Pages 1 through 8 redacted for the following reasons:
- -
Not Responsive

DISTRICT OF SOOKE

BYLAW NO. 518

A bylaw to amend Bylaw No. 500 *Sooke Zoning Bylaw, 2011* for the purpose of creating the Knox Centre Comprehensive Development Zone (CD11) and to amend the zoning of properties located at 2120 Church Road, 2110 Church Road and 2096 Church Road from Large Lot Residential (R1) and Community Facilities (P2) to Knox Centre Comprehensive Development Zone (CD11).

The Council of the District of Sooke, in open meeting assembled, enacts as follows:

1. This bylaw is cited as *Zoning Amendment Bylaw (500-2)*.

2. Bylaw No. 500, *Sooke Zoning Bylaw, 2011* as amended, is amended by adding Schedule 811 – Knox Centre CD Zone (CD11) immediately after Schedule 810 in **Part 5 – Zones** as follows:

"Knox Centre CD Zone **CD11**

811.1 **Purpose:** This zone provides for assisted living, commercial, and institutional uses within the District of Sooke.

811.2 **Permitted Uses:**

Principal Uses:
a) Assisted living facility
b) Community care facility

Accessory Uses:
a) Assembly use
b) Cemetery
c) Employee housing
c) Health services
d) Horticulture
d) Institutional use
e) Office
f) Parking lot, parkade
e) Personal services
g) Place of worship
h) Restaurant

811.3 **Minimum Lot Size for Subdivision Purposes**: 7,000 m^2

811.4 **Maximum Height:**
a) Principal Buildings: 15 m
b) Accessory Buildings: 9 m

811.5 **Maximum Lot Coverage**: 50%

811.6 **Minimum Setbacks:**

Use	Front Lot Line	Flanking Lot Line	Side Lot Line	Rear Lot Line
Principal Building or Structure	3 m	2 m	3 m	4.5 m
Accessory Buildings or Structures	4.5 m	4.5 m	1.2 m	4.5 m

811.7 **Conditions of Use**:
Recession plane rules may apply for buildings and structures more than 6 m in height. See General Regulations."

3. Bylaw No. 500, *Sooke Zoning Bylaw, 2011* is further amended in **Schedule A - Zoning Map** by changing the zoning on properties legally described as:

   Lot 14, Section 10, Sooke District, Plan 1057 except That Part In Plan VIP86034;
   Lot 1, Section 10, Sooke District, Plan VIP86034 and
   Lot A, Section 10, Sooke District, Plan 47114

   and as shown hatched on Schedule "A" to this bylaw from Large Lot Residential (R1) and Community Facilities (P2) to Knox Centre Comprehensive Development Zone (CD11).

4. Bylaw No. 500, *Sooke Zoning Bylaw, 2011* is further amended in the table in section 5.1, "Zones" of **Part 5 – Zones** by adding the following under "Comprehensive Development (CD) Zones":

Knox Centre	CD11	811

5. If any portion of this bylaw is set aside by a Court of competent jurisdiction, the portion is severed and the valid remainder shall remain in force and effect.

Introduced and read a first time the 27th day of February, 2012

Read a second time the 27th day of February, 2012

Public hearing held the 26th day of March, 2012

Amended the day of , 2012

Read a third time the day of 2012

Approved by the Ministry of Transportation and Infrastructure this 10 day of April , 2012.

Adopted on the day of 2012

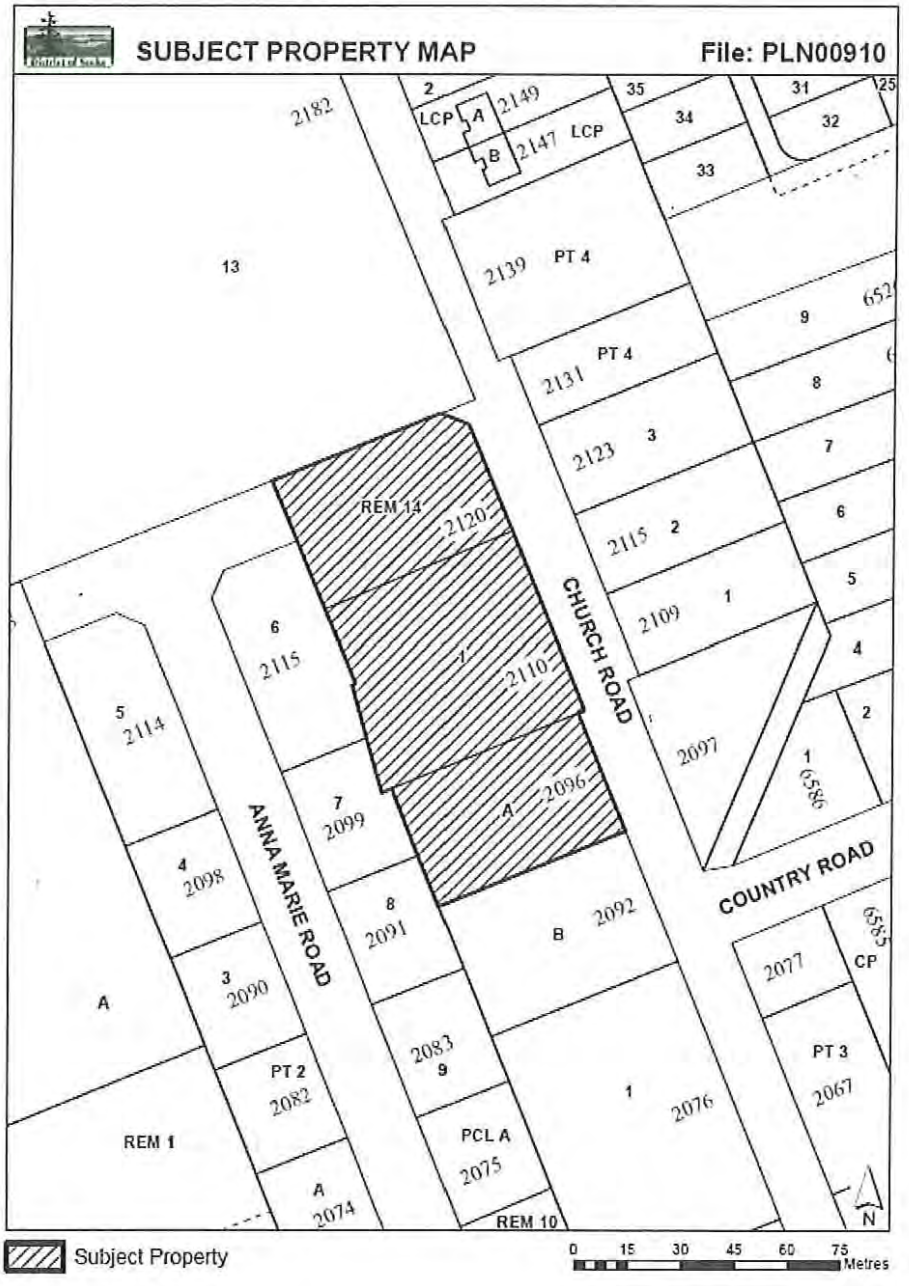
Wendal Milne
Mayor

Bonnie Sprinkling
Corporate Officer

Approved under the Transportation Act
this 10 day of April 2012

Development Technician

SCHEDULE A


SUBJECT PROPERTY MAP
File: PLN00910
2182
2
LCP
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32
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13
2139
PT 4
2131
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Pages 13 through 24 redacted for the following reasons:
- -
S3

Evanoff, Ryan TRAN:EX

To: Tara Johnson
Subject: Referral Response - PLN00910 - Knox Center

Re: Ministry File 2012-00145 // District of Sooke File PLN00910
Proposed Rezoning of 2120/2110/2096 Church Road – Knox center

Please accept this email as an official response for the above noted rezoning proposal.

The Ministry has reviewed the rezoning proposal and has no objections, in principle, to its approval. It is expected that the necessary modifications to the Sooke Road / Church Road intersection will be completed, via the Mariner's Village development, prior to opening of this new center.

The Ministry suggests that the District of Sooke follow the recommendations within the Boulevard Transportation Group Traffic Impact Assessment for the development dated October 12, 2010 (amended October 28, 2011).

If you have any questions or comments please feel free to contact myself directly.

Thank you,

Ryan Evanoff

Development Approvals Technician
Ministry of Transportation, Saanich Area Office
Phone Number: (250)952-4495 Fax: (250)952-4508

Evanoff, Ryan TRAN:EX

2012-00145

From: TRAN SCR DAS Saanich TRAN:EX
Sent: Wednesday, December 14, 2011 1:01 PM
To: Evanoff, Ryan TRAN:EX
Subject: FW: Sooke Referral - Rezone PLN00910 - 2120, 2110, 2096 Church Rd
Attachments: Referral Package.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

/Anne

From: Tara Johnson [mailto:tjohnson@sooke.ca]
Sent: Tuesday, December 13, 2011 3:35 PM
To: 'cpatrick@epcor.ca'; 'Lee-ann.shaw@sjrb.ca'; 'cpo-svi@bchydro.com'; TRAN SCR DAS Saanich TRAN:EX; 'developmentreferrals@bctransit.com'; 'beecher_baylm@live.ca'; 'dev-submissions.eng-planning@crd.bc.ca'; 'lmacdonald@crd.bc.ca'; 'pgodau@sd62.bc.ca'; 'Chris.Silburn@fortisbc.com'; 'benglish@tsoukenation.com'; Lake, Cynthia FLNR:EX; 'victoria.engineering@telus.com'; 'stephen.w.wright@rcmp-grc.gc.ca'
Subject: Sooke Referral - Rezone PLN00910 - 2120, 2110, 2096 Church Rd

Date: December 13, 2011

B.C. Hydro - Attn: Planning Referrals
EPCOR - Attn: Cindy Patrick
RCMP, Sooke Detachment - Attn: Planning Referrals
Shaw Cable - Attn: Lee-Ann Shaw
B.C. Transit – Attn: James Wadsworth
Beecher Bay Band Office – Attn: Bernice Mallet
CRD Water Department, Technical Services Division – Attn: Planning Referrals
Canada Post, Sooke Branch
Archaeology Branch Ministry of Tourism, Sport & the Arts - Attn: Planning Referrals
SEAPARC – Attn: Lynn MacDonald
School District 62, Sooke – Attn: Pete Godau
TELUS Communications – Attn: Planning Referrals
Fortis BC – Attn: Planning Referrals, Chris Silburn
Ministry of Transportation & Infrastructure – Attn: Ryan Evanoff
T'Sou-ke Nation – Attn: Bonnie English

RE: REZONING APPLICATION FOR 2120, 2110 AND 2096 CHURCH ROAD

File No.: **PLN00910**
Applicant: **AL KELLY**
Subject Property: **2120 Church Rd, 2110 Church Rd and 2096 Church Rd**

Please find attached for your review and comment, a copy of the rezoning application for 2120, 2110 and 2096 Church Road, legally described as:

PID 027-757-439 - Lot 1, Section 10, Sooke District, Plan VIP86034
PID 011-756-594 - Lot A, Section 10, Sooke District, Plan 47114
PID 008-078-441 - Lot 14, Section 10, Sooke District, Plan 1057 except That Part In Plan VIP86034

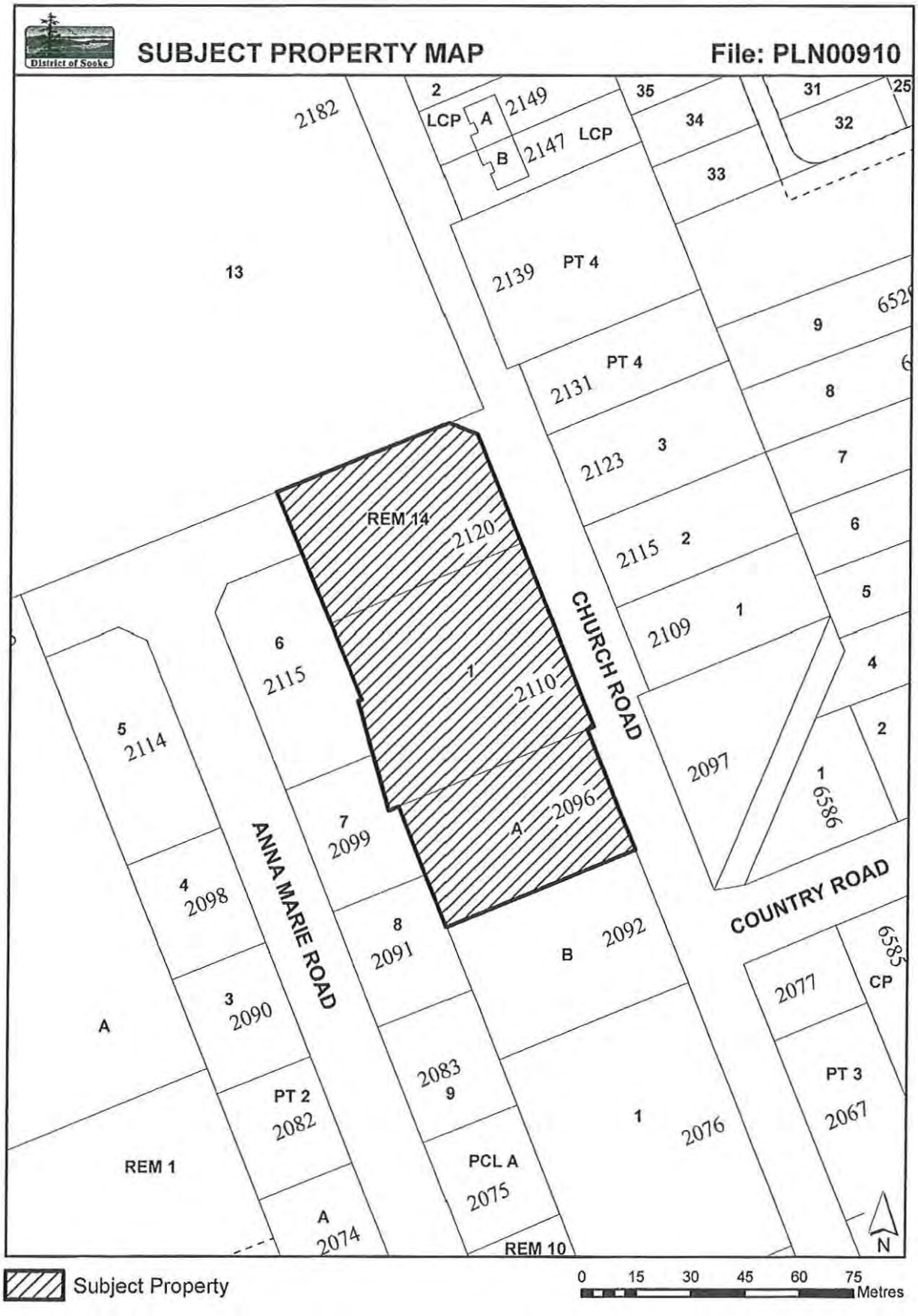
The property to be rezoned is approximately 7,199 m^2 (0.71ha). The application is consistent with the Official Community Plan 2010 as the land use designation is Town Centre. The application is to rezone the

subject property from Large Lot Residential (R1) and Community Facilities (P2) to a Comprehensive Development (CD) Zone and attached, please find a draft CD zone referred to as "Knox Centre" for your review and comment. For a better understanding of the project I have attached the owner's vision for the subject property.

We ask to please submit your comments to us by January 13, 2012. Should you have any questions or require additional information please contact Tara Johnson at the District of Sooke, 642-1628.

Sincerely,

Tara Johnson, MCIP
Planner II- District of Sooke
2205 Otter Point Road, Sooke BC V9Z 1J2
Email: tjohnson@sooke.ca
(250) 642-1628 Fax: (250) 642-0541


SUBJECT PROPERTY MAP
File: PLN00910
District of Sooke
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PT 4
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2123
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2115
2
2109
1
REM 14
2120
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2110
4
2096
CHURCH ROAD
6
2115
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2114
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2099
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2090
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PT 2
2082
REM 1
A
2074
ANNA MARIE ROAD
2083
9
PCL A
2075
REM 10
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2092
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2076
2097
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6586
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COUNTRY ROAD
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Subject Property
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Metres

Knox Centre CD Zone CD__

811.1 **Purpose:** This zone provides for residential, commercial, and institutional uses within the District of Sooke.

811.2 **Permitted Uses:**

Principal Uses:

a) Apartment building
b) Assembly use
c) Assisted living facility
d) Business offices and support Services, including post office
e) Cemetery
f) Community care facility
g) Health services
h) Institutional use
i) Office
j) Personal services
k) Place of worship

Accessory Uses:

l) Bakery
m) Commercial school or college
n) Country market
o) Employee housing
p) Horticulture
q) Licensed liquor establishment
r) Park
s) Parking lot, parkade
t) Restaurant

811.3 **Minimum Lot Size for Subdivision Purposes:** 7,000 m^2

811.4 **Maximum Height:**

a) Principal buildings: 22 m (6 storeys)
b) Accessory buildings: 9 m

811.5 **Maximum Lot Coverage:** 70%

811.6 **Minimum Setbacks:**

Use	Front Lot Line	Flanking Lot Line	Side Lot Line	Rear Lot Line
Principal Building or Structure	0 m	0 m	3 m	3 m
Adjacent to Duplex/Single Family Dwelling or Existing Housing per Town Centre Plan*	0 m	0 m	4.5 m	4.5 m
Accessory Building	0 m	0 m	3 m	4.5 m

811.7 **Conditions of Use:**

Recession plane rules may apply for buildings and structures more than 6 m (2 storeys) in height. See General Regulations.

DEFINITIONS OF USES – KNOX CENTRE CD ZONE

APARTMENT BUILDING means a building comprised of three or more dwelling units with shared entrance facilities to a common hallway, corridor or stairwell;

ASSEMBLY USE means the use or occupancy of a structure or a part thereof for the gathering of persons for civic, political, social, charitable, philanthropic, cultural, private recreational or private educational purposes;

ASSISTED LIVING FACILITY means a form of residential accommodation for persons who due to age, physical limitation or mental impairment, require personal services in order to continue to live independently in most respects. Each unit must have a private bed-sitting room; may have a kitchen; some or all of the units may have common facilities;

COMMERCIAL SCHOOL OR COLLEGE means an establishment which provides instruction in a specific field or curriculum;

COMMUNITY CARE FACILITY means a facility licensed pursuant to the *Community Care and Assisted Living Act*:

COUNTRY MARKET means premises for the sale by farmers or artisans of products they have grown or crafted locally including but not limited to fruits, vegetables, herbs, flowers, meat, fish, poultry, dairy products, baked goods, works of art, and crafts such as pottery, but excluding the sale of live animals.

EMPLOYEE HOUSING means residential accommodation provided by the employer for their employees;

HEALTH SERVICES means uses and buildings providing for physical and mental health services on an out-patient basis; includes medical and dental clinics and offices, health clinics and counseling services; may include dispensing and accessory retail sales of prescriptions and medications, and other types of health services goods and equipment;

HORTICULTURE means the practice of growing fruits, vegetables, flowers or ornamental plants;

INSTITUTIONAL USE means a facility established to serve a social, recreational, educational, or other public purpose and includes, but is not limited to: arena, armory, cemetery, college, community centre, community hall, court of law, fire hall, hospital, library, municipal office, park, playground, police station, public art gallery, public museum, school, stadium or public swimming pool;

OFFICE means the occupancy or use of a building for the purpose of carrying out business, financial or professional activities, and includes accessory retail;

PARK means public land for public recreation or conservation purposes; includes a historical or natural site; may include buildings, structures and infrastructure dedicated to the support of indoor and outdoor recreation, including horticulture;

PARKING LOT means an area of land or a structure, other than on a highway, used for the temporary parking of motor vehicles by the public whether free or for compensation for employees, clients, customers or residents, but excludes any area where vehicles are kept for sale or repair or are stored;

PERSONAL SERVICES means uses or structures for attending to individual needs which are related to human or pet care and appearance, or the cleaning and repair of personal effects; includes accessory sale of goods, barber shops, beauty shops, pet day cares, spas, tailors, dressmakers, shoe repair shops, and dry cleaning establishments and Laundromats; excludes health services;

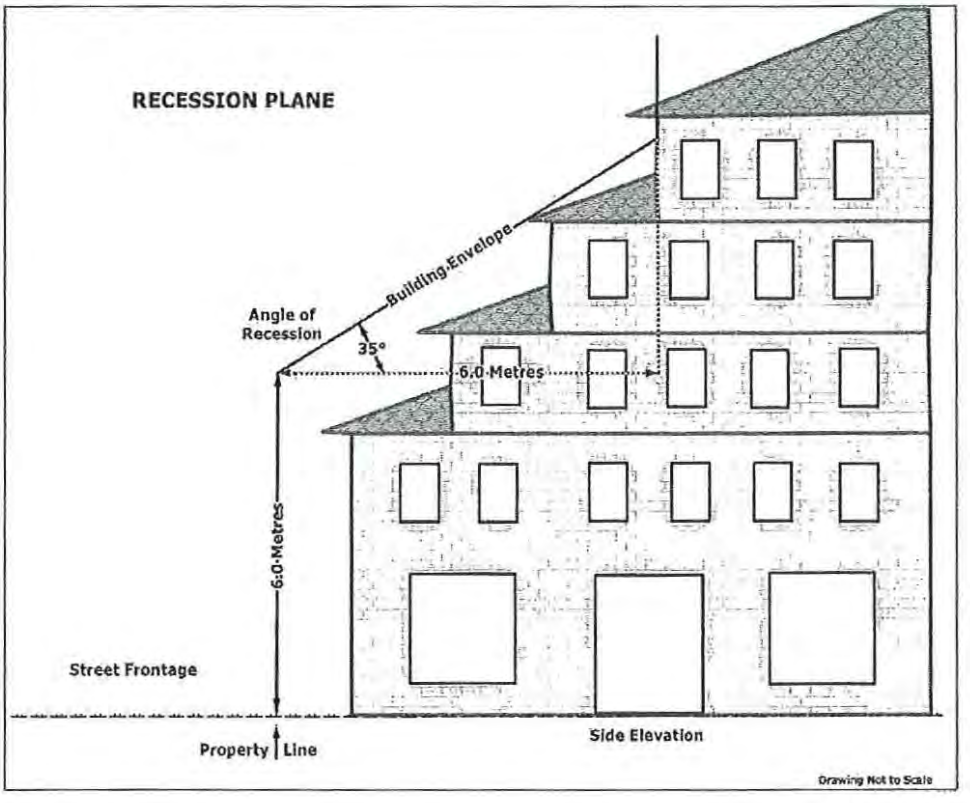
PLACE OF WORSHIP means a building wherein persons regularly assemble for religious worship and which is maintained and controlled by a religious body;

Recession Plane

The purpose of the recession plane rules is to assist with determining access to sunlight and daylight on the street, and protect public view corridors to the marine shoreline throughout the District of Sooke.

a) The recession plane provisions apply to all public view corridors to the marine shoreline and public view corridors are defined as any road or right of way directly intersected to Highway 14 and perpendicular to the marine shoreline.
b) The recession plane provisions apply on any side of a building that is fronting a highway which is defined as a public view corridor in 3.19(a);
c) No portion of the building or structure is to encroach within the 35° angle of recession as measured from a point 6 m above the property line, and 6 m back from the property line, per accompanying

diagram;



The draft Zoning Bylaw will permit the following Uses in Any Zone

The following uses are permitted in any zone:

a) Public utility buildings and structures, provided they comply with the siting, size and height limitations prescribed for the zone in which they are located;
b) Community Care Facilities licensed pursuant to the *Community Care and Assisted Living Act* in single family residential zones, licensed community care facilities providing day care for not more than 8 persons in care, or residential care for not more than 6 persons.
c) Transportation facility established by one of the levels of government or a Crown Corporation;
d) Hiking trails, horse trails, bicycle paths;
e) Parks;
f) Conservation uses;
g) Gardening and the growing of food;
h) Lighthouses and navigational aids.

District of Sooke Application for Rezoning

Submission

The Knox Vision Society

"To glorify God and serve our community through providing ministry services and facilities that reflect Christian values for young and old."

The Society is committed to providing the community of Sooke with the following services on as much of a 'cost recovery' basis as possible through and within the proposed **Campus of Care** facility:

- Affordable independent supportive living suites
- A sacred space for church worship and service
- Church administration offices
- Ministry support service space ("Care Suites")
  - counseling, podiatrist, hairdressing, massage therapy, physiotherapist, computer and fellowship room
- A memorial garden and park-like rest area
- A coffee bar and sitting area
- A laundromat with shower locker rooms
- Space for provision of educational services
- Community meeting spaces
- A resident service kitchen and eating area
- Senior's Day Care services
- Respite services
- Emergency Support Service designation

It is the Society's earnest and heartfelt desire to complete this project within the next 18 – 24 months and this application for rezoning is therefore respectfully submitted as our first step.

Should you have any questions pertaining to the application, you can direct them to Mr. Al Kelly S22

Sincerely Yours

Eleanor Shamrock
Chair
Knox Vision Society

" Matching Sacred Space with a Ministry to the Community."

Boulevard TRANSPORTATION GROUP

October 28, 2011
File No. 1185

Knox Vision Society
Attention: Al Kelly

RE: KNOX SOOKE COMMUNITY CENTRE DEVELOPMENT – REVIEW OF TRAFFIC IMPACTS DUE TO CHANGE IN LAND USE

Boulevard Transportation Group Ltd. completed a traffic impact assessment for the proposed Knox Community Centre Development in October 2010. Since the report was completed changes have been made to the site plan. This letter outlines our review of the changes in land use and trip generation and identifies any impacts due to the change in land use.

LAND USE AND TRIP GENERATION

Since the original study was completed up to 32 additional senior housing units have been added and a 2,970 sq. ft. classroom/board room space has been added. The classroom/board room space may be available to the public and therefore may generate separate trips to/from the site.

Based on this added land use the site will generate 10 additional trips (in pm peak and Sundays) as a worst case scenario. The trips will be split, four into the site and six exiting the site.

ANALYSIS

The additional trips were assigned to the surrounding road network based on the trip assignment outlined in the original report. The additional trips were then added to the post development Synchro models to determine if there was any change in LOS due to the additional trips.

The results of the analysis found that there is no change in LOS for any of the post development conditions, including the long term (2023) horizon.

Unit 201 – 791 Goldstream Ave | Victoria, BC | V9B 2X5 | Ph. (250) 388-9877 | Fax. (250) 388-9879

Boulevard TRANSPORTATION GROUP

SUMMARY

The addition of up to 32 housing units (to a total of 146 on-site) and a classroom/board room does not change any of the results or recommendations from the original report.

If there are any questions please feel free to contact me at 250-388-9877

Yours truly,

BOULEVARD TRANSPORTATION GROUP

per,

Nadine King

Nadine King, P.Eng., PTOE
Transportation Engineer

cc: Silvia Bonet – AJ Finlayson Architect

Unit 201 – 791 Goldstream Ave | Victoria, BC | V9B 2X5 | Ph. (250) 388-9877 | Fax. (250) 388-9879

DRAFT

Traffic Impact Assessment for Knox Community Centre Development on Church Road

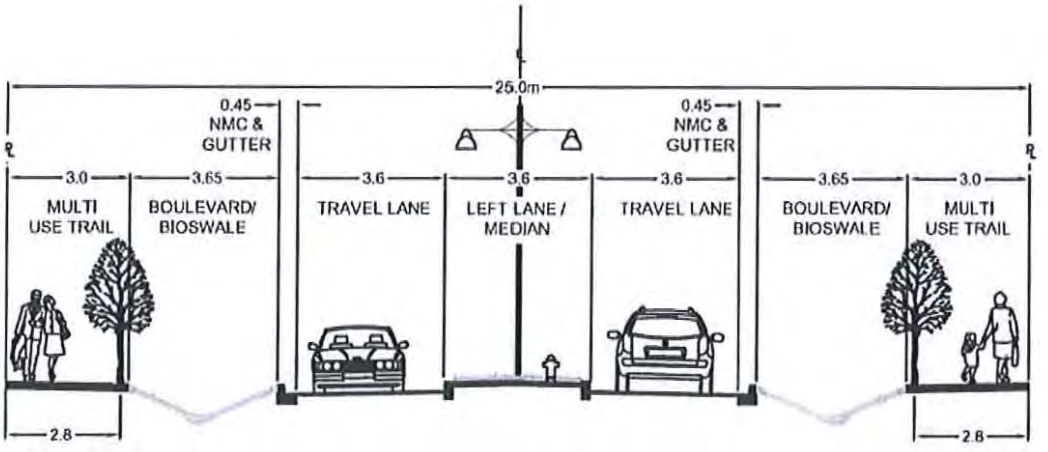
Sooke, BC

Boulevard Transportation Group

October 12, 2010

File: 1185

District of Sooke Engineering Specifications	SUPPLEMENTAL STANDARD DETAIL DRAWINGS



NOTES:

1. ALL CONSTRUCTION TO CONFORM TO MMCD SPECIFICATIONS AND DISTRICT OF SOOKE SUPPLEMENTS AND BYLAWS
2. THIS SECTION IS A TYPICAL MID-BLOCK DESIGN. INTERSECTIONS ARE TO BE DESIGNED INDEPENDENTLY
3. PLACE HYDRANTS IN CENTER MEDIAN LANDSCAPED AREA
4. PLACE STREET TREES 2.8m FROM PROPERTY LINE
5. POSSIBLE ADDITIONAL FUTURE TRAVEL LANES COULD BE ACCOMMODATED WITHIN THE BOULEVARD/BIOSWALE AREAS

Typical Section 25.0m Grant Road Connector - Proposed	Revision Date: MARCH 2010	Drawing Number: R11SS

DRAFT

TABLE OF CONTENTS

DRAFT

1.0 INTRODUCTION

Boulevard Transportation Group Ltd. was retained by *A.J. Finlayson Architect Ltd.* to undertake a traffic impact assessment for the proposed Knox Community Centre development (senior residence facility with a church redevelopment) on Church Road in Sooke, BC.

The development is comprised of three lots – 2096, 2110 and 2120 Church Road. The site is located on the west side of Church Road between Throup Road and Sooke Road. The study area includes Church Road from Throup Road to Sooke Road. There are the two key intersections in the study area: Throup Road/Church Road and Church Road/Sooke Road. See **Figure 1** for the study area and site location.

The study includes an analysis of the long term conditions in order to provide a clear view of the impacts on the surrounding road network after full build-out and occupancy. The study will identify on and off site improvements required. Study recommendations and conclusions are intended to provide safe and efficient movement of pedestrians, bicycles and vehicular traffic to/from and within the proposed development while minimizing the impact to non-site trips.

2.0 BACKGROUND INFORMATION

2.1 Existing Road Network

Sooke Road (Highway 14) is an undivided two lane rural arterial road under the jurisdiction of the Ministry of Transportation and Infrastructure (MoT). Sooke Road is currently the only east-west collector/arterial road which connects Phillips Road to Grant Road/Ella Road.

Church Road is a collector road under the jurisdiction of the District of Sooke. Church Road is currently at a rural standard with limited paved shoulders for pedestrians and cyclists; however, the Transportation Master Plan recommends bicycle lanes and sidewalks. Throup Road is a collector road connecting to Church Road and providing access connections to two existing schools. There are limited paved shoulders or separate provisions for cyclists or pedestrians on Throup Road. The ultimate cross section for Throup Road includes bicycle facilities and sidewalks.

The intersection of Sooke Road/Church Road is a signalized 'T' intersection with Church Road on the north side of Sooke Road. An eastbound left turn lane (25m parallel length) and a wide westbound through lane (to allow right turns to 'slip' past a through vehicle) are provided on Sooke Road. On Church Road southbound left and right turn lanes are provided (left turn lane is 15m). The intersection

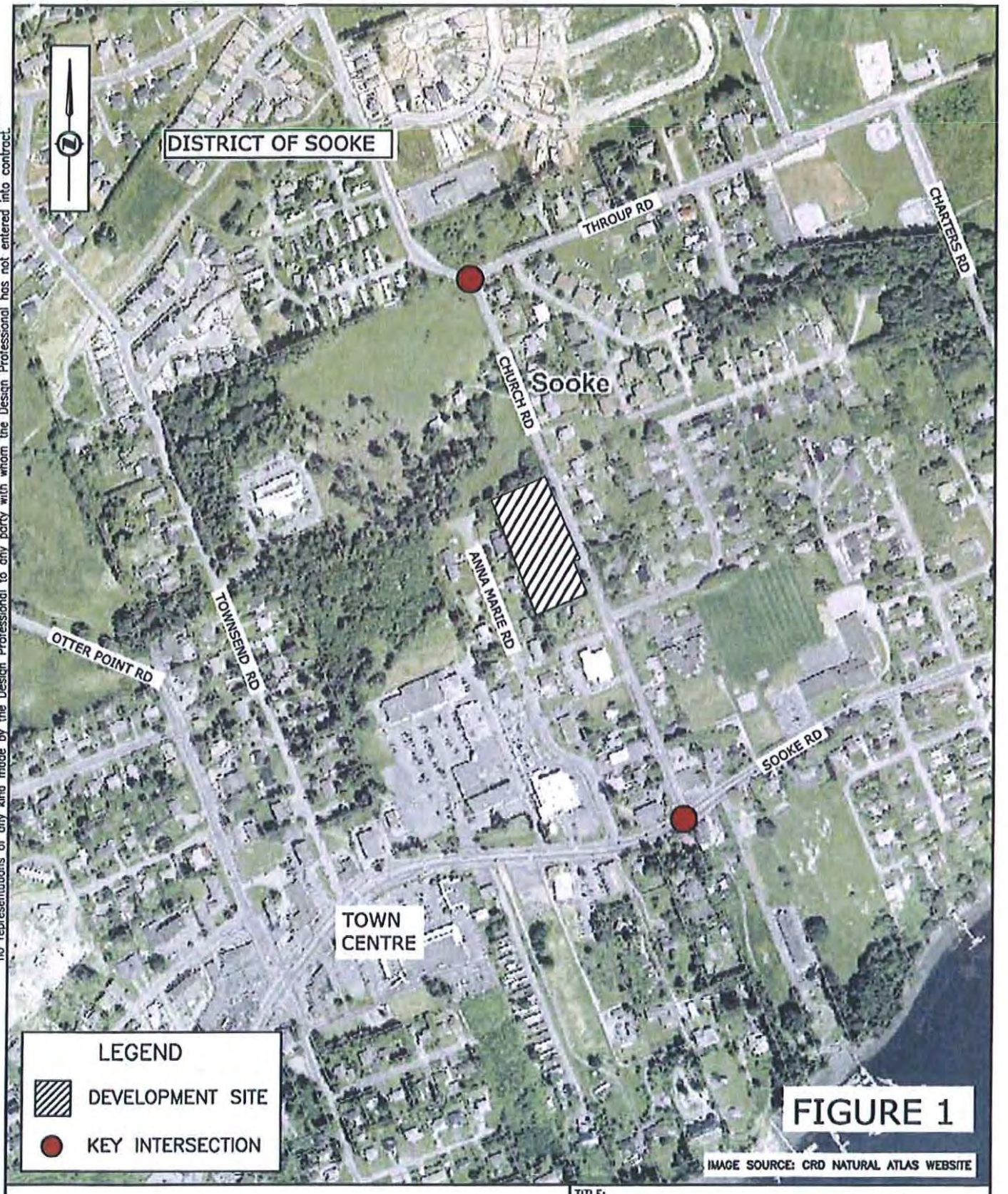


FIGURE 1

IMAGE SOURCE: CRD NATURAL ATLAS WEBSITE

These Design Documents are prepared solely for the use by the party with whom the Design Professional has entered into a contract, and there are no representations of any kind made by the Design Professional to any party with whom the Design Professional has not entered into contract.

Boulevard Transportation Group

TITLE:

KNOX COMMUNITY CENTRE

CHURCH ROAD, SOOKE, BC
STUDY AREA AND SITE LOCATION

DESIGNED:	DRAWN:	SCALE:
NK	mjo	NTS
DATE: SEP 22-10	DRAWING NO: 1185_FIG 1	REV.

DRAFT

will be four-legged within the next year or so as the Maniners Village (south area of the intersection) development is currently being constructed.

Throup Road/Church Road is an unsignalized three legged intersection. The westbound movement (from Throup Road onto Church Road) is currently stop controlled. There are no separate turn lanes at the intersection. Throup Road is part of the District's planned Connector Road project and will ultimately extend east to Phillips Road and west to Otter Point Road.

2.2 Land Use

The existing land use on the proposed development site is a church with a graveyard (Knox Presbyterian Church) and two single family houses. The land use within the surrounding area of the site is currently a mixture of single family residential, agricultural (farm), and institutional (RCMP office). There are commercial areas along Sooke Road approx. 300m south of the development.

The land use for the proposed development is 114 units of senior adult housing (Knox Sooke Community Centre) with a church attached. The proposed senior facility includes centralized amenities such as dining, lounge, multi-purpose room, and church space. The development lot size is approximately 0.76 ha (1.88 acres) and the proposed sanctuary area is 370 m^2 (4,000 ft^2). See **Figure 2** for the site plan and proposed accesses.

Figure 2: Site Plan and Access Points

2.3 Site Access

The site will be accessed from Church Road. One access (ramp to the underground parking lot) is proposed at the south end of the Church Road frontage. There is another access proposed on Church Road in the middle of the development frontage with surface parking. For delivery trucks, a loading zone is proposed on the northwest corner of the site and this is considered only accessible from Anna Marie Road (dead end).

3.0 TRIP GENERATION

The proposed development is a senior community centre (114 units) with a church. As the existing church will be replaced by the proposed church space of the centre, it is expected that the Sunday church traffic will not be significantly different from existing (the traffic data collected already includes the existing church traffic adjacent to the site). However, the Sunday church traffic is analyzed based on the addition of proposed sanctuary area as a worst case scenario. It is assumed that 50% of the Sunday service attendees come from the centre itself; therefore, only 50% of the total trip generation (church traffic) will be added for the Sunday peak hour analysis.

Three different peak hour periods are considered as worse cases of the week: PM peak hour, school PM peak hour and Sunday peak hour. Trips were generated for the site based on the proposed land use and the Institute of Transportation Engineers (ITE) *Trip Generation Manual (8th Edition)*. The proposed development (senior centre and church) will generate 20 trips in the PM peak hour and 42 trips in the Sunday peak hour. The school PM peak hour was determined to not be greater than the typical PM peak hour. The existing trips from the two single family lots were not subtracted from the trips generated as a conservative assumption. **Table 1** outlines the PM (weekday) and Sunday peak hour trip generation for full build-out of the proposed development.

The proposed site is a residential development for seniors. Residential land use does not generate pass-by trips. Therefore the generated trips were directly used for the analysis without any trip modifications.

DRAFT

Table 1: Peak Hour Trip Generation

ITE Code	Land Use	Quantity	Trip Rate	Trips		
				Total	IN	OUT
252	Senior Adult Housing - Attached	114 units	0.16 / unit (PM/Sunday)	18	11 (60%)	7 (40%)
560	Church	4,000 ft²	0.55 / 1000 ft² (Weekday PM)	2	1	1
			5.88* / 1000 ft² (Sunday)	24	12 (50%)	12 (50%)
		Total	Weekday PM	20	12	8
			Sunday Peak	42	23	19

* Note: Half of the regular rate (11.76) was applied for Sunday church trip generation assuming 50% of the church attendees come from on-site (internal trips).

4.0 TRIP ASSIGNMENT

The development trips were assigned to the two key intersections based on the distribution of existing trips and commercial area locations. It is expected that a low percentage of the trips generated from the care facility will be from/to the north. Sunday church traffic is expected to have a different trip distribution from the seniors development and have a higher percentage from/to the north. The following is the trip assignment for the proposed development and Sunday church traffic which will be added to existing traffic by the development.

Senior Adult Housing (Inbound 12; Outbound 8)

- 10% of all trips are to/from Church Road North
- 5% of all trips are to/from Throup Road
- 50% of all trips are to/from Sooke Road West
- 35% of all trips are to/from Sooke Road East

Sunday Church Service Traffic (Inbound 23; Outbound 19)

- 25% of all trips are to/from Church Road North
- 10% of all trips are to/from Throup Road
- 40% of all trips are to/from Sooke Road West
- 25% of all trips are to/from Sooke Road East

DRAFT

5.0 TRAFFIC CONDITIONS

5.1 Traffic Data Collection

There are two schools (Ecole Poirier Elementary and Journey Middle School) adjacent to Church Road. Therefore, the PM peak hour at Throup Road/Church Road occurs in the school closing times unlike a typical PM peak hour. The school PM peak hour is 2:30 PM to 3:30 PM and is over prior to the PM peak hour of the highway traffic. The PM peak hour on Sooke Road (Highway 14) occurs between 4:30 PM and 5:30 PM based on the previous count data.

Traffic counts were undertaken by Boulevard Transportation Group at Throup Road/Church Road during the school PM peak hour and at Church Road/Sooke Road during the PM peak hour on Sep 14, 2010.

Traffic count data was obtained from the MoT's website for Sunday peak hour analysis. Sunday traffic volumes were originally measured in October 2005 at the intersection of Church Road/Sooke Road and the 2% annual growth rate was applied for the 2010 background traffic volumes. The Sunday peak hour was determined to be 11:00 AM to 12:00 PM based on the church service hour.

5.2 Synchro Software

Synchro and SimTraffic form a two-part software program that model and simulate traffic conditions. Synchro uses the Highway Capacity Manual methodology, while SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly assigning vehicle travelling through the road network. Synchro analysis results yield measures of effectiveness – Level of Service (LOS), queue lengths and delays. Delays and the type of traffic control are used to determine the LOS letter grade, from LOS A (excellent operations) to LOS F (unstable/failing). LOS C or better is considered acceptable operations, while LOS D is considered to be on the threshold between acceptable and unacceptable operations. A full description of Synchro and SimTraffic is included as **Appendix A**.

5.3 2010 Existing Conditions

A review of the existing traffic conditions at the two intersections within the study area was undertaken using Synchro to determine the existing conditions with the existing road network.

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5.3.1 Existing PM Peak Hour Conditions

The signalized intersection of Church Road/Sooke Road operates at a LOS C or better except for the westbound through movement (LOS D: delay 48.1 seconds) in the PM peak hour. The westbound through 95th percentile queue is 186.3m while the eastbound through 95th percentile queue is 56.5m The southbound left 95th percentile queue is 18.6m (which is 2 or 3 vehicles in length) and the eastbound left 95th percentile queue is 9.6m.

At Throup Road/Church Road stop-controlled, all movements are operating at good levels of service (LOS A or B) in the PM peak hour. The westbound movement (from Throup Road onto Church Road) is currently operating at a LOS B (delay 11.6 seconds) and the 95th percentile queue is 6.3m (1 vehicle). See **Figure 3** for the 2010 existing traffic volumes and LOS in the PM peak hour.

5.3.2 Existing School PM Peak Hour Conditions

At the intersection of Church Road/Sooke Road, overall traffic conditions in the school PM peak hour (2:30 to 3:30 PM) are better than the PM peak hour. The westbound through movement is operating at a LOS C and its 95th queue length (168.2m) is also shorter than the PM peak hour.

At the intersection of Throup Road/Church Road, the westbound movement stop-controlled is operating at a LOS D with a 95th queue length of 46.3m. However, it was observed that the school traffic congestion did not last more than a half hour (the actual school peak time period occurs between 2:45 PM and 3:15 PM).

5.3.3 Existing Sunday Peak Hour Conditions

In the Sunday peak hour (11:00 AM-12:00 PM), at the two intersections the conditions are operating overall better than the PM peak hour and school peak hour. All movements at the two intersections are operating at a LOS C or better. See **Figure 3** for the 2010 existing traffic volumes and LOS in the School PM peak hour and Sunday peak hour.

5.4 2013 Traffic Conditions: Opening Day

It is assumed that the opening day is 2013 with full build-out. The 2010 existing traffic volumes were projected with a 2% annual growth rate to obtain the 2013 background traffic volumes at the two intersections. The Mariners Village development (just south of the intersection of Church Road/Sooke Road) won't be complete (estimate of 30% complete) by 2013. However as a conservative scenario, it is assumed that the 2013 background conditions include the Mariners Village traffic with full build out and a new lane configuration at the intersection of Church Road/Sooke Road. As per the previous

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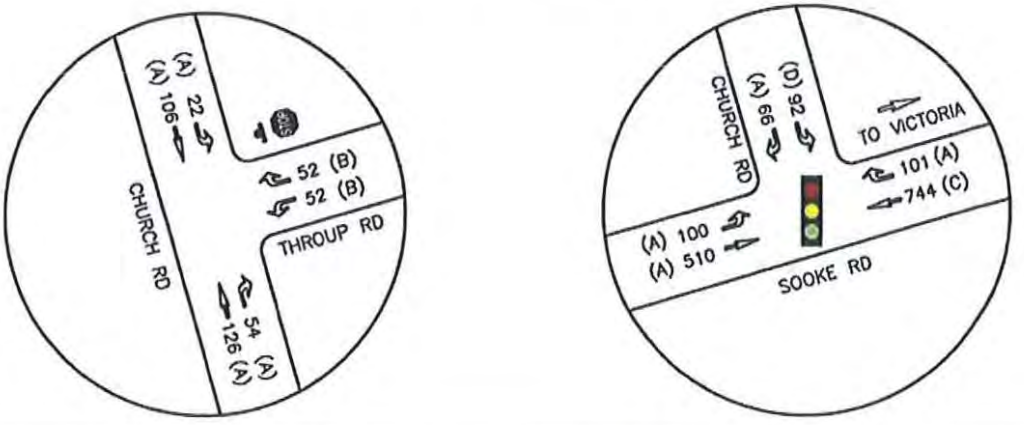
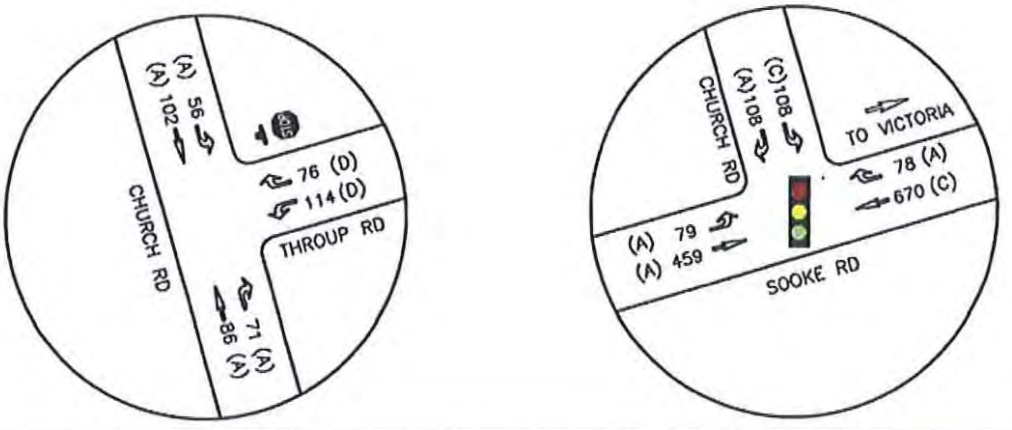
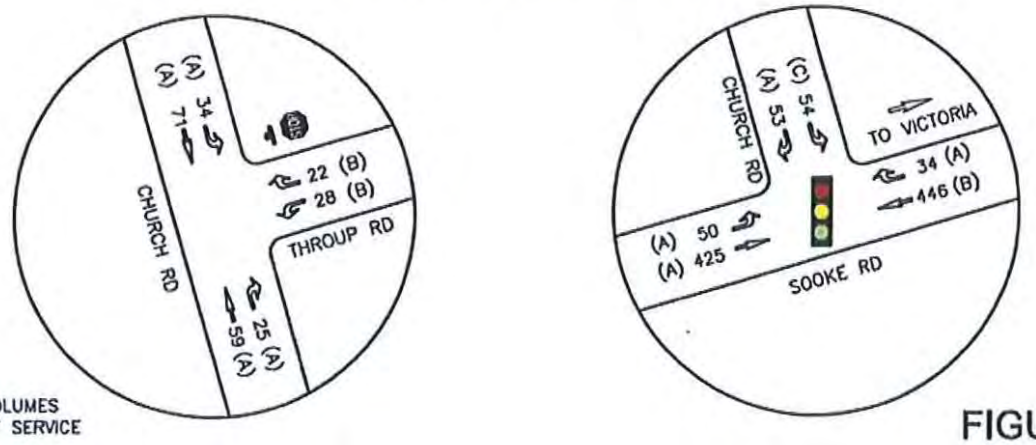
2013 BACKGROUND PM PEAK HOUR



2013 BACKGROUND SCHOOL PM PEAK HOUR



2013 BACKGROUND SUNDAY PEAK HOUR



##: TRAFFIC VOLUMES
(#): LEVELS OF SERVICE

FIGURE 3

Boulevard TRANSPORTATION GROUP

TITLE:
KNOX COMMUNITY CENTRE
2010 EXISTING CONDITIONS
PEAK HR VOLUMES & LEVELS OF SERVICE

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study, the proposed laning at Church Road/Sooke Road is a left turn lane and a right turn lane for the eastbound/westbound movements, and a left/through lane and a right turn lane for the northbound/southbound movements.

5.4.1 2013 Background Conditions: No Development

In 2013 without the development, the following results are based on the optimized cycle length at the signal of Church Road/Sooke Road. All movements will be operating at a LOS C or better except for the southbound/northbound left movements (LOS D) both in the 2013 PM peak hour and school PM peak. In the 2013 background Sunday peak hour, the southbound/northbound left movements will improve to a LOS C (all movements are at a LOS C or better).

At the intersection of Throup Road/Church Road, all movements will operate the same levels of service as the 2010 existing. See **Figure 4** for the 2013 background traffic volumes and LOS in the PM/School PM/Sunday peak hours.

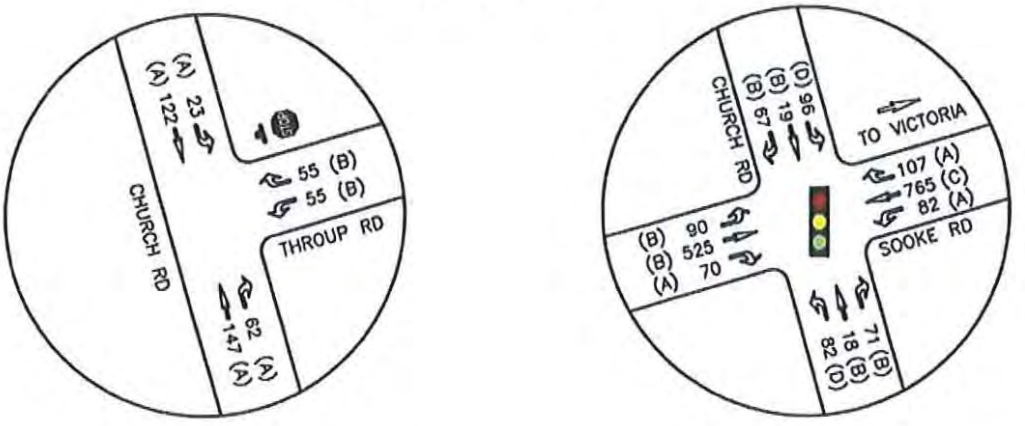
5.4.2 2013 Post Development: Opening Day

Of three peak hour periods at Church Road/Sooke Road, the worst case is the PM peak hour. Therefore the post development analysis is focused on the PM peak hour at Church Road/Sooke Road. However, for Throup Road/Church Road and the site access, the school PM peak hour is reviewed due to the high volumes. The development trips were assigned to the 2013 background traffic volumes.

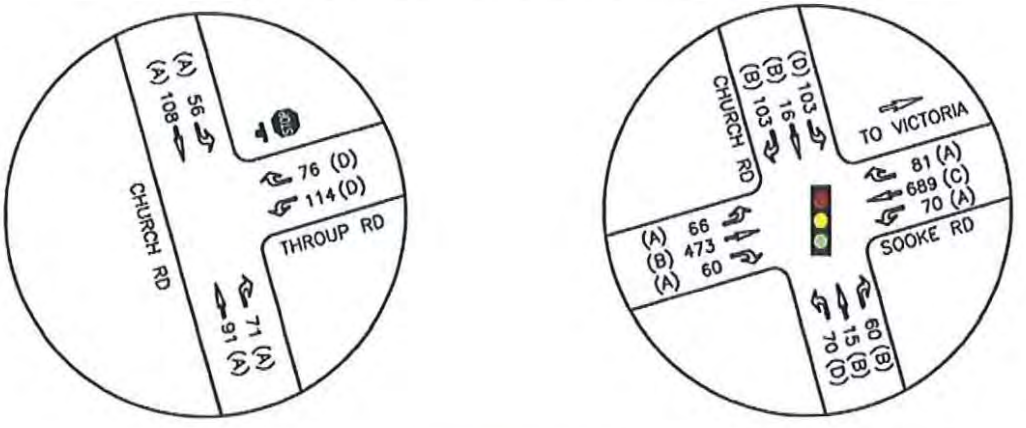
The results of the analysis found that the development will have little effect on traffic conditions at the intersection of Church Road/Sooke Road during the PM peak hour. The eastbound left movement will drop to a LOS B from a LOS A. However, the additional delay will be minimal (just 1.0 sec increase) during the PM peak hour. The additional eastbound left 95th percentile queue is 1.6m (the longest increase) and all other queues will increase less than 1m. At the intersection a maximum volume/capacity ratio will be 0.82 for the westbound thru movement; however, the v/c ratio value is unchanged between without the development and with the development.

The following table is a summary of the 2013 traffic conditions (opening day PM peak hour) at the intersection of Church Road/Sooke Road. See **Figure 5** for 2013 post development volumes and levels of service.

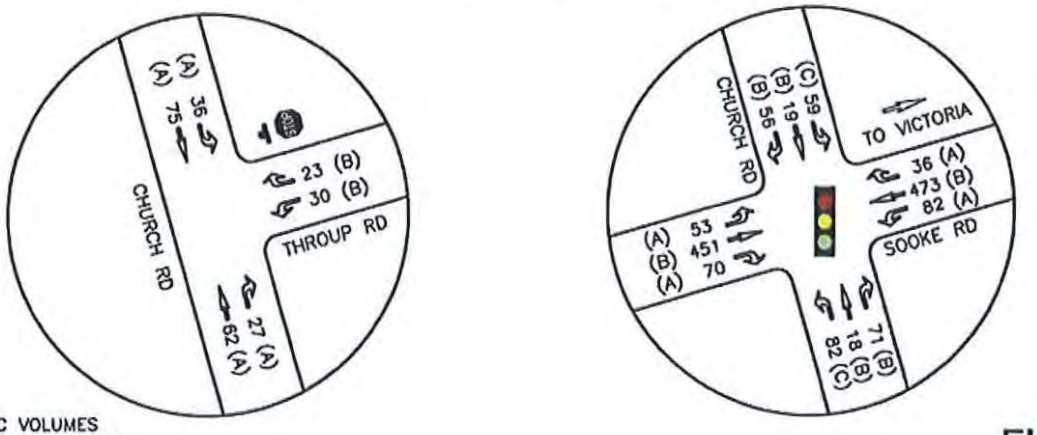
2013 BACKGROUND PM PEAK HOUR



2013 BACKGROUND SCHOOL PM PEAK HOUR



2013 BACKGROUND SUNDAY PEAK HOUR



##: TRAFFIC VOLUMES
(#): LEVELS OF SERVICE

FIGURE 4

Boulevard Transportation Group

TITLE: KNOX COMMUNITY CENTRE
2013 BACKGROUND CONDITIONS
PEAK HR VOLUMES & LEVELS OF SERVICE

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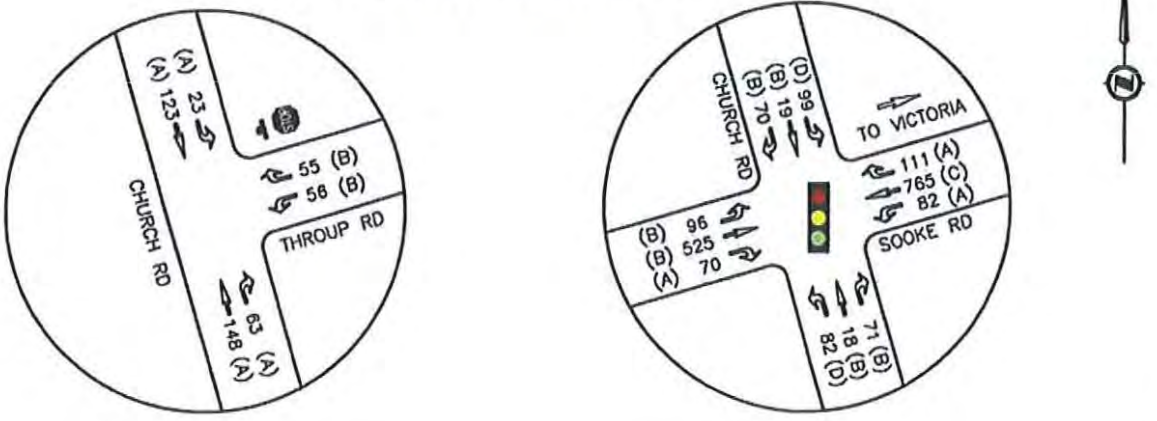
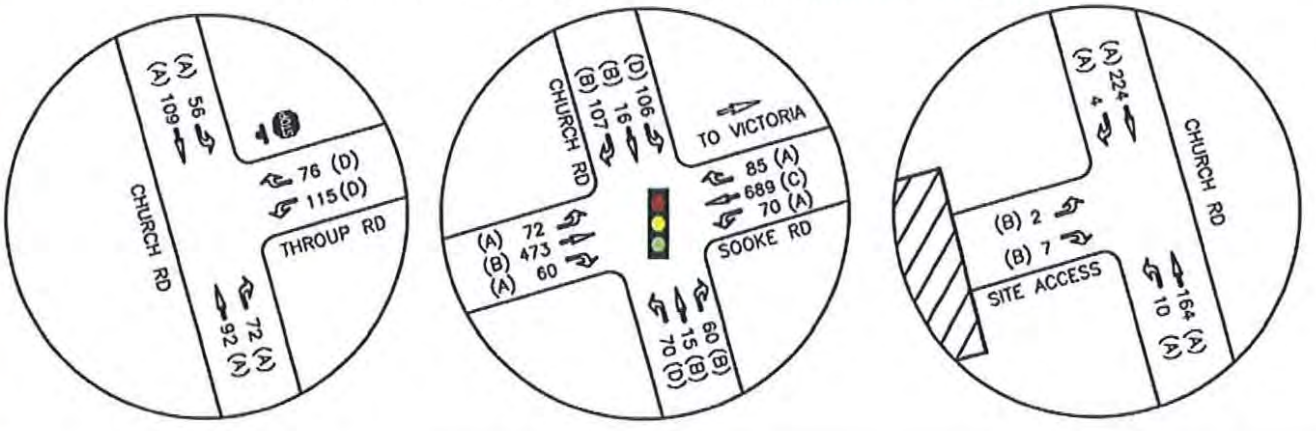
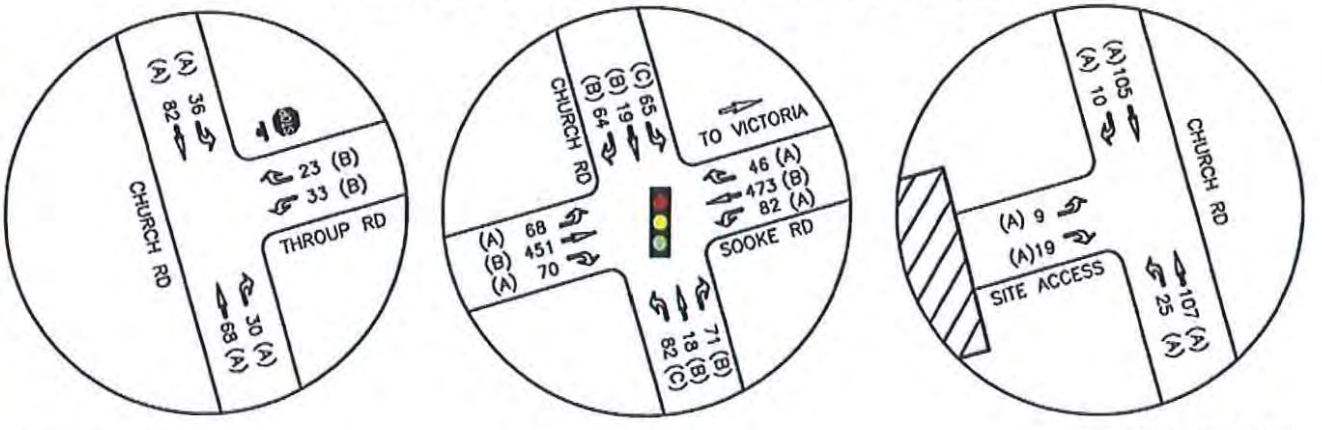
2013 POST DEVELOPMENT PM PEAK HOUR



2013 POST DEVELOPMENT SCHOOL PM PEAK HOUR



2013 POST DEVELOPMENT SUNDAY PEAK HOUR



#: TRAFFIC VOLUMES
(#): LEVELS OF SERVICE

FIGURE 5

Boulevard TRANSPORTATION GROUP

TITLE:
KNOX COMMUNITY CENTRE
2013 POST DEVELOPMENT–OPENING DAY
PEAK HR VOLUMES & LEVELS OF SERVICE

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DATE: SEP 16–10	DRAWING NO: 1185_FIG 5	REV.

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Table 2: 2013 Traffic Conditions at Church Rd/Sooke Rd (PM Peak Hr)

Movement	LOS		Delay (Sec)		95th Queue Length (m)	
	Bkgd*	Post D*	Bkgd*	Post D*	Bkgd*	Post D*
Northbound left	D	D	37.6	37.7	27.2	27.2
Northbound thru/right	B	B	12.9	12.9	15.6	15.6
Southbound left	D	D	46.6	47.5	29.8	30.7
Southbound thru/right	B	B	13.3	13.1	15.4	15.6
Eastbound left	A	B	9.5	10.5	11.1	12.7
Eastbound through	B	B	13.0	13.0	91.1	91.1
Eastbound right	A	A	4.8	4.8	7.7	7.7
Westbound left	A	A	5.6	5.6	8.4	8.4
Westbound through	C	C	26.2	26.6	219.3	219.3
Westbound right	A	A	8.5	8.6	15.0	15.3

* Bkgd: 2013 Background (with No Development); Post D: 2013 Post Development

In the Sunday peak hour, the intersection of Church Road/Sooke Road will be operating at a LOC C or better for all movements after the development is complete.

The intersection of Throup Road/Church Road will continue to operate at same levels of service as the 2013 background conditions. The northbound and southbound movements will be operating at a LOS A with the development during the three different peak hour periods. The westbound movement stop-controlled will have just 0.9 seconds of additional delay as a worst case during the school PM peak hour with the added development traffic. In the Sunday peak hour, only 0.3 seconds of additional delay will occur for the westbound movement despite the additional church traffic added.

Table 3: 2013 Traffic Conditions from Throup Rd onto Church Rd

Peak Hour Period	LOS		Delay (Sec)		95th Queue Length (m)	
	Bkgd*	Post D*	Bkgd*	Post D*	Bkgd*	Post D*
School PM Peak	D	D	31.9	32.7	48.0	49.2
PM Peak	B	B	12.2	12.3	7.3	7.4
Sunday Peak	B	B	10.6	10.9	3.4	3.7

* Bkgd: 2013 Background (with No Development); Post D: 2013 Post Development

At the site access on Church Road, all movements will operate at good levels of service (LOS A/B) during the three different peak hour periods with the development .

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5.5 Mitigations for 2013 Conditions (Opening Day)

Based on the 2013 conditions with or without the development, the intersection of Church Road/Sooke Road is operating at an acceptable level from a capacity perspective. The development will not affect traffic conditions at the two key intersections and adjacent roadway network. The levels of service are practically all unchanged between 2013 background (existing) and post development conditions.

At the intersection of Throup Road/Church Road and proposed access points, no mitigations are required in terms of roadway capacity.

6.0 LONG TERM CONDITIONS

The District of Sooke plans to implement the Connector Road project (ie. connection on Phillips to Throup to Grant) in the future. With the Connector, Sooke Road traffic is expected to be alleviated from Otter Point Road to Phillips Road. Instead traffic volumes on Throup Road (Grant Road Collector) will increase significantly as the new Connector Road connection provides an alternative east-west route in the north side of Sooke Road. The long term analysis assumes the Connector is complete. It is more desirable to connect the Connector Road with the current intersection of Throup Road/Church Road because one four legged intersection is formed. However, it is assumed that the Grant Road Collector is connected to Church Road south of Throup Road. The background traffic volumes for the ten year horizon (2023) were obtained from the previous study (Sooke Transportation Plan). The long term conditions were analyzed in Synchro software.

6.1 2023 Background Conditions: No Development

In 2023 without the development, at Church Road/Sooke Road, all movements will be operating at a LOS C or better with the Mariners Village traffic. However, at Throup Road/Church Road the westbound left movement (stop-controlled) will drop to a failing level of service (LOS F) based on the 2023 PM peak hour although a westbound right turn lane is proposed to be added on Throup Road.

6.2 2023 Post Development Conditions

In 2023 with the development, the intersection of Church Road/Sooke Road will continue to operate at a LOS C or better during the PM peak hour. At the intersection of Throup Road/Church Road, the post development traffic conditions are unchanged compared to the background conditions as the development traffic impacts are negligible (4 trips assigned to this intersection). At Throup Road/Church Road, the failing level of service for the westbound movement is already due to the existing (projected) volumes and stop control. See **Figure 6** for the 2023 traffic volumes and LOS during the PM peak hour.

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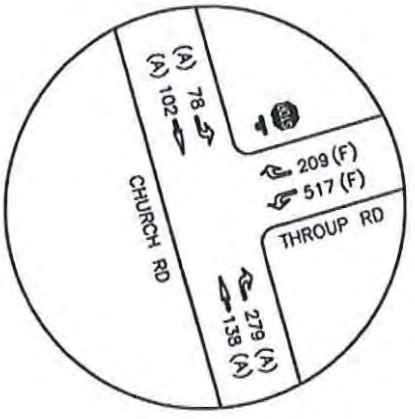
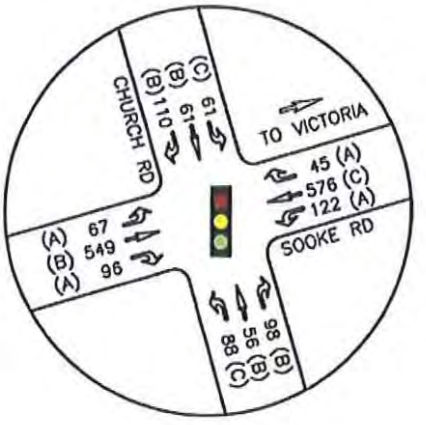
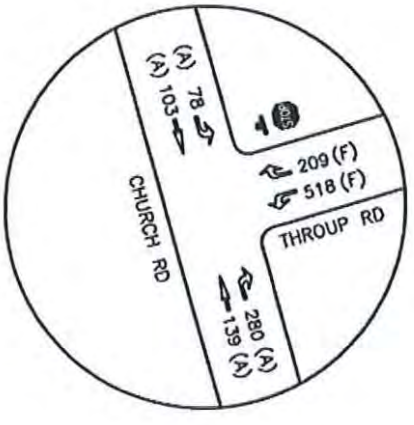
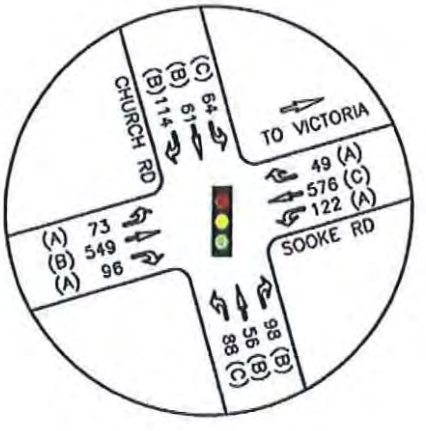
2023 BACKGROUND PM PEAK HOUR (NO DEVEOPMENT)





2023 POST DEVELOPMENT PM PEAK HOUR





##: TRAFFIC VOLUMES
(#): LEVELS OF SERVICE

FIGURE 6

Boulevard TRANSPORTATION GROUP

TITLE:
KNOX COMMUNITY CENTRE
2023 PM PEAK HOUR CONDITIONS
TRAFFIC VOLUMES & LEVELS OF SERVICE

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6.3 Mitigations for Long Term Conditions

In the long term at Throup Road/Church Road, mitigation is required to deal with the LOS F on Church Road. New traffic control should be implemented to improve traffic conditions at the intersection if the Connector Road is implemented. The intersection of Throup Road/Church Road is considered as a roundabout candidate location based on the overall/turning traffic volumes with the Grant Road Collector. With the implementation of roundabout, all movements will operate at acceptable levels of service (LOS C or better). This work is required due to existing conditions and the City should be working towards implementing these changes when the Connector Road is constructed in the future. The City should also consider creating a 4 legged intersection at Throup/Church Collector rather than 2 offset 'T' intersections.

7.0 GEOMETRICS AND SAFETY

7.1 Left Turn Lanes

At the site access on Church Road, a northbound left turn lane is not warranted based on the 2013/2023 post development peak hour volumes. All movements will continue to operate at a LOS A/B in the long term with the development traffic. Therefore, no separate left turn lanes are required at the site access/Church Road.

7.2 Sight Distances

Sight distances were reviewed for the proposed driveway locations on Church Road. The following table summarizes the measured and required turning and stopping sight distance for a design speed of 50km/h. Required sight distances are based on the TAC Geometric Design Guide for Canadian Roads.

Table 4: Sight Distances at Site Accesses on Church Rd for 50km/h

Location	Direction	Measured	Recommended Turning Sight Distance	Required Stopping Sight Distance	Turning Sight Distance Met?	Stopping Sight Distance Met?
Middle Point of Frontage	Looking Left	150m+	123m (right turn) 100m (left turn)	65m	Yes	Yes
	Looking Right	200m+	123m (left turn)	65m	Yes	Yes
South End of Frontage (ramp exit)	Looking Left	120m	123m (right turn) 100m (left turn)	65m	Yes	Yes
	Looking Right	200m+	123m (left turn)	65m	Yes	Yes

Sight distances were reviewed at the two driveway locations; one is located at a middle point of the Church Road frontage and the other is located at the south end of the development frontage. The middle point driveway location provides sufficient sight distances for both directions; sight distances measured exceed all sight distance requirements including the recommended turning sight distance (123m). At the proposed ramp location (underground parking), available sight distance looking right is sufficient (200m+). The sight distance looking left is 120m and this within half a vehicle length of the recommended turning sight distance (123m) and sufficient stopping sight distance for through vehicles is exceeded. Therefore, all sight distance requirements are met at the proposed driveway locations including the recommended turning sight distance.

Looking Church Road North at South End of Frontage

Looking Church Road South at South End of Frontage

7.3 Church Road Cross-section

The right-of-way of Church Road (frontage of the site) is currently 13m (partly 16m). Church Road should be upgraded with a typical 20m width of right-of-way along the frontage according to the District's collector road standards. A cross-section for urban collector roads includes sidewalks and bike lanes. Therefore, in the long term additional property along Church Road may be required to accommodate the collector road improvements including bike lanes.

8.0 ALTERNATIVE MODES

8.1 Pedestrians/Cyclists

The Sooke Town Centre (Evergreen Mall) is located within a walking distance (300m south) from the site. There are currently sidewalks on the west side of Church Road from Sooke Road to the Knox Church (2110 Church Road). The sidewalk should be extended along the whole development frontage for pedestrians and scooter users. There are currently no bike lanes on Church Road and adjacent roads. As Church Road is designated as a collector road, bike lanes would be required ultimately based

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on the City's cross-section plan. Therefore, consideration for future bike lanes is required when determining the sidewalk location.

8.2 Transit

The community bus service (Transit Route #63) is provided along Church Road of the development frontage. Currently this route (Sooke town loop) provides service four times each weekday. Along Sooke Road, transit service (Route #61) is provided to/from Langford/Victoria between every 20 minutes to every 1 hour. There is a bus stop (Route #61) on Sooke Road at Church Road (300m south of the site). A bus stop is recommended with waiting area (sign/seating/shelter) at the frontage of Church Road.

9.0 CONCLUSIONS

The proposed development with 114 units of senior adult housing (Knox Sooke Community Centre) will generate 20 trips in the PM peak hour and 42 trips in the Sunday peak hour.

The intersection of Church Road/Sooke Road is currently operating at a LOS C or better except for the westbound through movement (LOS D) in the PM peak hour. This intersection is proposed to be four-legged with improvements as the Mariners Village development proceeds; these changes are included in the impact analysis for the proposed Knox Community Centre. The addition of the development traffic will not change the levels of service for any movements at the intersection based on the 2013 opening day three peak hour periods (PM/School PM/Sunday) analysis. Additional delays with the development will be minimal (maximum 1.0 second for any movements) in the PM peak hour.

At Throup Road/Church Road, the westbound movement stop-controlled is currently operating at a LOS D in the school PM peak hour while operating at a LOS B in the PM/Sunday peak. The resulting LOS D occurs only for a half hour (2:45 PM to 3:15 PM) in the school PM peak hour. The development traffic will not affect any levels of service at the intersection in the three peak hour periods.

In the long term (2023: 10 year horizon after opening day), the Connector Road will be utilized as an alternative east-west route in the future. Based on the projected 2023 traffic volumes with the offset 'T' configuration, at Throup Road/Church Road the westbound movement stop-controlled will drop to a LOS F. However, the failing level of service is due to existing (projected) traffic. For the future traffic control at Throup Road/Church Road, a roundabout would be preferred to a traffic signal considering overall traffic volumes and safety. A one lane roundabout (ICD 35m or larger) will

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accommodate the future traffic demand at the intersection. The intersection of Church Road/Sooke Road is will be operating at a LOS C or better with/without the development in the 2023 three peak hour periods.

The accesses proposed on Church Road are appropriately located based on the sight distance. The proposed accesses will be a full movement. At the proposed two accesses on Church Road, all movements will be operating at a LOS A or B in the peak hours. At the site access/Church Road, a left turn lane is not warranted based on the 2013 or 2023 post development volumes.

There are sidewalks on the west side of Church Road from Sooke Road to the existing Knox Church. Sidewalks are required along the frontage for pedestrians and scooter users. There are currently no bike lanes on Church Road, but bike lanes are proposed according to the Transportation Master Plan. The current right-of-way (13m to 16m) at the site frontage is not enough to implement the proposed new cross-section for collector roads. Additional property may be required for the cross-section improvements.

The site is located close to the town centre and is within the walking distance to the Evergreen shopping mall. Currently transit route #63 (community bus) provides service to downtown on Church Road and route #61 provides service from Sooke Road (town centre) to Langford and Victoria.

10.0 RECOMMENDATIONS

The developer is to provide the following as part of the development to satisfy the traffic improvements required:

- A sidewalk along the Church Road frontage.
- Property required for the proposed new cross-section (right-of-way) on Church Road in the future.
- A bus stop with waiting area (sign/seating/shelter) at the frontage of Church Road

The City should ensure a roundabout can be constructed at the Throup Road/Church Road intersection in the future.

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APPENDIX A

Synchro Background

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MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed by using a software program called Synchro and SimTraffic, and the results were measured in delay, Level of Service (LOS) and 95th percentile queue length. Synchro is based on the Highway Capacity Manual (HCM) methodology. SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly "seeding" or positioning vehicles travelling throughout the network. The simulation, is run five times (five different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

Levels of Service

Traffic operations are typically described in terms of Levels of Service (LOS) which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable/disruptive operations). LOS E/F are generally undesirable operations for every day conditions.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The two tables below indicate the ranges of delay for LOS for signalized and unsignalized intersections.

Table A1: LOS Criteria

	Average Control Delay (seconds/vehicle)	
Level of Service	Unsignalized Intersection	Signalized Intersection
A	Less than 10	Less than 10
B	11 to 15	11 to 20
C	16 to 25	21 to 35
D	26 to 35	36 to 55
E	36 to 50	56 to 80
F	More than 51	More than 81

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APPENDIX B

Synchro Results – 2010 Existing

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0			10.0	0.0	15.0
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	24			14	24	14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.93		0.97
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1526	1575	1606	1379	1541	1379
Flt Permitted	0.144				0.950	
Satd. Flow (perm)	231	1575	1606	1282	1541	1337
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				31		76
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50	50		50	
Link Distance (m)		237.9	233.1		611.2	
Travel Time (s)		17.1	16.8		44.0	
Volume (vph)	100	510	744	101	92	66
Confl. Peds. (#/hr)	22			22		6
Peak Hour Factor	0.86	0.92	0.90	0.81	0.70	0.87
Heavy Vehicles (%)	2%	4%	2%	1%	1%	1%
Adj. Flow (vph)	116	554	827	125	131	76
Lane Group Flow (vph)	116	554	827	125	131	76
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	6.0	10.0	10.0	10.0	7.0	7.0
Minimum Split (s)	14.3	25.5	23.5	23.5	23.0	23.0
Total Split (s)	14.3	42.0	27.7	27.7	23.0	23.0
Total Split (%)	22.0%	64.6%	42.6%	42.6%	35.4%	35.4%
Maximum Green (s)	10.0	36.5	22.2	22.2	17.8	17.8
Yellow Time (s)	3.5	4.5	4.5	4.5	4.2	4.2
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None
Walk Time (s)		7.0	7.0	7.0		
Flash Dont Walk (s)		13.0	7.0	7.0		
Pedestrian Calls (#/hr)		10	10	10		
Act Effct Green (s)	34.1	36.7	27.3	27.3	11.5	11.5
Actuated g/C Ratio	0.64	0.72	0.53	0.53	0.21	0.21
v/c Ratio	0.33	0.49	0.97	0.18	0.40	0.22
Control Delay	6.9	7.5	48.1	10.1	23.3	7.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	7.5	48.1	10.1	23.3	7.2
LOS	A	A	D	B	C	A
Approach Delay		7.4	43.1		17.4	
Approach LOS		A	D		B	
Queue Length 50th (m)	3.5	23.9	~106.0	5.6	11.7	0.0
Queue Length 95th (m)	9.6	56.5	#186.3	14.6	18.6	7.7
Internal Link Dist (m)		213.9	209.1		587.2	
Turn Bay Length (m)	25.0			10.0		15.0
Base Capacity (vph)	389	1136	856	698	483	471
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.49	0.97	0.18	0.27	0.16

Intersection Summary

Area Type: CBD
Cycle Length: 65
Actuated Cycle Length: 51.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 27.1 Intersection LOS: C
Intersection Capacity Utilization 69.7% ICU Level of Service C
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sooke Rd & Church Rd

HCM Unsignalized Intersection Capacity Analysis
13: Throup Rd & Church Rd

22/09/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	52	52	126	54	22	106
Peak Hour Factor	0.71	0.65	0.87	0.75	0.70	0.76
Hourly flow rate (vph)	73	80	145	72	31	139
Pedestrians	7		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.0		1.0			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	393	188			224	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	393	188			224	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	91			98	
cM capacity (veh/h)	591	848			1335	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	153	217	171
Volume Left	73	0	31
Volume Right	80	72	0
cSH	702	1700	1335
Volume to Capacity	0.22	0.13	0.02
Queue Length 95th (m)	6.3	0.0	0.5
Control Delay (s)	11.6	0.0	1.6
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	1.6
Approach LOS	B		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Throup Rd & Church Rd

22/09/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	114	76	86	71	56	102
Peak Hour Factor	0.45	0.73	0.92	0.68	0.54	0.77
Hourly flow rate (vph)	253	104	93	104	104	132
Pedestrians	33		33			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.0		1.0			
Percent Blockage	3		3			
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	552	179			231	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552	179			231	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	39	88			92	
cM capacity (veh/h)	413	835			1292	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	357	198	236
Volume Left	253	0	104
Volume Right	104	104	0
cSH	485	1700	1292
Volume to Capacity	0.74	0.12	0.08
Queue Length 95th (m)	46.3	0.0	2.0
Control Delay (s)	30.5	0.0	3.9
Lane LOS	D		A
Approach Delay (s)	30.5	0.0	3.9
Approach LOS	D		

Intersection Summary			
Average Delay	15.0		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

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APPENDIX C

Synchro Results – 2013 Background

Lanes, Volumes, Timings
3: Sooke Rd & Church Rd

17/09/2010

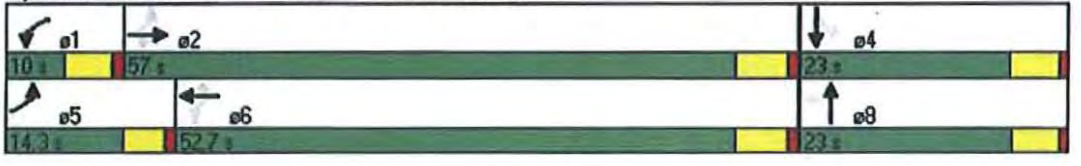
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.91					0.97	
Frt			0.850			0.850		0.879			0.882	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1526	1575	1365	1526	1606	1379	1526	1412	0	1541	1389	0
Flt Permitted	0.104			0.368			0.690			0.677		
Satd. Flow (perm)	167	1575	1365	591	1606	1255	1108	1412	0	1098	1389	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42			31		84			77	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		237.9			233.1			140.1			611.2	
Travel Time (s)		17.1			16.8			10.1			44.0	
Volume (vph)	90	525	70	82	765	107	82	18	71	96	19	67
Confl. Peds. (#/hr)	22					22						6
Peak Hour Factor	0.86	0.92	0.85	0.92	0.90	0.81	0.92	0.92	0.85	0.70	0.92	0.87
Heavy Vehicles (%)	2%	4%	2%	2%	2%	1%	2%	2%	2%	1%	2%	1%
Adj. Flow (vph)	105	571	82	89	850	132	89	20	84	137	21	77
Lane Group Flow (vph)	105	571	82	89	850	132	89	104	0	137	98	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	57.0	57.0	10.0	52.7	52.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	15.9%	63.3%	63.3%	11.1%	58.6%	58.6%	25.6%	25.6%	0.0%	25.6%	25.6%	0.0%
Maximum Green (s)	10.0	51.5	51.5	5.0	47.2	47.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	53.4	51.2	51.2	48.6	48.8	48.8	14.8	14.8		15.4	15.4	
Actuated g/C Ratio	0.69	0.68	0.68	0.63	0.65	0.65	0.19	0.19		0.20	0.20	
v/c Ratio	0.38	0.53	0.09	0.20	0.82	0.16	0.42	0.31		0.63	0.29	
Control Delay	9.5	13.0	4.8	5.6	26.2	8.5	37.6	12.9		46.6	13.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.5	13.0	4.8	5.6	26.2	8.5	37.6	12.9		46.6	13.3	
LOS	A	B	A	A	C	A	D	B		D	B	
Approach Delay		11.6			22.3			24.3			32.7	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	4.6	55.3	2.6	3.8	123.6	7.5	13.1	2.7		21.1	2.9	
Queue Length 95th (m)	11.1	91.1	7.7	8.4	#219.3	15.0	27.2	15.6		29.8	15.4	
Internal Link Dist (m)		213.9			209.1			116.1			587.2	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	306	1073	943	452	1038	822	272	410		269	399	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.34	0.53	0.09	0.20	0.82	0.16	0.33	0.25		0.51	0.25	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 75.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 20.0 Intersection LOS: B
Intersection Capacity Utilization 76.1% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sooke Rd & Church Rd



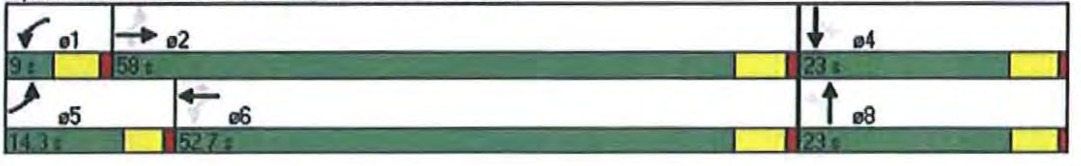
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.91					0.97	
Frt			0.850			0.850		0.878			0.869	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1526	1575	1365	1526	1606	1379	1526	1410	0	1541	1366	0
Flt Permitted	0.157			0.424			0.609			0.701		
Satd. Flow (perm)	252	1575	1365	681	1606	1255	978	1410	0	1137	1366	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41			26		71			118	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		237.9			233.1			140.1			611.2	
Travel Time (s)		17.1			16.8			10.1			44.0	
Volume (vph)	66	473	60	70	689	81	70	15	60	103	16	103
Confl. Peds. (#/hr)	22					22						6
Peak Hour Factor	0.86	0.92	0.85	0.92	0.90	0.81	0.92	0.92	0.85	0.70	0.92	0.87
Heavy Vehicles (%)	2%	4%	2%	2%	2%	1%	2%	2%	2%	1%	2%	1%
Adj. Flow (vph)	77	514	71	76	766	100	76	16	71	147	17	118
Lane Group Flow (vph)	77	514	71	76	766	100	76	87	0	147	135	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	58.0	58.0	9.0	52.7	52.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	15.9%	64.4%	64.4%	10.0%	58.6%	58.6%	25.6%	25.6%	0.0%	25.6%	25.6%	0.0%
Maximum Green (s)	10.0	52.5	52.5	4.0	47.2	47.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	46.7	47.0	47.0	42.1	44.6	44.6	15.1	15.1		15.9	15.9	
Actuated g/C Ratio	0.65	0.67	0.67	0.59	0.64	0.64	0.21	0.21		0.22	0.22	
v/c Ratio	0.23	0.49	0.08	0.16	0.75	0.12	0.37	0.25		0.59	0.35	
Control Delay	5.9	11.7	4.2	5.4	21.8	8.0	35.6	12.5		42.4	11.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.9	11.7	4.2	5.4	21.8	8.0	35.6	12.5		42.4	11.1	
LOS	A	B	A	A	C	A	D	B		D	B	
Approach Delay		10.2			19.0			23.3			27.4	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	3.4	46.1	1.9	3.3	99.4	5.3	11.0	2.2		22.5	2.3	
Queue Length 95th (m)	7.1	75.0	6.4	7.4	#185.8	11.6	24.2	13.9		31.4	16.7	
Internal Link Dist (m)		213.9			209.1			116.1			587.2	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	368	1089	956	473	1047	827	268	438		312	460	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.21	0.47	0.07	0.16	0.73	0.12	0.28	0.20		0.47	0.29	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 70
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 17.7 Intersection LOS: B
Intersection Capacity Utilization 70.9% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sooke Rd & Church Rd



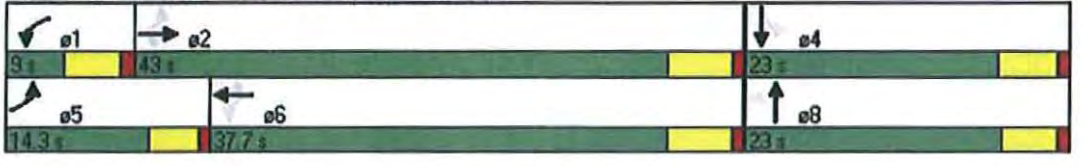
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.96					0.98	
Frt			0.850			0.850		0.881			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1441	1575	1365	1526	1545	1243	1526	1415	0	1441	1394	0
Flt Permitted	0.181			0.409			0.691			0.694		
Satd. Flow (perm)	275	1575	1365	657	1545	1192	1110	1415	0	1053	1394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			45			14		77			81	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		237.9			233.1			132.2			611.2	
Travel Time (s)		17.1			16.8			9.5			44.0	
Volume (vph)	53	451	70	82	473	36	82	18	71	59	19	56
Confl. Peds. (#/hr)	8					8						4
Peak Hour Factor	0.71	0.89	0.92	0.92	0.76	0.81	0.92	0.92	0.92	0.79	0.92	0.69
Heavy Vehicles (%)	8%	4%	2%	2%	6%	12%	2%	2%	2%	8%	2%	1%
Adj. Flow (vph)	75	507	76	89	622	44	89	20	77	75	21	81
Lane Group Flow (vph)	75	507	76	89	622	44	89	97	0	75	102	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	43.0	43.0	9.0	37.7	37.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	19.1%	57.3%	57.3%	12.0%	50.3%	50.3%	30.7%	30.7%	0.0%	30.7%	30.7%	0.0%
Maximum Green (s)	10.0	37.5	37.5	4.0	32.2	32.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	32.5	33.2	33.2	29.5	31.7	31.7	11.7	11.7		12.2	12.2	
Actuated g/C Ratio	0.58	0.64	0.64	0.53	0.61	0.61	0.22	0.22		0.22	0.22	
v/c Ratio	0.23	0.50	0.09	0.20	0.66	0.06	0.37	0.27		0.32	0.27	
Control Delay	6.1	11.5	4.6	6.0	17.7	7.6	27.7	10.9		26.7	10.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.1	11.5	4.6	6.0	17.7	7.6	27.7	10.9		26.7	10.8	
LOS	A	B	A	A	B	A	C	B		C	B	
Approach Delay		10.1			15.7			18.9			17.5	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	2.3	35.4	1.5	2.7	55.0	1.6	9.7	2.0		8.1	2.1	
Queue Length 95th (m)	5.6	72.5	7.4	8.3	85.3	6.1	22.4	12.9		16.8	13.2	
Internal Link Dist (m)		213.9			209.1			108.2			587.2	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	380	1063	936	440	980	762	367	520		348	515	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.20	0.48	0.08	0.20	0.63	0.06	0.24	0.19		0.22	0.20	

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 51.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 14.1 Intersection LOS: B
Intersection Capacity Utilization 56.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: Sooke Rd & Church Rd



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APPENDIX D

Synchro Results – 2013 Post Development

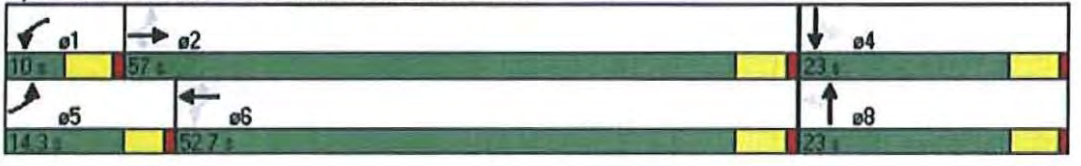
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.91					0.97	
Frt			0.850			0.850		0.879			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1526	1575	1365	1526	1606	1379	1526	1412	0	1541	1388	0
Flt Permitted	0.104			0.368			0.684			0.677		
Satd. Flow (perm)	167	1575	1365	591	1606	1255	1098	1412	0	1098	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42			33		84			80	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		237.9			233.1			140.1			611.2	
Travel Time (s)		17.1			16.8			10.1			44.0	
Volume (vph)	96	525	70	82	765	111	82	18	71	99	19	70
Confl. Peds. (#/hr)	22					22						6
Peak Hour Factor	0.86	0.92	0.85	0.92	0.90	0.81	0.92	0.92	0.85	0.70	0.92	0.87
Heavy Vehicles (%)	2%	4%	2%	2%	2%	1%	2%	2%	2%	1%	2%	1%
Adj. Flow (vph)	112	571	82	89	850	137	89	20	84	141	21	80
Lane Group Flow (vph)	112	571	82	89	850	137	89	104	0	141	101	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	57.0	57.0	10.0	52.7	52.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	15.9%	63.3%	63.3%	11.1%	58.6%	58.6%	25.6%	25.6%	0.0%	25.6%	25.6%	0.0%
Maximum Green (s)	10.0	51.5	51.5	5.0	47.2	47.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	53.6	51.3	51.3	48.6	48.8	48.8	15.0	15.0		15.6	15.6	
Actuated g/C Ratio	0.69	0.68	0.68	0.62	0.64	0.64	0.19	0.19		0.20	0.20	
v/c Ratio	0.40	0.54	0.09	0.20	0.82	0.17	0.42	0.31		0.64	0.30	
Control Delay	10.5	13.0	4.8	5.6	26.6	8.6	37.7	12.9		47.5	13.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	10.5	13.0	4.8	5.6	26.6	8.6	37.7	12.9		47.5	13.1	
LOS	B	B	A	A	C	A	D	B		D	B	
Approach Delay		11.8			22.5			24.3			33.1	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	5.0	56.3	2.6	3.9	126.6	8.0	13.1	2.8		21.9	2.9	
Queue Length 95th (m)	12.7	91.1	7.7	8.4	#219.3	15.3	27.2	15.6		30.7	15.6	
Internal Link Dist (m)		213.9			209.1			116.1			587.2	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	306	1071	941	451	1035	820	269	409		269	400	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.37	0.53	0.09	0.20	0.82	0.17	0.33	0.25		0.52	0.25	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 75.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 20.2 Intersection LOS: C
Intersection Capacity Utilization 76.6% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sooke Rd & Church Rd



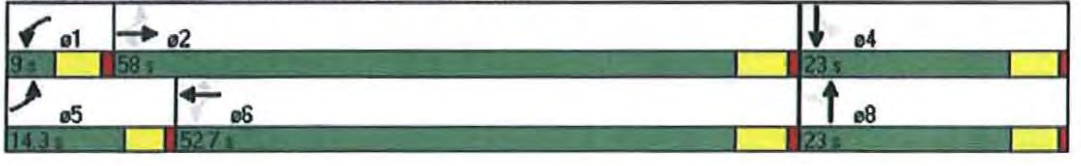
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.91					0.97	
Frt			0.850			0.850		0.878			0.868	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1526	1575	1365	1526	1606	1379	1526	1410	0	1541	1364	0
Flt Permitted	0.157			0.424			0.598			0.701		
Satd. Flow (perm)	252	1575	1365	681	1606	1255	960	1410	0	1137	1364	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41			28		71			123	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		237.9			233.1			140.1			326.6	
Travel Time (s)		17.1			16.8			10.1			23.5	
Volume (vph)	72	473	60	70	689	85	70	15	60	106	16	107
Confl. Peds. (#/hr)	22					22						6
Peak Hour Factor	0.86	0.92	0.85	0.92	0.90	0.81	0.92	0.92	0.85	0.70	0.92	0.87
Heavy Vehicles (%)	2%	4%	2%	2%	2%	1%	2%	2%	2%	1%	2%	1%
Adj. Flow (vph)	84	514	71	76	766	105	76	16	71	151	17	123
Lane Group Flow (vph)	84	514	71	76	766	105	76	87	0	151	140	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	58.0	58.0	9.0	52.7	52.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	15.9%	64.4%	64.4%	10.0%	58.6%	58.6%	25.6%	25.6%	0.0%	25.6%	25.6%	0.0%
Maximum Green (s)	10.0	52.5	52.5	4.0	47.2	47.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	47.2	47.5	47.5	42.3	44.9	44.9	15.4	15.4		16.1	16.1	
Actuated g/C Ratio	0.65	0.67	0.67	0.58	0.64	0.64	0.21	0.21		0.22	0.22	
v/c Ratio	0.25	0.49	0.08	0.16	0.75	0.13	0.37	0.25		0.60	0.35	
Control Delay	6.1	11.7	4.2	5.5	22.2	8.1	36.0	12.5		43.2	11.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.1	11.7	4.2	5.5	22.2	8.1	36.0	12.5		43.2	11.0	
LOS	A	B	A	A	C	A	D	B		D	B	
Approach Delay		10.2			19.3			23.5			27.7	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	3.8	46.9	1.9	3.4	101.8	5.7	11.1	2.2		23.4	2.3	
Queue Length 95th (m)	7.6	75.0	6.4	7.4	#186.9	12.1	24.4	14.0		32.3	17.1	
Internal Link Dist (m)		213.9			209.1			116.1			302.6	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	367	1086	954	470	1042	824	262	437		311	462	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.23	0.47	0.07	0.16	0.74	0.13	0.29	0.20		0.49	0.30	

Intersection Summary

Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 70.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 17.9 Intersection LOS: B
Intersection Capacity Utilization 75.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sooke Rd & Church Rd



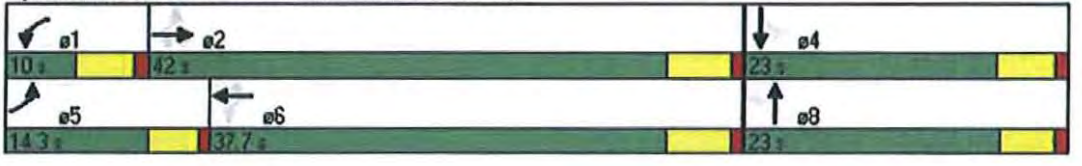
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.96					0.98	
Frt			0.850			0.850		0.881			0.878	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1441	1575	1365	1526	1545	1243	1526	1415	0	1441	1389	0
Flt Permitted	0.207			0.406			0.684			0.694		
Satd. Flow (perm)	314	1575	1365	652	1545	1192	1098	1415	0	1053	1389	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			45			20		77			93	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		237.9			233.1			141.5			309.2	
Travel Time (s)		17.1			16.8			10.2			22.3	
Volume (vph)	68	435	70	82	448	46	82	18	71	65	19	64
Confl. Peds. (#/hr)	8					8						4
Peak Hour Factor	0.71	0.89	0.92	0.92	0.76	0.81	0.92	0.92	0.92	0.79	0.92	0.69
Heavy Vehicles (%)	8%	4%	2%	2%	6%	12%	2%	2%	2%	8%	2%	1%
Adj. Flow (vph)	96	489	76	89	589	57	89	20	77	82	21	93
Lane Group Flow (vph)	96	489	76	89	589	57	89	97	0	82	114	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	42.0	42.0	10.0	37.7	37.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	19.1%	56.0%	56.0%	13.3%	50.3%	50.3%	30.7%	30.7%	0.0%	30.7%	30.7%	0.0%
Maximum Green (s)	10.0	36.5	36.5	5.0	32.2	32.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	31.3	31.9	31.9	28.6	30.7	30.7	11.9	11.9		12.4	12.4	
Actuated g/C Ratio	0.56	0.62	0.62	0.52	0.60	0.60	0.22	0.22		0.23	0.23	
v/c Ratio	0.27	0.50	0.09	0.20	0.64	0.08	0.36	0.26		0.34	0.29	
Control Delay	6.6	12.0	4.9	6.0	17.4	7.6	27.4	10.8		26.9	10.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.6	12.0	4.9	6.0	17.4	7.6	27.4	10.8		26.9	10.4	
LOS	A	B	A	A	B	A	C	B		C	B	
Approach Delay		10.4			15.2			18.7			17.3	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	2.9	35.1	1.6	2.7	51.3	2.1	9.5	2.0		8.8	2.1	
Queue Length 95th (m)	6.9	71.5	7.8	8.3	80.9	7.4	22.3	12.9		18.0	13.9	
Internal Link Dist (m)		213.9			209.1			117.5			285.2	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	397	1047	922	448	974	759	372	530		357	532	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.24	0.47	0.08	0.20	0.60	0.08	0.24	0.18		0.23	0.21	

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 51.2
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 14.0 Intersection LOS: B
Intersection Capacity Utilization 54.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Sooke Rd & Church Rd



HCM Unsignalized Intersection Capacity Analysis
13: Throup Rd & Church Rd

12/10/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	115	76	92	72	56	109
Peak Hour Factor	0.45	0.73	0.92	0.68	0.54	0.77
Hourly flow rate (vph)	256	104	100	106	104	142
Pedestrians	33		33			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.0		1.0			
Percent Blockage	3		3			
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	568	186			239	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	568	186			239	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	37	87			92	
cM capacity (veh/h)	404	827			1283	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	360	206	245
Volume Left	256	0	104
Volume Right	104	106	0
cSH	474	1700	1283
Volume to Capacity	0.76	0.12	0.08
Queue Length 95th (m)	49.2	0.0	2.0
Control Delay (s)	32.7	0.0	3.8
Lane LOS	D		A
Approach Delay (s)	32.7	0.0	3.8
Approach LOS	D		

Intersection Summary			
Average Delay	15.7		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Site Access & Church Rd

12/10/2010

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	2	7	10	164	224	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	8	11	178	243	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)				327		
pX, platoon unblocked						
vC, conflicting volume	445	245	246			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	445	245	246			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	566	794	1320			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	10	189	246
Volume Left	2	11	0
Volume Right	8	0	2
cSH	729	1320	1700
Volume to Capacity	0.01	0.01	0.14
Queue Length 95th (m)	0.3	0.2	0.0
Control Delay (s)	10.0	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	10.0	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

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APPENDIX E

Synchro Results – 2023 Conditions

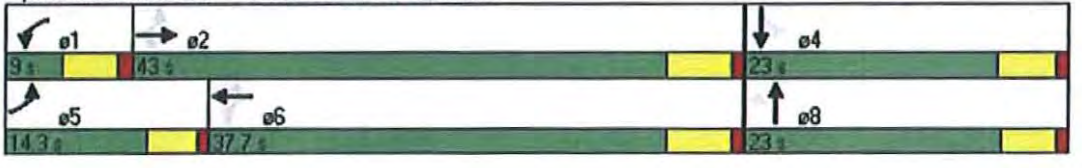
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.95					0.98	
Frt			0.850			0.850		0.904			0.899	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1541	1606	1365	1526	1622	1392	1526	1452	0	1541	1411	0
Flt Permitted	0.155			0.264			0.529			0.590		
Satd. Flow (perm)	251	1606	1365	424	1622	1322	850	1452	0	957	1411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			46			16		107			132	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		225.9			233.1			158.0			399.8	
Travel Time (s)		16.3			16.8			11.4			28.8	
Volume (vph)	67	549	96	122	576	45	88	56	98	61	61	110
Confl. Peds. (#/hr)	10					10						2
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.81	0.82	0.92	0.92	0.88	0.89	0.92	0.92	0.92	0.83	0.92	0.81
Heavy Vehicles (%)	1%	2%	2%	2%	1%	0%	2%	2%	2%	1%	2%	3%
Adj. Flow (vph)	83	670	104	133	655	51	96	61	107	73	66	136
Lane Group Flow (vph)	83	670	104	133	655	51	96	168	0	73	202	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	43.0	43.0	9.0	37.7	37.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	19.1%	57.3%	57.3%	12.0%	50.3%	50.3%	30.7%	30.7%	0.0%	30.7%	30.7%	0.0%
Maximum Green (s)	10.0	37.5	37.5	4.0	32.2	32.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	35.4	34.9	34.9	33.2	35.5	35.5	13.1	13.1		13.8	13.8	
Actuated g/C Ratio	0.58	0.62	0.62	0.57	0.63	0.63	0.22	0.22		0.23	0.23	
v/c Ratio	0.26	0.68	0.12	0.38	0.65	0.06	0.51	0.41		0.33	0.47	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	7.0	17.4	5.9	8.5	18.0	7.9	34.0	13.4		27.3	13.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	7.0	17.4	5.9	8.5	18.0	7.9	34.0	13.4		27.3	13.5	
LOS	A	B	A	A	B	A	C	B		C	B	
Approach Delay		15.0			15.9			20.9			17.2	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	2.9	59.8	3.2	4.8	62.0	2.0	10.7	6.3		7.8	7.3	
Queue Length 95th (m)	7.5	98.8	10.8	12.5	#136.4	7.9	25.3	21.6		17.5	24.8	
Internal Link Dist (m)		201.9			209.1			134.0			375.8	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	376	1030	892	351	1015	834	265	526		298	530	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.22	0.65	0.12	0.38	0.65	0.06	0.36	0.32		0.24	0.38	

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 56.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 16.3 Intersection LOS: B
Intersection Capacity Utilization 72.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sooke Rd & Church



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	517	209	138	279	78	102
Peak Hour Factor	0.71	0.65	0.87	0.75	0.70	0.76
Hourly flow rate (vph)	728	322	159	372	111	134
Pedestrians	7		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.0		1.0			
Percent Blockage	1		0			
Right turn flare (veh)		4				
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	712	352			538	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	712	352			538	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	53			89	
cM capacity (veh/h)	355	691			1033	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1050	531	246
Volume Left	728	0	111
Volume Right	322	372	0
cSH	421	1700	1033
Volume to Capacity	2.49	0.31	0.11
Queue Length 95th (m)	633.3	0.0	2.7
Control Delay (s)	699.8	0.0	4.6
Lane LOS	F		A
Approach Delay (s)	699.8	0.0	4.6
Approach LOS	F		

Intersection Summary			
Average Delay	402.9		
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

Lanes, Volumes, Timings
3: Sooke Rd & Church

12/10/2010

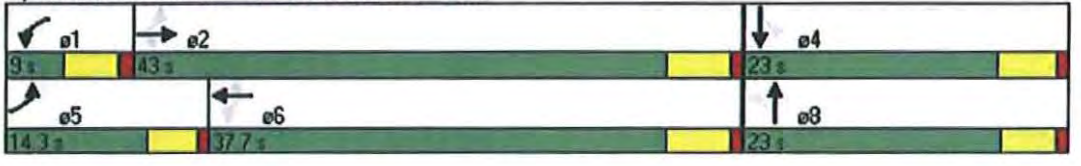
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		15.0	30.0		10.0	15.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2		15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.95					0.98	
Frt			0.850			0.850		0.904			0.898	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1541	1606	1365	1526	1622	1392	1526	1452	0	1541	1409	0
Flt Permitted	0.155			0.264			0.520			0.590		
Satd. Flow (perm)	251	1606	1365	424	1622	1322	835	1452	0	957	1409	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			46			17		107			137	
Headway Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		225.9			233.1			158.0			399.8	
Travel Time (s)		16.3			16.8			11.4			28.8	
Volume (vph)	73	549	96	122	576	49	88	56	98	64	61	114
Confl. Peds. (#/hr)	10					10						2
Confl. Bikes (#/hr)						5						
Peak Hour Factor	0.81	0.82	0.92	0.92	0.88	0.89	0.92	0.92	0.92	0.83	0.92	0.81
Heavy Vehicles (%)	1%	2%	2%	2%	1%	0%	2%	2%	2%	1%	2%	3%
Adj. Flow (vph)	90	670	104	133	655	55	96	61	107	77	66	141
Lane Group Flow (vph)	90	670	104	133	655	55	96	168	0	77	207	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phases	5	2	2	1	6	6	8	8		4	4	
Minimum Initial (s)	6.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		7.0	7.0	
Minimum Split (s)	14.3	25.5	25.5	9.0	23.5	23.5	21.0	21.0		23.0	23.0	
Total Split (s)	14.3	43.0	43.0	9.0	37.7	37.7	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	19.1%	57.3%	57.3%	12.0%	50.3%	50.3%	30.7%	30.7%	0.0%	30.7%	30.7%	0.0%
Maximum Green (s)	10.0	37.5	37.5	4.0	32.2	32.2	18.0	18.0		17.8	17.8	
Yellow Time (s)	3.5	4.5	4.5	4.0	4.5	4.5	4.0	4.0		4.2	4.2	
All-Red Time (s)	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	5.0	5.0				
Flash Dont Walk (s)		13.0	13.0		7.0	7.0	11.0	11.0				
Pedestrian Calls (#/hr)		10	10		10	10	0	0				
Act Effct Green (s)	36.2	35.8	35.8	32.6	34.0	34.0	13.3	13.3		14.0	14.0	
Actuated g/C Ratio	0.61	0.62	0.62	0.55	0.59	0.59	0.22	0.22		0.23	0.23	
v/c Ratio	0.27	0.67	0.12	0.39	0.68	0.07	0.51	0.41		0.35	0.48	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	6.7	17.3	5.9	8.8	20.1	8.1	34.7	13.5		27.9	13.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.7	17.3	5.9	8.8	20.1	8.1	34.7	13.5		27.9	13.5	
LOS	A	B	A	A	C	A	C	B		C	B	
Approach Delay		14.8			17.5			21.2			17.4	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	3.2	60.2	3.2	4.9	62.7	2.2	10.7	6.3		8.3	7.3	
Queue Length 95th (m)	7.9	98.8	10.8	12.5	#137.0	8.5	25.4	21.6		18.3	25.0	
Internal Link Dist (m)		201.9			209.1			134.0			375.8	
Turn Bay Length (m)	25.0		15.0	30.0		10.0	15.0			15.0		
Base Capacity (vph)	386	1028	890	341	973	800	258	522		295	529	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.23	0.65	0.12	0.39	0.67	0.07	0.37	0.32		0.26	0.39	

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 57.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 16.9 Intersection LOS: B
Intersection Capacity Utilization 73.1% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Sooke Rd & Church



HCM Unsignalized Intersection Capacity Analysis
13: Throup & Church

12/10/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	518	209	139	280	78	103
Peak Hour Factor	0.71	0.65	0.87	0.75	0.70	0.76
Hourly flow rate (vph)	730	322	160	373	111	136
Pedestrians	7		3			
Lane Width (m)	3.7		3.7			
Walking Speed (m/s)	1.0		1.0			
Percent Blockage	1		0			
Right turn flare (veh)		4				
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	715	353			540	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	715	353			540	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	53			89	
cM capacity (veh/h)	354	690			1031	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1051	533	247
Volume Left	730	0	111
Volume Right	322	373	0
cSH	419	1700	1031
Volume to Capacity	2.51	0.31	0.11
Queue Length 95th (m)	636.2	0.0	2.8
Control Delay (s)	706.3	0.0	4.6
Lane LOS	F		A
Approach Delay (s)	706.3	0.0	4.6
Approach LOS	F		

Intersection Summary			
Average Delay	406.1		
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		