

Application of the Silicon Valley's Travel Forecasting Models through the Internet

George Naylor – Valley Transportation Authority
Michael Clarke – Citilabs

Overview of the VTA Countywide Model

- Travel demand model required by CMA enabling legislation
- For Santa Clara County and adjacent counties, supports:
 - transit planning
 - highway planning
 - environmental analysis
- Based on the San Francisco MPO regional model from MTC and data from ABAG
- Model characteristics:
 - completely implemented in Cube scripts and modules using no standalone programs
 - 2958 Traffic Analysis Zones
 - transit mode choice for 8 sub-modes
 - congestion feedback loop for mode choice
 - modeling of six auto vehicle time periods
 - uses Citilabs' clustering software to reduce run-time from 50 hours to 7
- VTA modeling staff has remote access capabilities to the server

Local Member Assistance

- Provide models, data and results to member jurisdictions
- Charges a nominal fee to member cities for in-house modeling capabilities
- Larger jurisdictions have in-house staff and budgets for citywide model development (e.g., San Jose, Santa Clara, Milpitas, Sunnyvale)
- Many smaller jurisdictions rely on existing VTA model runs for base year and forecast year planning and traffic analysis
- Simplified applications often required by local jurisdictions to minimize run times (e.g., application of mode split factors)
- Requests from consultants for model runs to support VTA and local jurisdiction planning efforts

Goals of VTA with Mint

Web Access:

Broaden the number of users both internally and externally

Provide access to outputs to managers and decision-makers

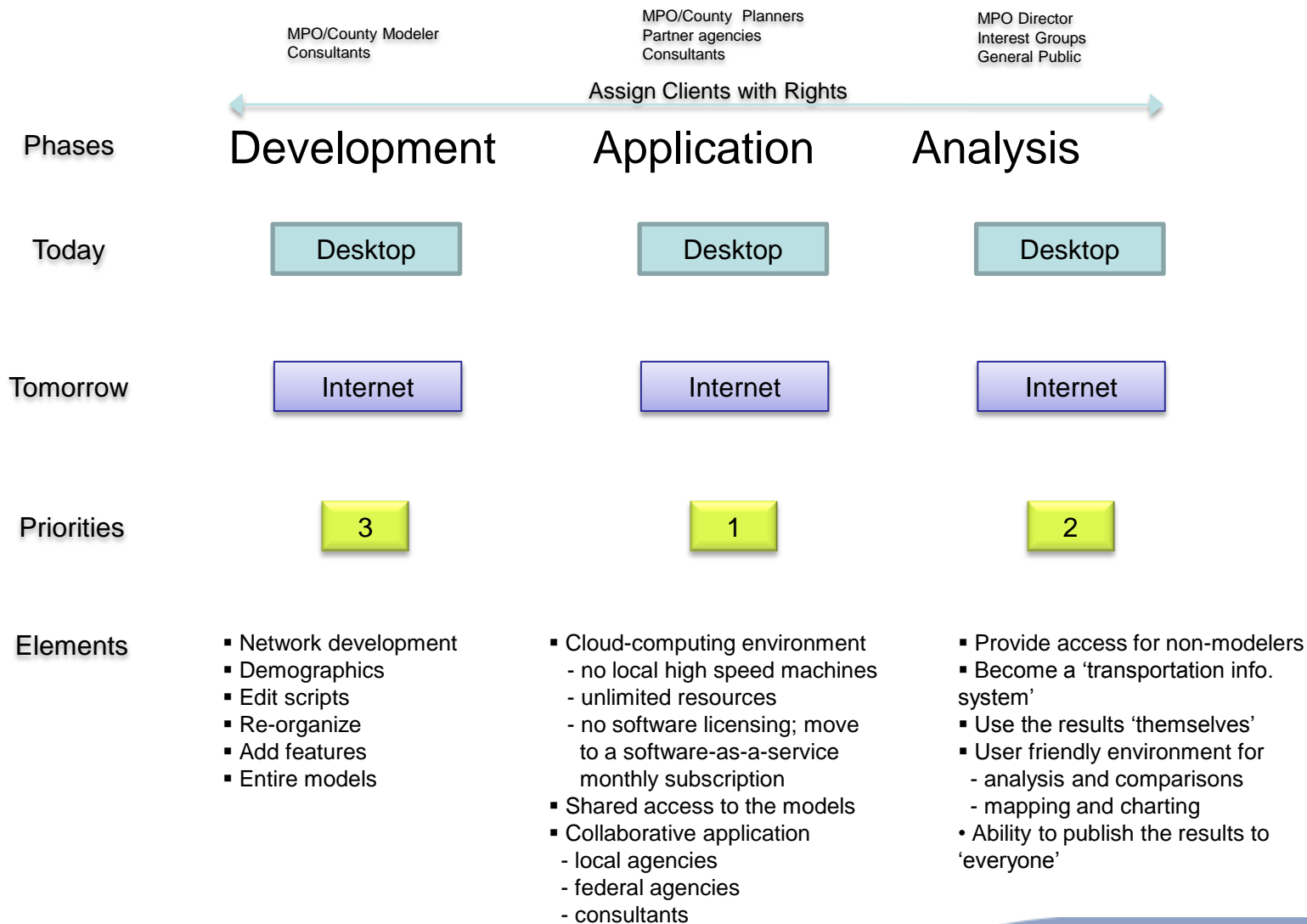
Concerns: is it secure? can access be limited/restricted? cost covered by fees?

Cloud Computing:

Reduce computer and software upgrades with ever-increasing complexity of modeling

Concerns: is it cost-effective, scalable, secure and reliable?

Why move modeling to the internet?



Primary Benefits

Internet: movement from a desktop-bound, 'locked' environment to an internet-based, 'open', sharable, 'work from anywhere/anytime' environment

Community Resource: model application and planning analysis done by non-experts using common web-browsers moving models to an active role in collaborative transportation planning

Cloud-Computing: placement of the models, data and software in a cloud-computing environment lowering hardware costs locally while providing 'unlimited' high-spec resources

Lower costs for the user: movement from locally licensed desktops to a software as a service model. Monthly subscription business model allowing many to use the model at low, or even, no cost

Lessens IT complexity: much of the IT burden of modeling is shifted from the user to the vendor

Data and Software Integration: easier to integrate with external systems: development reviews, regional air quality analysis, pavement maintenance systems, traffic and transit ITS systems and to receive and use data from data probes, detectors and static data sources

Primary Concerns

Loss of Control: many modelers voice concerns about providing access to the results and to the application of the models. Models aren't perfect; misuse or misinterpretation of the results

Security: placing calibrated models and data onto the internet raises concerns by some

Availability: must have access to the internet to use the models. Stability of the cloud-computing environment

Costs: it all seems great, but will it really be cheaper?

Change: early adopters versus the mass

Characteristics of the VTA Application

Development **Application** Analysis

Software developed and tested for:

Model Administration:

- creation client types with their 'roles' and 'rights'
- creation of model clients and association of the client type.
- For each client creation of login information and a client-specific 'sandbox'
- Sandbox is a work area for the specific client with upload/download capability;
- access can be provided to other clients to their sandbox
- System sandbox is area with common data

Model Application:

- Scenario creation, running and management
- Pay as you go capability in place
- Takes full advantage of the computing cloud environment providing elastic resources (processors and storage)
- Provides messaging via email and text on status
- Data management

Hosted within Amazon's EC2 Elastic Compute Cloud environment

Most data stored in ESRI geodatabase format

Characteristics of the VTA Application

Development

Application

Analysis

Direct download of data to desktop Cube and ArcGIS for mapping and analysis

In development:

On-line analysis, mapping and charting. For mapping, uses ArcGIS Server

User friendly interface for data analysis, comparisons and sharing of information

Creation and management of 'dashboards' for management across scenarios

Various statistical analysis

Characteristics of the VTA Application

Development

Application

Analysis

Models are developed in the desktop environment using Cube

Published to the internet directly from Cube, copying all aspects of the models, scenarios, data, etc to the internet

In the future, it will be possible to directly edit the data and models themselves through the internet

Areas in Beta Test

Valley Transportation Authority, San Jose

Houston, Texas MPO

Minneapolis, Minnesota MPO

Cincinnati, Ohio MPO

City of Leesburg, Virginia

Christchurch, New Zealand

Brisbane, Australia

Manila, Philippines

Dutch Government regional models

Results to Date

Has provided a clear path forward to move models from desktop to the internet environment

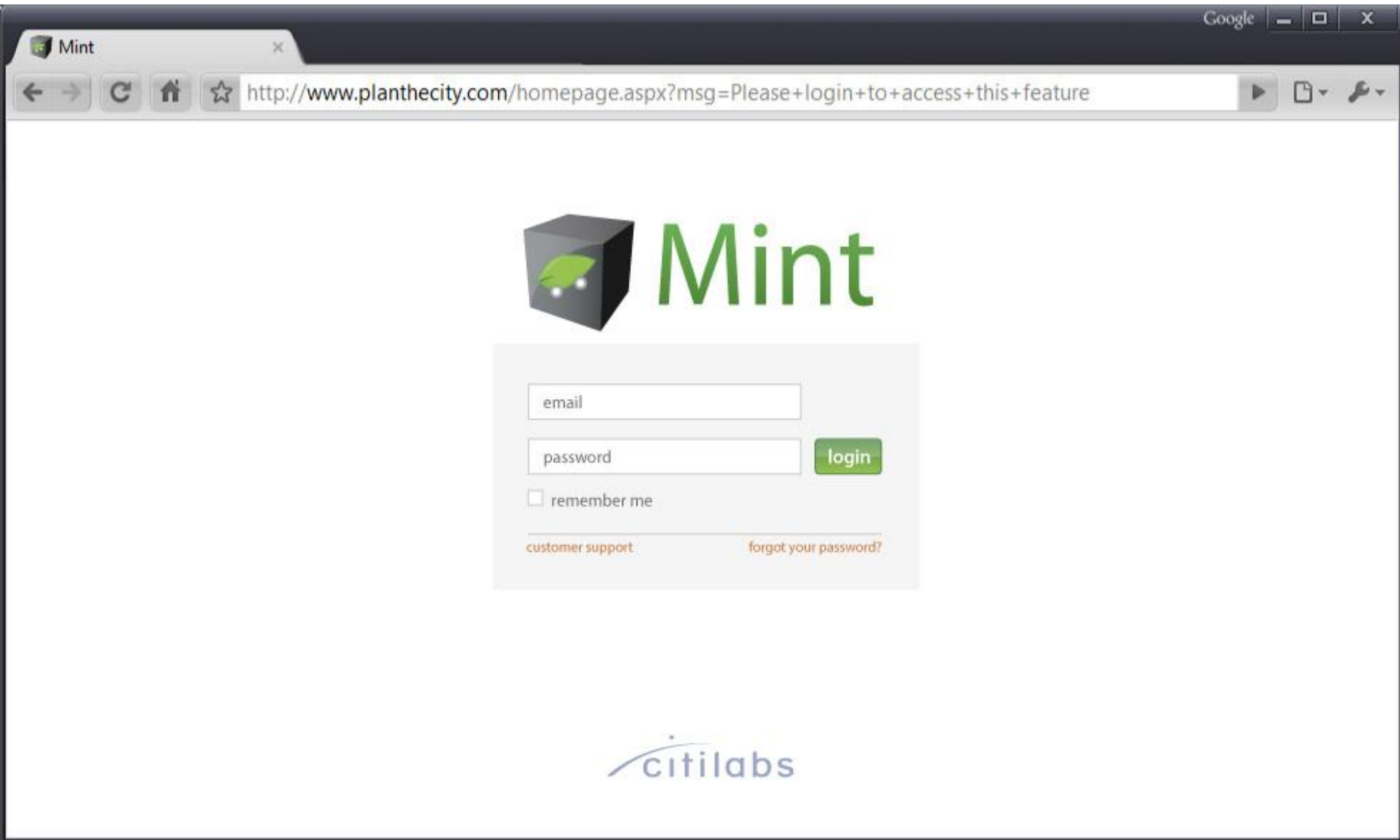
Clear success of hosting a model entirely on the internet

Highlights the cost and time savings possible by applying models in a cloud computing environment by reducing local hardware costs and providing 'unlimited' modeling resources

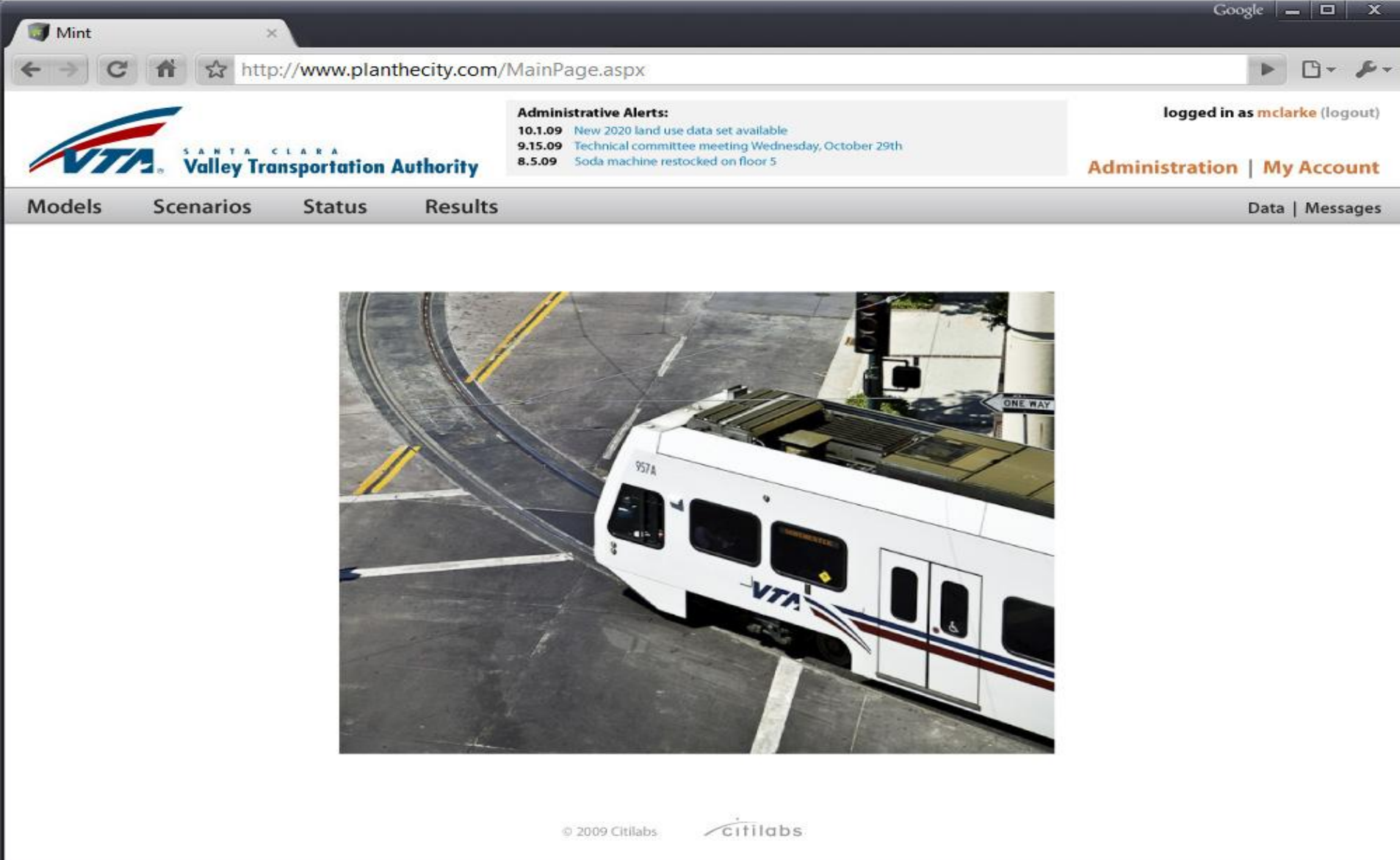
Provides an elegant solution to sharing a model with multiple model clients, securely and efficiently

But early in the process; not rolled out to the community at this point; only used by experts. Much of the benefits and concerns still to be assessed

Login Screen




Home Page



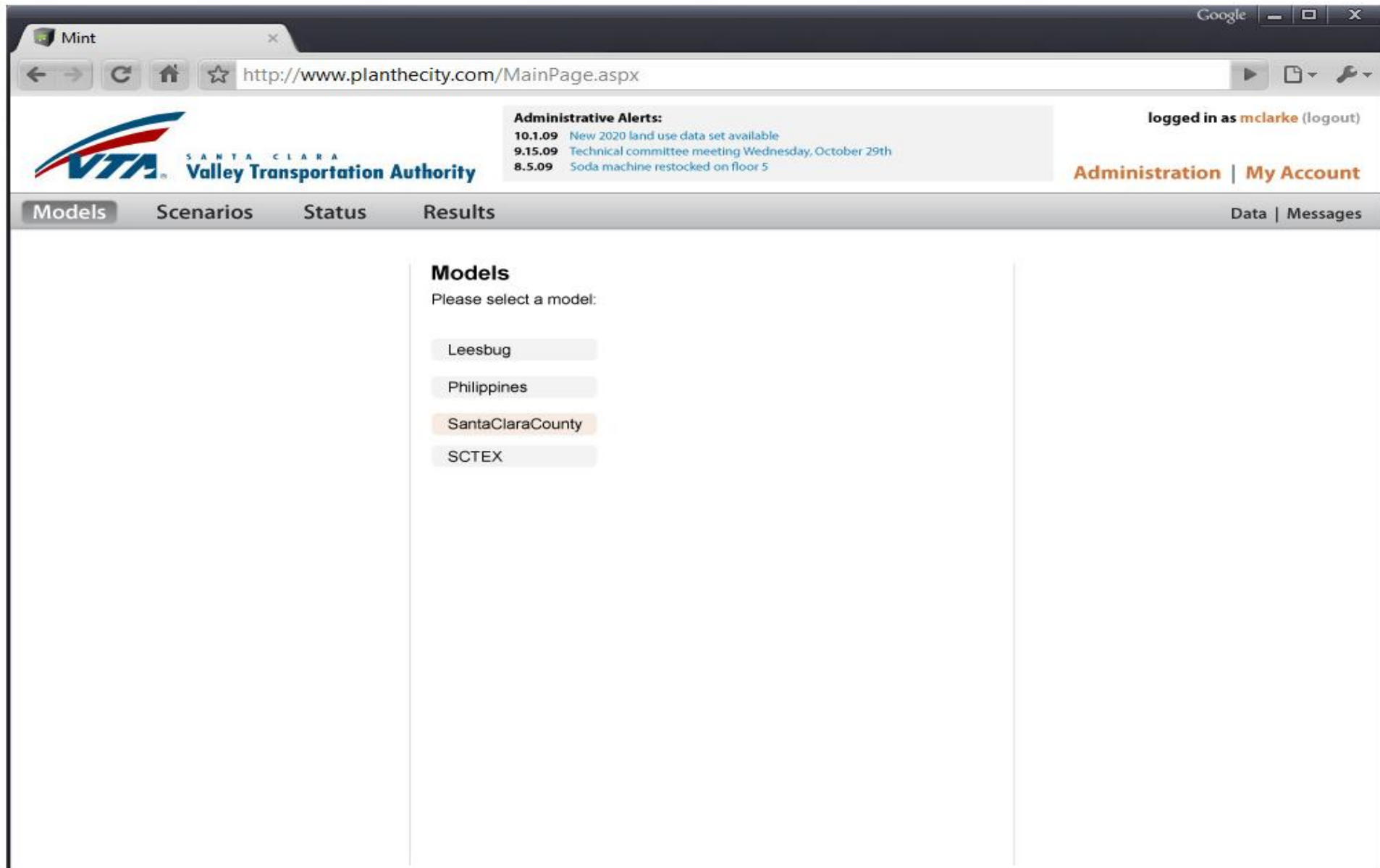
The screenshot shows a web browser window with the address bar displaying <http://www.planthecity.com/MainPage.aspx>. The page header includes the VTA logo and the text "SANTA CLARA Valley Transportation Authority". A navigation menu contains the following items: Models, Scenarios, Status, Results, Administration, My Account, and Data | Messages. A "logged in as mclarke (logout)" notification is present in the top right. An "Administrative Alerts" section lists the following items:

- 10.1.09** New 2020 land use data set available
- 9.15.09** Technical committee meeting Wednesday, October 29th
- 8.5.09** Soda machine restocked on floor 5

The main content area features a large photograph of a white VTA light rail train, numbered 957A, at a station platform. The train has the VTA logo and a wheelchair accessibility symbol on its side. The platform has yellow tactile paving and a "ONE WAY" sign is visible in the background.

© 2009 Citilabs 

Selection of Model



The screenshot shows a web browser window with the URL <http://www.planthecity.com/MainPage.aspx>. The page header includes the VTA logo and the text "SANTA CLARA Valley Transportation Authority". On the right side of the header, it says "logged in as mclarke (logout)" and provides links for "Administration" and "My Account". Below the header is a navigation bar with tabs for "Models", "Scenarios", "Status", and "Results". The "Models" tab is currently selected. The main content area is titled "Models" and contains the instruction "Please select a model:". Below this instruction are four buttons: "Leesbug", "Philippines", "SantaClaraCounty" (which is highlighted with an orange background), and "SCTEX". In the top right corner of the browser window, there is a "Google" search bar and window control buttons. In the bottom right corner of the overall image, there is a "citilabs" logo.

Scenario Management

- [-] SantaClaraCounty
 - [-] Base 2005
 - [+] FY2010
 - [+] FY2020
 - [+] Bart Extension
 - [+] FY2040
 - [+] private
 - [+] public
- [+] SCTEX
- [-] Applications
 - Model Update**

Scenario Name: **Base**

Forecast Year:

Highway Network:

Land Use Data:

External Production Attraction Totals:

Trip End Level of Service File:

Auto Operating Costs in Cents/Mile (Gasoline Fueled):

Auto Operating Costs in Cents/Mile (Non-Gasoline Fueled):

Golden Gate Bridge Toll (in Cents):

Toll for the Other Bridges (in Cents):

Scenario Manager Help

The Scenario Manager is where you select and schedule the scenario and application you will be running. You may also edit scenarios and add child scenarios.

Scheduling a Scenario

1. Switch to **Scenario Manager**.
2. Select your **Scenario** and **Application** in the left sidebar.
3. Click **Schedule Scenario**.

Updating a Scenario

1. Select **Update Scenario**
2. Edit any desired keys and click **Submit**.
3. Review your changes and click Publish Scenario


Creating a Child Scenario

1. Select **Create Child**

Run Status

Google

⏪ ⏩ 🔍 🗄️ ⚙️



SANTA CLARA
Valley Transportation Authority

Administrative Alerts:
10.1.09 New 2020 land use data set available
9.15.09 Technical committee meeting Wednesday, October 29th
8.5.09 Soda machine restocked on floor 5

logged in as mclarke (logout)

[Models](#) [Scenarios](#) [Status](#) [Results](#)

[Data](#) | [Messages](#)

Status

Scenario	User	Date	Time	Status	Priority	
Base 2005	mclarke	10/27/2009	8:11AM	STARTING	100	
FY2010	mclarke	10/27/2009	7:23AM	<div style="width: 50%; height: 10px; background: linear-gradient(to right, red, gray);"></div>	80	
FY2020	mclarke	10/27/2009	6:00AM	<div style="width: 30%; height: 10px; background: linear-gradient(to right, red, gray);"></div>	70	
Bart Extension	mclarke	10/26/2009	1:00AM	<div style="width: 20%; height: 10px; background: linear-gradient(to right, red, gray);"></div>	85	
FY2040	mclarke	10/23/2009	3:09PM	DONE	100	results
Leesburg	mclarke	10/22/2009	11:29AM	DONE	55	results
SCTEX	mclarke	10/20/2009	4:30PM	DONE	88	results
DNHBG	mclarke	10/20/2009	10:43AM	DONE	65	results
Leesburg2015	mclarke	10/19/2009	2:22PM	DONE	50	results

[Update Priority](#)

Run Manager Help

The Run Manager is where you can check status of scheduled runs, update priority, and download run results.e Priority Field.

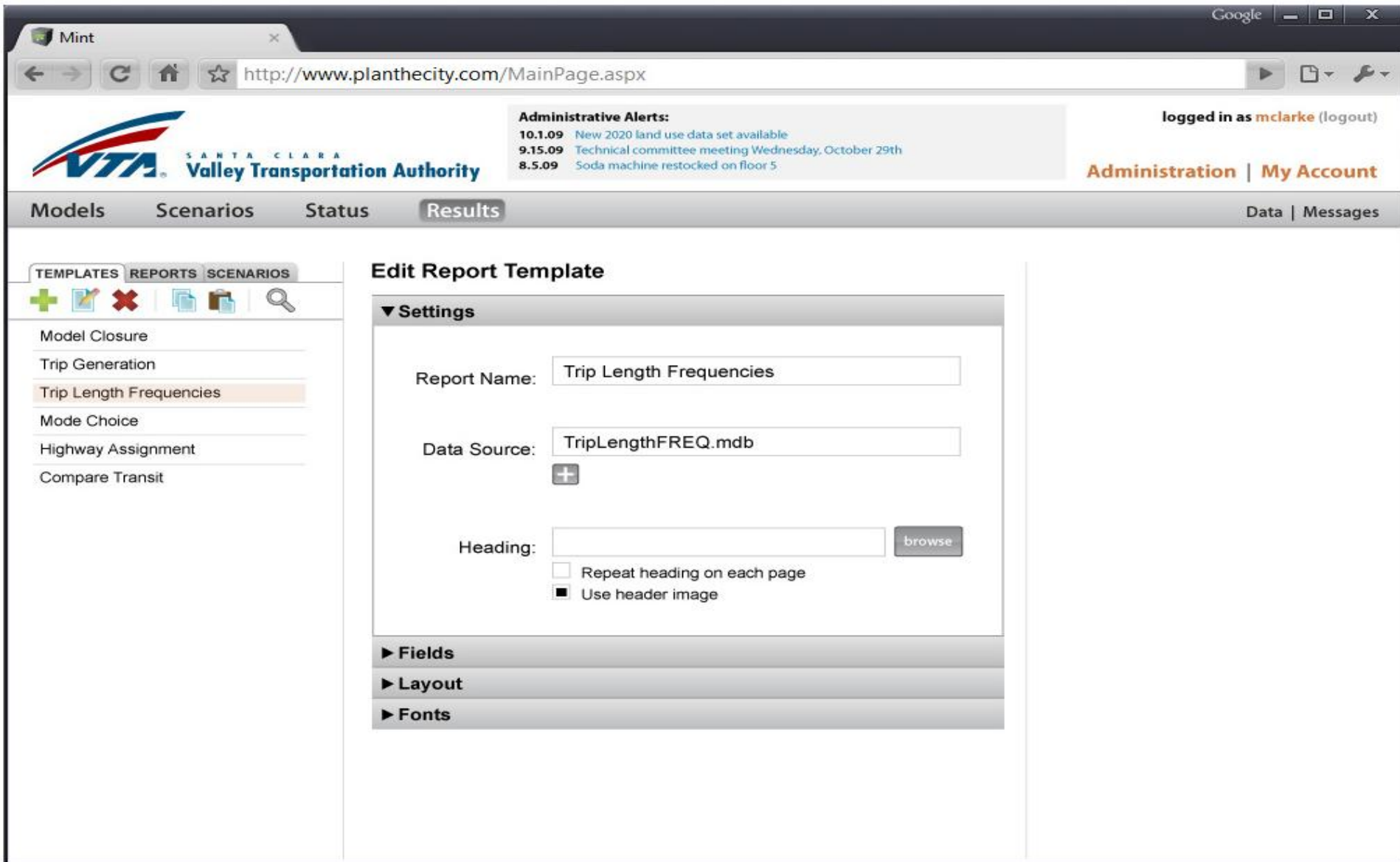
Scheduled Runs

- Enter a number from 1 - 100 in the Priority Field.
(1 is lowest priority, 100 is highest priority).
- Click **Update Priority**.

Completed Runs

- To download results click the **Results** button.
- You will be taken to the **File Manager** where you can select your scenario and download the results.

Results



The screenshot shows a web browser window with the URL <http://www.planthecity.com/MainPage.aspx>. The page header includes the VTA logo and navigation links for [Administration](#) and [My Account](#). A user is logged in as [mclarke](#). A sidebar on the left contains a menu with options: Model Closure, Trip Generation, Trip Length Frequencies (highlighted), Mode Choice, Highway Assignment, and Compare Transit. The main content area is titled 'Edit Report Template' and features a 'Settings' section with the following fields: Report Name (Trip Length Frequencies), Data Source (TripLengthFREQ.mdb), and Heading (empty). There is a 'browse' button next to the heading field and checkboxes for 'Repeat heading on each page' (unchecked) and 'Use header image' (checked). Below the settings are expandable sections for Fields, Layout, and Fonts.

Mint

Google

Administrative Alerts:
10.1.09 New 2020 land use data set available
9.15.09 Technical committee meeting Wednesday, October 29th
8.5.09 Soda machine restocked on floor 5

logged in as [mclarke](#) (logout)

[Administration](#) | [My Account](#)

Models Scenarios Status **Results** Data | Messages

TEMPLATES REPORTS SCENARIOS

Model Closure
Trip Generation
Trip Length Frequencies
Mode Choice
Highway Assignment
Compare Transit

Edit Report Template

▼ Settings

Report Name:

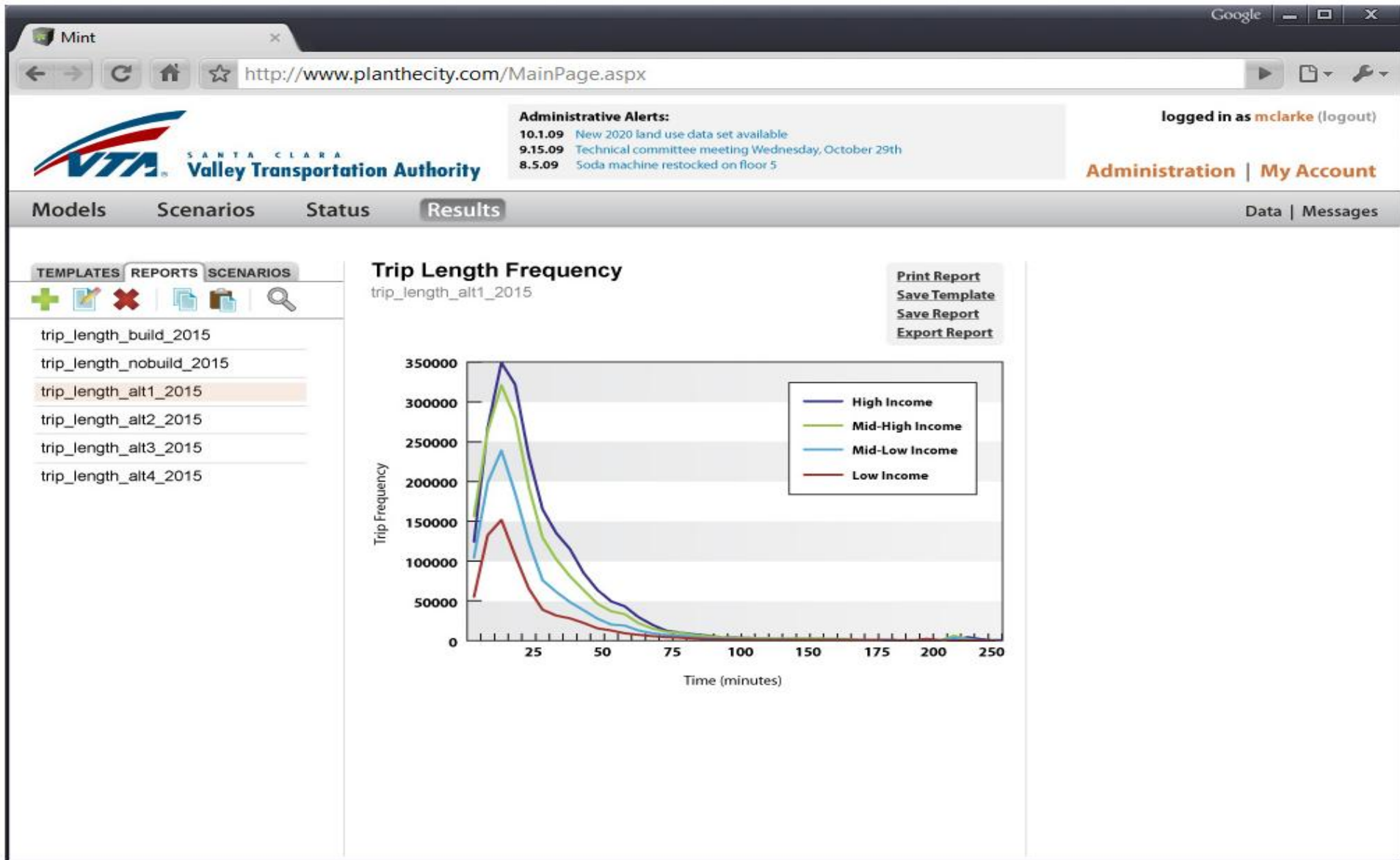
Data Source:

Heading:

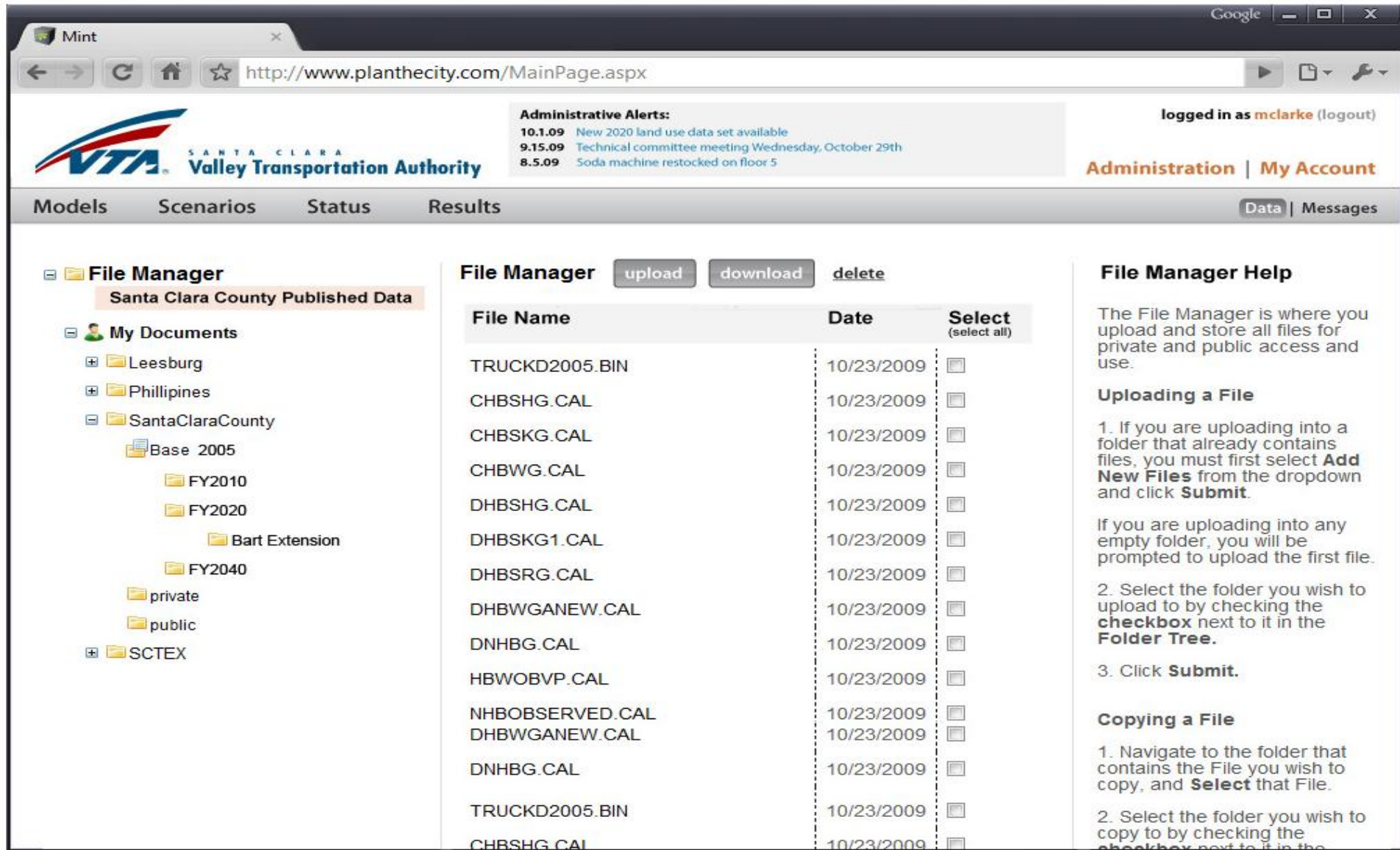
Repeat heading on each page
 Use header image

► Fields
► Layout
► Fonts

Reports/Charts



Data Management



The screenshot shows a web browser window with the URL <http://www.planthecity.com/MainPage.aspx>. The page header includes the VTA logo and navigation links for [Administration](#) and [My Account](#). A user is logged in as **mclarke**. A sidebar on the left contains a **File Manager** section with a tree view of folders: **Santa Clara County Published Data**, **My Documents**, **Leesburg**, **Phillipines**, **SantaClaraCounty** (containing **Base 2005**, **FY2010**, **FY2020**, **Bart Extension**, **FY2040**, **private**, **public**), and **SCTEX**. The main content area features a **File Manager** table with columns for **File Name**, **Date**, and **Select (select all)**. Above the table are buttons for **upload**, **download**, and **delete**. The table lists 18 files, all dated 10/23/2009. A **File Manager Help** sidebar on the right provides instructions on **Uploading a File** and **Copying a File**.

Administrative Alerts:

- 10.1.09 New 2020 land use data set available
- 9.15.09 Technical committee meeting Wednesday, October 29th
- 8.5.09 Soda machine restocked on floor 5

logged in as **mclarke** (logout)

[Administration](#) | [My Account](#)

Models Scenarios Status Results [Data](#) | Messages

File Manager

File Name	Date	Select (select all)
TRUCKD2005.BIN	10/23/2009	<input type="checkbox"/>
CHBSHG.CAL	10/23/2009	<input type="checkbox"/>
CHBSKG.CAL	10/23/2009	<input type="checkbox"/>
CHBWG.CAL	10/23/2009	<input type="checkbox"/>
DHBSHG.CAL	10/23/2009	<input type="checkbox"/>
DHBSKG1.CAL	10/23/2009	<input type="checkbox"/>
DHBSRG.CAL	10/23/2009	<input type="checkbox"/>
DHBWGANEW.CAL	10/23/2009	<input type="checkbox"/>
DNHBG.CAL	10/23/2009	<input type="checkbox"/>
HBWOBVP.CAL	10/23/2009	<input type="checkbox"/>
NHBOBSERVED.CAL	10/23/2009	<input type="checkbox"/>
DHBWGANEW.CAL	10/23/2009	<input type="checkbox"/>
DNHBG.CAL	10/23/2009	<input type="checkbox"/>
TRUCKD2005.BIN	10/23/2009	<input type="checkbox"/>
CHBSHG.CAL	10/23/2009	<input type="checkbox"/>

File Manager Help

The File Manager is where you upload and store all files for private and public access and use.

Uploading a File

1. If you are uploading into a folder that already contains files, you must first select **Add New Files** from the dropdown and click **Submit**.
2. Select the folder you wish to upload to by checking the **checkbox** next to it in the **Folder Tree**.
3. Click **Submit**.

If you are uploading into any empty folder, you will be prompted to upload the first file.

Copying a File

1. Navigate to the folder that contains the File you wish to copy, and **Select** that File.
2. Select the folder you wish to copy to by checking the **checkbox** next to it in the

Thank you