

Exit Number and Destination Signs

References

Lanes: <https://wiki.openstreetmap.org/wiki/Lanes>
Highway Tag: <https://wiki.openstreetmap.org/wiki/Key:highway>
Turn Tag: <https://wiki.openstreetmap.org/wiki/Key:turn>
Motorway Exit Info: https://wiki.openstreetmap.org/wiki/Exit_Info
Motorway Junction Tag: https://wiki.openstreetmap.org/wiki/Tag:highway%3Dmotorway_junction
Destination Tag: <https://wiki.openstreetmap.org/wiki/Key:destination>
Link Roads: https://wiki.openstreetmap.org/wiki/Link_roads_between_different_highways_types
https://wiki.openstreetmap.org/wiki/Highway_link
Roads and Routes: https://wiki.openstreetmap.org/wiki/United_States_roads_tagging/Routes#Nationwide
Names: https://wiki.openstreetmap.org/wiki/Names#Abbreviation_.28don.27t_do_it.29
Mapbox: <https://labs.mapbox.com/mapping/mapping-for-navigation/adding-exit-and-destination-signs/>

Key Terms

Destination Sign - A sign that details a route, road, city, or place for a vehicle to ascend to.

Exit Sign - a sign that indicates where a freeway exit is occurring, and is sometimes marked with a number of that exit.

Link road - link roads are used to identify slip roads or ramps

Exit number - The junction/exit number from the exit sign. Examples: 236, 11A, 51A-B

Exit Name - The exit name from the exit sign - this is not typical for most exits

Toward location - The location that the exit/ramp/slip road will head toward

Toward route number - The route number that the exit/ramp/slip road will head toward

Toward road name - The road name that the exit/ramp/slip road will head toward

Branch route number - The route number that the exit/ramp/slip road will branch onto

Branch route name - The road name that the exit/ramp/slip road will branch onto

Advisory speed limit - When a exit/ramp/slip road has an advisory speed sign

On-Ramp - a slip road that is entering and merging with a highway

Off-Ramp - a slip road that is exiting a highway

Route marker - the highway shield including the interstate or state route number

Overview

To solve navigation tasks our teams need to have a complete understanding of situations on the road in order to build the best route. For this reason, the freeway section includes part of the road which begins after the destination sign and is finished on the junction node. Freeway should contain information about the exit geometry, a number of lanes, and the destination of each lane. Highway exit signs indicate where and how a vehicle is allowed to exit the freeway. This is a link road that connects the freeway and an arterial road. The link road should be tagged along with the node where

the exit begins. This node is the start of the link road exiting a freeway. Both features need to be mapped to indicate a freeway exit.

Tagging

Motorway

Key	Value	Description
highway	motorway	Main road tag
lanes	*	Number of lanes
turn:lanes	* *	Used to tag indicated turn markings for individual lanes.
destination:lanes	* *	Toward direction of each lane

Node

Key	Value	Description
highway	motorway_junction	Main highway node tag
ref	*	Exit number
noref	yes	If no reference number exists

Linkway

Key	Value	Description
highway	*_link	Link road type
oneway	*	Links oneway status
junction:ref	*	Exit number
destination	*	Toward direction
destination:ref	*	Branch route number
destination:ref:to	*	Toward route number

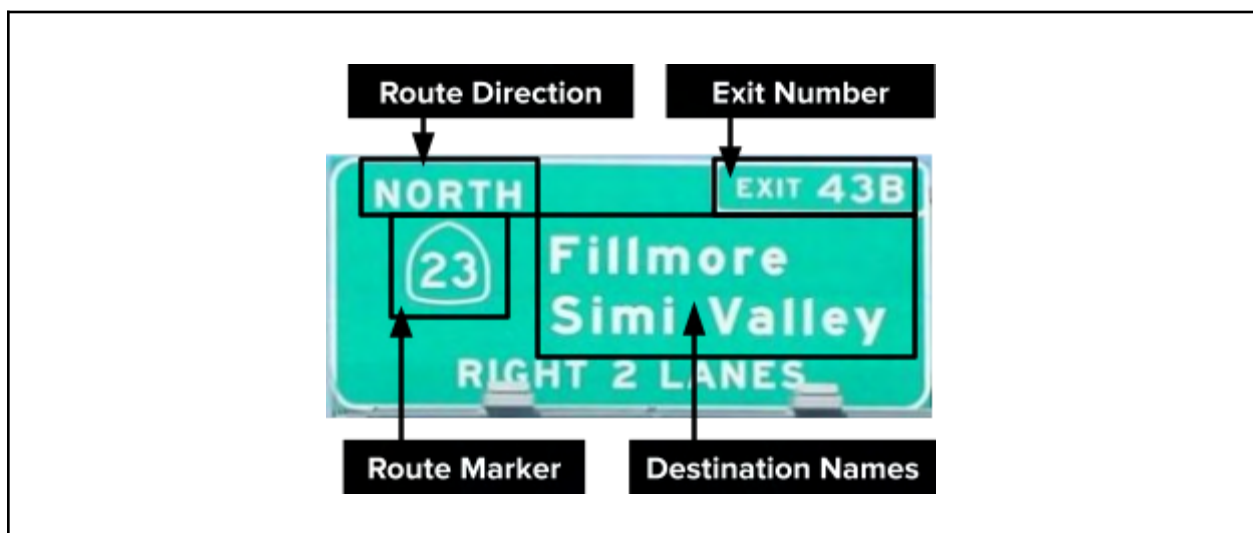
Exit and Destination Signs

Exit signs can be stand alone signs that indicate where the exit for a freeway is occurring as well as the number of that exit. Exit signs can also be presented within a destination sign.

A destination sign includes the names of locations that a road is heading to. The destination sign is what the driver actually sees while driving or navigating the road. The destination can be within a sign or ground writing.

Highway exit and destination signs are typically green and should only be used for determining tag information.

<i>Exit Sign</i>	<i>Destination Signs</i>
	



Sign Information	Tag
Route Marker	destination:ref= CA 23 North
Route Direction	destination:ref=CA 23 North
Exit Number	junction:ref= 43B / ref= 43B
Destination Name	destination= Fillmore ; Simi Valley

Freeway before junction, Motorway Junction and Links

For exit signs, the node and way are both tagged to indicate an exit sign or motorway split. The node should indicate the point where the exit or split starts. The link roads that exit or split from a node are tagged with exit sign information or destination information.

Freeway before junction (Motorway)

Freeways are multi-lane roads where an individual lane has a certain destination and information about this is carried by destination signs. Exit signs indicate that the motorway will be split. The highway type is indicated in the **highway=motorway** tag, and the **oneway=yes** tag indicates the road is one way. When Freeway crosses the destination sign, specific information on the sign describes the future behavior of traffic lanes. The number of lanes and exit geometry are described on satellite imagery and also by street-level imagery platforms like Mapillary and Bing Street Side Imagery.

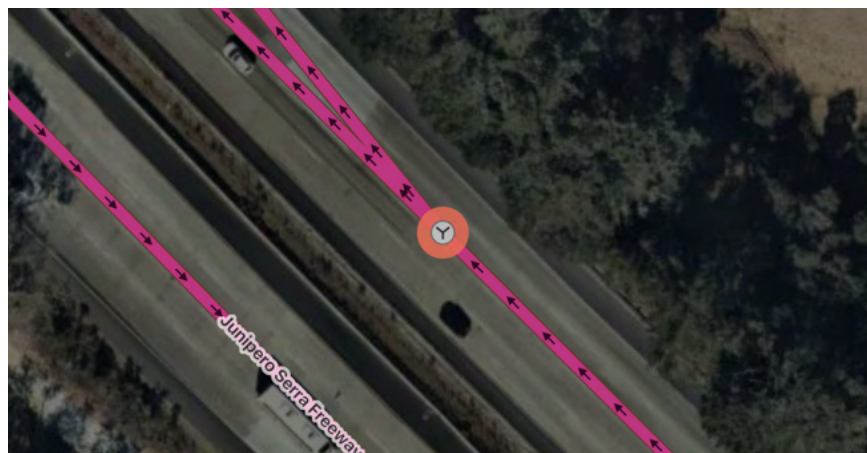
- The **lanes=*** tag indicates the number of traffic lanes.
- The **turn:lanes=|*** tag indicates turn markings for individual lanes. Value should be added, starting with the leftmost lane and ending with the rightmost. Each value separated with a | (vertical bar).
- As a rule, the destination or exit sign describes the geometry of the turn. It depends on the arrow position on the sign or on the road marking.
- The **destination:lanes=|*** tag describes the destination of each lane. Information on the destination sign indicates the destination of lanes on the motorway. Usually, leftmost and rightmost lanes are described by the exit signs. Each value separated with a | (vertical bar) by the same rule as for **turn:lanes=|*** tag.



Motorway Junction (Node)

In case of mapping of the exit signs the node and way are both tagged to indicate specific information. When a link road deviates from a way for an exit, the node where the link road starts is tagged to indicate the point of the road changes. The node will only need two tags to identify an exit. The tag **highway=motorway_junction** is used to indicate the type of highway feature. This tag is used for any type of link road when it is needed to indicate an exiting link or splitting from another one. The **motorway_junction** tag should not be used for segments going ON ramp.

- the **ref=*** tag is used to indicate the exit number.
- If no exit number can be verified through open source imagery, then the tag **noref=yes** should be tagged



Motorway Link (Linkway)

When a motorway junction link road exits or splits a motorway, the way begins at the motorway junction node. The first link road should include all necessary tags with the available information about the destination and exit. When the link road is an on ramp destination, the first link road way should have the necessary tags. The highway link type will be indicated in the **highway=*_link** tag, and the **oneway=yes** tag that indicates the link road is one way. In rare cases a link road will be tagged as **oneway=no** if it is a bi-directional road.

- The **junction:ref=*** tag indicates the exit number for the way.
- The **destination=*** tag is used to indicate the name of the destination the motorway junction exits to.
- If the destination includes a route marker, the **destination:ref=*** tag is used.
- If the destination route marker includes a 'TO' destination, where there is a proceeding destination in an exit's sign information, the **destination:ref:to=*** tag is used.



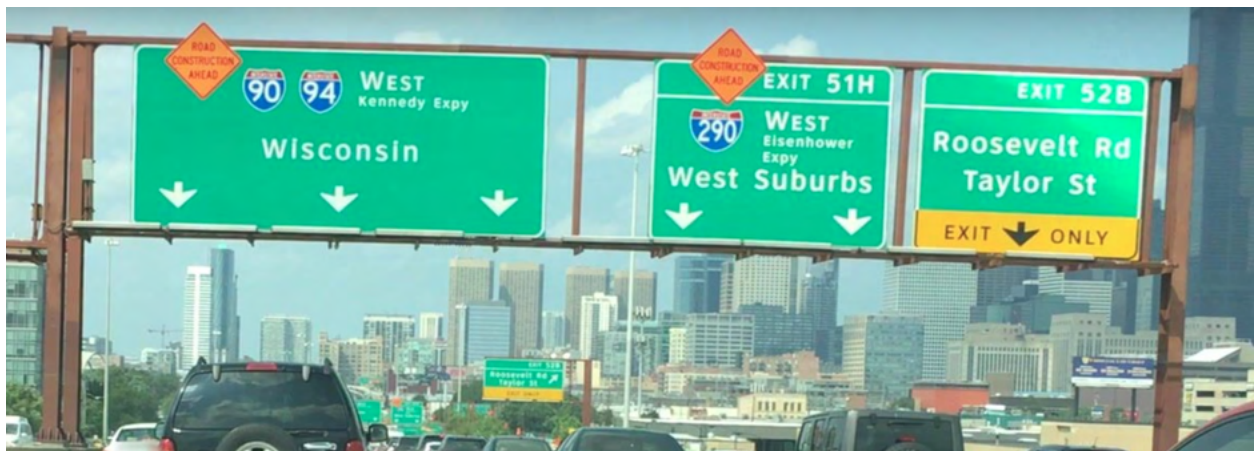
Tagging algorithm

Curation should be started from evaluation of closest to Exit images and gradually view the images moving away from the sign.

1. Try to find a large *Destination Sign* which has information about destinations and route numbers for each lane.
 - a. If *Destination Signs* is found, split the road under the Sign (if not splitted), and add information only from the sign to OSM tags.
2. If a large Sign wasn't found, add OSM tags only from the nearest *Destination Sign* to the Exit, that contains Linkway destinations.
3. Check tags on the curating segments, if **destination:street** or **destination:street:to** tags exist, move value from these tags to the **destination** tag
 - a. Firstly add to the destination tag major destinations like cities. After that add minor destinations like streets, parks, etc.
 - b. Values of **destination:street** tags which printed in the lower case shouldn't be moved to the **destination** tag

Edge-cases with destination:street tag

The **destination:street** tag can only be used when the *Destination Sign* has destination names with different character sizes. Street names that have the smallest character size should be added to the **destination:street** tag or shouldn't be added if it's not a street. In the **destination:lanes** tag these destinations should have the last position for the related lanes.



Tags verification

Values of tags that don't match with reality should be removed or changed according to the latest ground truth information.

1. Validate GT or the most recent (no older than 6 months) Mapillary images at a distance of **~0.625 miles** from the nearest exit in order to find Destination Signs & Exit Signs.
2. If no one sign wasn't found, check tags on the Freeway before junction, junction node & linkway(s)
 - a. If Destination Signs or Exit Signs are found, check information from these Signs. If it doesn't match with tags values from the validating segments, change tags values.
3. If tags that describe destinations, or route numbers, or exit numbers exist, check the date when these tags were last changed. If the tags were last changed less than six months ago, increase the validating distance to **1 mile**
4. Remove unnecessary tags. Remove **ref=*** tag from junction node, and add **noref=yes** tag
 - a. If tags with **ref** suffix exist, check out the [wiki](#) in order to match values from road segments with official information. If it matches, apply value from tags with **ref** suffix to **unsigned_ref** tag.

On Ramp and Off Ramp

Link roads that are considered going 'Off Ramp' are those that exit a motorway or freeway. Off ramp segments will require an **highway=motorway_junction** node tag at the beginning of the off ramp segment and all necessary tags.



Link roads that are considered going 'On Ramp' are ways that are entering a motorway or freeway. On ramp segments do not need a **highway=motorway_junction** node tag at the beginning or end of the segment since they are not meant for exit sign information.



An **Off Ramp** and **On Ramp** link road should always be split to represent two different ways. If a link road is continuous from off ramp to on ramp, the way should be split to represent two ways with their necessary tags.



Road Names

Road names on signs can be written in short form abbreviation, acronym, or initialism and it is important to use the full name in a tag. Any of these short form names should always be written in full form and never shortened within a tag. Below are a few examples of what types of short-form words that can be included in an exit name or road sign.

Short-form	Full-form
Rd	Road
St	Street
Dr	Drive
Br	Bridge
Ave	Avenue
Blvd	Boulevard
Pt	Point
Pkwy	Parkway
Cr	Creek
Mtn	Mountain
Mt	Mount
Jct	Junction









Ft	Fort
JR	Junior
Co	County
Tr	Trail

Route Markers


Route markers can often be included in a destination sign. Route markers indicate the type of route marker and number of the route. The ***destination:ref=**** tag is used to indicate the route number. A space will be in between the route type abbreviation and the number of the route for the value of the key, for example; "I 80". If there is a 'TO' destination the ***destination:ref:to=**** tag should be used as well. Below are examples of route number markers that are common in the state of California.


For more State Route Marker view this OSM wiki page:


https://wiki.openstreetmap.org/wiki/United_States_roads_tagging/Routes#California


Route	Route Value	Route Example
Interstate	I #	  
U.S. Route	US #	 
California State Route	CA #	
County Route	CR #	 



Highway Types for Link Roads

From	To	Link between
service unclassified residential 	service/unclassified/residential	not available
	tertiary	tertiary_link
	secondary	secondary_link
	primary	primary_link
	trunk	trunk_link
	motorway	motorway_link

tertiary 	service/unclassified/residential	tertiary_link
	tertiary	
	secondary	secondary_link
	primary	primary_link
	trunk	trunk_link
	motorway	motorway_link

secondary 	service/unclassified/residential	secondary_link
	tertiary	
	secondary	
	primary	primary_link
	trunk	trunk_link
	motorway	motorway_link

primary 	service/unclassified/residential	primary_link
	tertiary	
	secondary	
	primary	
	trunk	trunk_link
	motorway	motorway_link

trunk 	service/unclassified/residential	trunk_link
	tertiary	
	secondary	
	primary	
	trunk	
	motorway	motorway_link
motorway 	service/unclassified/residential	motorway_link

The correction of the motorway roads geometry

The correction of the geometry is necessary in cases if tags can't be applied correctly according to the current road geometry, or road geometry doesn't describe the true road situation. Before the road geometry is changed, check the following features:

1. Satellite and street-level images uploaded to OSM **after** the road segment geometry was changed last time.
2. Make sure that the road segment doesn't have **access** or **construction** tags.

Vehicles can't make the maneuver to linkway, according to road markings



Fixed road geometry



Cardinal Direction

If the destination sign contains information about the destination with the cardinal direction, this information should be written in the **destination** tags. Make sure there are no **Route Markers** on the destination sign.

Street-level image



Satellite image



Motorway

highway	motorway
lanes	3
turn:lanes	slight_left slight_right slight_right
destination:lanes	President George Bush Turnpike South President George Bush Turnpike East President George Bush Turnpike East

Node

highway	motorway_junction
noref	yes

Linkway 1

highway	motorway_link
oneway	yes
destination	President George Bush Turnpike South

Linkway 2

highway	motorway_link
oneway	yes
destination	President George Bush Turnpike East

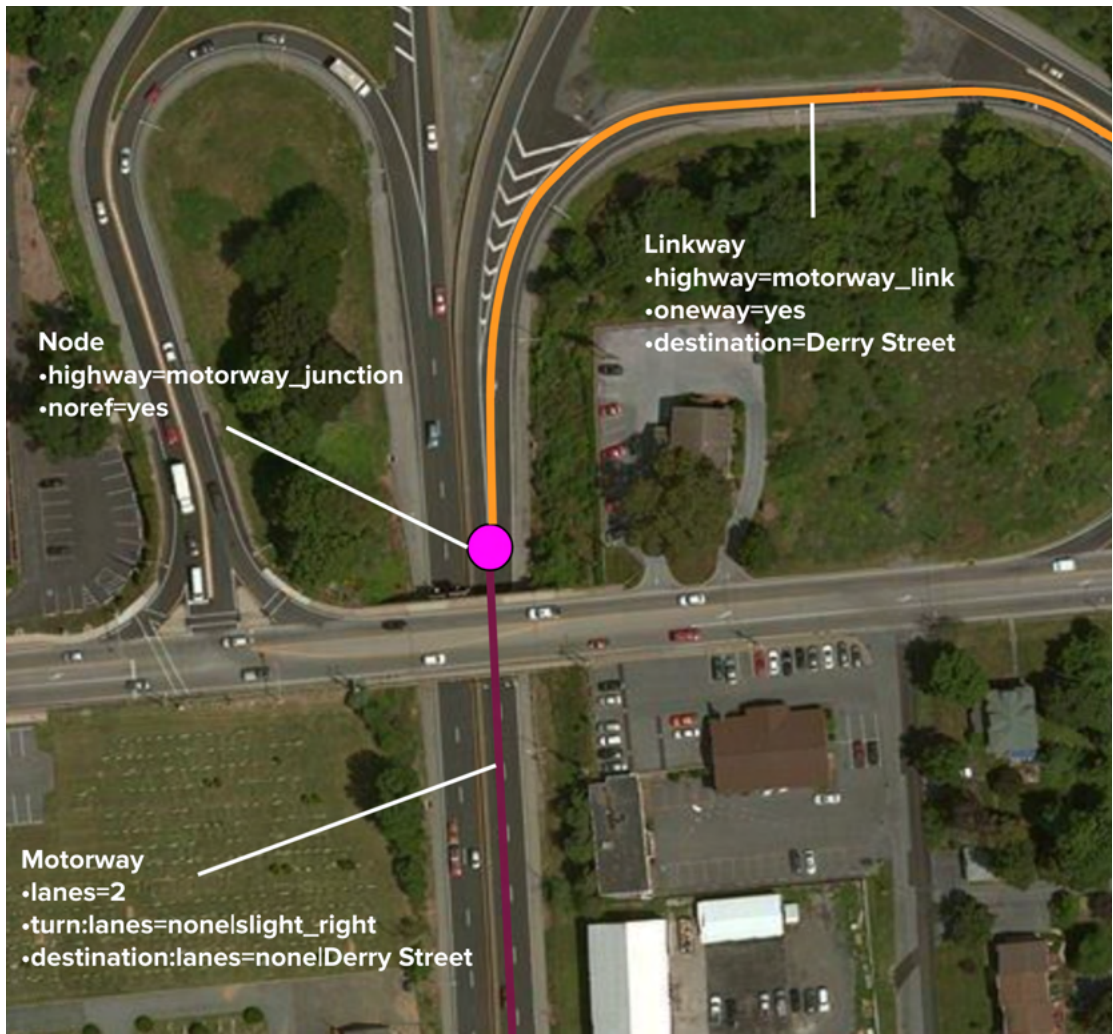
Examples

Simple Road Name

Street-level image



Satellite image



Motorway

highway	motorway
lanes	2
turn:lanes	none slight_right
destination:lanes	none Derry Street

Node

highway	motorway_junction
noref	yes

Linkway

highway	motorway_link
oneway	yes
destination	Derry Street

Unnumbered Exit

Street-level image



Street-level image



Satellite image



Motorway

highway	motorway
lanes	5
turn:lanes	none none none none slight_right
destination:lanes	San Rafael;Eureka San Rafael;Eureka San Rafael;Eureka San Rafael;Eureka Mill Valley; Stinson Beach

Node

highway	motorway_junction
noref	yes

Way

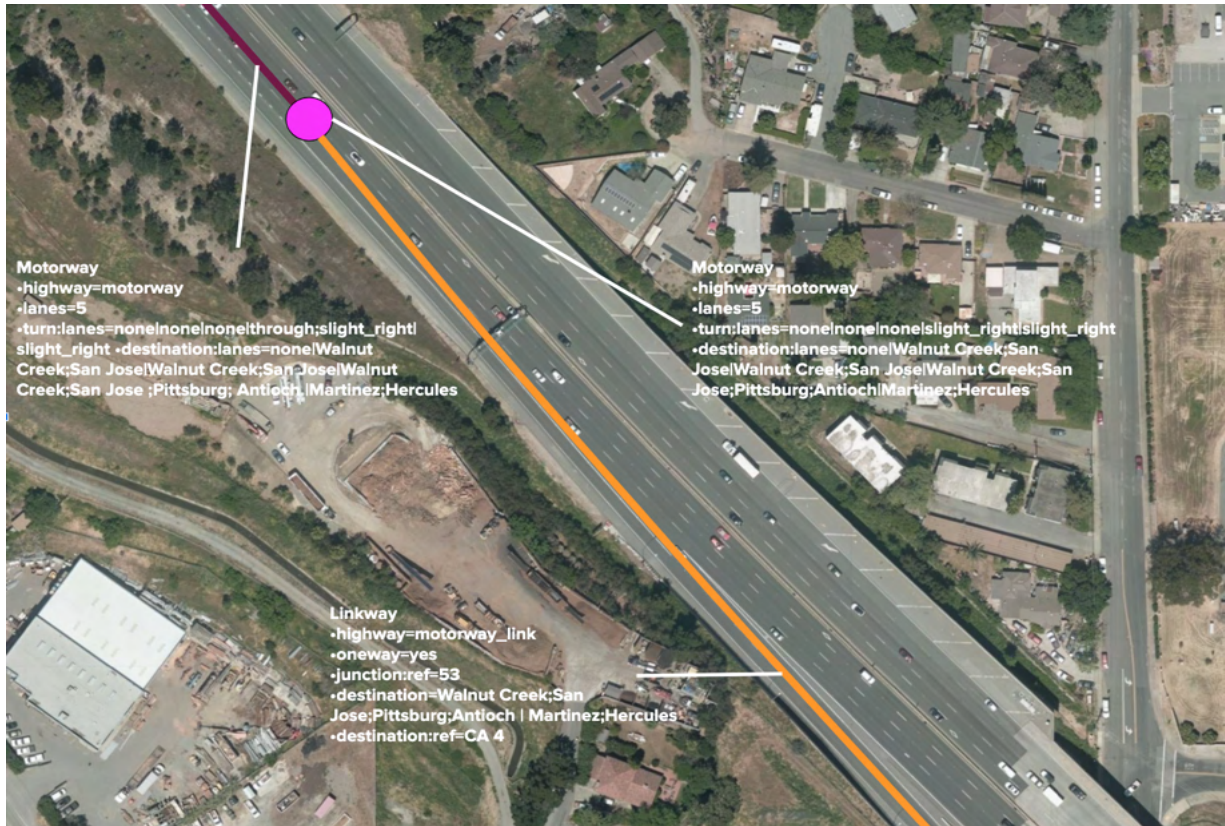
highway	motorway_link
oneway	yes
destination	Mill Valley;Stinson Beach
destination:ref	CA 1

Unnumbered Exit

Street-level image



Satellite image



Freeway

highway	motorway
lanes	5
turn:lanes	none none none through;slight_right slight_right
destination:lanes	none Walnut Creek;San Jose Walnut Creek;San Jose Walnut Creek;San Jose;Pittsburg;Antioch Martinez;Hercules

Node

highway	motorway_junction
ref	53

Way

highway	motorway_link
oneway	yes
junction:ref	53
destination	Pittsburg;Antioch;Martinez;Hercules
destination:ref	CA 4

A/B Split

Street-level image



Satellite image



Freeway

highway	motorway
lanes	4
turn:lanes	slight_left slight_left slight_right slight_right
destination:lanes	Carlisle; Lewistown Carlisle ; Lewistown Hazleton ; Allentown Hazleton ; Allentown

Node

highway	motorway_junction
ref	51A;51B

Way 51A

highway	motorway_link
oneway	yes
junction:ref	51A
destination	Carlisle;Lewistown
destination:ref	I 81 South; US 322 West

Way 51B

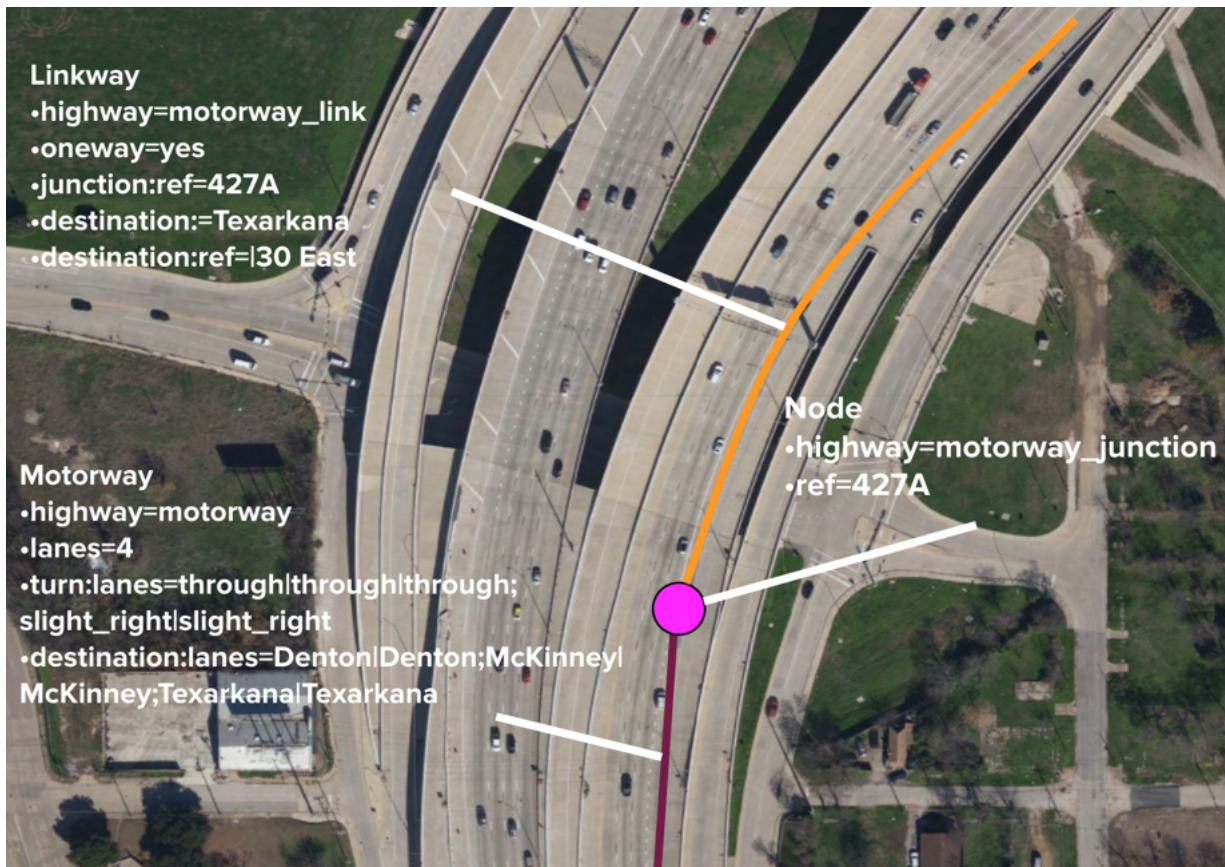
highway	motorway_link
oneway	yes
junction:ref	51B
destination	Hazleton;Allentown
destination:ref	I 81 North
destination:ref:to	I 78

Sign indicating distance to the next exit and arrows position

Street-level image



Satellite image



Signs that indicate the distance to the next exit are generally not considered when tagging. Because based on such signs, we cannot describe the behavior of lanes at the junction. Upward-oriented arrows on the signs often accurately describe the further behavior of the lanes, except if there are still local exits ahead.

Freeway

highway	motorway
lanes	4
turn:lanes	through through through;slight_right slight_right
destination:lanes	Denton Denton;McKinney McKinney;Texarkana Texarkana

Node

highway	motorway_junction
ref	427A

Linkway

highway	motorway_link
oneway	yes
junction:ref	427A
destination	Texarkana
destination:ref	I 30 East