CREATE ANOTHER MAP

The second map will focus on the Steiers building and its trade area. You will use the *Median Home Value by Block Group* thematic map as the background layer and display the Steiers building, its three- and six-minute drive-time trade areas, nearby shopping centers, and competing home centers above it.

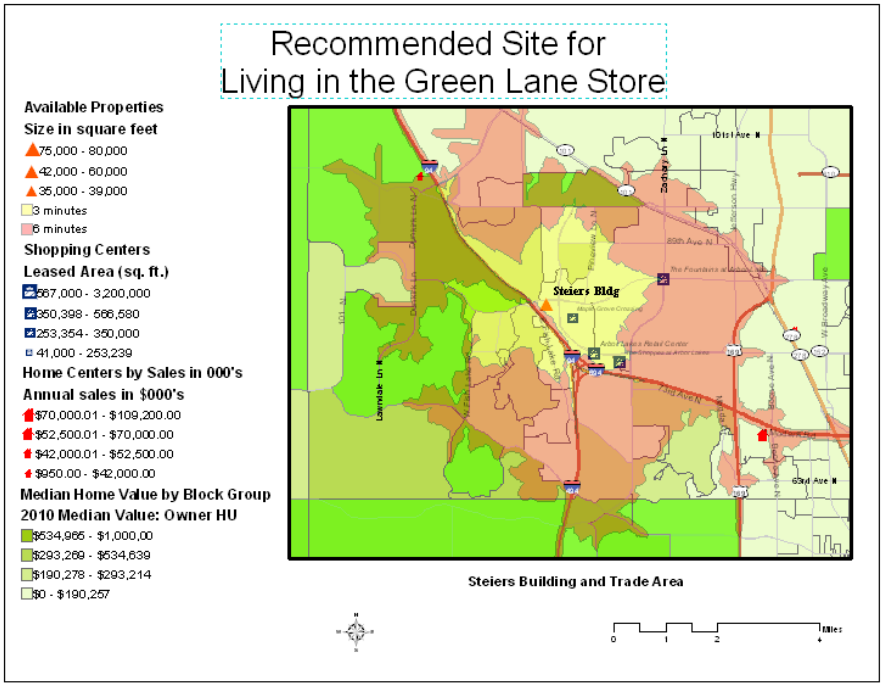
1 While still in layout view, zoom the map to the Steiers building property. Toggle the layers in the *table of contents* to display the *Available Properties*, *Available Properties Drive Time Trade Areas*, *Home Centers by Sales in 000's*, *Shopping Centers*, and *Median Home Value by Block Group* layers.

2 Adjust the transparency of the trade areas layer to improve the visibility of the *Home Centers* and *Shopping Centers* layers.

3 Edit the properties of the *Legend* to include the five visible layers. Adjust its size and that of the box that surrounds it as necessary. Move the *North Arrow* graphic and the scale bar to make room for the larger legend.

4 Edit the properties of the *Title* by entering ***Recommended Site for Living in the Green Lane Store*** as the new title. Edit the properties of the subtitle text by entering ***Steiers Building and Trade Area*** as the new subtitle.

Your layout view should resemble the one below:



5 When it does, click *File » Export Map* and save the map in JPEG format as *RecommendedSite.jpg* in *C:\My Output Data\Projects\LITGL Minneapolis St Paul\CustomData\Chapter5*. It is now ready to be inserted into the *Living in the Green Lane* business plan.

6 Save your map file to preserve your work.

You have completed the site selection process, recommended the Steiers building for the first store, and generated map documents to support that recommendation in *Living in the Green Lane*'s business plan.

Submit your work

Submit answers to the following questions:

Question 1: *Compare the values for the available sites. Which sites most closely match the characteristics of the green consumer profile?*

Question 2: *Which available properties display the most attractive spending patterns?*

Question 3: *How are available sites positioned relative to shopping centers that attract retail traffic and the transportation infrastructure that facilitates it?*

Question 4: *How are available sites positioned relative to competing home centers and the boundaries of Huff equal probability trade areas?*

Question 5: *Based on the maps and Locator Reports, which sites have the most favorable competitive environment? The most unfavorable? Explain.*

Question 6: *Which sites meet the selection criteria?*

Question 7: *Based on population characteristics, home-related expenditures, competitive factors, and site characteristics, which two sites are the most favorable? Explain why.*

Question 8: *The Carter site's median age is higher than the Steiers site's, and its average household size is lower. Do these factors reflect differences in the age, employment, and family composition of the two sites? If so, how might these factors affect Living in the Green Lane's sales in these trade areas?*

Question 9: *Are the favorable income, homeownership, and home value characteristics of these sites projected to continue through the next five years? Which site will have the greatest growth in population? In households?*

Question 10: *Both sites have high spending indexes for general home-related expenditures. Is this also true for more detailed categories of expenditures in this area? What implications do these indexes have for Living in the Green Lane's market potential?*

Question 11: *Do the age and household size differences between these two sites reflect underlying differences in lifestyle segments as well? If so, how might these differences affect Living in the Green Lane's marketing strategy in these trade areas?*

Question 12: *Based on your earlier analysis and your answers to these four questions (8–11), which location—Steiers or Carter—will you recommend as the site of Living in the Green Lane's first store? Explain your reasoning.*

Credits

Data

Data displayed in screen captures of Business Analyst is courtesy of Esri; the US Census Bureau; Infogroup; the Bureau of Labor Statistics; Applied Geographic Solutions, Inc.; Directory of Major Malls, Inc.; GfK Mediamark Research & Intelligence, LLC (GfK MRI); and Market Planning Solutions, Inc.

Instructor resources

Contextual information

This SpatiaLAB is written for business students in an integrated business GIS course at the undergraduate or graduate level. It may be used to replace the exercises in chapter 5 of *Getting to Know ESRI Business Analyst* in labs with Business Analyst Desktop Premium 10 installed. The emphasis is on using spatial analysis in the site selection process for a startup entrepreneurial firm wishing to open its first retail location. Thus, this lab would also be used as a stand-alone exercise in retailing or retail management courses or in conjunction with the *Trade Area Analysis and Site Selection without Customer Data: Part 1* SpatiaLAB for a more comprehensive site selection project.

This lab shows how to create drive-time trade areas and generate a variety of reports about them. It also covers the process of creating presentation-ready maps in *layout* view to support written reports, managerial briefings, or formal presentations. The maps and reports in this lab include many data layers that are covered in *Trade Area Analysis and Site Selection without Customer Data: Part 1* and are available in the *table of contents* in this lab.

Upon completion of the lab, students may be required to submit answers to several questions based on their observation of the maps and reports they have created or prepare a written project report that covers the site selection decision process in *Trade Area Analysis and Site Selection without Customer Data: Part 1* and *Part 2*. A sample format for this report is below.

Analysis and visualization tools

Business Analyst Desktop Premium 10 and the *LITGL Minneapolis St Paul* project file are required to complete this exercise.

Data information

All the data for this exercise is provided by Business Analyst Desktop Premium 10 software.

Data sources

Esri® Business Analyst data

Answer key

Table 1 Population characteristics of available trade areas

Trade area	Total households	Median HH income	% owning home	% college degree *	Median home value
Garrison 6th Street	74,781	$51,778	47.2%	35.9%	$121,658
Reynolds Highway 96E	13,808	$76,836	73.9%	50.4%	$178,847
Mayer 57th Avenue	42,300	$61,818	65.5%	35.8%	$143,237
Steiers Grove Drive	13,895	$95,785	85.8%	57.9%	$211,104
Hall Lone Oak Road	11,334	$82,171	54.7%	61.9%	$228,037
Carter Highway 7	12,507	$88,758	80.3%	62.6%	$247,277
Tucker Lyndale Avenue	35,322	$53,177	56.9%	29.9%	$118,825

* % college degree is the sum of the associate, bachelor, and graduate/professional degree percentages

Question 1: *Compare the values for the available sites. Which sites most closely match the characteristics of the green consumer profile?*

In table 1 above, across all four measures, the Steiers and Carter sites are the best matches for the profile. The Hall and Reynolds sites are close but fall short on at least one measure. Garrison and Tucker are the poorest matches for the profile.

Table 2 Home-related expenditures in available trade areas

Trade area	HH furnishings expenditures			Shelter expenditures		
	Total $ (millions)	Per HH	Index	Total $ (millions)	per HH	Index
Garrison 6th Street	$119	$1,598	78	$1,112	$14,872	94
Reynolds Highway 96E	$35	$2,533	123	$311	$22,496	142
Mayer 57th Avenue	$78	$1,846	90	$698	$16,489	104
Steiers Grove Drive	$41	$2,956	144	$359	$25,814	164
Hall Lone Oak Road	$30	$2,687	131	$272	$24,037	152
Carter Highway 7	$38	$3,022	147	$334	$26,685	169
Tucker Lyndale Avenue	$56	$1,576	77	$503	$14,233	90

Question 2: *Which available properties display the most attractive spending patterns?*

In table 2 above, Steiers and Carter, with their high indexes, are the most attractive sites relative to spending patterns. Comparatively, Reynolds and Hall have high indexes but lower total and per household spending.

Question 3: *How are available sites positioned relative to shopping centers that attract retail traffic and the transportation infrastructure that facilitates it?*

Visual observation of the map reveals that all the sites are reasonably well positioned relative to highway infrastructure. Garrison and Steiers appear to have several shopping centers nearby, while the remaining sites have relatively few.

Question 4: *How are available sites positioned relative to competing home centers and the boundaries of Huff equal probability trade areas?*

Visual observation of the map reveals that most of the sites are located near trade area boundaries, a good indication. The Garrison and Steiers locations appear to have the largest number of competitors.

Table 3 Shopping center and home center drive-time distances from available sites

Trade area	Attractors Shopping centers within 6 minutes		Competitors Home centers within 10 minutes	
	Number of centers	Number of stores	Number of competitors	Sales $ (miilions)
Garrison	4	111	8	$398
Reynolds	0	0	2	$112
Mayer	1	95	6	$266
Steiers	4	177	6	$223
Hall	1	35	6	$295
Carter	0	0	5	$245
Tucker	1	95	7	$338

Question 5: *Based on the maps and Locator Reports, which sites have the most favorable competitive environment? The most unfavorable? Explain.*

In table 3 above, Garrison is the most active site, with four shopping centers and eight competitors, largely due to its location near the intersection of several major highways. The Steiers site also has favorable retail attractions, offset by substantial competition. The Carter, Tucker, Hall, and Mayer sites have few shopping centers and strong competition, while the Reynolds site has few of either. Overall, the Garrison and Steiers sites seem to offer the most favorable balance of retail attraction and competition.

Question 6: *Which sites meet the selection criteria?*

The data in the attribute table reveals that all sites meet the parking space criterion. The Steiers, Reynolds, Carter, and Taylor sites fall within the desired size range. The Garrison site is above this range and the Hall and Mayer sites below it.

Question 7: *Based on population characteristics, home-related expenditures, competitive factors, and site characteristics, which two sites are the most favorable? Explain why.*

Review of this data indicates that Steiers and Carter are the two most attractive sites. They match the green consumer profile well; have favorable spending patterns, convenient locations, and reasonable competitive environments; and fall within the selection criteria.

Table 4 Population characteristics of Steiers and Carter trade areas

Population characteristic	Steiers building Grove Drive 6-minute drive time	Carter building Highway 7 6-minute drive time
Median age	36.4	44.2
Average household size	2.71	2.48
Not in labor force, 2000	17%	27%
Households with related children, 2000	38.5%	29.5%
Households with persons 65+, 2000	9.4%	24.2%
Median year moved into present house, 2000	1994	1991
Median year structure built, 2000	1984	1966

Question 8: *The Carter site's median age is higher than the Steiers site's, and its average household size is lower. Do these factors reflect differences in the age, employment, and family composition of the two sites? If so, how might these factors affect Living in the Green Lane's sales in these trade areas?*

According to table 4 above, yes, they do. The population in the Carter trade area is older and less involved in the workforce. Household size is lower as well. This means that incomes are more likely to be relatively fixed and, since household size is lower, the savings in energy and environmental efficiency less pronounced. This extends payback periods, the time over which the cost savings of an energy efficient system recovers its purchase price, a significant factor for Green Back Greens consumers.

Question 9: *Are the favorable income, homeownership, and home value characteristics of these sites projected to continue through the next five years? Which site will have the greatest growth in population? In households?*

The Market Profile Report indicates that, in both areas, household income and home value should increase over the next five years, while the level of homeownership will decline very modestly in both areas. Yes, future-year projections indicate that these factors will remain favorable over the next five years. Steiers is projected to have the greater growth in both population and households by a significant margin.

Question 10: *Both sites have high spending indexes for general home-related expenditures. Is this also true for more detailed categories of expenditures in this area? What implications do these indexes have for Living in the Green Lane's market potential?*

Yes, the Retail Goods and Services Expenditure Report indicates that the indexes remain high across the various categories of expenditures in the Home, Household Furnishings and Equipment and Household Operations categories. This means that these locations are both very attractive relative to their home-related spending patterns.

Table 5 Major Tapestry Segmentation segments by trade area

Steiers trade area Grove Drive			Carter trade area Highway 7		
Segment number and name	% of HHs	Index	Segment number and name	% of HHs	Index
13 *In Style*	26.5%	1065	07 *Exurbanites*	41.7%	1658
04 *Boomburbs*	25.4%	1115	02 *Suburban Splendor*	21.1%	1208
06 *Sophisticated Squires*	24.7%	903	24 *Main Street USA*	10.9%	422
12 *Up and Coming Families*	7.5%	215	30 *Retirement Communities*	8.0%	554
02 *Suburban Splendor*	5.2%	297	06 *Sophisticated Squires*	5.9%	214
Total	89.4%	xx	Total	87.6%	xx

Question 11: *Do the age and household size differences between these two sites reflect underlying differences in lifestyle segments as well? If so, how might these differences affect Living in the Green Lane's marketing strategy in these trade areas?*

The Tapestry Segmentation Area Profile Report indicates that these differences are reflected in differing lifestyle segment composition between the two trade areas. Further, the Tapestry Segmentation Summary Table reveals that the Carter trade area includes several households that do not meet the green consumer profile. The impact is that substantial portions of the population in this trade area would be less responsive to the product, promotion, and merchandising strategies of Living in the Green Lane, creating less potential for market penetration and growth.

Question 12: *Based on your earlier analysis and your answers to these four questions (8–11), which location—Steiers or Carter—will you recommend as the site of Living in the Green Lane's first store? Explain your reasoning.*

On balance, Steiers is the better alternative. It has a greater percentage of households in lifestyle segments that match the profile while matching the Carter area's high levels of spending on home-related products. In addition, it has slightly higher projected growth in terms of households and population over the next five years.

Additional notes

1. Although this lab is integrated with the *Trade Area Analysis and Site Selection without Customer Data: Part 1* SpatiaLAB to create a complete project, it is not necessary for students to complete that lab to work with this one. The initial map in this lab contains the results of the SpatiaLAB 4 procedures, and they are incorporated into the analysis performed here. Thus, although students would benefit from completing part 1, it is not necessary. At your discretion, this can be a stand-alone exercise.
2. This lab is the most extensive in the series as it focuses on the critical decision of this firm's first store location. Students use several maps, reports, and tables to answer the questions relevant to that decision. Be ready to provide assistance in matching reports and visual data to the questions and help students understand the relevance of the questions to the site selection decision.
3. Students use three-and six-minute drive-time polygons to define *Living in the Green Lane*'s trade area. The rationale for this approach and these thresholds are discussed in the text. Do you agree with this rationale? Do your students? You might wish to consider alternative approaches or different thresholds with students, using the *Trade Area* wizard to assess the impact of those adjustments on the site selection decision process.
4. Ask students to compare the drive-time trade areas with the *Shelter Expenditures Threshold Rings*. Compact threshold rings within larger drive-time polygons indicate locations whose market area encompasses shelter expenditures significantly higher than the threshold ring levels. Larger threshold rings in compact drive-time polygons indicate the reverse. This helps students understand the relationship between distance and potential sales for each location.
5. Although the reports used in this lab are very rich and provide the data relevant to this decision, they represent only three of the reports available in the *Trade Area* wizard. Encourage students to experiment with the other reports by rerunning the wizard and ordering them. Running the reports for a single selected property would allow them to see the contents of the report without generating overly large documents. For which types of organizations or marketing objectives would these additional reports be appropriate?
6. The *Shopping Centers Locator Report* and *Home Centers Locator Report* are provided below as resources for answering questions in the lab. Be sure to remind students that they must double-click these reports to load the full version necessary to answer the questions. The procedures for generating these reports are described in the *Trade Area Analysis and Site Selection without Customer Data: Part 1* SpatiaLAB. At your discretion, you may require students to generate these reports on their own instead of using the versions provided. The more experienced your students are with GIS, the more valuable this approach will be.
7. Direct students' attention to additional SpatiaLABs covering the business GIS tools and their application within marketing planning and decision making. Make them aware of the opportunities to use these learning exercises to augment their business GIS skills across a range of marketing applications.

8. Instead of a project report consisting of answers to lab questions, you may wish to have students complete a more comprehensive report covering both *Trade Area Analysis and Site Selection without Customer Data: Part 1* and *Part 2.* If so, you may wish to use the following structure and guidelines for that report. Feel free to adjust this format to your preferences or class requirements.

Report format

Each of your reports should be about six to eight pages in length and should follow this format:

I. **Introduction—**A summary of the circumstances addressed by the research project
II. **Problem statement—**A statement of the problem addressed by the project
III. **Data information—**A statement of the sources and dates of all data used in the analysis
IV. **Analytical methods—**A description of the analytic procedures used and how they will help solve the problem
V. **Research results** (the largest section of the project)—To include

A. Presentation of the results of the analysis

B. Exhibits such as the required maps, charts, and tables and any others you wish to include to clarify your report

VI. **Conclusions and recommendations—**Recommended response to the problem based on the results of the analysis

Appendix A: Home centers locator report

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Home Centers Locator Report

Name	City	Employees	Sales	Dir.	Minutes
1					
Garrison Bldg					
MENARDS	OAKDALE	0	49000	NE	10.39
HOME DEPOT	MINNEAPOLIS	140	49000	NW	11.05
SAFE HOMES MINNESOTA	MINNEAPOLIS	0	5250	NW	11.27
HOME DEPOT	ST PAUL	115	40250	SW	11.66
MENARDS	WEST ST PAUL	150	52500	SE	5.52
MENARDS	ST PAUL	200	70000	NW	6.38
LOWE'S	WEST ST PAUL	0	2450	SE	6.43
MENARDS	MAPLEWOOD	120	42000	NE	6.48
HOME DEPOT	INVER GROVE HTS	0	56000	SE	6.58
HOME DEPOT	ST PAUL	140	49000	SE	8.55
HOME DEPOT	MINNEAPOLIS	0	56000	NW	8.81
HOME DEPOT	MAPLEWOOD	200	70000	NE	9.31
Total number of business points:	**12**				

'NR' indicates that a point could not be connected to a route.

Source: ESRI, 2010 Estimates and Projections

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Appendix B: Shopping centers locator report

Shopping Centers Locator Report

Name	City	Total Stores	Retail Space	Dir.	Minutes
1					
Garrison Bldg					
Midway Marketplace	St. Paul	15	487196	NW	4.51
Sun Ray Shopping Center	St. Paul	31	287385	NE	4.64
Midway Shopping Center	St. Paul	40	293732	NW	4.89
Signal Hills Shopping Center	West St. Paul	25	225000	SE	5.52
HarMar Mall	Roseville	34	433048	NW	8.95
Total number of business points:	**5**				

'NR' indicates that a point could not be connected to a route.

Source: ESRI, 2010 Estimates and Projections

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Business Analyst Resource Center.
http://resources.esri.com/businessAnalyst/

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