1051 Vancouver Street, Victoria BC V8V 3K3, T: 250.361.3230 F: 604.629.2698

To:	**City of Courtenay**	Date:	**April 26, 2024**
Attention:	**Sofia Senin, C. Tech, CAPM**	Project No.:	**33727**
Reference:	**Ryan Road Transportation Improvements – Conceptual Design Report**		
From:	**Khal Joyce, EIT & Ian McKinnon, P.Eng.**		

1.0 Introduction

The City of Courtenay (the City) has retained ISL Engineering and Land Services Ltd. (ISL) to provide engineering services related to the conceptual design of active transportation and transit improvements on Ryan Road between Old Island Highway and Back Road. The project aims to enhance the safety and comfort of pedestrians, cyclists, and transit users along the corridor, as well as improve the efficiency and reliability of transit service. The project also considers the future needs and growth of the corridor, as well as the impacts and opportunities for adjacent land uses and developments.

This report presents two concept designs for the corridor: a short-term design and a long-term design. The short-term design proposes the installation of a sidewalk and raised (protected) bike lane on Ryan Road between Back Road and Sandwick Road to fill the existing infrastructure gap. The long-term design proposes a comprehensive corridor revitalization and includes dedicated bus lanes, protected bike lanes, continuous sidewalks, and protected intersections. The design options were developed based on the review of previous studies and planning documents, the BC Active Transportation Design Guide (BCATDG), Ministry of Transportation and Infrastructure (MoTI) standards, and industry best practices.

2.0 Background

2.1 Existing Conditions

Ryan Road is a major arterial road that connects the east and west sides of Courtenay and provides access to several commercial, residential, and institutional destinations. The corridor spans about 900 m and has four signalized intersections, located at Old Island Highway, N Island Highway, Sandwick Road, and Back Road. The roadway between curb lines is under the jurisdiction of MoTI, while all roadway outside of the curb lines is under the jurisdiction of the City. This is with the exception of Ryan Road at Old Island Highway, which is completely under the jurisdiction of the City.

The existing cross-section of Ryan Road consists of two through lanes in each direction, separated in some locations by a raised center median. The lane widths vary, ranging from 3.8 to 4.6 m with a posted speed limit of 50 km/h. There are left-turn lanes at all intersections, including a dual left-turn lane at the intersection of Ryan Road and N Island Highway (westbound). All four intersections include slip lanes for right-turn movements, which reduce the corner radius and increase the vehicle turning speeds. The slip lanes also create longer and less comfortable crossings for pedestrians and cyclists.

There are limited bicycle facilities on Ryan Road. Cyclists either need to share the road with vehicles or use the painted bicycle lanes or paved shoulders, which are not continuous or consistent in width. There are painted/buffered bike lanes on Back Road, south of the intersection with Ryan Road; however, they do not connect to any bike facilities north of the intersection.

There are sidewalks on both sides of Ryan Road, except for the north side between Sandwick Road and Back Road, where there is a gap of about 400 m. Pedestrians must walk on the shoulder or cross the road to access the south sidewalk. There are several commercial accesses along the corridor, especially on the south side, which create potential conflicts and disruptions for pedestrians.

There are multiple transit routes that operate on Ryan Road, with a total of four transit stops along the corridor (two in each direction). The transit stops are located on the shoulder or are partially in the travel lanes. The transit stop on the north side of Ryan Road between Sandwick Road and Back Road is not accessible by sidewalk and can only be reached by walking on the shoulder.

The traffic volumes on Ryan Road are high, especially during peak hours. The corridor also experiences significant congestion and delays, particularly at the intersections with Old Island Highway and N Island Highway. Intersections along the corridor are also identified as being in the top 10 collision locations in the region, according to the City's Transportation Master Plan (2019).

2.2 Previous Work

Several studies and projects have been conducted to address the issues and opportunities on Ryan Road. The following is a summary of the relevant previous work that has been reviewed and utilized by ISL as part of this assignment.

MoTI's Ryan Road Improvements Memo (2023)

This memo outlined the objectives and potential scope for a Ryan Road active modes improvement project, based on the findings of a corridor assessment and a stakeholder workshop. The memo identified the key issues and opportunities on the corridor, such as the lack of bicycle facilities, the gap in the north sidewalk, the safety concerns at the slip lanes, the transit delays and reliability, and the future growth and development potential. The memo also proposed some preliminary design concepts and recommendations, such as dedicated bus lanes, transit queue jumps, multi-use paths, slip lane closures, and protected intersections.

Associated Engineering's (AE) Technical Memorandum (2020)

This memo presented two options for a new sidewalk on the north side of Ryan Road between Sandwick Road and Back Road to fill the existing gap and improve pedestrian connectivity and accessibility. The minimized design proposed a 2.0 m wide concrete sidewalk along the existing shoulder of the roadway, complete with MoTI curb and gutter. The maximized design included a 2.0 m bike lane and buffer zone along with the 2.0 m sidewalk proposed in the minimized option. Both design options considered the relocation of the bus stop near Sandwick Road, the relocation of existing streetlights, as well as the drainage factors.

City of Courtenay's Cycling Network Plan (2019)

This plan provided a vision and a framework for developing a safe, comfortable, and connected cycling network in Courtenay for the next 5-20+ years. The plan was guided by the Official Community Plan (OCP) and the Regional Growth Strategy (RGS), and aligned with the BC Active Transportation Design Guide. The plan developed a long-term cycling network which focused on a spine network that builds on recent improvements and connects to key destinations. Specific to the Ryan Road corridor, the plan recommended improving crossing conditions for connecting bike lanes on Back Road by utilizing a protected intersection design.

The Cycling Network Plan was updated in June 2023 and included revised locations for cycling network improvements on both a 5-year and long-term timeline. The revised report also included updated cross-sections. This updated Cycling Network Plan formed the basis of our recommended designs.

Urban Systems Transit Infrastructure Study (2021)

This study assessed the existing and future transit infrastructure needs and opportunities in Courtenay, Comox, and Cumberland, in coordination with BC Transit and the Comox Valley Regional District (CVRD). The study identified several transit priority measures and infrastructure improvements to enhance the transit service quality and reliability, as well as the transit user experience and accessibility. For the Ryan Road corridor, the study suggested interim queue jump lane improvements at Old Island Highway, where a westbound queue jump lane would allow buses to bypass queued left-turn vehicles. A long-term improvement would be to consider dedicated transit lanes.

PBX Engineering's Traffic and Lighting Installation Design (2023)

This project involved the design and installation of new traffic signals and street lighting at the Ryan Road/Back Road intersection, as well as the upgrade of the existing traffic signals and street lighting at the Ryan Road/Sandwick Road intersection. As part of this project, bike boxes were added for westbound left-turn and through cyclists at the Ryan Road/Back Road intersection. The project also included new signage and detection systems.

3.0 Conceptual Options

3.1 Overview

Based on the review of the previous work and the current conditions on the corridor, ISL has developed two design options for the active transportation and transit improvements on Ryan Road: a short-term design and a long-term design. The short-term design aims to provide some immediate and low-cost improvements that can enhance the safety and comfort of pedestrians, cyclists, and transit users, as well as support the City's goals. The long-term design envisions a full build-out scenario that can accommodate future growth and demand on the corridor, as well as provide a high-quality active transportation and transit network that follows best practices and standards.

The design options were developed using the City-provided cadastral mapping and orthophotos, as well as the BC Active Transportation Design Guide, MoTI standards and other relevant documents and guidelines. Concept drawings for each design option are attached in Appendix A.

3.2 Short-Term Design

The short-term design was developed with the goal of filling the gap in existing sidewalk infrastructure, while considering the alignment for continuity with the future long-term designs. It proposes a 1.8 m protected bike lane adjacent to a 2.0 m sidewalk, following the City's "Arterial Road Section B" guidelines, with a 0.7 m utility strip as a buffer. A floating bus stop will be integrated for transit users' convenience, while ensuring that the stop is accessible for those with visual impairments, based on the latest guidance from the BCATDG and other relevant sources.

Benefits

- Enhanced safety for pedestrians and cyclists
- Improved connectivity for transit users
- Aligns with future option to install dedicated bus lanes, protected bike lanes along the rest of the corridor
- Does not require reconfiguration of travel lanes

Considerations

- Cycling connectivity remains limited and unbalanced with the rest of the corridor

- Requires ditch infilling and installation of a new drainage system along the new sidewalk and bike lane
- Existing gas main appears to run directly below the proposed sidewalk and bike lane and may require adjustment or relocation. The City should confirm the location of the main during detailed design.
- Multiple existing light poles located along the section are in conflict and may require adjustment or relocation.
- Possible need for retaining wall or additional right-of-way between 800 Ryan Road and Back Road on the north side to accommodate cut slopes.
- Proposed development frontage at 925 Braidwood Road does not align and will need to be adjusted.

A possible alternative to this design could include the substitution of the sidewalk and bike lane for a multi-use path. Some of the benefits and considerations of this option are described below.

- Allows for bi-directional travel for people biking between Back Road and Sandwick Road, particularly during the time when only the short-term design has been constructed.
- Improves connectivity while maintaining the same footprint as future full reconstruction alignments.
- May require some modifications once the long-term design is implemented to maintain consistency with the rest of the corridor.

While the multi-use path option is beneficial in the short-term, we understand that the City would prefer to not make any modifications to the infrastructure once the long-term design has been constructed. Based on this preference, ISL recommends the short-term design as described above, which includes a uni-directional protected bike lane and sidewalk.

3.3 Long-Term Design

The long-term design proposes a comprehensive and sustainable transportation corridor that prioritizes safety, accessibility, and efficiency for all users. This vision integrates key elements such as protected bike lanes, sidewalks, and dedicated bus lanes. The long-term design was developed based on the guiding background information, particularly the updated Cycling Network Plan and the 2021 Transit Infrastructure Study. The cross section for the corridor is based on a modification to the City's "Arterial Road Section B" guidelines, which includes the addition of dedicated bus lanes.

Key Elements

- **1.8 m Protected Bike Lanes:** Dedicated lanes adjacent to the sidewalk provide a safe and separated space for cyclists, promoting active transportation and reducing the risk of conflicts with vehicles.
- **2.0 m Sidewalks:** Wide sidewalks enhance pedestrian accessibility and comfort, fostering a pedestrian-friendly environment along the corridor.
- **0.7 m Utility Strips:** Buffer zones between the bike and vehicular lanes enhance safety and provide space for utilities and possible landscaping.
- **3.3 m Travel Lanes:** Opportunity to reduce the width of the existing oversized travel lanes to a modern standard of 3.3 m. This extra space can be used to accommodate dedicated bus lanes with limited right-of-way acquisition. This width of travel lane may require additional coordination with MoTI, discussed further below in the ‘considerations’ section.
- **3.6 m Dedicated Bus Lanes:** Dedicated bus lanes prioritize public transit, improving reliability and efficiency for transit users while reducing vehicle congestion. 3.3 m (measured to face of curb) is considered to be a sufficient lane width for dedicated bus lanes based on BC Transit’s Infrastructure Guidelines; however, 3.6 m was selected based on MoTI’s requirement to measure lane width to edge of pavement for curb lanes.
- **Protected Intersections:** All intersections along Ryan Road will be redesigned with protected features, including closure of slip lanes, offsetting the bike lanes with physical protection, as well as reduced crossing distances.

- **Driveway Consolidation and Continuous Sidewalks:** Driveways along the corridor will be consolidated to minimize interruptions to pedestrian and cyclist pathways, improving overall safety and efficiency. At all existing driveways, the sidewalk will be extended through to create a continuous pedestrian pathway, enhancing connectivity and accessibility along the corridor, and reinforcing the modal hierarchy.
- **Floating Bus Stops:** All four bus stops along the corridor will be upgraded and integrated with the new bike facilities and sidewalk to ensure safety and accessibility for all users. Bus stops will be designed in accordance with the latest guidance from the BCATDG and may include the use of rapid rectangular flashing beacons (RRFBs).

Benefits

- Protected bike lanes, dedicated bus lanes, and intersection improvements enhance safety for all road users, reducing the risk of conflicts.
- Widened sidewalks and continuous pathways improve accessibility for pedestrians, cyclists, and transit users.
- Investments in safe infrastructure for vulnerable modes encourages more people to travel using modes other than a personal vehicle, one of the City's stated goals.

Considerations

- Implementing these corridor enhancements will require significant capital expenditures. The City could consider engaging MoTI or other organizations that may be able to provide some cost sharing through grants or other means.
- Significant engagement with MoTI may be required in order to implement 3.3 m lanes along the corridor. While lanes of this width are considered by professionals in this industry to be the safest, MoTI standards may require additional analysis of turning movements or other factors before they will be accepted for use on their right-of-way.
- The curb alignments shown on the provided drawings are conceptual only and are not based on topographic survey data. Some locations show civil works extending beyond the property lines. The extent of these encroachments will need to be confirmed and considered by the City during the detailed design process, as land may need to be acquired.
- Closure of slip lanes and reconfiguration of the intersections will require replacement of traffic signal infrastructure. This investment can also be paired with improvements that could allow for transit and emergency vehicle signal priority.
- In general, there are multiple utilities along the project alignment that may need to be relocated to facilitate the road upgrades. During this road upgrade project, there may also be opportunities for underground asset renewal. The condition of all underground infrastructure in the area should be assessed as part of the detailed design to determine if replacement is necessary.

This design was developed based on the provided background information, previous studies, and planning documents. However, there are other options that could be considered by the City that may involve additional challenges. In particular, maintaining lane widths greater than 3.5 m, along with centre medians, while technically feasible, may require significantly more right-of-way, along with the challenges associated with road widening of this scale, such as property acquisition and construction costs.

4.0 Cost Estimate

Summaries of the Class D construction cost estimates for both designs are presented below (2024 dollars). A detailed breakdown for each design option is attached following this report. This cost estimate is conceptual and was established based on both historical costs and project experience. Further refinement and accuracy will require the completion of a topographic survey and further detailed design.

Short-Term Design

Item	Subtotal
General Requirements	$110,000
Roadworks	$1,063,500
Electrical	$135,000
Subtotal	$1,318,500
Contingency (40%)	$527,400
Engineering and Professional Services Allowance (10%)	$131,850
Total	**$1,977,750**

Long-Term Design

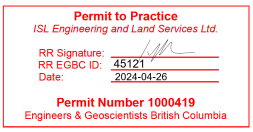
Item	Subtotal
General Requirements	$400,000
Roadworks	$4,327,500
Electrical	$1,700,000
Subtotal	$6,567,500
Contingency (40%)	$2,627,000
Engineering and Professional Services Allowance (10%)	$656,750
Total	**$9,851,250**

5.0 Closure

We trust this memorandum meets the City's current requirements. Please contact the undersigned at your earliest convenience should there be any additional clarification or discussion of next steps required.

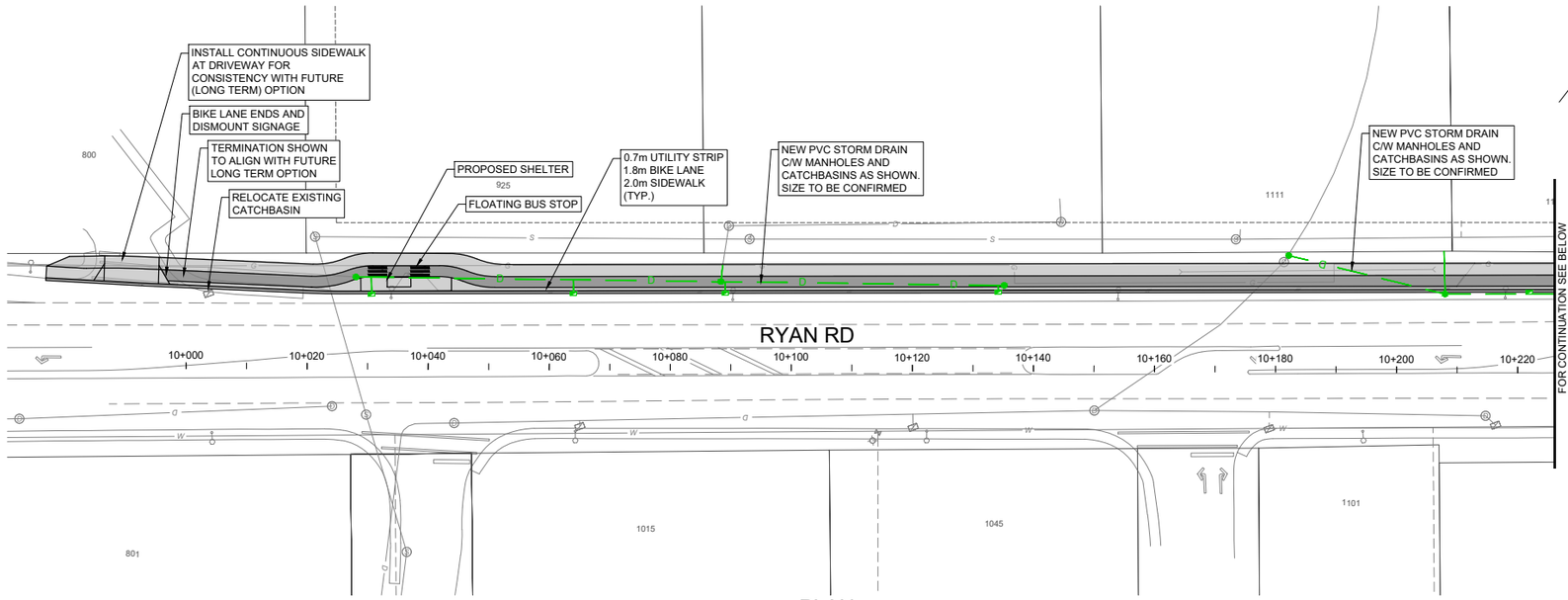
Sincerely,
ISL Engineering and Land Services Ltd.

Khal Joyce, EIT
Project Engineer



Ian McKinnon, P.Eng.
Engineer of Record

Attachments
Concept Design Drawings
Cost Breakdown



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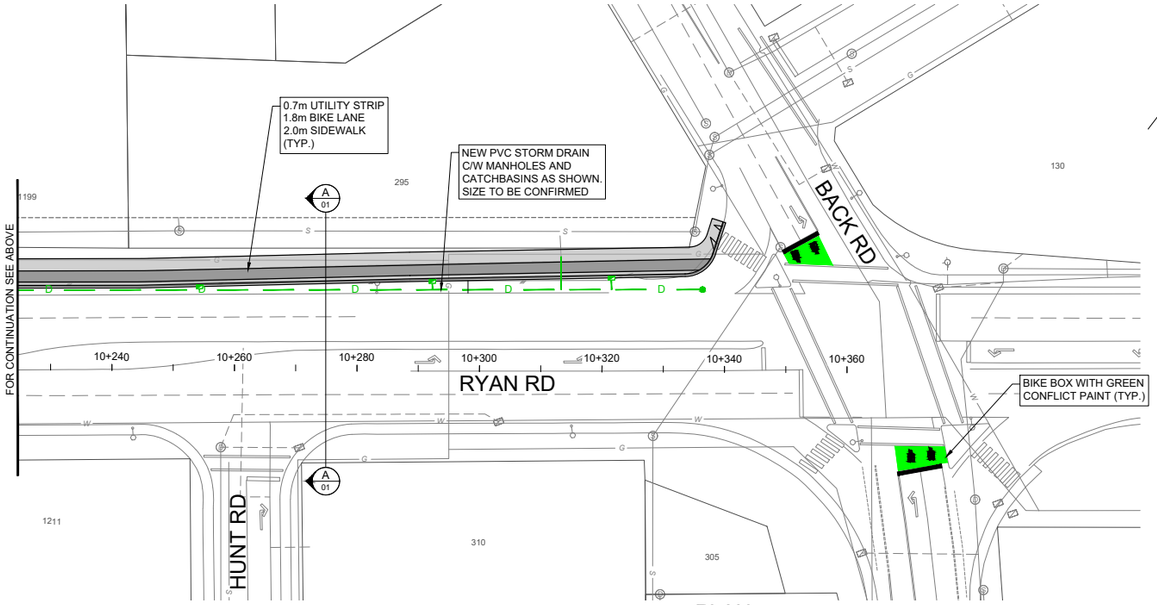

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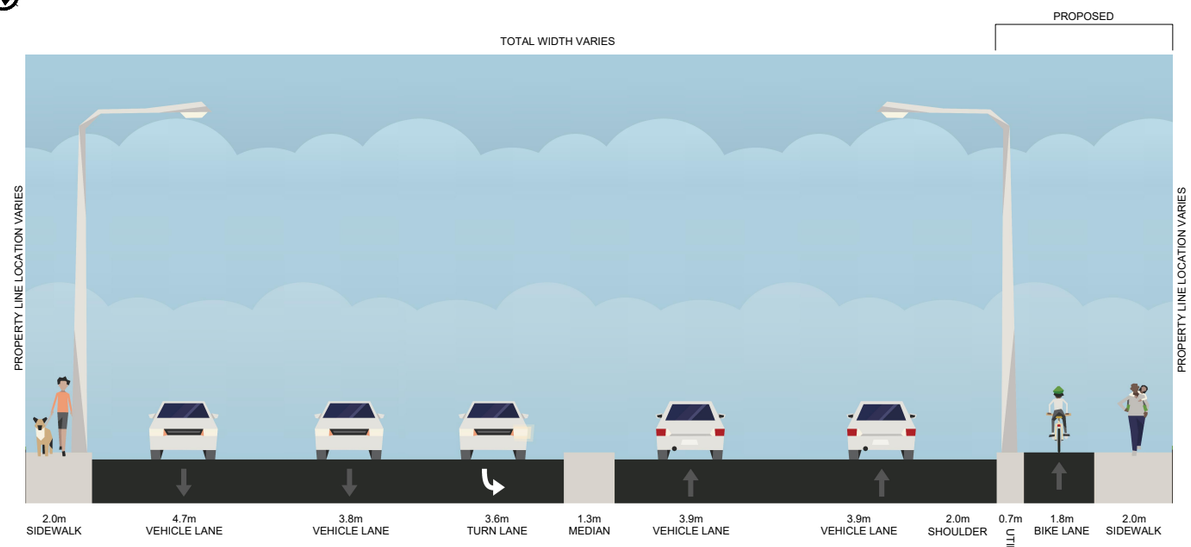

SECTION A 01
NTS

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GENERAL NOTES:

1. EXISTING PAVEMENT MARKINGS ARE DRAWN BASED ON ASSUMED LOCATIONS (NO TOPOGRAPHIC SURVEY)

PLOT DATE: April 16, 2024

REV NO.	REVISION DESCRIPTION	DATE	DRAWN	APPR'D
1	CONCEPT DESIGN	2024-04-16	KPJ	IM

City of Courtenay

ROAD WORKS

RYAN RD - SHORT TERM UPGRADES

STA 10+000 TO 10+360

CONCEPT DESIGN DESIGN NO. 33727

ISL
1051 Vancouver St, Victoria, BC V8V 3K3
T: (250)361-3230 F: (604)629-5756

SCALE	1:500	CREATION DATE	2024-04-16
DRAWN BY	KPJ	DESIGN BY	KPJ
CHECKED BY	ES	APPROVED BY	IM

DWG. NO. 01 OF 01 REV. 1

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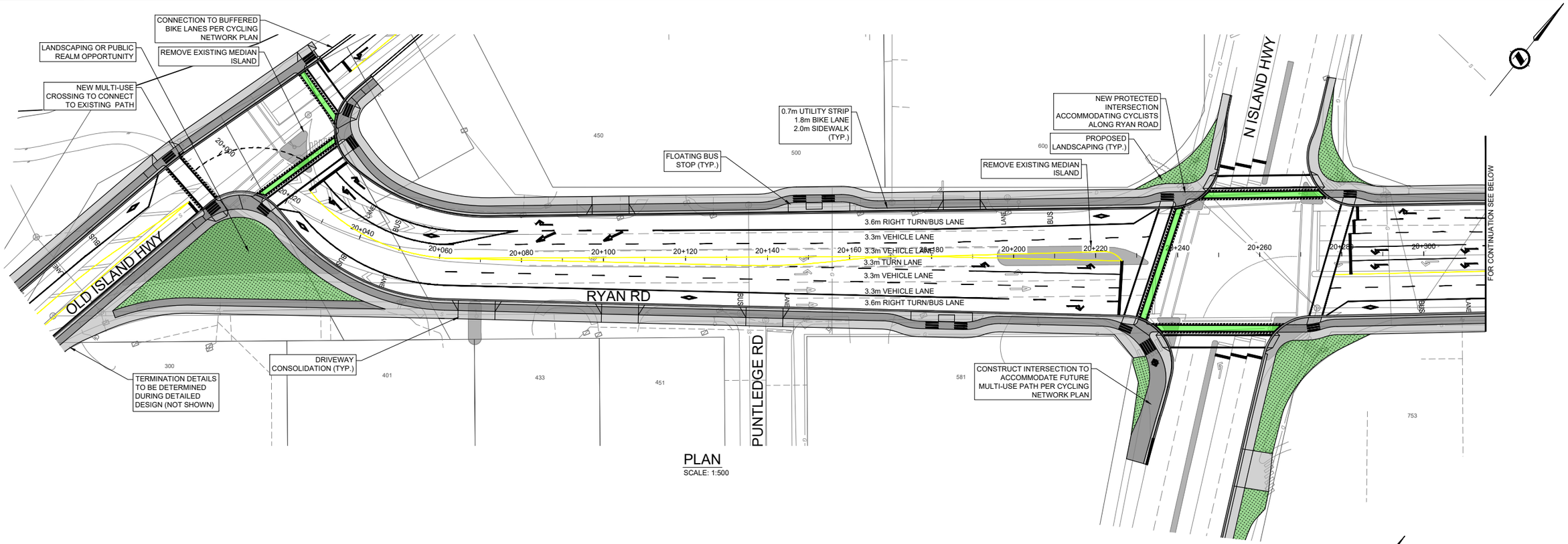

GENERAL NOTES:

1. EXISTING PAVEMENT MARKINGS ARE DRAWN BASED ON ASSUMED LOCATIONS (NO TOPOGRAPHIC SURVEY)

PLOT DATE: April 16, 2024

REV NO.	REVISION DESCRIPTION	DATE	DRAWN	APPR'D
1	CONCEPT DESIGN	2024-04-16	KPJ	IM

City of Courtenay

ROAD WORKS

RYAN ROAD - LONG TERM UPGRADES

STA 20+000 TO STA 20+630

ISL
1051 Vancouver St, Victoria, BC V8V 3K3
T: (250)361-3230 F: (604)629-9756

SCALE	1:500	CREATION DATE	2024-04-16
DRAWN BY	KPJ	DESIGN BY	KPJ
CHECKED BY	ES	APPROVED BY	IM

DWG. NO. 01 OF 02

REV. 1

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CONCEPT DESIGN

DESIGN NO. 33727

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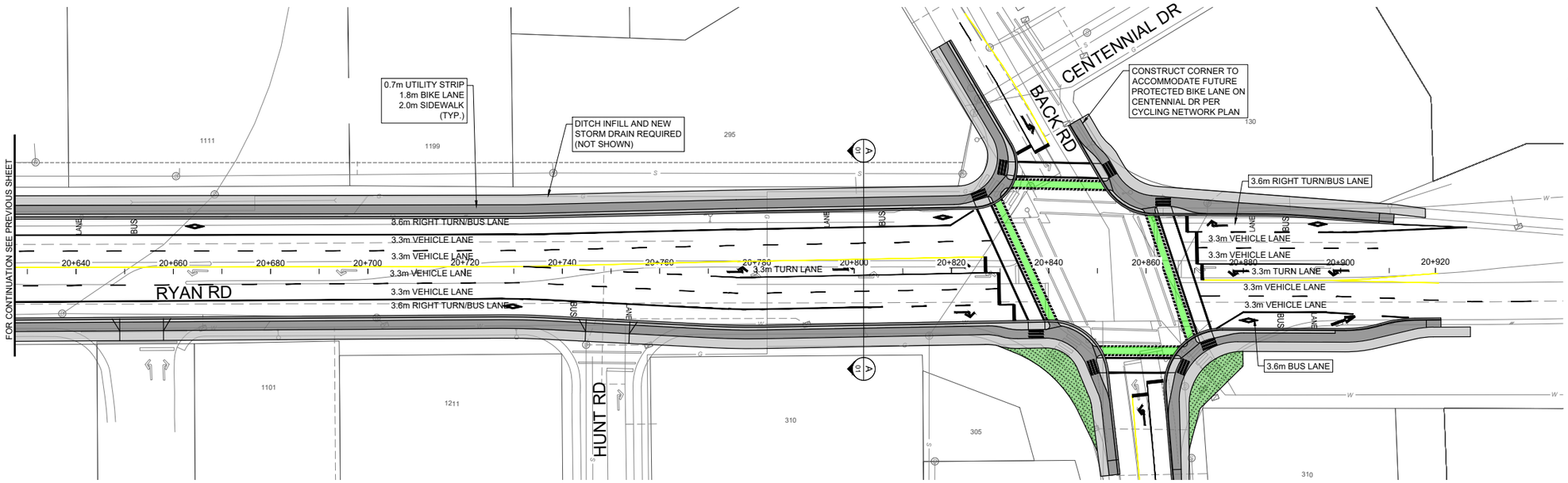

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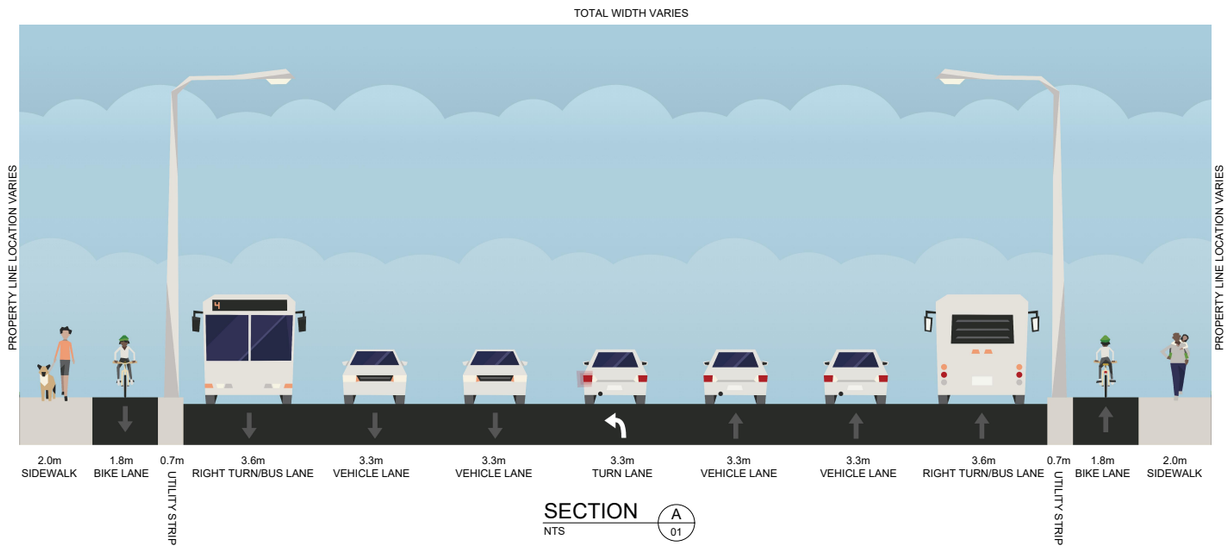

SECTION A-01
NTS

GENERAL NOTES:

1. EXISTING PAVEMENT MARKINGS ARE DRAWN BASED ON ASSUMED LOCATIONS (NO TOPOGRAPHIC SURVEY)

PLOT DATE: April 16, 2024

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CONCEPT DESIGN DESIGN NO. 33727

REV NO.	REVISION DESCRIPTION	DATE	DRAWN	APPR'D
1	CONCEPT DESIGN	2024-04-16	KPJ	IM

City of Courtenay

ROAD WORKS

RYAN ROAD - LONG TERM UPGRADES

STA 20+630 TO STA 20+920

ISL
1051 Vancouver St, Victoria, BC V8V 3K3
T: (250)361-3230 F: (604)629-5756

SCALE	1:500	CREATION DATE	2024-04-16
DRAWN BY	KPJ	DESIGN BY	KPJ
CHECKED BY	ES	APPROVED BY	IM

DWG. NO. 02 OF 02 REV. 1

Ryan Road AT Improvements

Class D Project Cost Estimate - Short Term Design

	DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE	AMOUNT
	TRAFFIC CONTROL, VEHICLE ACCESS AND PARKING				
	Traffic Control and Traffic Management Plan	Lump Sum	1	$ 50,000.00	$ 50,000.00
	Mobilization/Demobilization	Lump Sum	1	$ 40,000.00	$ 40,000.00
	ENVIRONMENTAL PROTECTION				
	Environmental Protection	Lump Sum	1	$ 20,000.00	$ 20,000.00
	CONCRETE WALKS CURBS AND GUTTERS				
	Concrete Barrier Curb & Gutter c/w Granular Base	Lineal Metre	400	$ 350.00	$ 140,000.00
	Concrete Sidewalk c/w Granular Base	Square Metre	1000	$ 200.00	$ 200,000.00
	PRE CAST CONCRETE				
	Retaining Walls (0.5-1.5m Height) (Optional)	Square Metre	25	$ 1,000.00	$ 25,000.00
	ROADWAY EXCAVATION, EMBANKMENT AND COMPACTION				
	Removals and Common Excavation	Lump sum	1	$ 80,000.00	$ 80,000.00
	HOT-MIX ASPHALT CONCRETE PAVING				
	Machine Laid Hot Mix Asphalt - 75mm Thickness	Tonne	120	$ 400.00	$ 48,000.00
	PERMANENT PAVEMENT MARKINGS				
	Permanent Thermoplastic and Paint Markings	Lump Sum	1	$ 10,000.00	$ 10,000.00
	MMA (Bike Boxes)	Square Metre	50	$ 400.00	$ 20,000.00
	STORM SEWER				
	PVC DR35 Main	Lineal Metre	275	$ 1,100	$ 302,500.00
	Storm Servicing and Misc. Infrastructure	Lump Sum	1	$ 40,000.00	$ 40,000.00
	Storm Tie-ins	Each	3	$ 5,000.00	$ 15,000.00
	MANHOLES AND CATCHBASINS				
	Manhole c/w Base, Risers, Frame, Barrel and Cover	Each	6	$ 10,000.00	$ 60,000.00
	Catchbasin c/w Frame, Cover, Leads, Tie-ins	Each	13	$ 6,000.00	$ 78,000.00
	Removal of Existing Storm Infrastructure	Lump Sum	1	$ 45,000.00	$ 45,000.00

	DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE	AMOUNT
	ELECTRICAL AND UTILITIES				
	Utility Relocation	Lump sum	1	$ 50,000.00	$ 50,000.00
	Light Pole Relocation or Replacement	Lump Sum	1	$ 75,000.00	$ 75,000.00
	New Signage and/or Relocation	Lump Sum	1	$ 10,000.00	$ 10,000.00
	Rapid Rectangular Flashing Beacons (Optional at Bus Stop)	Lump Sum	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 1,318,500.00**
				Class D General Contingency Allowance (40%)	**$ 527,400.00**
				Allowance for Engineering (10%)	**$ 131,850.00**
				GRAND TOTAL ESTIMATE	**$ 1,977,750.00**

Advisory: This cost estimate has been developed based on both historical costs and project experience. ISL Engineering and Land Services Ltd. accepts no liability for any variance from the costs and quantities estimated during this project.

Assumptions and Notes:

1. This estimate was established based on conceptual designs only. Further refinement and accuracy will require conducting a topographic survey and detailed design.
2. Storm sewer costs are based on conceptual design only. Some details are assumed to be included in lump sum costs.
3. Need for retaining walls to be assessed further in detailed design. Included assumed quantity for costing purposes.

Ryan Road AT Improvements

Class D Project Cost Estimate - Long Term Design

	DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE	AMOUNT
	TRAFFIC CONTROL, VEHICLE ACCESS AND PARKING				
	Traffic Control and Traffic Management Plan	Lump Sum	1	$ 200,000.00	$ 200,000.00
	Mobilization/Demobilization	Lump Sum	1	$ 150,000.00	$ 150,000.00
	ENVIRONMENTAL PROTECTION				
	Environmental Protection	Lump Sum	1	$ 50,000.00	$ 50,000.00
	CONCRETE WALKS CURBS AND GUTTERS				
	Concrete Barrier Curb & Gutter c/w Granular Base	Lineal Metre	2350	$ 350.00	$ 822,500.00
	Concrete Sidewalk c/w Granular Base	Square Metre	7250	$ 200.00	$ 1,450,000.00
	PRE CAST CONCRETE				
	Retaining Walls (0.5-1.5m Height) (Optional)	Lineal Metre	50	$ 1,000.00	$ 50,000.00
	ROADWAY EXCAVATION, EMBANKMENT AND COMPACTION				
	Removals and Common Excavation	Lump sum	1	$ 520,000.00	$ 520,000.00
	HOT-MIX ASPHALT CONCRETE PAVING				
	Machine Laid Hot Mix Asphalt - 75mm Thickness	Tonne	800	$ 400.00	$ 320,000.00
	PERMANENT PAVEMENT MARKINGS				
	Eradication	Lump Sum	1	$ 50,000.00	$ 50,000.00
	Permanent Thermoplastic and Paint Markings	Lump Sum	1	$ 100,000.00	$ 100,000.00
	MMA (Green Conflict Paint)	Square Metre	350	$ 300.00	$ 105,000.00
	LANDSCAPING				
	Topsoil and Seed	Square Metre	1800	$ 50.00	$ 90,000.00
	UTILITIES				
	Drainage (Allowance)	Lump Sum	1	$ 820,000.00	$ 820,000.00
	Electrical, Traffic Signals, Light Poles, Utilities and Signage (Allowance)	Lump sum	1	$ 1,700,000.00	$ 1,700,000.00
	Rapid Rectangular Flashing Beacons (Optional at Bus Stops)	Lump sum	4	$ 10,000.00	$ 40,000.00
				Subtotal	**$ 6,567,500.00**
				Class D General Contingency Allowance (40%)	**$ 2,627,000.00**
				Allowance for Engineering (10%)	**$ 656,750.00**
				GRAND TOTAL ESTIMATE	**$ 9,851,250.00**

Advisory: This cost estimate has been developed based on both historical costs and project experience. ISL Engineering and Land Services Ltd. accepts no liability for any variance from the costs and quantities estimated during this project.

Assumptions and Notes:

1. This estimate was established based on conceptual designs only. Further refinement and accuracy will require conducting a topographic survey and detailed design.
2. Drainage is based on the short term design + additional catch basins and associated infrastructure. Assumed no new storm drain aside from between Back Rd and Sandwick Rd (not shown on drawings).
3. Need for retaining walls to be assessed further in detailed design. Included assumed quantity for costing purposes.