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MEMORANDUM

DATE:	2025-01-15	RWDI Reference No.: 2508962
TO:	Dean Shwedyk	EMAIL: dean@hemswortharchitecture.com
FROM:	Keith Choi	EMAIL: Keith.Choi@rwdi.com
	Michel Parent, C.E.T.	EMAIL: Michel.Parent@rwdi.com
	Phil Tsui, P. Eng.	EMAIL: Philip.Tsui@rwdi.com
RE:	Environmental Noise Criteria Limits Review, Existing Conditions and Operation Suggestions Spearhead Expansion Nelson, BC.	

Dear Dean,

This memo provides an environmental noise review of the proposed Spearhead expansion to the existing facility at 4655 Highway 3A, Nelson, BC. The review consists of environmental noise criteria recommendations, an estimation of existing baseline sound levels at nearby receptors and preliminary mitigation advice for general design components for industrial facilities located adjacent to residential zones.

The Spearhead facility is in the Regional District of Central Kootenay (RDCK), northeast of the City of Nelson (CoN), BC. Both jurisdictions have enacted noise control bylaws, however, neither the RDCK bylaw No. 2440¹ nor the CoN bylaw No. 3201² have specific noise limits. The bylaws generally prohibit making noise that disturbs the public.

¹ Regional District of Central Kootenay (RDCK), (2015), Regional District of Central Kootenay Noise Control Bylaw No. 2440, 2015

² The Corporation of the City of Nelson (CoN), (2011), The Corporation of the City of Nelson Noise Control Bylaw No. 3201, 2011

STUDY AREA

The Spearhead facility is located north of Highway 3A, east of Nelson, BC, near the Kokanee Creek Provincial Park. The Spearhead expansion building is proposed for construction west of the existing buildings. Figure 1 shows the local study area including the Spearhead facility, expansion building approximate location and Highway 3A. The Canadian Pacific Railway Nelson Subdivision rail line is located across the West Arm of Kootenay Lake along the south shore, not shown in the figure below.



Figure 1: Local Study Area, Receptors and Spearhead Facility Location

Receptor locations evaluated are presented in Table 1. Receptors are selected based on proximity to the proposed expansion facility.

Table 1: Receptor Locations

Receptor ID	UTM Coordinates (NAD 83, Zone 10)	
	Easting (m)	Northing (m)
R01	490358	5494754
R02	490333	5494768
R03	490269	5494772
R04	490315	5494910
R05	490232	5494901
R06	490176	5494880
R07	490163	5494773
R08	490121	5494818



NOISE CRITERIA LIMITS REVIEW

The Spearhead facility expansion is within the RDCK which enacted bylaw No. 2440 that provides general prohibitions on causing unwanted sounds or noise that disturbs the public, however specific decibel limits are not defined. The nearby CoN has enacted bylaw No. 2440 that provides general regulations on undesirable sound emissions, however, that document also omits specific decibel limits for daytime and nighttime sound levels. The CoN bylaw No. 2440 does state that no person shall perform construction activities that disturb the comfort of persons between the nighttime hours 22:00 and 07:00 or on Sunday without written approval from the Director of Engineering and Operations.

RWDI has reviewed 26 local bylaws for various municipalities, townships, districts, and cities in the region for specific limits on noise. Of the bylaws reviewed in the region, only six have specific noise limits. A complete listing of the review bylaws is supplied in Attachment A, with the locations with specific sound level limits provided in Table 2 below:

Table 2: Summary of Regional Noise Bylaws with Specific Noise Level Limits

Location	Bylaw	Sound Level Limits (dBA)	
		Day	Night
District Of Coldstream	Noise Regulation Bylaw No. 1694, 2017	60	50
Regional District Of North Okanagan	Noise Regulation Bylaw No. 2581, 2013	60	50
Regional District Of Okanagan-Similkameen	Bylaw No. 2931, 2022	60	55
City Of Chilliwack	Community Standards Bylaw 2021, No. 5041	NA	65
City Of Abbotsford	Bylaw No. 2687-2017	60	55
The Corporation Of The Township Of Langley	Community Standards Bylaw 2019 No. 5448	55	45

Other community bylaws provide some guidance on acceptable sound level limits for various community zones. The Regional District of North Okanagan, a comparable district in terms of demographics and location within central BC, notes permitted sound levels from an Intermediate Zone (commercial) or Activity Zone (Industrial) to a Quiet Zone (Residential) of 60 dBA daytime (07:00 – 10:00), and 50 dBA nighttime (10:00-07:00). RWDI recommends these limits be applicable to properties within the RDCK for general guidance for the purpose of providing acoustical recommendations. It is RWDI's stance that limiting commercial or industrial facility noise contributions to neighbouring residential receptors to 60 dBA during the daytime and 50 dBA during the nighttime can reduce noise complaint concerns from the public. Other considerations such as allowable construction hours only between 07:00 and 22:00, except on Sundays, protects the public from unwanted sound.



EXISTING CONDITIONS

Existing conditions are defined as the existing ambient soundscape around the proposed Spearhead expansion site as shown in Attachment B. Sources of environmental sound from road traffic travelling along Highway 3A and distant rail freight train traffic on the Canadian Pacific Railway Nelson subdivision contribute to the existing conditions soundscape.

Traffic volumes for Highway 3A were obtained from the BC Ministry of Transportation (BC MoT) and Infrastructure website with the traffic reports presented in Attachment C. Traffic volumes for westbound traffic on Highway 3A adjacent to the Spearhead facility were obtained for the BC MoT site ID P-81-4 report³ that shows an Annual Average Traffic Data (AADT) volume of 1274 vehicles per day. The BC MoT site ID P-81-4 report does not present eastbound traffic; therefore, the eastbound traffic volumes were obtained from the BC MoT site ID P-31-3EW report⁴ that shows an AADT volume of 3162 vehicles overall with 45% of those vehicles travelling eastbound, resulting in 1423 vehicles per day. The eastbound AADT may be slightly elevated due to the eastbound turning volume from Harrop Access Road⁵.

For existing conditions modelling purposes the data was not grown for future volumes. Heavy vehicle percentages were assumed based on default model parameters for ordinary roads. Local roadway traffic volumes within the development area are not included in the model as their anticipated AADT is insignificant compared to the arterial roadway. Table 3 presents a summary of the road traffic data used for modelling.

Table 3: Road Traffic Volumes

Roadway	Segment	Current Traffic (AADT)	Speed Limit (km/hr)	% Heavy Vehicles	
				Daytime	Nighttime
Highway 3A	Westbound	1274	80	20	10
	Eastbound	1423 ¹	80	20	10

Notes: [1] Eastbound AADT may be slightly elevated due to additional eastbound turning volumes from Harrop Access Road. Turning volumes are not presented in the BC MoT Site ID P-31-2NS report in Attachment C.

³ BC MoT Site ID P-81-4 10-year Annual Summary for 2024, <https://prdoas6.pub-apps.th.gov.bc.ca/tig-public/Report.do?pdbSiteId=14235>

⁴ BC MoT Site ID P-31-3EW 10-year Annual Summary for 2024, <https://prdoas6.pub-apps.th.gov.bc.ca/tig-public/Report.do?pdbSiteId=14117>

⁵ BC MoT Site ID P-31-2NS 10-year Annual Summary for 2024, <https://prdoas6.pub-apps.th.gov.bc.ca/tig-public/Report.do?pdbSiteId=14172>

Rail traffic on the distant Canadian Pacific Railway (CPR) Nelson Subdivision may contribute to the existing ambient soundscape. Rail volume data was obtained from the Government of Canada open data website⁶ for grade crossing inventory that indicates the CPR Nelson Subdivision rail line is rated for two (2) trains per 24-hour period travelling at a speed of 20 miles per hour. The open data rail crossing summary is presented in Attachment D. The train composition was assumed based on RWDI's experience and typical model inputs in the absence of specific data from CPR. Table 4 presents a summary of the rail data used for modelling.

Table 4: Rail Traffic Volumes

Railway	Subdivision	Train Composition	Speed Limit (km/hr)	Train Pass-bys	
				Daytime	Nighttime
Canadian Pacific Railway	Nelson	2 Locomotives 65 Rail Cars	32 (20 mph)	1	1

Sound levels due to the adjacent road transportation sources were predicted using the RLS-90 standard (RLS,1990) as implemented in the Cadna/A software package. Rail traffic sources were predicted using the FTA/FRA calculation standards as implemented in the Cadna/A software package. Predicted sound levels are presented in Table 5.

Table 5: Transportation Model Predicted Sound Levels at Receptors

Receptor ID	Predicted Sound Level due to Current Traffic Volumes (dBA)		Receptor ID	Predicted Sound Level due to Current Traffic Volumes (dBA)	
	Daytime (07:00 to 22:00)	Nighttime (22:00 to 07:00)		Daytime (07:00 to 22:00)	Nighttime (22:00 to 07:00)
R01	61	50	R05	53	43
R02	64	54	R06	56	46
R03	62	52	R07	57	47
R04	52	42	R08	61	50

Based on the results from the environmental noise modelling, the predicted sound pressure levels at the receptors adjacent to the facility support the recommended 60 dBA daytime and 50 dBA nighttime criteria limits. Baseline monitoring may be beneficial to establish the actual sound levels at receptors.

⁶ Government of Canada open data website, <https://open.canada.ca/data/en/dataset/d0f54727-6c0b-4e5a-aa04-ea1463cf9f4c>



OPERATION SUGGESTIONS

Source contributions from commercial and industrial equipment may cause concern at neighbouring receptors and be the source of noise complaints. The following operational strategies considered at the planning and design stage may result in more cordial relations with public stakeholders and reduce or eliminate retrofit costs associated with addressing possible future complaints.

Operations and equipment have different predicted sound pressure levels at the receptors adjacent to the facility due to various factors (i.e., source sound power level, path of propagation, topography, source directivity, meteorological conditions, etc.). RWDI recommends considering the loudest sound source contributors that may have the greatest effect on neighboring receptors. RWDI does not have the proposed facility final design nor the proposed equipment sound power levels at this stage and is unsure of the actual equipment selection at the existing or expanded facility. The following list presents typical planning and design considerations for reduced sound levels at neighbouring receptors for wood fabrication facilities, based on our experience:

- Dust collector exhaust orientation; aiming exhaust source directivity away residential receptors. Installing silencers on dust collector exhaust outlets may also be effective.
- Enclosing dust collector air blower housing in an acoustical enclosure or installing an absorptive acoustic barrier very near the sources and of sufficient length and height to block the direct transmission path to the receptor. Effective sound barriers contain sufficient mass (i.e., 20 kg/m² minimum) to reduce the direct sound transmission path.
- Avoiding stockpiling materials along the property line adjacent to the receptor. The operation of a forklift with a back-up beeper can be a source of residence complaints.
- Loading and unloading materials can result in drop or impact noises. Schedule materials handling during daytime hours to minimize resident concerns.
- Buildings that do have operable doors should be closed during evening and nighttime shifts, when possible, to minimize sound contributions of these open-door sources during quieter nighttime hours.
- Select low-noise model heating ventilation and air conditioning (HVAC) equipment.

RWDI can recommend site specific sound source mitigation strategies (i.e., engineering solutions or administrative controls) upon receipt of final design sound equipment data.



Dean Shwedyk
Hemsworth Architecture
RWDI#2508962
January 15, 2025

CLOSING

We trust that this memo has provided you with all the information you require at this time. A review of the municipal noise criteria bylaws indicates that a design limit of 60 dBA during the daytime and 50 dBA during the nighttime is appropriate for this community. Site specific monitoring is recommended to confirm existing background noise levels. RWDI can provide further noise mitigation consulting upon request and receipt of final design data. Please do not hesitate to contact us should you have any questions.

Yours truly,

A handwritten signature in black ink, appearing to read 'Keith Choi'.

Keith Choi
Project Manager

A handwritten signature in black ink, appearing to read 'Michel Parent'.

Michel Parent, C.E.T
Senior Acoustical Consultant

A handwritten signature in black ink, appearing to read 'Phil Tsui'.

Phil Tsui, P.Eng,
Senior Acoustical Engineer

RWDI

January 15, 2025
Attach.



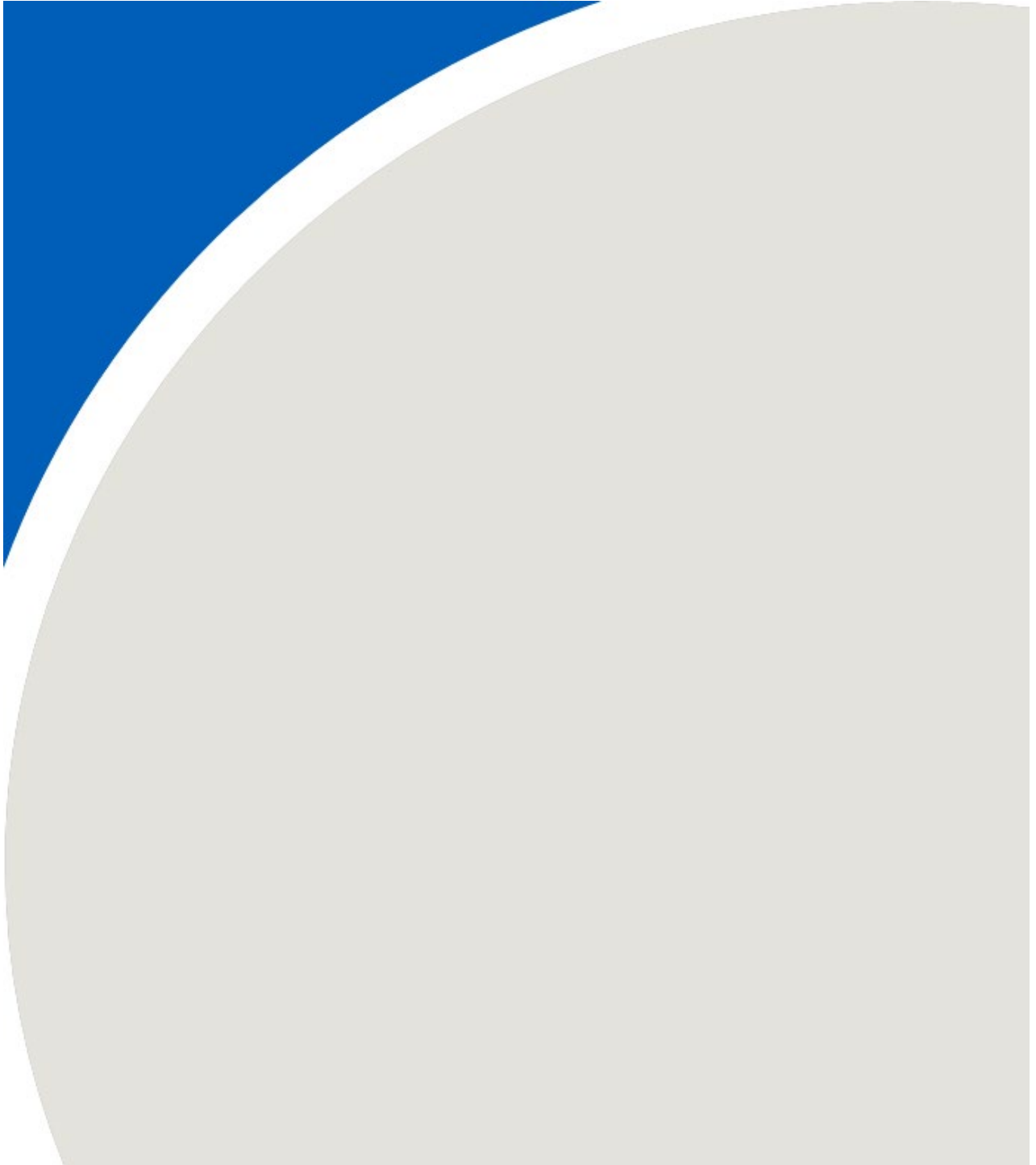
STATEMENT OF LIMITATIONS

This document entitled Environmental Noise Limits Review, Existing Conditions and Operation Suggestions was prepared by RWDI AIR Inc. ("RWDI") for Spearhead ("Client"). The results presented in this document have been conducted for the Client and are specific to the project described herein ("Project"). The results represent site conditions at the time the measurements were taken. Since equipment noise and vibration levels may change over time, it is recommended that RWDI be retained by the Client to verify applicability prior to relying on this data for another purpose.

The data contained in this document have also been presented for the specific purpose(s) set out herein. Should the Client or any other third party utilize the document and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this document carefully review the stated assumptions contained herein to understand the different factors which may impact the conclusions and recommendations provided.

APPENDIX A



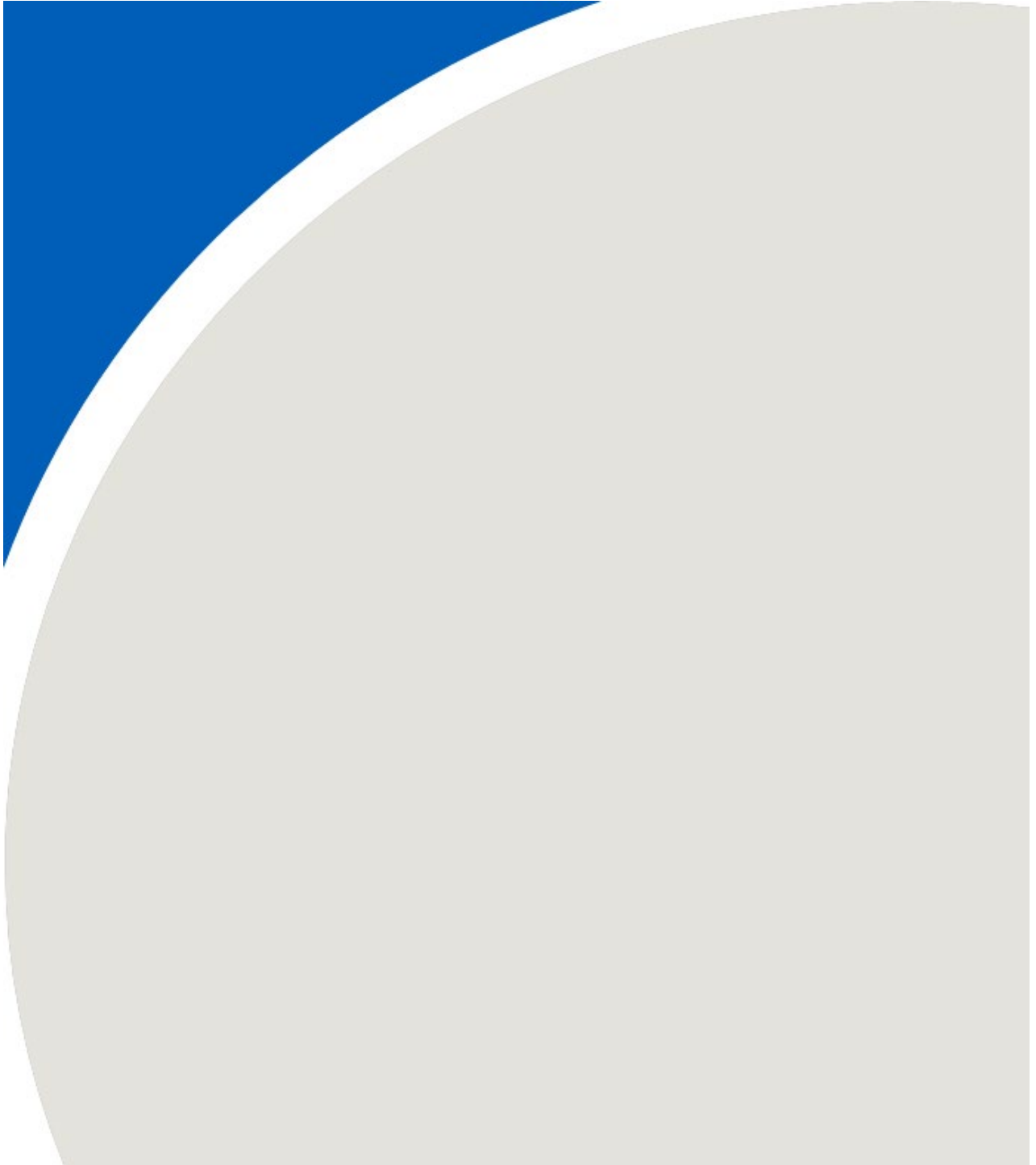
ATTACHMENT A: NOISE BYLAW REVIEW AND SUMMARY

Summary of Local Noise Bylaws

Location	BYLAW	Sound Level Limits (dBA)		
		Day	Night	Notes
Salmon Arm	Noise-Prevention-Bylaw-No-2037	No	No	No specific limits, subjective annoyance criteria.
The Corporation Of The District Of Sicamous	Good Neighbour Bylaw No. 1005, 2021	No	No	
City Of Vernon	GOOD NEIGHBOUR BYLAW 4980, 2005	No	No	
District Of Coldstream	Noise Regulation Bylaw No. 1694, 2017	60	50	From Activity Zone (Industrial) to Quiet Zone (Residential)
District Of Lake Country	Bylaw 857, 2013	No	No	No specific limits, subjective annoyance criteria.
Village Of Lumby	Good Neighbour Bylaw No. 838, 2020	No	No	
City Of Kelowna	BYLAW NO. 11500	No	No	
City Of West Kelowna	BYLAW NO. 0151	No	No	
City Of Kamloops	GOOD NEIGHBOUR BYLAW NO. 49-1	No	No	
District Of Logan Lake	Bylaw 721, 2012	No	No	
City Of Williams Lake	GOOD NEIGHBOUR BYLAW NO. 2194, 2014	No	No	
Columbia Shuswap Regional District	Bylaw No. 5754	No	No	
Thompson-Nicola Regional District	Bylaw No. 2480	No	No	
Regional District Of Central Okanagan	Bylaw No. 403	No	No	

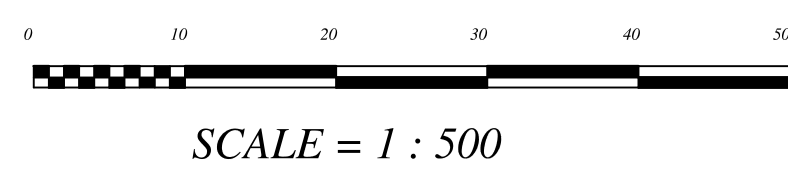
Location	BYLAW	Sound Level Limits (dBA)		
		Day	Night	Notes
Regional District Of North Okanagan	Noise Regulation Bylaw No. 2581, 2013	60	50	From Activity Zone (Industrial) to Quiet Zone (Residential)
Regional District Of Okanagan-Similkameen	BYLAW NO. 2931, 2022	60	55	
Fraser Valley Regional District	Bylaw No. 0841,2007	No	No	No specific limits, subjective annoyance criteria.
Regional District Of Kootenay Boundary	Bylaw No. 1431	No	No	
Regional District Of Central Kootenay	Noise Control Bylaw No. 2440, 2015	No	No	
City of Nelson	Noise Control Bylaw No. 3201, 2011	No	No	
Cariboo Regional District	Bylaw No. 4713	No	No	
Squamish-Lillooet Regional District	Bylaw No. 1724-2021	No	No	
City Of Chilliwack	Community Standards Bylaw 2021, No. 5041	No	65	Commercial/Industrial Noise Limit
City Of Abbotsford	Bylaw No. 2687-2017	60	55	From Activity Zone (Industrial) to Quiet Zone (Residential)
District Of Kent	Noise Regulation Bylaw No. 1320, 2005	no	no	
The Corporation Of The Township Of Langley	Community Standards Bylaw 2019 No. 5448	55	45	Specific to all Quiet Zones.

APPENDIX B



SITE PLAN AND ROAD PROFILES OF
PARCEL A (BEING A CONSOLIDATION OP LOTS 1 AND 2, SEE CA5564282),
LOT S, LOT 4 AND LOT 5, DISTRICT LOT 790
KOOTENAY DISTRICT PLAN NEP2449

B.C.G.S. 82F.065

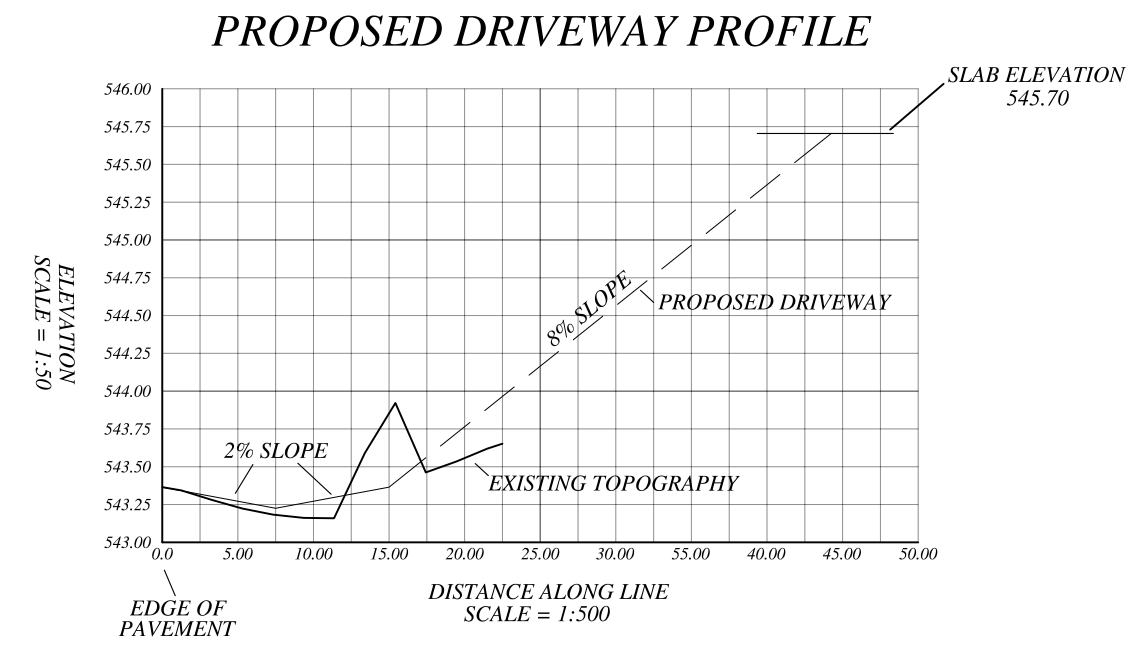
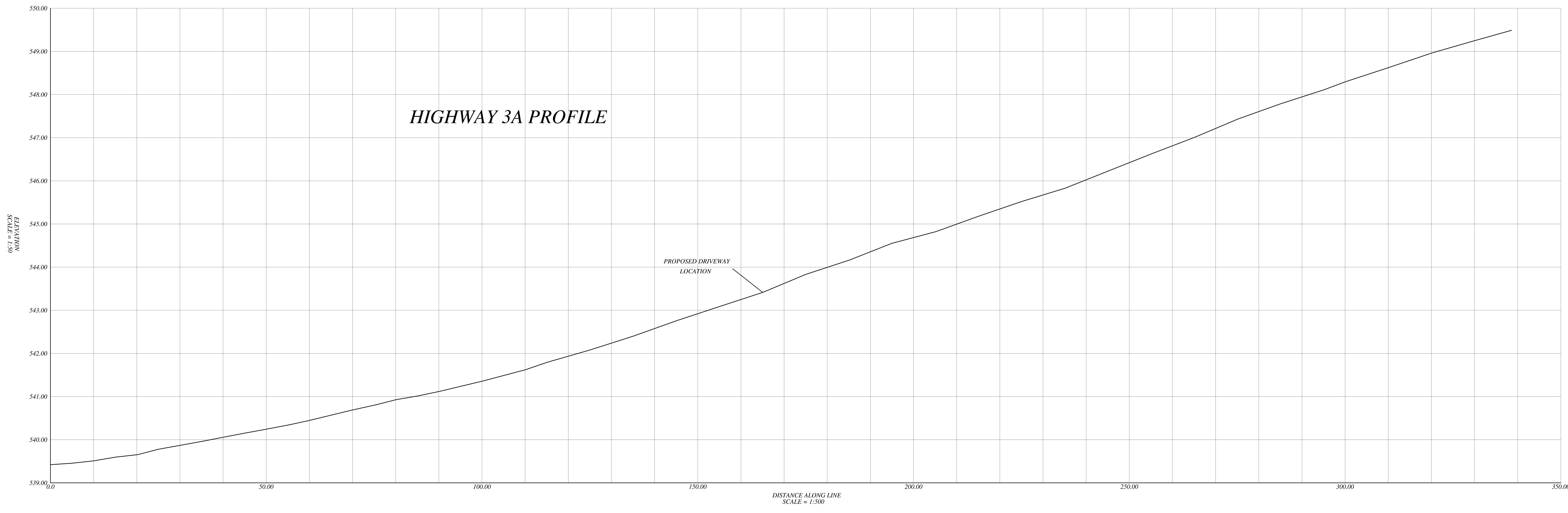
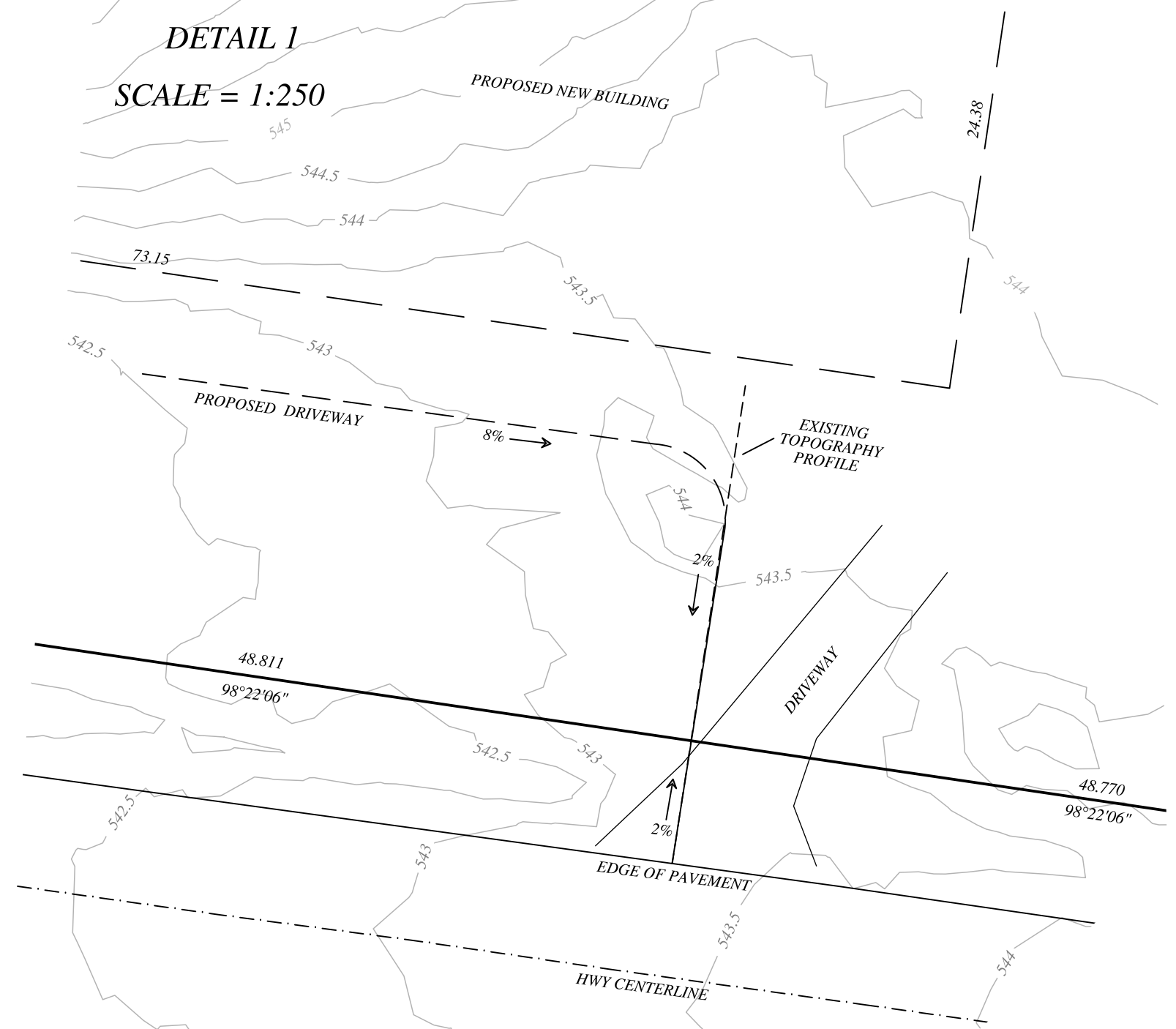


The intended plot size is 1118mm in width
and 864mm in height (E size at a scale of 1:500)

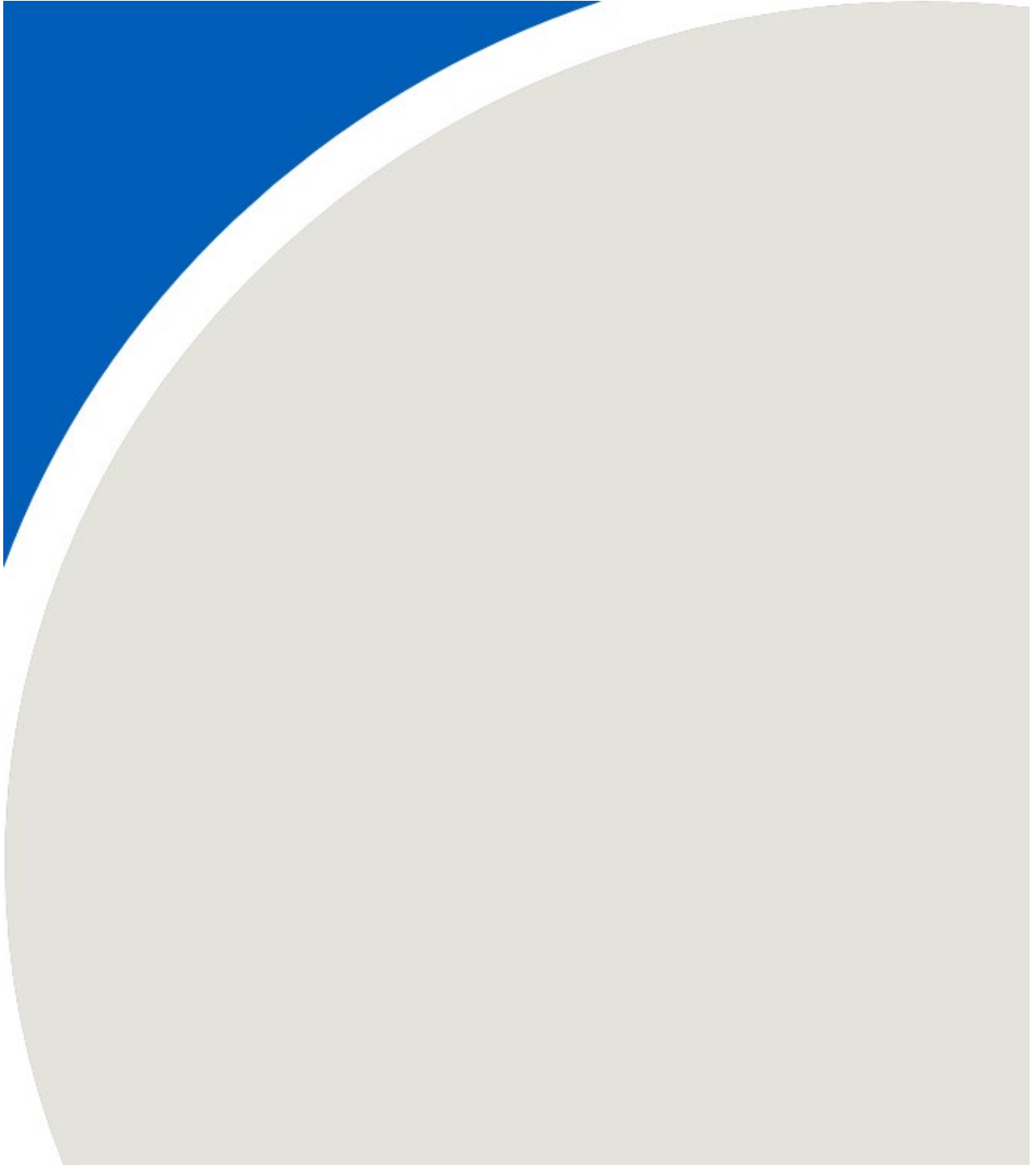
LEGEND

Grid bearings are derived from differential dual frequency
GNSS observations and are referred to the central meridian
UTM Zone 11.
Contours are 0.5m

- Denotes iron post found
- △ Denotes traverse hub placed
- ▲ Denotes traverse hub found



APPENDIX C



Traffic Data

10 Year Annual Summary for 2024

TM Site ID: **P-31-2NS**

TM Site Name: **Harrop - P-31-2NS, Harrop Access Road**

Location: Harrop Access Road, just south of Route 3A, east of Nelson

Posted Speed:

Report Run on: Tuesday January 14 2025 12:54 PM

AADT

SADT

Traffic Data in this report

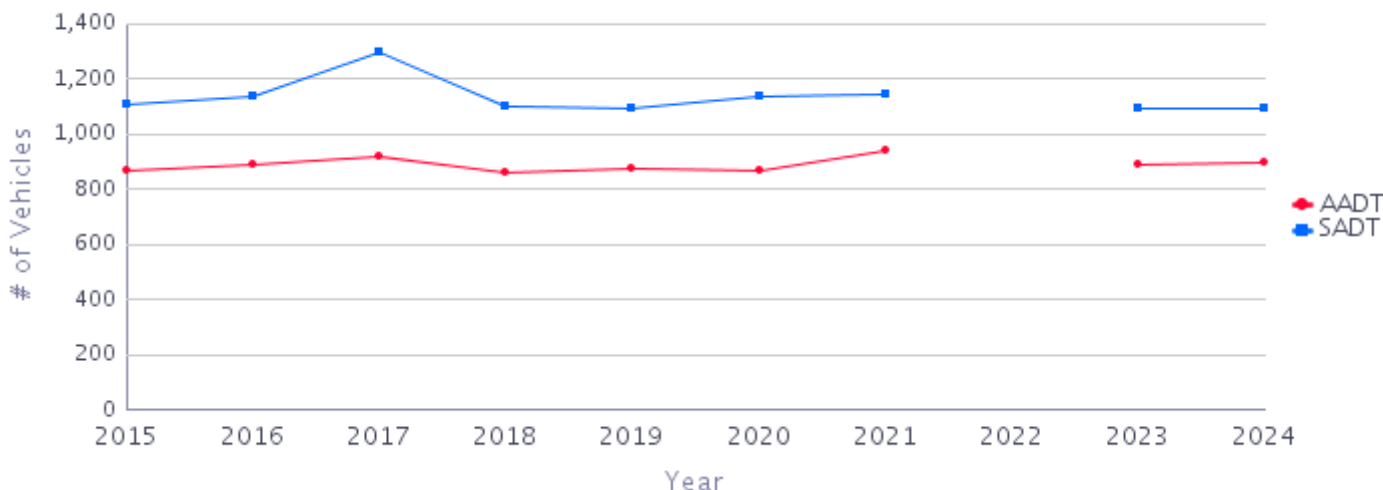
Annual Average Daily Traffic
A calculated daily estimate of the number of vehicles passing this site.

Summer Average Daily Traffic
(for the months of July and August)

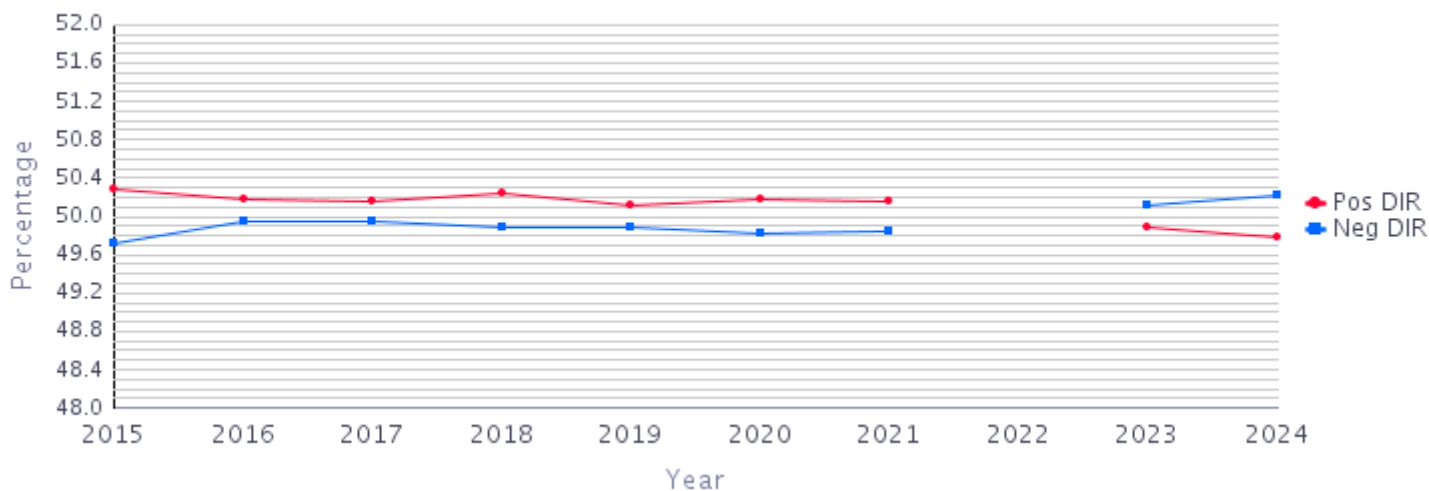
Average Daily Traffic Volumes

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AADT	871	889	919	860	874	869	941		890	898
SADT	1,107	1,136	1,297	1,097	1,095	1,135	1,143		1,095	1,093

10 Year Annual Statistics



10 Years % AADT by Direction



Traffic Data

10 Year Annual Summary for 2024

TM Site ID: **P-31-2NS**

TM Site Name: **Harrop - P-31-2NS, Harrop Access Road**

Location: Harrop Access Road, just south of Route 3A, east of Nelson

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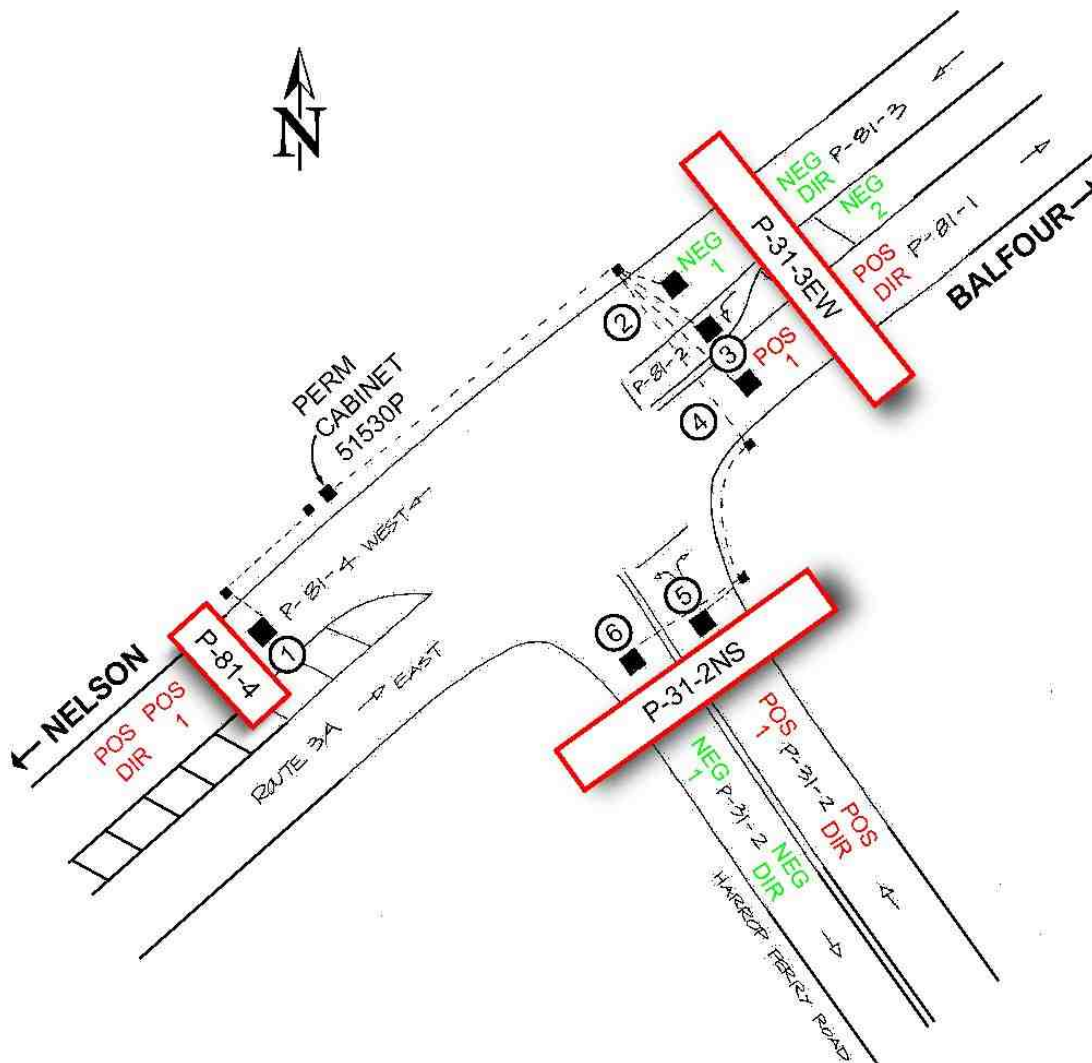
Disclaimer information and the most current traffic data may be found at: <http://www.th.gov.bc.ca/trafficData>

Traffic Data

10 Year Annual Summary for 2024

TM Site:	Description:
P-31-3EW	ROUTE 3A, JUNCTION WITH HARROP FERRY ROAD JUST EAST OF NELSON
P-31-2NS	HARROP FERRY ROAD, JUNCTION WITH ROUTE 3A JUST EAST OF NELSON
P-81-4	ROUTE 3A, JUNCTION WITH HARROP FERRY ROAD JUST EAST OF NELSON

Station: 51530P Name: HARROP JUNCTION Survey: 5153	▲ - Short Count Post ■ - Loops ■ - Cabinet ■ - Junction Box	□ - TRADAS Traffic Measurement Site ① - Channels A - Detectors	PHOTOLOG YEAR: - HIGHWAY: - IMAGE NUMBER: - SHOWS LOOPS: - ☐ YES ☒ NO
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NOT TO SCALE

Highway Planning Branch
TRANHighway.Planning@gov.bc.ca

Revised Date: February / 2005
Version 3-A

Traffic Data

10 Year Annual Summary for 2024

TM Site ID: **P-31-3EW**

TM Site Name: **Harrop - P-31-3EW, Castlegar - Nelson Creston**

Location: **Route 3A, at Harrop Access Road, east of Nelson**

Posted Speed:

Report Run on: **Tuesday January 14 2025 11:25 AM**

AADT

SADT

Traffic Data in this report

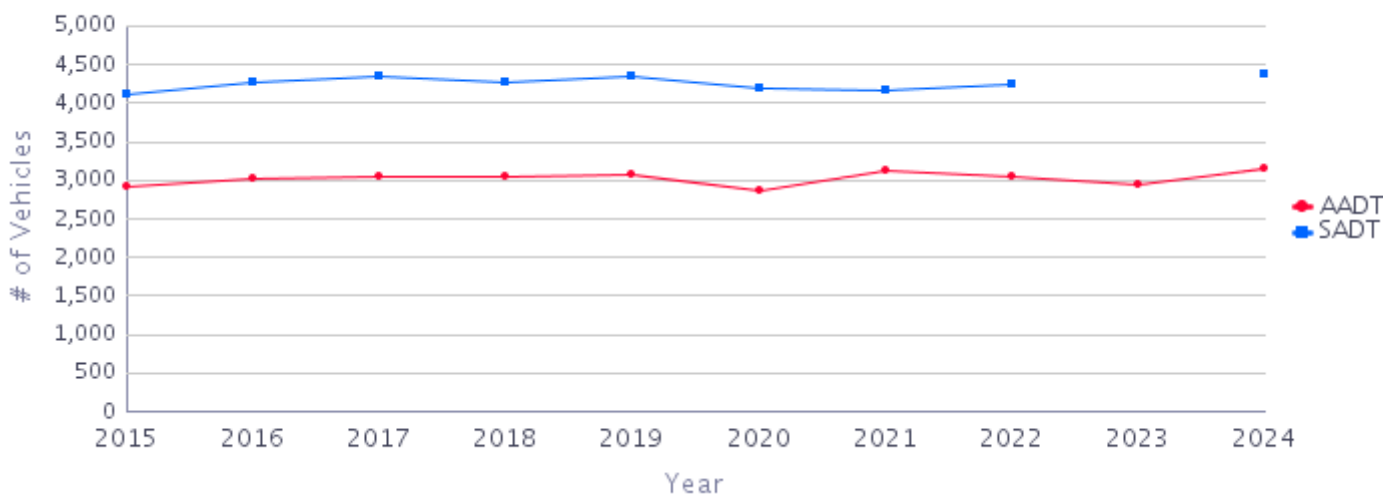
Annual Average Daily Traffic
A calculated daily estimate of the number of vehicles passing this site.

Summer Average Daily Traffic
(for the months of July and August)

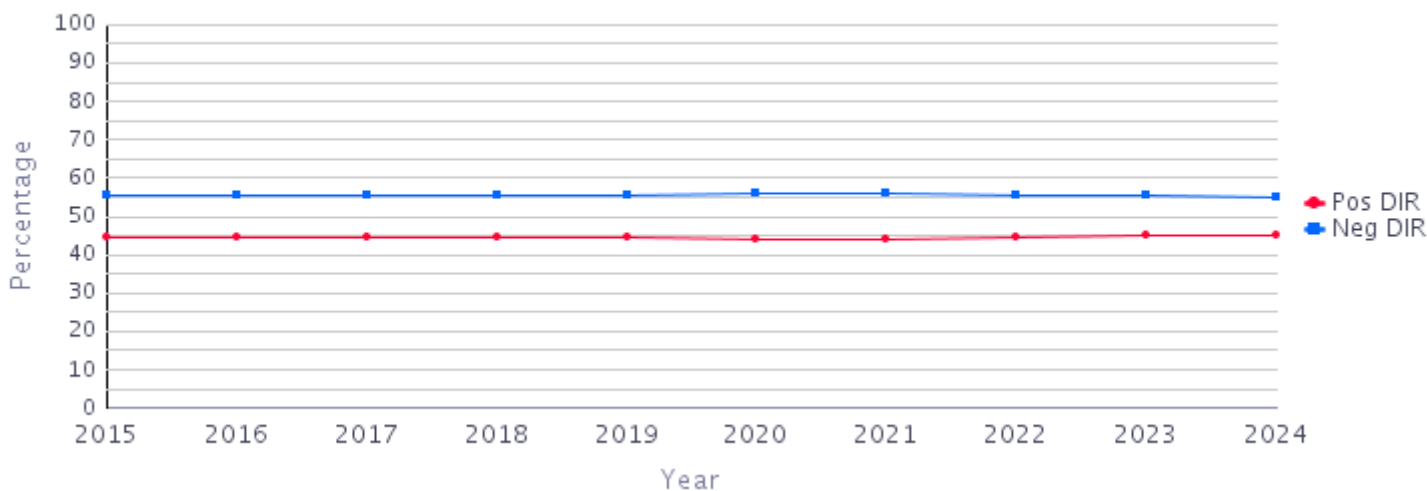
Average Daily Traffic Volumes

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AADT	2,919	3,018	3,053	3,036	3,078	2,852	3,118	3,040	2,954	3,162
SADT	4,114	4,269	4,353	4,262	4,347	4,195	4,158	4,231		4,363

10 Year Annual Statistics



10 Years % AADT by Direction



Traffic Data

10 Year Annual Summary for 2024

TM Site ID: **P-31-3EW**

TM Site Name: **Harrop - P-31-3EW, Castlegar - Nelson Creston**

Location: Route 3A, at Harrop Access Road, east of Nelson

Posted Speed:

Report Run on: Tuesday January 14 2025 11:25 AM

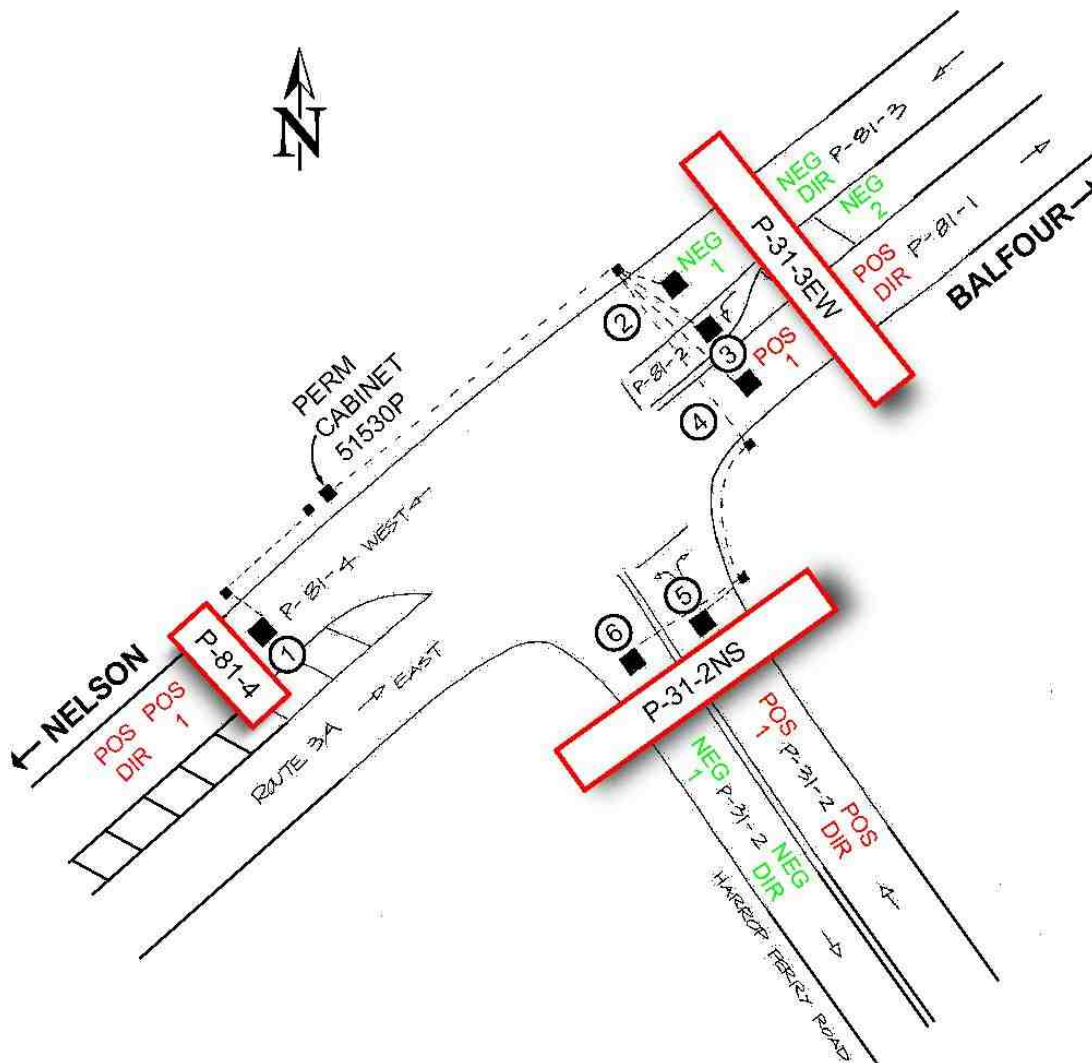
Disclaimer information and the most current traffic data may be found at: <http://www.th.gov.bc.ca/trafficData>

Traffic Data

10 Year Annual Summary for 2024

TM Site:	Description:
P-31-3EW	ROUTE 3A, JUNCTION WITH HARROP FERRY ROAD JUST EAST OF NELSON
P-31-2NS	HARROP FERRY ROAD, JUNCTION WITH ROUTE 3A JUST EAST OF NELSON
P-81-4	ROUTE 3A, JUNCTION WITH HARROP FERRY ROAD JUST EAST OF NELSON

Station: 51530P Name: HARROP JUNCTION Survey: 5153	▲ - Short Count Post ■ - Loops ■ - Cabinet ■ - Junction Box	□ - TRADAS Traffic Measurement Site ① - Channels A - Detectors	PHOTOLOG YEAR: - HIGHWAY: - IMAGE NUMBER: - SHOWS LOOPS: - ☐ YES ☒ NO
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TRANHighway.Planning@gov.bc.ca

Revised Date: February / 2005
Version 3-A

Traffic Data

10 Year Annual Summary for 2024

TM Site ID: **P-81-4**

TM Site Name: **Harrop - P-81-4, Keremeos - Kaleden Junction**

Location: Route 3A, Wb, just west of Harrop Access Road, east of Nelson

Posted Speed:

Report Run on: Tuesday January 14 2025 11:25 AM

AADT

SADT

Traffic Data in this report

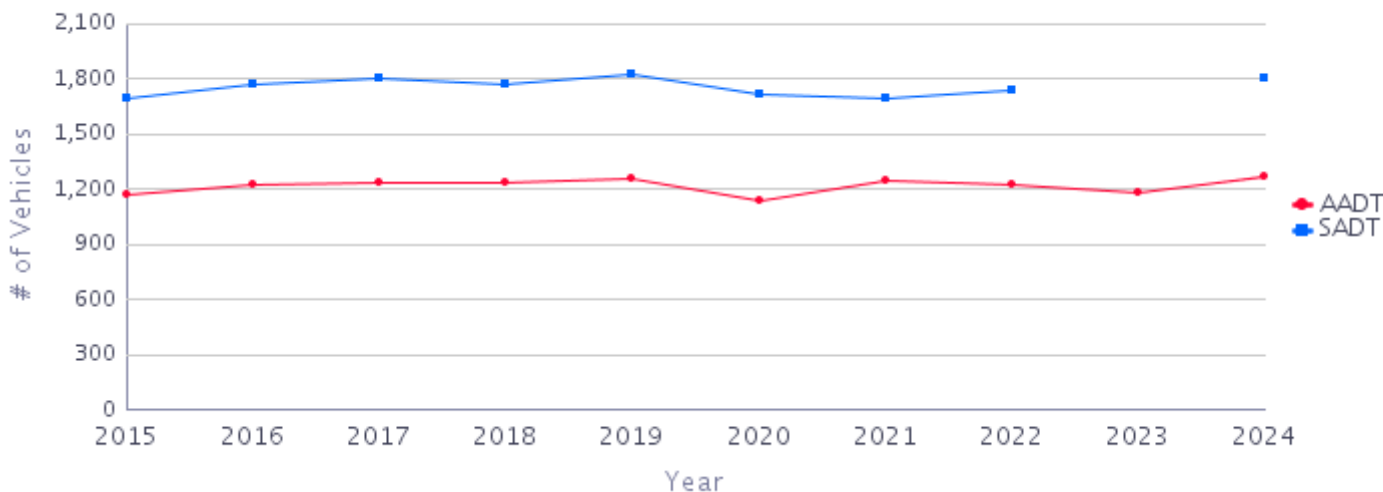
Annual Average Daily Traffic
A calculated daily estimate of the number of vehicles passing this site.

Summer Average Daily Traffic
(for the months of July and August)

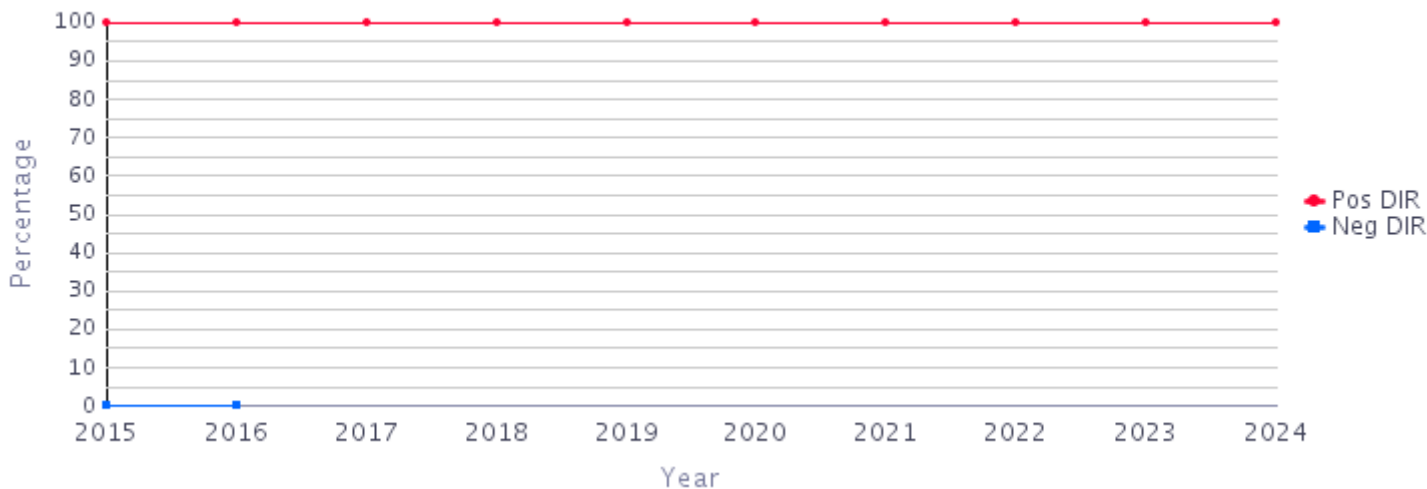
Average Daily Traffic Volumes

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AADT	1,173	1,223	1,238	1,235	1,257	1,137	1,242	1,227	1,185	1,274
SADT	1,692	1,772	1,804	1,775	1,825	1,718	1,697	1,739		1,805

10 Year Annual Statistics



10 Years % AADT by Direction



Traffic Data

10 Year Annual Summary for 2024

TM Site ID: **P-81-4**

TM Site Name: **Harrop - P-81-4, Keremeos - Kaleden Junction**

Location: Route 3A, Wb, just west of Harrop Access Road, east of Nelson

Posted Speed:

Report Run on: Tuesday January 14 2025 11:25 AM

Disclaimer information and the most current traffic data may be found at: <http://www.th.gov.bc.ca/trafficData>

Traffic Data

10 Year Annual Summary for 2024

TM Site: Description:

P-31-3EW
P-31-2NS
P-81-4

ROUTE 3A, JUNCTION WITH HARROP FERRY ROAD JUST EAST OF NELSON
HARROP FERRY ROAD, JUNCTION WITH ROUTE 3A JUST EAST OF NELSON
ROUTE 3A, JUNCTION WITH HARROP FERRY ROAD JUST EAST OF NELSON

Station: 51530P

Name: HARROP JUNCTION

Survey: 5153

▲ - Short Count Post

■ - Loops

■ - Cabinet

■ - Junction Box

□ - TRADAS Traffic Measurement Site

① - Channels

A - Detectors

PHOTOLOG

YEAR: -

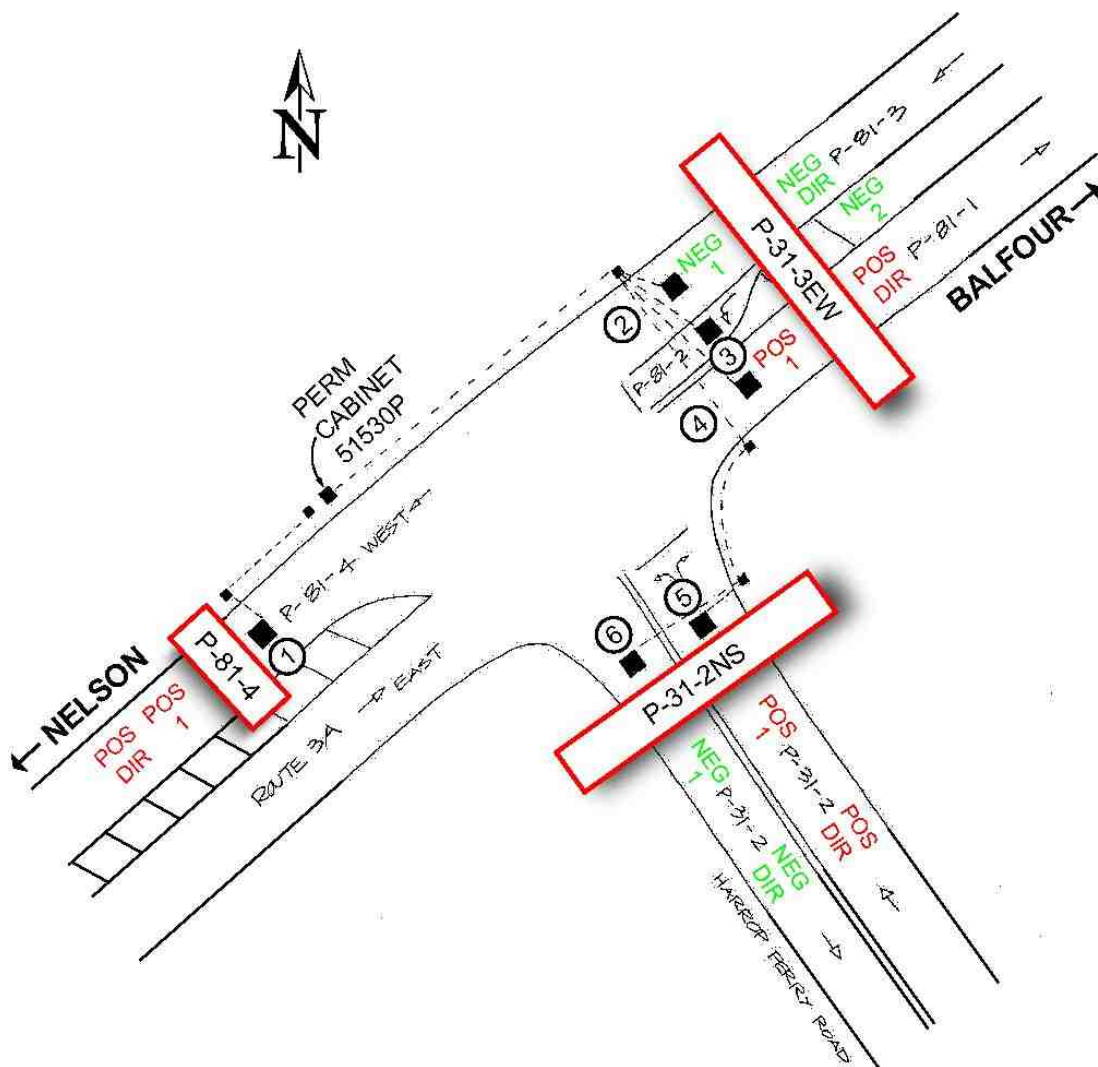
HIGHWAY: -

IMAGE NUMBER: -

SHOWS LOOPS: -

☐ YES

☒ NO

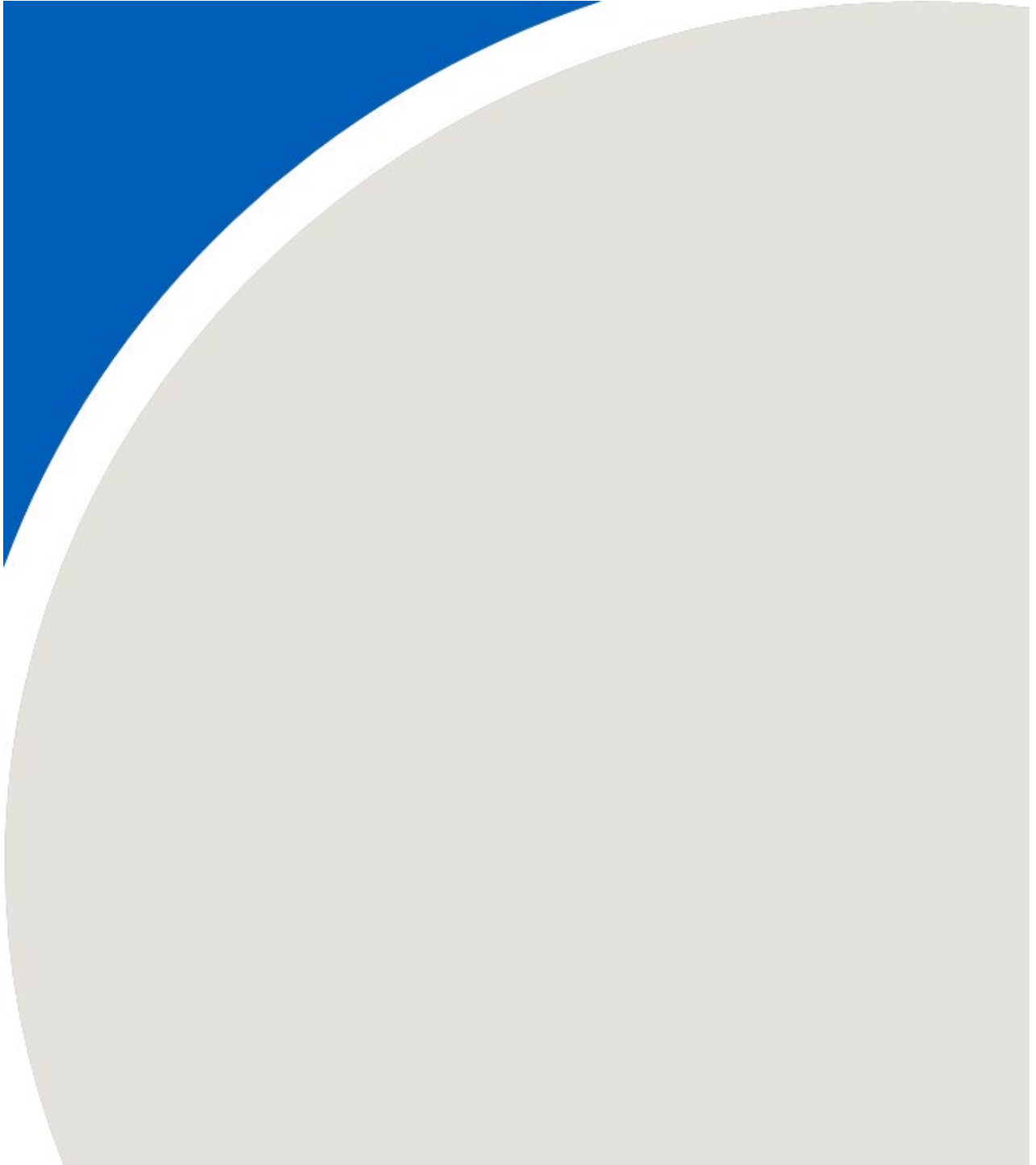


NOT TO SCALE

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TRANHighway.Planning@gov.bc.ca

Revised Date: February / 2005
Version 3-A

APPENDIX D



Spur Name	Location	Latitude	Longitude	Road Authority	Protection	Accidents	Fatality	Injury	Trains Daily	Vehicles Daily	Train Max Speed (mph)	Road Speed (km/h)	Lanes	Tracks	IsUrban
-	Harrop Procter Rd	49.60554	-117.0539	British Columbia Highways	Active - FLB	0	0	0	2	504	20	50	2	1	N

Source: <https://open.canada.ca/data/en/dataset/d0f54727-6c0b-4e5a-aa04-ea1463cf9f4c>