TOWN OF LAKE COWICHAN

Public Works and Environmental Services Committee
Tuesday, March 17th, 2020 at 6:00 p.m. – Council Chambers

AGENDA

1.	**CALL TO ORDER**	**Page #**
	INTRODUCTION OF LATE ITEMS (if applicable)	
2.	**APPROVAL OF AGENDA**	
3.	**BUSINESS ARISING AND UNFINISHED BUSINESS**	
	(a) Superintendent, Public Works and Engineering Services re: WTP Update	**3**
	(b) **Ongoing Items Still Being Addressed:**	
	(i) CLEC Water System-Update.	
	(ii) Updating of Signage.	
4.	**DELEGATIONS AND REPRESENTATIONS**	
5.	**CORRESPONDENCE**	
6.	**VERBAL COMMENT FROM THE PUBLIC ON A SUBSEQUENT ITEM ON THE AGENDA**– (maximum 3 minutes per speaker and maximum time allotted 15 minutes)	
7.	**REPORTS**	
	(a) Superintendent, Public Works and Engineering Services re: Summary Report for Feb/March 2020.	**5**
	(b) Superintendent, Public Works and Engineering Services re: Roads-Capital Plan.	**7**
	(c) Superintendent, Public Works and Engineering Services re: Sidewalks-Capital Plan.	**10**
	(d) Superintendent, Public Works and Engineering Services re: South Shore Bus Shelter Replacement.	**15**
	(e) Superintendent, Public Works and Engineering Services re: Sewer Plan 2020.	**19**
	(f) Superintendent, Public Works and Engineering Services re: Town Waters Distribution Network.	**28**
8.	**NEW BUSINESS** None.	
9.	**NOTICES OF MOTION**	
10.	**PUBLIC RELATIONS ITEMS**	
11.	**QUESTION PERIOD** (maximum 3 minutes per speaker and maximum time allotted 15 minutes) **- Limited to items on the agenda**	
12.	**ADJOURNMENT**	

Please note: Should this meeting end sooner than 7:00 p.m., the next meeting may start no later than 10 minutes after adjournment of this meeting.

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Memo

TO: Chief Administrative Officer

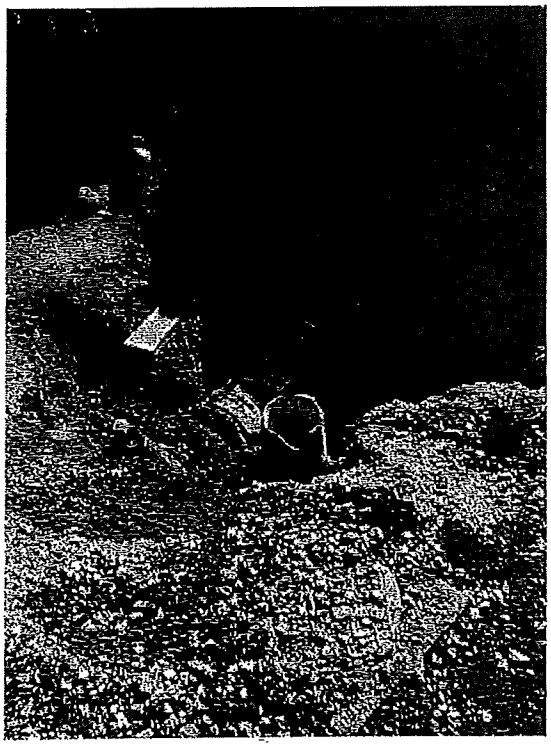
SUBJECT: WTP update

DATE: March 13, 2020

FROM: Superintendent, Public Works and Engineering Services

Current Status:

- Blind flanges at the North Shore Road and River Road need to be capped to prevent the release of untreated water in the distribution network.
  - River road was completed on the 12th-Mar.
  - Northshore will start on the 16th-Mar. .
- River road capping on River Road was straight forward. Contractor had easy access to valve.



Picture shows completed blocking and capping on River Road

- North Shore capping is not straight forward. When contractor investigated the valve, there was significant water infiltration and the clay subsurface made ground conditions very unstable.
- Contractor will have to use two vactor trucks to continuously haul away muddy water. The construction hole will take up the entire lane. Water interruption notices have be sent to all affected houses.
- Stantec is scheduled to be onsite on the 16th-Mar to continue commissioning.
- Tritech will be onsite at the same time on the 16th-Mar to address outstanding deficiencies.
- Was expecting to receive a proposal form a new 3rd party Level 4 Operator. Due to a loss of resource from contractor. PWS is looking for another resource.
    - Operator's duties would include: monthly walk-through and inspection of the WTP with written reports of the walk-through to be submitted to VIHA..
- Water from the WTP is currently running through the filters (without coagulation chemicals), UV and chlorine systems.

Kam So, P.Eng, MBA (Candidate)
Superintendent, Public Works and Engineering Services

Memo

TO: Chief Administrative Officer

SUBJECT: Summary Report for PWS – Feb 2020/Mar 2020

DATE: March 13, 2020

FROM: Superintendent, Public Works and Engineering Services

Asset Management Plan

- Asset Management Project
  - Progress meeting with consultant conducted on 20th-Feb.
  - Next step – consultant working towards final report.

Capital Projects

- River Road Boaster Station Upgrade
  - 95% design submitted for review.
  - External Fire Pumps with diesel back-up is required for flow capacity.
  - Received updated cost estimate.
  - Waiting for FN response to increase funding.

- Sewage Lagoon Slope Stability
  - Construction tender awarded.
  - Works starts on 16th-Mar-20.
  - Clearing of site, fencing being taken down.
  - Required silt/safety fencing to prevent deer from entering the lagoon.

- North Shore Water Intake - Genset
  - Received Electrical consultant on site on the 27 "Jan to inspect pump house.
  - Delivery of genset expected in April.
  - Awaiting pricing from contractor to install genset.

- WTP See WTP Memo
  - Check valves at WTP and Intake Pump house have been installed.
  - Waterline at River Road has been capped.
  - Work to continue on North Shore Road, to cap water line.

- Green Infrastructure - Environmental Quality Sub-Stream Application Grant has been submitted.

- Scoping condition assessment for the eventually replacement of the Pine Street Booster Station.
- Preparing scope of work for Modelling of the Town Sewage System.

Maintenance

- Repaired 3 water leaks;
- All streetlights requests have been submitted to BC Hydro;
- On-going patching of roads.
- Sidewalk repairs as required.

Major Flood Events - None

Power Outages – None

Operations

- PWS crew maintained weekly garbage collection.
- PWS crew contained daily water and wastewater collection.
- Fire hydrate checks conducted.
- PWS crew compiled quarterly Lagoon and Water reports.

Meetings

- Met with several contractors on brush clearing.

Reports

- Submitted recycling study report to Recycle BC.
- Submitted annual Water Consumption report Statistics Canada
- Reviewed and commented on CVRD Watershed Study.
- Submitted Sewage Lagoon information to SLR for Annual Lagoon Report.

Training

- Level 1 First Aid training planned for April.

Safety

- Submitted Emergency Environmental Plan for Environment Canada
  - Meets the requirements set out by Emergency BC
  - Conducting desk top training with crew.

Kam So, P.Eng, MBA (Candidate)
Superintendent, Public Works and Engineering Services

Memo

TO: Chief Administrative Officer

SUBJECT: Roads – Capital Plan

DATE: March 12, 2020

FROM: Superintendent, Public Works and Engineering Services

Background

A well-maintained road infrastructure is a crucial requirement if economic development, growth and important social benefits are to accrue to the Town of Lake Cowichan. Poorly maintained roads constrain mobility; significantly raise vehicle operating costs, increase accident rates and their associated human and property costs.

Over a period, road surfaces will continue to deteriorate requiring the roads to be repaired. The Town does not have the financial capacity or resources to repair every road at the same time, but fortunately this is not a necessary strategy. The condition of the roads should be classified for type of use and traffic type. The road should be monitored to watch the condition of the surface and forecast when the deterioration will reach a point that resurfacing is required. Budgeting of financial resources to allow for resurfacing to be completed in a timely manner so as to not allow a disruption in service, minimize life cycle costs and fit within the strategy of the Town's asset management plan.

Strategy for Town road prioritization

1. Collector Roads should be given priority over local roads. Minimum threshold of condition of Collector Roads should be higher than for local roads.
2. High density traffic areas should be given priority over lower density traffic areas.
3. Roads deteriorate exponentially with heavier vehicle traffic. Use of heavy vehicles on local roads should be minimized. Repair of roads with heavy weight vehicle traffic should be prioritized.
4. Resurfacing of roads should be timed at the same time as repairs of water mains, sewage or storm lines is undertaken.
5. Roads should not deteriorate to the point of needing re-construction.
6. Preventative maintenance activities should be utilized to extend the life of the asset.

There is no official criterion on what condition a road can deteriorate to before the road needs resurfacing. But a good strategy is to extend the life of a road with preventative maintenance activities such as fixing potholes, filling of cracks and avoid the use of heavy traffic. Resurface of a road must occur before the point of needing a full reconstruction.

Some local roads may not need resurfacing for decades. An issue with local residential roads is that cars drive too fast. A local road with minor deterioration is a natural speed suppressant for vehicles.

Suggested Road Prioritization

Road	Start	Finish	Type of Road	Length	Reason for Priority	Estimated Price Construction Only	Suggested Planned Year
North Shore Road	Round a bout	Wilson Road	Collector	250 m	Main arterial road. Poor condition. Major project.	180,000	2020-21
River Road	North Shore Rd	Indian Road	Local	300 m	Road is deflecting. Pavement alligator cracking.	216,000	2020
Greendale Rd.	Cowichan Lake Rd	Town Limit	Local	800 m	Road is poor condition. To be put in after the sewage line is complete.	576,000	2023
Stone Rd	South Shore Road	Alder Road	Local	300 m	Cracking and beginning to deteriorate	216,000	2021
Wilson Rd	North Shore Rd	Grosskleg Way	Local	70 m	Road is cracking. Heave machinery route. Busy route.	50,400	2021
Stone Rd	Hemlock Entrance		Local	20 m	Heavy cracking. Steep incline.	14,400	2021
Stone Rd	Fir Entrance		Local	20 m	Heavy cracking. Steep incline.	14,400	2021
Boundary Rd	Lot 48	Comiaken Ave	Local	150 m	Need for width expansion due to Lot 48 development.	108,000	2021
Johel Rd	At turn in Road	Kwassin Cres	Local	60 m	No sub-base. Poor condition will deteriorate quickly.	43,200	2021

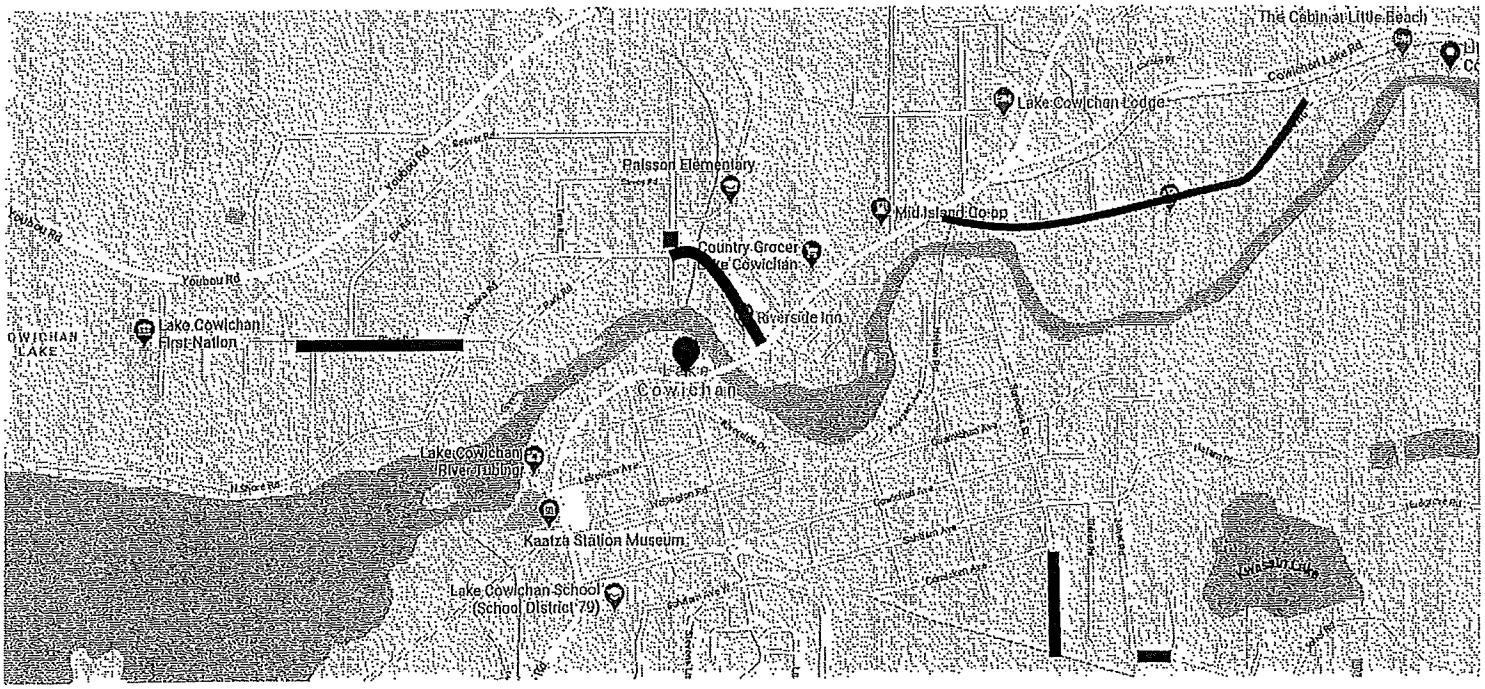
Future Plans							
King George St	South Shore Road	Round-about	Collector	250 m	High profile road. Beginning to crack.	180,000	2022
North Shore Road	Wilson St	Town limit	Collector	1 km	Road is cracking. Clay sub-base will continue to deflect. Increased traffic due to FN Development.	720,000	2022

For discussion
The suggested road prioritization is an asset strategy that would greatly improve the Town's road network gradually and does not allow for significant service interruptions.

The cost estimate is for resurfacing of a standard 9m wide road at $720 lane per meter. Costs do not include design, project management, curbs, sidewalks or sub-base.

Appendix A

Map of suggested prioritization



Kam So, P.Eng, MBA (Canadiate)
Superintendent, Public Works and Engineering Services

Memo

TO: Chief Administrative Officer

SUBJECT: Sidewalks Capital Plan

DATE: March 13, 2020

FROM: Superintendent, Public Works and Engineering Services

Background

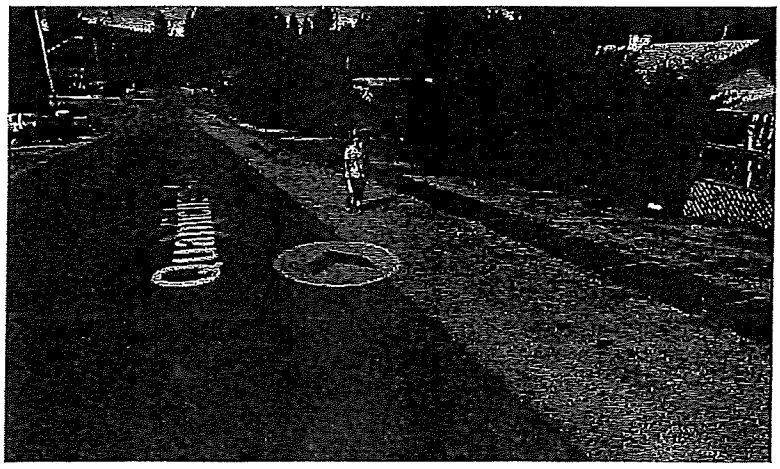
Sidewalks play an important role in transportation, as they provide a safe path for people to walk along that is separated from the motorized traffic. They aid road safety by minimizing interaction between the pedestrians and motorized traffic.

Overtime sidewalks deteriorate, break and warp. Walking paths will need to be readjusted to allow for pedestrians to be uninhibited.

The MMCD standard width of sidewalk on an urban collector road (North Shore, King George, Sahtlam, South Shore, Cowichan Lake Rd) is 1.8 meters. The standard of an urban local road (every other road in town) is a width of 1.5 meters.

When a sidewalk is too narrow, pedestrians cannot walk side by side. It becomes a tripping hazard. Or pedestrians or scooters would just choose to walk on the road, as seen in the below picture.

Although there are some newer sections of sidewalk that are the standard 1.5 meter width, many sections are only 1.2 m in width.



Pedestrians choosing to walk on the roads rather than the sidewalks.

Suggested Sidewalk Strategy

1. Pedestrians need a complete path that will connect the length of their desired route. Walking paths should form a complete trail.
2. Sidewalks deteriorate over time. Sidewalks that are in need of repair should be repaired.
3. The absence of sidewalks can post hazards from narrow roads. Prioritize sidewalks where there is a hazard.
4. Existing sidewalks that are too narrow are unusable and a safety hazard.
5. Sidewalks should be prioritized in busy walking traffic areas such as downtown or areas close to downtown.

Sidewalk capital plan list

See Appendix A – Side Walks Capital Plan.

Discussion

The Side Walk program can be gradually completed over a number of years. Other strategies of prioritizing sidewalks would be rank areas of population density, new versus replacement, safety or any combination.

No sidewalks are better than broken sidewalks. An option could be to remove sections of sidewalk if they are not going to be addressed. Removing impervious sections of sidewalks will be better for storm drainage.

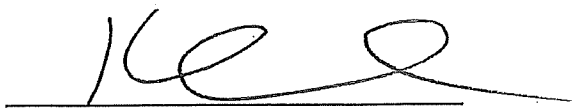
Steps to creation of Sidewalk Plan

1. Decide on a prioritization strategy.
2. Verify that all potential section sidewalk projects are on list.
3. Determine a yearly budget.
4. Rank sidewalk sections in order of council priority.
5. Complete projects that are budgeted for 2020.
6. Re-evaluate project list next year for changes in priority and adjusting sidewalk conditions.

Conclusion

The estimate for a unit meter length of sidewalk can vary between $70 per meter to $160 per meter.

A high level estimate of a budget of $100,000 for 5 years will restore and bring up to MMCD standards all the deficient sidewalks in town to like new conditions.



Kam So, P.Eng, MBA (Candidate)
Superintendent, Public Works and Engineering Services

#	Street Name	From	To	Length (m)	Width (m)	In Service	Priority	Reason	Estimated Cost ($70/m)	Estimated Cost ($100/m)	Estimated Cost ($150/m)	Suggested Year. Based on $100,000 a year at $70/m
1	Park Rd.	North Shore Rd.	River Rd.	300	1.22	1960	H	High Traffic Area	21000	30000	45000	2020
2	River Rd.	Park Rd.	North Shore Rd.	100	1.22	1980	H	Safety, Hill	7000	10000	15000	2020
3	River Rd.	North Shore Rd.	Elk Rd.	200	1.50	1980	H	Safety, Hill	14000	20000	30000	2020
4	North Shore Rd.	Wilson Rd.	South Shore Rd.	400	1.50	1990	H	High Traffic Area	28000	40000	60000	2020
5	Stone Ave.	South Shore Rd.	Stevens Cres.	500	1.22	1985	H	High Traffic Area	35000	50000	75000	2020
6	Stone Ave.	Stevens Cres.	Sahtlam Ave.	70	1.22	1985	H	High Traffic Area	4900	7000	10500	2021
7	Stone Ave.	North of Stevens Cres	Ravine to Hemlock	180	1.22	2009	H	High Traffic Area	12600	18000	27000	2021
8	Fir St.	Stone Ave.	Larch St.	55	1.22	1950	H	Bad Condition	3850	5500	8250	2021
9	Larch St.	Fir St.	Hemlock St.	100	1.22	1950	H	Bad Condition	7000	10000	15000	2021
10	Larch St.	Hemlock St.	Arbutus St. E.	76	1.22	1950	H	Bad Condition	5320	7600	11400	2021
11	Arbutus St.	Larch St.	Alder St.	300	1.22	1950	H	Bad Condition	21000	30000	45000	2021
12	Alder St.	Stone Ave.	Arbutus St. W.	39	1.22	1950	H	Bad Condition	2730	3900	5850	2021
13	Cowichan Ave.	South Shore Rd.	Coronation St.	400	1.22	1950	H	High Traffic Area	28000	40000	60000	2021
14	Cowichan Ave.	Coronation St.	King George St.	94	1.22	1950	H	High Traffic Area	6580	9400	14100	2021
15	Coronation St.	Cowichan Ave. W.	Nelson Rd. W.	74	1.22	1970	H	High Traffic Area	5180	7400	11100	2021
16	Wellington Rd.	Nelson Rd. W.	Riverside Dr.	339	1.22	1998	H	High Traffic Area	23730	33900	50850	2022
17	Riverside Dr.	Wellington Rd.	King George St.	227	1.22	2008	H	Crowded Area/Remove curb	15890	22700	34050	2022
18	Renfrew Ave.	King George St.	Coronation St.	100	1.22	1975	H	High Traffic Area	7000	10000	15000	2022
19	Coronation St.	Renfrew Ave.	South Shore Rd.	91	1.22	1970	H	High Traffic Area	6370	9100	13650	2022
20	Coronation St.	Renfrew Ave.	Lakeview Ave.	77	1.22	2016	H	High Traffic Area	5390	7700	11550	2022
21	Lakeview Ave.	Coronation St.	King George St.	100	1.22	1990	H	High Traffic Area	7000	10000	15000	2022
22	King George St.	South Shore Rd.	Cowichan Ave.	218	1.22	1990	H	High Traffic Area	15260	21800	32700	2022
23	Sahtlam Ave.	Roundabout	Poplar St.	100	1.22	1982	H	High Traffic Area	7000	10000	15000	2022
24	Poplar St.	Sahtlam Ave.	Cowichan Ave.	33	1.22	1950	H	No existing sidewalk	2310	3300	4950	2022
25	Sahtlam Ave.	Poplar St.	Pine St.	143	1.50	1982	H	Bad Condition	10010	14300	21450	2022
26	Grants Lake Rd.	Somenos St.	Natara Place	254	1.22	1992	H	Difficult Vehicle Traffic	17780	25400	38100	2023
27	Grants Lake Rd.	Somenos St.	Natara Place	60	1.50	1992	H	Difficult Vehicle Traffic	4200	6000	9000	2023
28	Cowichan Ave. E.	Roundabout	Poplar St.	88	1.22	1950	H	Old Sections only	6160	8800	13200	2023
29	Cowichan Ave. E.	Poplar St.	Pine St.	146	1.50	1950	H	Bad Condition	10220	14600	21900	2023
30	Cowichan Ave. E.	Pine St.	Cottonwood St.	145	1.22	1950	H	Bad Condition	10150	14500	21750	2023
31	Cowichan Ave. E.	Cottonwood St.	Somenos St.	146	1.22	1950	H	Bad Condition	10220	14600	21900	2023
32	Somenos St.	Sahtlam Ave.	Cowichan Ave. E.	80	1.22	1950	H	Bad Condition	5600	8000	12000	2023
33	Somenos St.	Cowichan Ave. E.	Quamichan Ave.	77	1.22	1950	H	Bad Condition	5390	7700	11550	2023
34	Somenos St.	Quamichan Ave.	Nitinat Ave.	81	1.22	1950	H	Bad Condition	5670	8100	12150	2023
35	Quamichan Ave.	Cottonwood St.	Somenos St.	145	1.22	1990	H	No existing sidewalk	10150	14500	21750	2023
36	Quamichan Ave.	Somenos St.	Boundary Rd.	46	1.22	1995	H	No existing sidewalk	3220	4600	6900	2023
37	Boundary Rd.	Cowichan Ave. E.	Quamichan Ave.	67	1.22	1995	H	No existing sidewalk	4690	6700	10050	2023
38	Cowichan Ave. E.	Somenos St.	Boundary Rd.	20	1.22	1950	H	No existing sidewalk	1400	2000	3000	2023
39	Cottonwood St.	Quamichan Ave.	Nitinat Ave.	77	1.22	1950	H	Bad Condition	5390	7700	11550	2023
40	Centennial Hall			66	1.22	1950	H	High Traffic Area	4620	6600	9900	2024
41	Sall Rd.	South Shore Rd.	end	100	1.22	1975	L	Low Traffic Area	7000	10000	15000	2024
42	Johel Rd.	#147 Johel Rd.	Kwassin Cres.	67	1.50	1970	L	Bad Condition	4690	6700	10050	2024
43	Johel Rd.	Kwassin Cres.	Chappell Cres.	41	1.50	1970	L	Bad Condition	2870	4100	6150	2024
44	MacDonald Rd.	110-140 MacDonald		43	1.22	2009	M	Moderate Traffic Area	3010	4300	6450	2024
45	MacDonald Rd.	Cowichan Lk. Rd.	Oak Lane	200	1.22	1965	M	Moderate Traffic Area	14000	20000	30000	2024
46	MacDonald Rd.	Oak Lane	end	100	1.22	1965	M	Moderate Traffic Area	7000	10000	15000	2024
47	Neva Rd.	Cowichan Lk. Rd.	Oak Lane	200	1.22	1980	M	Moderate Traffic Area	14000	20000	30000	2024

48	Neva Rd.	Oak Lane	Madill Rd.	200	1.22	1980	M	Moderate Traffic Area	14000	20000	30000	2024
49	Cottonwood St.	Sahtlam Ave.	Cowichan Ave.	30	1.22	1950	M	Old Sections only	2100	3000	4500	2024
50	Cottonwood St.	Sahtlam Ave.	Comiaken Ave.	78	1.22	1950	M	Bad Condition	5460	7800	11700	2024
51	Boundary Rd.	Comiaken Ave.	end	185	1.22	1995	M	Bad Condition	12950	18500	27750	2024
52	Comiaken Ave.	Boundary Rd.	Cottonwood St.	138	1.22	1985	M	Bad Condition	9660	13800	20700	2024
53	Comiaken Ave.	Cottonwood St.	Pine St.	140	1.22	1985	M	Bad Condition	9800	14000	21000	2025
54	Cottonwood St.	Cowichan Ave. E.	Quamichan Ave.	60	1.22	1950	M	Not to standard	4200	6000	9000	2025
55	Nitinat Ave.	Cottonwood St.	Somenos St.	154	1.22	1992	M	Bad Condition	10780	15400	23100	2025

Total Length	8,280

Total Cost	$528,500	$755,000	$1,132,500

Memo

TO: Chief Administrative Officer

SUBJECT: South Shore Bus Shelter Replacement

DATE: March 13, 2020

FROM: Superintendent, Public Works and Engineering Services

Background

Bus stops are an access point for travellers using BC Transit services. While they can be a positive feature of transit travel, they are often cited as a barrier to transit use due to poor quality shelters, inadequate lighting or other design and infrastructure characteristics.

In a recent market analysis, shelters at bus stops were among the top five enhancements needed to encourage new riders to transit who are currently using other modes of travel.

Historically the selection of shelter design and functionality has been led by the municipality for which the service is being provided. As such, a broad variety of manufacturers and designs have been utilized, and no set standardization methodology or procurement strategy employed (Figure 1)

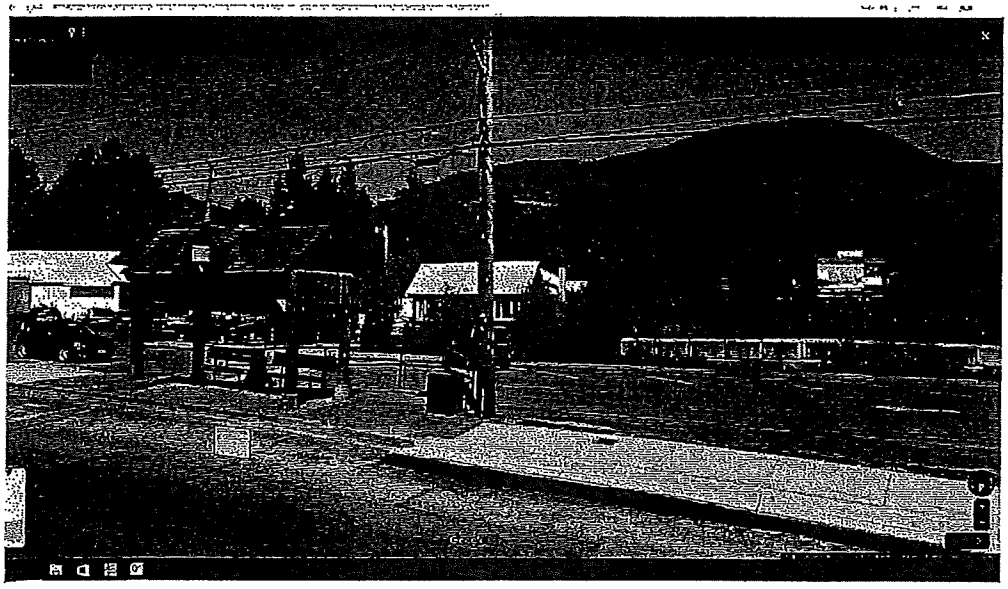


Figure 1. Bus Shelter on South Shore Road.

Issues with South Shore Road bus shelter:

- Mobility issues from scooters being blocked by the benches.
- Roof is too high and does not adequately protect users from the rain.
- No place for signage.
- Not clearly marked as a bus stop.
- Aging structure in need to rehabilitation.
- Does not use existing land features to optimize accessibility.
- Sharp drop off behind the bus shelter.
- Replacement parts need to be custom made.

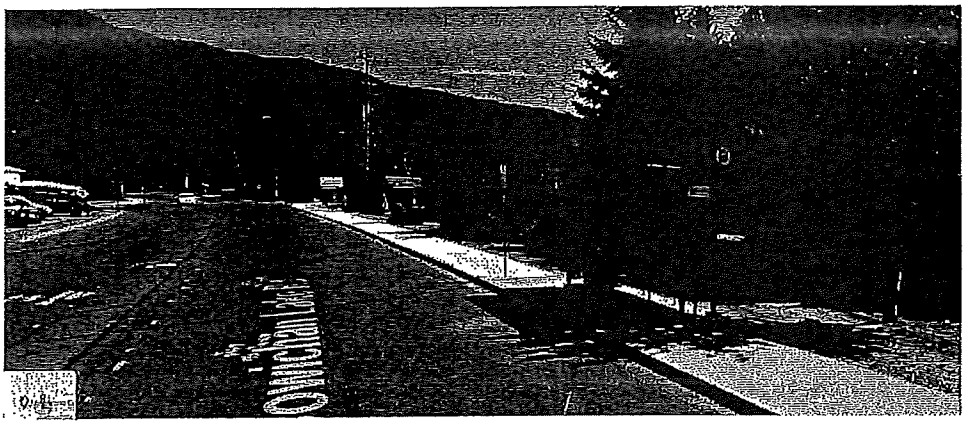


Figure 2. Example of a standard Bus Shelter on Cowichan Lake Road is a metal Tara Type 3 Shelter (2011). The company is no longer in business.

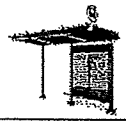
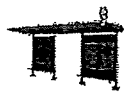
BC Transit

Municipalities can access to provincial capital funding in order to purchase standardized shelters for use in their communities.

There are currently three bus shelters in town. The two shelters pictured above and one more in front of the legion.

BC Transit Shelters – Overview of Costs T-Series

Typical BASE costs* for each type of shelter (not including taxes):

Shelter Type	Woodland T-Series Shelter Designs		
Type 2 (T2) Series: 10 – 20 passenger boardings per day Cantilevered, single back wall, single bench seat, tempered glass panels available			
	$13,743		
Type 3 (T3) Series: 21 – 200 passenger boardings per day Cantilevered or side wall design, 1 bench seat, optional extra rear panel, tempered glass panels also available			
	$19,213	$18,226	
Type 4 (T4) Series: 400+ Cantilevered or side wall design, 2 bench seats, optional extra rear panel			
	$28,751	$27,560	$29,955
Type 5 (T5) Series: custom Price quote on request, based on customized design and site requirements			

*Prices referenced are for the basic model with no lighting but include onsite installation costs. Prices do not include any applicable taxes, or travel or BC Transit PM time and IDC charges that will be incurred.

*Refer to Appendix B – Detailed Schedule of Costs for additional costs and further details.

Figure 2: the appropriate replacement size for the North Shore Bus Shelter is the Type 3 Series.

Under the capital upgrade program, the bus shelters are **owned by BC Transit** as assets in order to facilitate the capitalization of costs and allow for cost sharing with participants. Provincial cost sharing for shelter purchases under the Bus Stop Program will follow the standard contribution agreement for capital projects.

Provincial Share: 46.7%
Municipal Share: 53.3%

The municipality is responsible for any civil and electrical work required to prepare a site for shelter installation. This includes the funding and construction of any infrastructure such as, but not limited to, bus pads or engineered foundations, pullouts, sidewalk construction, and electrical grid connections where required.

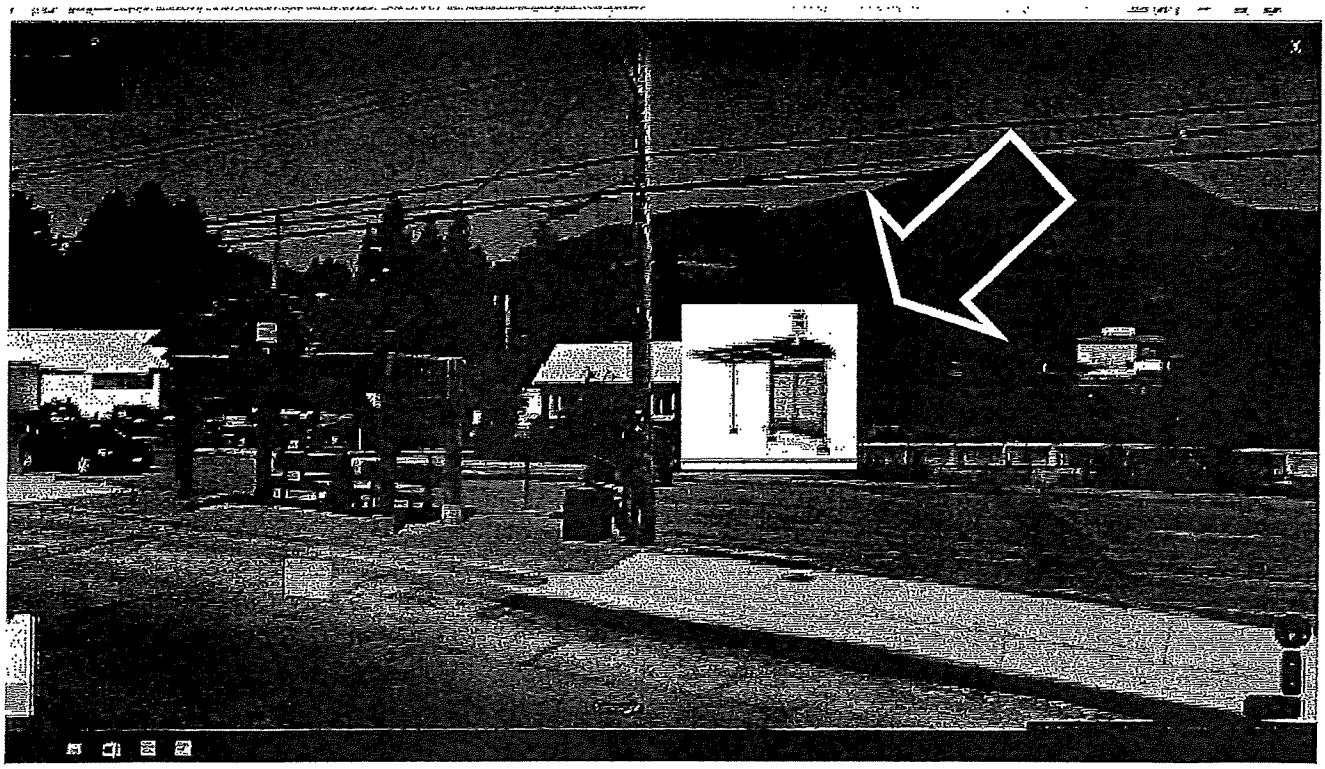
Municipalities, through their acceptance and willing participation in this program, agree to maintain the BC Transit shelters in accordance with standard industry practice.

This maintenance, funded 100% by the municipality includes (but is not limited to) the following regular maintenance items:

- Removal of snow and ice when required
- Removal of garbage
- Prompt removal of graffiti
- General cleaning (power washing) of structure on a regular basis
- Soft clean solar roof panels and remove debris monthly
- Monitoring and replacement of damaged components in a timely manner

Recommendations

1. Apply for funding through the BC Transit Shelter Program for a Type 3 Shelter. Cost of shelter $19,213. Not including site prep.
2. Remove existing South Shore Bus Shelter.
3. Install new bus shelter at the back of the bus loop. See picture below



Kam So, P.Eng, MBA (Candidate)
Superintendent, Public Works and Engineering Services

Memo

TO: Chief Administrative Officer

SUBJECT: Sewer Plan 2020

DATE: March 13, 2020

FROM: Superintendent, Public Works and Engineering Services

Background

A sanitary sewer is an underground system for transporting sewage from houses and commercial buildings within Lake Cowichan to the town sewage lagoon for treatment and disposal.

Sanitary sewer overflow can occur due to blocked or broken sewer lines, infiltration of excessive stormwater or malfunction of pumps. In these cases untreated sewage is discharged from a sanitary sewer into the environment prior to reaching sewage lagoon. To avoid this, constant maintenance is required.

The maintenance requirements vary with the type of sanitary sewer. In general, all sewers deteriorate with age, and with age infiltration and inflow are problems leading to increased operating costs at the sewage lagoon and often results in overflows to the environment. Holding infiltration to acceptable levels requires a high standard of maintenance. A comprehensive construction inspection program is required to prevent inappropriate connection of cellar, yard, and roof drains to sanitary sewers. The probability of inappropriate connections is higher where sewers and sanitary sewers are found in close proximity, because construction personnel may not recognize the difference.

For decades, when sanitary sewer pipes cracked or experienced other damage, the only option was an expensive excavation, removal and replacement of the damaged pipe, typically requiring street repavement afterwards. Today, there are other methods than only External Point Repairs that allow for internal repairs like epoxy resin to re-line aging or damaged pipes, effectively creating a "pipe in a pipe".

Pipeline Assessment

The town has accessed each sewer pipe and was given a rating that reflects the priority and need for maintenance. Table 1, provides a description of the potential implications of the rating.

Table 1.

Rating	Typical Structural Defects	Typical O&M Defects	Grade Description
5	Broken/Hole >= 3 Clock Positions Broken/Hole (with soil/voids visible) Collapse Deformed > 10% diameter	Infilration Gusher Deposits > 30% of cross section Root balls in mainline	Most significant
4	Multiple Fractures Broken and 1 clock Position Hole and 1 clock Positions Deformed <= 10% diameter	Infiltration Runner Deposits <= 30% of cross section Medium roots in mainline	Significant
3	Multiple Cracks Logitudinal and Spiral Fractures	Infiltration Dripper Deposits <=20% of cross section Tap Roots in mainline Medium roots in lateral	Moderate
2	Logitudinal Crack, Spiral Crack Circumferential Fractures Large Joint Offset of Seperation	Infiltration Weeper Deposits <=10% of cross section Roots fine in mainline Tap roots in lateral Defective lateral	Minior to Moderate
1	Minor		Minor

Overall Condition of Sewage System

			Custom Pipe Rating				
Diameter (mm)	Total Length Inspected (m)	MH to MH Segments	5	4	3	2	1
150	228	5	0	0	0	0	5
200	14119	196	5	6	20	36	129
250	1512	19	0	0	6	5	8
Total	15859	220	5	6	26	41	142
			2%	3%	12%	19%	64%

Overall, 83% of all pipe segments are found to be in good condition; where 142 of the pipe segments (64%) showed minimal to no defects, and 41 of the pipe segments (19%) contained defects that were considered minor to moderate. These pipe segments generally do not require maintenance. If maintenance is required it is minor, such as grease cutting or debris removal.

Of the 37 pipe segments (17% overall) that had a pipe rating of 3 or greater, 5 had severe defects (rating 5) and 6 had moderate to severe defects (rating 4). These pipe segments require more intensive maintenance, including root cutting, grouting, trenchless point repairs, and external point repairs.

Sewage rehabilitation strategy

1. Inflow and Infiltration is causing issues with overflow at the sewage lagoon. There is an order from the Ministry of the Environment and Climate Change that the town needs to address the overflow.
2. Pipes with a grade description of 1-3 do not need to be addressed right away, but they will soon become 4-5 and the costs to repair will become higher.
3. Address the suggested repairs in order of significance.
4. Every year, re-evaluate the list and continue with projects in priority.

Suggested order of rehabilitation

See Appendix A.

Kam So, P.Eng, MBA (Candidate)
Superintendent, Public Works and Engineering Services

Town of Lake Cowichan
Water Inventory

Street Name	In Service Date	Pipe Length (meters) 50mm 2"	100mm 4"	150mm 6"	200mm 8"	250mm 10"	345 mm 12"
Indian Road							300
River Rd	1980			**80**	**240**	**650**	
Alder St	1950			**64**			
Arbutus St	1950			**41.8**			
Carnell Drive				**54.8**			
Cedar Ave.	1950				**103.8**		
Centennial Park	2015				**350**		
Cowichan Avenue	1950			155			
Elk Rd	1980				**280**		
Fern Rd	1983			**180**			
Fir Lane	1950			**88.6**			
Grants Lake Road	1950			**579**	**102**		
Greendale Rd	1950	630	180				
Hemlock St	1950			**145.3**			
Larch St	1950			**220**			
MacDonald Rd	1965			**550**			
Nelson Road East	1950				**65**		
Nelson Road East	1950			**96**			
Neva Rd	1980			**420**			
Oak Lane	1965			**120**			
South Shore Road	2012				**20**		
Stone Ave	1950			221			
Beaver Rd	1989			390			
Beech Crescent	2007			265			
Berar Rd	1975		190				
Boundary Rd	1950		290				
Castley Heights	1992					310	
Chappell Cres	1981			65			
Comiaken Ave	1985			360			
Coronation St N	1970			150			
Cottonwood St.	1950		180				
Darnell Rd	1950		250				
Deer Rd	1975		240				
Eldred Rd	1974		280				
Gordon Rd	1950	180					
Hillside Rd	1977		80				
Johel Road	1970			400			
King George St	1950			50			

Town of Lake Cowichan
Water Inventory

Street Name	In Service	Pipe Length (meters)					
		50mm	*100mm*	*150mm*	*200mm*	*250mm*	*345 mm*
	Date	*2"*	*4"*	*6"*	*8"*	*10"*	*12"*
Lake Park Road	1994				210		
Lakeview Rd	1950		20	240			
Maple Ave.	1950		120				
Natara Place	1950			100			
Nitnat Ave	1950			170			
Nootka Cres	1975		60				
North Shore Rd	1950				450	860	
Park Rd	1960			300			
Peterson Rd.	2002	50					
Pine Street new	1950				180		
Poplar St	1950		110				
Prospect Ave.	1950		500				
Quamichan	1950				250		
Quamichan Ave	1950				400		
Renfrew Ave	1975	150			110		
Riverside Dr	1950		40	210			
Rockland Rd	1950	100					
Sahtlam Ave	1950		320	500			
Sall Rd	1975			150			
Savoy Rd	1978		240				
Scholey Cres	1991		100				
Somenos	1950		20	450			
Stanley Rd	1950		220				
Stevens Cres	1950	35	90				
Tern Rd New	1975		250				
Wellington Rd	1950	80	160			150	
Wilson Rd	1975			250			
	Total	1,225	3,940	6,922	2,521	1,320	-

Order of Priority	Pipe Segment	Pipe Rating	I&I	Recommended Rehabilitation	Est Cost
1	B15 - B4A	5	Yes	External Point Repair for Hole Soil Visible @ 48.1 m	18000
2	F24 - F23	5	Yes	Trenchless Point Repair for Hole Soil Visible @ 43.6 m	4800
3	J5A - J5	5	Yes	1. External Point Repair for pipe sag @ 26.1 m 2. Trenchless Point Repair @ 32.1 m US, Root cut and reinspect to confirm rehabilitation method 3. Trenchless Point Repair @ 30.4 m DS, Root cut and reinspect to confirm rehabilitation method	40100
4	B24 - B5	5	Yes	1. External Point Repair for Hole from 41.5 m 2. Trenchless Point Repair for Roots Fine Joint @ 71.4 m	22800
5	E53 - E52	5	Yes	1. Trenchless Point Repair for Hole (Soil Visible) @ 66.3 m US and reinstate service connection	8400
6	S25B S25	5	No	External Point Repair, Re-Inspect	4700
7	D24 - D21	5	Yes	Grouting, Trenchless Point Repair, Re-Inspect, Cut Crease	5700
8	SC06 - S25	5	No	External Point Repair	14300
9	D25 - D24	5	No	Cut Crease, Root Cutting, Grouting, Trenchless Point repair.	5700
10	F1 - 1D1	4	Yes	1. Cut Grease @ 7.6 m 2. Trenchless Point Repair @ 7.6 m, reinspect after CG to confirm rehabilitation method 3. Cut Grease @ 45.7 m	5800
11	E41 - E33	4	Yes	1. Root Cut and Trenchless Point Repair @ 26.7 m and Reinstate Service Connection 2. Trenchless Point Repair for Surface Aggregate Missing @ 88.9 m	17700
12	G3 - G2	4	Yes	1. Trenchless Point Repair for broken pipe @ 21.5 m and Reinstate Service Connection	8400
13	S25 - S24	4	No	Root Cutting, Re-Inspect	600
14	S28 - S27	4	No	Remove Debris, External Point of Repair	9500
15	SC06B - S25B	4	No	Reline, Root Cut, Re-Inspect	51,400
16	D19 - D18	4	No	External Point Repair	4500
17	D23 - D22	4	No	External Point Repair	5400
18	J4 - J1	4	Yes	1. Grout Infil Runner - Manhole/Sewer interface @ 94.2 m	3600
19	E39 - E37	4	Yes	1. Grout Infil Runner inside MH E37 Barrel @ 85.9 m	3600
20	F19 - F15	4	No	1. Cut Intruding Service 2. Trenchless Point Repair @ 38.9 m and Reinstate Service Connections, Root cut and reinspect to confirm rehabilitation method	13500
21	E3 - E2	3	Yes	1. Trenchless Point Repair for broken pipe @ 22 m	4800
22	F16 - F15	3	Yes	1. Trenchless Point Repair for Hole - LEAKING @ 81.9 m	4800
23	H15 - H13	3	Yes	1. Trenchless Point Repair for Hole @ 10.9 m	4800
24	F14 - F4	3	Yes	1. Trenchless Point Repair for Hole @ 37.4 m and Reinstate Service Connections	4800
25	A6 - A5	3	Yes	1. Trenchless Point Repair for Crack and Infil staining @ 62.45 m	4800
26	B8 - B7	3	No	1. Trenchless Point Repair @ 46m DS of MH B8, reinspect to confirm rehabilitation method	9300
27	C20 - C19	3	No	1. Root Cutting for Roots Fine Joint @ 44.7 m 2. Trenchless Point Repair @ 46 m 3. Cut Grease @ 46 m US	9400
28	A13 - A6	3 3	No	1. External Point Repair for Joint Offset Large @ 1 m 2. External Point Repair for Joint Offset Large @ 18.6 m	36000
29	A9 - A2	3	Yes	1. Grout Infil Runner from 12 o'clock @ 42.2 m 2. Grout Infil Stain from 4 o'clock @ 46.1 m	7200
30	H2 - H1	3	Yes	1. Grout Tap Break-in Capped - WITH ROCKS@ 19.3 m	3600

31	C12 - C8	3	Yes	1. Cut Intruding Service Tap Break-in Intruding @ 90.6 m and Reinstate Service Connections 2. Grout Infil Stain @ 117.2 m	4800
32	E40 - E39	3	Yes	1. Trenchless Point Repair for Roots Fine Barrel @ 62.9 m	4800
33	E49 - E44	3	Yes	1. Trenchless Point Repair for AGGREGATE CHIPPED AND SEEPING @ 55.6 m	4800
34	D4 - D3	3	No	1. Cut Grease from 40 m to 50.0 m	900
35	B10 - B9	3	No	1. External Point Repair for Tap Break-in Defective @ 29.2 m	20400
36	C3 - C2	3	No	1. Trenchless Point Repair for Surface Aggregate Projecting - CONCRETE IS Flaking at Join from 9 o'clock @41.9 m	5400
37	1A1 - 2A1	3	No	1. Cut Grease from 6.0 m to 12.0 m	900
38	G1 - 1D1	3	No	1. Cut Grease @ 29.2 m	4800
39				2. Root Cutting for Roots Fine Joint @ 33.3 m	
40	E21 - E20	3	No	1. Cut Grease @ 74.2 m	900
41	D13 - D12	3	No	Cut Crease	500
42	E50 - E49	3	No	Cut Crease, External Point Repair	4900
43	D14 - D13	3	No	Cut Crease	300
44	S9 - S8	3	No	External Point Repair	5400
45	SC7 - S20	3	No	External Point Repair	5200
46	D8 - D9C	3	No	Re-Inspect	400
47	D6 - D5	3	Yes	Re-Inspect	900
48	D41 - D17	3	No	Re-Inspect	400
49	K1 - D9A	3	No	Re-Inspect	400
50	D9A - D9B	3	No	Re-Inspect	400
51	D9C - D7	3	No	Re-Inspect	500
52	D7 - D6	3	No	Re-Inspect	600
53	S24 - S23	2	Yes	Trenchless Point Repair	3800
54	K3 - K2	2	Yes	Cut Crease, Grouting	1500
55	D46 - D5	2	No	Grouting	1100
56	S20 - S22	2	No	Remove Debris	400
57	D5 - D4	2	No	Re-Inspect	600
58	E52 - E44	2	No	1. Trenchless Point Repair for Infil Stain @ 93.3 m	4800
59	C22 - C6A	2	No	1. Remove Deposits Settled Gravel @ 67.5 m	900
60	J1 - E22	2	No	1. Cut Grease @13.1 m	900
61	E42 - E34	2	No	1. Cut Grease @ 81.7 m	900
62	E34 - E33	2	No	No 1. Cut Grease @ 46.1 m	500
63	A20C - A20B	2	No	1. Root Cutting and Grout for Roots Fine Joint @ 46.5 m	500

Table 5-3: Recommended Rehabilitation on Public Property based on Smoke Testing Results

Detections from Downspout

D1	C28B	C28A	External Point Repair	5000
A9	C28A	C28A	External Point Repair	5000
A5	A20E	A20D	Replace IC Cap	300
B3	E9	E8	Replace IC Cap	300
B8	A22	A21	Replace IC Cap	300
A2	F18	F17	Replace IC Cap	300
D4	C13	C12	Replace IC Cap	300
A10	C2A	C28A	Replace IC Cap	300
A4	H5	H4	Replace IC Cap	300
C2	A3	A2	Replace IC Cap	300
A3	F7	F6	Replace IC Cap	300
A3	D31	D30	Replace IC Cap	300
A4	K7	K6	Replace IC Cap	300
B8	S15	S14	Replace IC Cap	300
A2	SC06B	S25B	Replace IC Cap	300
B7	D35	D34	External Point Repair	4000
B3	SC4	S16	External Point Repair	4000
B4	D30	D29	External Point Repair	4000
B5	D32	D10	External Point Repair	4000
B1	E50	E49	External Point Repair	4000
A6	K5	K4	External Point Repair	4000
A7	K6	K5	External Point Repair	4000
A5	K7	K6	External Point Repair	4000
B6	K8	K7	External Point Repair	4000
C1	S8	S7	External Point Repair	4000
B2	S8	S7	External Point Repair	4000
A1	S9	S8	External Point Repair	4000
C2	SC06B	S25B	External Point Repair	4000

Memo

TO: Chief Administrative Officer

SUBJECT: Town Water Distribution Network.

DATE: March 13, 2020

FROM: Superintendent, Public Works and Engineering Services

Background

The Town's distribution network consists of watermains that are underground pipes that deliver a steady supply of fresh, clean drinking water to residents and businesses.

The Town has approximately 22.3 km of various sizes from 50 mm to 250 mm in diameter.

The original watermains in town were put into service in 1950.

The correct size of watermain will allow water to be delivered to residents at the proper flow and at the proper demand.

Sizing the system

To determine the required diameter size of watermain, the amount of water flow required must be established. It would be easiest turn on all the fixtures in an area and add up their flow rates, and using the total for system demand. However, the likelihood of all fixtures being in operation simultaneously is negligible.

System demand is assigned by estimating the population and occupancy type of an area.

With the system demand calculation a water model is created to provide a preliminary judgment on the required main water line size. This figure is adjusted later if the chosen size produces excessive pressure loss.

Since 1950, the population of the town has been growing and there is a need to increase the diameter size of many sections watermains due to a an increasing loss in hydraulic and fire flow capacity.

Some sections of pipe also need to be repaired due to mineral deposits clogging in the inside of the pipes leading to poor water pressure and increased line breakages. Constantly repairing the same line, will eventually lead to a catastrophic service disruption.

Status of Town's Watermains

There are two watermains that need to be increased to allow for proper Hydraulic capacity for the town. 300 m on Indian Road and 1000 m on River Road.

20 other areas are needed to increase the size of the watermains to allow for proper fire flow protection.

The remaining water lines have been installed in 1950 and are past their expected lifespan. Pipes that are beyond 70 years old could have mineral deposits that lessen water flow are more susceptible to line breakages. These lines do not necessarily need to be replaced immediately , but should be continuously monitored.

Status of Town's other water infrastructure

The Intake Pump House on North Shore road will need replacing in 10 years. The booster station at Neva Road needs an additional fire pump.

There are projects on the go already that address the fire flow issues at the River Road Pressure Zone and the Slopes Pressure Zone.

Town Water Main Strategy

1. Increase sizing of watermains that meet town water hydraulic capacity.
2. Increase sizing of watermians that meet town fire flow capacity.
3. Replace watermains that are not performing at their design capacity.
4. Replace watermains that have continuous service disruptions.

Discussion

The watermains on Indian Road and River Road are the only water lines leaving the WTP. It is imperative that these water lines meet the hydraulic design capacity. Estimated cost $317,500.

The 6.4 km of pipe upsizing for the fire flow can be gradually improved over several years. Estimated total cost $1,166,575.

The remaining system that was installed in 1950 can be scheduled to be replaced in 5-10 years. Estimated total cost $2,831,250.

The cost was calculated by using $250/m for just Pipe and Backfill. .

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Superintendent, Public Works and Engineering Services