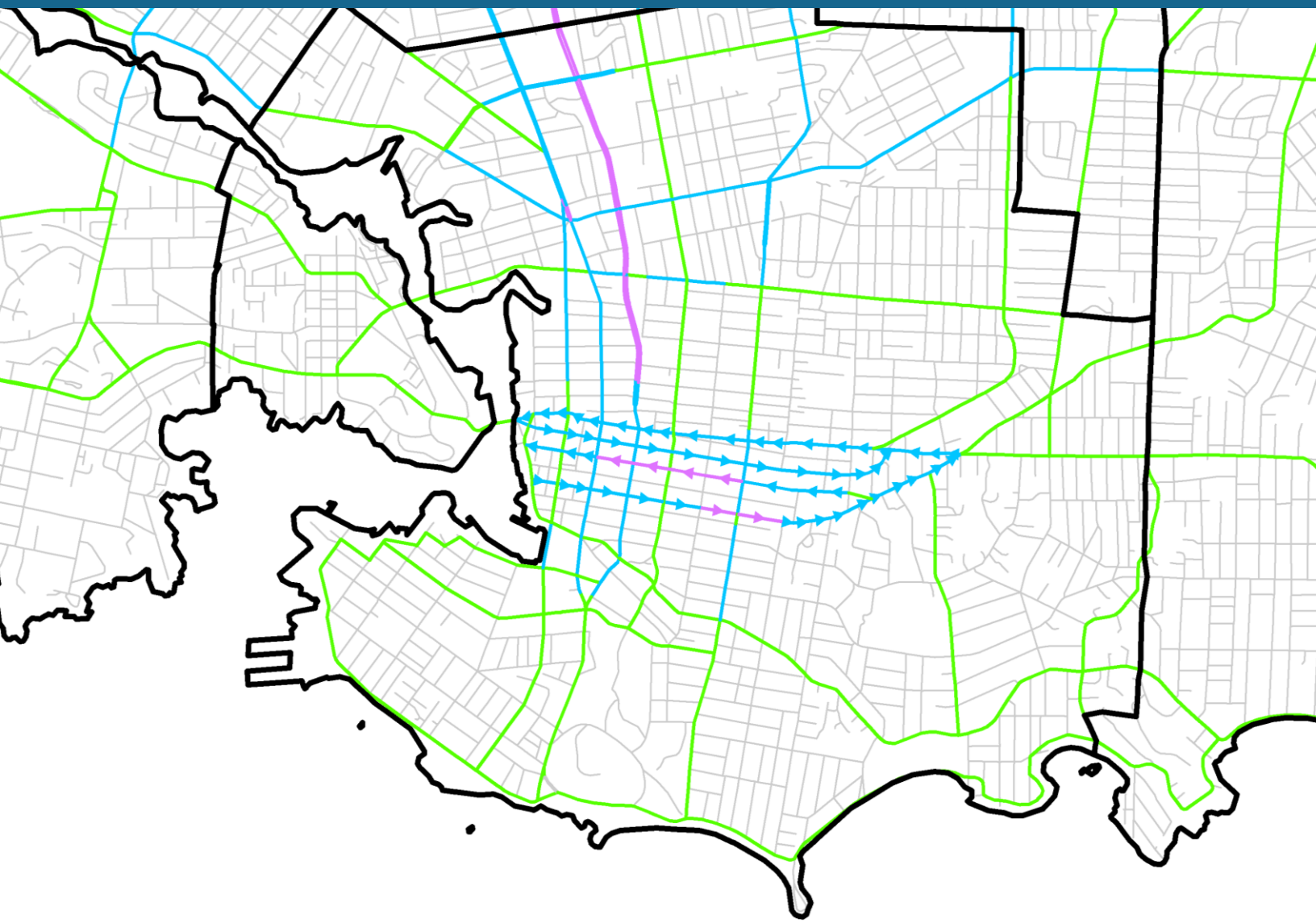

Evacuation Time Analyis Tool

Capital Regional District

Final Report

July 2020

ISL Engineering and Land Services Ltd. Is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

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1.0 Introduction

Through the Regional Emergency Management Partnership (REMP), 10 municipalities located in the Capital Regional District (CRD) are developing a Regional Evacuation Route Framework that addresses major issues of safety and emergency preparedness. The Union of BC Municipalities Community Emergency Preparedness Fund is funding this project.

The scope of the project evolved through initial meetings, from the development of a regional framework, to the development of a flexible evacuation time analysis tool. This report prepared by ISL Engineering and Land Services (ISL) details the development and steps undertaken to create the Evacuation Time Analysis (ETA) tool.

There are three main stages to the project as follows:

- The collection of demographic information within the study area, including Census population and georeferenced household information, to understand how many residents and properties would be affected by different emergency scenarios.
- Reviewing the road network and developing a high-level capacity calculation for different road types, based on laning and turn movements along an evacuation route.
- The development of a spreadsheet-based ETA Model evacuation time tool for emergency staff to utilize to determine evacuation time for any potential scenario.

2.0 Affected Population and Vehicle Factor

This section describes the data used in the first step of the ETA Model. There are a number of useful sources that can be reviewed to better understand the likely population and vehicle demands that could be expected under various evacuation scenarios.

2.1 Hazard Definitions

Early project meetings showed that it would be difficult to define specific hazard scenarios. The only clearly defined scenario is the Tsunami scenario which affects a very small percentage of the population close to the shore.

It was agreed that the model should provide flexibility to analyze any potential scenario, therefore high level breakdowns of municipal population were provided by census tract or neighbourhood boundaries which will be selectable in the model with an option to adjust the percentage of population.

Subject to the hazard occurring, municipal staff may have to use other methods such as their internal GIS departments to get a more accurate estimate of affected population. This can be entered directly into the model if appropriate.

2.2 Census Data

The population data was obtained from the 2016 Canadian Census using the census tract and census subdivision geographic areas. For the City of Victoria, the neighbourhood geographic areas were used with the 2011 Census population data which was factored to 2016 levels. **Table 2.1** provides an overview of the population demographics of the study area.

Table 2.1: Study Area Population Overview (2016 Census)

Municipality	Total Population
Victoria	85,792
Saanich	114,148
Central Saanich	16,814
North Saanich	11,249
Sidney	11,672
Highlands	2,225
Oak Bay	18,094
Esquimalt	17,655
View Royal	10,408
Langford	35,342
Colwood	16,859
Sooke	13,001
Metchosin	4,708
Juan de Fuca Electoral Area	4,860

Municipality	Total Population
Salt Spring Island Electoral Area	10,557
Southern Gulf Islands Electoral Area	4,732
Total Population	378,116

Census data was collected for each census tract and census subdivision area within the project study area as shown in **Figure 2.1**. Neighbourhood boundaries were used in the City of Victoria.

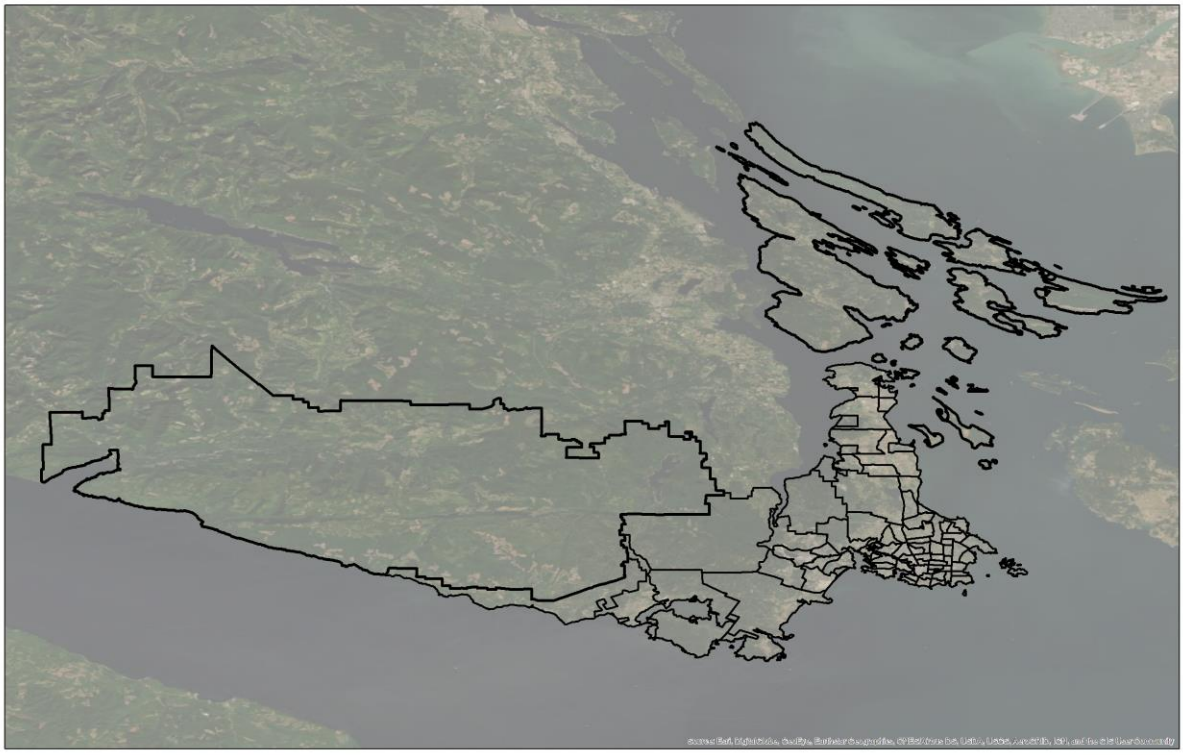


Figure 2.1: Study Area and Census Population by Census Tract and Census Subdivision Areas

2.3 Vehicle Ownership Data

The vehicle ownership rates were obtained from the 2017 Capital Regional District Origin Destination Household Travel Survey. This report's Section 4 Sub-area Demographic and Travel Summaries include vehicle ownership rates for each municipality, as shown in **Table 2.2**.

Table 2.2: Study Area Vehicle Ownership (2017 CRD OD Household Travel Survey)

Municipality	Vehicles per Person
Victoria	0.61
Saanich	0.70
Central Saanich	0.82
North Saanich	0.97
Sidney	0.75
Highlands	0.91
Oak Bay	0.71
Esquimalt	0.60
View Royal	0.67
Langford	0.72
Colwood	0.76
Sooke	0.77
Metchosin	0.96
Juan de Fuca Electoral Area	0.92
Salt Spring Island Electoral Area	0.79
Southern Gulf Islands Electoral Area	0.79*

* Rate from Salt Spring Island is used due to information not available

Population in each municipality is multiplied by the vehicle ownership rates to estimate the number of vehicles to be evacuated if evacuation starts during the evening (i.e. residents are at home rather than work).

It should be noted that other evacuation studies have shown that not all multi-car households would use all their vehicles during an evacuation, with findings often indicating where car ownership is approximately 2 vehicles per household, evacuating traffic is often closer to 1.5 vehicles per household. Car-pooling should be encouraged particularly for large scale evacuations to reduce congestion. The model assumes the default rates for each municipality which is assumed to be on the conservative side.

3.0 Evacuation Routes

This section describes the data used and assumptions in the second step of the ETA Model.

A map of the road network is provided for each municipality. The map was generated using the Statistics Canada 2019 road network file and color-coded by the number of lanes in each direction. A visual check using Google Maps and Google Street View was completed for every collector and arterial road in the network. This check verified the number of lanes and the direction of travel. The number of lanes displayed represent the number of lanes in each direction. Parking lanes were not counted. Turning lanes were also not counted. When there was a discrepancy between the number of lanes in either direction the lower number of travel lanes was used to provide a more conservative estimate of evacuation time.

Initial project meetings highlighted that there were no clearly defined hazard scenarios or evacuation routes. Therefore, in order to provide a flexible model for almost any potential scenario, some work must be done by the user to determine evacuation routes. Instructions are provided to assist in entering relevant information regarding the routes. The information would, in turn, used to derive the capacity on each route. An emphasis on the turning movements is required since they are typically the capacity constraints on each route which would dictate the evacuation times. Several assumptions were used to generalize the capacities for the various cases, as they relate to the road classification, traffic control, and signal timing. They are further described in this section.

3.1 Road Capacity

Unconstrained road capacity of a single lane is typically around 1,600 vehicles per hour. This is based on a continuous stream of traffic maintaining a little over a 2 second headway between vehicles. This capacity assumes uninterrupted flow, therefore wherever there is a requirement for a vehicle to come to a stop, this will be reduced, often by a significant amount. Therefore, it is important to determine the constraints that will impact the route and the related vehicular capacity.

Within the study area, higher order roads such as highways and arterials typically have 2 or 3 lanes per direction, and they are usually constrained at traffic signals. Although some highways are uninterrupted, the entrances and exits are still usually constrained by traffic signals. It is assumed that lower order roads such as collectors and local roads have 1 lane per direction and they are usually constrained at signals, roundabouts, and stop signs.

Table 3.1 outlines the various road network laning and the corresponding capacity considered on each evacuation route. The lowest capacity is to be chosen for each route.

Table 3.1: Road Network Capacity Assumptions

Directional Number of Lanes	Capacity (Vehicles/hour)
3	2,880
2	1,920
1	640

Table 3.2 outlines road network constraints where the evacuation route passes a traffic signal with various turn movements. The lowest capacity is to be chosen for each route.

Table 3.2: Road Network Turn Capacity Assumptions

Constraint	Capacity (Vehicles/hour)
Dedicated or Shared Left Turn Lane at Traffic Signal	225
Dual Left Turn Lane at Traffic Signal	450
Dedicated or Shared Right Turn Lane at Traffic Signal	750
Dual Right Turn Lane at Traffic Signal	600

For each evacuation route, and there may be multiple for a given scenario, the number of lanes, intersection control, turn movements and turn lanes are determined. The capacity of each specified route is added together, resulting in total evacuation capacity.

3.2 Ferry Capacity

There are municipalities within the CRD only with access to ferries as evacuation routes, such as the Salt Spring Electoral Area and Southern Gulf Island Electoral Area. The route capacities for the ferries were determined by examining BC Ferries website for the vessel vehicle and passenger capacities, as shown in **Table 3.3**.

Table 3.3: Ferry Capacity (BC Ferries)

Vessel	Capacity (Vehicles/sailing)	Capacity (Passenger/sailing)
Bowen Queen	61	400
Kuper	26	269
Mayne Queen	58	400
Queen of Capilano	100	457
Queen of Cumberland	112	462
Quinitsa	44	300
Quinsam	63	400
Salish Eagle	138	600
Salish Raven	138	600
Skeena Queen	92	450

The user will determine the vessels available for evacuation and the number of sailings per day. The person capacity of each vessel is added together, resulting in total vessel evacuation capacity.

4.0 Time of Day

This section describes the data used and assumptions in the third step of the ETA Model.

4.1 Place of Work and Commuting Mode

The Census provides information about place of work, this provides some insight into the location of people and how they travel and how populations within a given municipality might change based on time of day. **Table 4.1** outlines day and evening populations for each municipality based on home and employment location. It does not account for tourism, shopping or recreational activities.

Table 4.1: Study Area Day and Night Population Overview (2016 Census)

Municipality	Day Time Population	Evening Population
Victoria	113,362	85,792
Saanich	104,448	114,148
Central Saanich	16,619	16,814
North Saanich	11,489	11,249
Sidney	12,937	11,672
Highlands	1,375	2,225
Oak Bay	15,494	18,094
Esquimalt	18,500	17,655
View Royal	10,853	10,408
Langford	30,357	35,342
Colwood	12,574	16,859
Sooke	10,176	13,001
Metchosin	3,948	4,708
Juan de Fuca Electoral Area	3,700	4,860
Salt Spring Island Electoral Area	10,442	10,557
Southern Gulf Islands Electoral Area	4,887	4,732

Table 4.1 shows that Victoria experiences an influx of population from outside its city boundaries during the day. North Saanich, Sidney, View Royal, Esquimalt and Southern Gulf Islands Electoral Area also experience an increase of population during the day. This will increase the estimated number of vehicles to be evacuated for these municipalities if evacuation starts during the day. Saanich, Central Saanich, Highlands, Oak Bay, Langford, Colwood, Sooke, Juan de Fuca Electoral Area and Salt Spring Island Electoral Area experience a decrease of population during the day. This will decrease the estimated number of vehicles to be evacuated for these municipalities if evacuation starts during the day.

4.2 Hourly Background Traffic and Vehicle Capacity

Evacuating capacity estimated in step 2 assumes the road network has no background traffic. If an evacuation of a small portion of the population were to begin during the typical peak traffic periods while most people continue with their day-to-day travels, the available capacity to evacuate may be significantly reduced.

The hourly background traffic was determined by examining 11 count sites from the Ministry of Transportation and Infrastructure's Traffic Data Program. This will serve as a proxy for background traffic and vehicle capacity for each municipality. For each site, data from the most recent year and the month September was used whenever possible.

For each municipality, background traffic was determined using traffic volumes in the outbound direction. A percent capacity utilization is calculated for each hour. For example, if it was observed that the peak traffic capacity utilization (100%) occurs at 4 p.m. Traffic volumes in the remaining hours were divided by the peak hour traffic volumes. This results in percent capacity utilization for each hour. **Figure 4.1** shows the percent capacity utilization in each hour for the municipalities where highway counts are available.

	JDF	Sooke	Metchosin	Langford	View Roya	Saanich	Victoria	C.Saanich	N.Saanich
00:00	1%	2%	3%	3%	4%	5%	4%	6%	8%
01:00	1%	1%	2%	2%	2%	2%	2%	2%	2%
02:00	0%	1%	1%	2%	2%	2%	2%	2%	2%
03:00	2%	3%	2%	2%	2%	2%	2%	3%	2%
04:00	4%	10%	7%	6%	6%	5%	4%	10%	6%
05:00	17%	36%	27%	22%	17%	11%	13%	22%	13%
06:00	30%	73%	58%	72%	59%	33%	43%	48%	31%
07:00	39%	67%	49%	60%	67%	58%	67%	85%	65%
08:00	53%	59%	51%	53%	62%	65%	74%	91%	82%
09:00	53%	60%	49%	57%	61%	60%	66%	77%	72%
10:00	63%	59%	51%	56%	57%	61%	65%	73%	74%
11:00	84%	63%	53%	57%	59%	65%	68%	76%	72%
12:00	71%	59%	53%	56%	59%	68%	69%	77%	76%
13:00	78%	54%	53%	56%	60%	69%	68%	75%	81%
14:00	81%	54%	55%	60%	65%	74%	69%	77%	87%
15:00	74%	64%	65%	66%	73%	82%	75%	86%	90%
16:00	67%	66%	70%	70%	76%	86%	80%	96%	100%
17:00	45%	58%	62%	61%	69%	81%	76%	83%	86%
18:00	30%	47%	46%	46%	55%	64%	56%	60%	60%
19:00	17%	32%	31%	36%	40%	46%	39%	42%	40%
20:00	11%	25%	25%	29%	30%	36%	31%	35%	40%
21:00	7%	18%	17%	20%	24%	28%	25%	21%	35%
22:00	4%	10%	11%	12%	14%	18%	16%	18%	20%
23:00	1%	5%	6%	6%	8%	11%	9%	12%	13%

Figure 4.1: Percent Capacity Utilization

4.3 Evacuation Time

With information on the percent capacity utilization, the remaining capacity for each hour is available for evacuation. After a start time is selected, a running total of the outstanding number of evacuating vehicles is generated, and uses all the available capacity for each subsequent hour. The running total is calculated until the outstanding number of vehicles reaches zero. The time it takes to evacuate all the vehicles is the evacuation time.

5.0 User Guide

The worksheet in Appendix A is provided for the user to plan the evacuation routes.

The rules are illustrated on the top right. These include special treatments for merging, diverging, and crossing routes. Merging and diverging routes are count as one route because when capacity is being used by evacuating vehicles by one route, it cannot be used again by another route. Otherwise it is double-counting.

Common intersection controls are two-way stop-control (TWSC), all-way stop-control (AWSC), roundabout, and traffic signal. To simplify user experience while not compromising on accuracy, a set of assumptions was applied. Every time an evacuation route passes a traffic signal, there is a capacity adjustment. But addition information is needed to differentiate the capacity adjustment since it could vary. The additional information is to specify the turn movement and associated number of turn lanes at the traffic signal.

It should be noted that the lowest capacity is to be derived for each route. Therefore, it is not about the number of constraints along the route that's important, it is about the lowest capacity constraint that dictates the capacity of the whole route. High capacity routes are ones without big constraints such as signal left turns. So, staying away from them could increase capacity and reduce estimated evacuation time.

A route is created starting from the edge of the evacuation boundary and ending at the evacuation destination without violating any rules, while trying to stay away from signal left turns. The tables on the bottom right are for the user to record characteristics about each route in terms of minimum number of lanes along the route, the presence of traffic signals with additional turn movement and turn lane information.

There are only so many routes for a given origin and destination pair, because any more routes would violate the merging rule.

Select the “CRD” worksheet for municipalities on the main island and “Ferry Islands” worksheet for the smaller ferry dependent islands. Make sure the sheet is oriented in the top left before beginning. All grey colored cells require input from the user.

Step 1 – Selecting Affected Population and Vehicle Factor

Instructions: Select the desired municipality and the impacted areas on the menus to the left. For each area, enter the percentage of population affected (i.e. to be included in the evacuation).

Selecting the desired municipality will bring in all relevant maps and information associate with that municipality. It is not possible to select multiple municipalities. Selecting the areas that encompass the evacuation zone will list relevant population information of the selected areas into the table below. These areas are based on neighbourhood or census tract boundaries. Hold the “control” key to select multiple neighbourhoods or census tracts. Choosing the various neighbourhoods or census tracts will adjust the total population respectively.

The affected population are those within the evacuation zone, which is a fraction of the population of the selected areas. Entering percentages in the grey colored cells will change the affected population respectively. A higher percentage will increase the affected population, while a lower percentage will decrease the affected population. If it is desired to have half of a neighourhood or census tract, then select the desired area and then enter 50% for the population percentage affected.

The vehicle ownership factors are automatically populated based on the Capital Regional District Origin Destination Household Travel Survey. They are multiplied by the affected population to generate the estimated number of vehicles to be evacuated. A higher vehicle ownership factor will result in more vehicles to be evacuated, thus increasing the estimated evacuation time. A lower vehicle ownership factor will result in fewer vehicles to be evacuated, thus decreasing the estimated evacuation time.

Where the population has been determined through GIS, or for a specific event, the number of people can be entered manually in the “other” row.

Shown at the bottom of the step, the total numbers of affected population and estimated vehicles are carried over for calculations in step 3.

Step 2 – Select the Available Evacuation Routes

Instructions: Specify the evacuation routes available to leave the impacted area by entering the routes, the minimum number of lanes along the route, and turning movements along each route. For ferry evacuation, enter the name of the vessel from the dropdown list, and number of sailings per day which would be determined through the schedule at the time of evacuation or discussion with BC ferries should more vessels be available to support the evacuation.

For each route the capacity is approximated based on constraints along the route. Entering more routes will increase the total capacity. Avoiding signal left turns will increase the total capacity. This total capacity, with further adjustments in the next step, is used to subtract the number of vehicles to be evacuated to produce the estimated evacuation time. Higher total capacity will reduce the estimated evacuation time. Lower total capacity will increase the estimated evacuation time.

Shown at the bottom of the step, the total capacity is carried over for calculations in step 3.

Ferry evacuation only applies for the Salt Spring Island Electoral Area and Southern Gulf Islands Electoral Area. For each route the passenger and vehicle capacity are approximated based upon the passenger and vehicle capacity of the vessel and the number of sailings per day. It is recommended to consult the ferry schedule to determine the vessel used and count the number of sailings. It should be noted that the number of sailings per day can be easily double-counted. Especially, the route from Saturna Island to Tsawwassen should be excluded if it transfers at Mayne. This is because the sailing from Pender Island stopping at Mayne to Tsawwassen has already been counted.

Entering more routes will increase the total capacity. The total passenger and vehicle capacity are used to divide the total population and total vehicles to produce the estimated evacuation time. Bigger vessels and more sailings will result in a decrease of the estimated evacuation times. Smaller vessels and fewer sailings will result in an increase of the estimated evacuation times.

A graph is provided to show that when the number of vehicles to be evacuated is reduced, the evacuation time is also reduced. Increased carpooling and increased walk-on passengers can reduce the number of vehicles to be evacuated. Minimum evacuation time is when ferry passenger capacity is fully utilized. In this case, a fraction of the vehicles are left on the island.

A higher vehicle proportion (i.e. less carpooling and walk-on) will increase the estimated evacuation time because ferry passenger capacity is less utilized. On the contrary, a lower vehicle proportion (i.e. more carpooling and walk-on) will decrease the estimated evacuation time because ferry passenger capacity is more utilized.

Step 3 – Select the Evacuation Start Time (Land Evacuation Only)

Instructions 3A: Select day or night from the two options for the desired evacuation start time. This will adjust the affected population based on census employment data for those working within and outside each municipality during the day.

If day time evacuation is selected, it will adjust the affected population based on census employment data for those commuting in and commuting out from each municipality during the day. Depending on which option is selected this will increase or decrease the affected population and the estimated number of vehicles to be evacuated, which will impact the estimated evacuation time respectively.

Instructions 3B: Select the estimated evacuation start time, this will generate a running total of the outstanding number of evacuating vehicles, based upon the anticipated background traffic on the road network.

There are two graphics to the right associated with each hour. The first graphic represents the background traffic level. The second graphic represents available capacity. The higher the background traffic level, the lower the available capacity, and vice versa. Background traffic level is based on various count locations across the CRD. It is the highest during the peak hour and the lowest around midnight. The available capacity is used to estimate the evacuation time. The higher the available capacity, the shorter the estimated evacuation time will be. Evacuation starting around mid-night usually produces the shortest evacuation time. The opposite is also true, the lower the available capacity, the longer the estimated evacuation time will be. Evacuation starting around the peak hour usually produces the longest evacuation time.

Also, by selecting a start time, the model generates a running total of the outstanding number of evacuating vehicles. This uses up the available capacities, hour by hour starting from the specified start time, until the outstanding number of evacuating vehicles reaches zero. The time it takes for evacuating vehicles on the network to reach zero is the evacuation time. This is demonstrated in the chart at the bottom, which shows background traffic, available capacity, and vehicles remaining after the specified start time.

Review Evacuation Time Summary

Review all of the fields that went into the estimated evacuation time calculation to ensure they reflect the intent of the evacuation. Make any adjustments as required.

6.0 Recommendations to Improve Evacuation

The following recommendations are made to support evacuation, some of which are subject to the evacuation scenario occurring:

6.1 General Readiness

- Monitor wildfire and Tsunami threats, and call an evacuation with sufficient time to comfortably evacuate those threatened, if possible.
- Assign neighbourhoods (through an app, paper notifications, or website information) with a primary evacuation route, should there be a need to call for a rapid no-notice evacuation.
- Establish lines of communication with appropriate agencies and support staff. Have one unified command post for all stakeholders. As necessary, traffic control personnel and/or BC MoTI Contractors should have the same radio frequency as First Responders.
- To avoid lineups at gas stations, where an evacuation is anticipated, encourage residents to maintain at least half a tank of gas in their vehicles.

6.2 Traffic Management

- Clearly identify evacuation routes for each neighbourhood or evacuation zone, if appropriate.
- In the event of a hazard that only affects one of the study areas and requires rapid evacuation, request BC MoTI and their contractors close Ministry roadways to non-evacuating traffic to reduce conflicting traffic.
- Maintain lanes into the evacuation zone for emergency personnel, transit, as well as fuel or tow trucks.
- Have tow trucks and refuelling trucks strategically located to manage breakdowns.
- Determine available traffic management resources required for a rapid no-notice evacuation.
- Have information booth or checkpoint at key locations to prevent entry and increase security.
- Determine if there are particular neighbourhoods more at threat than others and prioritize evacuation using appropriate traffic control measures.
- Place highest priority for traffic control where there are stop-controlled left turns onto the evacuation route in the direction of evacuation, particularly those with a higher population.

6.3 Transit

- Determine the need for those without walkable access to a transit stop, and a strategy to pick those people up.

- Determine if there are school buses that can be used in an evacuation, if not already required to evacuate school children.

- Limit those evacuating by bus to one hand luggage size item per person to increase person carrying capacity on transit vehicles.

- Identify a contact with BC Transit that can be contacted with regard to sourcing additional buses for those that require assistance to evacuate.

- Consider the need to create muster stations where people could assemble for evacuation assistance via transit or other means.

6.4 Other Modes

- While unlikely to be a primary mode of evacuation. Bicycles have the benefit of being able to ride through moderate conditions that might otherwise prevent vehicle access, allowing people to escape during a hazard. Consider the potential need for secure bicycle storage at muster stations.

- Walking is also unlikely to be a primary mode of evacuation, but people may walk to muster stations, or transit stops, and may need help in evacuating from there.

6.5 Wayfinding

- Fixed Message Signs may be permanent signs that are covered or uncovered, they may indicate an evacuation route to a particular destination. It should be noted that this is only anticipated to be necessary in a no-notice mass evacuation, where time is limited and traffic capacity more of a concern

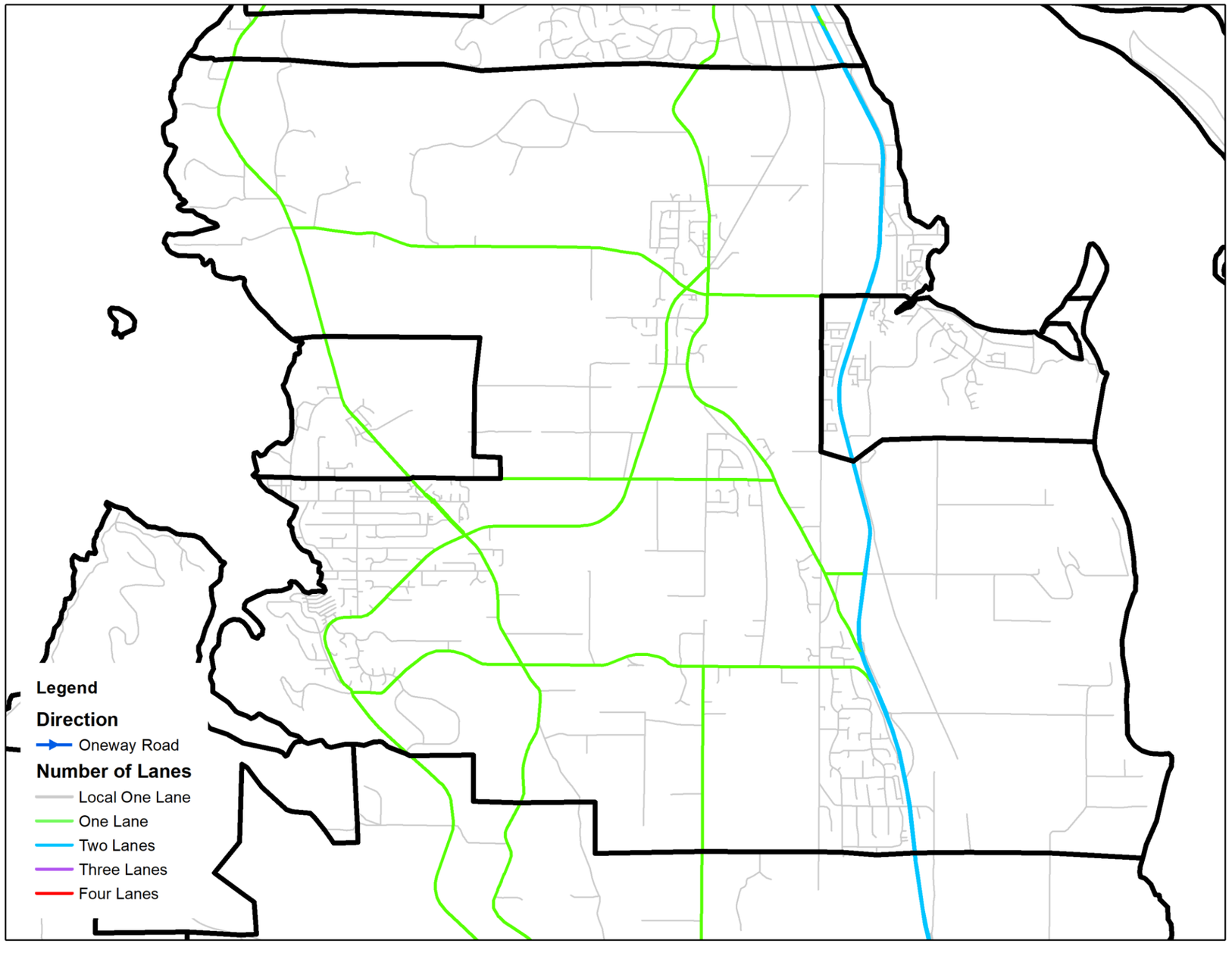
- With sufficient warning and a timely evacuation order, the community should have sufficient time to evacuate to the destination of their choosing.

- Dynamic Message Signs could be used at strategic locations for many purposes. The most useful may be in the event that the community is on evacuation notice, the message could inform drivers of this and to check for up-to-date information helping improve community readiness, especially if evacuating to neighbouring municipalities and/or temporary shelters.

APPENDIX A

Evacuation Route Worksheets

Central Saanich



Capacity Guide

Single Evacation Route

Capacity of Approx 1,600 vehicles/hour/lane during free

A 2 or 3-lane road is likely a major roadway, Capacity is approximately 60% of free-flow.

A 1-lane road is likely a minor road, Capacity is approximately 40% of free flow.

Merging Evacuation Routes

If two evacuation routes merge, treat as one route.

Crossing Evacuation Routes

If two evacuation routes cross, treat as two separate routes.

Diverging Evacuation Routes

If one evacuation route diverges, treat as one route.

Left Turns

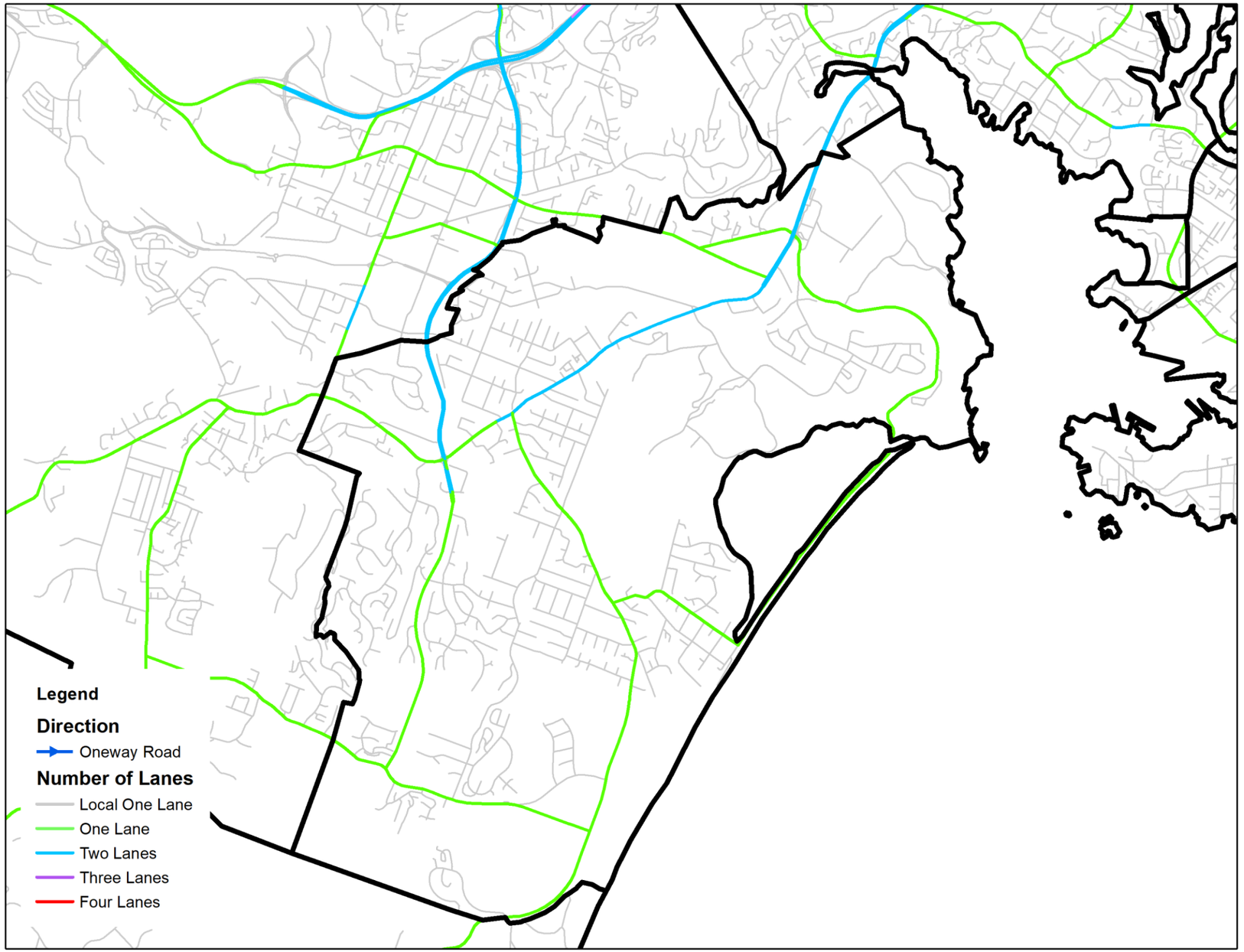
If an evacuation routes requires a left turn, capacity is significantly reduced to approx 250 vehicles per hour for a single left turn or 500 for a double left turn.

Right Turns

If an evacuation routes requires a right turn, capacity is slightly reduced to approx 750 vehicles per hour for a single right turn or 600 for a double right turn.

Route	Description	Min Num of Lanes	LT	2LT	RT	2RT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Colwood



Capacity Guide

Single Evacation Route

Capacity of Approx 1,600 vehicles/hour/lane during free

A 2 or 3-lane road is likely a major roadway, Capacity is approximately 60% of free-flow.

A 1-lane road is likely a minor road, Capacity is approximately 40% of free flow.

Merging Evacuation Routes

If two evacuation routes merge, treat as one route.

Crossing Evacuation Routes

If two evacuation routes cross, treat as two separate routes.

Diverging Evacuation Routes

If one evacuation route diverges, treat as one route.

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If an evacuation routes requires a left turn, capacity is significantly reduced to approx 250 vehicles per hour for a single left turn or 500 for a double left turn.

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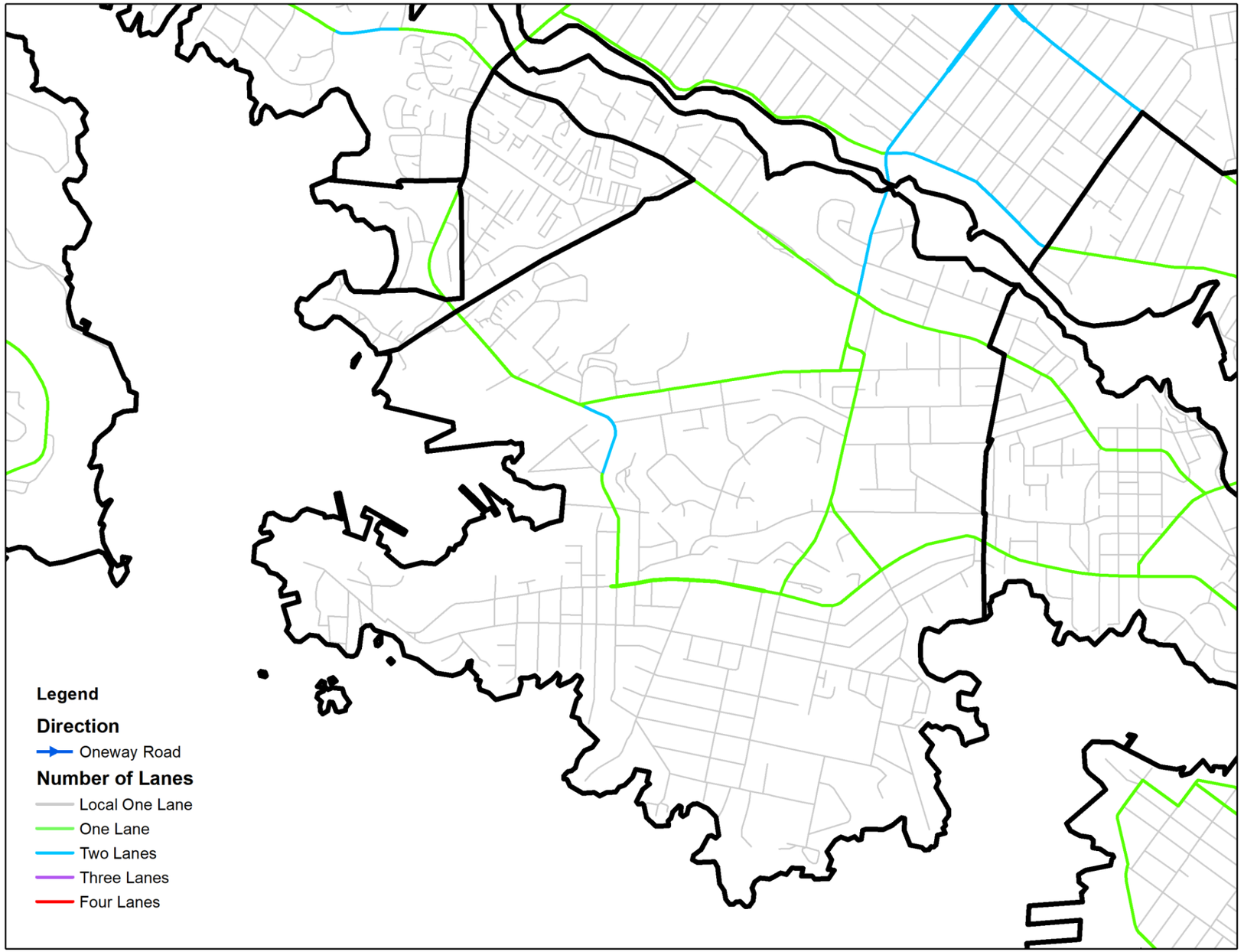
If an evacuation routes requires a right turn, capacity is slightly reduced to approx 750 vehicles per hour for a single right turn or 600 for a double right turn.

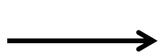
Route	Description	Min Num of Lanes	LT	2LT	RT	2RT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Esquimalt



Capacity Guide

Single Evacation Route

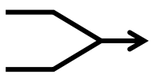


Capacity of Approx 1,600 vehicles/hour/lane during free

A 2 or 3-lane road is likely a major roadway, Capacity is approximately 60% of free-flow.

A 1-lane road is likely a minor road, Capacity is approximately 40% of free flow.

Merging Evacuation Routes

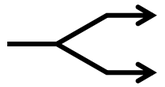


If two evacuation routes merge, treat as one route.

Crossing Evacuation Routes

If two evacuation routes cross, treat as two separate routes.

Diverging Evacuation Routes



If one evacuation route diverges, treat as one route.

Left Turns

If an evacuation routes requires a left turn, capacity is significantly reduced to approx 250 vehicles per hour for a single left turn or 500 for a double left turn.

Right Turns

If an evacuation routes requires a right turn, capacity is slightly reduced to approx 750 vehicles per hour for a single right turn or 600 for a double right turn.

Route	Description	Min Num of Lanes	LT	2LT	RT	2RT
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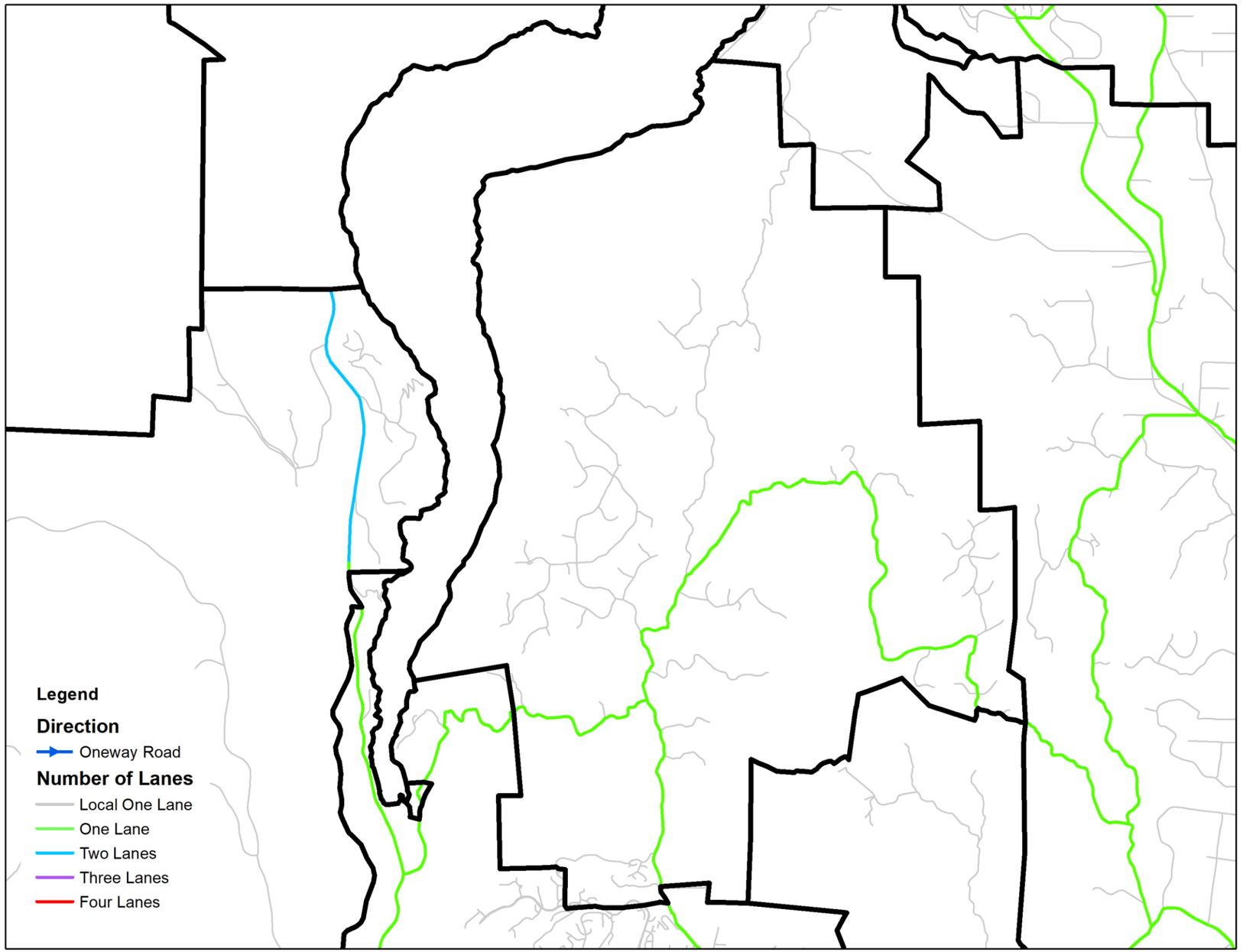
Highlands



Capacity Guide

Single Evacation Route

Capacity of Approx 1,600 vehicles/hour/lane during free

A 2 or 3-lane road is likely a major roadway, Capacity is approximately 60% of free-flow.

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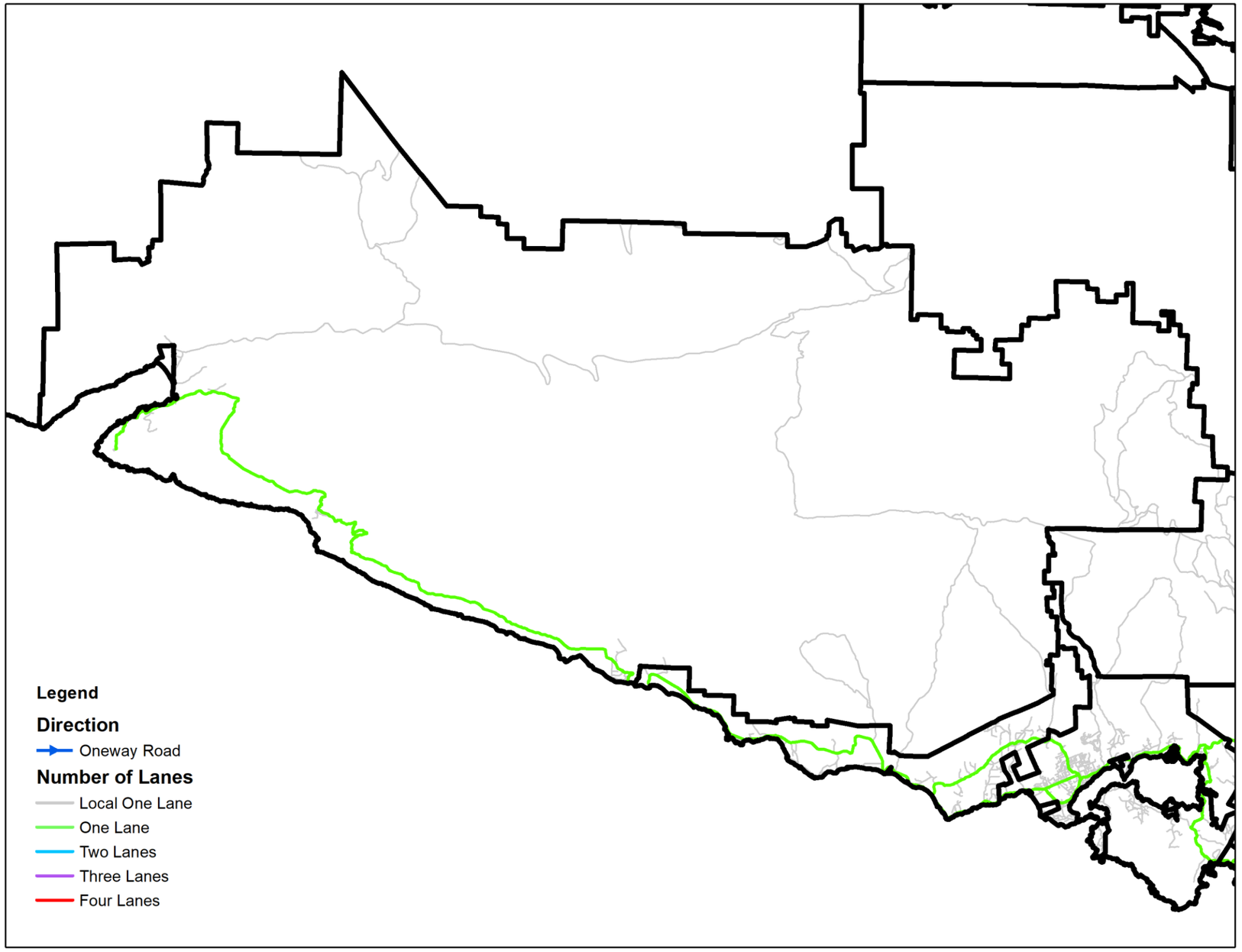
Juan De Fuca



Capacity Guide

Single Evacation Route

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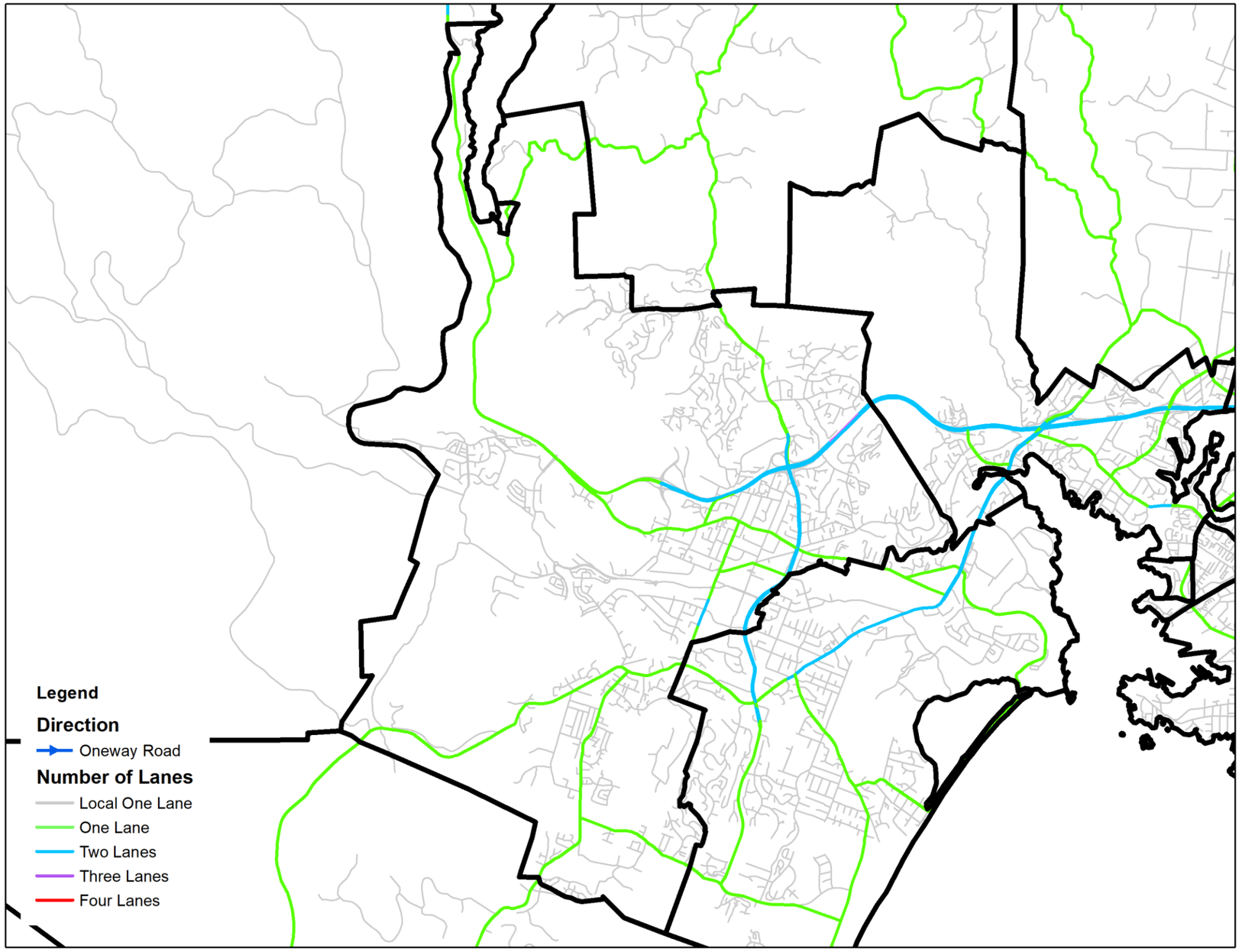
Langford



Capacity Guide

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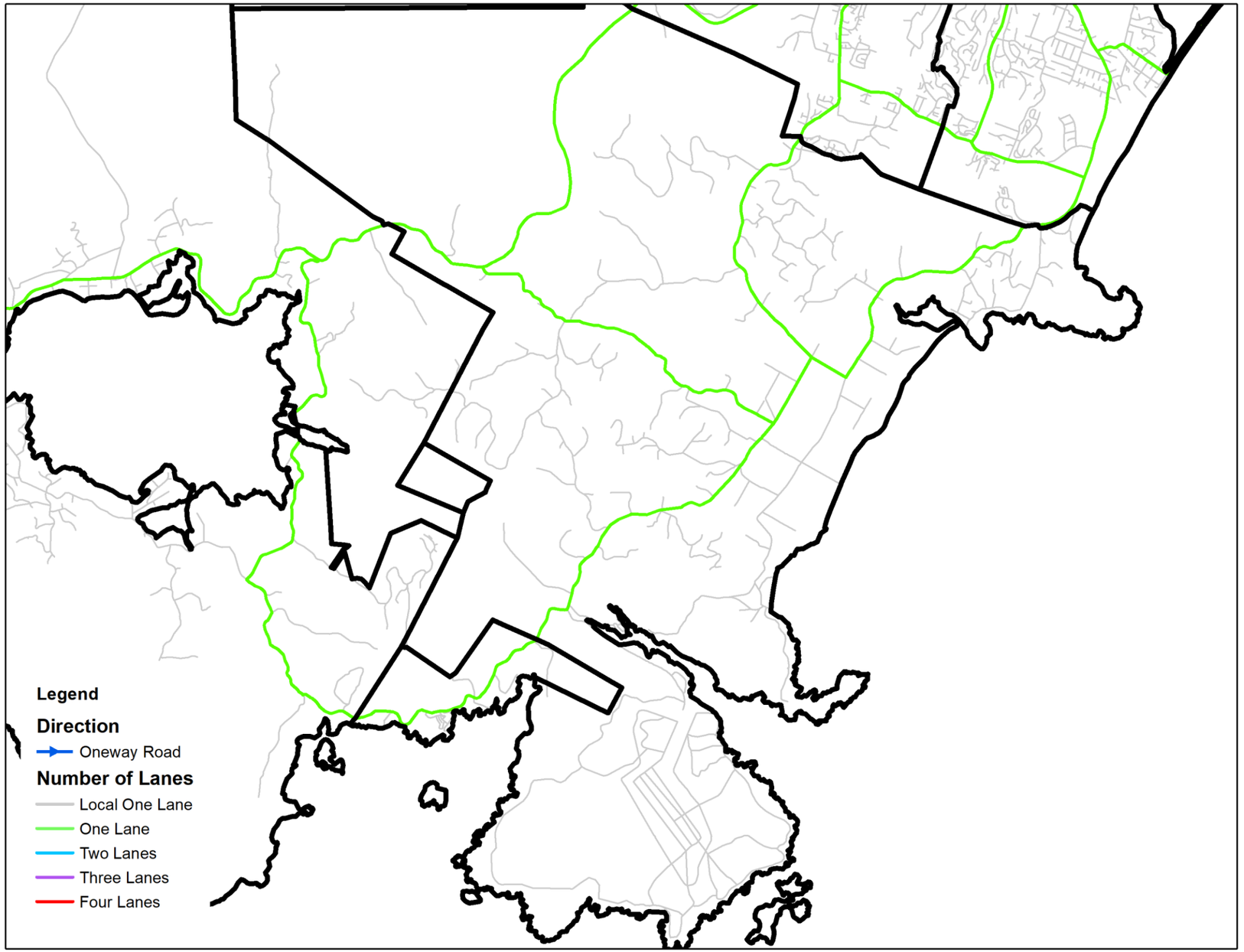
Metchosin



Capacity Guide

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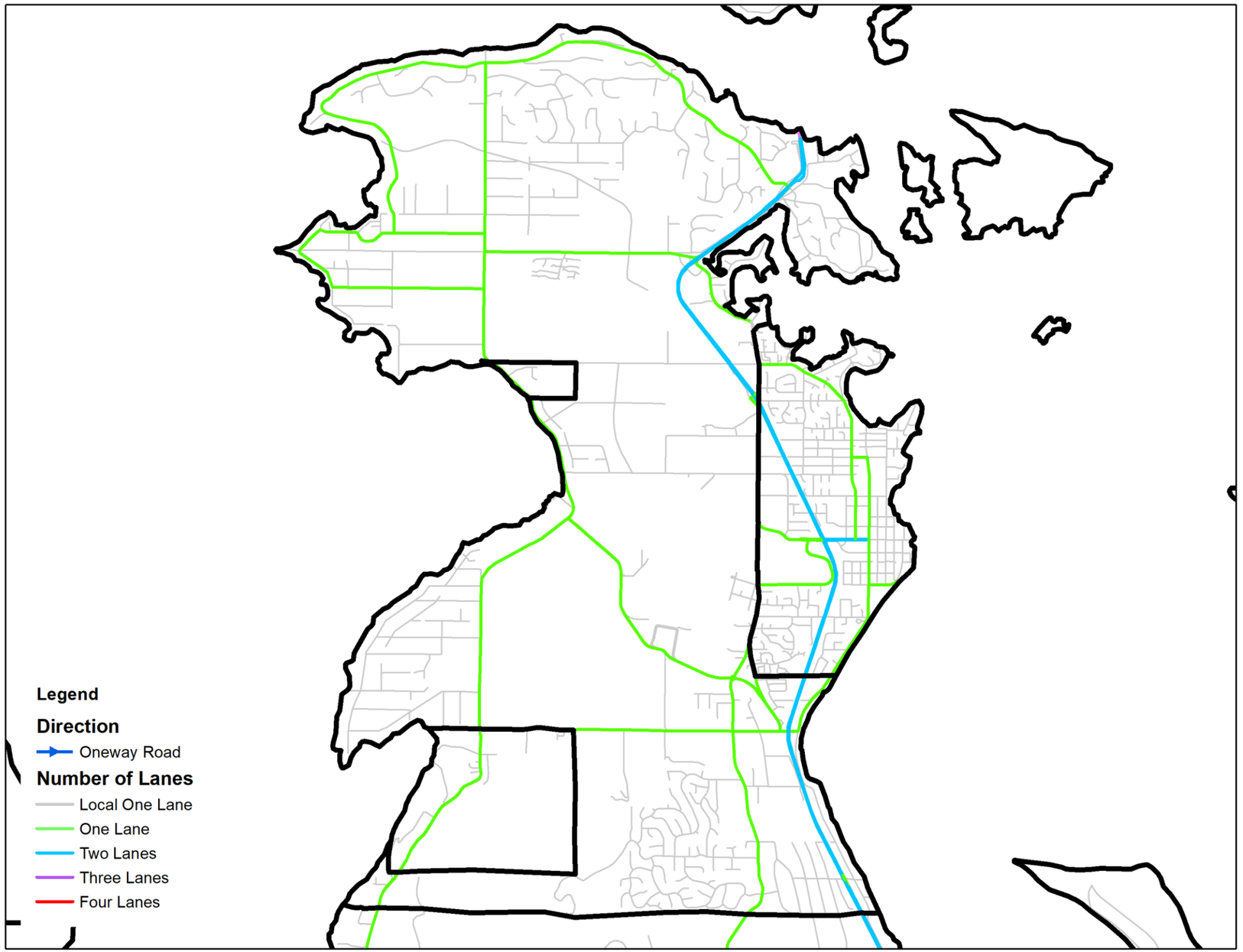
North Saanich



Capacity Guide

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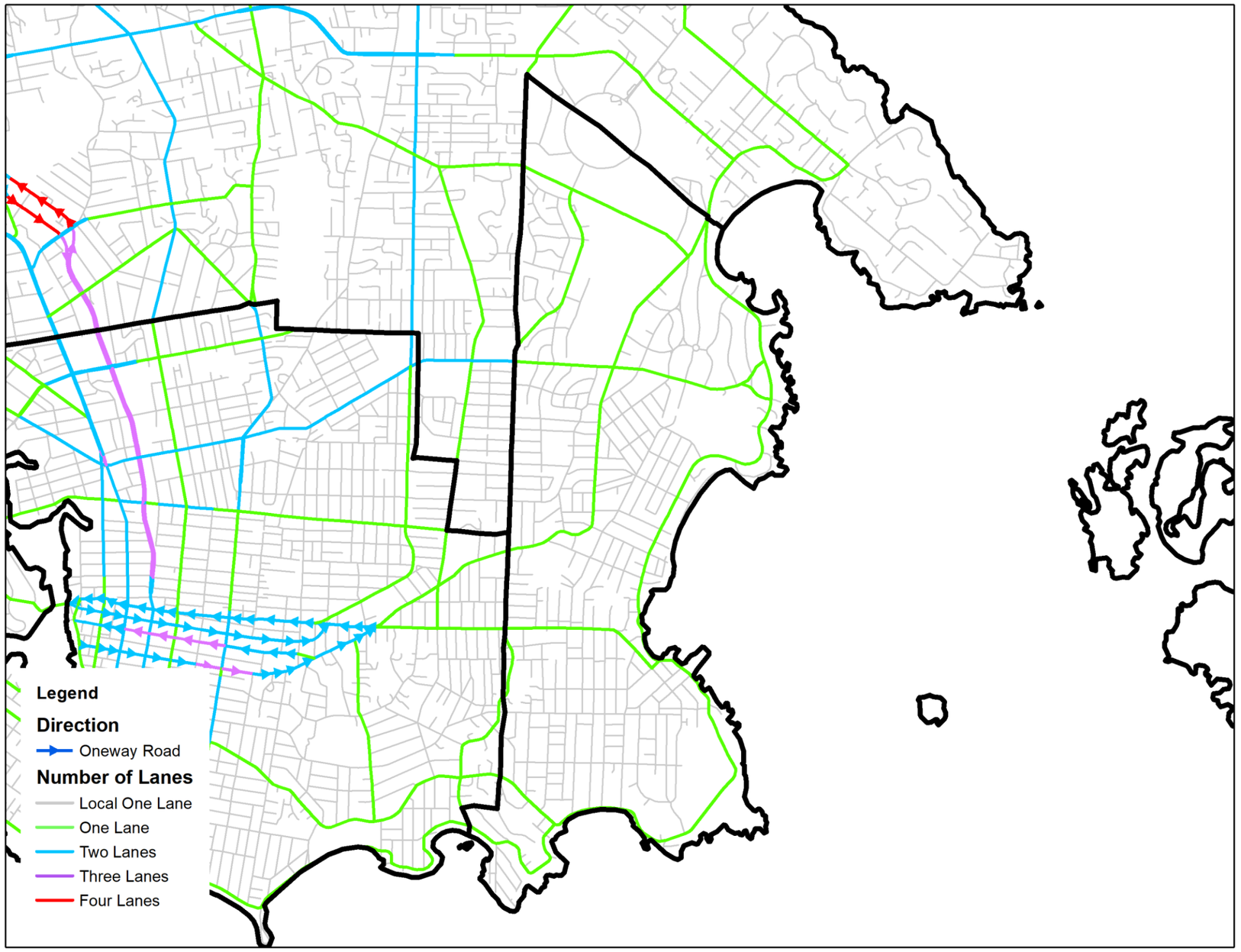
Oak Bay



Capacity Guide

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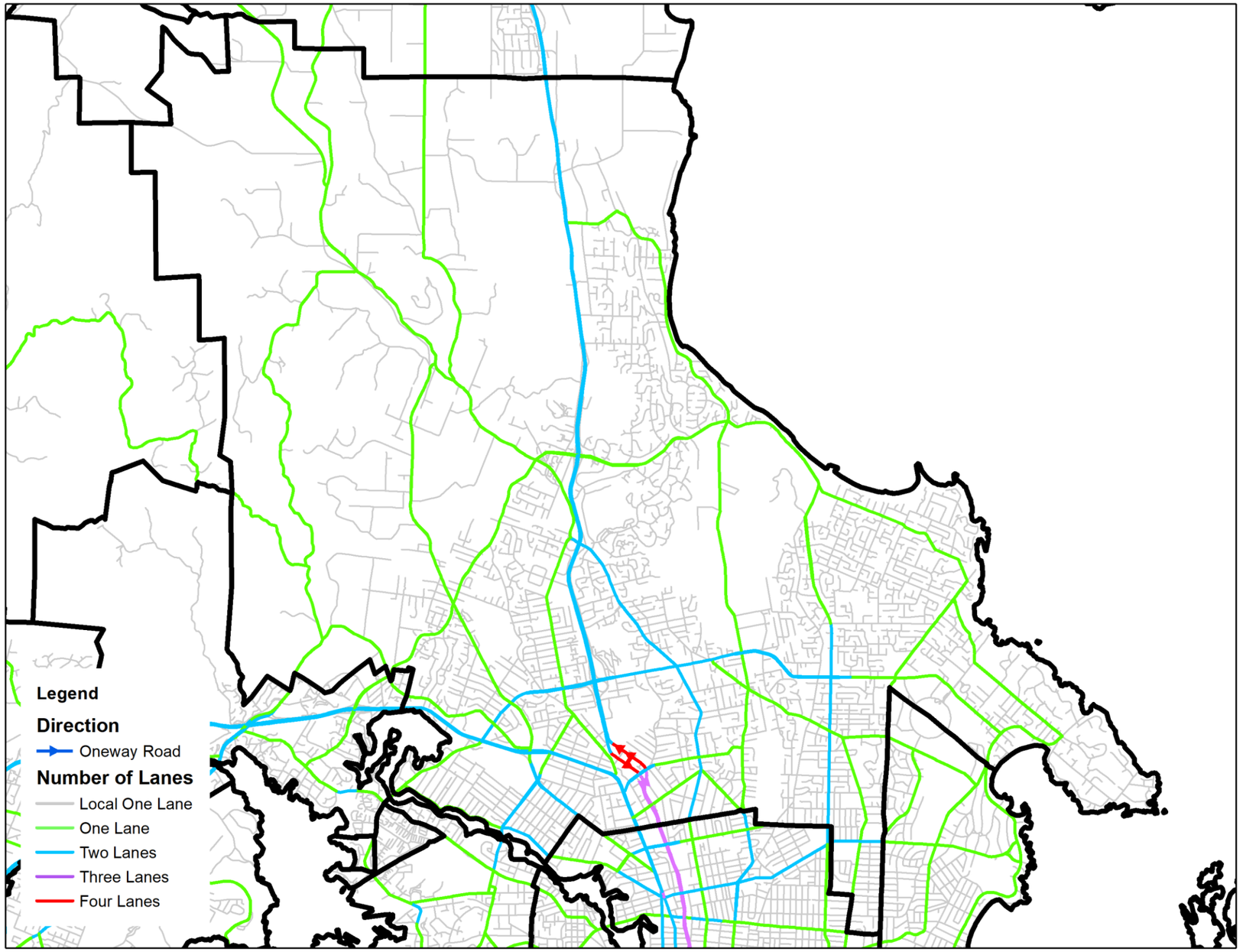
Saanich



Capacity Guide

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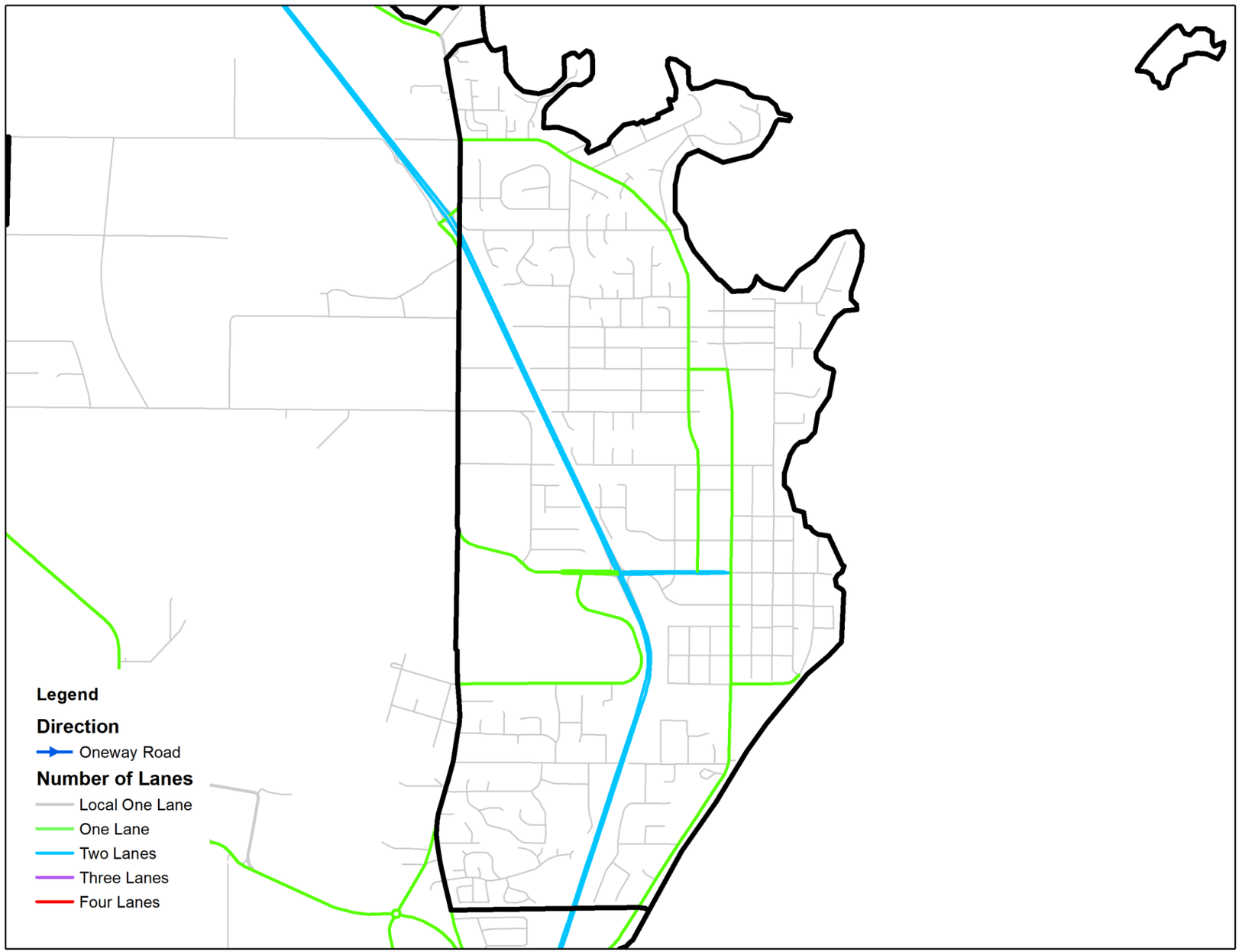
Sidney



Capacity Guide

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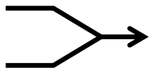
Merging Evacuation Routes



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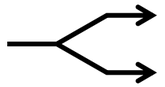
Diverging Evacuation Routes



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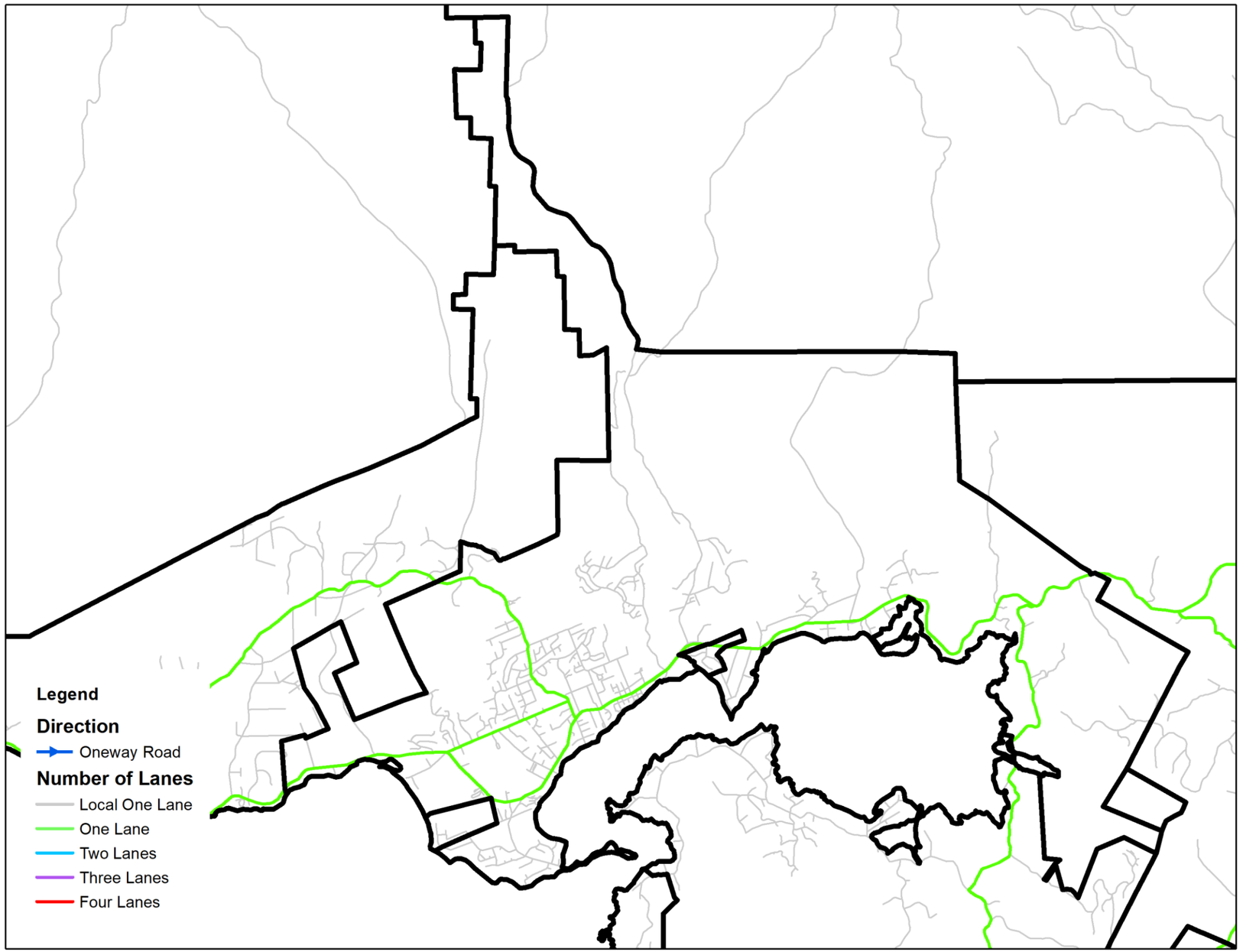
Sooke



Capacity Guide

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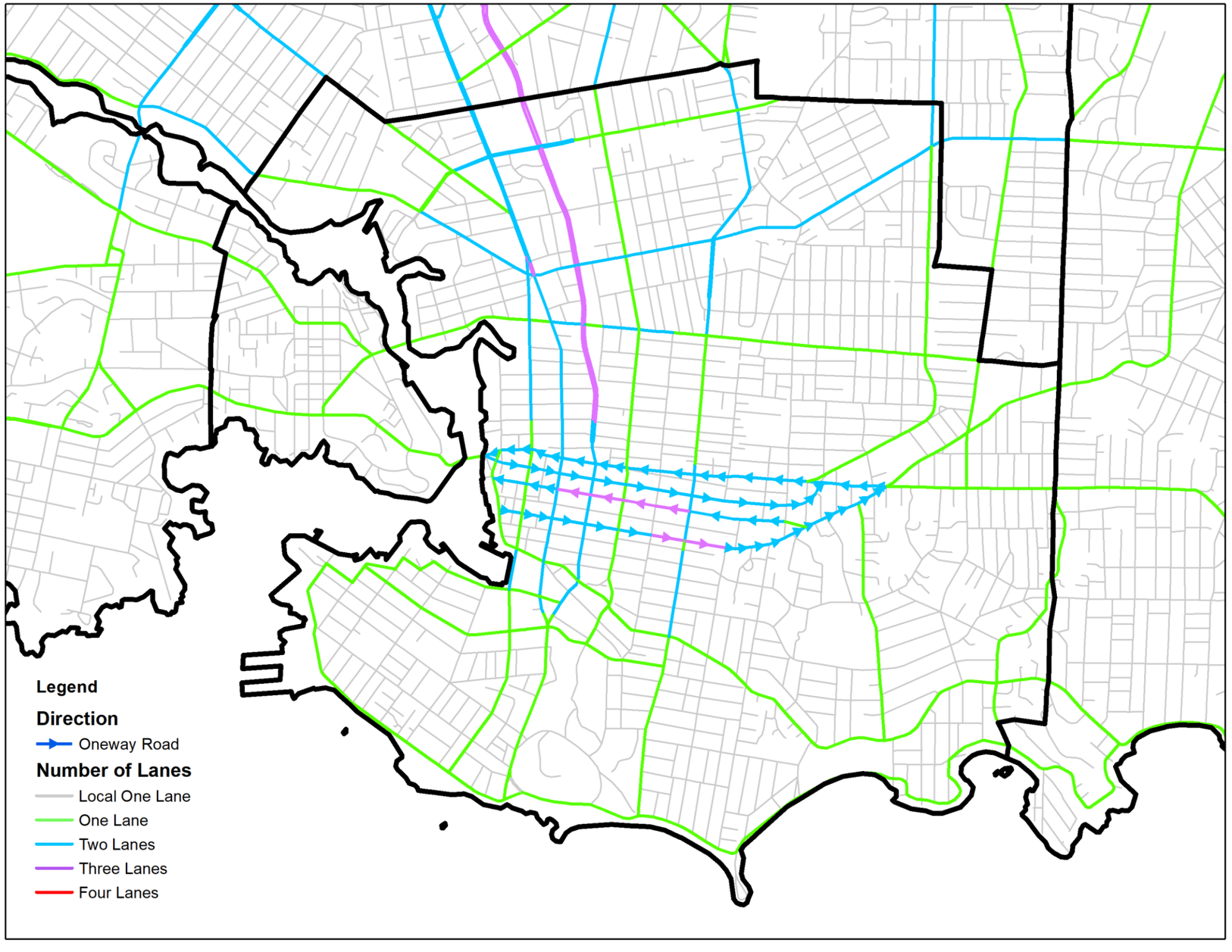
Victoria



Capacity Guide

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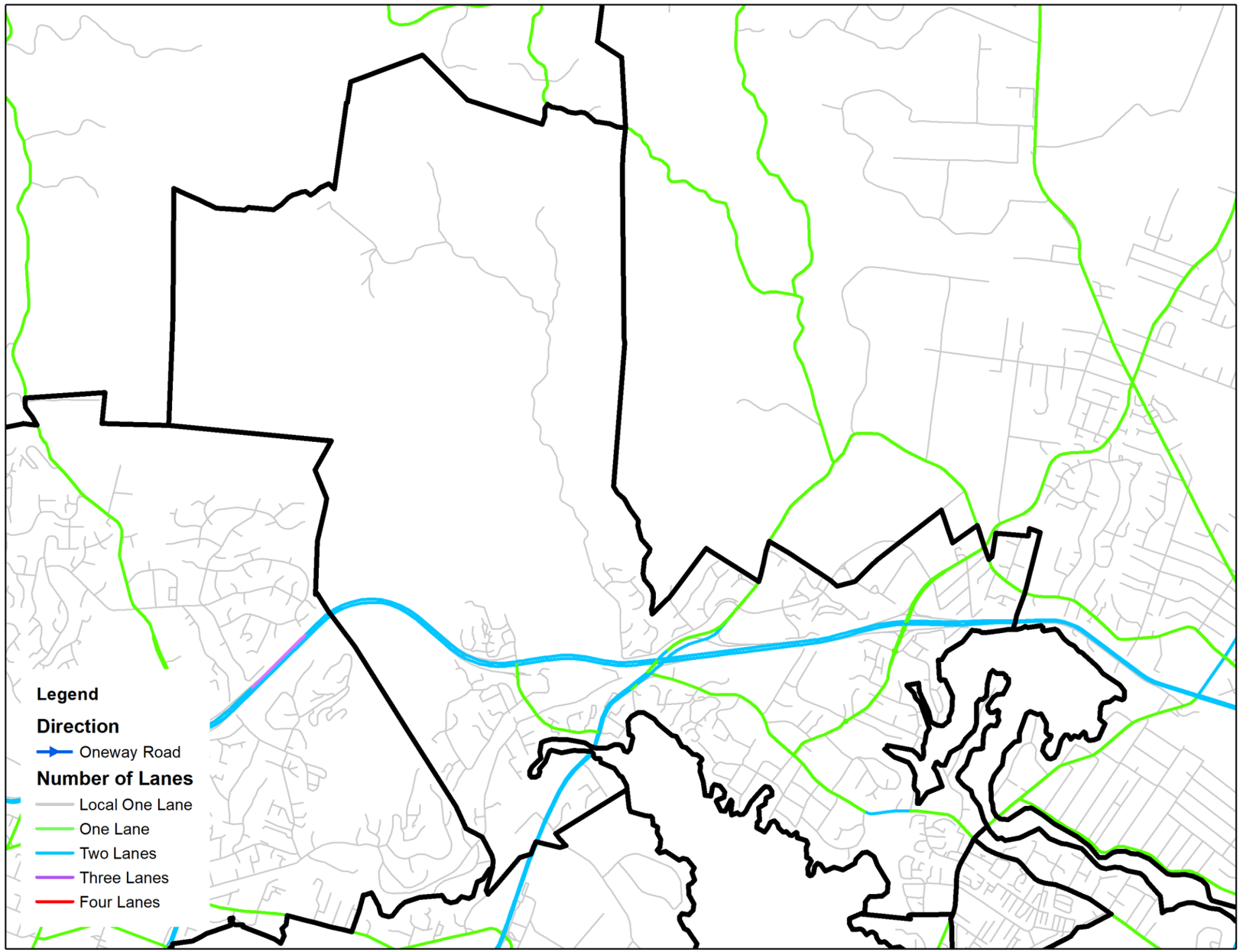
View Royal



Capacity Guide

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1						
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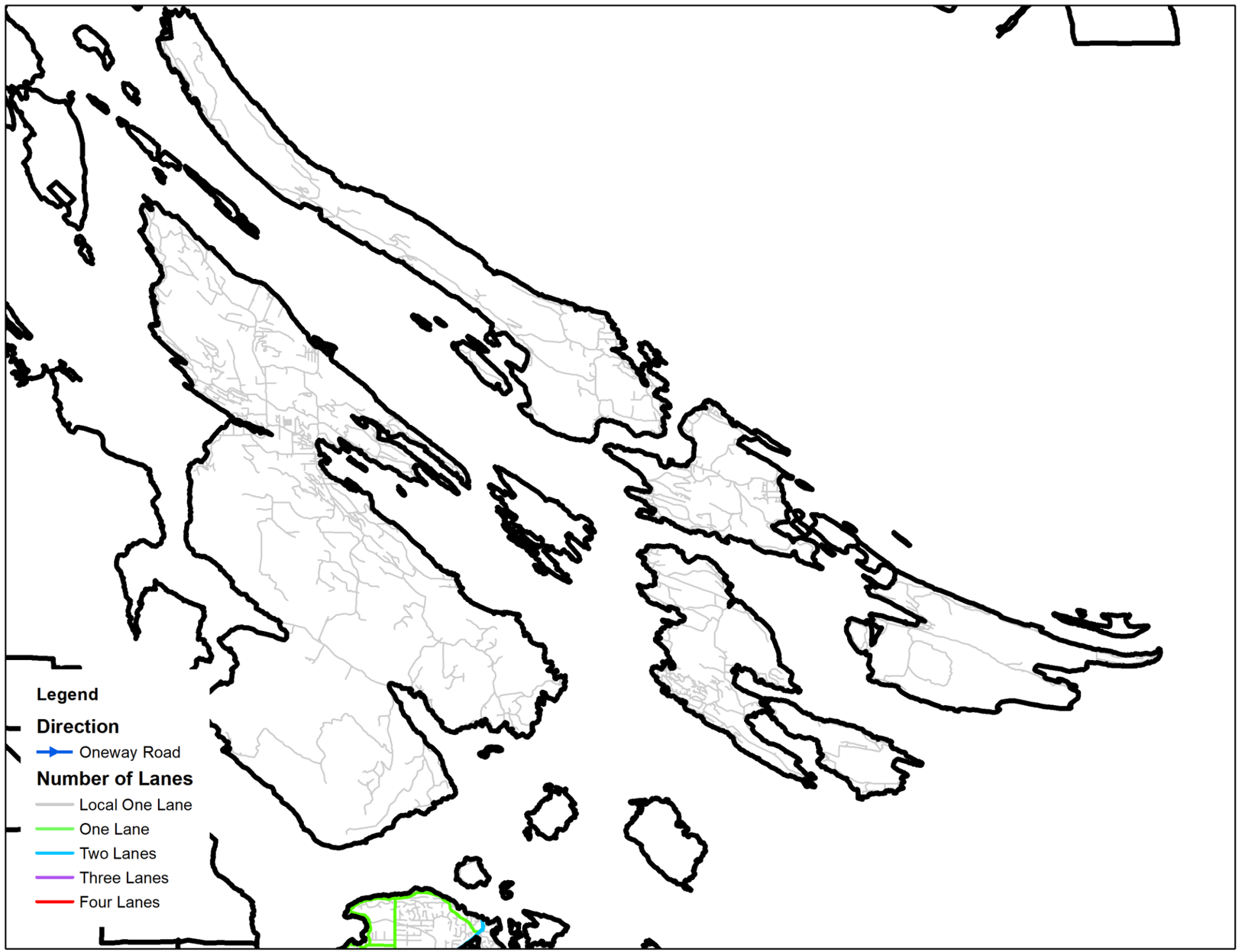
Southern Gulf Islands



Route	Vessel	Num of Sailings per Day
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