

TOD Calculator

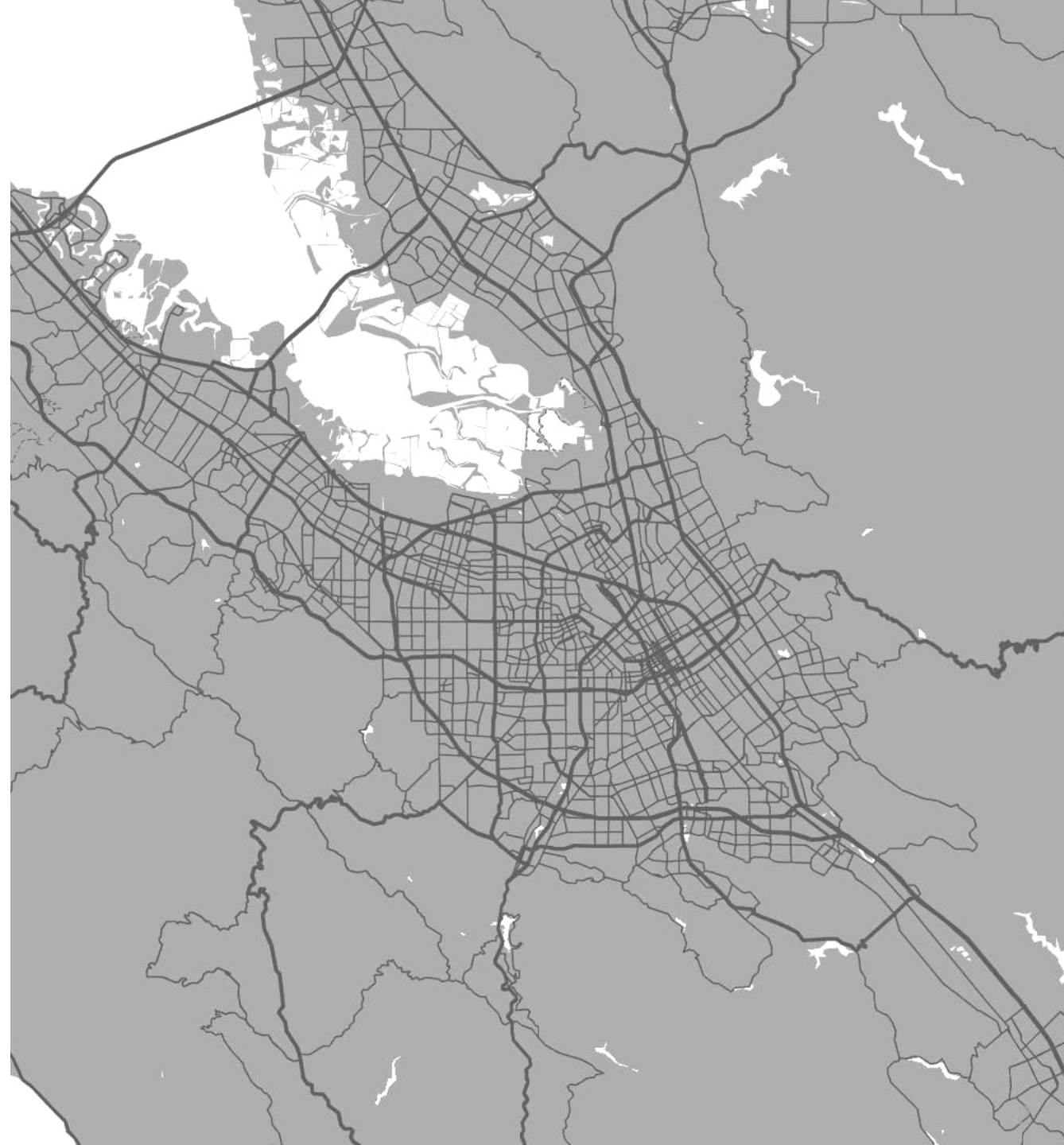
Innovation Incubator: Fall 2023 - Spring 2024

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Contents

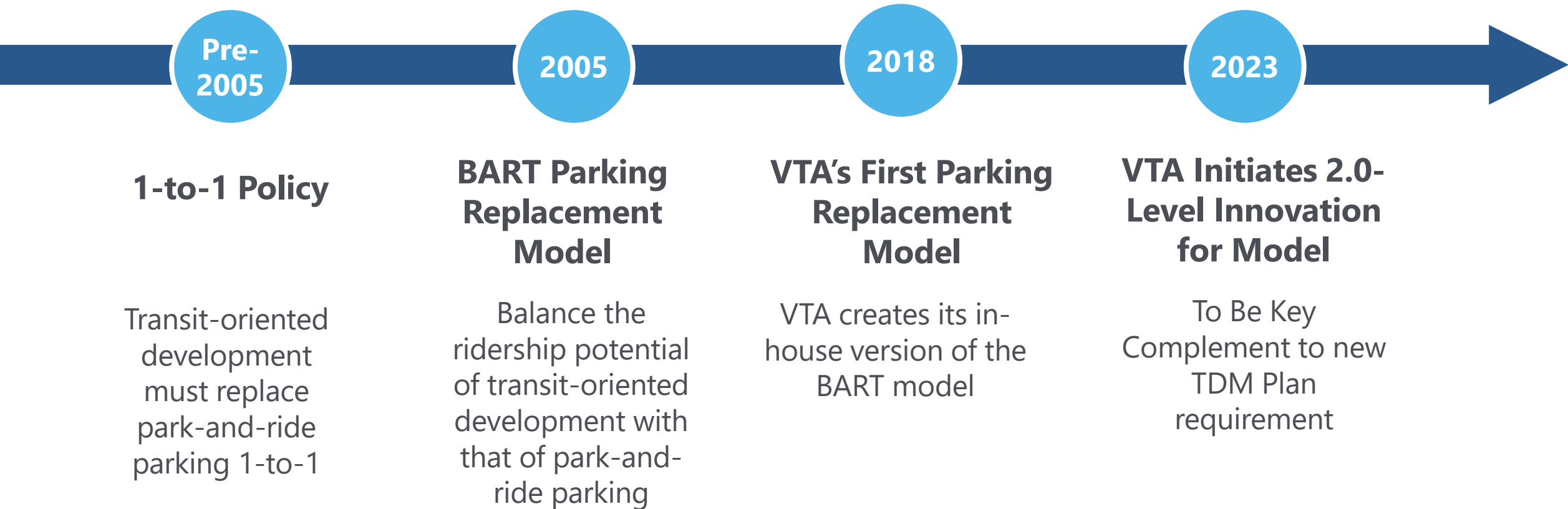
- 1 Project Intro & Purpose**
- 2 Model Overview**
- 3 Model Demonstration**
- 4 Next Steps for Further Model Development**



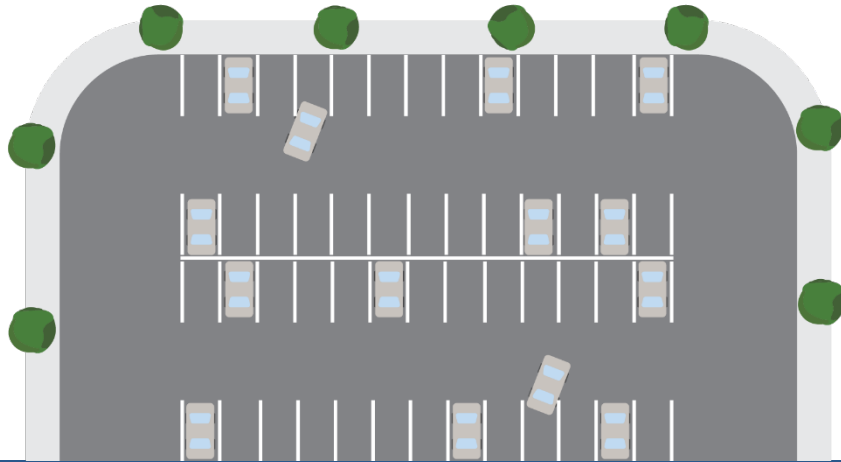
Why develop the TOD Impact Calculator?

Incubator Project Context:

Model Development for BART, VTA, NJ Transit



The TOD Calculator builds on previous spreadsheet scenario tools, while also acknowledging that ...

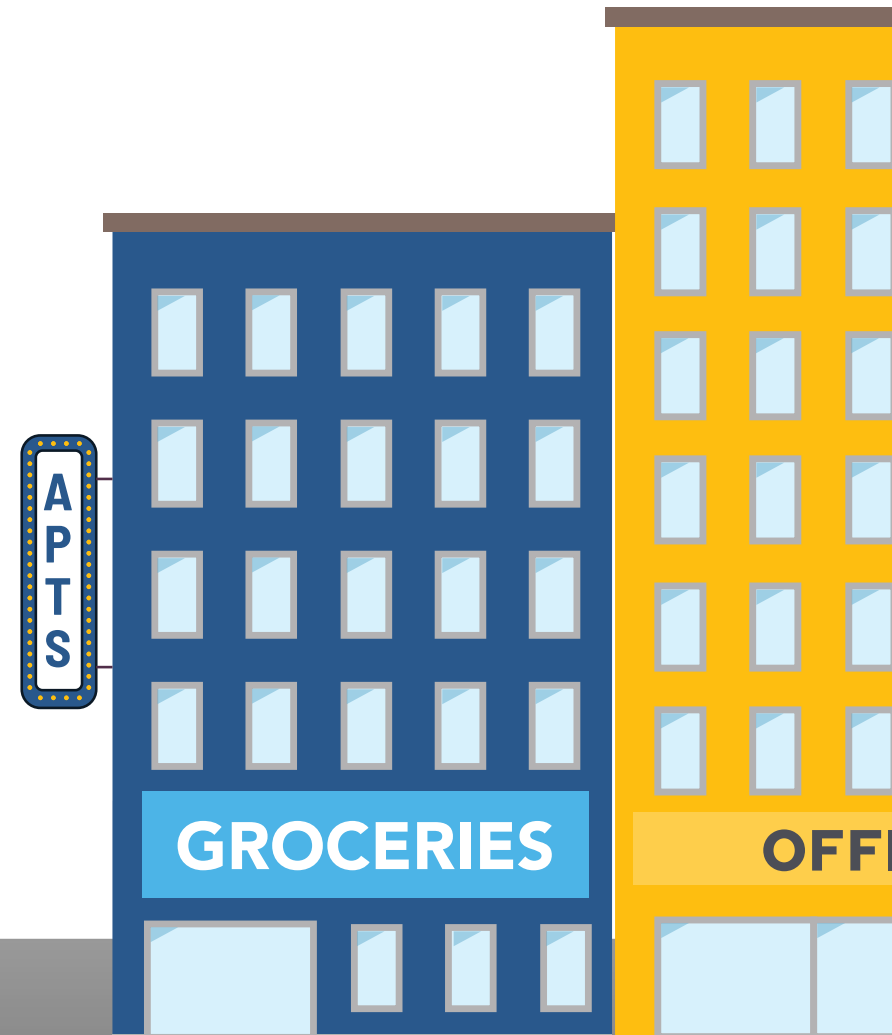


Parking is underutilized at many stations, so adding or removing **parking** will often have *no impact* on ridership



TOD generates ridership while making land around stations better places to live, work, and spend time

Especially with lower parking utilization levels today with additional work-from-home commuters, why should we replace empty parking with ...



Especially with lower parking utilization levels today with additional work-from-home commuters, why should we replace empty parking with **...even more empty parking?**



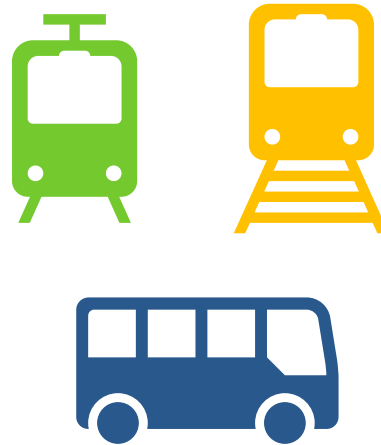
**Who is the TOD
Impact Calculator for?**

Plug-and-play model tool to understand potential for various TOD scenarios

Real Estate Professionals



Transit Agencies



Nelson\Nygaard
and Perkins +
Will



Perkins&Will

**What does the TOD
Impact Calculator allow
clients or
Nelson\Nygaard to do?**

Four things:

1

Compare
TOD proposals
consistently

2

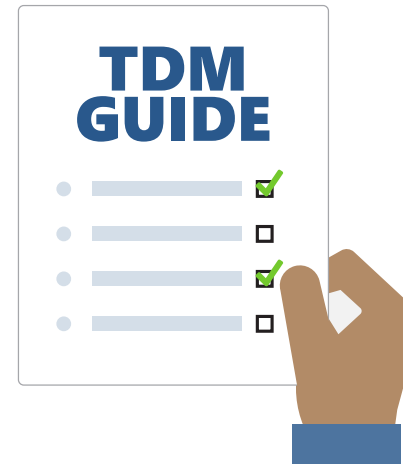
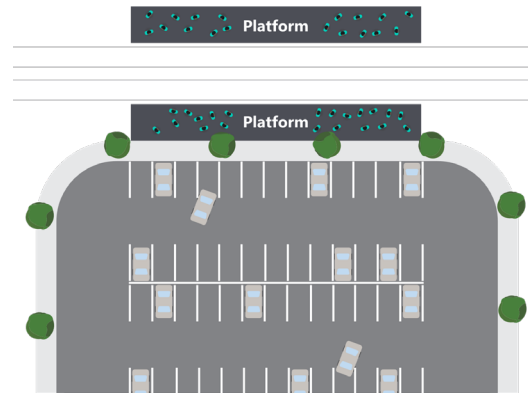
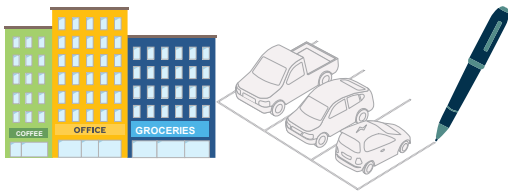
Test
scenarios and inform
RFP parameters

3

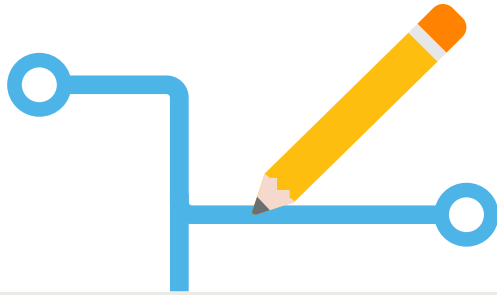
Demonstrate
and calibrate the
impact of TDM

4

Attract
TOD proposals that
align with your goals



This model prioritizes comparative calculations over predictive modeling.



Identifies TOD, Parking, and TDM factors more/less likely to generate Transit Ridership – **but it is not a Transit Ridership Model for transit stations/system**



Predicts rough level of TOD parking availability, to suggest potential for more/less PNR capacity – **but it is not a fully-loaded Parking Demand Model**



Incorporates TDM measures selected from a representative menu, which include estimated VMT reductions – **but it is not a replacement for a true VMT-reduction model**

This keeps the model simpler and easier to maintain/update.

**How does the
TOD Impact
Calculator work?**

Three important, interconnected features support a variety of TOD client needs by focusing outputs on *ridership* more than *parking*

SP

Shared Parking Model for the Proposed Development Program

TDM

Transportation Demand Management Plan Impact Analysis

SPR

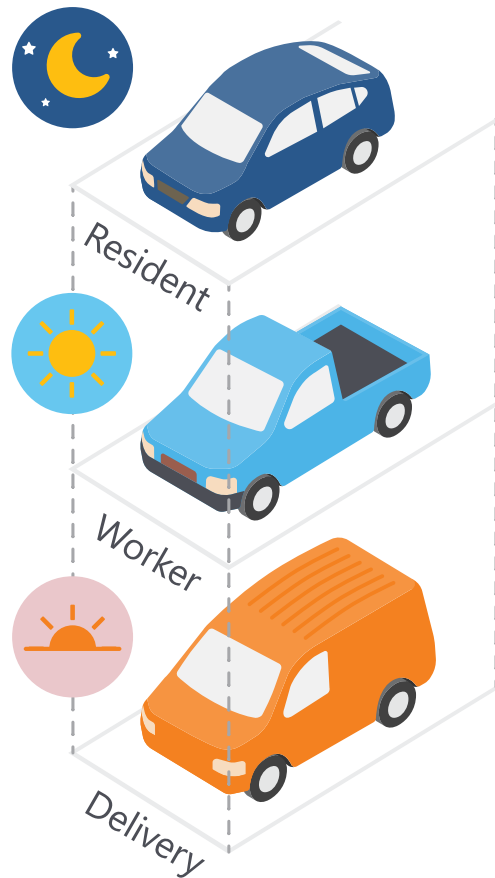
Smart Parking Replacement Analysis

Shared parking means getting *more parking* out of *fewer total spaces*

Key Model Assumption: Additional unshared parking does not increase ridership

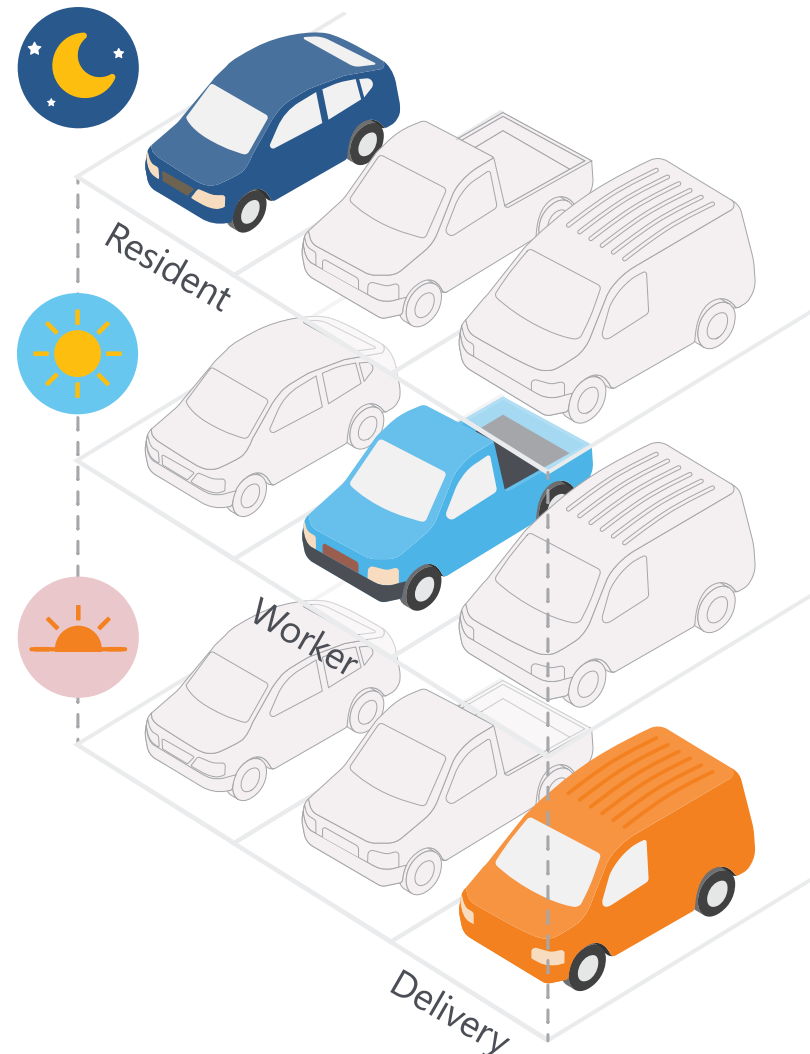
Shared parking

MODEL:
Additional shared parking may have ridership benefit

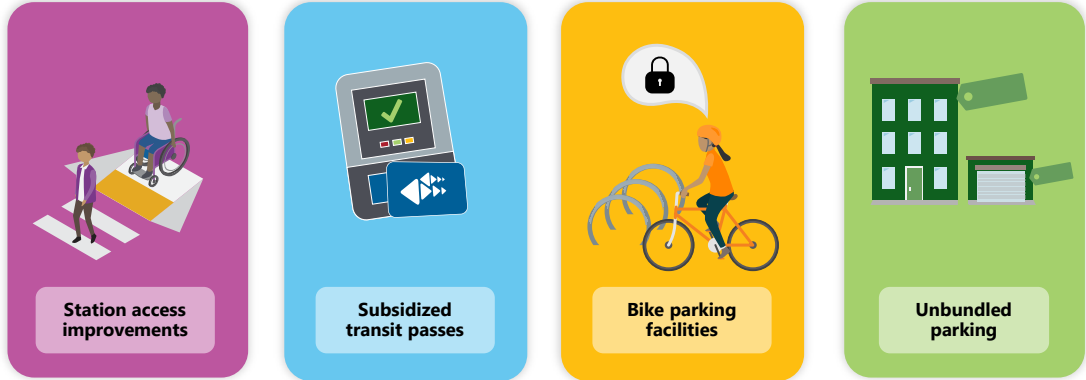


Unshared parking

MODEL:
Additional unshared parking does not increase ridership



How do TDM programs impact the model?

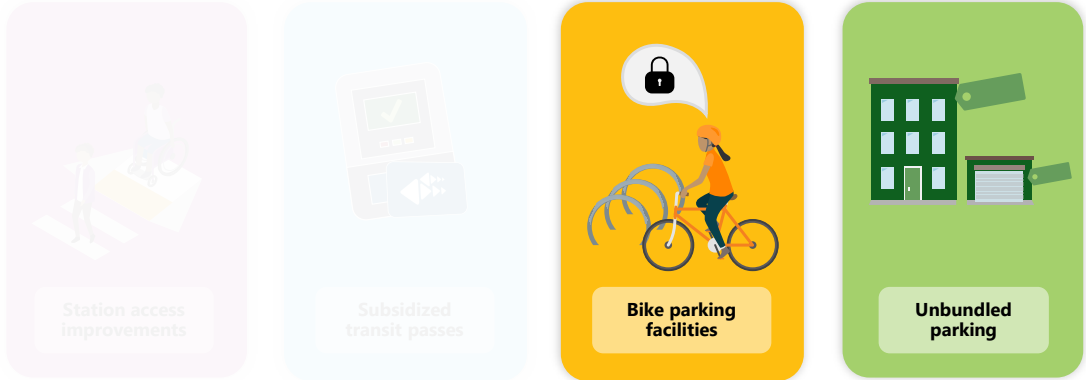


Station access improvements

Subsidized transit passes

Bike parking facilities

Unbundled parking



Station access improvements

Subsidized transit passes

Bike parking facilities

Unbundled parking

Scenario C
 TDM program geared to boost ridership and multimodal station access

Scenario D
 Lowest cost TDM program with less impact on ridership and parking demand

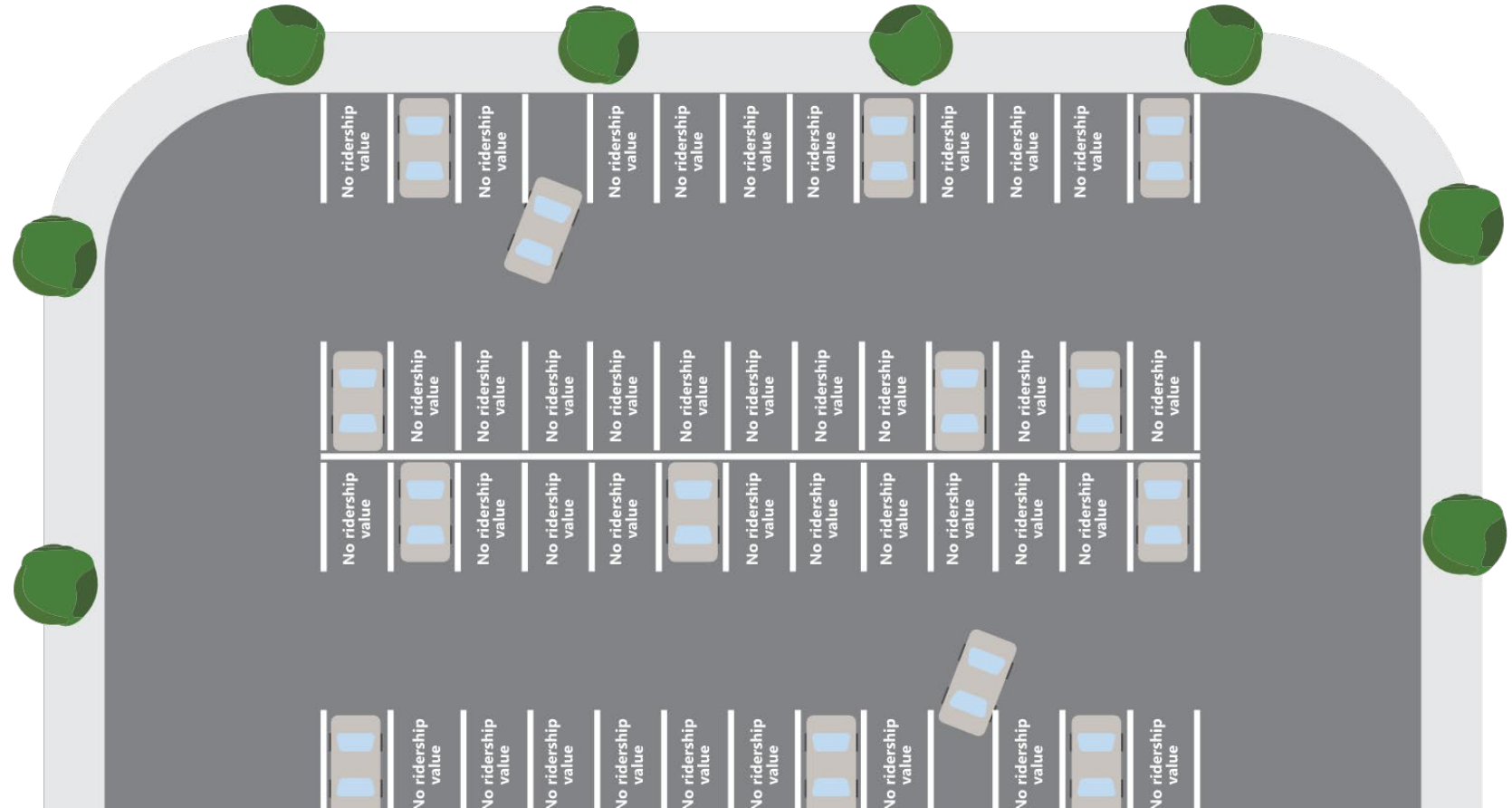
Scenario C wins! 🏆

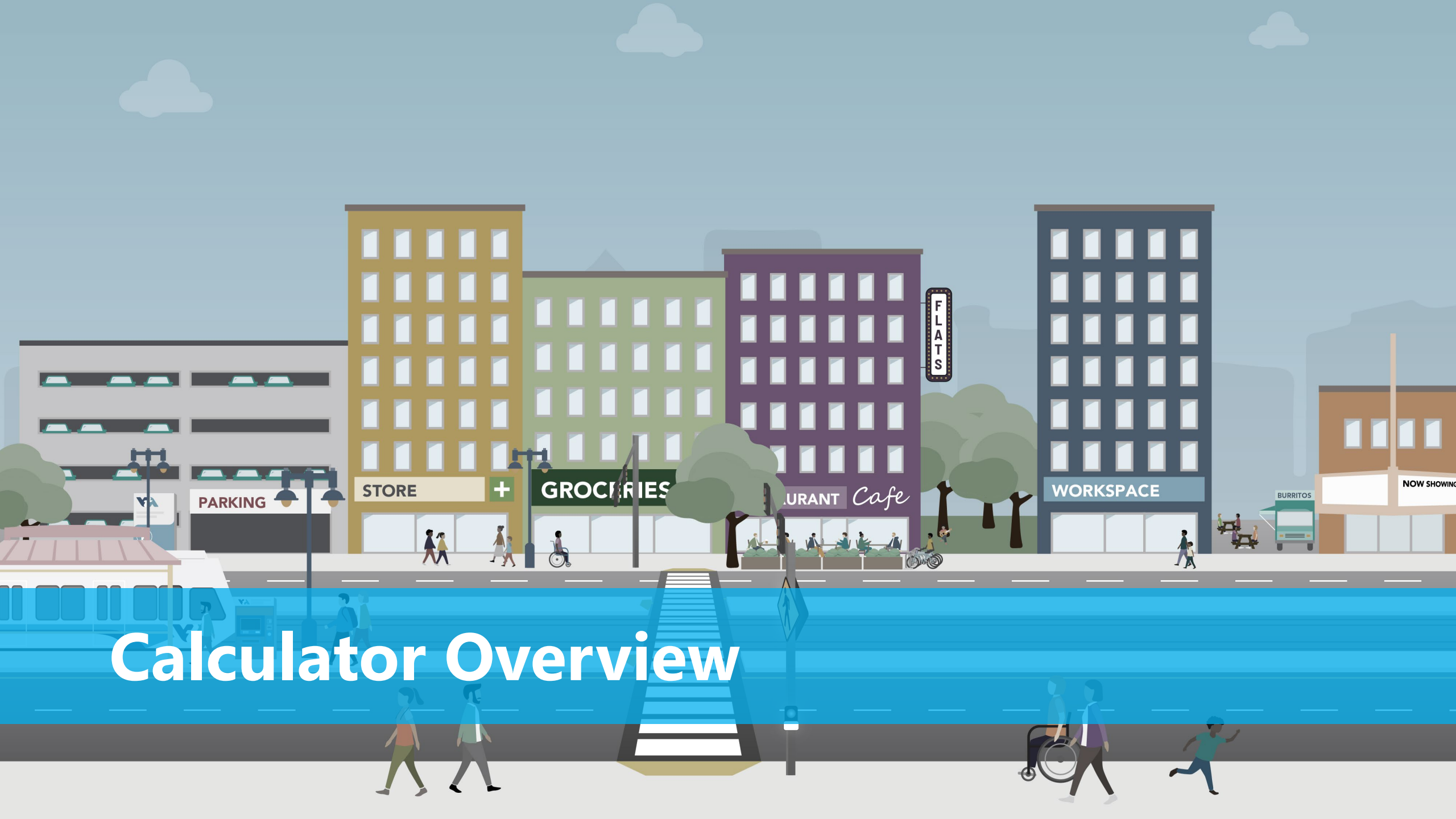
When parking at selected stations is routinely underutilized today, the model should recognize there is a higher-and-better-use for the parcel

The model only assigns ridership value *up to the current peak park-and-ride utilization level*

(Not the entire park-and-ride capacity)

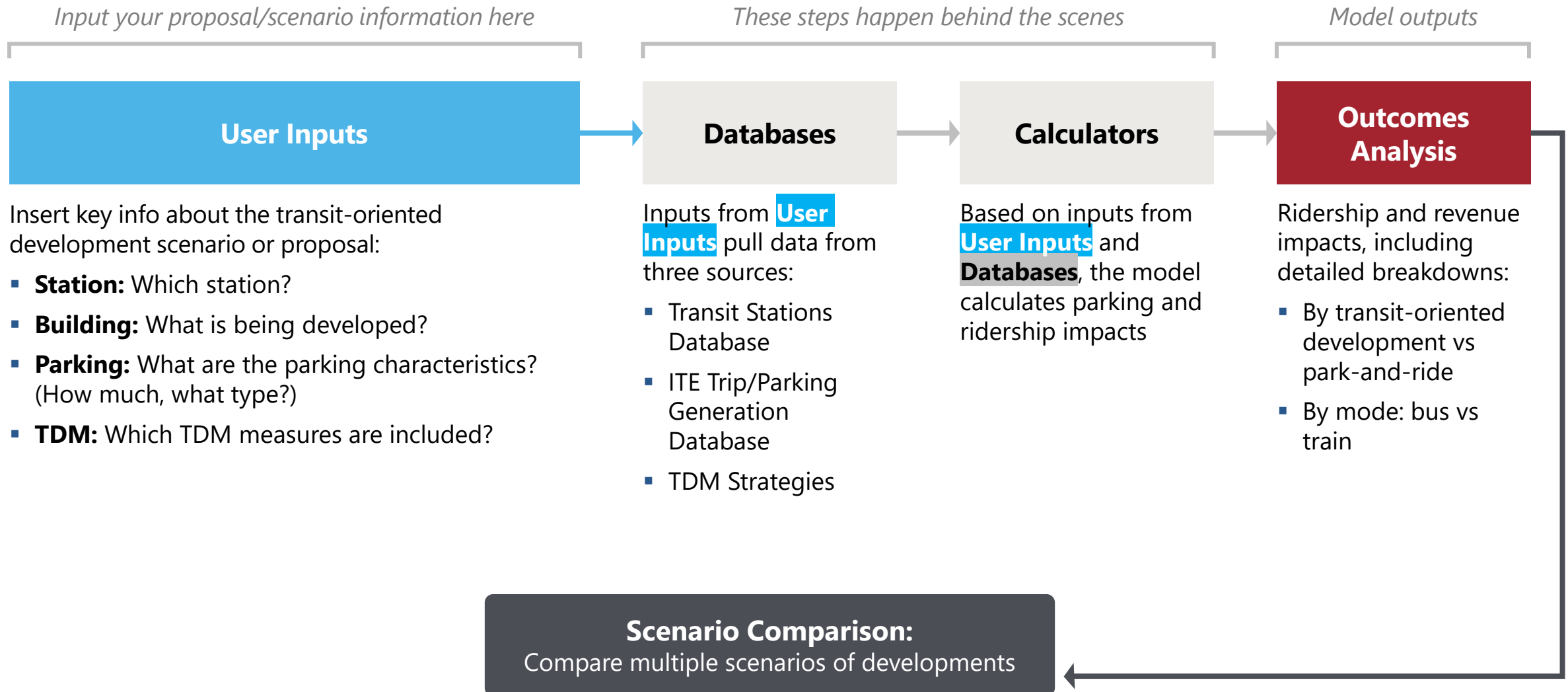
Occupancy rates are one client-managed data point to be included in the background database to run the model





Calculator Overview

TOD Calculator Overview



User Inputs

Station Profile

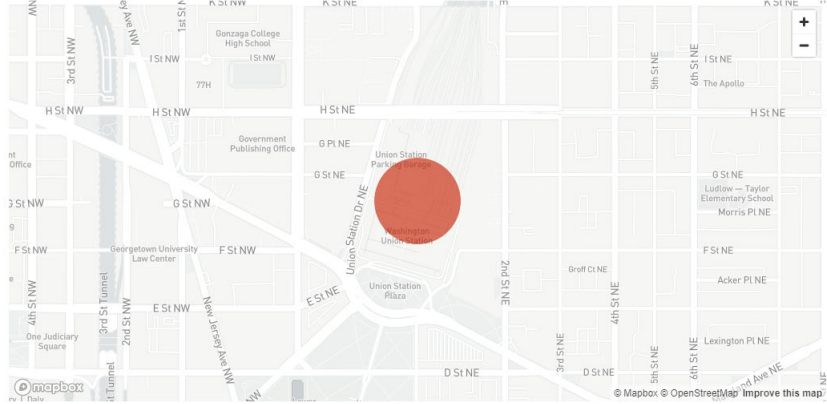
A station area is selected for development.

- The **station mode profile** displays transit modes available along with ridership and transit fares.
- The **station parking profile** displays its supply, daily parking rates, and weekend/weekend parking usage rates.


<https://nelsonnygaard-todcalculator.streamlit.app/>

Station Profile


Select Station
Union Station



Station Mode Profile



Train Ridership: 200
Fare: \$4.05



Bus Ridership: 200
Fare: \$2.50

Station Parking Profile

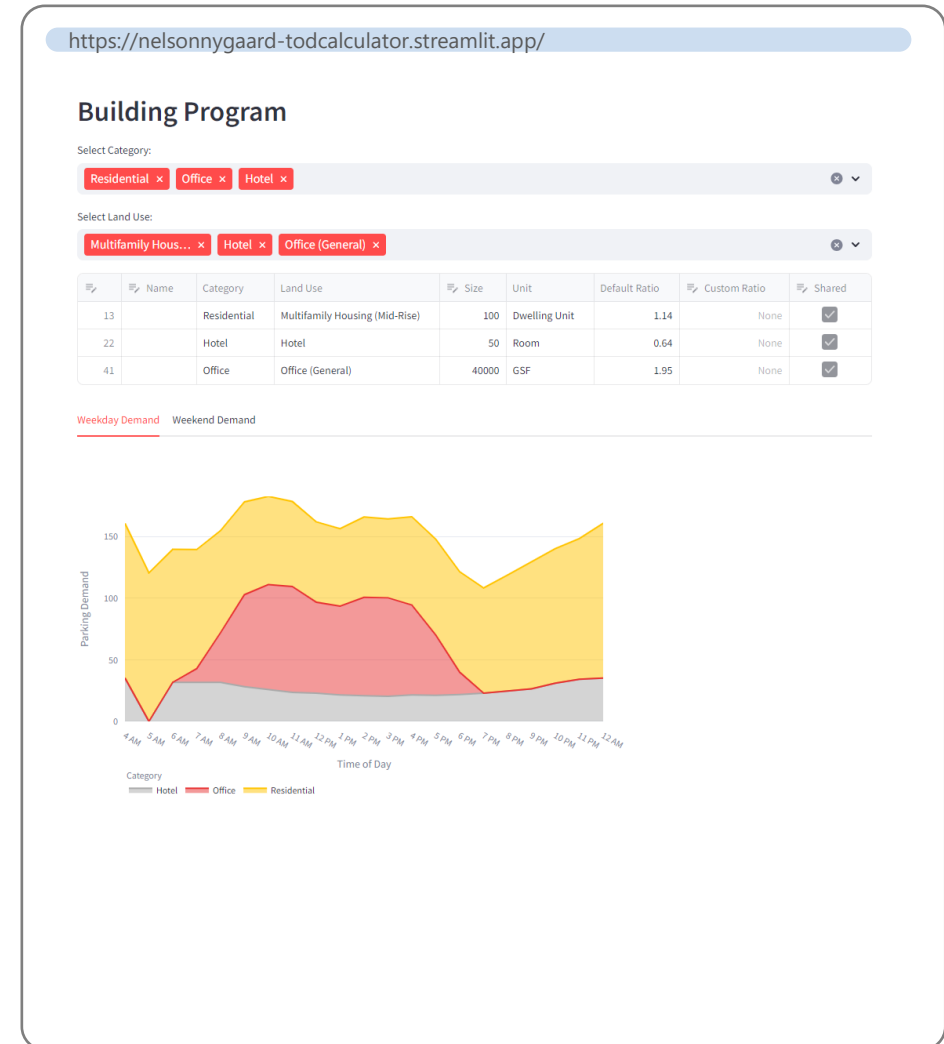
	Parking Supply	Parking Price	Parking Demand - Weekday	Parking Demand - Weekend	
	0	400	\$2.50	300	20

User Inputs

Building Program

The building program provides input fields for the development uses.

- Multiple programs can be added along with its size and whether they will have shared or unshared parking.
- A parking demand chart provides an overview of parking demand throughout different times of day.



User Inputs

Parking Program

A parking program supplements the building program. The developer can set the price and supply available for station park-and-ride users.

<https://nelsonnygaard-todcalculator.streamlit.app/>

Parking Program

Number of Existing Park-and-Ride Spaces to be Retained/Replaced	0	-	+
Total Number of Parking Spaces Available for TOD Uses	0	-	+
Percent of TOD Spaces to be Shared with Park-and-Ride	0.00	-	+
Proposed Park-and-Ride Daily Price	1.00	-	+
Proposed Daily Price for Shared TOD Spaces Available to Park-and-Ride Users	3.00	-	+

User Inputs

TDM Program

Transportation demand strategies can be toggled on/off to increase transit ridership. Some strategies include multiple implementations that can be selected from the drop-down menu.

<https://nelsonnygaard-todcalculator.streamlit.app/>

TDM Program

Category Maximum: 0.1

Toggle	Strategy	Select Implementation
<input checked="" type="checkbox"/>	Improve Walking Conditions	N/A
<input checked="" type="checkbox"/>	Bicycle Parking - Residential	Providing 1.5 long-term bicycle parking space per dwelling unit, up to 100 u...
<input type="checkbox"/>	Bicycle Parking - Office/Commercial	Providing long-term and short-term bicycle parking spaces as required by Ci...
<input checked="" type="checkbox"/>	Bicycle Repair Station	N/A
<input checked="" type="checkbox"/>	Bicycle Maintenance Services	N/A
<input checked="" type="checkbox"/>	Showers, Changing Facilities, and Lockers	N/A
<input type="checkbox"/>	Bike Valet	N/A
<input type="checkbox"/>	Family TDM Amenities	At least one cargo bike and one collapsible shopping/utility cart for shared u...
<input type="checkbox"/>	On-Site Daycare	N/A
<input type="checkbox"/>	Affordable Healthy Food Retail	N/A

Compare Scenarios

Once user inputs are completed, the scenario can be saved, then loaded into the scenario tab for cross-scenario comparisons. This can be helpful for determining the combination of building programs and/or TDM strategies that can lead to greater TOD impacts.

Save Scenario

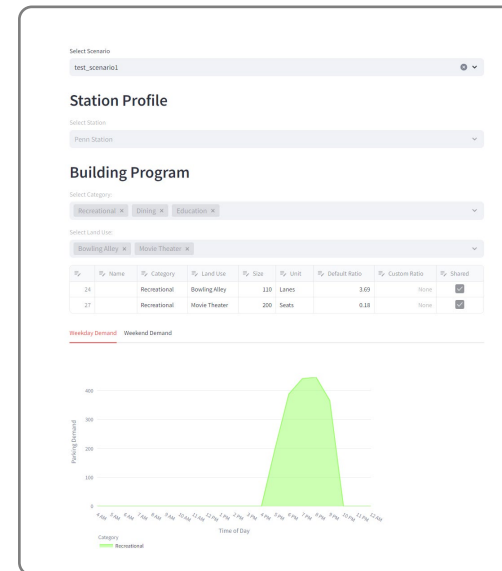
Save Your Scenario

Scenario Name

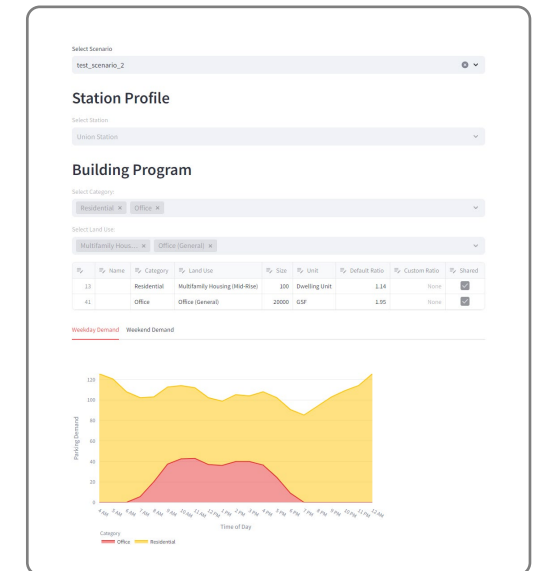
Type your scenario name

Save

Scenario 1



Scenario 2



Schedule for Updating the Model

- **Demand/Trip Generation measures**
 - Track for ITE updates
- **Station measures**
 - Every 3 years
 - When TOD interest rises for a specific station, do a complete update for that station, and, if possible, the two closest stations
- **TDM Program Menu**
 - Model will need to stay in alignment with the menu, the implementation measures, and points allotted for each



Incubator Project Deliverable

Website

- <https://nelsonnygaard-todcalculator.streamlit.app/>
- This website is currently offline for demonstration purposes. The app will go online once some functionalities are disabled to control user outputs being saved to the database.

GitHub

- https://github.com/PerkinsAndWill/tod_calculator
- The code currently lives in Perkins&Will's GitHub and can be accessed by contributors given access.

Future Project Development

- Continue user interface refinement with future VTA on-call task order