BRITISH COLUMBIA | Ministry of Transportation and Infrastructure

DEVELOPMENT SERVICES
GENERAL COMMUNICATION

MoTI File #: 2018-03121
Date: May/16/2022

District of West Vancouver
VIA Email

Attention: Jenn Moller, Director, Engineering and Transportation

Re: Traffic Impact Assessment for British Pacific Properties Cypress Village Development:

Please accept this letter as formal acceptance of the Traffic Impact Assessment Final Report Rev. 2, prepared by Donna Howes dated April 26th, 2022 and attached to this letter.

If you have any questions please feel free to call Kattia Woloshyniuk at (236) 468-1926.

Yours truly,

Kattia Woloshyniuk
Senior Development Officer

Attachment: Cypress Village – TIA Final – 27.04.21 – sent to DWV.pdf

Local District Address
Lower Mainland District 310-1500 Woolridge Street Coquitlam, BC V3K 0B8 Canada Phone: (604) 527-2221 Fax: (604) 527-2222

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Technical Memorandum

To: Bryce Tupper, P.Eng.: British Pacific Properties

From: Donna Howes, P.Eng., PTOE, FEC, Howes Technical Advantage Ltd.

Date: October 31, 2023

Re: **BPP Cypress Village TIA – Summary Document**

This memorandum includes a one-page summary document of the Traffic Impact Study for Cypress Village (Attachment 1). It is understood that this will be used as an abstract for the rezoning process.

Respectfully submitted,

October 31/2023

Donna Howes, P.Eng., PTOE, FEC
Director
Howes Technical Advantage Ltd.
Permit to Practice # 1000164
Proudly certified as a leader in quality management under
Engineers and Geoscientists BC's OQM Program from 2015 to 2021.

ATTACHMENT 1

CYPRESS VILLAGE – TRAFFIC IMPACT ASSESSMENT – SUMMARY

British Pacific Properties (BPP) is planning to develop Cypress Village as a mixed use, complete community located above Highway 1 in the Upper Lands area within the District of West Vancouver. As part of the Cypress Village rezoning process, a Traffic Impact Assessment (TIA) was undertaken and has been approved by the District of West Vancouver (DWV) and the BC Ministry of Transportation and Infrastructure (BC MoTI).

At full build out, the Village consists of residential and commercial development complemented by an elementary school, a community centre, childcare facilities and a firehall. The breakdown of the residential and commercial uses include:

- Residential – 3,711 units made of single family, multi-family and seniors housing
- Commercial – 380,600 square foot consisting of retail, office, light industrial and a hotel.

The placement and type of land uses, together with the planning of roads, pathways and inclusion of a transit service to Park Royal, have all been designed to encourage residents, employees and visitors to use active transportation modes and transit as a first choice, rather than a passenger vehicle.

The TIA includes the analysis of the impact of Village development on the existing transportation network, recommends infrastructure upgrades at specific locations and further reviews the traffic volumes in relation to these proposed upgrades. Resulting from the traffic analysis, and subject to approval of final concepts by DWV and BC MoTI, the following improvements are planned for the local road network to accommodate traffic volumes for Cypress Village:

- Westmount Connector - A new two-way road connecting Cypress Bowl Road to the Westmount Interchange
- North side of Westmount Interchange - full signal at Westmount Connector/Highway 1 westbound off-ramp
- Full signal at Westmount Road/Westridge Avenue with a westbound right turn lane
- Widening of Cypress Bowl Road from Highway 1 to Cypress Lane with an additional traffic lane in each direction
- North side of Cypress Bowl Road Interchange - an additional westbound right turn lane will be added together with a half signal for westbound/northbound movement only
- New traffic signal at Cypress Bowl Lane/Cypress Bowl Road (Mulgrave School Access)
- Two new roundabout intersections/access points to the Village on Cypress Bowl Road

It is projected that, with the above improvements, the future road network will perform well at full build-out of Cypress Village with all intersections operating at acceptable levels of service.

April 2022

Traffic Impact Assessment
Cypress Village Development

British Pacific Properties, West Vancouver, BC

FINAL REPORT: Rev 2

Howes Technical Advantage Ltd.

This report was prepared by Howes Technical Advantage Ltd. for British Pacific Properties Ltd. The scope of work and related responsibilities are defined in the Conditions of Assignment. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Decisions made or actions taken as a result of our work shall be the responsibility of the parties directly involved in the decisions or actions.

Contents

1. Introduction

British Pacific Properties Ltd. (BPP) is planning to develop "Cypress Village" on approximately 350 acre planning area in the Upper Lands Area in West Vancouver, BC. Cypress Village is included in the District of West Vancouver's (DWV) updated Official Community Plan (OCP) adopted in 2018.

Cypress Village falls within the area called the Upper Lands within the OCP, adjacent to a neighbourhood called Rodgers Creek, for which an Area Development Plan (ADP) and zoning bylaw exist. The proposed development site is located adjacent to Cypress Bowl Road, north of Highway 1.

The planning process for the Cypress Village ADP by the DWV is currently underway. Cypress Village is envisioned as a compact, sustainable, urban community that will include a diverse mix of housing types, as well as commercial space, such as retail, hotel and office along with community facilities, all to meet the needs of residents of Cypress Village and Rodgers Creek. The development density for this area is based on the development potential of the Cypress Village lands plus transferring development potential from other parts of the Upper Lands that will become protected natural areas.

Concurrent with the ADP, BPP is submitting a rezoning application for Cypress Village to DWV, which will include a traffic impact assessment (TIA). The BC Ministry of Transportation and infrastructure (MOTI) has an interest in this assessment based on the proximity of the development to Highway 1 and Cypress Bowl Road, which are under their jurisdiction.

The scope of this report is for the TIA which will be submitted as part of the rezoning application. The terms of reference for the TIA was approved by both the DWV and MOTI. The TIA provides an overview of the transportation system proposed for Cypress Village, including an assessment of travel by various modes of transportation, traffic operations and impacts, and associated infrastructure requirements.

Howes Technical Advantage Ltd. (HTA) was retained by BPP to prepare the TIA. HTA is supported by a team of specialist consultants for transportation modelling and analysis (McElhanney Ltd.), for alternative mode assessment and quality control (Richard Drdul, P.Eng.), and for transit assessment (Dennis Fletcher).

2. Context

This section describes the location and development overview for Cypress Village.

2.1. Location

The proposed Cypress Village is located west of Cypress Bowl Road and north of Highway 1 (**Figure 1**).

Significant developments in the vicinity of Cypress Village include (refer to **Figure 2**):

- Cypress Provincial Park and Cypress Mountain Resort are located north of (uphill from) Cypress Village on Cypress Bowl Road.

- The DWV Operations Centre is located near the planned Village core, inside the first 180-degree switchback on Cypress Bowl Road.
- Mulgrave School is an independent K-12 school located east of (downhill from) Cypress Village and is accessed from Cypress Lane.
- BPP's Rodgers Creek development is located northeast of Cypress Village, with connections to Cypress Bowl Road via Chippendale Road and Uplands Road. The last few phases are currently under construction.

2.2. Proposed Development

Current plans for Cypress Village include 3,586 residential dwelling units, 100,000 ft^2 of assisted living (125 units), 130,000 ft^2 of commercial space, 130,000 ft^2 of light industrial/commercial uses, a 120 room hotel, and 85,300 ft^2 of other uses including an elementary school, daycare facilities, community centre and a fire hall. The intent is that the planning area will retain as much of the high value ecological inventory as possible, and consequently density will be concentrated in and around the Village core, which is to be located adjacent to Cypress Bowl Road. The conceptual layout of the proposed development is shown in **Figure 3** which identifies the land use location in separate numbered zones (referred to as "pods"). A "core area" is shown with a dashed yellow line, and includes the majority of the amenities in the Village and most of the commercial development. Further details regarding development plans are included in Section 6.

2.3. Proposed Off-Site Improvements

The development includes several transportation infrastructure improvements which are proposed to be included in the future network. These include:

- A new two lane road called Westmount Connector which will connect Cypress Bowl Road to the Westmount Highway 1 interchange with a signalized intersection at the westbound off-ramp of the interchange.
- Conversion of the existing intersection on Cypress Bowl Road at the DWV Operations Centre into a new 5 legged roundabout connecting Village Street and Westmount Connector.
- A new roundabout at the intersection of Cypress Bowl Road and a realigned Eagle Lake Road.
- A full traffic signal at the Cypress Lane intersection on Cypress Bowl Road.
- Upgrades to Cypress Bowl Road from Cypress Lane to the Highway 1 interchange.
- Upgrade the Westmount Road/Westridge Road intersection to a full traffic signal.

2.4. Study Area

The study area for the TIA extends from the Cypress Bowl Road interchange on Highway 1 in the east to Cypress Falls Park in the west and is bounded by Cypress Creek to the north and by Highway 1 to the south. The study area is shown in **Figure 4**.

The key intersections within the study area include:

Existing intersections:

- Cypress Bowl Road/Highway 1 westbound off ramp
- Westmount Road/Westridge Ave
- Cypress Bowl Road/Cypress Lane
- Cypress Bowl Road/Uplands Dr (part of Rodgers Creek - under construction)
- Cypress Bowl Road / Chippendale Road

Proposed new intersections:

- Cypress Bowl Road/Village Road South/Westmount Connector (reconfiguration of Eagle Lake Access Rd and realignment of Operations Centre Access)
- Cypress Bowl Road/Eagle Lake Road
- Westmount Connector/Highway 1 westbound off ramp

2.5. Municipal Analysis

As part of the planning process for Cypress Village, a higher-level analysis was undertaken to assess the impact of the development outside of the study area, along key corridors in West Vancouver. This work is referred to as the "municipal analysis" and the Regional Transportation Model (RTM) was used for the analysis. The output from the RTM was used as a reference point and provides guidance for the TIA. This was used in developing assumptions for this study as well as a tool to assess traffic access patterns to and from the Village. Input for the analysis in this study was used to confirm future trip generation, future trip distribution, future background traffic growth rate and future mode splits.

3. Assumptions

The following assumptions were made for this report:

- The development layout details were provided by UDA Consultants.
- The preliminary road design details were provided by Urban Systems Ltd.
- Assumptions for build out were supplied by BPP.

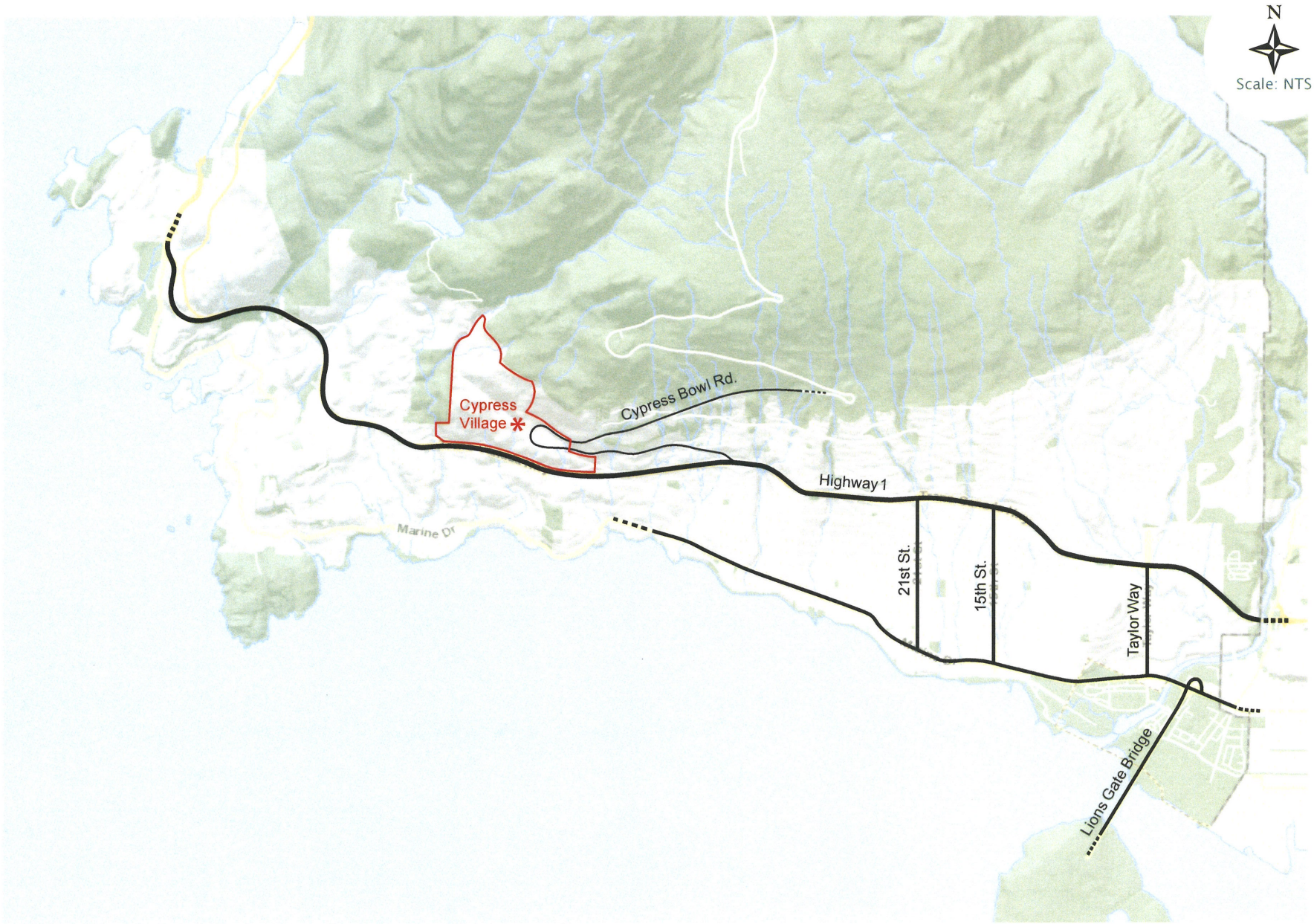


Figure 1
Municipal Analysis Study Area and Road Network

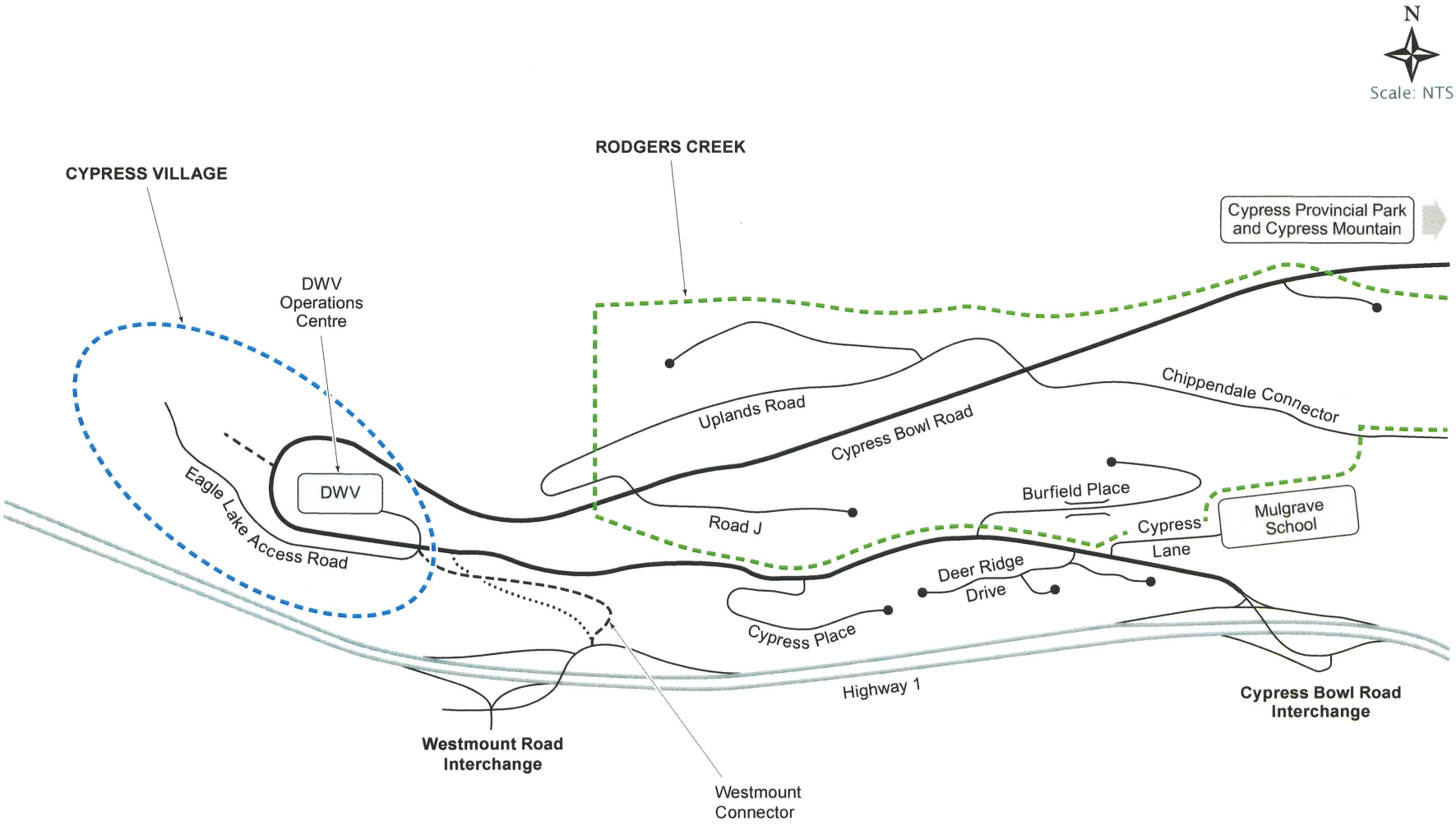


Figure 2
Cypress Village and other Developments

Figure 3
Cypress Village — Conceptual Development Layout

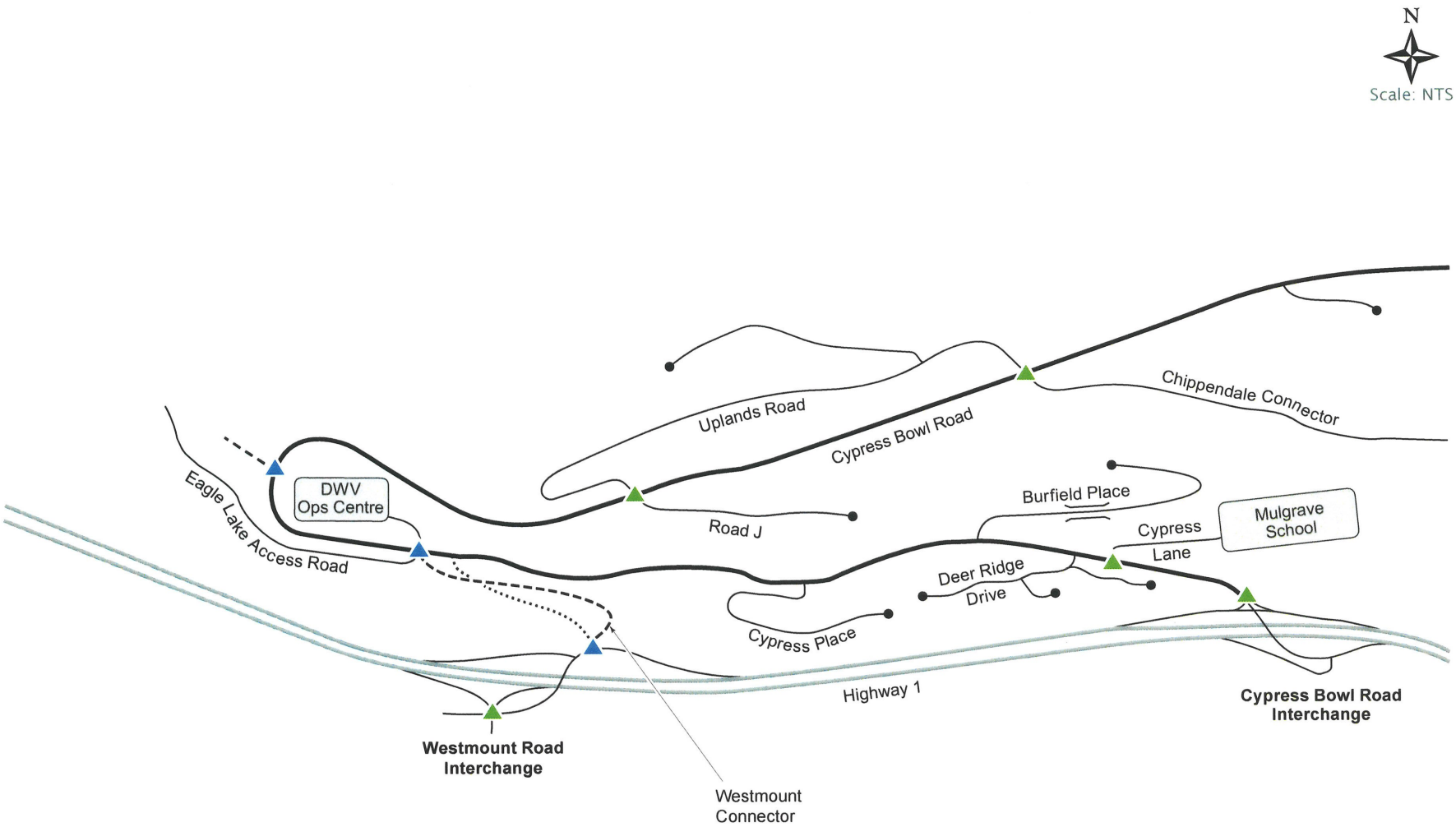


Figure 4
Study Area and Road Network

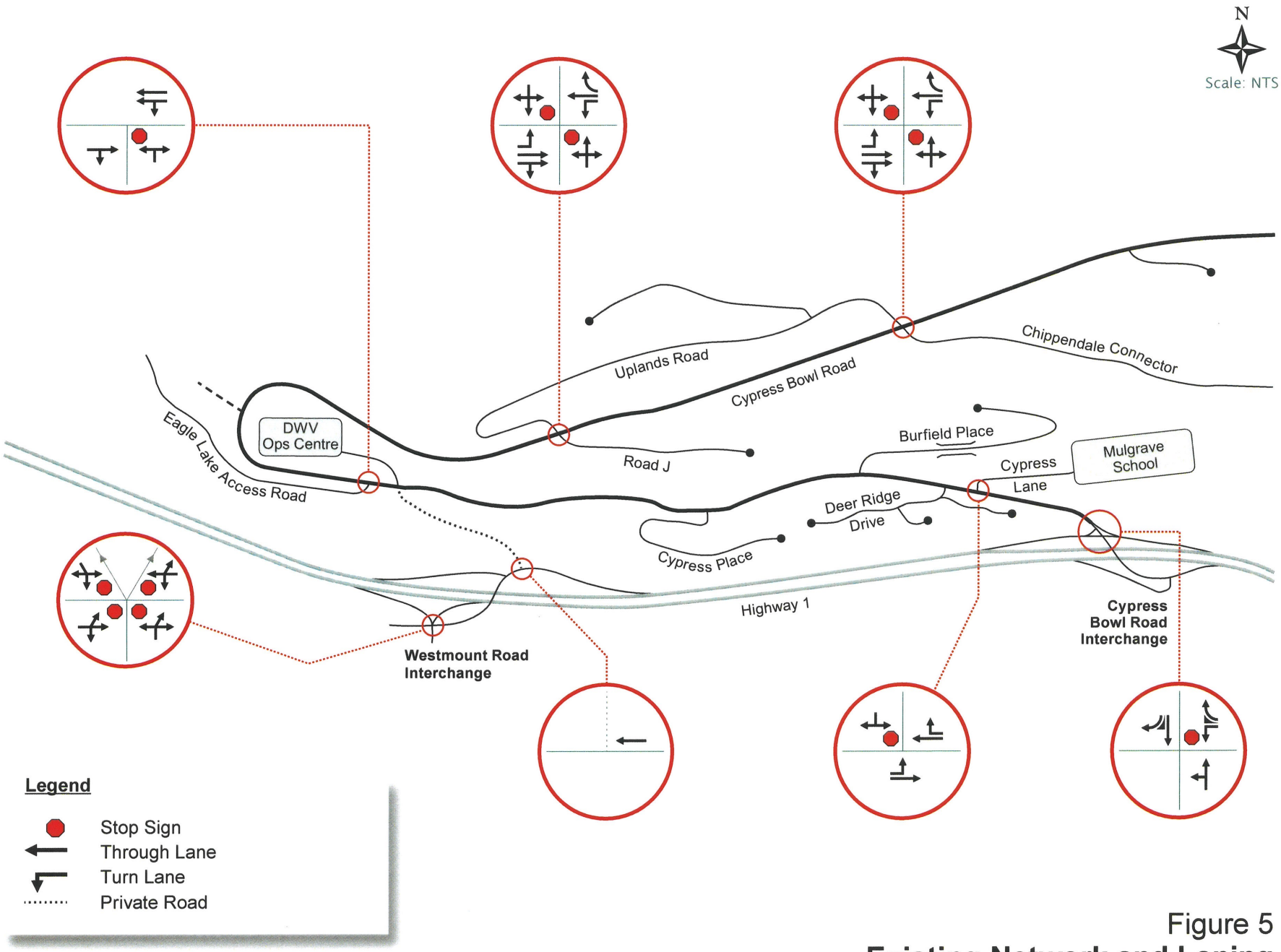


Figure 5
Existing Network and Laning

4. Existing Conditions

This section outlines the existing transportation system for all modes within the study area.

4.1. Road Network

The existing road network, laning and traffic controls are shown in **Figure 5**. The roads and major intersections are described below.

- Cypress Bowl Road is an arterial road under the jurisdiction of the MOTI. The lower part of the road is two lanes with paved shoulders that end just west of Cypress Place (the Stonecliff neighbourhood), where a second uphill lane begins. The posted speed limit is 60 km/h. There are no dedicated bicycle lanes or sidewalks, and no formal drainage system. Street lighting is provided at spot locations.
- Cypress Lane is the sole access to Mulgrave School and connects as a T-junction with Cypress Bowl Road. There is a left turn bay eastbound on Cypress Bowl Road, and a longer westbound right turn lane. Currently, the school has permission to provide manual traffic control using traffic control persons during the morning and afternoon peak hours.
- Three cul-de-sac roads provide access to residential neighbourhoods from Cypress Bowl Road – Deer Ridge Drive and Cypress Place on the south side, and Burfield Place on the north side. A left turn bay is provided on Cypress Bowl Road at each intersection.
- Eagle Lake Access Road is a paved road that begins on the south side of Cypress Bowl Road opposite the DWV Operations Centre and continues through the future Cypress Village site. The road is currently used to access the School District 45 Works Yard, the BC Hydro substation, and DWV facilities at the Eagle Lake reservoir. The BPP site office is also located on the Eagle Lake Access Road.
- Chippendale Road is a collector road that connects to Cypress Bowl Road approximately 2 km north of the DWV Operations Centre. The Chippendale Road/ Cypress Bowl Road intersection is pre-ducted for future traffic signals and includes street lighting.
- Uplands Way is a new local road under construction which will connect to Cypress Bowl Road, south of Chippendale Road. This will provide another connection for the Rodgers Creek neighbourhood. The Uplands Way / Cypress Bowl Road intersection will be pre-ducted for future traffic signals and include street lighting.
- Highway 1 (the Trans Canada Highway) is a four-lane freeway with two interchanges that would provide access to the future Cypress Village. The Cypress Bowl Road interchange is approximately 2.5 km east of the proposed Cypress Village core area and is currently the only access location to Highway 1. The Westmount interchange to the south of Cypress Village is a future access location (currently there is a private access road connection to the interchange used to service a water reservoir, pump station and a materials stockpile site).

4.2. Transit

There are four transit routes in the vicinity of Cypress Village which are summarized in **Table 1** and illustrated in **Figure 6**. There is currently no transit service directly to Cypress Village or anywhere on Cypress Bowl Road.

Three of the transit routes operate to or through Park Royal, which is the regional connection point for transit services in West Vancouver. From Park Royal, there are bus connections to North Vancouver and downtown Vancouver, where there are SkyTrain, SeaBus and bus connections to the rest of the region.

Table 1: Existing Transit Routes in Vicinity of Cypress Village

Route	Destinations	Weekday		Saturday	Sunday & Holiday
		Peak	Off-Peak		
253	Caulfeild-Park Royal	30 min	60 min	60 min	60 min
256	Whitby Estates-Park Royal	60 min	60 min	60 min	60 min
257	Horseshoe Bay-Vancouver Express	15 min	20 min	15 min	20 min
262	Lions Bay-Caulfeild	30 min	60 min	60 min	60 min

Figure 6: Existing Transit Routes in West Vancouver

4.3. Active Modes

There are no designated facilities for pedestrians or cyclists in the study area. Cypress Bowl Road is a popular route for both competitive and recreational cyclists. Cyclists currently ride on the road, in the traffic lane, or on the shoulder where available.

As part of the Rodgers Creek development, a "mountain path" for pedestrians and cyclists is being constructed connecting Rodgers Creek from Chippendale Road to the future Cypress Village. This is a 3m wide, illuminated, asphalt pathway. The alignment is shown within the active transportation network described in Section 5.3.

4.4. Existing Traffic Data and Peak Hour

Traffic in the study area has been monitored since 2015. This includes intersection counts as well as automatic volume counts for a week at a time. Data was collected to reflect the peak periods during typical operating times of the roadways (i.e. not during holiday periods or weekends).

Recent intersection counts were conducted for the study intersections during the weekday AM and PM peak periods. The counts were undertaken for all intersections in October 2018 and March 2019, while additional counts were undertaken at specific locations in October 2020, May 2021, and June 2021.

The current peak hour on Cypress Bowl Road is influenced by the DWV Operation Centre and Mulgrave School. The operation of Mulgrave School has a large impact on the operation and latent capacity of the Cypress Lane/Cypress Bowl Road and Cypress Bowl Road/Highway 1 intersections. Mulgrave School has staggered start and finish times for the elementary and high school students and recently made further adjustments to spread arrival and departure times in support of social distancing on site. As a result of these changes the peak traffic demand related to the school has been reduced and has been spread over a longer peak period. The school has confirmed that the new pandemic schedule has now been adopted as part of the regular school schedule.

Recent data collected in May 2021 indicate that the changes to the school schedule have resulted in a shift of the school AM peak hour to 8-9 AM.

The peak hours for analysis were established by identifying the hours with the highest overall volumes during the AM and PM data collection time periods; to ensure consistency with the Regional Transportation Model (RTM); and to reflect the future Cypress Village peak hours. As such, the AM peak hour for analysis is 7:30 - 8:30 AM and the PM peak hour is 4:30 - 5:30 PM. This was discussed with and approved by MOTI.

The adjusted 2018 base year weekday AM and PM peak hour traffic volumes are shown in **Figure 7**.

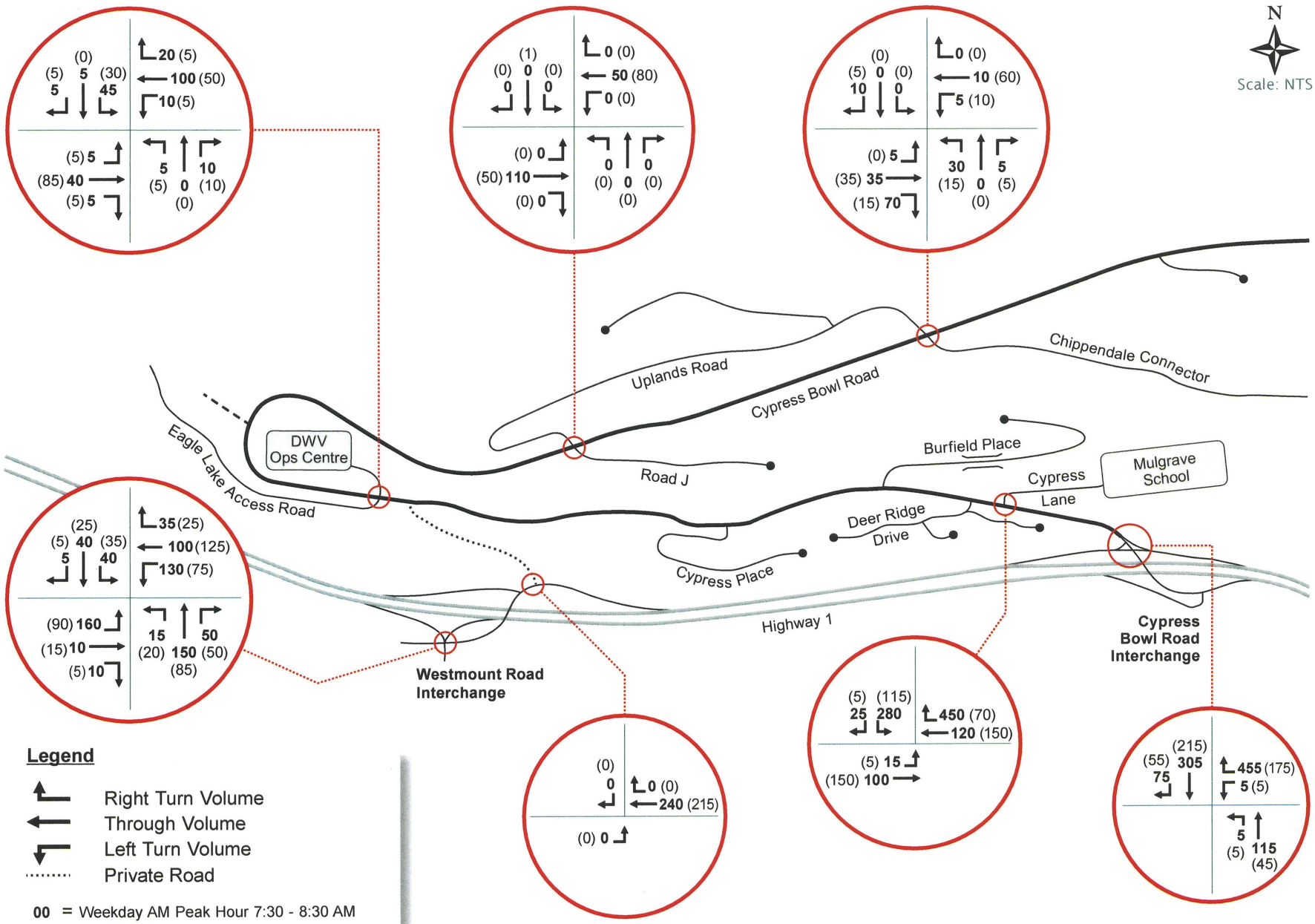


Figure 7
Existing Traffic Volumes Adjusted (2018)

5. Future Network Conditions

This section describes the proposed future transportation network.

5.1. Proposed Future Road Network

The proposed future road network and laning is shown in **Figure 8.** The following road network improvements (as noted in Section 2.3) have been committed to by BPP and are included in the full build out scenario for 2043:

- Westmount Connector – a new two-lane road connecting Cypress Bowl Road to the Westmount interchange with a signalized intersection at the interchange.
- Conversion of the existing intersection on Cypress Bowl Road at the DWV Operations Centre into a new 5 legged roundabout connecting Village Street and Westmount Connector.
- A new roundabout at the intersection of Cypress Bowl Road and a realigned Eagle Lake Road.
- Upgrade the Cypress Lane/Cypress Bowl Road intersection to a full traffic signal.
- Upgrade the Westmount Road/Westridge Road intersection to a full traffic signal.

The context plan of the preliminary design of the network is shown in **Figure 9.** The driveways and future auto connections between land use pods in shown in **Figure 10.**

5.2. Proposed Future Transit Network

DWV and BPP wish to encourage transit for trips to and from Cypress Village, as a means of reducing numbers of automobiles on regional roads, and for trips within Cypress Village.

TransLink typically introduces transit service to a new neighbourhood when the population and density within walking distance of the new route reaches a specified level. To encourage transit use at Cypress Village, BPP has committed to operate an "Independent Transit Service" (ITS) during the first few years of development of the Village, before TransLink service is introduced. BPP has approval from TransLink to proceed with planning the ITS. The transit service assumed for this analysis for full build out is 15-minute peak frequency with a standard bus (35-seater) as per TransLink Transit Service Guidelines. The route would operate between Cypress Village and Park Royal as shown in **Figure 11.** The peak period trip time is estimated as 20 minutes in the peak direction with a 10 minute off peak trip.

Transit routes are proposed to operate on Cypress Bowl Road and Eagle Lake Road as described below and illustrated in **Figure 12**:

- The primary transit route serving Cypress Village is shown with a solid blue line. Buses would operate via Cypress Bowl Road and Eagle Lake Road. Initially the route would end at Godman Way where buses would turn around at the roundabout.
- As Cypress Village develops, transit service would be extended further west as shown with a dashed blue line.

- Transit service could be provided on the Westmount Connector when it is extended to Highway 1, as an alternative to or in addition to service on Cypress Bowl Road.
- A shuttle bus could operate between Cypress Mountain and Cypress Village as shown with a dashed green line.
- Bus stops are indicated with red circles. All bus stops will include seating and shelters, as well as a wheelchair landing pad and other accessibility features as per TransLink guidelines.

The commitments by BPP include transit stop infrastructure.

Buses typically layover at the end of a route where recovery time is scheduled to ensure that buses remain on schedule. This means that a bus may be parked at a bus stop for several minutes before resuming service. Initially, layovers would be accommodated at bus stops on Eagle Lake Road west of Cypress Bowl Road, where bus bays would be provided so that buses stop out of the traffic lane. When transit service is extended further west on Eagle Lake Road, a single bus bay would be constructed at the west end of the route to accommodate a bus layover.

5.3. Proposed Future Active Transportation

Cypress Village will be designed to encourage walking and cycling for a large share of travel within the neighbourhood, such as trips to and from local commercial facilities, community facilities, schools and transit stops.

The majority of active transportation trips will be made within the core area, in the eastern portion of Cypress Village. The majority of the housing units are located in this area, where the terrain is flat or with gentle grades, and commercial uses and other destinations in the Village centre are within walking distance. Cypress Village will also be designed to provide extensive recreational hiking and cycling opportunities for residents and visitors to the community.

There will be a comprehensive active transportation network throughout Cypress Village. Pedestrian and bicycle facilities are shown in **Figure 13** and **Figure 14** respectively, and include the following:

- Multiuse pathways shared by pedestrians and cyclists: Pathway grades will be designed to maintain accessibility for persons with disabilities and to accommodate cyclists of all ages and abilities.
- A multiuse pathway on the north side of Eagle Lake Road designated for pedestrians and uphill cycling only.
- A wide traffic lane downhill on Eagle Lake Road to accommodate experienced, confident cyclists.
- Pedestrian-only sidewalks provided on most roads. In some cases, such as on the north side of Eagle Lake Road, pedestrians would be accommodated on shared multiuse pathways instead.
- Pedestrian-only plazas in the Village core where cyclists will be asked to dismount and walk their bicycles, to avoid potential conflicts with pedestrians (separate routes will be available for cyclists to ride around pedestrian-only plazas).

- Pedestrian-only trails with gravel or soft surfaces: These trails are secondary elements of the active transportation network and will not be accessible to persons with disabilities.
- Improved bicycle facilities on Cypress Bowl Road, where cyclists currently ride in the traffic lanes (the specific type of bicycle facilities will be determined by MOTI and will be incorporated into road and intersection designs for Cypress Village as appropriate).

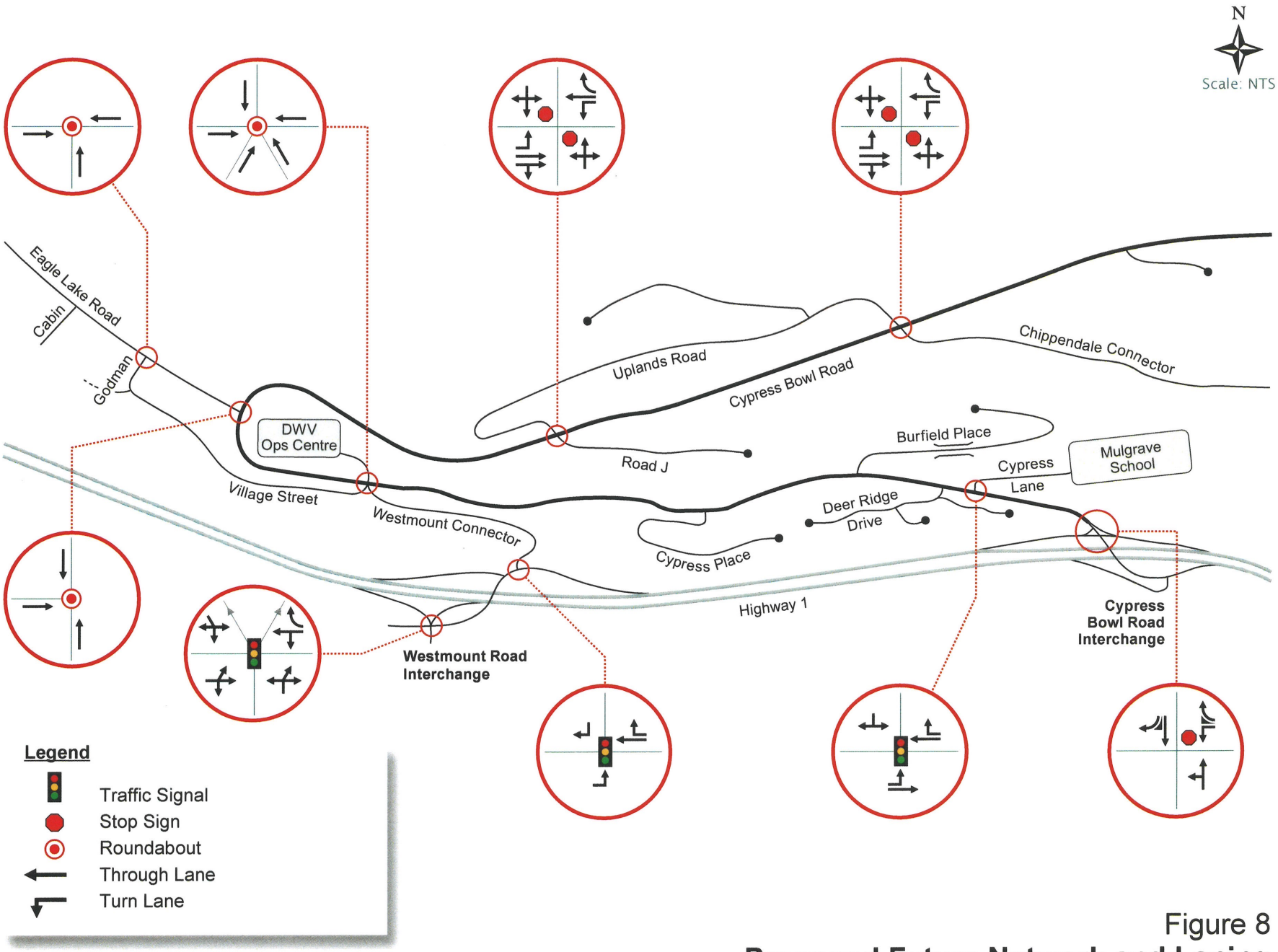


Figure 8
Proposed Future Network and Laning

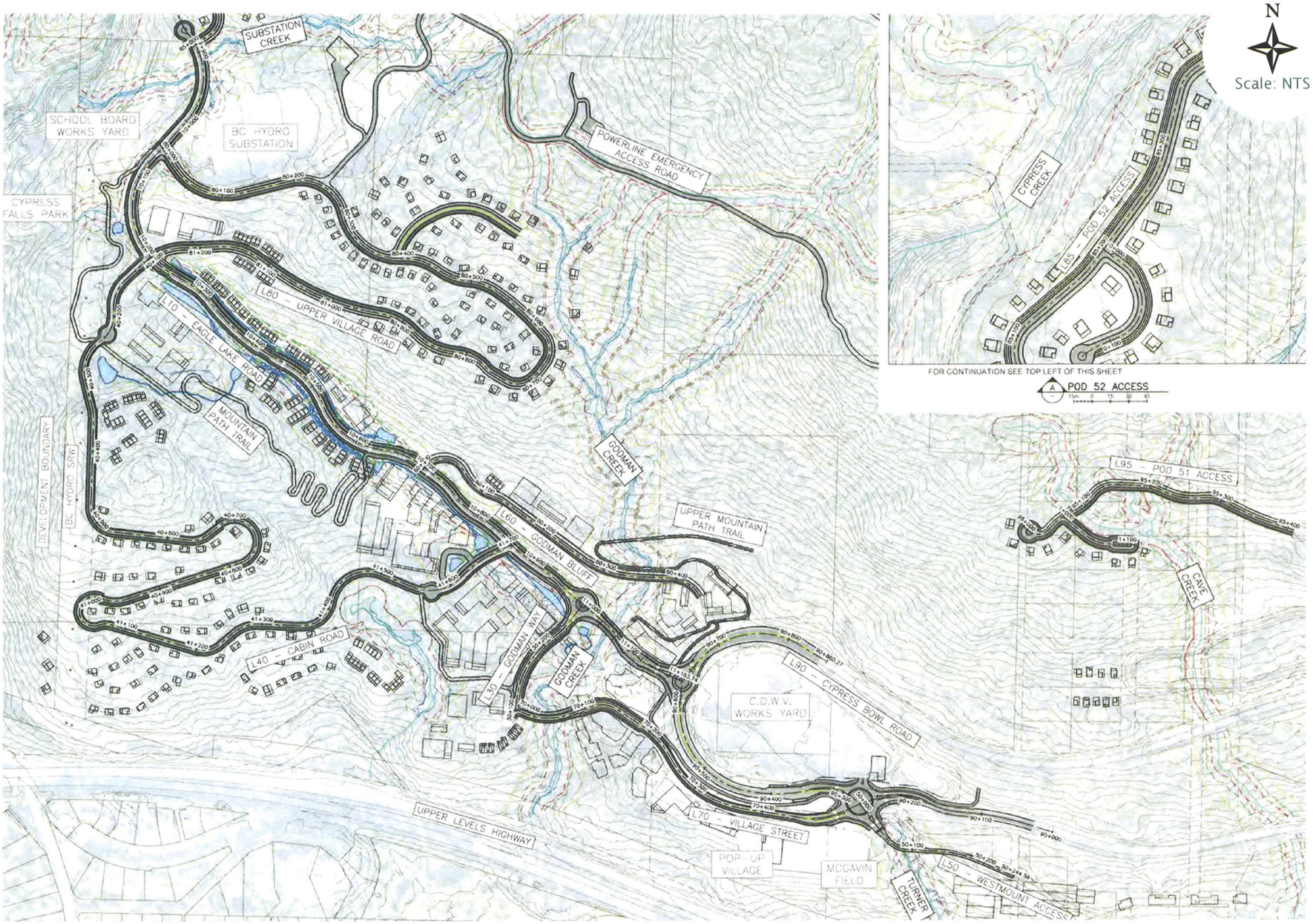


Figure 9
Conceptual Road Layout

Figure 10
Conceptual Future Auto Network

Figure 11: Future Transit Routing

Figure 12
Conceptual Future Transit Network

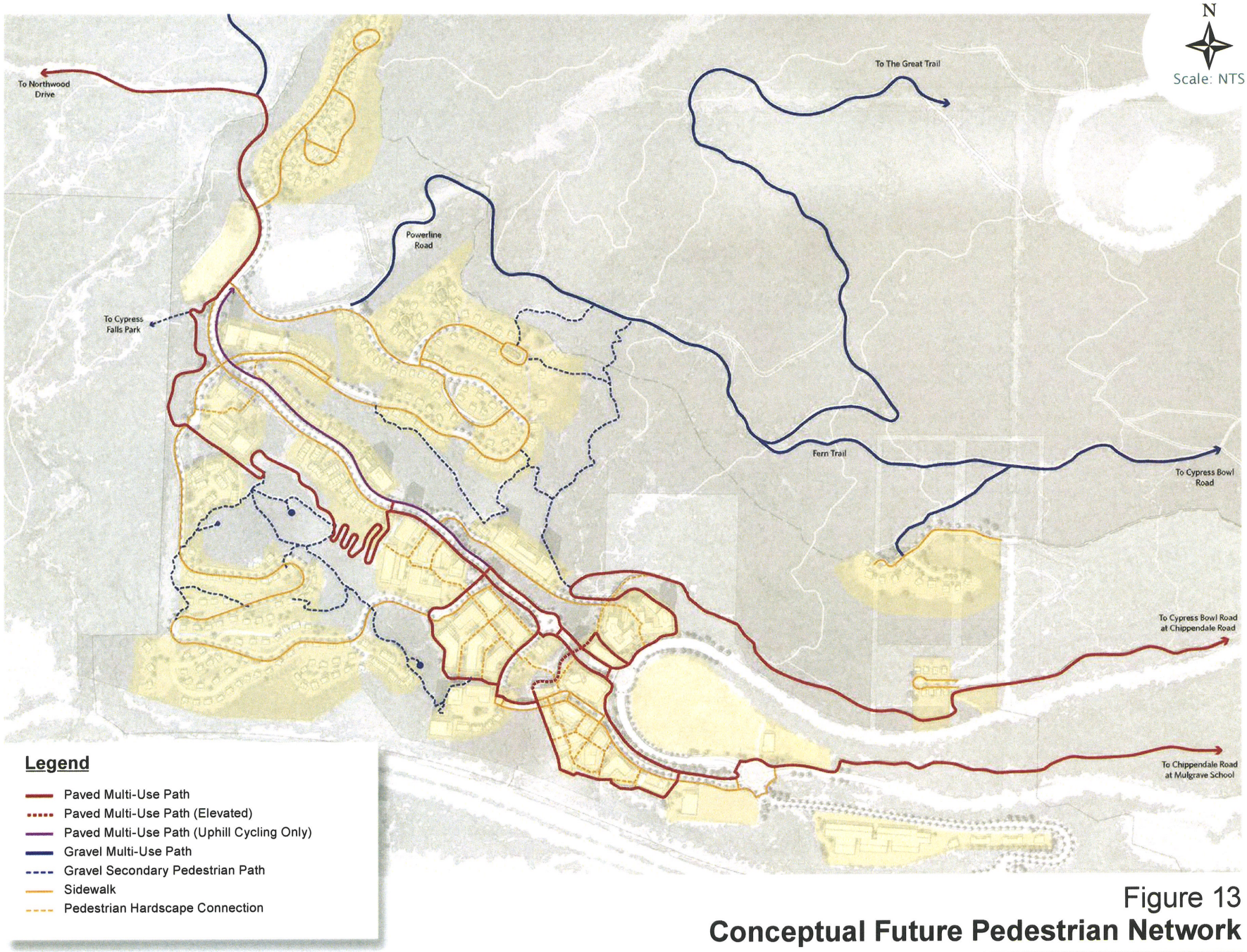


Figure 13
Conceptual Future Pedestrian Network

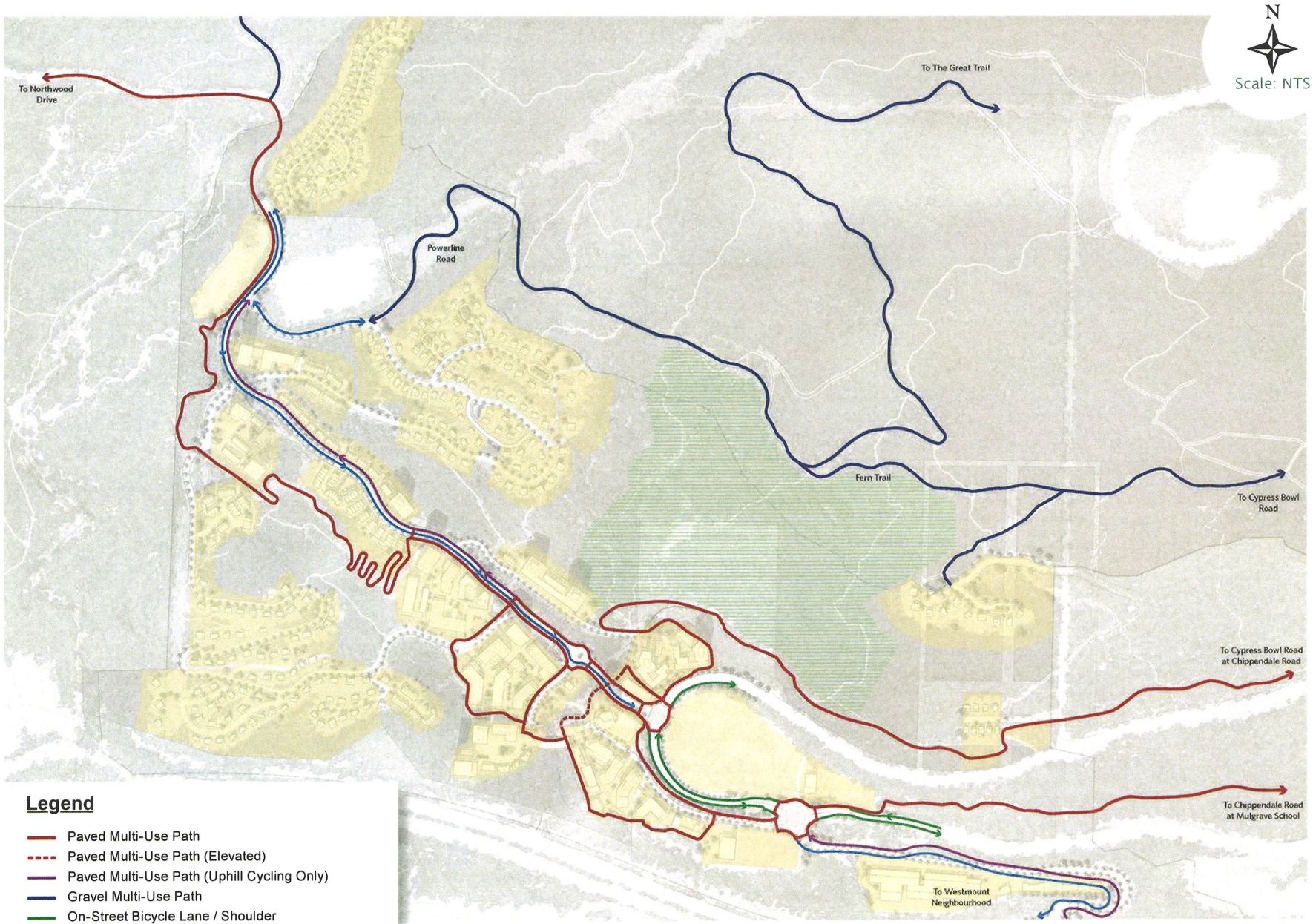


Figure 14
Conceptual Future Cycling Network

6. Project Traffic

This section describes the planned land uses for Cypress Village and the associated trip generation.

6.1. Development Layout

Cypress Village is divided into two main areas – the core area and outside the core area. This is shown in **Figure 3.** This was done to define how future users of the Village will move and for analysis purposes. The core area is defined based on the topography of the location and the proposed linkages for cycling and walking. This area consists of residential, retail (e.g. specialty and grocery stores), restaurant, office, recreational (e.g. community park and sports fields), and hotel land uses, as well as an elementary school. It is assumed that multiple travel modes will be used within the core area (e.g. walking, cycling, transit and automobile). Approximately 60% of all residential sites are located within the core area. This area was assumed to include the land uses that were within walking distance to the centre of the mixed-use area as well as areas where there is high connectivity for active modes.

For the development outside the core area, residential land uses will make up most of the land use pods. The primary mode of travel for these pods will be via automobile.

It is assumed that all students that attend the school will reside in Cypress Village. Some external trips for teachers were accounted for. The assumption is made that the demographic of the residents in the core area are families with children and the majority will walk to school.

6.2. Land Uses and Location

Land uses associated with the proposed development are summarized in **Table 2**, separated into the areas of core, non-core, and Uplands.

Table 2: Cypress Village Proposed Land Uses

Land Use Description	Residential					Retail			Office			Light Industrial	Hotel	Comm. Centre	Fire Hall	Education	
	Multi-Family			Single-Family	Assisted Living	Grocery	Restaurant	Specialty	General	Medical	University					Daycare	Elem. School
	Low-Rise	Mid-Rise	High-Rise														
Unit	DU [1]	DU	DU	DU	GFA[2]	GFA	GFA	GFA	GFA	GFA	GFA	GFA	Rooms	GFA	GFA	GFA	GFA
Core	32	1058	1340		100	25	26	42.6	20	7	10		120	26	13	6.18	36
Outside Core	123	113	684	211								130				4.12	
Uplands	6			19													
TOTAL	161	1171	2024	230	100	25	26	42.6	20	7	10	130	120	26	13	10.3	36

Notes:

1. DU = dwelling unit

2. GFA = gross floor area (1,000 sq. ft.)

6.3. Trip Generation Methodology

The trip generation development includes a combination of trip generation based on rates identified in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition (2017), internalization of trips, transit ridership, and active mode use.

The trip generation methodology flow chart in **Figure 15** illustrates the process that was applied in developing the estimated project trips for Cypress Village.

The trip generation process followed is a step wise process in reviewing the land use and transportation mode choice and the associated reductions from the initial, standard ITE vehicle trips rates by land use type. Various reductions were then made to account specific characteristics of Cypress Village. These were assessed based as internal trip reductions (trips that would occur only in the Village area) and external trip reductions (those trips that leave for or arrive from destinations outside the Village).

In addition to the core area in the Village, a walking catchment area was also established for the school which is smaller than the core area based on the school location in Pod 2. This was used for reference for walking trips to the school. This layout is shown in **Figure 16.**

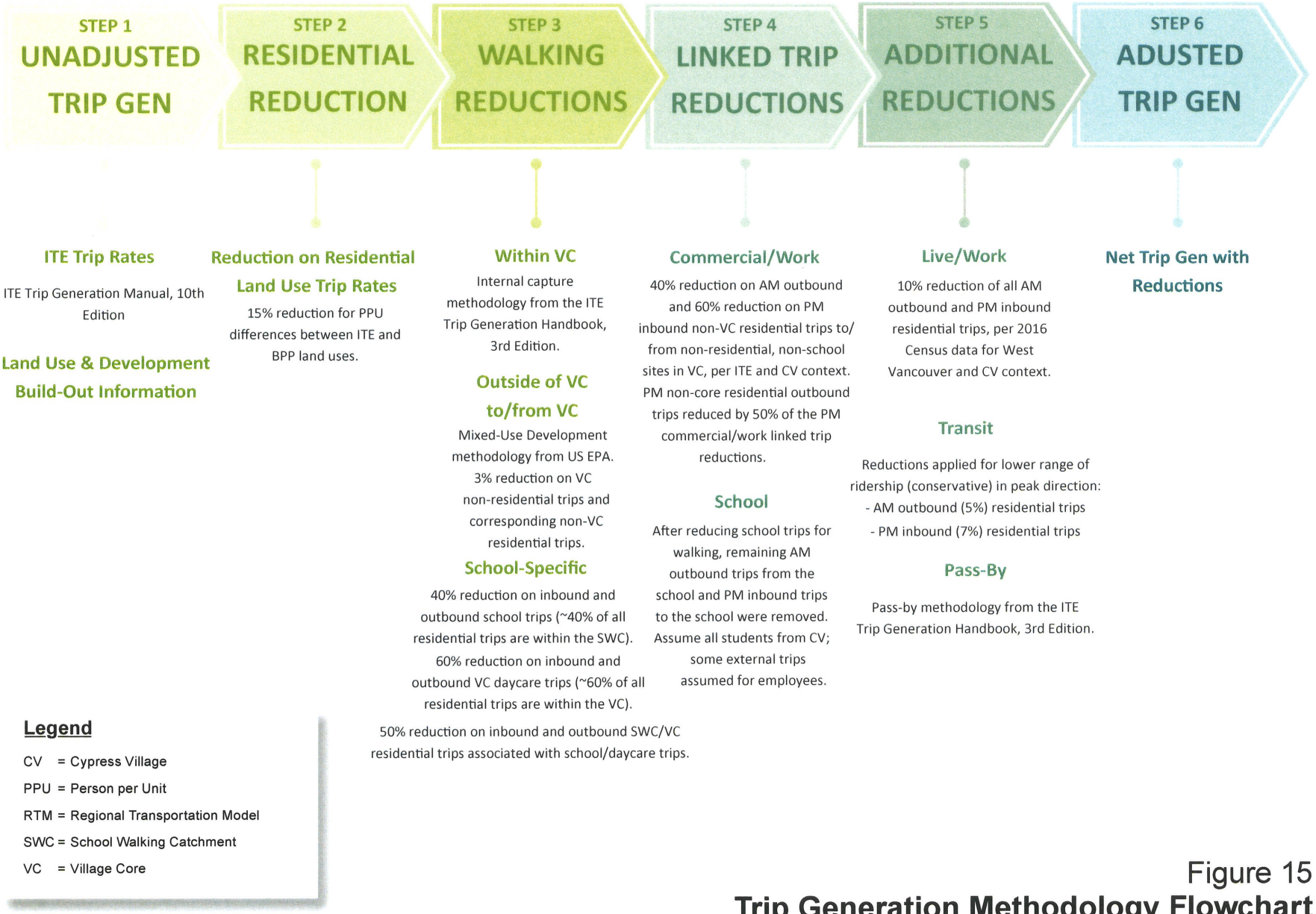


Figure 15
Trip Generation Methodology Flowchart

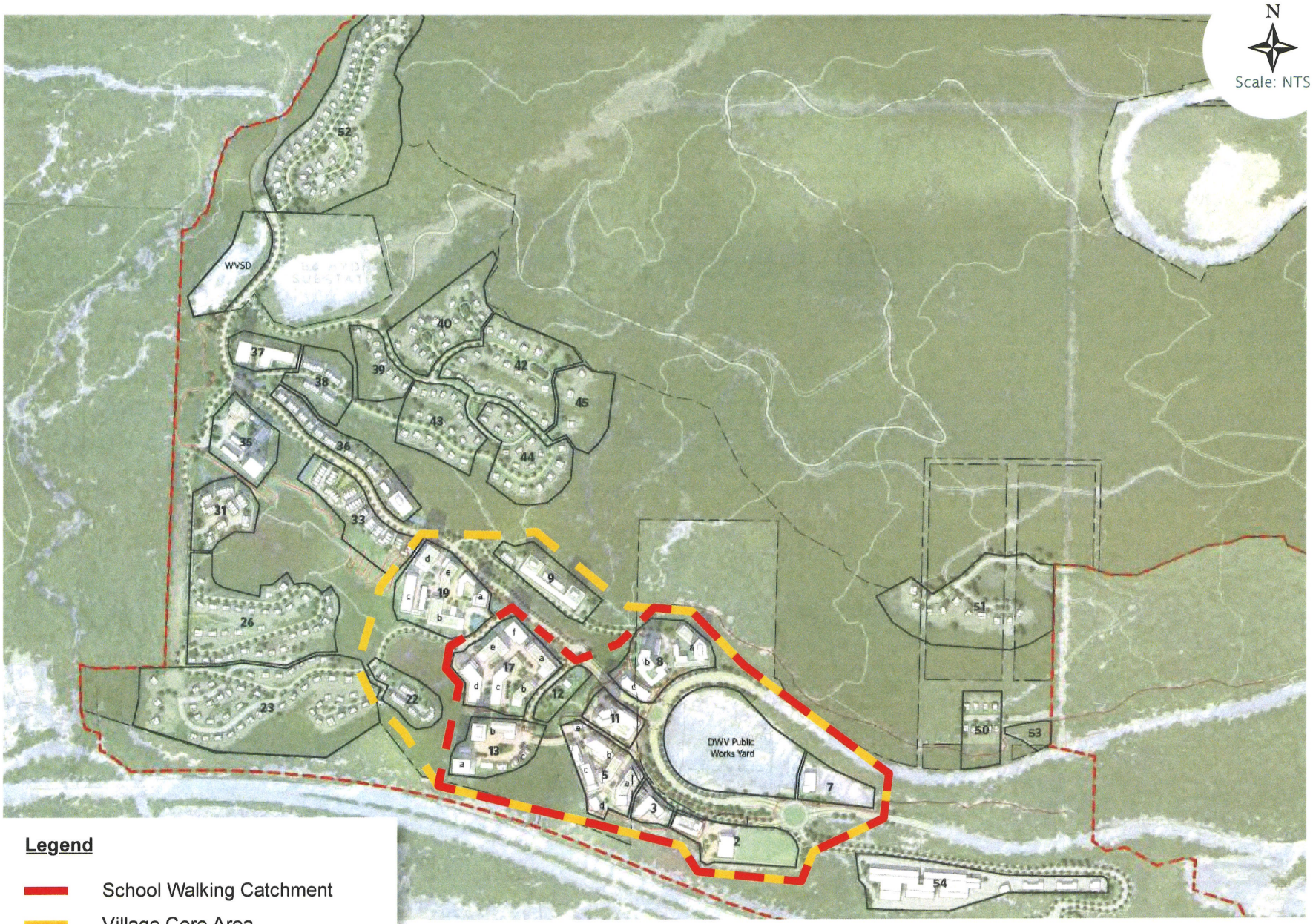


Figure 16
Cypress Village — Conceptual Core Area & Walking Catchment

6.4. Total Net Vehicle Trips - Project Traffic

The resulting total net adjusted vehicle trips on the external road network is summarized in Table 3.

Table 3: Net New External Vehicle Trips

	Subtotal Unadjusted Trips	Residential Reductions	Walking Reductions			Linked Trip Reductions		Additional Reductions			Total Net Adjusted Trips
			Core	Non-Core	School	Commercial	School	Work from Home	Transit	Pass-By	
AM Vehicle Trips	2,377	201	166	58	188	220	168	51	34	69	**1,222**
In	985	52	83	29	97	110	84	0	10	38	**482**
Out	1,392	149	83	29	91	110	84	51	24	31	**740**
PM Vehicle Trips	2,653	230	506	62	37	310	30	58	74	42	**1,304**
In	1,489	144	253	31	18	124	15	58	57	23	**766**
Out	1,164	86	253	31	19	186	15	0	17	19	**538**

6.5. Project Trip Distribution

The trip distribution for the village was separated into two components:

- Internal Trip Distribution - how trips are made between the internal land use pods and the accesses on Cypress Bowl Road
- External Trip Distribution - how trips are made between the Village and external destinations (e.g. eastbound and westbound Highway 1, Westmount Connector vs. Cypress Bowl Road East, etc.)

6.6. Project Traffic Volumes

The project traffic volumes for build out (year 2043) and shown in **Figure 17** on the future network.

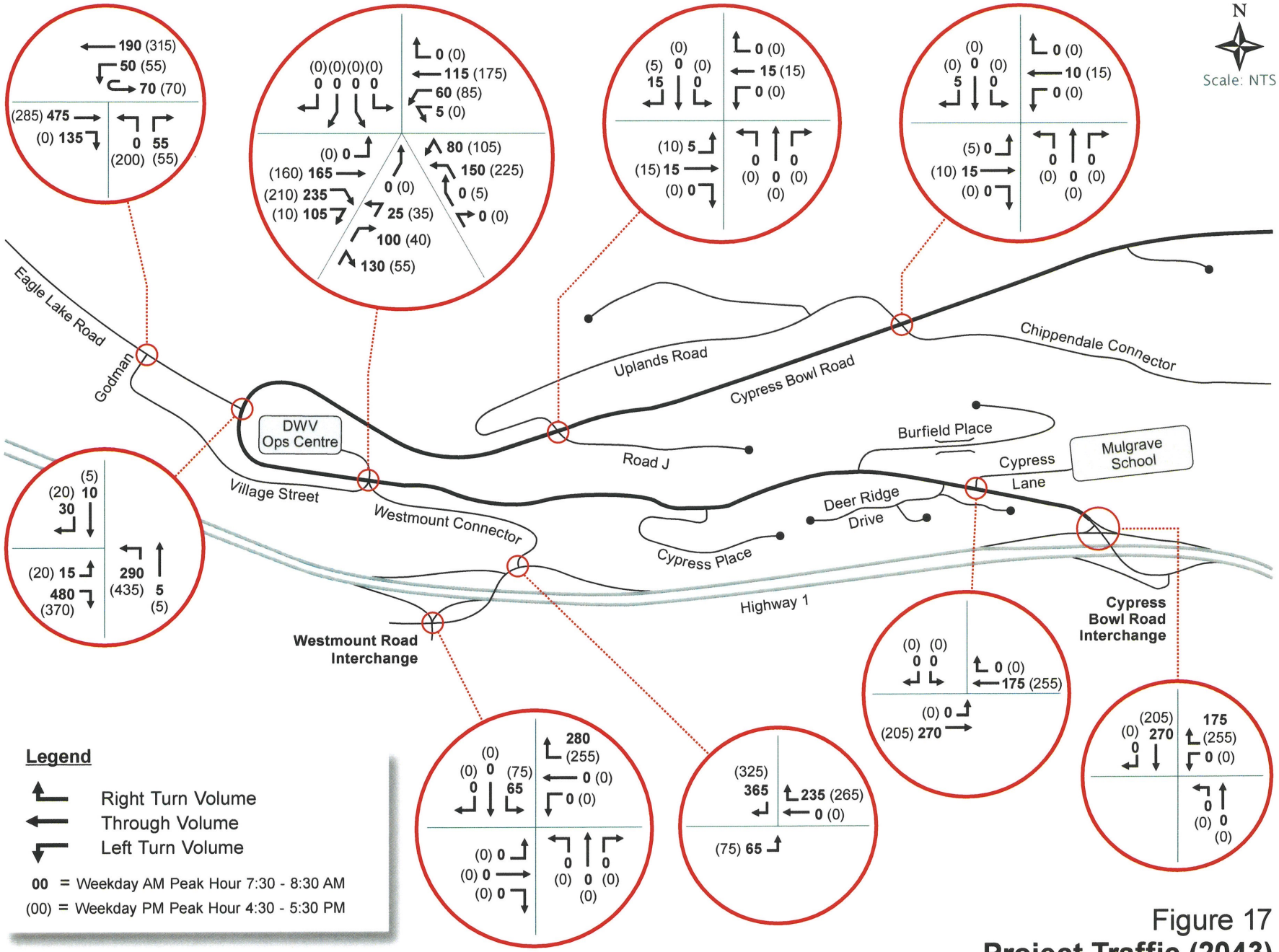


Figure 17
Project Traffic (2043)

7. Future Traffic Volumes

This section outlines the development of the future traffic volumes. This includes a description of the future background traffic without Cypress Village and the total combined traffic (background traffic plus Cypress Village traffic) for full build out by year 2043.

7.1. Assumptions

The following assumptions were used to determine the future forecast traffic volumes:

- The full build out of the Village is forecast for 2043.
- Background traffic growth on Highway 1 and on Cypress Bowl Road was estimated as a 1% annually compounding growth rate (as determined from the RTM).
- No growth was applied to Mulgrave School traffic as there are no plans to expand the school at this time.

7.2. Rodgers Creek Development

The total build out for the Rodgers Creek development is 1,215 units by the year 2035. The existing traffic counts include the 93 completed Rodgers Creek units, and therefore the remaining 1,122 units were accounted for in the future background volumes. The trip generation for Rodgers Creek has followed the same methodology as Cypress Village. Reductions were made for residential PPUs, as well as Work from Home. No other deductions were made. The trips were distributed based on the location of the development and access to Cypress Bowl Road.

7.3. Background Traffic Year 2043

The forecast 2043 background traffic volumes for the weekday study peak hour are presented in **Figure 18**.

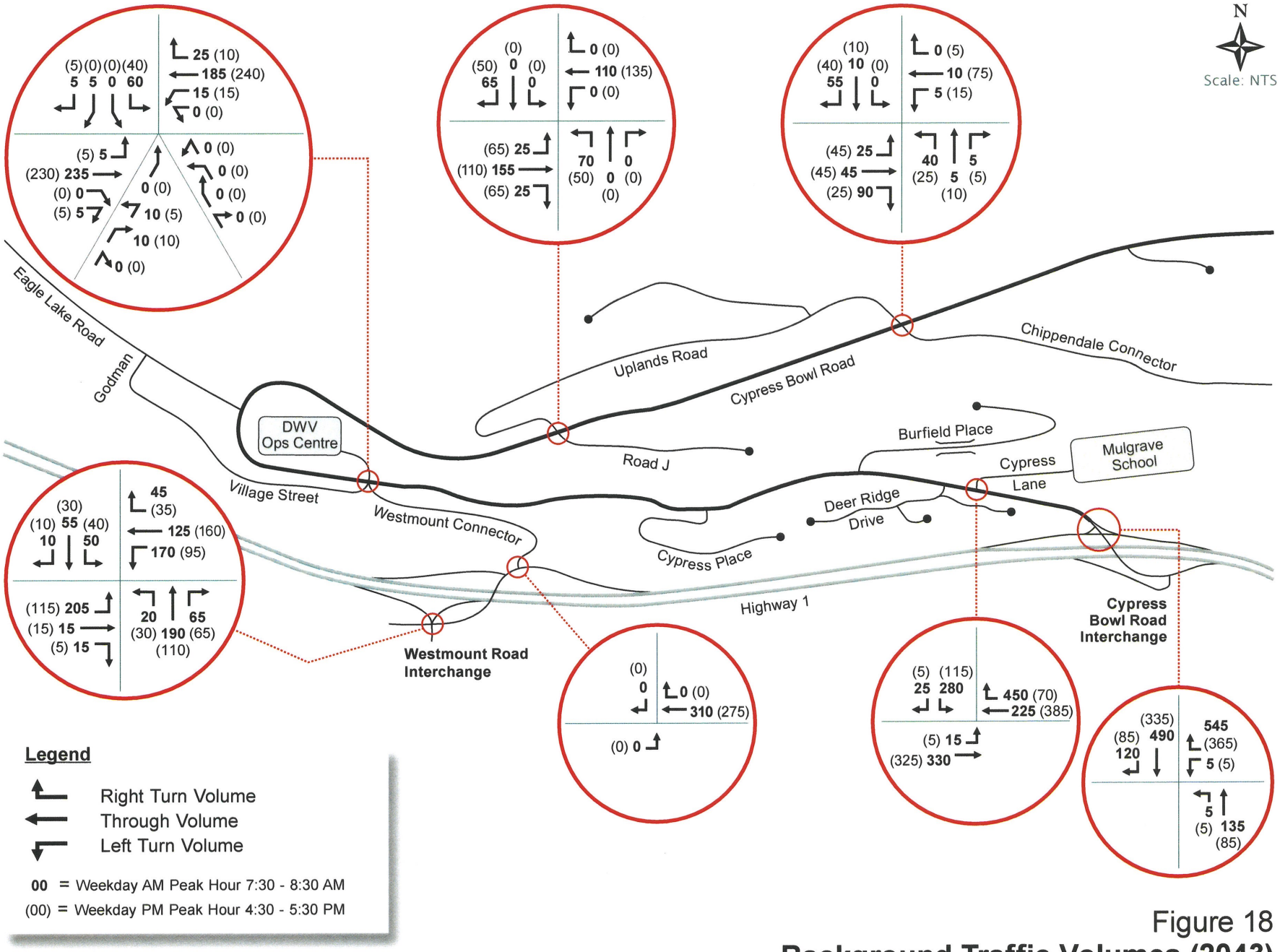


Figure 18
Background Traffic Volumes (2043)

7.4. Opening Day: Total Traffic Year 2043

To estimate the future traffic volumes for 2043 the Background traffic volumes for 2043 were used as a base and the Project traffic was added to produce the total combined traffic for year 2043 volumes as shown in **Figure 19**.

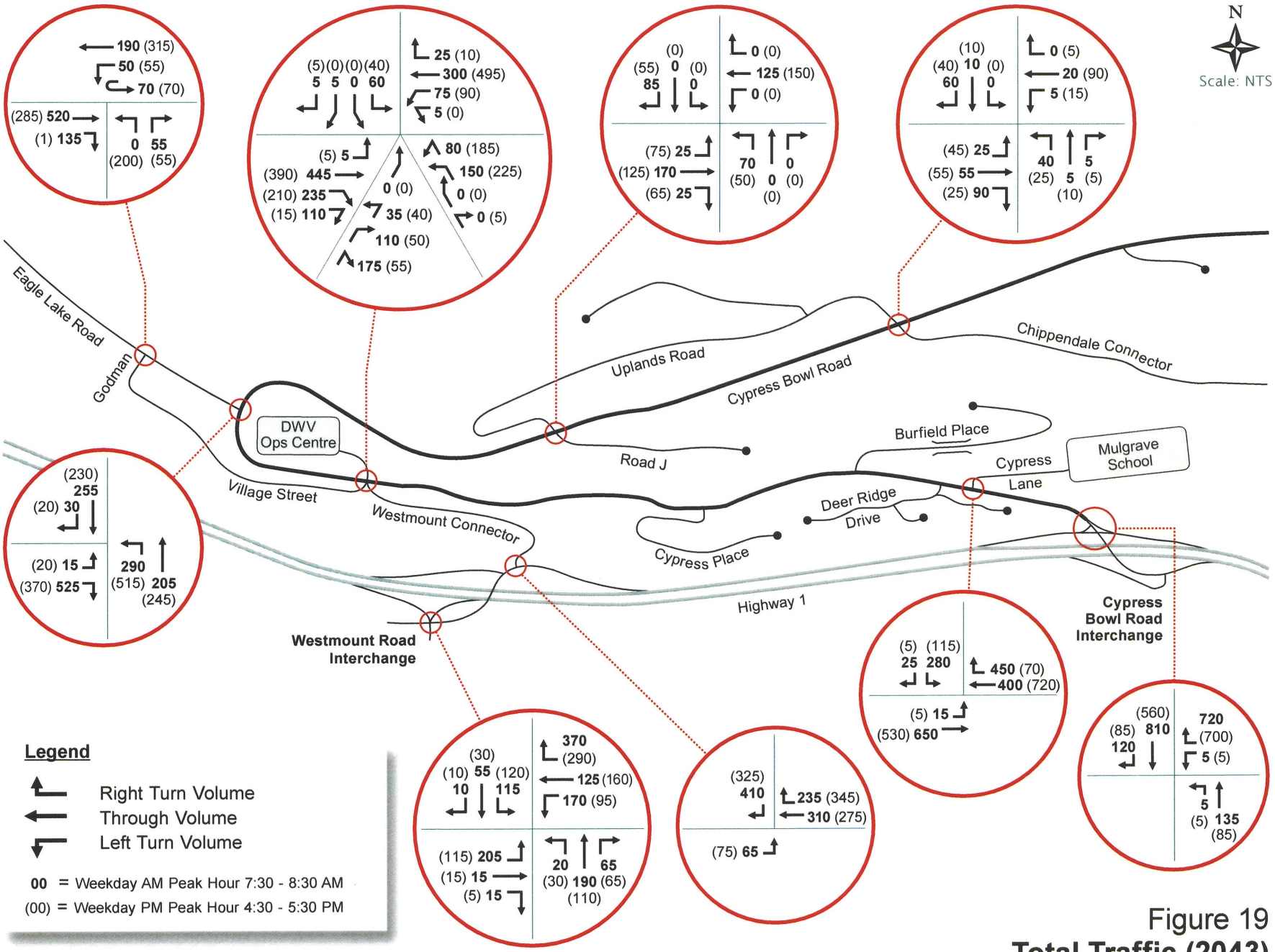


Figure 19
Total Traffic (2043)

8. Analysis

This section outlines the methodology used, assumptions and results of the traffic analysis for Cypress Village land use.

8.1. Methodology

The analysis was based on the assumptions, future land use scenarios and future transportation networks described in previous sections. A Vistro model (Section 7.1.1) was developed to support the analysis.

The Synchro software suite was used for the traffic analysis for the existing and the ultimate horizon for the unsignalized and signalized intersections. This analysis was based on the procedure and methods of the Highway Capacity Manual (HCM) for signalized and unsignalized intersections. The proposed roundabouts were analyzed using the Sidra software. Highway Capacity Software (HCS) was used to analysis the Highway 1 on-ramps.

Operations of roadway facilities are described in terms of Level of Service (LOS). LOS is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to manoeuvre. Six service levels are defined ranging from LOS A, the best operating conditions, to LOS F, the worst operating conditions. LOS E corresponds to "at or near capacity" operations. When volumes exceed capacity, stop-and-go conditions result, and operations are designated LOS F.

The calculated 95th percentile queue length is also reported in terms of length (m) where the space occupied by a car is approximately 7m.

The LOS and the 95th percentile queue lengths are presented in **Table 4.** The ramp analysis output is described in **Table 5.**

Table 4: Level of Service Criteria for intersections

Level of service (LOS)	Average delay for Unsignalized intersections / Roundabout movements (seconds per vehicle)	Average delay for Signalized intersection movements (seconds per vehicle)
A	0-10	0-10
B	10-15	10-20
C	15-25	20-35
D	25-35	35-55
E	35-50	55-80
F	> 50	> 80

Table 5: Level of Service Criteria for ramps

Level of Service	Maximum Density (Passenger Cars Per Kilometer Per Lane) Freeway Weaving Segments and Ramp Junctions
A	≤ 6.3
B	> 6.3 - 12.5
C	> 12.5 - 17.5
D	> 17.5 - 21.9
E	> 21.9
F	Demand Exceeds Capacity

8.2. Existing Conditions

Cypress Bowl Road operates mainly free flow in the existing condition as there is no traffic control (e.g. traffic signals) impeding travel from Highway 1 to Cypress Mountain.

The existing intersections operate well, and all traffic movements are LOS A or B. There are some queues in the AM peak relating to students being dropped off in the morning at Mulgrave School, although this has been mitigated somewhat by recent adjustments to staggered start and end times at the school.

Additionally, two highway on-ramp merge sections were analyzed – the Cypress Bowl Road / Highway 1 eastbound on-ramp and the Westmount Road / Highway 1 eastbound on-ramp merge. All operate well under existing conditions with the worst-case being LOS C in the AM peak hour for both ramps.

8.3. Future Network (2043)

The review of the traffic operations indicated that new infrastructure would be needed for key locations. This included:

- **Signalization at Cypress Lane and Cypress Bowl Road:** The current manual traffic control at this intersection will not be sustainable in the long term and signalization will be necessary to manage the traffic demands for Mulgrave School and the Village.
- **Signalization at Westmount Road and Westridge Avenue:** The 4-way stop will not be able to accommodate the future traffic demand with the Westmount Connector traffic. As such a signal will provide added capacity and safer operations in the future.
- **Signalization at Highway 1 off-ramp and Westmount Connector:** This was previously discussed with MOTI and the recommendation from staff was signalization for the access to be allowed.

8.4. Future Conditions (2043)

The Background Traffic 2043 volumes and the Total Traffic 2043 volumes were analyzed using the future network as shown in **Figure 8.**

The future road network, with the planned improvements noted above, can accommodate the future traffic associated with Cypress Village at acceptable levels of service.

The study intersections are listed below with commentary on the future operation.

- **Cypress Bowl Road / Highway 1 Off-ramp:**
  The analysis of this intersection identified that further improvements than those already planned were needed. An option for improvement includes adding a half signal for westbound and northbound movements together with adding additional lanes along Cypress Bowl Road between the north side of the interchange and Cypress Lane. This improvement would increase the safety of the operations at the intersection with clearly defined rights of way and increased capacity for the peak operations. The conceptual layout of this improvement is shown in **Figure 20.** The analysis of this operation at full build out indicates that the LOS would be similar to the existing condition with manageable queues.
- **Cypress Bowl Road/Cypress Lane:** With the increase in background traffic on Cypress Bowl Road, the delay for the southbound traffic increases in the AM peak hour. As such the LOS for this movement is D with an approximate 50m queue. With new signalization, the analysis shows that the delay for the southbound traffic will improve to LOS B or better for the background and total traffic scenarios with similar queue lengths.
- **Road J / Cypress Bowl Road:** This intersection is planned with stop control for Road J and Uplands Way. This intersection will operate well in full build out, with all movement operating at LOS C or better.
- **Chippendale Rd / Cypress Bowl Road:** This intersection is planned with stop control for Chippendale and Uplands Way. This intersection will operate well in full build out, with all movement operating at LOS B or better. Although this intersection does not warrant a traffic signal at this time, it is proposed that this intersection be monitored for delays especially for the pedestrian movements with the proximity to the new Mountain Pathway. The intersection has been pre-ducted for signals and the warrants for a future pedestrian signal can be assessed in the future.
- **Westmount Road / Westridge Avenue Intersection:** With the Westmount Connector constructed, there will be an increase in traffic accessing this intersection on the way to and from the Village. As such, the future control is recommended as full signalization with a westbound right turn channelized bay. The west access to the Chevron gas station should be closed as it will be too close to the new signal. With these improvements, all movements will operate at LOS B or better at full build out.
- **Westmount Connector / Highway 1 Off-ramp Intersection:** The Westmount Connector will access the Westmount Interchange at the westbound off-ramp as a full signal. In addition, westbound traffic will be able to access the Connector northbound from Westridge Way. This intersection will operate satisfactorily in the full build out scenario. The westbound queue is estimated to extend not more than 45m west of the intersection and should not back onto the highway.

- **Roundabouts**: There are three new roundabouts proposed for the future network:

  Cypress Bowl Road / Village Street / Westmount Connector
  Cypress Bowl Road / Eagle Lake Road
  Eagle Lake Road / Godman Way

  The three roundabouts will all operate effectively with LOS B or better. Estimated queues do develop in the peak direction at Village Street roundabout with a maximum queue length of 70m in the AM EB movement and 85m in the PM westbound movement. These queues can be managed within the road layout and do not block accesses or other intersections.

- **Highway interchange eastbound on-ramps:** Additionally, the two highway eastbound on-ramp merge sections were analyzed at the Westmount and for Cypress Bowl Road Interchanges. Based on the HCS analysis, with full buildout of the site in Year 2043, the Cypress Bowl Road on-ramp would operate at LOS D (AM peak). It should be noted that this on-ramp also operates at LOS D under the 2043 background conditions (i.e. without development traffic). The Westmount on-ramp would operate at LOS C during both peak hours in 2043 under the total traffic conditions (i.e. with development traffic).

The proposed future network as a result of this analysis is shown in **Figure 21**.

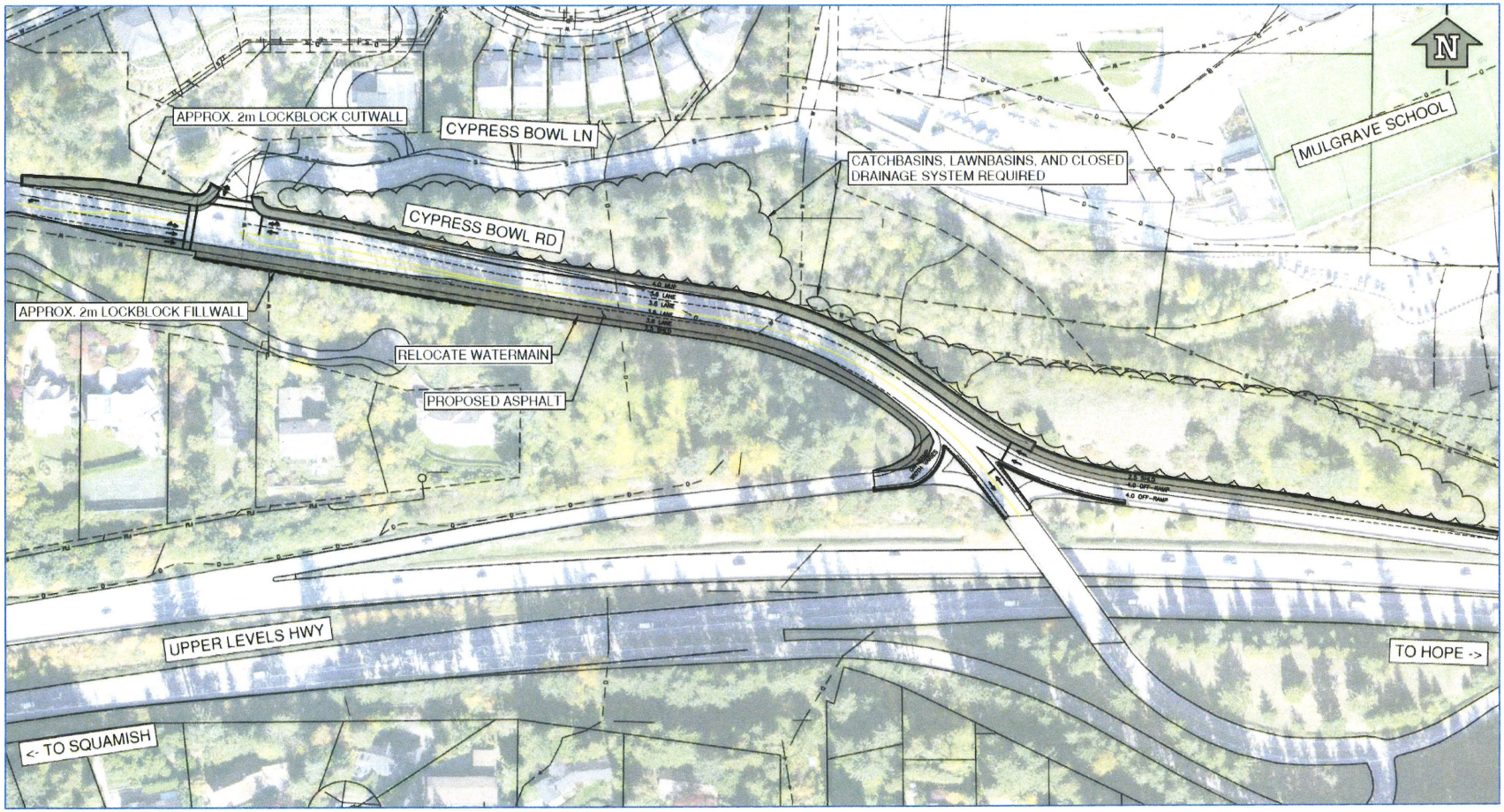


Figure 20: Conceptual layout - CYPRESS BOWL ROAD near Highway 1 (Urban Systems, June 18, 2021)

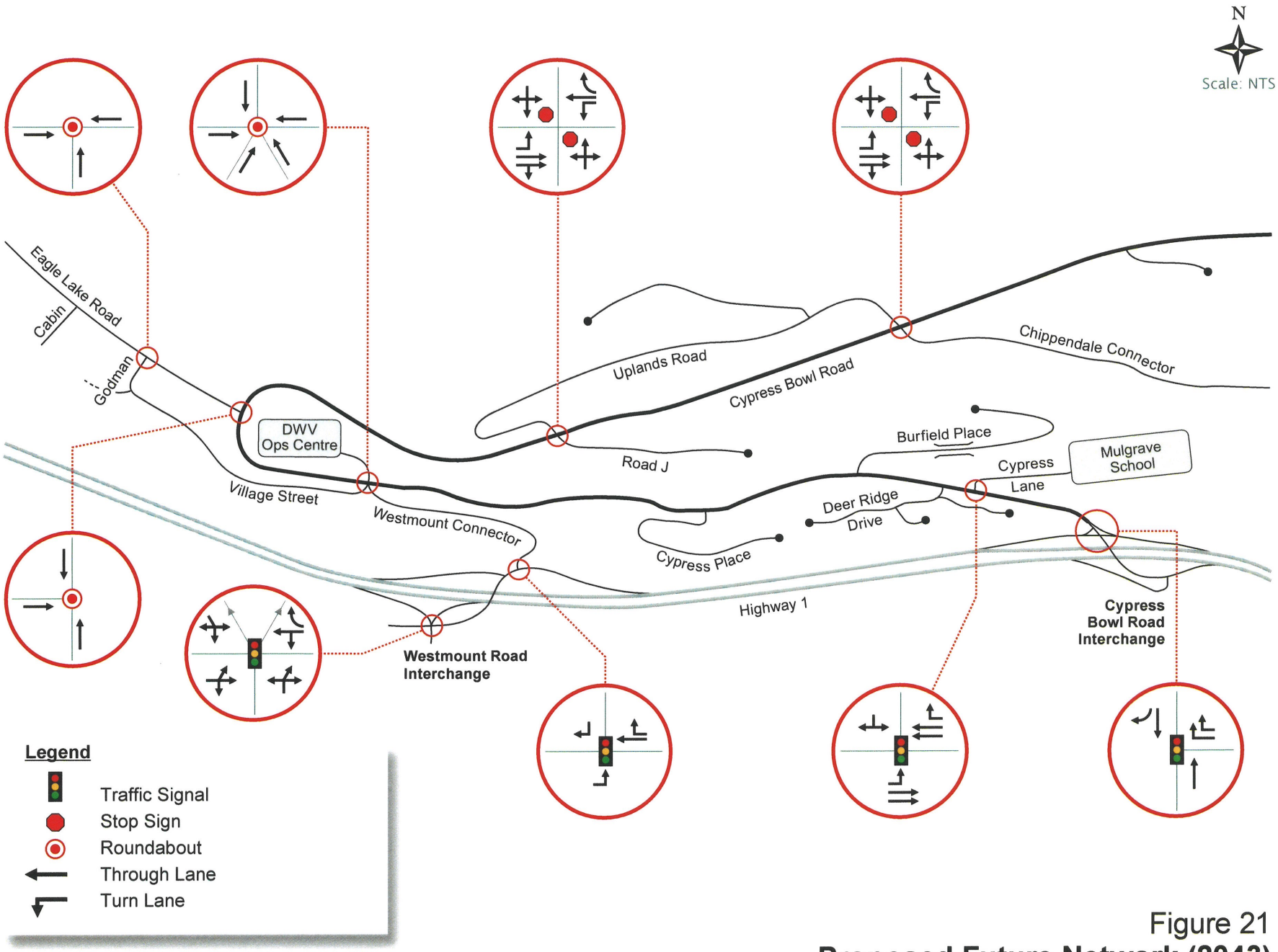


Figure 21
Proposed Future Network (2043)

9. Conclusions

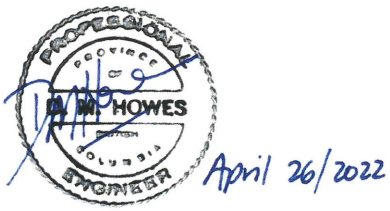
The following conclusions are made based on the review and analysis completed:

- FUTURE ROAD NETWORK:
  - BPP has committed to constructing the following improvements for full build out in order to accommodate future traffic:
    - Widening of Cypress Bowl Road from Highway 1 to Cypress Lane with an additional traffic lane in each direction
    - Highway 1/Cypress Bowl Road - additional westbound right turn lane and half signal for westbound/northbound movement only
    - Full traffic signal at Cypress Bowl Road and Cypress Lane
    - Westmount Connector - A new two-way road connecting Cypress Bowl Road to the Westmount Interchange
    - Full signal at Westmount Connector/Highway 1 westbound off-ramp
    - Full signal at Westmount Road/Westridge Avenue with a westbound right turn lane
  - Cypress Village will have two main access points which will include two roundabouts at the intersections of Cypress Bowl Road and Village Street and the realigned Eagle Lake Road.
  - Internal to the Village road network, there will be a roundabout at Godman Road/ Eagle Lake Road.
- FUTURE TRANSIT AND ACTIVE MODE NETWORK:
  - An Independent Transit Service is proposed during the first few years of development of the Village to encourage transit use before TransLink service is introduced. The route would operate between Cypress Village and Park Royal with an assumed 15-minute peak frequency at full build out.
  - The Village will have a comprehensive active transportation network including multiuse pathways, sidewalks and bicycle facilities.
- PROJECT TRIPS:
  - Reductions were applied to trip estimates to reflect internal trip reductions including household size and other travel modes/choices, such as walking, linked trips and working from home. External trip reductions were applied to reflect transit use and pass-by traffic.
  - The total project external vehicle traffic Cypress Village is estimated at 1,222 two-way trips in the AM peak hour (482 inbound and 740 outbound) and 1,304 two-way trips in the PM peak hour (766 inbound and 538 outbound).
- ANALYSIS:
  - The future road network operates well at full build out of Cypress Village with all the intersections operating at LOS C or better.
  - The interchange on-ramps operate at LOS D or better.
  - Further monitoring of the operation of the intersection of Chippendale Road/Cypress Bowl Road is recommended as pedestrian demand increases, with the consideration of a pedestrian signal.

10. Recommendation

The transportation impact of Cypress Village can be accommodated by the future transportation network upgrades proposed by BPP and no additional improvements are required.

Respectfully submitted,



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