



SALUIT USER DOCUMENTATION



Prepared in 2015 by Placeways LLC and Fitzgerald & Halliday, Inc. on behalf of

New Jersey Transportation Planning Authority

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SALUIT User Documentation

October, 2015

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ABOUT THIS DOCUMENT

This document provides end-user-oriented information about NJTPA's small area land use impact tool, SALUIT. It divides into several sections.

[Introduction](#) provides brief introductory and general information.

[Quick Start](#) provides abbreviated instructions for setting up and exploring a SALUIT analysis project.

Set Up provides detailed user-oriented instructions on the SALUIT Toolbar tools and the process of creating SALUIT projects to study the impacts of proposed small-area projects.

[Working with an Analysis](#) is a short set of suggestions for working with any SALUIT-based analysis regardless of which template was used to set it up.

The Standard Analysis provides commentary and background information on the comprehensive analysis created by SALUIT's default Standard Template.

[Indicators and Models](#) describes the modeling and formulas used for indicators that appear in the Standard Analysis. It also provides detailed tables of the parameters used in the Standard Analysis and provides sources for the data.

Modeling Workflow Diagrams provide a visual explanation of the modeling logic in the Standard Analysis.

Hyperlinks, identifiable by colored font and underlined text, link to other places in this document or on the web.





INTRODUCTION



INTRODUCTION TO SALUIT

The **Small Area Land Use Impact Tool** (SALUIT, pronounced *sal-oo-EET*) is a computer model developed by the North Jersey Transportation Planning Authority (NJTPA) for analyzing the anticipated impacts resulting from changes to local land use. The model estimates impacts of alternative scenarios using measurements (called indicators) involving transportation (e.g., VMT changes, mode shifts), infrastructure (e.g., water supply, waste water), economic (e.g., revenue) and environmental (e.g., air quality) aspects important to local communities and to the northern New Jersey region as a whole. The goal of SALUIT is to provide a technical tool for NJTPA and partner planning staff to perform land use scenario impact modeling at the small area (community) scale.

SALUIT works as an add-in to *ArcGIS® Desktop* and adds to the capabilities of the ArcGIS extension *CommunityViz® Scenario 360™*.

The SALUIT website is <http://www.njtpa.org/Data-Maps/Land-Use-Impact-Model.aspx>

INTENDED USERS

If you are setting up SALUIT projects yourself, you should be familiar with the basics of ArcGIS and CommunityViz Scenario 360.

If you are viewing or exploring a SALUIT project that has been set up for you, you will only need to be comfortable with standard Windows controls, and you will also need to understand basic urban planning concepts.

SALUIT works only for study areas in the northern New Jersey region covered by [NJTPA](#).

HOW SALUIT WORKS

When you create a new SALUIT project using the [Create New Project](#) tool, SALUIT automatically finds and downloads GIS and other data relevant to the area you have chosen to study. This data is coming from NJTPA servers and potentially other sources, and includes a large amount of data and models specially developed for SALUIT. You can also add your own data from local sources if desired.

Once the data is loaded, a CommunityViz Scenario 360 analysis runs automatically. The analysis includes formulas, charts, saved views and other components stored in the [SALUIT Template](#) you have chosen to use (such as the Standard Template). This provides a “base scenario” or starting point for your own analysis.

To explore scenarios, you sketch on the map to designate proposed land uses for parcels in your project site. Their impacts are automatically calculated and displayed. You can also explore the effects of changing variable assumptions that go into the modeling. Working with a SALUIT analysis after it has been created is done almost entirely with standard Scenario 360 functions.

SALUIT is installed with a Standard Template that provides a comprehensive set of impact models for small area land use projects. Users may also create and share their own templates to address other specific topics. Only the Standard Template modeling is described in this document.





QUICK START



QUICK START



The **Small Area Land Use Impact Tool** (SALUIT) is a tool from NJTPA for analyzing the anticipated impacts resulting from changes to local land use. This Quick Start section provides abbreviated instructions for setting up and exploring a SALUIT analysis project. The rest of the document provides more detail.

INSTALLATION

You'll need ArcGIS Desktop and CommunityViz Scenario 360 to use SALUIT. [Details.](#)

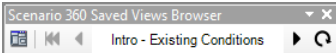


1. Double-click the installation file *NJTPA_SALUIT.msi* to launch the installer.
2. After installation, open ArcMap and use Customise > Toolbars > SALUIT Tools to display the [toolbar](#).

CREATE A PROJECT

1. Click **Create SALUIT Project**  on the [SALUIT Toolbar](#). 
2. Locate your project study area on the locator map and zoom in.
3. Follow the instructions on the [Create Project](#) window for naming your project and designating its study area (the larger, general area) and project site (the specific location where land use changes will be made). Keep the area small for [performance](#) reasons.
4. Wait while your data is downloaded, an analysis framework is created, and setup modeling calculations are run. This will take some time.

PAINT PROPOSED LAND USES

Paint the initial project proposal onto the **Site Parcels** layer. [Details.](#)

1. Open the Scenario 360 **Saved Views Browser**  (Scenario 360 toolbar menu ► View ► Saved Views Browser Toolbar). Go the Saved View called **Painting Charts**.
2. Be sure the **Site Parcels** layer is turned on. Make this layer the only selectable layer using ArcGIS selection settings.
3. Open the Scenario 360 Sketch Tools Toolbar.
4. Start editing using the Scenario 360 **Start Scenario Editing**  tool.
5. Click on a land use type shown for the Site Parcels layer in the ArcMap Create Features window, and then use the Scenario 360 **Painter Tool**  (available on the Sketch Tools toolbar) to paint land uses onto parcels in your project site, representing the proposal you are studying. If you have not suspended dynamic updates, expect a processing delay of up to a minute after you paint the first parcel. Subsequent parcels will update more quickly.

EXPLORE SAVED VIEWS

Use the Saved Views Browser to step through the Saved Views provided in the [Standard Analysis](#).

- The charts display [Indicator](#) values
- The maps display color-coded data as well. Consult the ArcMap Table of Contents for a legend for each layer. Use the check boxes in the table of contents to turn layers on and off.



ADDITIONAL FEATURES AND FUNCTIONS

SALUIT capabilities extend well beyond those covered in this Quick Start. This document provides full details. Some highlights:

- Create and compare alternative [scenarios](#)
- Add transit stops, parks, and other points of interest for inclusion in the Standard Analysis in addition to painting land uses
- Use [Scenario 360 viewing options](#) to customize your view and explore the analysis on your own
- Get detailed [reports](#)
- [Add your own data](#) to enhance or replace data from the NJTPA cloud
- Adjust detailed [modeling parameters](#) and assumptions
- Create your own analysis and save it as a [template](#) that can be used in other locations





SET UP



INSTALLATION AND SYSTEM REQUIREMENTS

SYSTEM REQUIREMENTS

SALUIT is a desktop application that also accesses data from the cloud (via the internet). To use it you will need:

- *ArcGIS® Desktop* from Esri (version 10.2 or later). <http://www.esri.com>
- *CommunityViz® Scenario 360™* from Placeways (version 5.0 or later). <http://placeways.com>
- *SALUIT* from NJTPA. <http://www.njtpa.org/Data-Maps/Land-Use-Impact-Model.aspx>
- An internet connection

Check the SALUIT website for up-to-date information about version compatibility.

INSTALLATION

SALUIT is an ArcGIS Add-In with additional supporting files. Obtain the installation file **NJTPA_SALUIT.msi** from NJTPA.

- There are different versions of the installation file for different versions of ArcGIS (e.g., 10.2 or 10.3). Be sure you have the SALUIT installer that matches your ArcGIS version.



Installing the add-in requires administrative privileges. To install the add-in:


1. Uninstall any existing version:
 - a. Open your system's Programs and Features.
 - b. Select NJTPA SALUIT and click Uninstall.
2. Double-click 'NJTPA_SALUIT.msi'.

When you install SALUIT, it adds the following to ArcGIS/CommunityViz:

- A [SALUIT toolbar](#) that provides access to specialized SALUIT functions.
- Program and system files including a [configuration file](#), which you should update regularly (about once per month) to ensure that your application is using the latest available data and settings.




SALUIT Screens. The **Help**  buttons on SALUIT screens lead to this PDF document. Use the table of contents and other links within this document to find help articles pertaining to the SALUIT add-in. You can identify SALUIT screens from the **SALUIT logo**  or the word SALUIT in the title bar.

CommunityViz Scenario 360. The **Help**  buttons on *CommunityViz Scenario 360 screens* lead to the built-in, context-sensitive Scenario 360 Help system, which provides information pertaining to Scenario 360. This system is also available [online](#).

ArcGIS ArcMap. For ArcGIS help, use the ArcGIS Desktop Help system.

SALUIT Terminology. This document contains a list of key terms. See [Terminology](#).

SALUIT TOOLBAR

The **SALUIT toolbar**  provides access to SALUIT wizards and other functions. It appears in your ArcGIS window after SALUIT has been installed. If it is not already showing, open it using **ArcGIS Customize tab ► Toolbars ► SALUIT Tools**.

As with other toolbars, you can:

- “Dock” it to the edge of your ArcGIS window by dragging the title bar or the “handle” (three vertical dots that appear on docked toolbars)
- “Float” it by dragging the title bar or the “handle” away from the edge
- Close it by floating it and then using the X in the upper right-hand corner
- Reopen it using ArcGIS Customize tab ► Toolbars ► SALUIT Tools.
- Customize it (change which buttons it contains) by clicking the ▼ down arrow, clicking on **Toolbar Options...**, and choosing **Customize**.

TOOLBAR BUTTONS



Start Scenario 360 takes you to the Scenario 360 welcome screen, where you can open an existing analysis.



Save commits the current analysis to memory.



Create New Project opens the wizard used for creating new SALUIT projects (analyses). You must be connected to the internet for this to work. See [Create New Project](#).



Download Data downloads all available SALUIT cloud data for the study area of the SALUIT analysis you are working in. You must be connected to the internet for this to work. See [Download Data](#).



Load Local Data opens the wizard used for adding data from your own sources apart from the SALUIT cloud. See [Load Local Data](#).



Create Template opens the wizard used for creating new SALUIT templates that other people can use, based on your existing analysis. See [Create Template](#).



About SALUIT provides version numbers and a web site link, as well options to update your configuration.



Help links to the SALUIT website where this document is posted. See [Getting Help](#).




CREATE NEW PROJECT

Use the **Create New Project** window to set up a new SALUIT analysis of a particular project site within a given study area. This is a one-time set-up for a given project. It imports location-specific data and models, and it analyzes existing conditions, but it does not create any future development proposals—to create those, see [Working with a SALUIT Analysis](#).

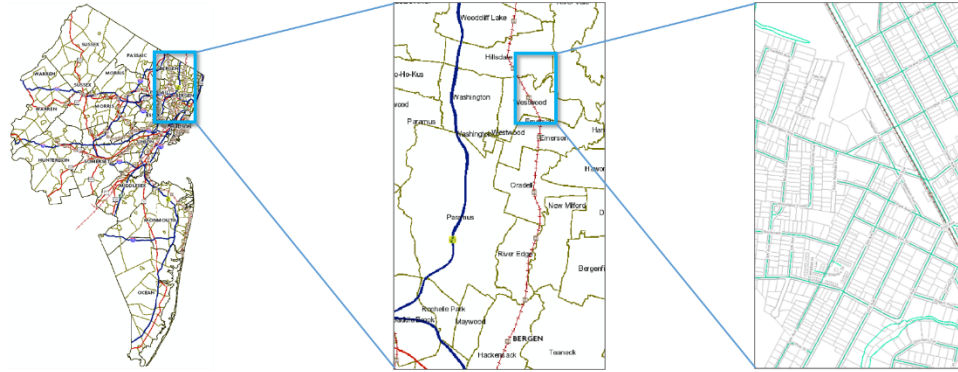
BEFORE STARTING

- Have a project in mind. A typical SALUIT project
 - Concerns land use changes to a small area (usually between 1 acre and 2 square miles)
 - Is early in the land-use decision-making process, with room for considering alternatives and variations
 - Is in the NJTPA region
- Understand the terms [project site](#) and [study area](#) as they are used by SALUIT. See [Terminology](#).
- Be sure the ArcGIS Scenario 360 extension is active and the SALUIT add-in is installed
- Know the location of your project site
- Know the study area that you want to use for reference
- Optionally, have ready a layer containing selected features that define your project site and/or study area
- Have a live internet connection
- Set aside some time, as the new project creation process may take a good portion of an hour after you have finished the relatively simple set-up steps in the wizard

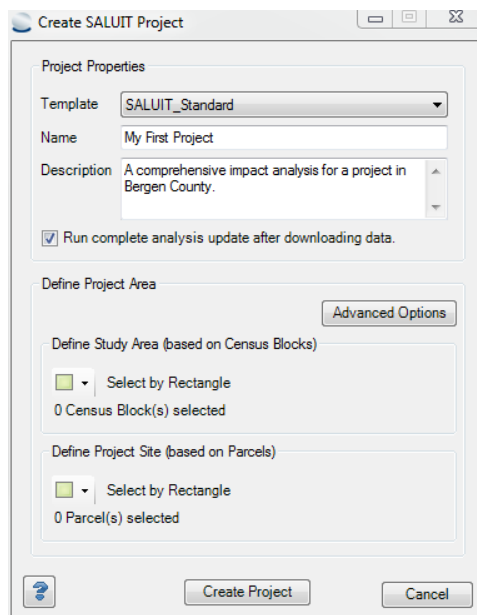
PROJECT CREATION STEPS

1. If it is not already open, start ArcMap. You may start from an empty ArcGIS project or an existing ArcGIS project.
2. Click **Create SALUIT Project**  on the [SALUIT Toolbar](#).
 - A special SALUIT-specific basemap, called a **locator map** (and sometimes displayed as “Saluit/SaluitBaseMap” in the table of contents), will be downloaded from the cloud and displayed. Depending on your connection speed it may take several seconds to load. Zoom in to display Census block boundaries (green) and parcel boundaries (gray).
 - *Advanced:* If you are starting from an existing project, the locator map will not load automatically. Use the Add Locator Map button to download it if needed. See [Advanced Project Creation Methods](#).





- The **Create SALUIT Project** window will be displayed.



3. Specify Project Properties

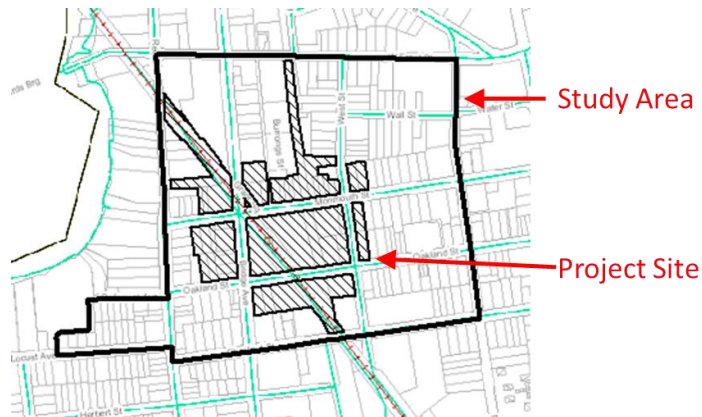
- **Template.** Choose a SALUIT template from the dropdown box. A [template](#) is a prepackaged set of analysis formulas (models), displays, and other components that will be applied to your study area and project site. If in doubt, choose *SALUIT Standard*.
- **Name.** Type a name for this project. We recommend a simple, descriptive title. Spaces are allowed, but most other special characters (e.g., “/”) are not. This name will also be used to name associated files and folders.
- **Description.** Type an optional description for this project.
- **Checkbox:** *Run a complete analysis update after downloading data.* Normally you leave this box checked. Clear the box only if you want to postpone the initial analysis update (that is, initializing and running all the modeling formulas), which may take some time. If you choose not to run updates, calculation results will initially be zero. You can run the update later using the **Scenario 360 toolbar** dropdown menu ► **Data** ► **Update Analysis**. One reason for postponing the update is that you plan



to [Load Local Data](#), after which another update will be needed. In that case, clearing this box saves a redundant update.


4. Define Project Area


- Do this step carefully. Your settings will define the boundaries of the analysis and they cannot be easily changed after you exit this window.
 - The recommended study area size is between 1 acre and 2 square miles.
 - The project site should lie entirely within the study area. If the study area and project site share an edge in some places, slight overlaps may occur at the edges because Census block boundaries do not necessarily match parcel boundaries exactly.
 - The recommended project site size is less than 1000 parcels.
 - You may wish to consider additional [Speed and Performance Recommendations](#).
- You will define the study area and project site by selecting Census blocks and parcels, respectively. The selection process is similar to, but not exactly the same as, ArcMap feature selection. You are selecting features in the cloud, so there may be a slight delay before your selection is highlighted.
- Before making your selections, zoom in on the locator map using standard ArcMap controls until the area you want to use is large enough to see and not cut off on any edges. Zooming in will cause Census block boundaries (green) and parcel boundaries (gray) to display. See [TIPS: Finding Your Project Location](#), below. Move the Create SALUIT Project window out of the way so your view is unobstructed.
- There is a default (standard) method of manually selecting features on the map to define the project area. There is also an [advanced method](#) of importing existing features from another source.



Standard Method: Select by Point, Rectangle, or Polygon

About Select By... Tools. With this method you use feature selection tools provided in the Create SALUIT Project window. (You must use the selection tools provided on this window, not those in ArcMap.) To use a tool, select it on the Create SALUIT Project window by clicking on its icon, then click or drag on the map. There may be a slight delay before selected features are highlighted because a query goes out to the cloud. You will know a tool is active if it has a

blue rectangle around its icon. For example,  Select by Polygon shows that this tool is

active, while  Select by Polygon shows that this tool is not active. To stop using a tool, click the **Esc** button on your keyboard. Default tool selections are provided, but you may use



alternate selection tools available by clicking the small ▼ down-arrow next to a tool icon. To revise a selection, simply use the tool again. When you have made a selection, the number of features selected is displayed on the window. This information may be a consideration for speed and performance.

● **Select by Point** toggles selection on or off when you click on an individual feature. This provides a handy way to add or remove individual features from your selection.

■ **Select by Rectangle** selects any features that touch (intersect) a rectangle that you drag on the map by clicking in one corner and then dragging your cursor to the opposite corner

⬡ **Select by Polygon** selects any features that touch (intersect) a polygon that you draw on the map by clicking on its corners and then double-clicking to finish.

- A. Looking at the locator map, find the Census blocks you want to use for the study area.
 - B. Select Census blocks to define your study area by clicking on ● **Select by Point** and then clicking on the Census blocks you want to use. Or, use an alternate selection tool as described above.
 - C. Select parcels to define your project site by clicking on ⬡ **Select by Polygon** and drawing a polygon on the map by clicking on its corners and then double-clicking to finish. Any parcels that touch (i.e., intersect) the polygon will be selected. Or, use an alternate selection tool as described above.
 - TIP: The project site must lie within the study area. If necessary, redraw your study area slightly larger so it contains all site parcels.
5. Carefully review your selections, recalling that they cannot be changed after you click Create Project. On the map, the study area will be outlined with a thick black border and the project site parcels will be covered with diagonal hash marks. When ready, click **Create Project**.
- **Messages:** You may receive a message regarding your study area and site parcels selections.
 - A warning message will display if any part of the project site boundary extends outside the study area boundary. If this occurs, check your boundaries visually. Generally, the project site boundary should lie completely within the study area boundary. However, parcels and Census blocks do not always line up exactly, so it is possible that parts of some project site parcels protrude slightly outside the Census blocks that define the study area. If the mismatch is minor, there is no cause for alarm and you may proceed. If the mismatch is significant, it is recommended you redraw the boundaries; otherwise the analysis models, which assume the study area contains the project site, will not make logical sense.



- An error message will display if the project site boundary and the study area boundary do not overlap at all. You must redraw them to proceed.
- A warning message will display if any of the project site parts contained “islands” that needed to be filled in. The project site is represented by a new, SALUIT-created layer called Project Site Boundary. It consists of a single, usually-multipart feature that is the union of the parcels you have selected, and it often shows up as city blocks separated by a network roadways. In some cases, one or more of the project site parts (e.g., blocks) will contain a hole where no parcel is present. This creates a topological donut that is problematic for spatial calculations and is therefore not allowed in SALUIT. The tool automatically fills in the holes and provides this warning message, which is usually no cause for alarm and you can continue.
- A warning message will display if the project site is larger or smaller than recommended, based either on area or feature count. The upper size limits are recommendations, not requirements, and are for performance reasons. See [Speed and Performance Recommendations](#).


6. At this time you will see progress bars as a complete Scenario 360 analysis is set up and data is downloaded from the cloud, an analysis is created, and (if the box is checked) a complete analysis update is run. **This process may take some time.** Be aware that it is a one-time setup for a given project.

When it completes, a confirmation message will appear. Your project is now created. For next steps, see [Working with a SALUIT Analysis](#).

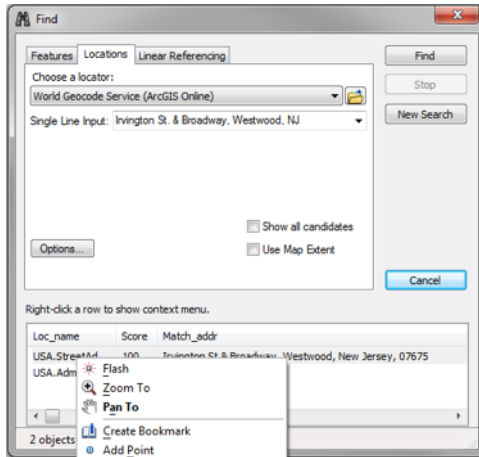
7. (Optional) As a precaution, consider making a backup copy of your analysis immediately after creating it. To do so use **ArcMap File menu ► Save Analysis As...** and give the new analysis a name that indicates it is a backup and includes the date. (Do NOT use Windows Explorer or ArcCatalog.) Then return to working on your original analysis. It’s a good idea to make backups regularly while working on an analysis.

TIPS: FINDING YOUR PROJECT LOCATION

ArcMap Find Tool

ArcMap’s **Find**  tool, available on the ArcMap Tools toolbar, can zoom quickly to a town, address, or intersection.



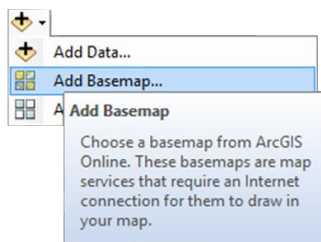



To use it:

1. Go to the **Locations** tab. Accept the default locator called World Geocode Service (ArcGIS Online).
2. In the box for **Single Line Input**, type the name of a place. You may use towns, streets addresses, intersections (e.g., Main & Broadway), or other place names.
3. Click the **Find** button in the upper right. This will populate a list of places in the lower box.
4. Right-click on the row you want and choose **Zoom To**. Your map will zoom and pan to the place you have chosen.

For more details, refer to ArcGIS Desktop Help.

Basemaps




If desired, you may add an ArcGIS basemap to your project in addition to the SALUIT locator map. This may be helpful in showing aerial imagery when selecting parcels, for example. Access ArcGIS basemaps from the ArcMap **Add Data**  button on the Standard toolbar. Note that they may take some time to load and slow down zooming and panning. For best performance, leave basemaps turned off until you are zoomed in to the general vicinity of your site.

ADVANCED PROJECT CREATION METHODS

Advanced: Starting From an Existing Project

You may create a SALUIT project analysis from an existing ArcMap project or CommunityViz analysis.

1. Click **Create New Project**  and fill in Project Properties normally.
2. To Define Project Area, you may choose any of the following methods:
 - a. Use the standard method described above. If a **Load Locator Map** button is visible on the Create SALUIT Project window, SALUIT has detected your existing project and will not load the locator basemap automatically. Press this button if you need it. Note that the Locator Map (sometimes labelled "Saluit/SaluitBaseMap") appears at the bottom of your table of contents. To see it, you may need to turn off other layers or drag the layer upward in the table of contents.
 - b. Use the [advanced method](#) for defining project area described below.



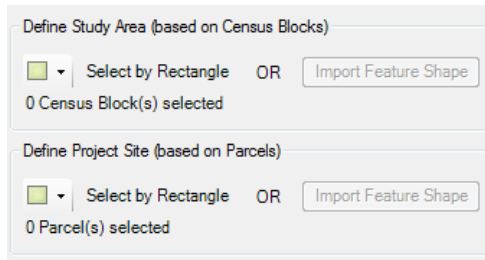
3. Click **Create Project**. Data will be downloaded to match the project area you just defined.

Advanced users may also wish to use [Download Data](#) or [Load Local Data](#) as part of their project creation process.

Define Project Area Advanced Method: Use Existing Data

If you already have a GIS layer (called a selection layer) containing a polygon feature or features that define your study area or project site, you can use it to select Census blocks or parcels to use for your selection. This may save time if, for example, you already have a project site layer available. Note that the final SALUIT project site or study area may not match your feature shape exactly because SALUIT is constrained to using Census block and parcel boundaries.

- A. Before opening the Create SALUIT Project window, add the layer(s) to your ArcMap project using standard ArcGIS tools.
- B. Open the Create SALUIT Project window and specify project properties.
- C. In the Define Project Area section, click **Advanced Options**. This will display the **Import Feature Shape** buttons on the Create SALUIT Project window. At this stage they will still be inactive (grayed out).




- D. Using normal ArcMap tools, select the feature or features in the selection layer you want to use for selection. This will activate the **Import Feature Shape** buttons.
- E. In the Define Project Area section, click the **Import Feature Shape** button under Define Study Area or Define Project Site, as appropriate. After a short pause, you will see Census blocks (for study area) or parcels (for project site) selected. These are the features that intersect your imported feature shape(s). To define both a study area and a project site using this method, do one first, then change your selection and do the other.
- F. If needed, adjust the selection using the manual **Select by ...** tools described in the Manual method above.

TROUBLESHOOTING AND REPORTING

If there are any problems downloading data from the cloud, you may receive an informational error message. This message may occur because the NJTPA server is offline, there were problems with your internet connection, or data has become unavailable for some reason.




- **Please report these events to NJTPA** when they occur so we can quickly identify any problems with the data we are serving. Visit the SALUIT website for contact information: <http://www.njtpa.org/Data-Maps/Land-Use-Impact-Model.aspx>

You may also wish to try again at a later time, and/or check to be sure you have the latest [configuration file](#) and [Standard Template](#) using Check for Update from the **About SALUIT**  button.



DOWNLOAD DATA

Use the **Download Data**  button on the SALUIT Toolbar to **download all available SALUIT cloud data** for your current study area and project site. To use this function, you must:

- Be connected to the internet
- Have a Scenario 360 analysis open
- Have a layer in your analysis named “Study Area Boundary”

The download starts immediately and may take some time. You can stop the process by clicking **Cancel** on the progress dialog; however, any data that have already been downloaded will not be removed.

Typical reasons for using this function:

- You want to refresh an earlier download with the newest available data
- An earlier attempt to download data failed or was stopped prematurely
- You want to retrieve data without using [Create New Project](#)
- You just want the data and don’t want to use other SALUIT functions at this time

Downloaded data are placed in a geodatabase in your analysis folder:

C:\CVFiles\{AnalysisName}\Data\CloudData.gdb

The downloaded data are not automatically added to your current analysis. If you want to add them, use [Load Local Data](#) after downloading.

For some layers in the [Standard Analysis](#) template, data may be retrieved for locations near, but outside the study area. This is done intentionally so that access calculations (e.g., distance to nearest transit stop) are more meaningful in areas where destination points are scarce. Details will vary based on configuration, but as an example, if there are no transit stops in the study area, Download Data may look to see if there are any stops within 1 mile of the boundary (a 1-mile buffer around the study area) and if so, retrieve those. If there are no stops within 1 mile, it will try again at 5 miles and then again at 15 miles. You can inspect your downloaded data to see which features were retrieved.

IF YOU ARE NOT USING A SALUIT-CREATED PROJECT

To determine which data to download, Download Data uses:

1. A layer called **Study Area Boundary** containing exactly one polygon feature (multipart polygons not allowed)
2. A layer called **Project Site Boundary** containing exactly one polygon feature (multipart polygons are allowed)

If either layer contains more than one feature, only the first feature is used. These layers are automatically created for you if you use SALUIT’s [Create New Project](#) tool. If you do not use that tool, you can create the layers yourself.



Only the Study Area Boundary is required. If the Project Site Boundary is missing, no parcels data will be downloaded and you will receive a message saying so, but other data pertinent to the Study Area, including parcels, will still be retrieved.



LOAD LOCAL DATA

The SALUIT Load Local Data wizard provides an optional manual mechanism for you to add data to your existing analysis. You can point to any appropriate GIS data source your computer can access. Data are copied into the datasets referenced by your SALUIT analysis and the source is left intact. The process works by adding features or records to existing—though possibly empty—layers in the SALUIT analysis. It does not add new layers.

- **TIP:** Do NOT add dynamic data to your SALUIT analysis (CVAnalysis.gdb) using ArcCatalog or Windows Explorer. Use this wizard or other Scenario 360 setup tools instead.

Typical reasons for using this wizard:

- *Adding* data to layers for which information is not available from the NJTPA SALUIT cloud. Examples: fire stations, hospitals, or local amenities. In the SALUIT Standard template, you can use local data for “[points of interest](#)” layers.
- *Supplementing* cloud data with additional features. Example: local parks that don’t appear in regional parks datasets.
- *Replacing* cloud data with new or better data to which you have access.

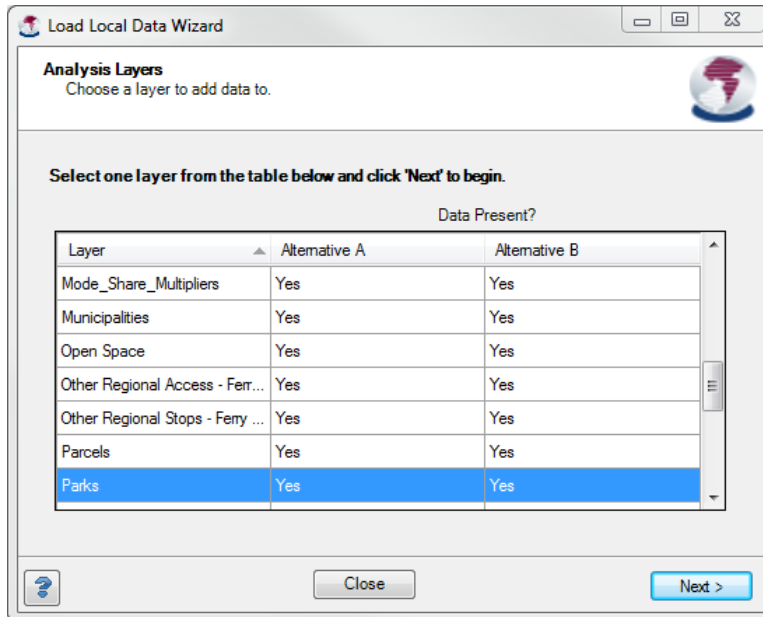
Access the Load Local Data wizard from the [SALUIT Toolbar](#) using the **Load Local Data**  button.

LOCAL DATA REQUIREMENTS

- Ensure the layer is projected in the SALUIT standard coordinate system:
NAD_1983_StatePlane_New_Jersey_FIPS_2900_Feet
- Check the extent of the layer and clip if necessary to lie within or near the study area. All data in the source dataset will be loaded into the analysis.



SCREEN 1 – ANALYSIS LAYERS



This screen displays the non-core data layers and tables used by the SALUIT Template you are currently using (which was set when you used [Create New Project](#)). Both dynamic and non-dynamic layers are shown. SALUIT core data layers (TAZ and Site Parcels) are excluded because special versions maintained by NJTPA are required for SALUIT models to work properly.

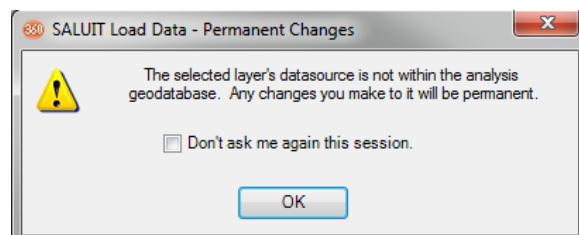
The term “layers” is used to refer to either layers (feature classes) or stand-alone data tables.

The names of the layers appear in the Layers column. Subsequent columns show your current scenario(s) and specify whether any features are present for a given layer in a given scenario. Yes means at least one feature is present.

Italic font in a row means that you have loaded data for that layer during this wizard session. This information may be helpful when you are loading several layers and need to keep track.

To add or modify data for a given layer:

1. Click on the layer’s name in the grid to select it. The row will turn blue. Select only one layer at a time; you will be able to return to this screen and work on additional layers later if desired.
2. Click **Next**. This displays Screen 2 (see below).
3. Before the next screen appears, if you are adding data to a non-dynamic layer, you may receive a message notifying you that any changes you make to the layer will be permanent. This is a courtesy message and it is usually fine to click OK. “Permanent” means that your changes cannot be undone by SALUIT or CommunityViz because you are working outside the

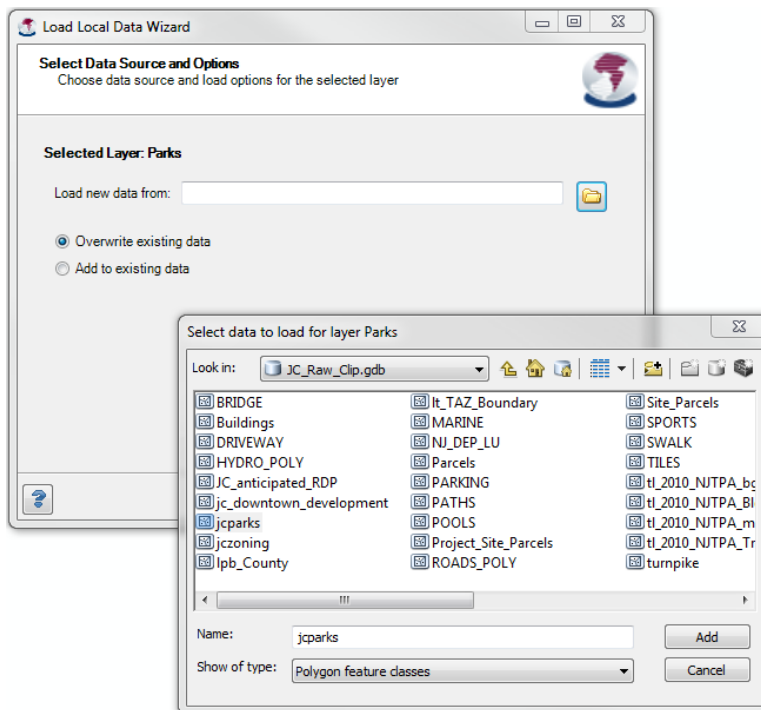



CVAnalysis.gdb database that they control. If necessary, you can still edit the layer at a later time using other ArcGIS tools and ArcCatalog.

Close exits the wizard.

- If you have loaded any data during this wizard session, you will be prompted to run an **analysis update** on that layer. An analysis update is recommended because it recalculates all the formulas relating to the layer so that the new information is included in modeling results. The main reason not to run an update would be that it may take a long time and you want to postpone it until later.

SCREEN 2 – SELECT DATA SOURCE AND OPTIONS



1. Click the **Browse**  button to locate and select the source of the data you want to load.
 - The browser will only display files matching the type (layer type or table type) of the analysis layer you are working on. For example, if the target is a polygon layer, only polygon layers will be shown in the browser.
 - After locating the file, select it and click **Add**.

When you have finished, the full path name will appear in the box on the Select Data Source wizard screen. If the path name is too long for the box and you need to read it, hover your cursor over the box and look for a tool tip.

2. Choose whether to overwrite or add to existing data:



- **Overwrite existing data** is the default and most common choice. It will remove any existing data in the layer you are working on and replace it with your new source data. If you do not have any data for that layer currently, this choice will simply add your new source data.
 - **Add to existing data** allows you to supplement existing data with additional features or records. Use it with caution. If there are identical features in the existing data and the new source data, this option may produce hidden duplicates, potentially leading to confusion and unexpected results.
3. In some cases, you may be given the option to **Load to selected scenario only**. If you have local data that you want to use in one scenario but not others:
- Check the box and then specify a scenario using the dropdown options.

This option is usually used for adding data that describe a particular development proposal. You want the features to appear in just one scenario so you can compare it to existing conditions or, alternative proposals.

This option does not appear for non-dynamic layers because non-dynamic layers are the same in all scenarios. This option is also not available if you only have one scenario in your analysis. To make a layer dynamic, or to add scenarios, use standard Scenario 360 tools.

- [Learn more about dynamic layers and adding scenarios in the Scenario 360 Help.](#)

Cancel Load undoes anything you have entered on this screen and returns to the first screen.

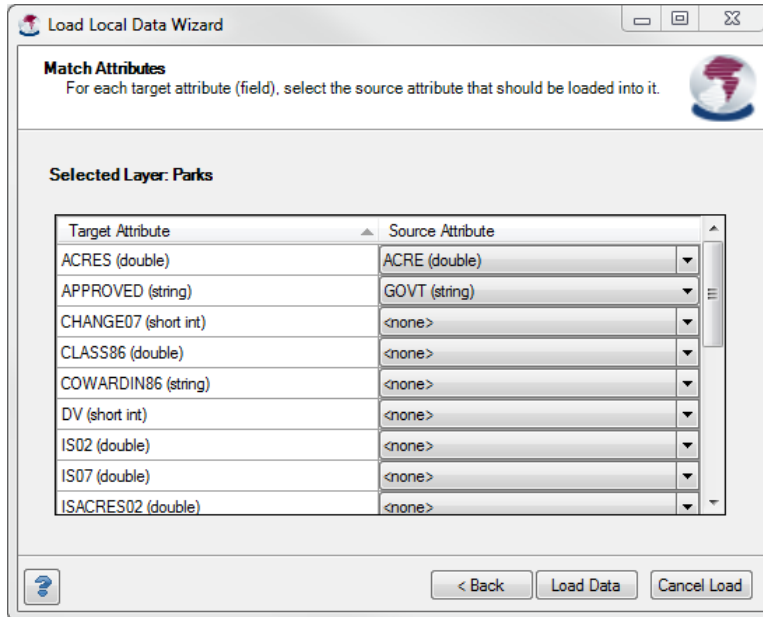
When ready, click **Next** to continue or **Back** to return to the first screen.

Delete Data?

If you chose “Overwrite Existing Data” on this screen, you will be prompted to confirm that you want to delete any existing data with the message, “Overwriting data will delete all existing data, if any, in the layer {LayerName} in scenario {ScenarioName}. Do you want to proceed?” This message is a courtesy reminder and not a cause for alarm. Normally you will respond Yes and proceed to the next screen. If you choose No, nothing more will happen and you will be returned to the Select Data Source and Options screen.



SCREEN 3 – MATCH ATTRIBUTES



Sometimes your source data will use different attribute names than the SALUIT template uses. Use this screen to make the translation.

Matching is only needed for editable, non-dynamic attributes in the layer you are working on. (“Editable” attributes exclude geodatabase fields like SHAPE and OBJECTID.) The information from this screen will only be used to locate data in the source layer. The data and attribute names in the source data will not be changed, and attributes in the source layer that are not used in your SALUIT analysis will be ignored. Matching is not done for dynamic attribute names because the values of dynamic attributes are calculated by Scenario 360, not imported from source data.

In Scenario 360, “attribute” and “field” are synonymous.

Target Attribute gives the names of non-dynamic attributes (if any) in the SALUIT layer you are working on. The geodatabase field type is given in parentheses after the name.

Source Attribute allows you to select attributes in the source layer that contain the values you want used for the corresponding target attribute.

- Matching names are displayed by default.
 - This means that if the source data already contains attributes with the same name as a target attribute, the wizard will detect them and offer them as defaults. You can still change the source attribute if desired.
- Only valid types are displayed.
 - The geodatabase field type of the source attribute must be the same as, or compatible with, the target type. For example, if the target attribute is a number (e.g., *int*, *float*, *double*), then the



source type must also be a number. The wizard only displays valid options from the source data, so you may choose any option it offers. If the exact type does not match but is compatible (e.g., target is *double* but source is *float*), the wizard will convert the source type to the target type during the load process.

- **None** is an acceptable entry for any or all source attributes. However, if your source data is missing attributes listed in the table, you may want to examine the analysis to understand the modeling implications of missing data in your case.
- **A blank table** means the SALUIT analysis does not need any non-dynamic attributes in the layer you are working on. If this occurs, simply click **Load Data** or another desired button at the bottom of the screen.

Load Data launches the process of copying the source data for this layer into your analysis. When loading is finished you will receive a confirmation message and be returned to the first screen of the wizard. The name of the layer you just loaded data for will now be in italics. To load more data, choose another layer and repeat the wizard process.

Cancel Load stops the loading process and returns you to the first screen of the wizard. If you use this button after loading has started but before it completes, check afterwards to be sure that no partial data is remaining in your analysis. If it is, use Scenario 360 tools to remove the layer from the analysis.

ADDING POINTS OF INTEREST LAYERS




The [SALUIT Standard Template](#) analysis includes formulas that calculate distances from residents and employees to up to 3 layers containing unspecified “points of interest.” These layers are not provided by NJTPA but you can load your own if desired using Load Local Data. Typical points of interest include public safety facilities (police stations, fire stations, hospitals), amenities, historic sites, hazard sites, grocery stores and farmers’ markets, and many others.

You must have an existing GIS point layer (shapefile or geodatabase feature class) containing the points. Please make sure the layer conforms to the [local data requirements](#). To use line or polygon layers rather than points, see below.

To load:

- Use Load Local Data on the layers Points of Interest 1, 2, and/or 3.

After loading, set symbology and Saved Views:

1. From the Scenario 360 toolbar, click **Saved Views** .
2. In the **Your Saved Views** list, select the Saved View called Points of Interest {1, 2, or 3 as appropriate} and click **Load View**.
3. Adjust the symbology on your points of interest layer using standard ArcMap tools.
4. Click **Saved Views**  again to bring up the Saved Views list.
5. In the Your Saved Views list, select the view called Points of Interest {number}.
6. Click the **Properties**  button.
7. Do not change anything on this Edit Saved View screen. Simply click **OK** to save your new symbology.




8. **Close** the Saved Views window.
9. Repeat as needed for the other points of interest layers.

Advanced: Polygon and Line Layers as Points of Interest

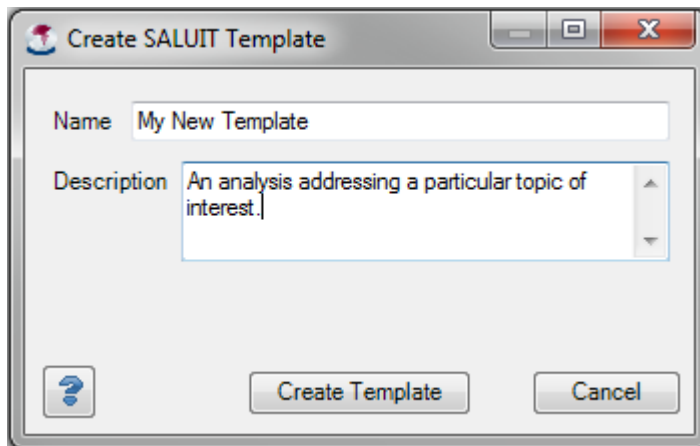
The SALUIT Standard template creates empty point layers for use as Points of Interest. If you are comfortable with CommunityViz Scenario 360 setup, you can use polygon layers or line layers instead per the following instructions. The distances used here are from each parcel in the Site Parcels layer to its nearest feature in the Points of Interest layer. The distances are measured between the closest vertexes of the respective features, not between centroids.

To use points-of-interest layers containing polygons or line features in the SALUIT Standard template:

1. Add the layer(s) to your analysis using the ArcMap or the Scenario 360 **Add Data**  command.
2. Using standard Scenario 360 formula editing tools, revise the following two dynamic attribute formulas so that they will look for your new layer rather than the original Points of Interest layer:
 - In the **Site Parcels** layer, edit the dynamic attribute **Dist2POI**
 - In the **Parcels** layer, edit the dynamic attribute **Dist2POI**
 - If needed, edit **Dist2POI2** and **Dist2POI3** in a similar manner
3. Optionally, edit the names of affected indicators so they are more descriptive. The indicators affected are:
 - Indicator:Proximity to Points of Interest Site Future 1
 - Indicator:Proximity to Points of Interest Study Area Fut 1
 - Indicator:Proximity to Points of Interest Baseline 1
 - Indicator:Proximity to Points of Interest Site Baseline 1
 - Indicator:Proximity to Points of Interest Forecast 1



CREATE TEMPLATE



If you have made a useful new analysis that you want other people to be able to use in their own locations, you can create a template and share it. The button sequence for saving a template is extremely simple, but you should take care in preparing your analysis beforehand. For more information on templates, see [About SALUIT Templates](#).

PREPARATION

A template is meant to be reused and shared, either by others or by yourself at a later time, so you want it to be carefully made, easy to understand, and well documented. You create a SALUIT template by creating a CommunityViz Scenario 360 analysis (either from scratch or from another SALUIT analysis) and then saving its structure. Thus the key to making a long-lasting, useful template is making a well-documented, easy-to-understand prototype analysis.

If they are going to use cloud data, SALUIT Templates *must* contain:

- A layer called **Study Area Boundary** containing exactly one polygon (multipart features are not allowed)
- A layer called **Project Site Boundary** containing exactly one polygon (multipart features are allowed)

If these layers are absent, other aspects of the template will still work, but no cloud data will be downloaded.

In addition, following are guidelines or “best practices” for those templates.

- Give preference to using datasets that are widely available at the appropriate scale across the region
- Give preference to indicators that will be meaningful to multiple projects, not just the current one
- Give preference to reusing source data that is already available from NJTPA
- Give preference to using variable assumption values that are provided in the model parameters table. Other assumptions will still be saved, but their values will not vary by location.
- Use clear, plain English names for all analysis components including layers, dynamic attributes, indicators, assumptions, charts, and saved views
- Include easily-understood descriptions with all analysis components, including layers
- Use variable assumptions for any modeling parameters that may differ across locations
- Build Saved Views, paying close attention to what a new user will see and the sequence they will experience using the Saved Views Browser



- Build Saved Views using the “zoom to layer” option rather than your own current screen extent

CREATE A SALUIT TEMPLATE

1. From the [SALUIT Toolbar](#), click **Create Template**  .
2. In the Create Template window, give your template a useful, descriptive, easily recognizable name.
3. Click Create Template.

Saving may take some time. When it is complete, your new template will be stored as a file with the file extension *.cvtem* in C:\CVFiles\Templates\SALUIT. For example,

C:\CVFiles\Templates\SALUIT\MyTemplateNameExample.cvtem

You may share the file freely.

If you think other SALUIT users would benefit from your template, please send it to NJTPA for potential posting on the SALUIT website.

USING SHARED TEMPLATES

If someone else shares a template file with you, place it in C:\CVFiles\Templates\SALUIT, then start ArcMap, then click [Create New Project](#) from the SALUIT Toolbar. The new template will appear in the dropdown list of template options.



ABOUT SALUIT TEMPLATES

SALUIT Templates are reusable collections of CommunityViz formulas and other analysis components that can be applied to different study areas—essentially, topic-specific CommunityViz analyses without the data. They are stored as files that can be easily shared among users.

For instructions on making your own SALUIT Template, see [Create Template](#).

Depending on what the person who authored the template chooses to use, templates include some or all of the following Scenario 360 components:

- Layer and table names (but not content)
- Dynamic attributes including their formulas
- Non-dynamic attribute names
- Indicators including their formulas
- Assumptions including their min, max, and default values
- Charts
- Alerts
- Saved Views
- Sketch Styles
- Wizard settings for:
 - Build-Out Wizard
 - Suitability Wizard
 - 360 Indicators

SALUIT Templates are saved as a special file type, *.cvtem*. They are stored in C:\CVFiles\Templates\SALUIT. SALUIT is installed with one template called *SALUIT Standard*. If other users create and share additional templates, or if you make a template for your own use, you can use those as well.

To use an existing template, be sure its file is stored on your computer in C:\CVFiles\Templates\SALUIT. Then [create a new project](#) and choose the template name from the dropdown list at the top of the Create SALUIT Project window.



SPEED AND PERFORMANCE RECOMMENDATIONS

As a project gets larger and an analysis gets more complex, users may start to experience delays as they work with the tool. Following are suggestions for managing and improving speed and performance:


PROJECT SIZE

- Keep the number of parcels in the **project site** as small as possible. This count is usually the most important factor for both data download times and real-time analysis performance. Performance depends on a great many factors, but as a rough guideline you can expect fast performance with anything less than 100 site parcels, and acceptable performance with less than 1,000 site parcels.
- Limit the number of parcels in the **study area** if you can. This count affects how long it takes for initial data download and for the initial, one-time analysis update when a project is created. If using the SALUIT Standard template, it is not as large a factor for subsequent analysis.

CREATING NEW PROJECTS

- Choose a time to create a new project when you have some time available, because a great deal of data transfer and processing is required.
- Create and test a project yourself before engaging others.

REAL-TIME ANALYSIS

- When painting (sketching) alternative land-uses, consider using **Suspend Dynamic Analysis**  to temporarily pause updates during a sketch session for a smoother experience.
- Minimize the number of scenarios you create. Usually 5 scenarios is more than enough for good decision-making, and fewer scenarios means faster updates.

CREATING NEW TEMPLATES

- Use Scenario 360 best practices for speed and performance.
- If using parcels in the SALUIT Standard template, avoid calculations (except one-time set-up calculations) on the SALUIT Parcels layer and use the Site Parcels layer instead.

DATA MANAGEMENT


- Backup your work regularly. Make backup files using ArcMap **File** menu ► **Save Analysis As...**
- Remove excess layers and attributes.
- If performance seems particularly slow, try cleaning up your database using the ArcGIS **Compact** tool.



CONFIGURATION FILE

SALUIT uses a special file called a configuration file to keep track of settings and information that may change over time. For example, the configuration file contains information on where to find data sources in the cloud, values for certain modeling parameters, and other SALUIT settings.

To keep your SALUIT installation up to date, you should periodically check for configuration file updates provided by NJTPA:

- From the SALUIT toolbar, choose **About SALUIT** .
- Click **Check for Updates**.
- Read the message to compare your version number with the latest available. You will be prompted to have the current version downloaded and installed automatically. This process will overwrite your existing configuration file.
- You will also be asked about downloading the latest Standard Template, which is recommended. The template does not have version numbers so the new download may or may not make any changes to your current Standard Template. The template is only used when you first create a new project and updates to it will not affect your existing analyses.

You will need to be connected to the internet for this to work. We recommend checking for updates once per month.

Advanced users may wish to edit their own configuration files using a plain text editor like Notepad to make changes such as changing cloud source location data.

For technical reference, the configuration file is stored in C:\ProgramData\CommunityViz\SALUIT\.



TERMINOLOGY

This article provides descriptions of a few key terms used by SALUIT and some essential Scenario 360 terms. They are in alphabetical order. Refer to the Scenario 360 Help system for a complete glossary.

Analysis is the Scenario 360 term for a Scenario 360 project that includes dynamic analysis components. It is roughly synonymous with “project.”

Attribute is another name for a field or column in a layer attribute table. The term is sometimes used for the entire column in the table and sometimes for an individual cell. Attributes provide information about features in a layer.

Benchmark is an indicator that estimates a typical value for a comparably sized project in the region.

Dynamic attributes in Scenario 360 are layer attributes whose values are determined by formulas and constantly updated by the Scenario 360 Dynamic Analysis Engine.

Dynamic layers in Scenario 360 are those that contain dynamic attributes. They are stored in a special analysis geodatabase called CVAnalysis.gdb that resides in each CommunityViz analysis folder.

Layers as used in this document and SALUIT are geodatabase feature classes *or* stand-alone data tables containing spatial or non-spatial data used in the project.

NJTPA, the [North Jersey Transportation Planning Authority](#), is the federally authorized Metropolitan Planning Organization for 6.6 million people in the 13-county northern New Jersey region. Its region includes the counties of Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren, including the sub-regions Newark and Jersey City.

Project site is the SALUIT term for the location you are studying, typically evaluating the impacts of one or more development proposals. Project sites are defined by a set of parcels (that don’t necessarily need to be contiguous). Once your project has been created, you will be able to sketch proposed land use changes on the project site parcels (and even modify the parcel boundaries if desired). A typical project site is larger than 1 acre and smaller than 1 square mile.

SALUIT (sal-oo-EET) stands for Small Area Land Use Impact Tool.

SALUIT Templates are reusable collections of CommunityViz formulas and other analysis components that can be applied to different study areas—essentially, topic-specific CommunityViz analyses without the data. They are stored as files that can be easily shared among users.

Scenario 360™ is a component of CommunityViz® planning software. It is the platform on which SALUIT is based.

Study area is a larger area that contains the project site. It is included to provide context for the modeling results. While a typical project site is a number of parcels or blocks, a typical study area might be the municipality in which the project site is located. The study area is defined by a set of Census blocks. When working with the analysis, you *cannot* modify study area parcels outside the project site. A typical SALUIT chart will show modeling results for the study area and the project site side-by-side, so they can be compared. For example, you could see a city’s total population (study area result) displayed next to the proposed population of the project site under different scenarios.





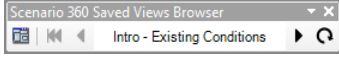
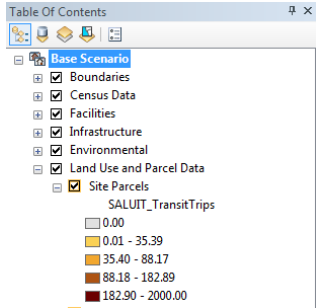




WORKING WITH AN ANALYSIS



WORKING WITH A SALUIT ANALYSIS

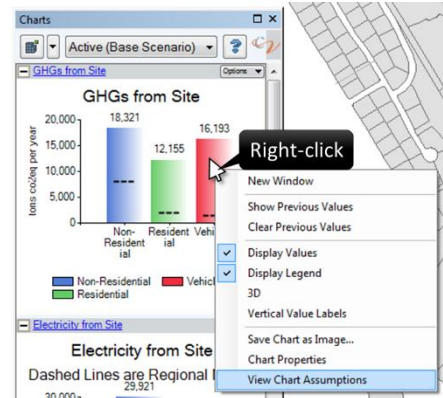
This article provides general guidance on what to do once you have created a new SALUIT analysis using [Create New Project](#) or someone else has created an analysis for you.

Familiarity with CommunityViz Scenario 360 sketching and viewing controls will be helpful. There are no required steps and you are free to work with and explore the analysis in any way you wish, but here are some suggestions:

1. Open the Scenario 360 **Saved Views Browser**  (Scenario 360 toolbar menu ► View ► Saved Views Browser Toolbar). Step through the Saved Views provided by the template you are using (such as the [SALUIT Standard template](#)). Look at the maps and charts to familiarize yourself with the kind of information and analysis being provided. (At this time, you will only be seeing data on existing conditions and a temporary, auto-populated project site land use scenario.) Maps are often color-coded to present particular information. Consult the ArcMap Table of Contents to see the **legend** being used for each layer, and use the checkboxes to turn layers on and off so you can see what's underneath. 
2. **Paint** the initial project proposal onto the Site Parcels layer. If you are new to Scenario 360 sketching, review the Scenario 360 Help on Scenario Sketch Tools or follow these abbreviated directions:
 - If a Saved View for “painting” is available, go to it. In the Standard Template, use the Saved View called Painting Charts.
 - Be sure the Site Parcels layer is turned on. It may be helpful to make this layer the only selectable layer using ArcGIS selection settings.
 - Note that *Site Parcels* is not the same as *Parcels*. Edit the *Site Parcels* layer.
 - Open the Scenario 360 Sketch Tools Toolbar. If desired, **Suspend Dynamic Updates**  .
 - Start editing using the Scenario 360 **Start Scenario Editing**  tool.
 - Click on a land use type shown for the Site Parcels layer in the ArcMap Create Features window, and then use the Scenario 360 **Painter Tool**  (available on the Sketch Tools toolbar) to paint land uses onto parcels in your project site, representing the proposal you are studying. Move the paintbrush slowly ensure each parcel is painted. If you have not suspended dynamic updates, expect a processing delay of up to a minute after you paint the first parcel. Subsequent parcels will update more quickly.
 - *Advanced:* You may also edit Site Parcels features in other ways, such as adding new ones or dividing existing ones using standard ArcGIS editing methods. (Make sure the Site Parcels layer is set as the only selectable layer before editing.) If you divide one parcel into parts, the parts will inherit the land use style attributes of the parent. If you create a new parcel, it will have a blank land use style. You can edit the land use style by painting with the palette.
 - When finished, if you suspended dynamic updates earlier, **Resume Dynamic Updates**  and wait for processing to occur.



3. Return to the Saved Views Browser and tour the analysis again, paying attention to how impacts for the project site have changed.
4. Explore the models for any particular topic in more detail by right-clicking on bars in the charts and choosing options such as Indicator Properties (Formula) or, if applicable, View Chart Assumptions. As appropriate, try adjusting assumptions to see their effect. (Not all charts are affected by variable assumptions. In those cases, View Chart Assumptions is grayed out and inactive.) Horizontal dashed lines on some charts show benchmark values representing results that might be typical for comparably sized projects in the region.
5. *Advanced:* Add parks or transit stops to your project. Use the Scenario 360 **Start Scenario Editing** tool and then standard ArcMap tools to edit the Parks layer or the Future Bus Stops, Future Regional Stops, or Future Train Stops layers.
 - **Tip:** If nothing happens after you add a stop, stop editing and discard your edits. Click **Suspend Dynamic Updates** on the Scenario 360 Sketch Tools toolbar, start editing again and add your stop, then click **Resume Dynamic Updates**.
6. Return to the *Painting* Saved View and experiment with different land use paints representing small changes to the initial proposal, or make an entirely new scenario. You can create additional scenarios to represent alternative site proposals and then compare them using the Scenario 360 Scenario Comparison window, or by setting the Charts window to “Compare by All Scenarios.”



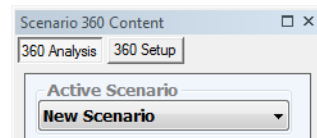
CREATING ADDITIONAL SCENARIOS

To create a new scenario, go to **Scenario 360 Content** window ► **360 Setup** ► **Work Flow** view ► **Scenarios**

and click the **New Scenario**  button.



Tips:

- Saved Views are tied to particular scenarios, so you may need to change the active scenario to your new scenario before painting in it.
- If the ArcMap Create Features window does not immediately display a palette for the Site Parcels layer in your new scenario, turn the Site Parcels layer display off and then on again in the ArcMap table of contents.





GETTING REPORTS

In addition to the charts in each saved view that show the values of select indicators, you can get more details on modeling results in several ways. The two most user-friendly methods are:


- View a summary of indicator values by clicking the **Indicators**  button on the Scenario 360 toolbar. You may wish to **Organize**  the results by category or other parameters.



- Create an HTML and/or printer-friendly report using the **Reports**  button on the Scenario 360 toolbar. Click the **New Report**  button and select report type **Summary of the analysis**. Step through the wizard to select which components and topic categories you want to include.

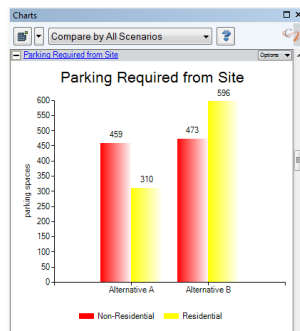
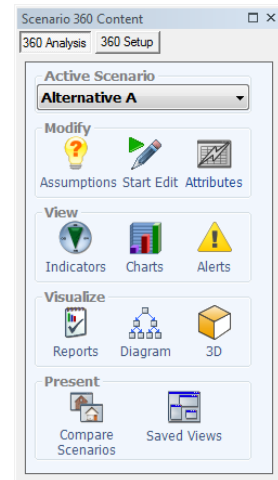
SCENARIO 360 VIEWING OPTIONS

In addition to Saved Views, Scenario 360 provides many easy-to-use controls that allow you customize what you are seeing. Consult the Scenario 360 Help for details, but here are a few highlights:


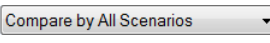
The **Scenario 360 Toolbar** 

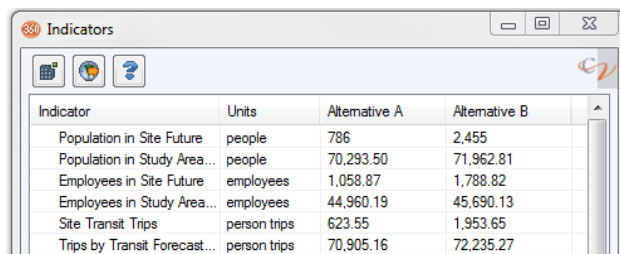
or the similar **360 Analysis** tab (illustrated at right) on the Scenario 360 Content window let you turn on and off the **Indicators**, **Charts**, and **Assumptions** windows, among others. If the Scenario 360 Content window is not showing, click **Toggle**

Scenario 360 Dockable Window  on the Scenario 360 toolbar.





The **Charts** window (illustrated at left) can be docked to any edge of your ArcMap window, or floated in the middle. To make charts larger and labels clearer, make the chart window larger by dragging on its edges. Some charts have dashed lines showing benchmarks. Hover over a benchmark line to read its label. Note the controls at the top of the window:

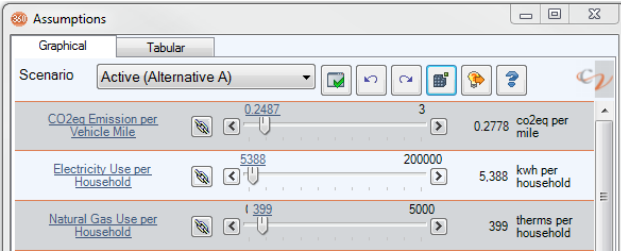
- The **Organize**  button allows you to choose which charts are being displayed.
- The **Scenarios**  dropdown determines which scenario or scenarios charts apply to. The Active scenario is the one currently showing on the map.
- Any given chart can be opened in its own new window: use the **Options** button on the chart.





Indicator	Units	Alternative A	Alternative B
Population in Site Future	people	786	2,455
Population in Study Area...	people	70,293.50	71,962.81
Employees in Site Future	employees	1,058.87	1,788.82
Employees in Study Area...	employees	44,960.19	45,690.13
Site Transit Trips	person trips	623.55	1,953.65
Trips by Transit Forecast...	person trips	70,905.16	72,235.27


The **Indicators** window lists indicator values in tabular form. Click on the top of any column to sort by that column. Drag on column borders to make them wider. Use the **Organize**  button to choose which indicators are being displayed. You can export the table to Excel-readable .csv format using the **Export Indicator Values**  button.

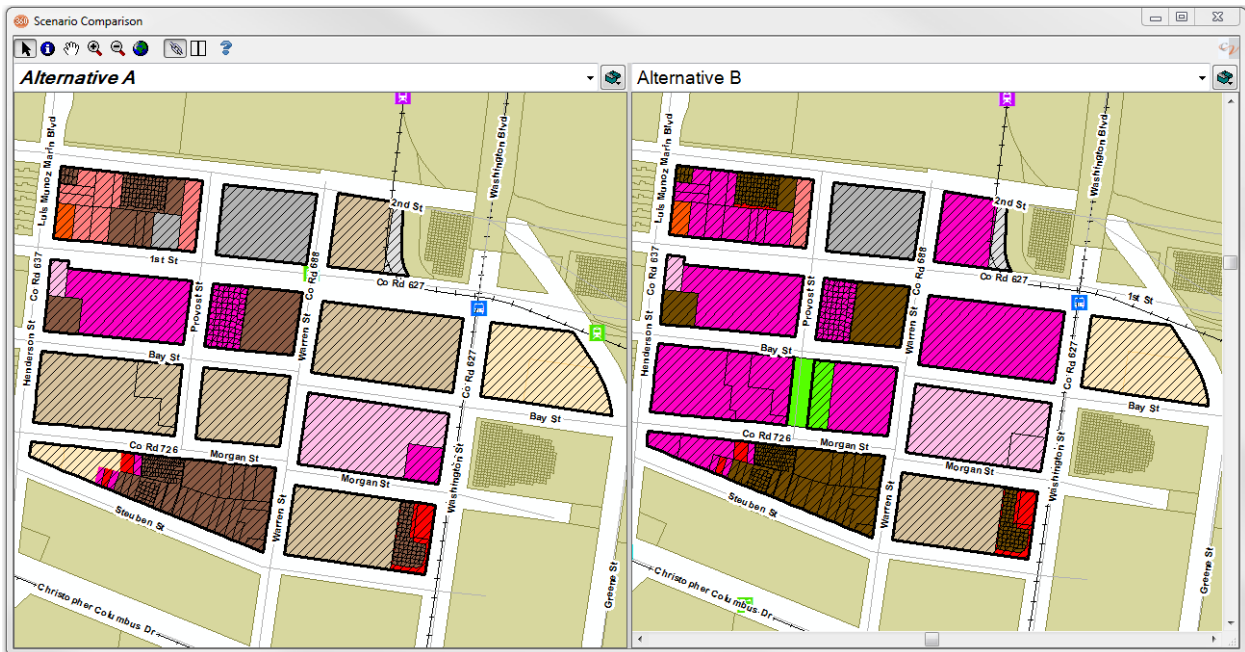




The **Assumptions** window provides an easy way to

view and/or change input parameters used by some formulas and models. Use the **Organize**  button to choose which assumptions are being displayed. To make changes, move the sliders and then click the **Apply Assumption Changes**  button. The underlined blue numbers along the slider scale are the default values; click to return the assumption to its original value. Click on the name of the assumption for its description.

To see side-by-side maps of your scenarios, use the **Compare Scenarios**  button to open the Scenario Comparison window:




READING FORMULAS AND MODELS

(Advanced:.) You can view the Scenario 360 formulas used by SALUIT models using standard Scenario 360 tools.

For a quick view of the indicator formula driving values in charts, right-click on the chart and choose **Indicator Properties (Formula)**. However, most SALUIT indicators are not completely contained in a single formula; the formula you see usually references other components (indicators, attributes, and/or assumptions) as well. The “upstream” indicators and attributes have their own formulas, which in turn may descend from others, and so on, creating a logic tree.



To examine the formula for any indicator or dynamic attribute, go to **Scenario 360 Content** window ► **360 Setup** ► **Work Flow** view and choose **Dynamic Attributes** or **Indicators**. This opens a window listing the attributes or indicators and a summary of their properties, including their formulas. You can filter the list by choosing a **Category** and (for dynamic attributes) a **Layer** (e.g., Site Parcels) at the top of the window and the pressing the **Apply Filter**  button. If you can't see the entire formula, drag the formula column wider, or double-click to open an editing window that includes a Formula tab. Refer to the Scenario 360 Help for more details.

CHANGING MODEL PARAMETERS

(Advanced:) The SALUIT Standard Analysis (and likely other SALUIT templates) come with a number of preset modeling parameters that you can adjust if desired. In the Standard Analysis, the starting parameters are based on NJTPA's research and customized based on the location of your study area and its characteristics (see [Indicators and Models](#)). If you have better data or want to test the effects of different assumptions, you can use CommunityViz and ArcGIS tools to do so.

Please refer to [Indicators and Models](#) for details.





THE STANDARD ANALYSIS



INTRODUCTION TO THE SALUIT STANDARD TEMPLATE

A general purpose analysis, captured as the “SALUIT Standard” template, is included when SALUIT is installed. This section describes what it does and the models it contains. One chapter provides explanatory, planner-oriented notes on the Saved Views, which present modeling results. Another chapter provides a visual guide to the models driving the results.

To set up this analysis on your own data, following the instructions for [Create New Project](#). Once you have created the project, follow the steps in [Working with a SALUIT Analysis](#). Use the Saved Views Browser (Scenario 360 dropdown menu ► Presentation ► Saved Views Browser Toolbar) to display the template’s Saved Views, which provide a tour of the many topical analyses provided. Also feel free to use [Scenario 360 viewing options](#) to explore the analysis on your own.

The data layers, statistics, and modeling parameters used by the Standard Template were first developed in 2015 and may change over time. You may wish to confirm you have the latest [configuration file](#) and have downloaded the most recently available data from NJTPA.

SAVED VIEWS

Narrative descriptions of each Saved View follow. For information on the technical modeling behind the results, see [Indicators and Models](#) and [Model Workflow Diagrams](#). As you view the displays, you can call up additional information using standard ArcMap and Scenario 360 features and displays such as these:

- *Map legend (symbolology)* appears in the ArcMap Table of Contents.
- *Descriptions of the indicators* (modeling results) whose values appear in charts are available by right-clicking on the bar in the chart and choose Indicator Properties.
- *Descriptions of all components*, including assumptions and dynamic attributes as well as indicators, are available by looking at their properties from the 360 Setup tab, in reports, and elsewhere throughout the interface
- *Benchmark values* appear in some charts as horizontal dashed lines. These represent values that would be typical for comparably sized projects in the region.
- *Modeling formulas* can be seen in the 360 Setup windows for dynamic attributes and indicators
- *Tabular reports* showing full details on all components are available via the Reports button on the Scenario 360 toolbar

Feel free to work with the tool’s many interactive features while perusing Saved Views. For example, you may wish to pan and zoom the map, display additional layers or charts, adjust layer symbolology, open or close additional windows, and so on. Simply refresh the current Saved View to return to the original display if desired.

These Saved Views are organized into 3 stages: the first several views provide information about your study area and project site as they are today, based on NJTPA data and models. The Saved Views called Painting and Painting Charts are used for sketching development proposals you are evaluating. The remaining views provide modeling results arranged in topic-specific groups.



INTRO – EXISTING CONDITIONS

This view is a good place to get oriented and familiarize yourself with the study area and project site. Existing conditions are shown on the map and in the charts. “Existing” means “at the time of the latest available data,” which is usually the most recent US Census but may differ based on the data being sourced by the SALUIT [configuration file](#) or potentially [local data](#) you have added.

Map: The ArcMap Table of Contents provides a legend describing the existing land uses displayed. These come from the New Jersey Department of Environmental Protection 2012 Land Use/Land Cover data and the State of New Jersey Division of Taxation 2010 MOD-IV database (or updated versions thereof).

Charts: Estimates for population, households, housing units and employees are based on Census block values that are either shown directly or distributed to site parcels using a model. Commute shed data comes from NJTPA transportation models. NJ Transit’s [Transit Score](#) is calculated as an average for the study area using a formula developed and used by NJ Transit. The red lines show thresholds for achieving various categories of transit supportiveness.

0.0 -- 0.6	Low Base
0.6 – 1.0	Marginal Base
1.0 – 2.5	Low Base
2.5 – 7.5	Medium-High Base
>7.5	High Base

Hover your cursor over a line to read its label.

PROJECT SITE

Map: The view zooms to the boundary of the project site you have defined. Note a new layer in the ArcMap table of contents and on the map symbolized with a neutral color and diagonal hash marks: **Site Parcels**. These features are a copy of the underlying original parcels, and this layer is the one that is used for land-use painting and most of the future-conditions impact modeling performed by the SALUIT Standard analysis.

Charts: Estimates for population, housing units and employees are based on Census block values that are either shown directly or distributed to site parcels using a model.

PROJECT SITE – EXISTING LAND USE

Map: The ArcMap Table of Contents provides a legend describing the existing land uses displayed. These come from the New Jersey Department of Environmental Protection 2012 Land Use/Land Cover data and the State of New Jersey Division of Taxation 2010 MOD-IV database (or updated versions thereof).

Charts: Estimates for population, households, housing units and employees are based on Census block values that are either shown directly or distributed to site parcels using a model.

BUS ACCESS – EXISTING

Map: The layer Bus Stop Access (listed in the Infrastructure layer group) shows quarter-, half-, and one-mile distances to the nearest local bus stop. Regional express buses are not included here but do appear in the



following Saved View. These are “network” distances as opposed to straight-line distances, meaning that they are measured along the street network. The underlying Parcels layer shows straight-line distances.

Charts: Residential (and Employee) Proximity to Bus - Existing charts show the average straight-line distance to the nearest local bus stop for each resident or employee in the area. (If there are no stops within the study area, SALUIT searches outside the study area at increasingly longer distances up to a certain limit to try to find at least one.) Resident (and Employee) Bus Access estimate the number of residents and employees who are within each network distance category. It may be interesting to view this same data in pie chart form: from the Options dropdown on the chart, choose Chart Properties... and then change Chart Type to Pie.

OTHER REGIONAL ACCESS – EXISTING

This view is the same as the previous Bus Access view except that it measures distances to regional or express buses and ferries. Distance thresholds are increased to ½, 1, 5, and 10 miles to reflect the long distances people typically travel to access these services.

TRAIN ACCESS – EXISTING

This view is the same as the previous Bus Access view except that it measures distances to train, light rail, and PATH stations. Distance thresholds are increased to ½, 1, 5, and 10 miles to reflect the long distances people typically travel to access these services.

FLOODPLAIN

Map: FEMA floodplain maps are displayed. Up to three flood zones are shown: 0.2 Pct. Annual Chance is a less risky area than Zones A and AE. Details: <http://www.fema.gov/flood-zones>. The underlying parcels are color coded according to their household density.

Charts: The chart counts the number of existing household units in a flood zone of any type.

PAINTING

Interactive: Use this view, or its companion Painting Charts, to sketch development proposals and assess their impacts. See [Working with a SALUIT Analysis](#).

Map: The Site Parcels layer is featured. Paint land uses on this layer (or edit it in other ways) to represent a project proposal. The land uses available in the palette are described in [Land Use Palette](#). Their parameters have been preset by NJTPA using representative values for your type of study area and can be viewed and/or edited in the data table called LandUsePalette. Also refer to [About Existing and Future Land Use](#) for notes the differences between data shown for existing conditions and modeling results for your paints.

PAINTING CHARTS

This view is the same as the Painting view except that it adds numerous charts showing indicators that illustrate the diverse impacts of the proposal. Other Saved Views present the same charts in smaller, topic-oriented groupings. To learn more about a given chart, look for its relevant Saved View in this list.

ADDING TRAIN STOPS/EXPRESS BUS AND FERRY/LOCAL BUS



Interactive: *Train* refers to train, light rail, or PATH. *Express Bus and Ferry* refers to regional express buses and ferry terminals. *Local Bus* is differentiated from express bus. Use these 3 views to sketch in new transit stops and see the resulting effects on transit access. See [Working with a SALUIT Analysis](#), step 5.

Map: The Site Parcels layer is colored according to the straight-line distance from each parcel to its nearest stop, whether that stop is existing or has just been sketched in by you.

Charts: The charts show the average distance a resident or employee would be from the nearest stop, using straight-line distances.

SITE FLOODPLAIN

Map: FEMA floodplain maps are displayed. Up to three flood zones are shown: 0.2 Pct. Annual Chance is a less risky area than Zones A and AE. Details: <http://www.fema.gov/flood-zones>. The underlying parcels are color coded according to their household density. Here the map is zoomed to the Project Site extent.

Charts: The charts estimate the number of household units in a flood zone of any type. A chart of future site units within flood zones details the units affected from the land use paint proposal for the site.

ROADWAY SYSTEM IMPACTS

Map: Site Parcels are colored according to the density of residential trips they generate. Purely commercial parcels will show 0 values.

Charts: A comprehensive set of indicators is provided. On many charts, horizontal dashed lines represent “benchmarks” that you can use to compare your project with regional or national norms. Hover your cursor over these lines to see their exact value. If lines are not showing they may be off the scale of the chart. You can change the chart’s scale by editing the chart properties from Scenario 360 Setup—see the Scenario 360 Help for details.

- Trips (vehicle trips per day), VMT (vehicle miles traveled), and average trip length are estimated using parametric modeling techniques that forecast the impacts of the development you have sketched based on factors such as land use type, density, and location. Unless otherwise noted, trips are those originating in the project site. “Destination trips” are those attracted by the project site. These results are approximate.
- Parking requirements combine a model with some assumptions you can adjust. From the chart’s Options dropdown box, choose View Chart Assumptions.
- Mode share (percent of trips using vehicles, transit, and walking) is difficult to forecast for future conditions and is coarsely estimated here.

MODE SHARE - SITE

Map: Site Parcels are colored according to the raw number of transit trips they generate.

Charts: Mode share (percent of trips using vehicles, transit, and walking) is difficult to forecast for future conditions and is coarsely estimated here.

SITE PARKING



Interactive: The Assumptions window is open in this view, showing the assumptions that affect parking. After examining the current settings, try moving the slider bar(s) and then applying your new values by clicking the



Apply Assumption Changes button.

Map: Site Parcels are colored according to the raw number of parking spaces they require for combined residential and commercial uses.

Charts: Parking estimates combine a model with some assumptions you can adjust. From the chart's Options dropdown box, choose View Chart Assumptions.

ENVIRONMENTAL CHARTS

Interactive: The Assumptions window is open in this view, showing the assumptions that affect environmental indicators. After examining the current settings, try moving the slider bar(s) and then applying your new values by



clicking the **Apply Assumption Changes** button.

Map: Site Parcels are colored according to their sketched land use.

Charts: Electricity and natural gas consumption values are rate-based estimates for employees and households. Greenhouse gas (GHG) emissions are derived from those two energy uses and vehicle travel. Modeling parameters are adjustable. (From the chart's Options dropdown box, choose View Chart Assumptions.) Water and wastewater usage, as well as impervious surface, are estimated using land-use specific multipliers from the land use palette, which you can view and/or change in the data table called LandUsePalette.

PARKS

Interactive: If your project will include new parks you can add them to the map by editing the Parks layer, and the model will dynamically update its access calculations. Any parks you painted in the Site Parcels layer will need to be copied as new features into the Parks layer. (Parks may also be deleted.)

Map: A Parks layer (derived from regional land use data) displays existing parks. Some local parks may not appear unless they have been added using Load Local Data. Parcels (both study area and site) are color coded according to their straight-line distance to their nearest park.

Charts: The Resident Proximity to Parks - Existing charts show the average distance to the nearest park in the Parks layer for existing residents in the study area and project site. The Resident Proximity to Parks - Future charts show the same information for residents represented by the painted land uses in the project site and existing residents in the study area. All the distance calculations shown here are based on the Parks layer, not on any parcels that might be painted with a "parks" land use. Depending on what you have sketched, features in the Parks layer may represent either existing or future conditions.

POINTS OF INTEREST 1, 2, AND 3

Map: These views will only make sense if you have [added a Points of Interest layer](#) using Load Local Data. If you have, features in that layer will be displayed. Parcels are color coded according to their straight-line distance to their nearest feature in the points of interest layer.



Charts: The Existing Resident Proximity to Points of Interest charts show the average distance to the nearest feature in the Points of Interest layer for existing residents in the study area and project site. The Future Resident Proximity to Points of Interest charts show the same information for residents represented by the painted land uses in the project site and existing residents in the study area.

MUNICIPAL COSTS AND REVENUE

Interactive: The Assumptions window is open in this view, showing the assumptions that affect parking. After examining the current settings, try moving the slider bar(s) and then applying your new values by clicking the

Apply Assumption Changes  button.

Map: Site Parcels are color coded according to their estimated federal, state and local tax revenue from commercial land uses.

Charts: School-age-students living in the proposed project are estimated using land-use specific multipliers from the land use palette, which you can view and/or change in the data table called LandUsePalette. Resulting school costs use a variable assumption for cost per student. Municipal costs include typical expenses for police, emergency services, parks, road maintenance, and general administration (but not schools) associated with new development.

- Cost values will vary considerably across localities, so you are encouraged to check the variable assumptions and adjust them if needed. If they are not already showing, access the assumptions from a chart's Options dropdown by choosing View Chart Assumptions.

Tax and economic activity results in this view use data and models from NJTPA's IMPLAN model. Please refer to [IMPLAN Definitions](#) for detailed explanations.

TRANSIT ACCESS – FUTURE

Interactive: If your project will include new transit stops you can add them to the map by editing the appropriate Future Transit layer, and the model will dynamically update its access calculations that are based on straight-line distances. Results that use network distances (measured along the street network) are not updated.

Map: The layer Bus Stop Access (listed in the Infrastructure layer group) shows quarter-, half-, and one-mile distances to the nearest local bus stop under today's conditions. These are network distances. The underlying Parcels and Site Parcels layers show straight-line distances, which are used when modeling future alternative scenarios.

Charts: Charts with "proximity" in their titles show the average straight-line distance to the nearest transit stop for reach resident or employee in the area. These values will recognize any new transit stops that you add to the map. Charts with "access" in their titles estimate the number of residents and employees who are within each distance category using network distances to existing transit. It may be interesting to view this same data in pie chart form: from the Options dropdown on the chart, choose Chart Properties... and then change Chart Type to Pie.





INDICATORS AND MODELS



INDICATORS AND MODELS

This chapter describes the SALUIT Standard Analysis approach to modeling approximately 27 indicators or indicator sets that have been identified as holding particular importance or interest to planners in the NJTPA region.

ABOUT INDICATORS


Indicators are numbers that measure characteristics of the study area and project site. They are the result of formulas and models being applied to the map data and other supporting information about the project site and study area. Indicators usually use some or all of the following inputs:

- Attributes of features on the map (including both existing and proposed conditions)
- Variable assumption values, also known as inputs
- Tabular data tied to the land use palette
- Other tabular data

Assumptions and tables are described in more detail below.

Some indicators are paired with **benchmarks**, which estimate the typical value for that indicator for a comparably sized project in the region. Benchmarks usually multiply an average rate (adjusted for location) by the number of people, employees, dwelling units, etc., as appropriate.

VARIABLE ASSUMPTIONS

In the Standard Template, the following modeling parameters are set up as variable assumptions that are easy to change using the Scenario 360 “slider bar” **Assumptions**  control:

Number of Bedrooms Single Family
Number of Bedrooms Multifamily Low Rise
Number of Bedrooms Multifamily High Rise
Average School Costs per Student
Average Residential Unit Size
Parking Reduction for Urban Centers
CO2eq Emission per Vehicle Mile
Value for Error Bar
Average Municipal Cost per Capita
Electricity Use per Household
Natural Gas Use per Household
Household GHG Emission Rates
Electricity Use per Employee
Natural Gas Use per Employee
Employee GHG Emission Rates




LAND USE PALETTE

In the Standard Template, the table called Land Use Palette stores many of the parameters associated with the land uses used for painting. The pre-populated land use types are:

Grocery
Hotel
Light Industrial
Medical Office
Mixed Use Multifamily Office Professional
Mixed Use Multifamily Retail
Office Professional
Parks*
Residential Multifamily high rise
Residential Multifamily low rise
Residential Multifamily medium
Residential Single unit high density
Residential Single unit low density
Residential Single unit medium density
Restaurant
Retail
Specialty Retail
Storage Warehousing
Theater Complex
Vacant built
Vacant greenfield

*Note: The Parks land use type is used for most impact calculations, but Standard Template indicators measuring distances to parks are based on a separate layer called Parks. If you paint a Site Parcels feature as a park, or if you create a new feature in the Parks layer, it may be helpful to apply the matching edit to the other layer as well.

To modify the land use palette, you can:

- Change many (but not all) parameter values in the table by editing it with standard ArcMap tools: see the table below for details
- Add, delete, or modify land use types by editing the table with standard ArcMap tools. Once you have made any changes in the land use names or added or deleted land uses from the table, update your Scenario 360 Sketch Styles to match using the Sketch **Style Manager**  .

Here is additional information about the parameter fields in the LandUsePalette data table.

Parameter	Editable?	Description
Division	Yes	Classification used for some parameter look-ups. Options are Urban Core, Inner Suburb, Outer Suburb, Rural, and Shore.



IMPLANUse	Yes	Classification used for IMPLAN look-ups. Options are Hotel, Health Care Office/Lab, Apartment Housing, Prof Office, Retail/Store, and Retail/Restaurant.
LU_BusinessActivity	No: Edit CountyIMPLAN table instead	IMPLAN term. Please refer to the IMPLAN definitions section.
LU_ChildPerHH	Yes	Children per household, used for school attendance calculations.
LU_ConstructionCosts	Yes	Construction costs per square foot. Not currently reported in Saved Views, but calculated costs available for future use.
LU_Density	Yes	Residential dwelling units per acre
LU_EmpPerKSF	Yes	Employees per thousand square feet of building floor space
LU_EmpPerRoom	Yes	Employees per hotel room. Not currently used.
LU_EmpPerScreen	Yes	Employees per movie screen. Not currently used.
LU_FAR	Yes	Floor area ratio for commercial uses. (Total floor area of the building divided by lot size.)
LU_HotelRooms	Yes	Absolute number of hotel rooms.
LU_ISR	Yes	Impervious surface ratio. (Ratio of land that is impermeable to rainfall.)
LU_NonresPkgPerKSF	Yes	Parking spaces required per thousand square feet of commercial building floor space
LU_NonResWW	Yes	Nonresidential wastewater produced in gallons per day, based on restaurant seats, hotel rooms, employees (for light industrial and storage warehousing uses), or square feet
LU_ParkingBenchmarks	Yes	Comparative reference for parking spaces required per land-use-appropriate unit
LU_PersonIncome	No: Edit CountyIMPLAN table instead	IMPLAN term. Please refer to the IMPLAN definitions section.
LU_PPH	Yes	Persons per household
LU_ResH2OUse	Yes	Water use in gallons per day per household for residential uses
LU_ResType	Yes	Classification used for some parameter look-ups. Options are Non-Residential, Residential HR (high rise residential), Residential MF (multifamily), and Residential SF (single family).
LU_RevenuePerEmp	No: Edit CountyIMPLAN table instead	IMPLAN term. Please refer to the IMPLAN definitions section.
LU_Seats	Yes	Absolute number of seats in a restaurant.
LU_Tax_Federal	No: Edit CountyIMPLAN table instead	IMPLAN term. Please refer to the IMPLAN definitions section.



LU_Tax_StateLocal	No: Edit CountyIMPLAN table instead	IMPLAN term. Please refer to the IMPLAN definitions section.
LU_TruckTripsPerEmp	Yes	Truck trips per day per employee for non-residential uses.
LU_TruckTripsPerHH	Yes	Truck trips per day per household.
SCENARIO	No: Do not change	The CommunityViz scenario of the records you are viewing.

OTHER MODELING PARAMETERS TABLES

Advanced users may have reason to edit the other tables (in addition to variable assumptions and the LandUsePalette table) used by the Standard Analysis to store modeling parameters. These include:

- Benchmarks
- CountyIMPLAN
- LUTypes
- Mode_Share_Multipliers. (In this table, do not edit the fields PctTransit and PctWalk; they are dynamic attributes and any edits you make will be overwritten by the formula calculations.)
- ResImpactsFromBedrooms
- Trip_Gen_Rates

Be aware that these tables are populated automatically by SALUIT based on the location of your study area, so their content will vary by location. For a complete set of reference tables for the entire region, please contact NJTPA.

IMPLAN DEFINITIONS

SALUIT uses an NJTPA model called IMPLAN for economic impact assessments. The economic impact assessment estimates the total impacts, which are defined to include:

- **Direct** – the spending at the site of the development. Direct effects are the focal point of an impact analysis.
- **Indirect** – the purchases of goods and services by suppliers. By definition, the first round of indirect impacts includes the purchase of supplies and services that are required to produce the direct effects. Subsequent purchases of supplies and services generate other rounds of indirect impacts. Such purchases continue to ripple through the economies of each of the regions in the MRIO model.
- **Induced** – the purchases (of such items as food, clothing, personal services, vehicles, etc.) that arise, in turn, from the increase in the aggregate labor income of households.

The **total economic impact** consists of the direct, indirect and induced effects. The economic measurements included in this analysis are:

- **Employment Effects** –Jobs generated or supported , including:



- Direct employment: onsite full- and part-time equivalent jobs or jobs in the initial Industry/business development.
- Total employment: The total number of full-time equivalent jobs (direct, indirect and induced) generated in each of the geographically defined regions.
- **Business Output/Revenue** – Output represents the value of industry production. In IMPLAN, these are annual production estimates for the year of the data set and are in producer prices. For manufacturers this would be sales plus/minus change in inventory. For service sectors production = sales. For retail and wholesale trade, output = gross margin and not gross sales.
- **Personal Income Effects** – Includes all forms of employment income, including Employee Compensation (wages and benefits) and Proprietor Income.
- **State and Local Tax Effects** – defined as revenues collected by state and sub-state governments. The taxes include employee, personal, proprietor, business, household and corporate taxes.
- **Federal Tax Effects** – defined as revenues collected by the federal government from corporate income, personal income, social security, and excise taxes.

ABOUT EXISTING AND FUTURE LAND USE

SALUIT models land use (and the resulting impacts) in two different ways. The method for existing land use is different from the method for future land use.

First, the model calculates existing land use for each feature in the **Parcels** layer (the attribute *BASE_LandUse*). This value is calculated from 2 sources: New Jersey Department of Environmental Protection 2012 Land Use/Land Cover data and the State of New Jersey Division of Taxation 2010 MOD-IV database (or updated versions thereof). The existing land use value is used to determine how population, households, housing units and employees are assigned to parcels from overlying Census block data. This is helpful in analyzing where people are today in relation to bus stops, floodplains and other model facilities. If you want to modify existing land use, change the value of *BASE_LandUse* in the Parcels layer and associated results will update accordingly.

Second, the model provides a way for a user to develop a land use future in the **Site Parcels** layer. Initially, when you load the Saved View for Painting or Painting Charts, the Site Parcels layer is pre-populated with some suggested future values. These value are *not* the same as present day land use. You can use the land use palette to modify these and paint the Site Parcels layer with a future scenario that is “similar” to present day in land uses, but the impact calculations will use the same modeling logic as they do for other future scenarios. In particular, they will estimate the future population using density rates associated with the land uses you have painted, rather than looking at existing population data from the Census the way the Parcels layer does. The result is that your future scenario that simulates present day land uses will likely not show the exact same population as shown for existing conditions.

To illustrate this idea, take the example of a 1-acre parcel that currently holds a multifamily building with 25 apartment units. Based on Census data, this parcel has 35 residents. In the *BASE_LandUse* attribute in the Parcels layer, this feature is classified as “RESIDENTIAL, HIGH DENSITY OR MULTIPLE DWELLING.”



Suppose you want to simulate this parcel in a future scenario so you can demonstrate a “no change” condition. You start by painting the corresponding feature in the Site Parcels layer with the land use “Residential Multifamily low rise,” which is the closest you have to the existing land use. This paint assigns a density of 20 units per acre and 2.5 persons per household, which results in a modeled outcome of 20 apartments and 45 residents. This result is similar to, but not exactly the same as, the Census data.

SALUIT is designed to work across multiple locations in a large and diverse region. The Land Use Palette for future uses is helpful in providing a starting kit of land use types for building and testing possible futures, but it will not always match your local conditions exactly. If you want to adjust the model, you can modify the density values for “Residential Multifamily low rise” in the LandUsePalette table, or create a new land use class that more closely matches your existing conditions.



INDICATOR DIRECTORY

HOW INDICATORS ARE DESCRIBED IN THIS DOCUMENT

When describing the locations being studied, this document uses the following terms:

- **Site, or project site** is a specific location where proposed changes are being considered as part of the analysis. It is the “small area” in the name “Small Area Land Use Impact Tool.” Typically it is a few parcels, a few blocks, or a neighborhood.
- **Study area** is a larger polygon that is used for context and comparisons. Study areas consist of one or more contiguous census blocks.

SALUIT takes a site-centric approach to impact indicator calculations for project scenarios, which means that it calculates the impacts generated by the project site, but generally does not calculate the wider, downstream system or community impacts. An example is trip generation: SALUIT estimates vehicle trips per day generated by the project, but it does not model the broader impact of those trips on the community’s transportation networks.

Indicators were developed based on municipal, regional, state and national data sets, depending on the type of indicator and geographic scale. Where possible the most granular and precise data has been incorporated into SALUIT.

Indicator values can apply at both the site scale and study area scale. In addition, they can represent existing conditions and/or future conditions. These indicator variations can be thought of as entries in the following table:

	Present	Future Forecast	Alternate Scenario
Site	(entry)	(entry)	(entry)
Study Area	(entry)	(entry)	(entry)

SALUIT is an impact measurement tool (the “I” in the acronym). To calculate impacts, it often multiplies the number of impact *generators* (e.g., households or employees) by an impact *coefficient* (e.g., trip generation per square foot for a given land use). When this calculation occurs in a model, the number of impact generators comes from specific data about the site or study area, but the coefficients are often generalized to a higher scale such as rural/suburban/urban or a region-wide average.

In SALUIT, data regarding impacts for present and future forecast conditions for the study area generally comes from published sources such as US Census and NJTPA’s regional data and models. The indicator values presented are derived by looking up these published values and summarizing them appropriately. Indicators for the project site are usually calculated by SALUIT using modeling techniques described below. In tabular form, the typical (though not universal) modeling approach for each situation is:

	Present	Future Forecast	Alternate Scenario
Site	Look-up from data representing existing conditions	Not used	Modeled using coefficient values
Study Area	Look-up from data representing existing conditions	Look-up from future forecast data	Study area forecast combined with model results above



Depending on the information available and the indicator's context, not all scale or conditions will be used. The color scheme in the table will indicate which scale and conditions are being used by the indicator. Green indicates that the condition and scale are being used; gray indicates that they are not being used by the indicator.

While the formula or model for each indicator variation above will usually be the same, the data used may vary:

- For project scenarios at the site level, the data for impact *generators* (e.g., households or employees) usually comes from the sketches in the scenario itself. The data for impact *coefficients* (e.g., trip generation per square foot for each land use) is usually from an external, project-independent source.
- For study areas as a whole, the data for impact generators comes from external sources such as Census block-level or TAZ-level projections. When coefficients are used, they are typically the same as for project sites. Some study area impacts are pre-calculated from NJTPA models, and are simply summarized or averaged for comparison.

In the indicator descriptions below:

- **Description** is general and refers to all variations of the indicator (present/future and site/study area)
- **Formula or Model** is general but uses example names for impact generators, such as parcels or buildings, whose source may vary across indicator variations
- **Data sources** are presented in tables as described above with additional tables or descriptions as necessary.
- **Benchmark** is an optional component that is sometimes included to make the indicator value easier to understand in context. It is provided so that the user can directly compare their indicator to a value that represents a typical condition. The benchmark is often an NJTPA regional or divisional (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural) average value that uses the same data source as the indicator so as to be directly comparable to the indicator.



HOUSES IN 100-YEAR FLOODPLAIN

Description: Summary calculation of housing units that are within the 100-year floodplain.

Methodology: Using CommunityViz spatial functions, calculates the relationship between layer(s) with building data and layer for flood data. Indicator is a sum of units that are in features which intersect the flood areas.

Formula or Model:

$$\text{Polygon (e.g. parcels):} \frac{\text{OverlapArea ([layer : 100-year floodplain])}}{\text{[attribute : shape area]}} \times \text{[attribute : number of units]}$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	Housing Units (Census Blocks), FEMA 100-Year Flood		User Sketch UserInput(ParcelLU), land use density coefficients, FEMA 100-Year Flood
Study Area	Housing Units (Census Blocks), FEMA 100-Year Flood	TAZ Forecast Housing Units, FEMA 100-Year Flood	User Sketch + TAZ Forecast Housing Units, FEMA 100-Year Flood

Benchmark: There is no benchmark for this indicator.

TRIP GENERATION ESTIMATES

Description: For projects sketched in SALUIT, the tool estimates the number of new trips (vehicle-based and otherwise) generated by the project. This relies on assumptions about trip generation rates tied to geographic areas (subregions) within the NJTPA region. The rates are further broken out into residential types (single family, multifamily and highrise). Trip generation rates are derived from the NJRTM-E Model. Trips are calculated for both work and non-work productions and reported as total person trips.

Methodology: Using table lookups, trip generation rates for the specific subregion and residential type are brought into the parcel data and multiplied by the generators from the sketched land uses (future site). Present day trip rates are transferred to parcel data from overlapping TAZ features.

Formula or Model:

$$\text{Trip Rate for Subregion by Unit Type * Population}$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	TAZ (NJRTM-E) trip statistics		Population from user sketch (LU), subregion trip generation rates
Study Area	TAZ (NJRTM-E) trip statistics	TAZ (NJRTM-E) trip statistics	User Sketch + TAZ (NJRTM-E) trip statistics



Benchmark: This benchmark value is the average number of trips per person. A separate weighted average was found for each division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural) of the NJTPA region. The trip information comes from the NJRTME Trip Generation Estimates (based on 2013 ACS) and includes non-motorized estimated trips.

VEHICLE MILES TRAVELED (VMT)

Description: For projects sketched in SALUIT, the tool estimates the new vehicle miles traveled generated by the project. Existing VMT is estimated from NJRTM-E TAZ data. VMT is estimated for both work and non-work productions and reported as total VMT.

Methodology: VMT is derived by multiplying the number of vehicle trips (a percent of total trips) generated by an average trip length. This relies on assumptions about trip distance rates tied to geographic areas (subregions) within the NJTPA region. Trip distance rates are derived from the NJRTM-E Model.

Formula or Model:

$$\text{Percent Vehicle} * \text{Person Trips} * \text{Average Trip Length for Subregion}$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	TAZ (NJRTM-E) trip statistics		Average trip length & percent vehicle for subregion from NJTRM-E, Person trips (previously calculated)
Study Area	TAZ (NJRTM-E) trip statistics	TAZ (NJRTM-E) trip statistics	Site subregion VMT, TAZ (NJRTM-E) trip statistics

Benchmark: The benchmark is the average number of vehicle miles traveled per person. A separate average VMT was calculated for each division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural) of the NJTPA region. VMT was calculated using NJRTME trip estimates by multiplying vehicle trips (all trips with TAZ as origin) by the average vehicle person trip distance and dividing by the 2015 population.

NEW TRUCK TRIPS

Description: For projects sketched in SALUIT, the tool estimates the number truck trips generated by the project.

Methodology: Truck generation is estimated using similar methods to the NJRTM-E estimation method. Rates for truck trips are associated to employments types in the NJRTM-E. In SALUIT, we use the same rates crosswalking the employee types to the Land Use Palette types.

Formula or Model:

$$\text{Truck Trip Generation Rate by Land Use} * \text{Generator (Employees or Households)}$$



Data sources: NJRTM-E

	Present	Future Forecast	Alternate Scenario
Site			User Sketch UserInput(ParcelLU), NJRTM-E truck trip generation rates
Study Area			

Benchmark: There is no benchmark for this indicator.

PROXIMITY TO TRANSIT

Description: This indicator gauges the relative proximity of people and employees to different transit options. It is a calculation of the weighted average distance of dwelling units and employees to transit stops. The indicator differentiates between transit stops of different types: local bus, express bus and ferry, or train (including light rail and PATH).

Methodology:

The indicator is a weighted average distance for all dwelling units (or employees) to the nearest straight-line point of connection to transit (any of the transit options available).

Formula or Model:

$$\frac{\sum_n u_n r_n}{\sum_n u_n}$$

Where n is the number of features, u is the number of dwelling units within a feature, and r is the straight-line distance from the closest vertex of the parcel feature to the nearest transit stop point.

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	Census Blocks (households & employees), transit stops		User Sketch UserInput(ParcelLU), land use density coefficients, transit stops
Study Area	Census Blocks (households & employees), transit stops	TAZ Forecast households and employees, transit stops	User Sketch + TAZ Forecast households and employees, transit stops

Benchmark: The benchmark for this indicator is the weighted average straight-line distance from US Census blocks to the regional transit. The average distances were calculated by division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural).

NJ TRANSIT'S TRANSIT SCORE

Description: A score developed by NJ Transit to categorize areas according to the transit-readiness of an area by measuring densities for population, employment and zero-car households. The scores and categories are

- <0.6 = Low
- 0.6-1.0= Marginal
- 1.01 – 2.5 = Medium
- 2.51 – 7.5 = Medium-High



> 7.5 = High

Methodology:

For study areas, this is a simple look-up from results NJ Transit and NJTPA have already calculated at the TAZ level. (The relevant TAZ will be chosen based on maximum overlap with the study area.) For sites, NJ Transit’s formula (below) is utilized.

Formula or Model:

$$(.41 * \text{Population per acre}) + (.09 * \text{Jobs per acre}) + (.74 * \text{zero car households per acre})$$

Data sources: NJTransit

	Present	Future Forecast	Alternate Scenario
Site	NJTPA Transit Score using TAZ RTP 2013 forecasts		User Sketch UserInput(ParcelLU), land use density coefficients for population and jobs, Census rates for zero-car households
Study Area	NJTPA Transit Score using TAZ RTP 2013 forecasts	NJTPA Transit Score using TAZ RTP 2013 forecasts	User Sketch + Future Forecast

Benchmark: The benchmark is the average NJ Transit score by division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural).

RESIDENTS WITHIN WALKING AND DRIVING DISTANCE OF TRANSIT

Description: Summary calculation of the household population within walkable distances (¼, ½ and 1 mile) to local bus stops and walkable/drivable distances (½, 1, 5 and 10 miles) to regional transit stops. The indicator differentiates between transit stops of different types (local bus, express bus and ferry, and train, including light rail and PATH) and uses an ESRI *network* data type to calculate distance service areas by facility (transit stop).

Methodology: The indicator requires the development of network distance polygons. These shapes depict distances from a transit stop along walkable network pathways. A walkable network was developed from the road network with certain types of roads removed: turnpikes, divided highways and other major arterials that are unlikely to safely support pedestrian traffic. Road directionality (one-way vs. two-way) were ignored when calculating walk networks. The network distance polygons was developed beforehand using Esri’s Network Analyst and served to the user as another map layer. Using a CommunityViz function such as OverlapArea, the indicator sums household populations based on the proportional overlap with the network distance polygons.

Formula or Model:

$$\frac{\text{OverlapArea} ([\text{layer} : \text{network distance polygon}])}{[\text{attribute} : \text{shape area}]} \times [\text{attribute} : \text{households}]$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	Census Blocks (households), transit stops		User Sketch UserInput(ParcelLU), land use density coefficients, transit stops



Study Area	Census Blocks (households), transit stops	TAZ Forecast households, transit stops	User Sketch + TAZ Forecast households, transit stops
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Benchmark: There is no benchmark for this indicator.

EMPLOYEES WITHIN WALKING DISTANCE OF TRANSIT

Description: Summary calculation of the employees within walkable distances (¼, ½ and 1 mile) to local bus stops and walkable/drivable distances (½, 1, 5 and 10 miles) to regional transit stops. The indicator differentiates between transit stops of different types (local bus, express bus and ferry, and train, including light rail and PATH) and uses an ESRI *network* data type to calculate distance service areas by facility (transit stop).

Methodology: The indicator requires the development of network distance polygons. These shapes depict distances from a transit stop along walkable network pathways. A walkable network was developed from the road network with certain types of roads removed: turnpikes, divided highways and other major arterials that are unlikely to safely support pedestrian traffic. Road directionality (one-way vs. two-way) was ignored when calculating walk networks. The network distance polygons was developed previously using ESRI's network analyst and served to the user as another map layer. Using a CommunityViz function such as *OverlapArea*, the indicator sums employees based on the proportional overlap with the network distance polygons.

Formula or Model:

$$\frac{\text{OverlapArea} ([\text{Layer} : \text{network distance polygon}])}{[\text{attribute} : \text{shape area}]} \times [\text{attribute} : \text{employees}]$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	Census Blocks (employees), transit stops		User Sketch UserInput(ParcellU), land use density coefficients, transit stops
Study Area	Census Blocks (employees), transit stops	TAZ Forecast employees, transit stops	User Sketch + TAZ Forecast employees, transit stops

Benchmark: There is no benchmark for this indicator.

PERCENT AND NUMBER OF TRIPS USING ALTERNATIVE MODES

Description: This indicator estimates the percent and number of trips using alternative modes of transportation. These include walk, transit and vehicle trips.

Methodology: Using person trips (work and non-work) previously derived, vehicle trips are broken out based on percent of total person trips from the NJTRM-E percent by TAZ. Future site parcels use an average trip percent for subregion based on geographic match with the project site subregion.

Transit and walk trips use Census Transportation Planning Package percent trips by mode for work-based trips. For non-work based trips, a future implied transit and walk percent is calculated using tested correlative variables to derive an overall percent. Six variables are used:



- Population Density - Population/Developable area (in square miles)
- Employment Density - Employment/Developable area (in square miles)
- Zero Car Household Percent - The percentage of total households with zero cars
- Intersection Density - Number of intersections/Developable Area
- Restrictiveness Ratio - Network restrictive roads miles/total roads miles (network restrictive roads defined as limited access roads, two-way roads with more than 2 lanes in each direction, divided roads, and all roads with freeflow speed greater than 40mph)
- Street Connectivity - Number of intersections/distance of roadways

The first three variables (population density, employment density and zero car household percent) are calculated for the future study area including the project site proposal and forecasted future growth. The final three use a mean value baseline conditions with the study area TAZ features.

Values are multiplied by derived rates which vary by division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural). The summed overall value results in an implied percent of total person trips using transit or walk modes.

Formula or Model:

$$\% \text{ of non-work trips by mode (transit or walk)} = \sum_n V_n M_n$$

Where n is the number of variables for the mode share equation, V is the variable estimate for the study area, and M is the derived rate for that variable and geographic location.

The total trips by mode is then:

- Vehicle trips = % vehicle * total person trips
- Transit trips = % CTPP transit * person work trips + Implied % transit * person non-work trips
- Walk trips = % CTPP walk * person work trips + Implied % walk * person non-work trips

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	NTRTM-E Mode share statistics		Person trips by work and non-work previously calculated, 6 variables for equation, CTPP transit and walk percent, subregion vehicle percent from NJRTM-E, derived multipliers by division
Study Area	NTRTM-E Mode share statistics	NTRTM-E Mode share statistics	Site future trips + Forecast NTRTM-E Mode share statistics

Benchmark: This benchmark reflects the mean mode share percentage using the ACS Census Mode Share 2009-2013 (TAZ as producer) data. Mean percentages were calculated by place types: mature metropolitan, metropolitan with office, industrial and retail uses, urban area, urban center, suburb, rural area, rural town, and vacation area.



Description: Access to... indicators are a set of indicators which reflect the average distance of residents to various community destinations such schools, town centers, health facilities, parks and open space among other potential destinations. While interesting in their own right, these can also be useful for helping planners identify areas (and particularly areas of vulnerable populations) that may need better or more equitable access to certain destinations.

Methodology: Similar to transit access, these indicators gauge the relative proximity of residents to different destination types. It is a calculation of the weighted average distance of residents to the respective destination.

Formula or Model:

$$\frac{\sum_n p_n r_n}{\sum_n p_n}$$

Where n is the number of features, p is the number of people within a feature, and r is the straight-line distance from the centroid of the feature to the nearest destination.

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	Census Blocks (population), community destinations including parks, open space, medical facilities, town centers, schools, and other amenities such as libraries, shopping centers, etc.		User Sketch UserInput(ParcelLU), land use density and persons per household coefficients, community destinations
Study Area	Census Blocks (population), community destinations	TAZ Forecast population, community destinations	User Sketch + TAZ Forecast population, community destinations

While most data for this indicator is supplied by the user, parks and open space is supplied by the SALUIT tool. The parks layer used by SALUIT to estimate the distance from a parcel to a park was created using five input layers:

- NJDEP’s 2012 land use/land cover GIS file
- NJDEP’s state golf course GIS file
- ESRI’s parks layer from their available base data
- NJDEP’s “newstate” state open space GIS data
- NJDEP’s county-level open space GIS data

Benchmark: There is no benchmark for this indicator.

COMMUTE SHED

Description: These twin indicators count the number of jobs within commuting distance (60-minute travel time) of the study area by car or train. They are for general reference and are not affected by site scenarios.

Methodology: The indicators look up TAZ-level data provided by NJTPA’s travel model. Commuting distance is based on 60-minute travel time. The indicator is calculated as a mean value for the study area TAZ features.



Formula or Model:

Mean ([attribute:TAZ:CommuteShed])

Data sources: NJTRM-E

	Present	Future Forecast	Alternate Scenario
Site			
Study Area	NJRTM-E employment data		

Benchmark: There is no benchmark for this indicator.

PARKING SPACE REQUIREMENTS FOR SITE (BY USE)

Description: Summary calculation of the number of parking spaces required by a given use based on Institute of Transportation Engineers (ITE) Parking Generation Manual (4th Edition). Parking needs are reduced based on car ownership. In Urban Core areas, a reduction factor is applied to non-residential parking needs.

Methodology: This indicator depends on the land use types sketched in SALUIT. The number of seats/dwelling units will be multiplied by the peak parking demand to produce a range of parking spaces (minimum and maximum) required for restaurants and residential uses. For all other land use types, parking demand will be calculated per 1,000 square feet of gross floor area (GFA) to produce a range of parking spaces (minimum and maximum) required for office, retail, medical and light industrial uses. It should be noted that, based on the parking requirements contained within local zoning codes, design guidelines, and the New Jersey Residential Site Improvement Standards (RSIS), the parking ranges provided below may need to be modified to account for local conditions.

Formula or Model:

Parking Space Rate * Number of Units * Reduction Factor

Data Source:

	Present	Future Forecast	Alternate Scenario
Site			User sketch plus ITE Parking Generation Manual Estimates (see table below)
Study Area			

ITE Parking Generation Manual (4th Edition)

Land Use	Peak-period Parking Demand Range of Spaces per 1,000 square feet of GFA
Restaurant (High Turnover Sit-Down)	0.23-0.63 per seat
Restaurant with Drive thru	1.45-23.6
Retail (Pharmacy with drive-thru)	1.65-3.75
Retail (discount club)	0.91-4.6
Specialty Retail	1.5-2.9
Office Professional	0.86-5.58
Hotel	0.61-1.94 per occupied room



Land Use	Peak-period Parking Demand Range of Spaces per 1,000 square feet of GFA
Medical Office	0.96-5.65
Light industrial	0.36-1.19
Storage Warehousing	0.03-1.92
Residential Single unit high density	1.33-2.17 per dwelling unit
Residential Single unit medium density	1.33-2.17 per dwelling unit
Residential Single unit low density	1.33-2.17 per dwelling unit
Residential Multifamily low rise	0.8-1.43 per dwelling unit
Residential Multifamily high rise	1.15-1.52 per dwelling unit
Mixed Use Multifamily Retail	1.04-1.96 per dwelling unit

Benchmark: There is no benchmark for this indicator.

CONSTRUCTION COSTS BY TYPE

Description: Construction costs may include estimations of land acquisition costs, taxes, impact fees and other predictable costs associated by common types of development. This is a coefficient-based indicator using the number of square feet of commercial development or similar measurement.

Methodology: This indicator is based on national benchmarks and depends on the project sketched in SALUIT. Costs per square foot of commercial and residential projects will be calculated.

Formula or Model:

$$\text{Cost per Square Foot} * ((\text{Dwelling Units} * \text{Average Unit Size}) + \text{Non-Residential Square Feet})$$

Data Source:

	Present	Future Forecast	Alternate Scenario
Site			User sketch plus RS Means Square Foot Cost Estimates (see table below)
Study Area			

RS Means Square Foot Cost Model Coefficients

Type/Use	Construction Cost per Square Foot
Apartment, 1-3 story	\$153.84
Apartment, 4-7 story	\$168.48
Apartment, 8-24 story	\$213.83
Office/Professional	\$205.73
Warehousing (non-refrigeration)	\$104.84
Food sales	\$105.08
Healthcare	\$240.48



Education	\$158.40
Food Services (restaurants)	\$298.06
Lodging	\$181.76
Strip Shopping	\$122.43
Retail	\$125.73
Service	\$247.38
Movie Theater	\$165.18

<http://www.rsmeans.com/models/>

Benchmark: There is no benchmark for this indicator.

NEW FACILITY/SERVICE COSTS

Description: This indicator estimates typical municipal costs (schools, police, emergency services, parks, road maintenance, and general administration) associated with new development. Development generates revenue but also new expenditures as the local government is required to provide services to new residents. The Rutgers’s University Bloustein Local Government Research Center published this information.

Methodology:

This indicator relies heavily on coefficients that reflect typical expenses at the municipal level. The coefficients may vary based on urban, suburban and rural settings. The user can change the coefficients if they have place-specific data. Expenses are estimated using per capita costs that can easily be multiplied based on the number of additional households, residents, or functional population added during the process of development.

Formula or Model:

Municipal Cost per Capita * Number of People

Data Source:

	Present	Future Forecast	Alternate Scenario
Site			User sketch plus coefficients representing municipal costs per capita from the Bloustein Local Government Research Center
Study Area			

Service Costs per Capita from “Size May not be the Issue: An Analysis of the Cost of Local Government and Municipal Size in New Jersey” (Bloustein Local Government Research Center, November 2014)

Municipal Population Size	Average Cost Per Capita (2011; Without Shore Communities; 513 Municipalities)
Low - 1,900	\$1,271
1,901 - 3,600	\$1,217
3,601 - 5,150	\$1,092
5,151 - 7,050	\$1,200
7,051 - 8,600	\$1,118



8,601 - 11,450	\$1,129
11,451 - 15,930	\$1,290
15,931 - 23,510	\$1,241
23,511 - 40,600	\$1,217
40,601 - 277,140	\$1,340

Benchmark: There is no benchmark for this indicator.

ECONOMIC ACTIVITY AND TAX REVENUE

Description: This indicator estimates revenue (typically from sales tax and property tax, but may include business or franchise taxes) associated with new development. While commercial, service and industrial development is most often associated with generating revenue, residential development also generates revenue directly through property taxes and indirectly through induced sales tax that is generated from spending by new residents of households in residential development.

Methodology: This data was generated by NJTPA using IMPLAN, a complete economic assessment package including data and software. A separate IMPLAN model was run for each NJTPA county. Five metrics were created including personal income, business activity, state and local taxes, federal tax revenue and total tax revenue. Units are in millions of dollars per year. IMPLAN coefficients are based per employee. Additional information about the IMPLAN modeling can be found at the IMPLAN definitions section of this document and on the NJTPA website.

Formula or Model:

Economic activity or tax revenue per employee * Number of Employees

Data Source:

	Present	Future Forecast	Alternate Scenario
Site			User sketch plus IMPLAN Tax and Revenue Model coefficients
Study Area			

Benchmark: There is no benchmark for this indicator.

NEW STUDENT POPULATION (ELEMENTARY, MIDDLE/HIGH)

Description: New residential and mixed use developments typically add families to a neighborhood. This indicator estimates the number of new students (children) added by new developments.

Methodology: This indicator relies on coefficients that estimate the number of children per household by geographic division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural).

Formula or Model:

Number of Households * Children per Household (from Land Use lookup)

Data sources:



	Present	Future Forecast	Alternate Scenario
Site			User sketch plus coefficients derived from US Census 2013 ACS
Study Area			

Benchmark: There is no benchmark for this indicator.

SCHOOL COSTS (ELEMENTARY, MIDDLE/HIGH)

Description: This indicator estimates the total costs associated with adding new students to the public educational system within school districts within the NJTPA region. The state department of education published the Taxpayer’s Guide to Education Spending – 2014 which supplies the information for this indicator.

Methodology: For all new residential projects sketched in SALUIT, the costs of adding new students to public schools will be estimated per pupil. Estimates for per pupil costs vary based on the location of the school district within the NJTPA region (e.g., urban, suburban, rural).

Formula or Model:

$$\text{Assumed Cost per Student} * \text{Estimated New Students}$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site			User sketch plus Cost per student from coefficients from the Taxpayer’s Guide to Education Spending – 2014.
Study Area			

Benchmark: There is no benchmark for this indicator.

NON-RESIDENTIAL PROJECTED WASTEWATER FLOW

Description: The New Jersey Department of Environmental Protection (NJDEP) as part of N.J.A.C. 7-14A-23, Technical Requirements for Treatment Works Approvals Applications, publishes projected flow criteria, which are to be used computing the projected flow to wastewater conveyance and treatment facilities and when making an application for a treatment works approval pursuant to N.J.A.C. 7:14A-22. Projected wastewater flow criteria are provided in gallons per day based on type and quantity of land uses.

Methodology: This indicator uses specific land uses, square footages, as well as the number of seats, students, and employees to estimate the amount of wastewater (in gallons per day) that will result from proposed projects.

Formula or Model:

$$\text{Wastewater Rate} * \text{Proposed Units}$$



Data Sources:

	Present	Future Forecast	Alternate Scenario
Site			User sketch plus coefficients from NJ DEP wastewater flow criteria
Study Area			

Benchmark: There is no benchmark for this indicator.

RESIDENTIAL WATER USE

Description: Residential water use is an estimate of the amount of water consumed per day by households in the NJTPA region. Data for this indicator is published by the USGS for residential water use, broken down by single family and multifamily households.

Methodology: This value is calculated using a coefficient that estimates water consumption and wastewater generations per capita.

Formula or Model(s):

$$\text{Water Use Rate} * \text{Proposed Units}$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site			User sketch plus coefficients from USGS Circular 1405: Estimated Use of Water in the United States, 2010
Study Area			

Benchmark: There is no benchmark for this indicator.

IMPERVIOUS SURFACE

Description: The Impervious surface indicator estimates the ratio of impervious surface area to total parcels area by using coefficients for each land use type.

Methodology: Percent impervious surface coefficients were generated using NJ DEP 2007 land cover data for each land use in the SALUIT palette and will vary by land use division.

Formula or Model:

$$\sum_k a_k r_k$$

where k is the land use type, a_k is the area of parcels with land use k , and r_k is the impervious surface ratio for land use k .

Data sources:

	Present	Future Forecast	Alternate Scenario



Site			User sketch plus impervious surface coefficients derived from DEP land use
Study Area			

Benchmark: There is no benchmark for this indicator.

LAND CONSUMED/PRESERVED

Description: The Land Consumed indicator helps gauge the change in the urban footprint among different scenarios. A parcel is said to be “consumed” by development when its land use changes from undeveloped, open, or agricultural to any built classification in the palette (i.e., residential, commercial, industrial uses).

Methodology:

Sum([Attribute:ParcelsBeforeProject:Area], Where([Attribute:LandUse] = “Undeveloped”)) –
Sum([Attribute:ParcelsAfterProject:Area], Where([Attribute:LandUse] = “Undeveloped”))

Formula or Model: Pending further development

Data sources:

	Present	Future Forecast	Alternate Scenario
Site	Parcel land use		User Sketch UserInput(ParcelLU)
Study Area	NJ DEP LU		

Benchmark: There is no benchmark for this indicator.

GREENHOUSE GAS EMISSIONS FROM VMT AND STATIONARY (BUILDINGS) SOURCES

Description: These indicators estimate the greenhouse gas emissions from automobiles using VMT and stationary sources. For stationary sources, land use-based coefficients based on energy are used to reflect GHG emissions. Data for these indicators originates in the NJTPA Greenhouse Gas Inventory and Regional Forecasts, 2011.

Methodology: Using data derived from the NJTPA Greenhouse Gas Inventory (2006) the amount of carbon dioxide equivalent (CO₂e) is calculated based on a per mile rate for cars and a per therm rate for stationary sources.

Formula or Model:

$$\text{CO}_2\text{e Rate} * \text{VMT} + \text{CO}_2\text{e Rate} * \text{Therms}$$

Data Sources:

	Present	Future Forecast	Alternate Scenario
Site			User Sketch plus coefficient derived from the NJTPA Greenhouse Gas Inventory, 2011
Study Area			



Benchmark: For stationary sources benchmark value uses the average amount of CO₂e in metric tons emitted per year per household (for residential uses) and per employee (for non-residential uses). For vehicular emissions, an average amount of CO₂e in metric tons emitted per year per vehicle mile travelled. These averages were found for each division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural) of the NJTPA region. The emissions data comes from the NJTPA Greenhouse Gas Inventory, 2011.

RESIDENTIAL ENERGY USE

Description: Energy use is an estimate of the amount of energy consumed by households in the study area. Residential energy use is broken down by single family and multifamily households and is multiplied by assumptions about residential energy consumption. Estimating commercial energy use may be possible by estimating energy use per employee or by square foot, but it adds additional complexity and may be limited to certain commercial types.

Methodology: This value is calculated using a coefficient that estimates energy use per household for residential development and per employee or per square foot for commercial development.

Formula or Model:

$$\text{Electricity Rate} * \text{Proposed Units} + \text{Natural Gas Rate} * \text{Proposed Units}$$

Data sources:

	Present	Future Forecast	Alternate Scenario
Site			User Sketch UserInput(ParcelLU), land use density coefficients, energy coefficients
Study Area			

Benchmark: For stationary sources benchmark value uses the average amount of electrical and natural gas energy consumed in therms per year per household (for residential uses) and per employee (for non-residential uses). These averages were found for each division (Urban Core, Inner Suburb, Outer Suburb, Shore and Rural) of the NJTPA region. The emissions data comes from the NJTPA Greenhouse Gas Inventory, 2011.

POPULATION, HOUSEHOLDS AND EMPLOYEES

Description: These indicators display the total number of persons, households and employees for the SALUIT area of interest as well as any new development that the user sketches. Where appropriate, these values are reflected as densities by use. Common data sources such as the US Census and NJTPA employment data are used.

Methodology: These values are sums based on the data in the analysis.

Formula or Model:



Data sources:

	Present	Future Forecast	Alternate Scenario
Site	Census block households and employees		User Sketch UserInput(ParcelLU), land use density coefficients
Study Area	Census block households and employees	TAZ forecast households and employees,	User Sketch + TAZ forecast households and employees

Benchmark: There is no benchmark for this indicator.

LINKS TO INDICATOR SOURCE DATA

- Bloustein Local Government Research Center, “Size May not be the Issue: An Analysis of the Cost of Local Government and Municipal Size in New Jersey” (November 2014)
- IMPLAN, <http://www.implan.com/> See also an NJTPA subregional study which used IMPLAN in Somerset County in 2012-2013, <http://www.njtpa.org/planning/subregional-planning/2012-2013-subregional-studies.aspx>
- NJ DEP, Non-residential projected wastewater flow N.J.A.C. 7:14A-23,
- <http://www.nj.gov/dep/dwg/pdf/rulestwa.pdf>
- NJ DEP 2007 land cover <http://www.nj.gov/dep/gis/lulc07shp.html>
- NJDEP 2012 land cover <http://www.nj.gov/dep/gis/lulc12c.html>
- NJ State Department of Education, Taxpayer’s Guide to Education Spending – 2014; <http://www.state.nj.us/education/guide/2014/district.shtml>
- [NJTPA Greenhouse Gas Inventory 2011,](http://www.njtpa.org/planning/regional-studies/recently-completed-studies/region-wide-greenhouse-gas-emissions-inventory-pro/regionalgreenhousegasinventory.aspx)
- <http://www.njtpa.org/planning/regional-studies/recently-completed-studies/region-wide-greenhouse-gas-emissions-inventory-pro/regionalgreenhousegasinventory.aspx>
- NJTPA NJRTEM-E, <http://www.njtpa.org/data-maps/travel-demand-modeling.aspx>
- NJTPA population and employment forecast data, <http://www.njtpa.org/data-maps/demographics/forecasts.aspx>
- RS Means Square Foot Cost Models, <http://www.rsmeans.com/models/>
- US Census, <http://www.census.gov/>
- USGS Circular 1405: Estimated Use of Water in the United States, 2010





MODEL WORKFLOW DIAGRAMS

The diagrams on the following pages provide a visual explanation of the modeling logic in the SALUIT Standard Analysis.



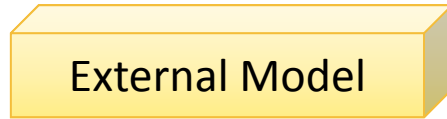


SALUIT Model Workflow

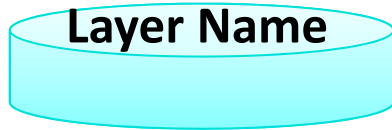
Diagrams and processing steps for various model calculations in the NJTPA SALUIT model



General Legend



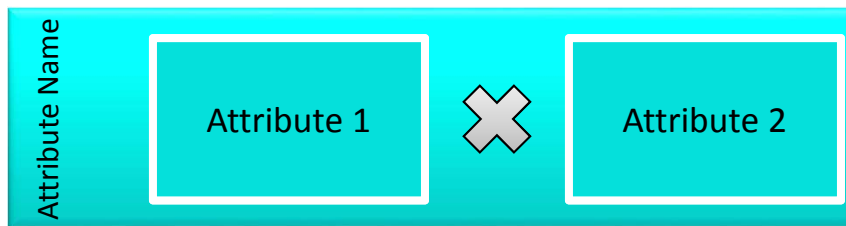
Cubes represent models outside of SALUIT which may inform data layers used



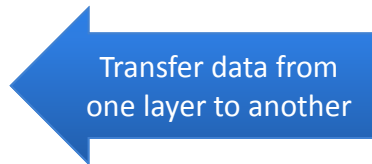
Silos represent datasets being used in the model as dynamic layers or lookup (reference) layers



Attribute values are typically represented as rectangles throughout this document – Rectangles located outside of silos are indicator values



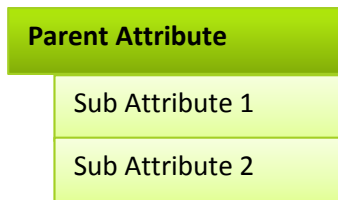
Attribute values sometimes contain internal calculation steps and appear as to the left



Large arrows describe the geoprocessing step to transfer data from one layer to another within the analysis



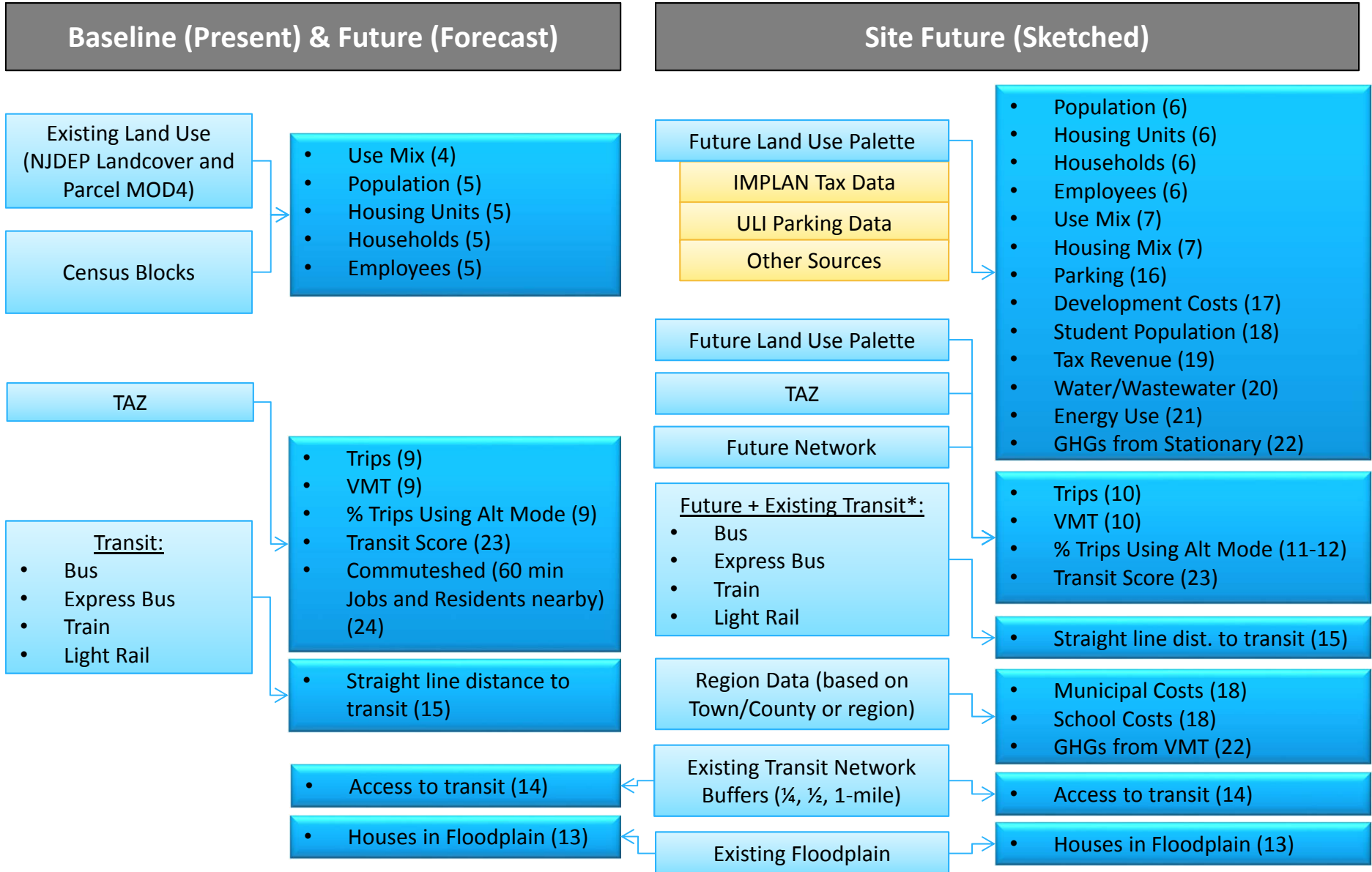
Black arrows illustrate the flow of calculations, between data layers and internally within



Attribute groupings appear with the master attribute as a bold title with sub attributes indented below – sometimes calculations are included in the list to maximize space usage



Model Flow Overall

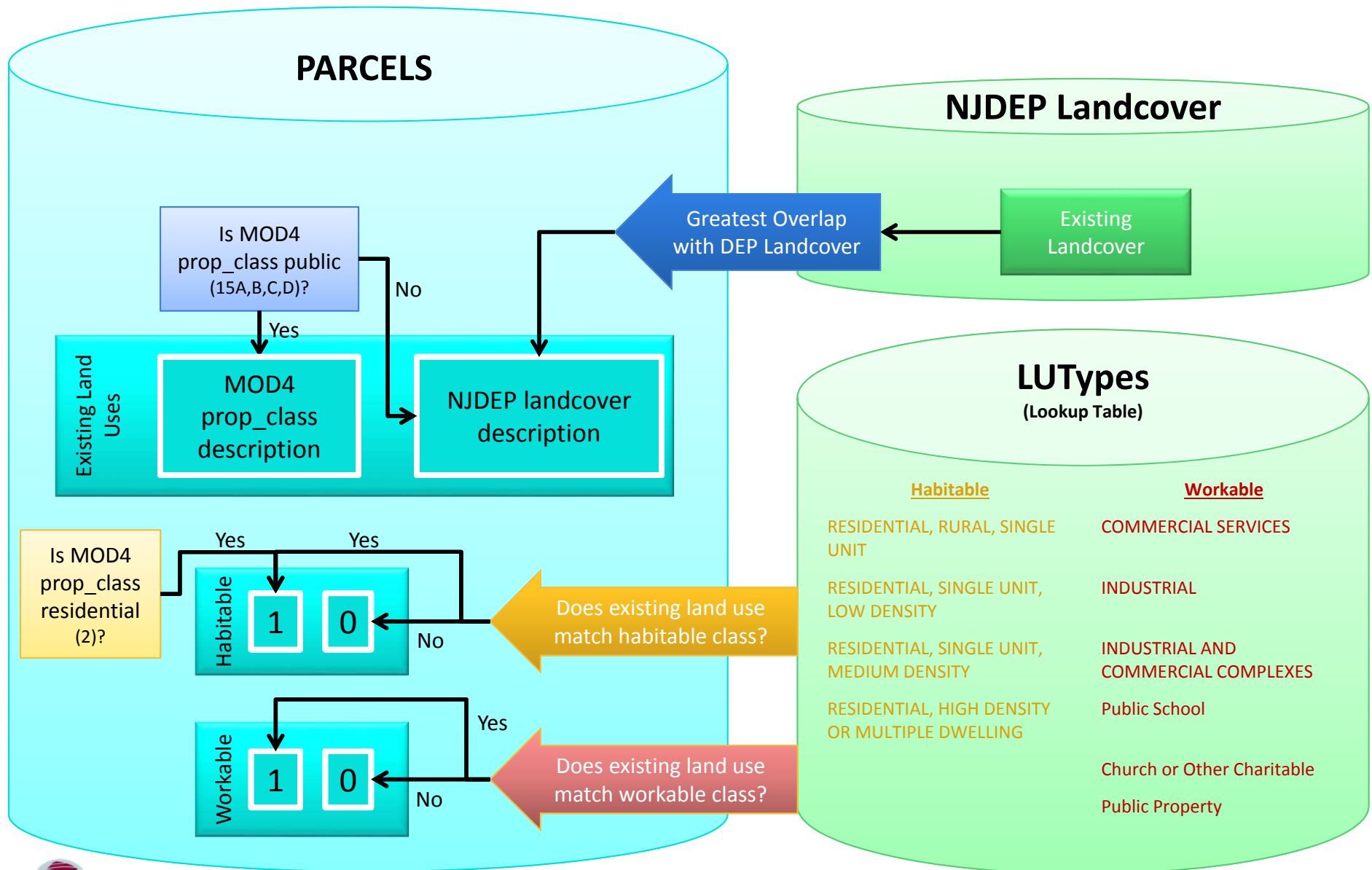


NOTE: Letters in parentheses represent the page reference where more detailed flow diagrams can be found for that item.

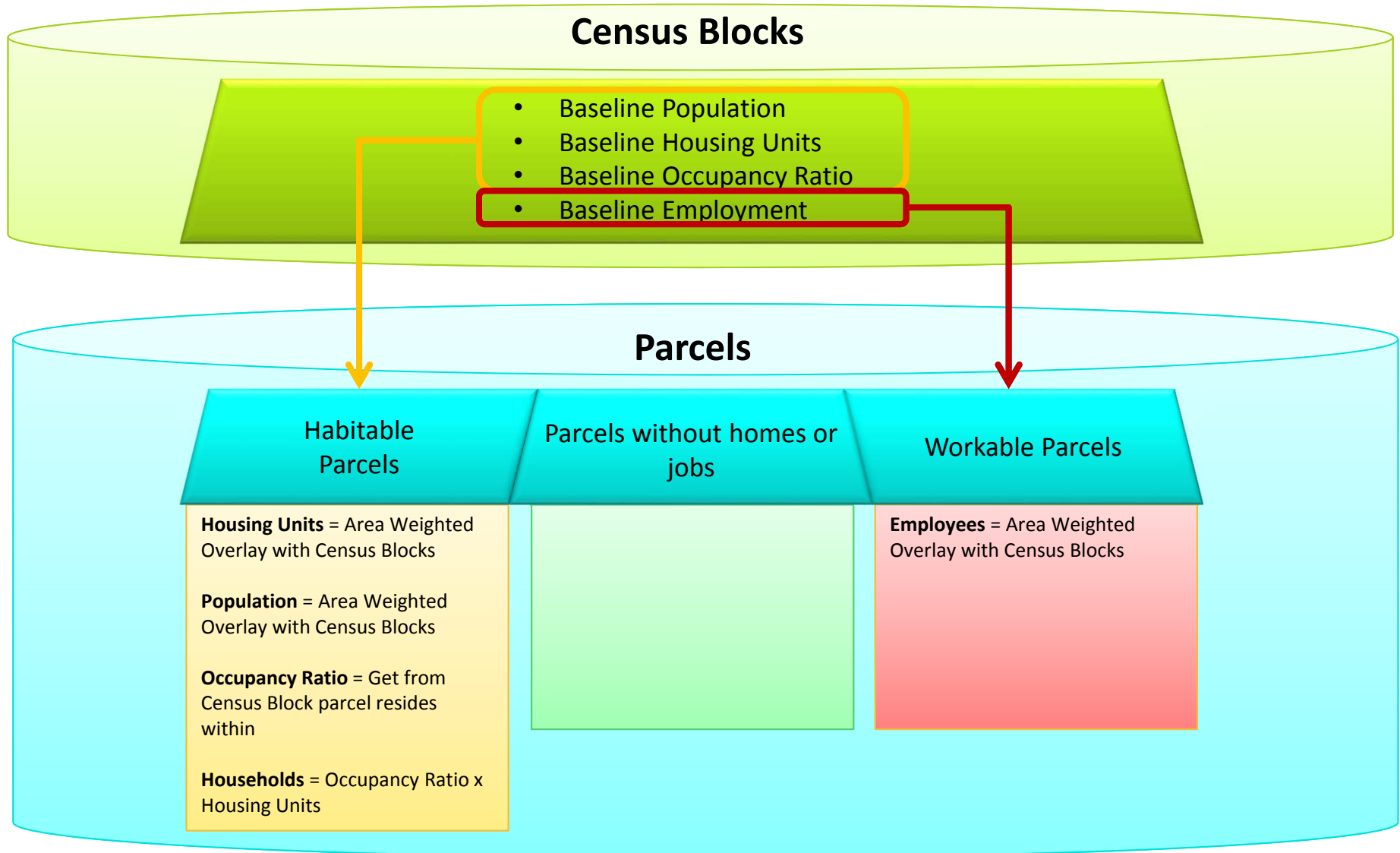
*Future transit distance will be based on shortest distance of existing or future added transit stops



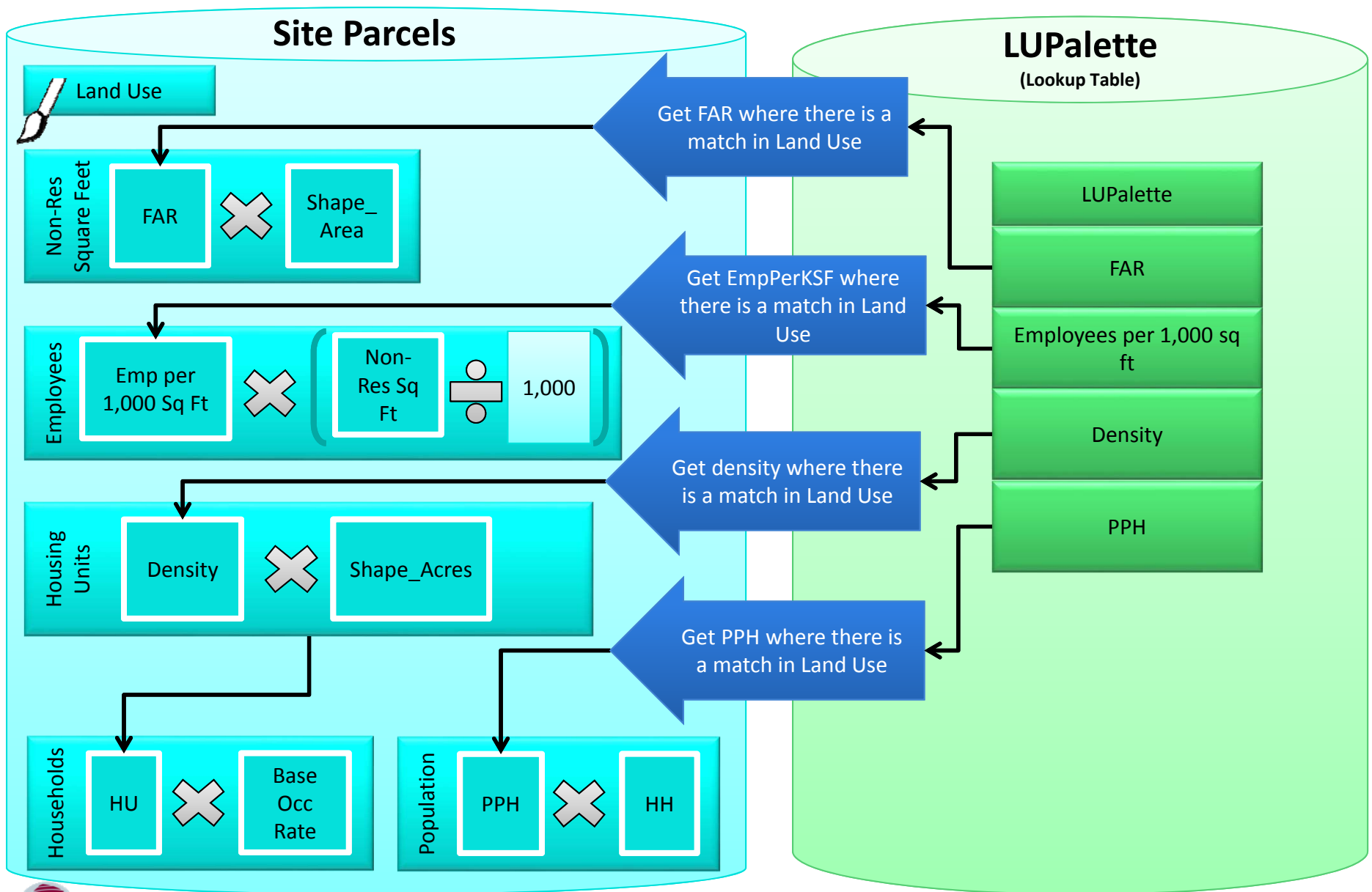
Existing Land Use



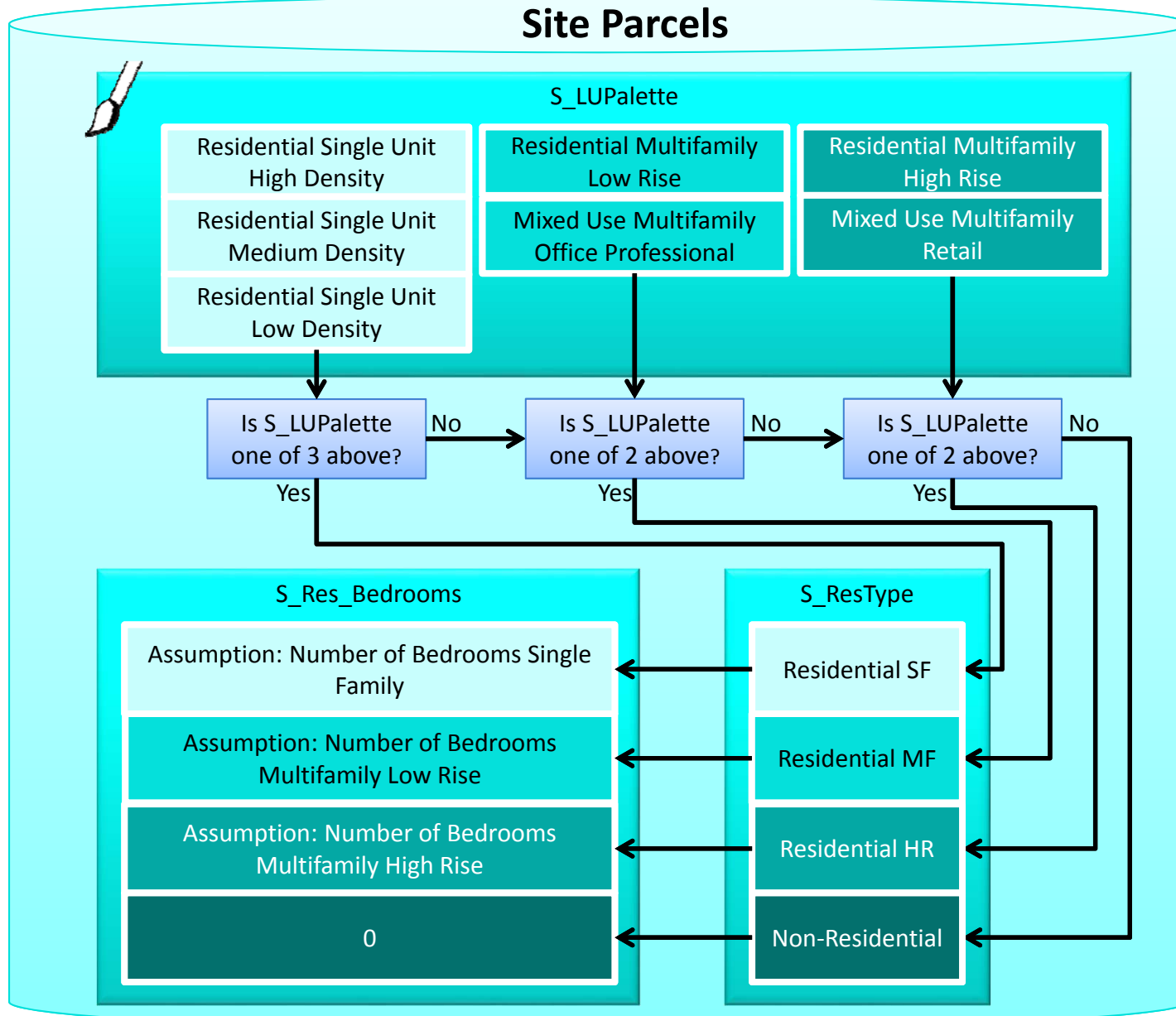
Baseline Inputs from Census



Development at Site



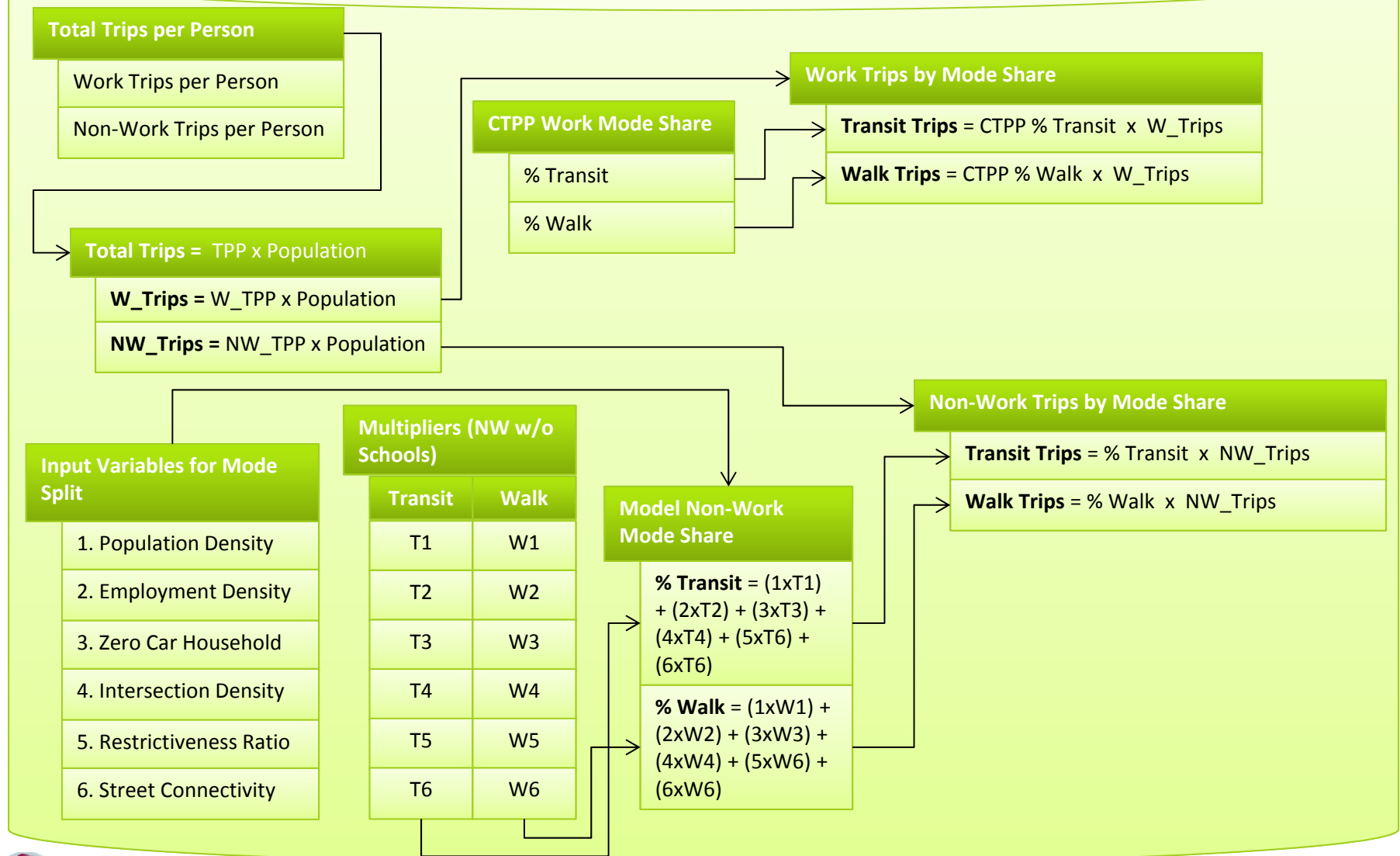
Residential Sketch Information



NJRTM-E

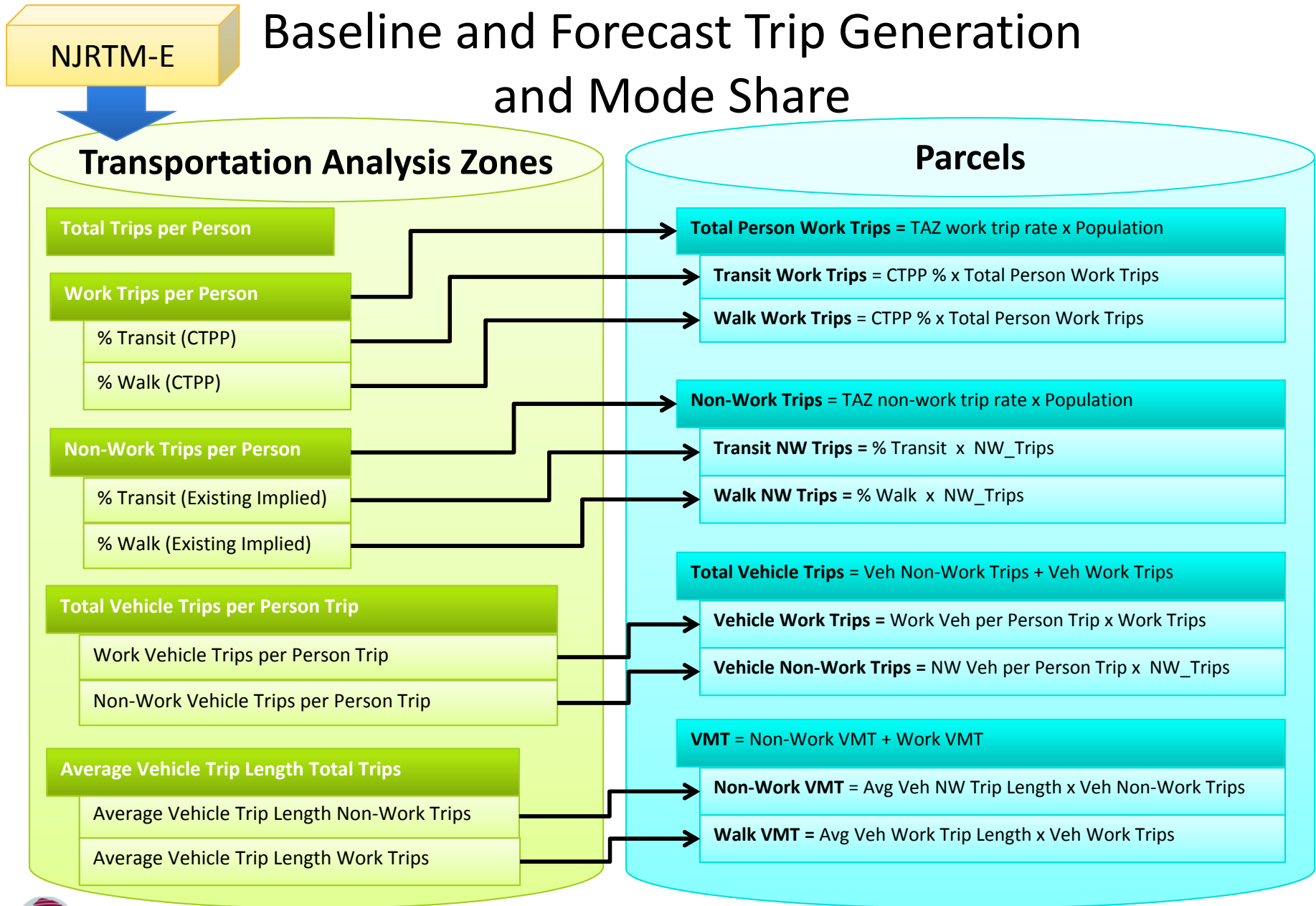
Transportation Pre-Calculations

Transportation Analysis Zones

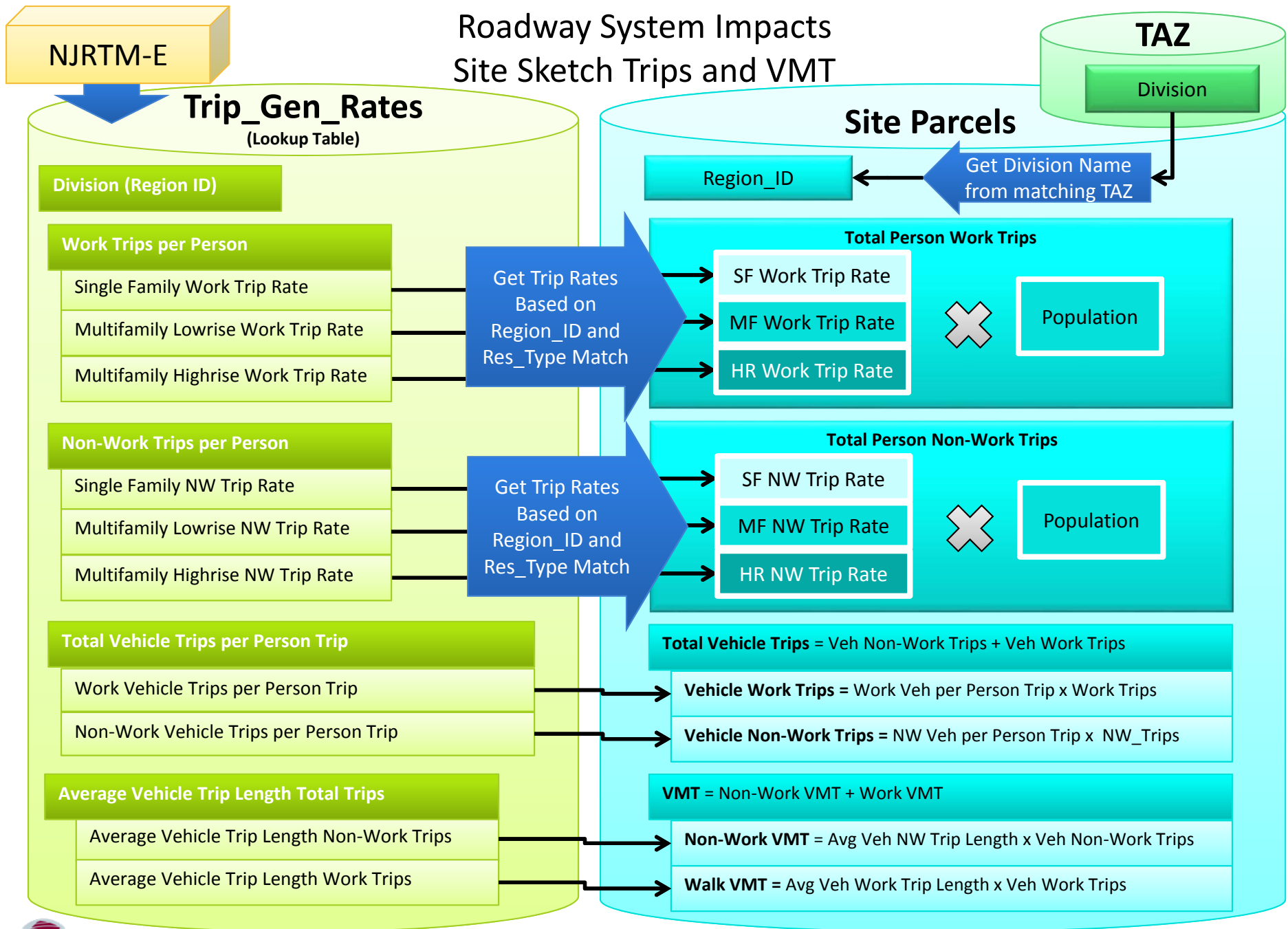


Roadway System Impacts

Baseline and Forecast Trip Generation and Mode Share

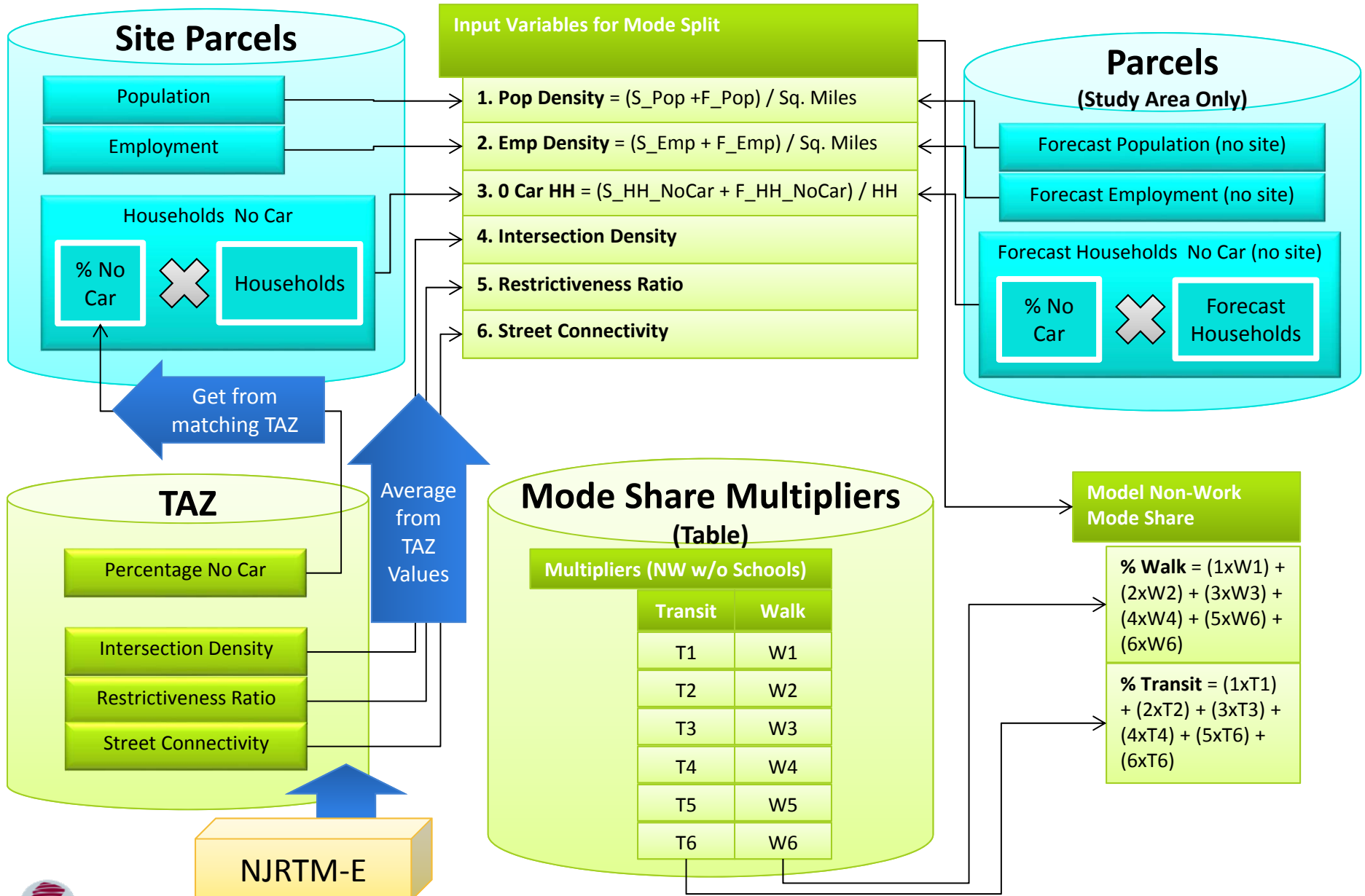


Roadway System Impacts Site Sketch Trips and VMT



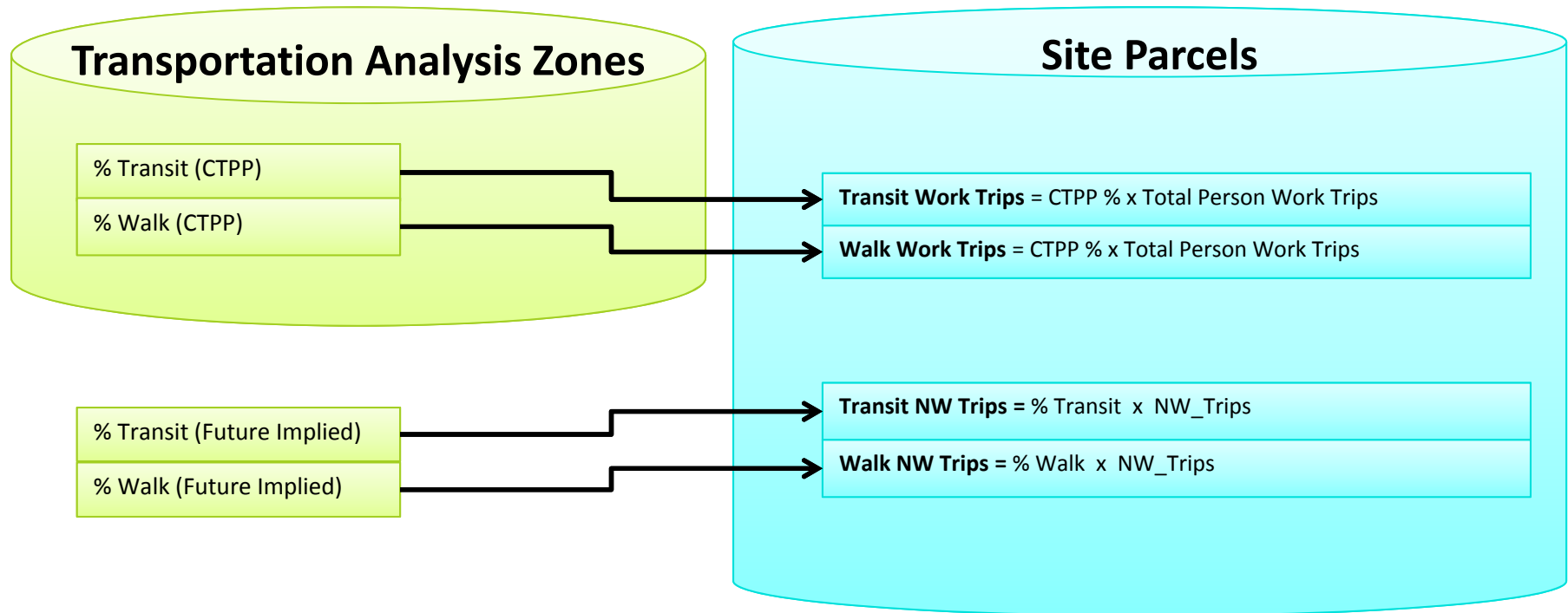
Roadway System Impacts

Non-Work Mode Share from Sketch

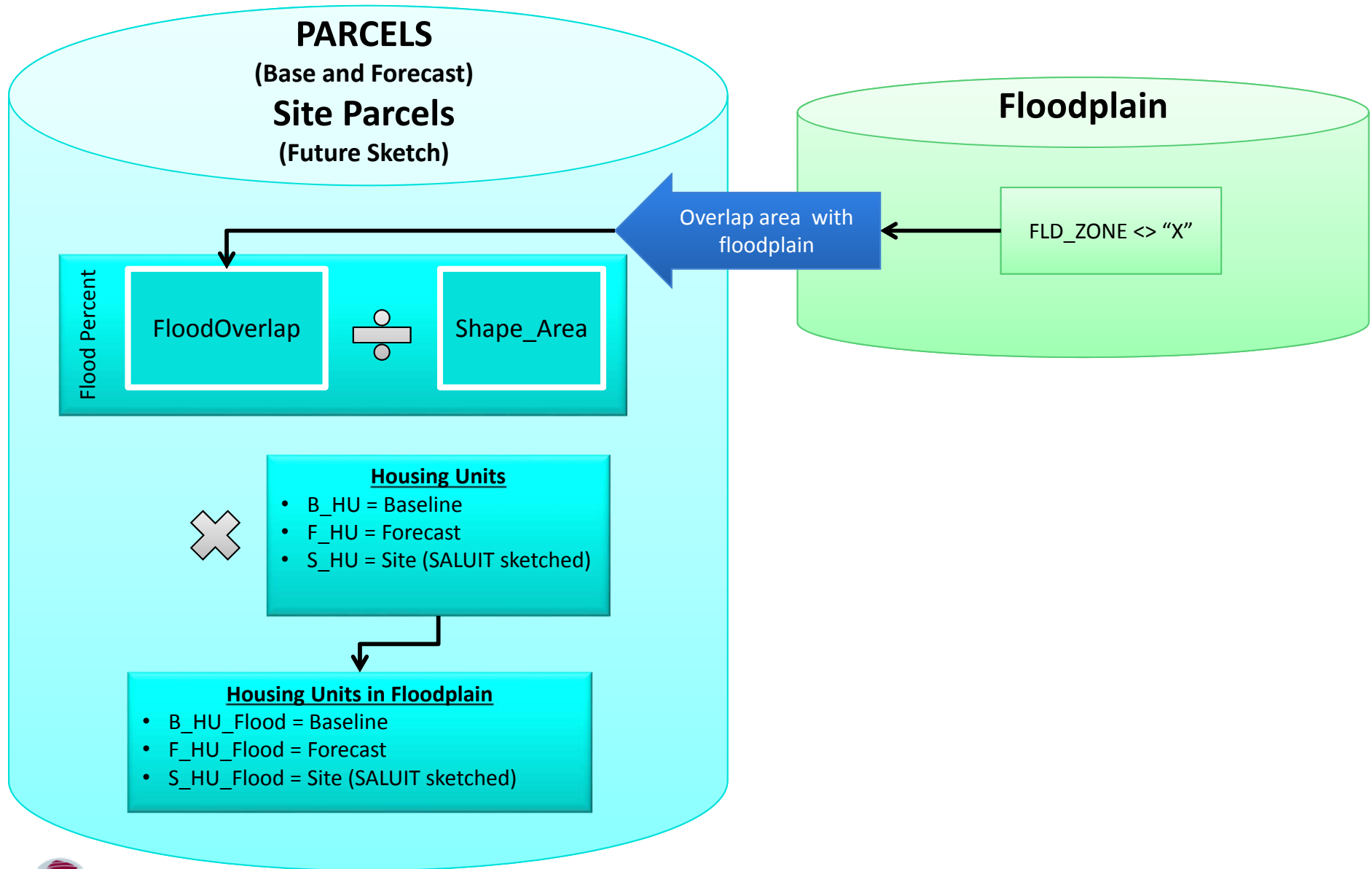


Roadway System Impacts

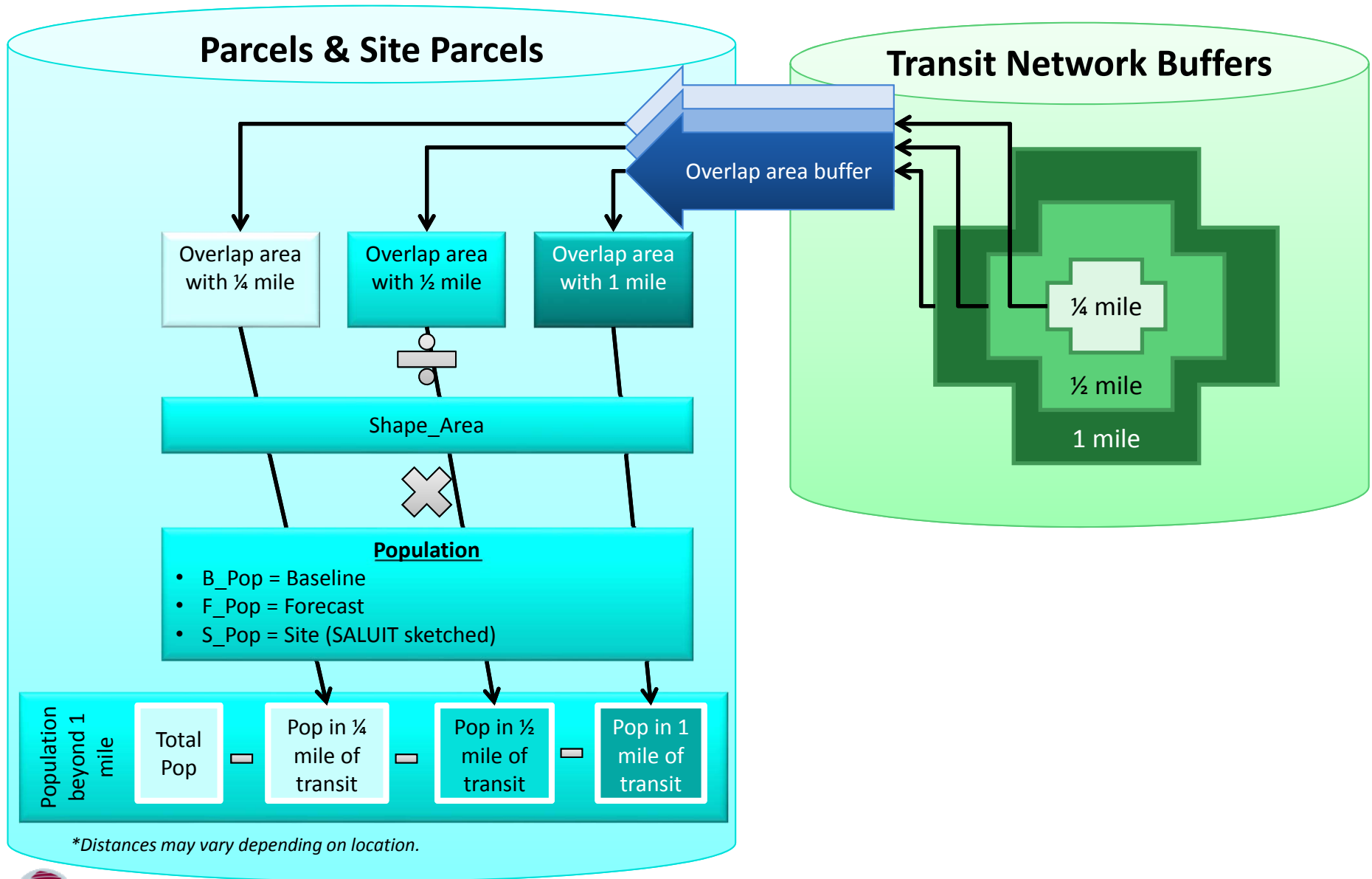
Site Mode Share



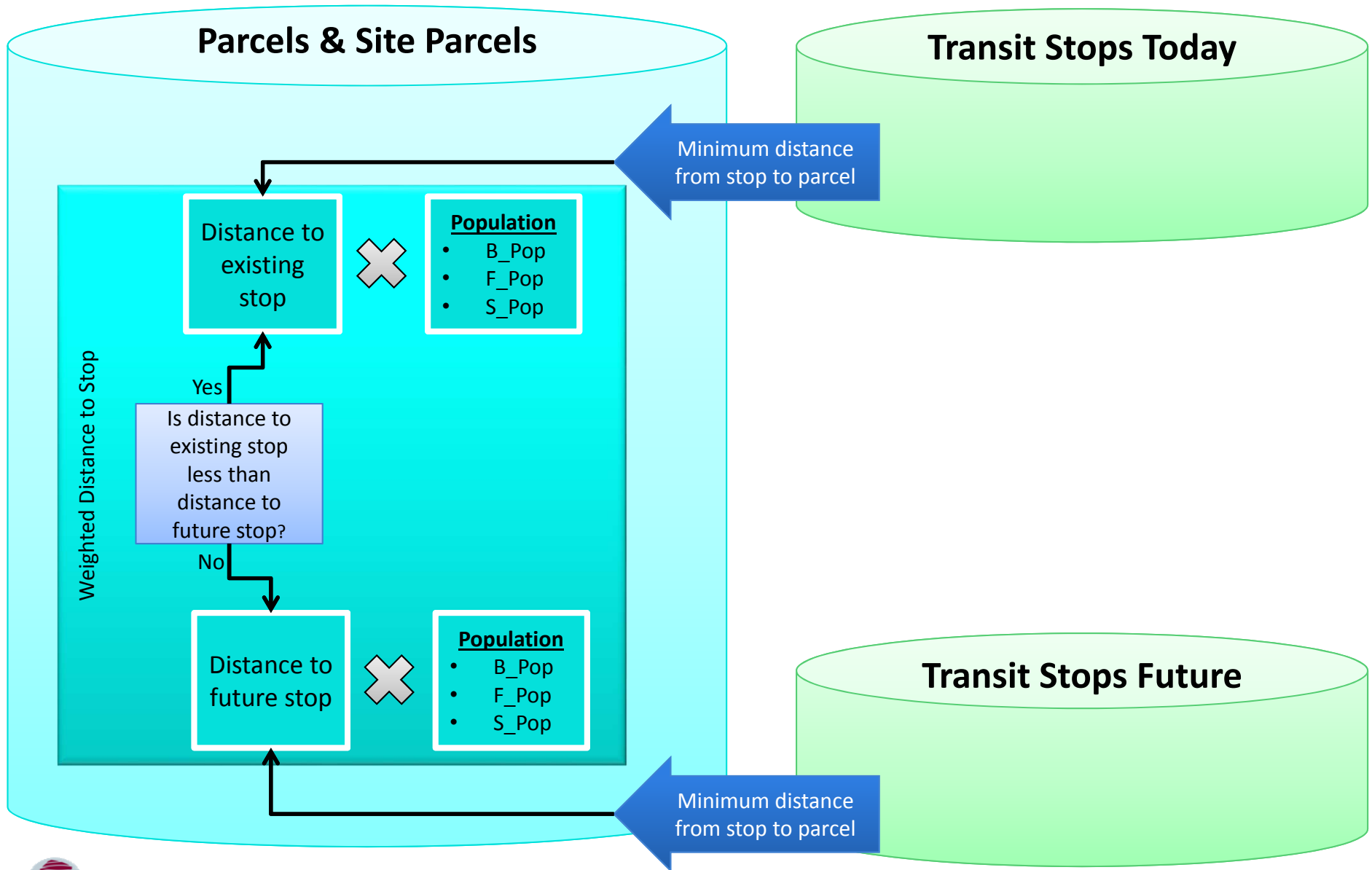
Flooding and Drainage



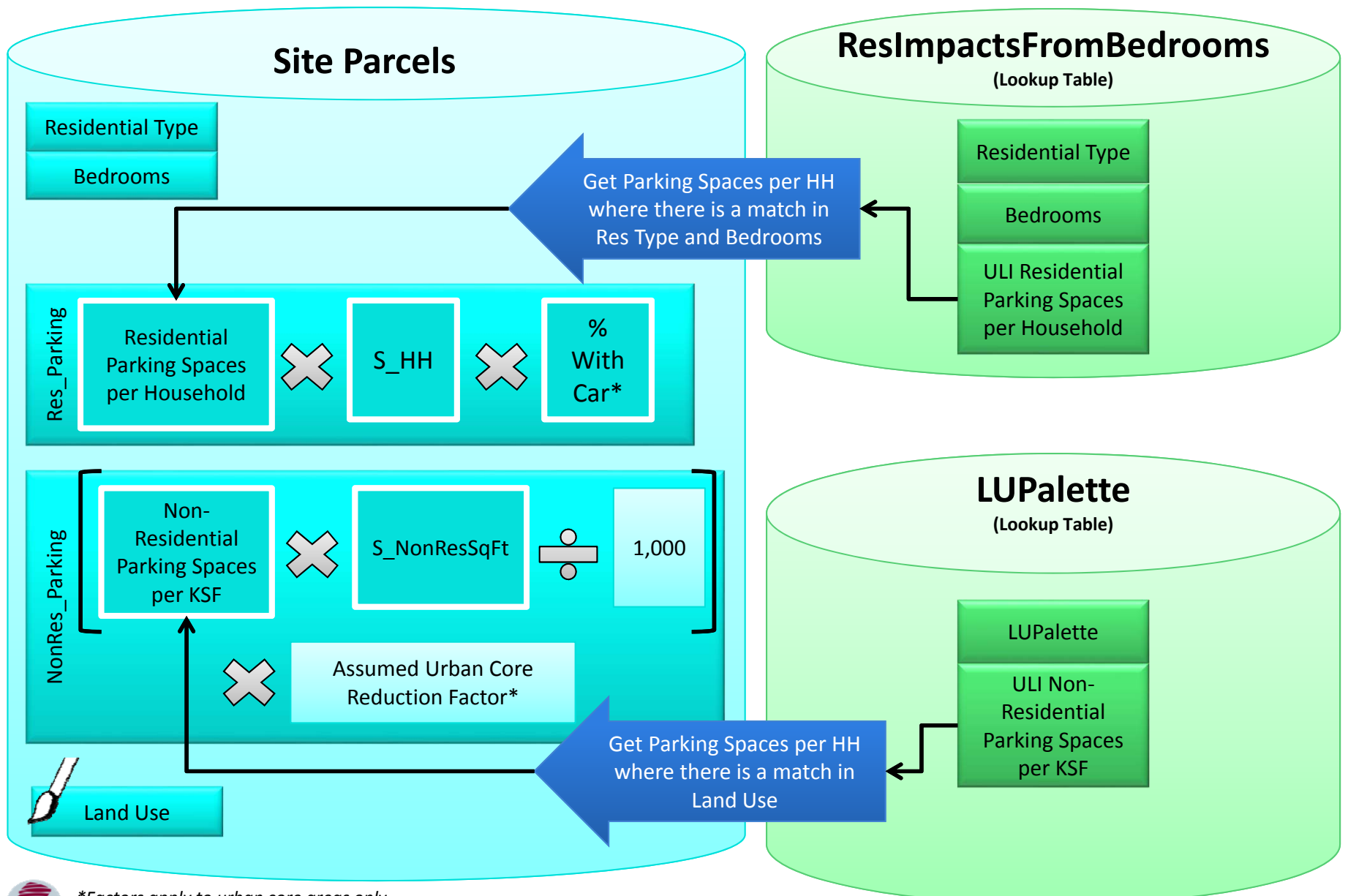
Transit & Accessibility: Access Zones



Transit & Accessibility: Weighted Average Distance

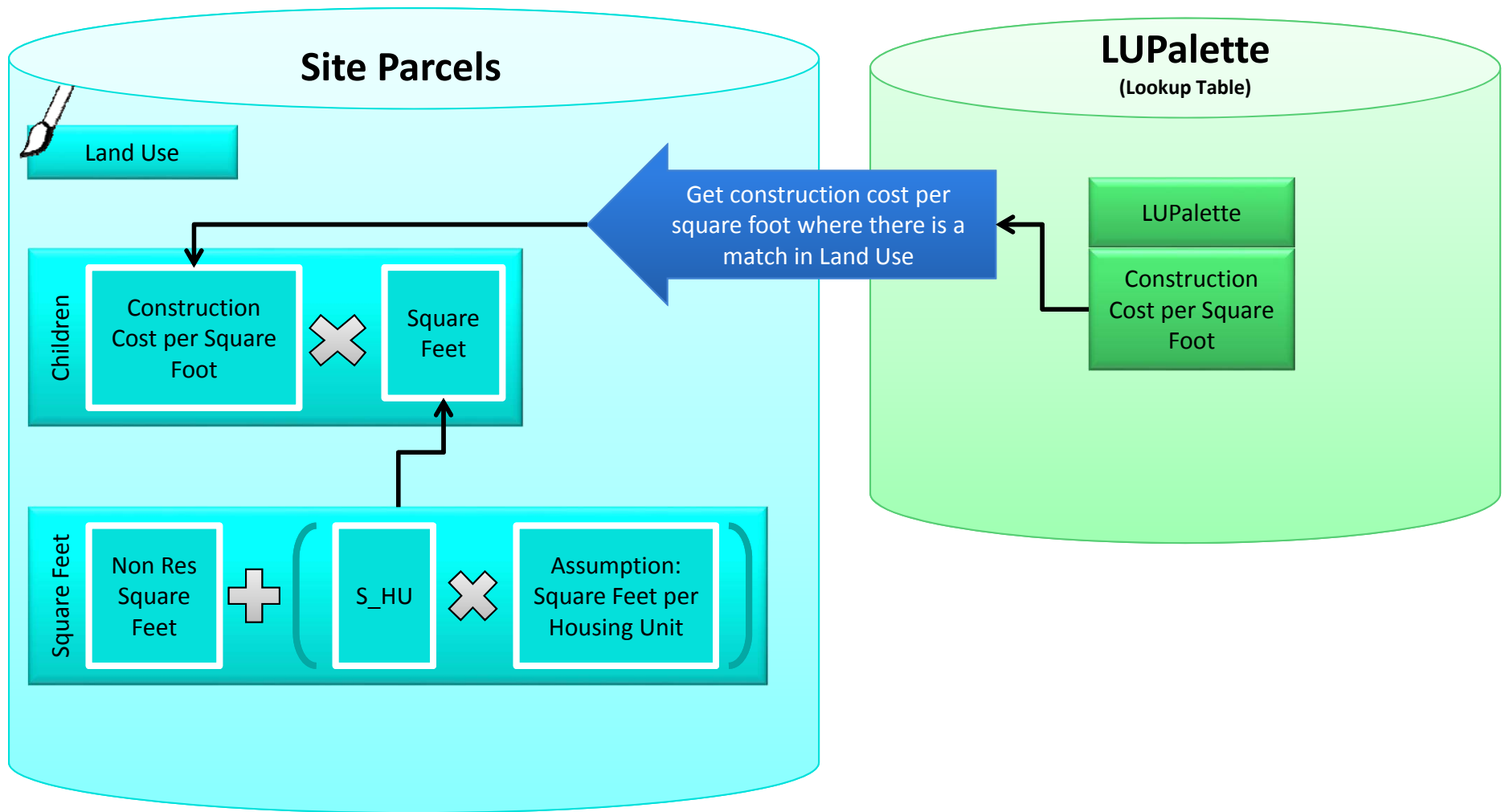


Parking

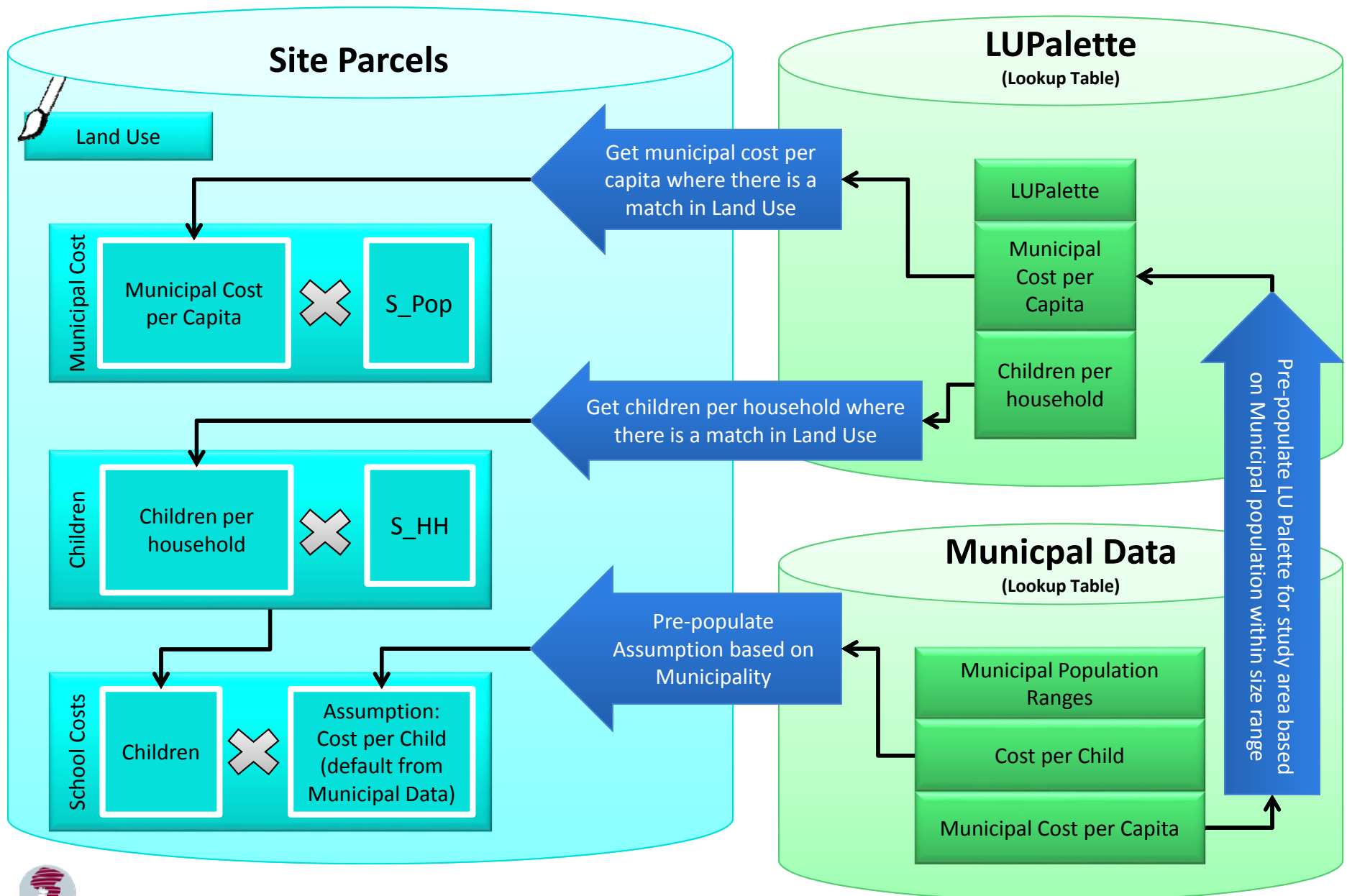


*Factors apply to urban core areas only.

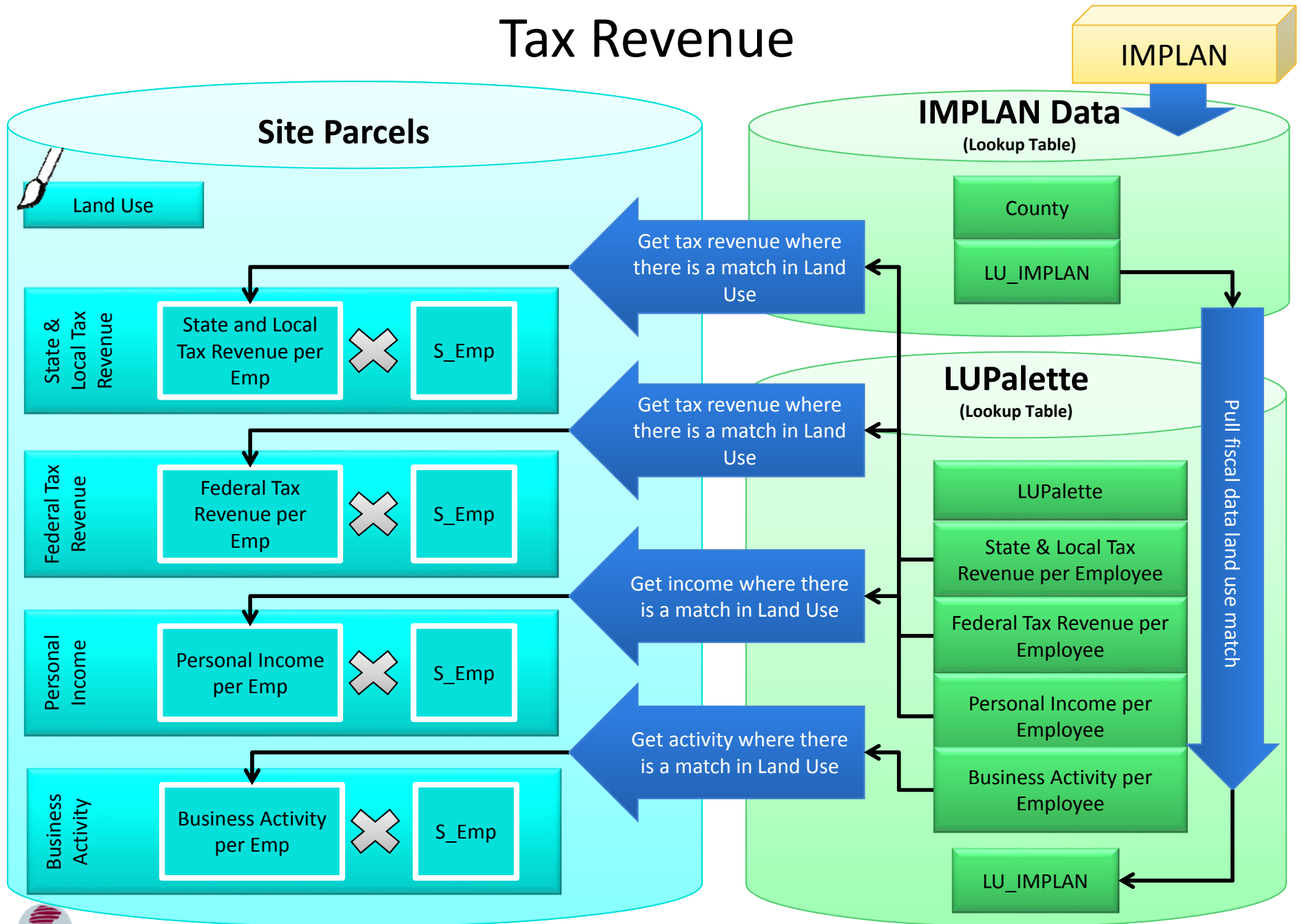
Construction Costs



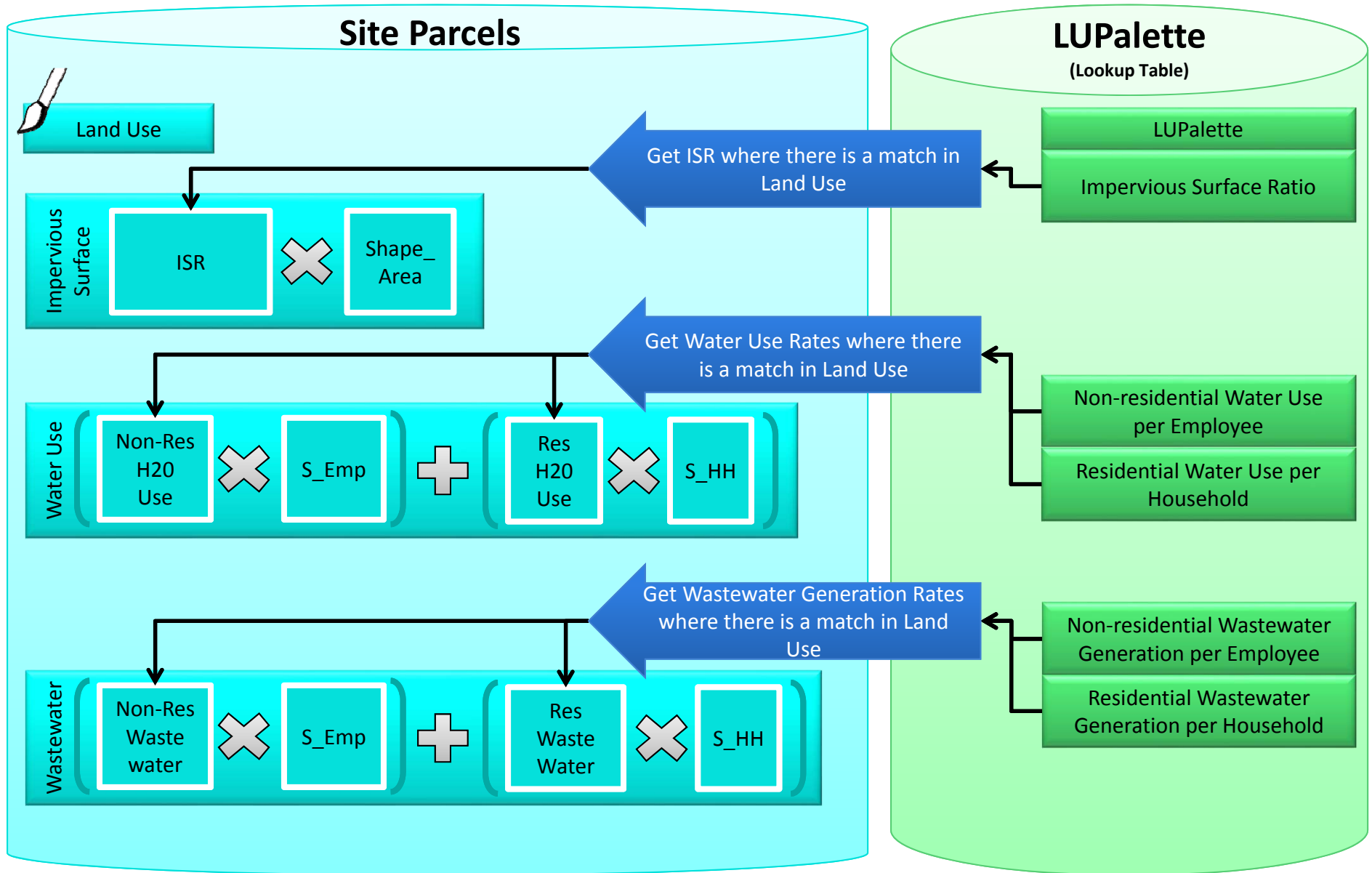
Municipal



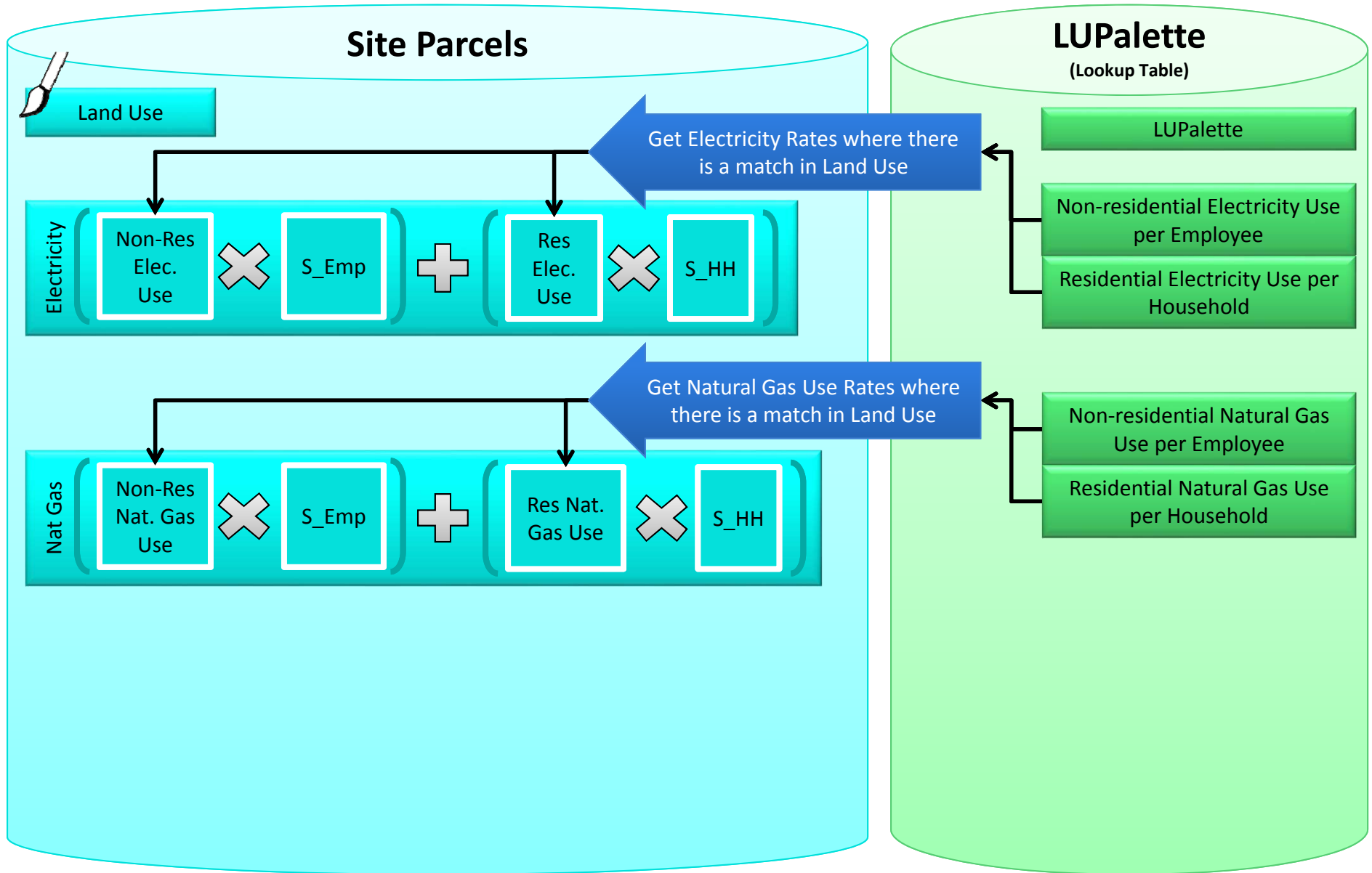
Tax Revenue



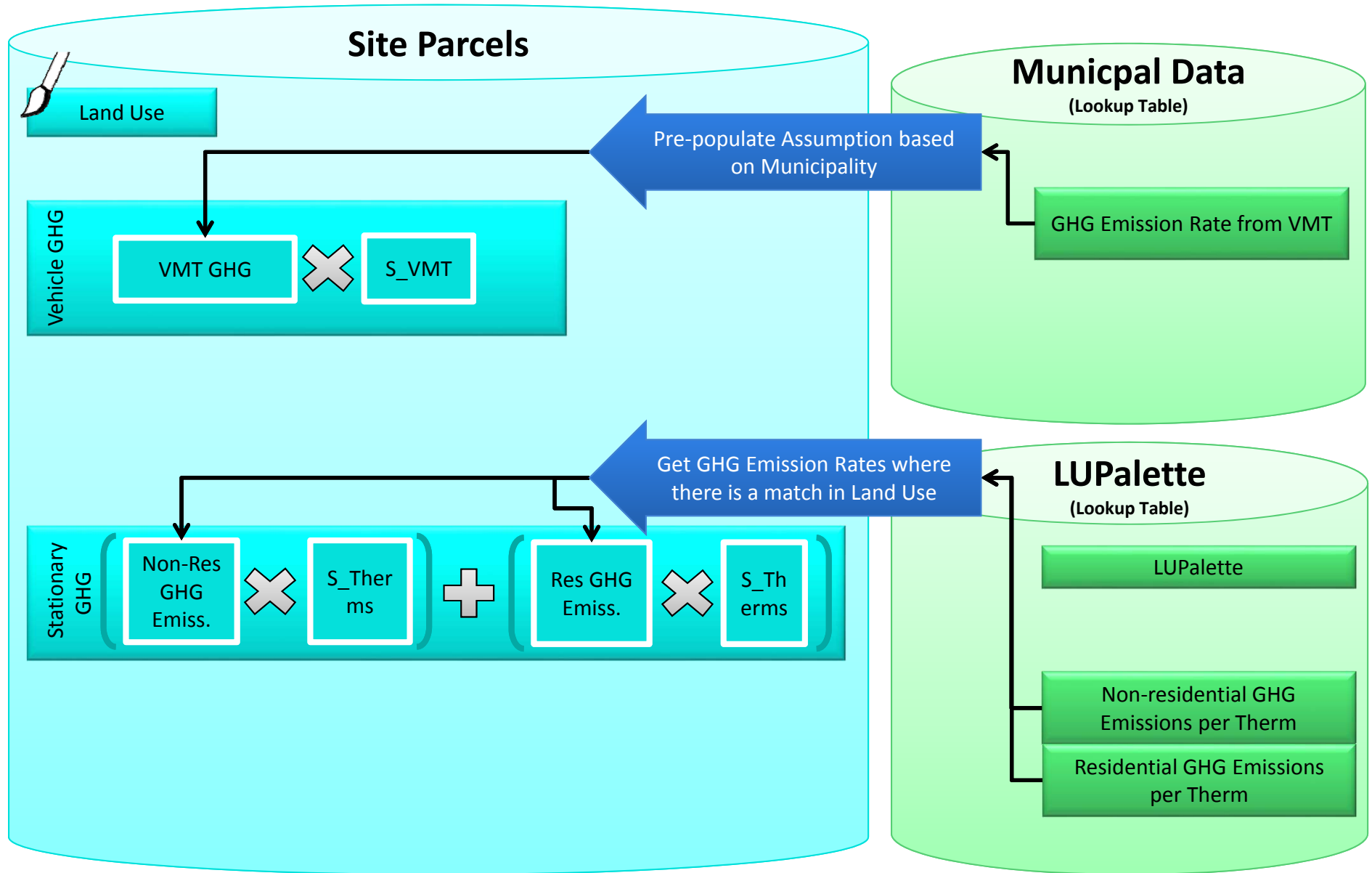
Environment



Environment



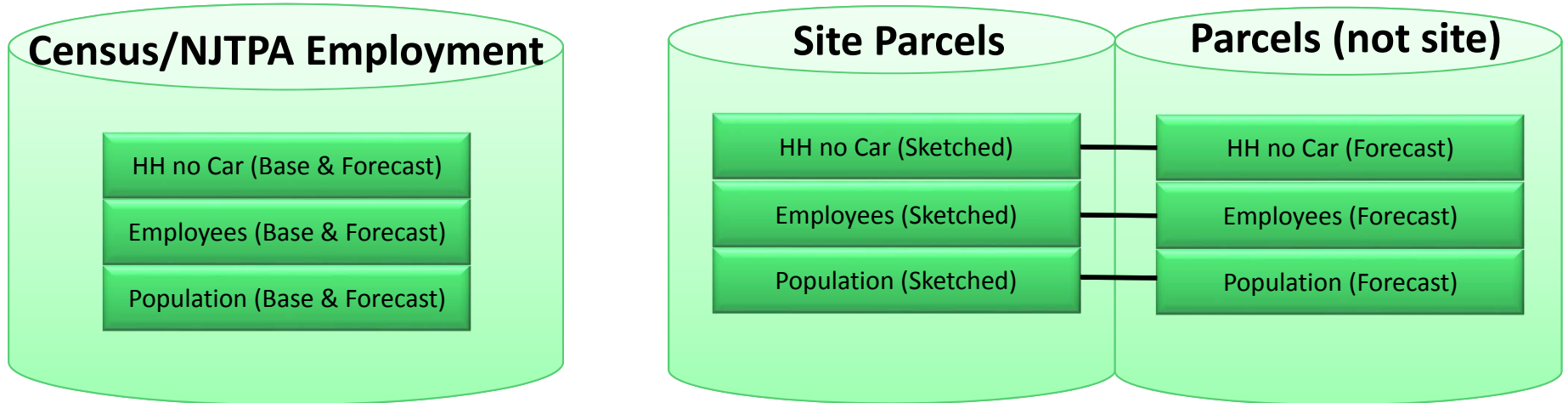
Environment



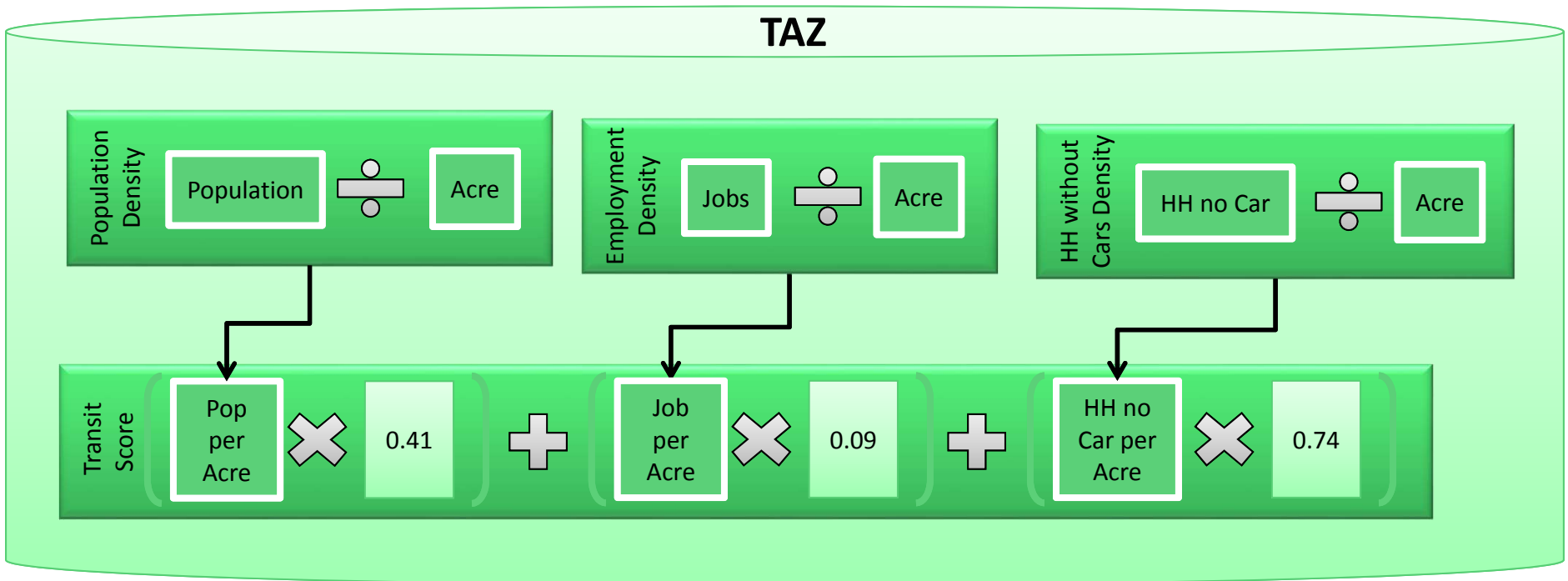
Transit Score

Study Area Baseline & Forecast

Site Future TAZ



TAZ



Commuteshed

