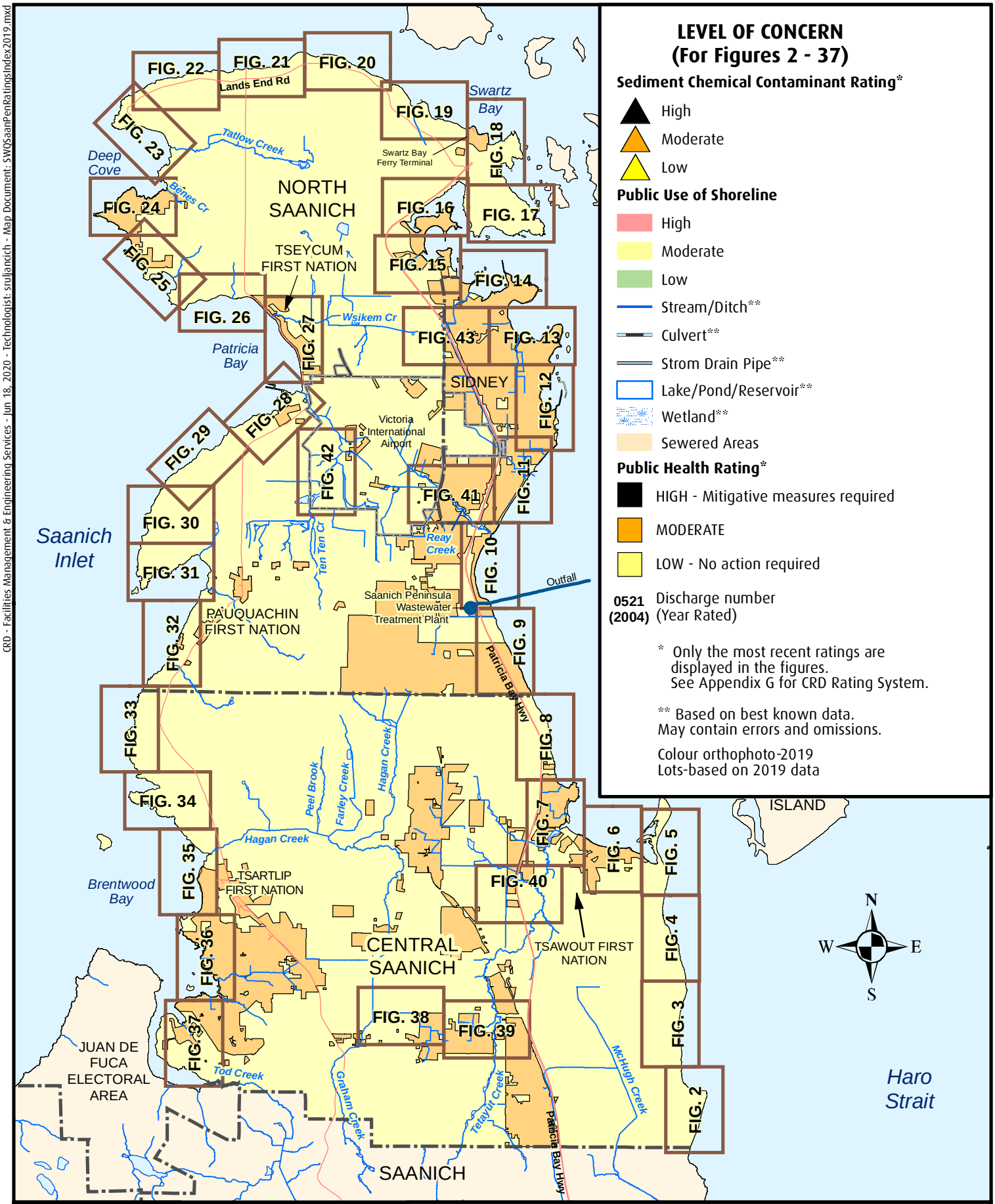
APPENDIX A

LOCATION OF STORMWATER DISCHARGES
2019



Kilometres
0 0.5 1 2
Projection: UTM ZONE 10N NAD 83

Figure 1
Key Index for Figures 2 - 37 and Legend

- Sewage Treatment Facility & Outfall
- Significant Ditches, Streams & Storm Drains
- Municipal and First Nations Boundary
- Major Roads
- FIG. 25 Map Tile with Figure Number
- Sewered Areas

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CRD - Facilities Management & Engineering Services - Jun 18, 2020 - Technologist: srufiancich - Map Document: SWQSaanPenRatingsIndex2019.mxd

Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

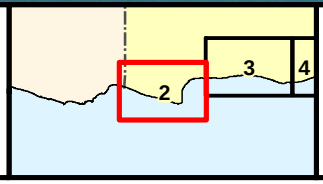

Figure 2

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

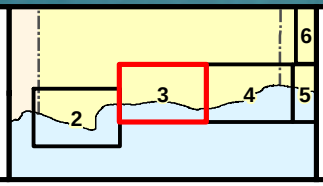

Figure 3

Saanich Peninsula 2019
Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

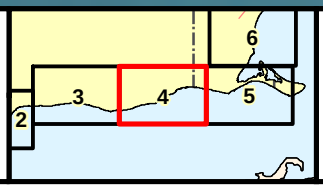

Figure 4

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

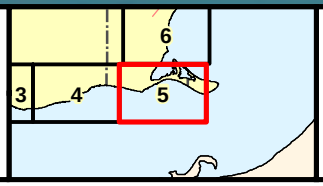
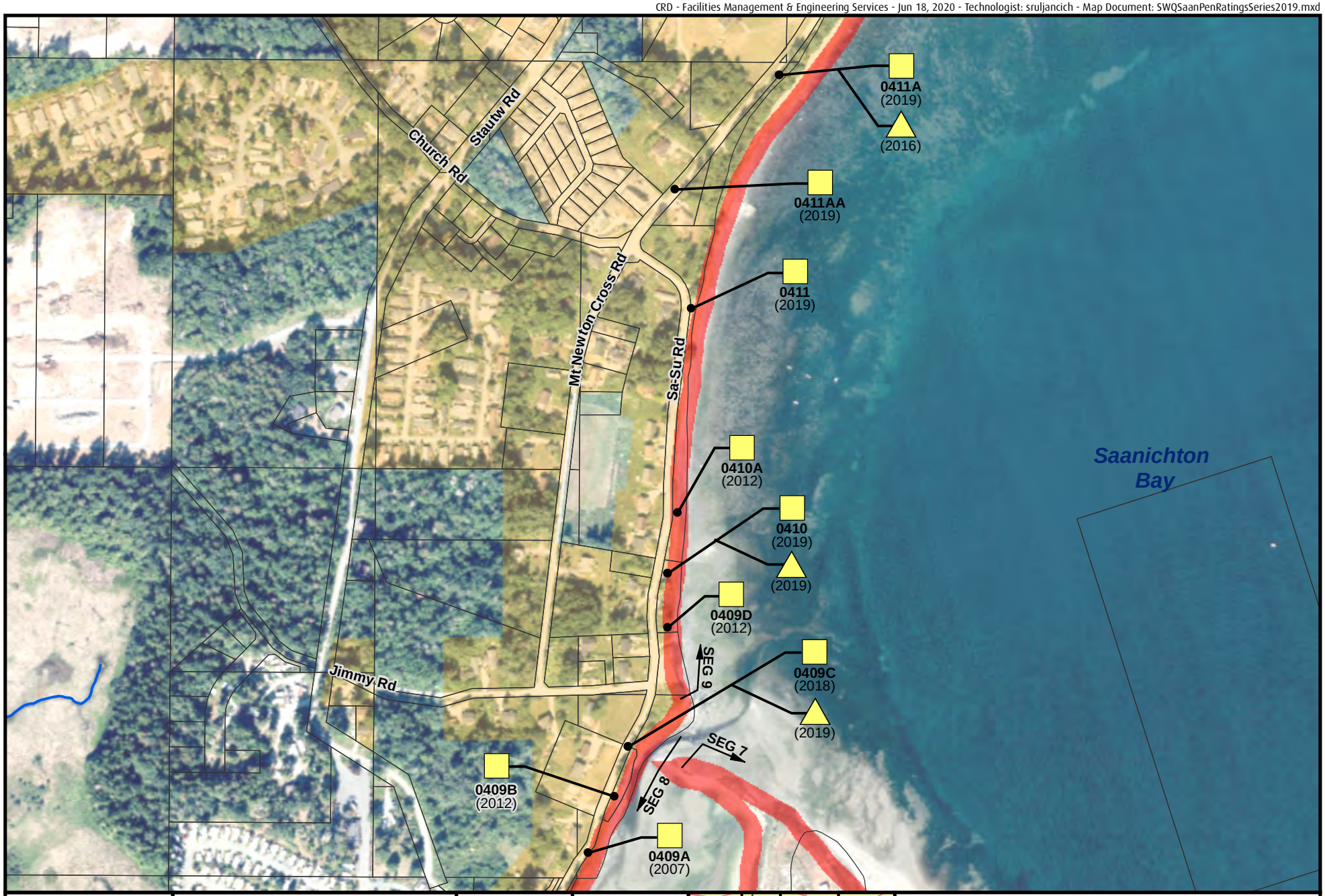


Figure 5
Saanich Peninsula 2019
Stormwater Discharge Location
and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

W E S N

For Key Index and Legend See Figure 1

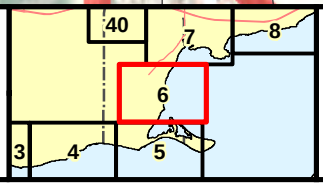


Figure 6

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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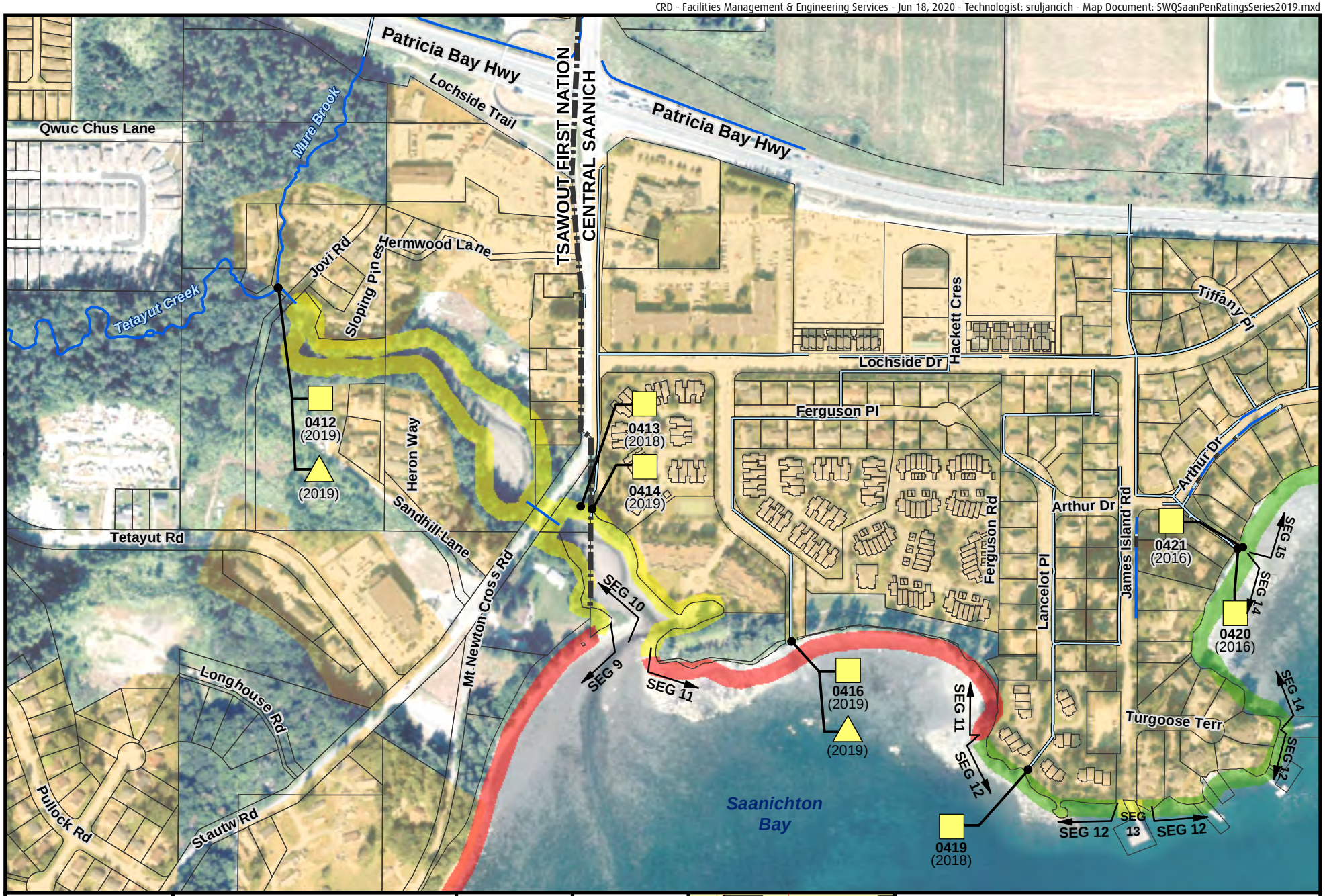

CRD Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S N E

For Key Index and Legend See Figure 1

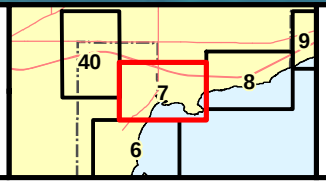

Figure 7

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

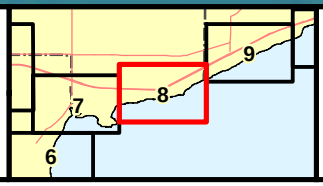

Figure 8

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

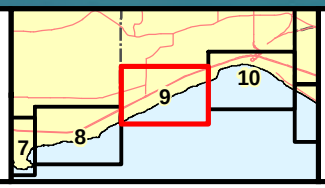

Figure 9

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

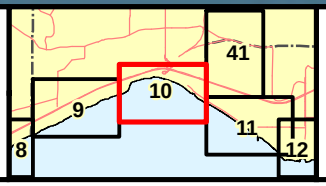

Figure 10

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

CRD Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S N E

For Key Index and Legend See Figure 1

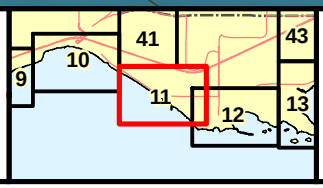
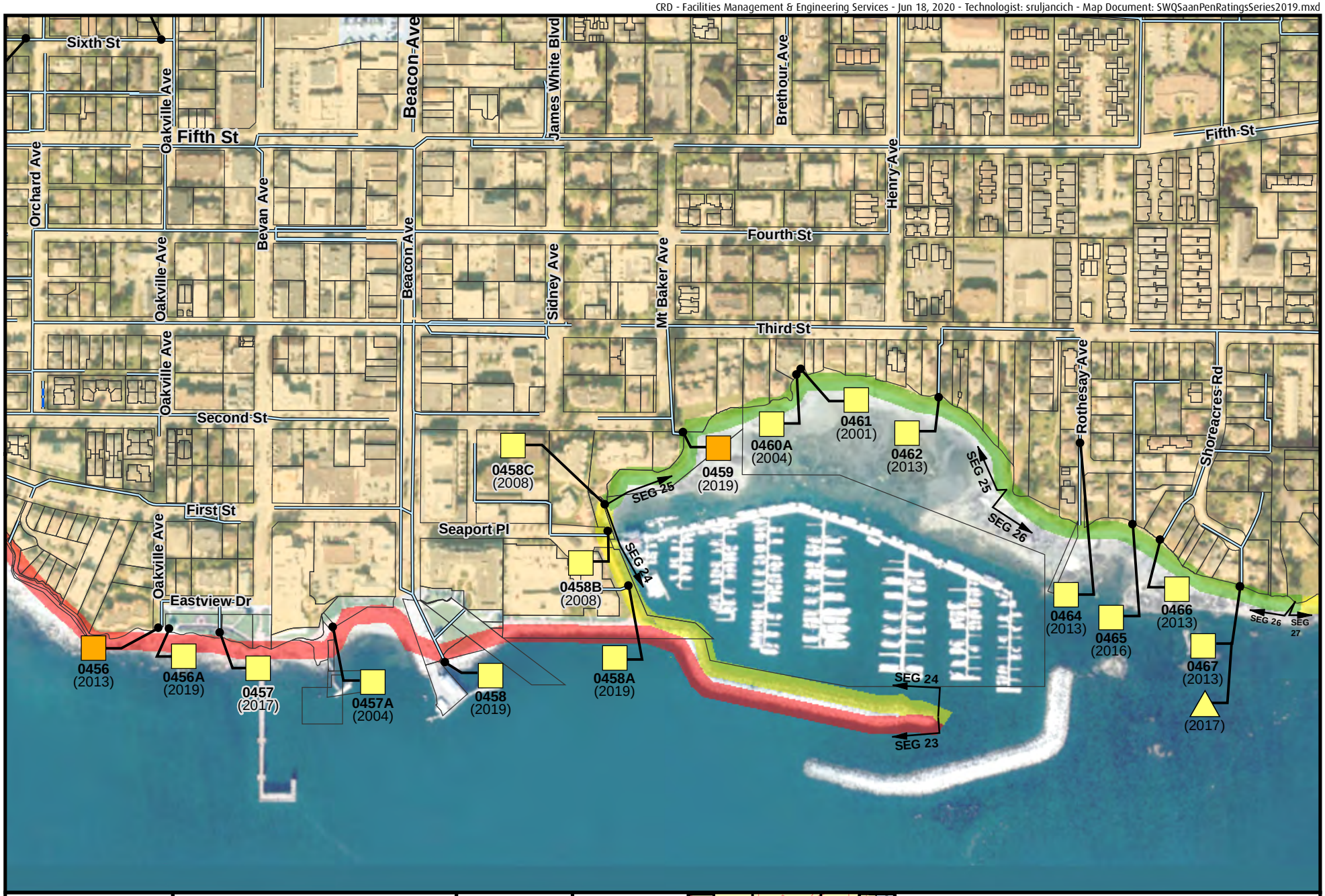


Figure 11

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

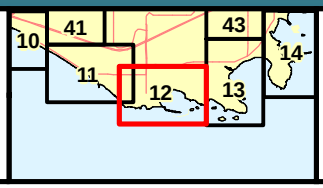
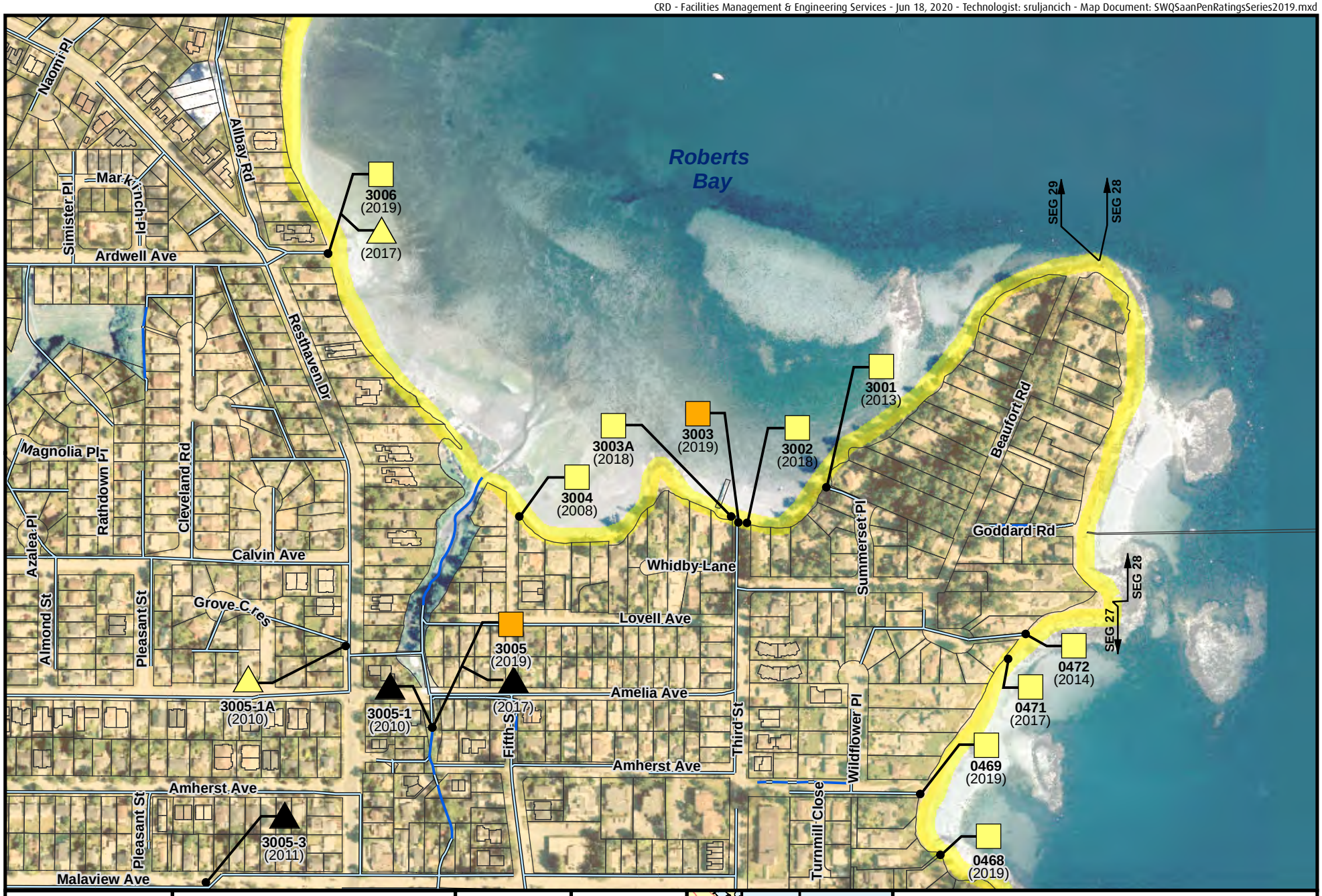


Figure 12

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

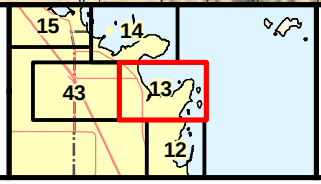

Figure 13

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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CRD
Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

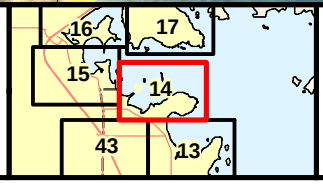

Figure 14

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

CRD Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

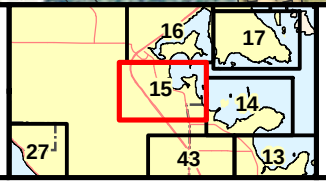

Figure 15

Saanich Peninsula 2019
Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

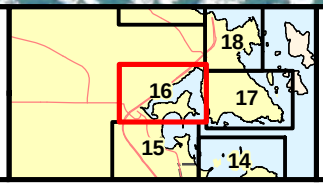

Figure 16

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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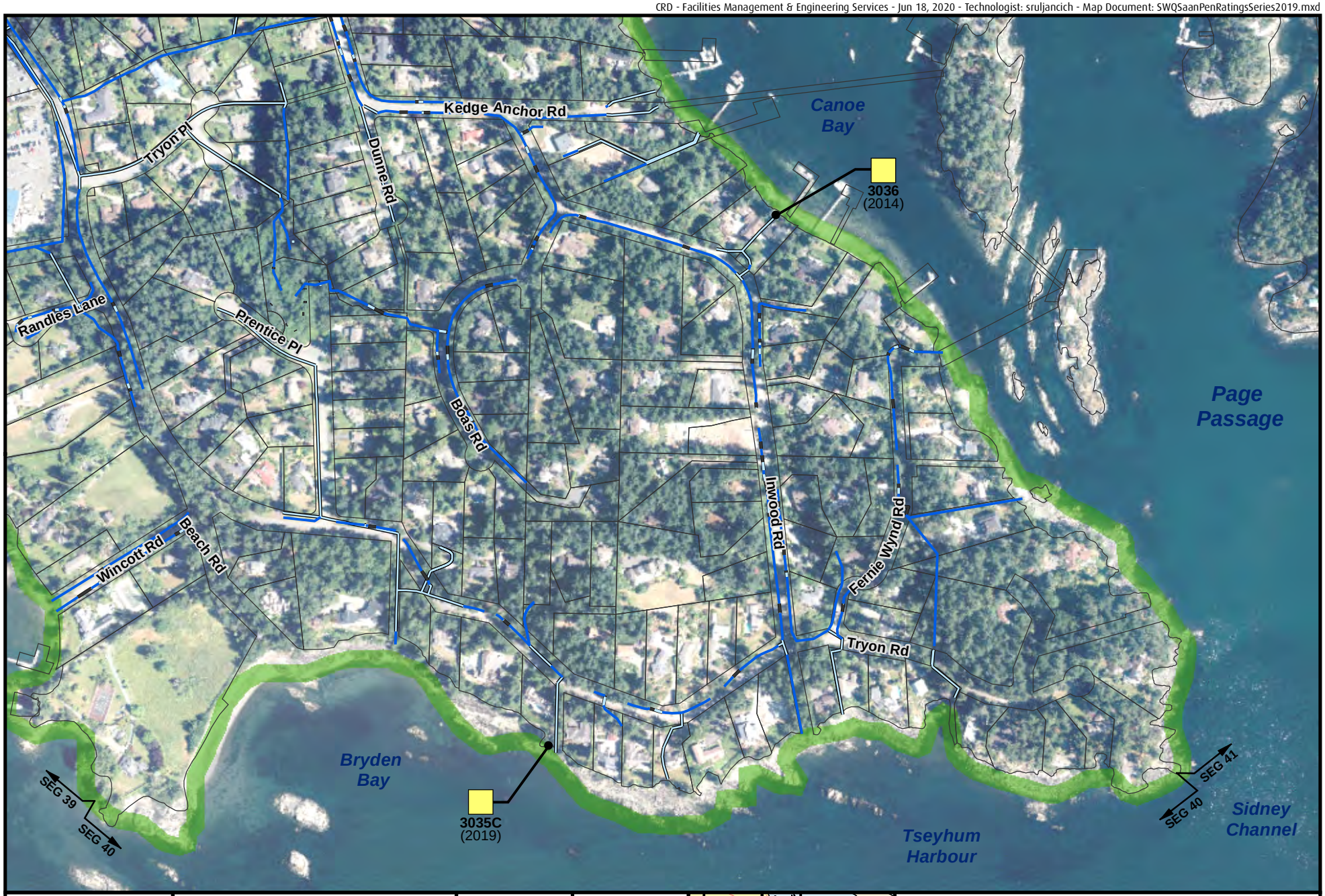

Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

N W E S

For Key Index and Legend See Figure 1

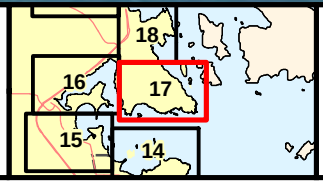

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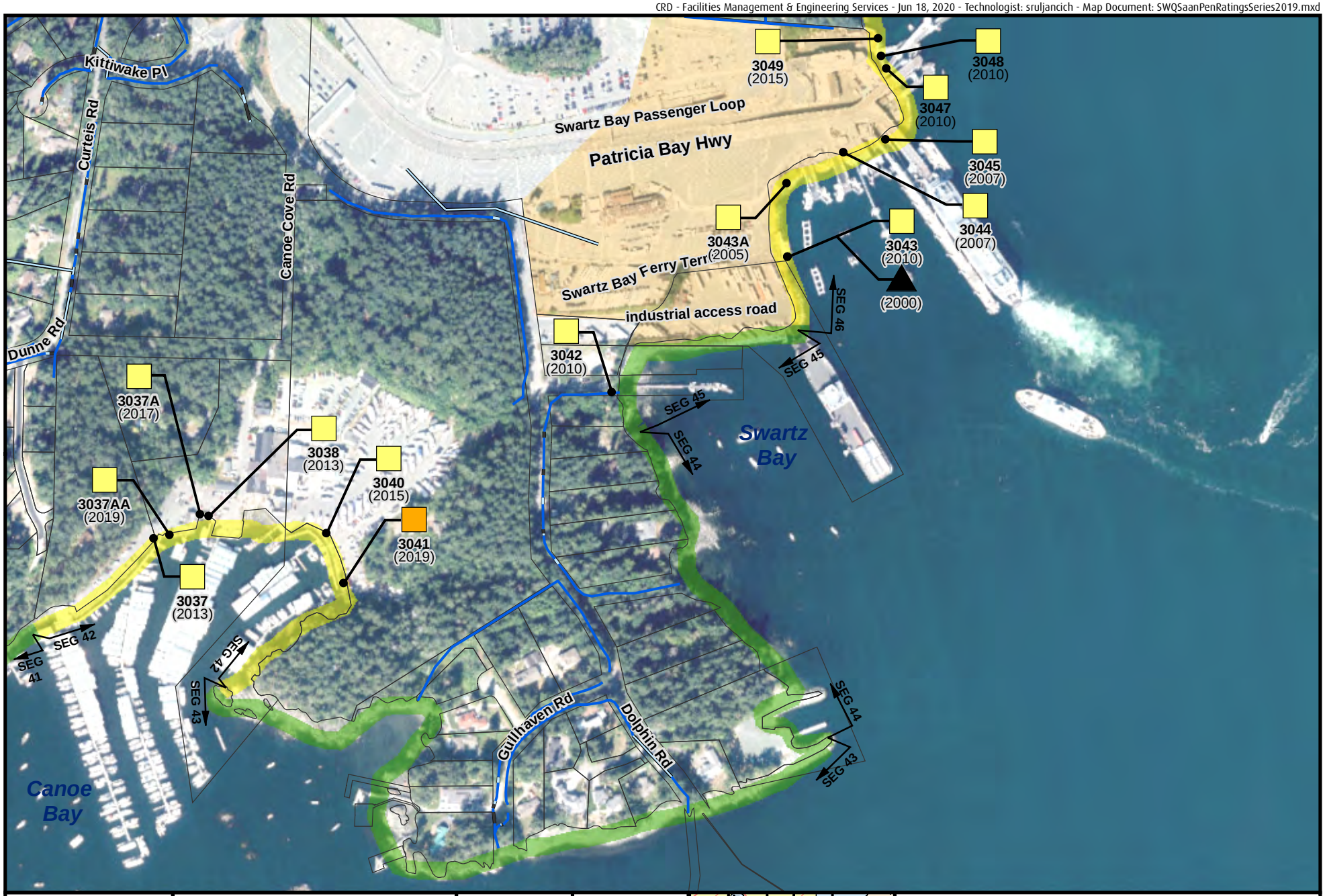
Figure 17

Saanich Peninsula 2019
Stormwater Discharge Location
and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S N E

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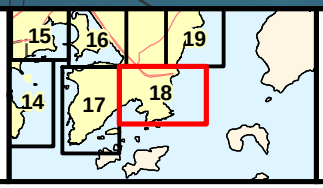
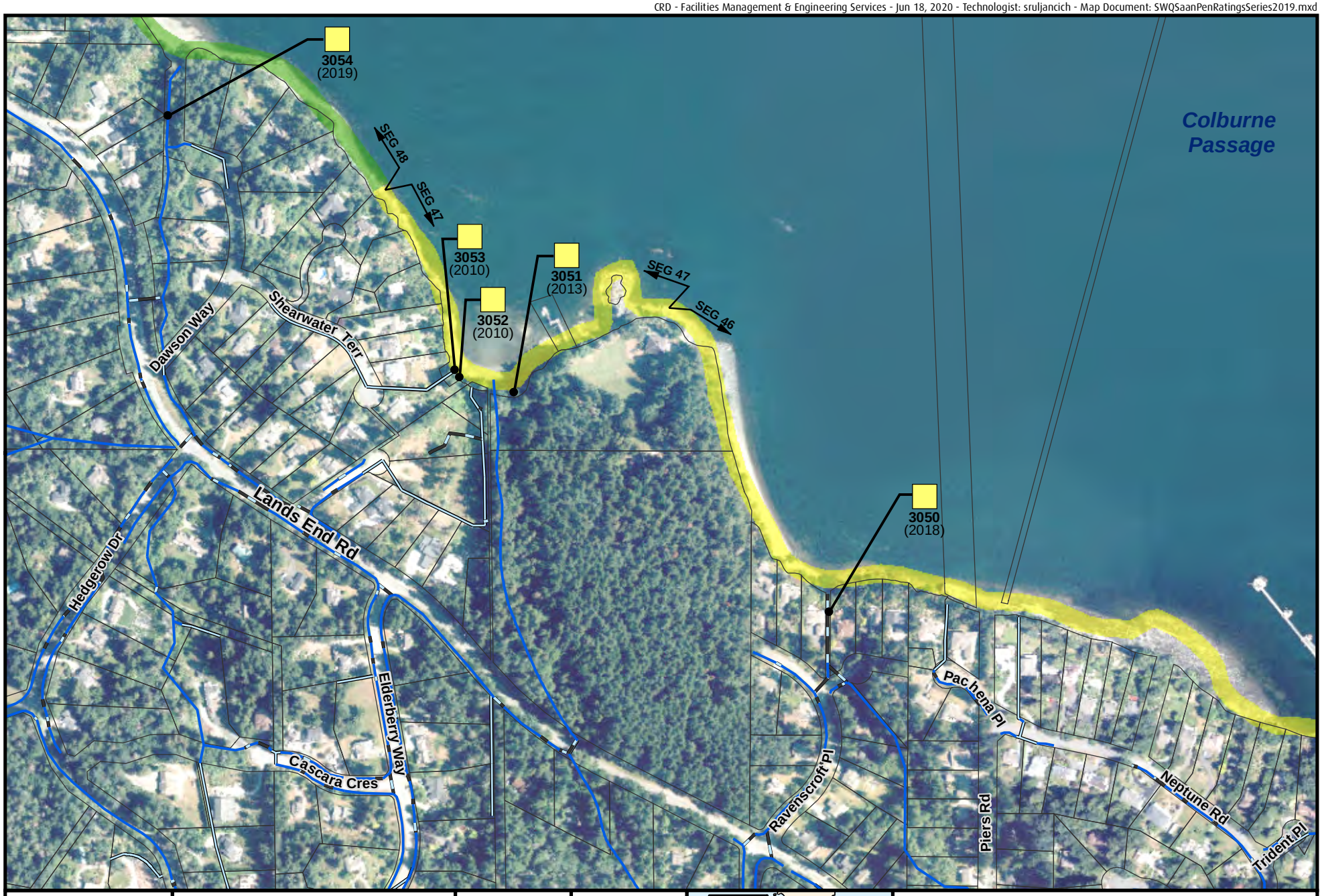


Figure 18

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

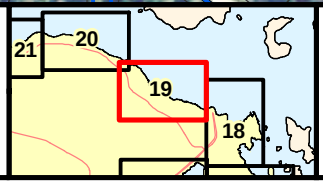
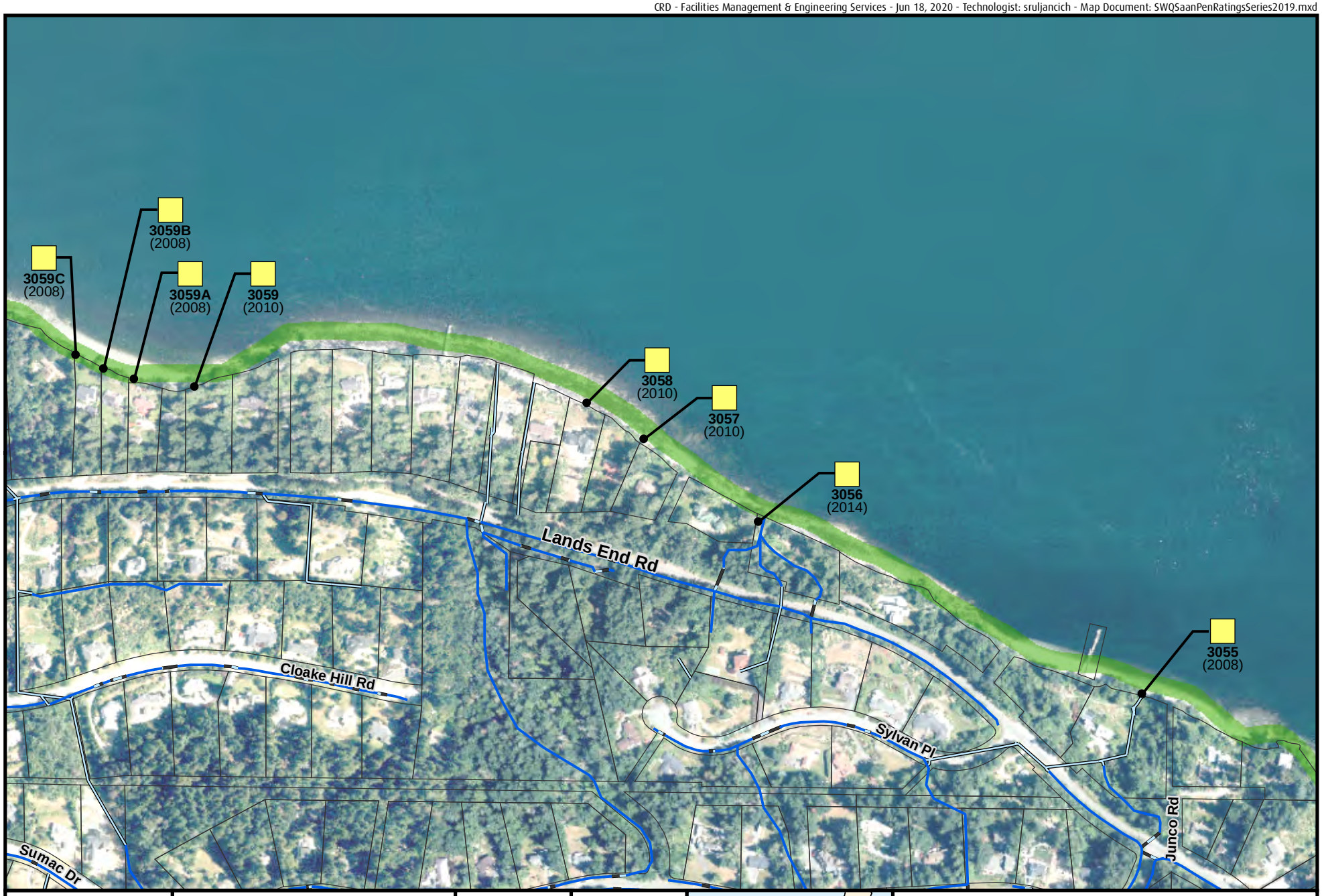


Figure 19
Saanich Peninsula 2019
Stormwater Discharge Location
and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

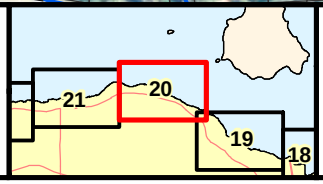

Figure 20

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

N W E S

For Key Index and Legend See Figure 1

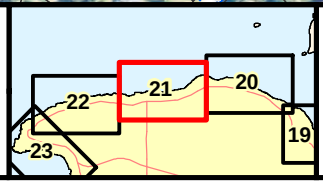

Figure 21

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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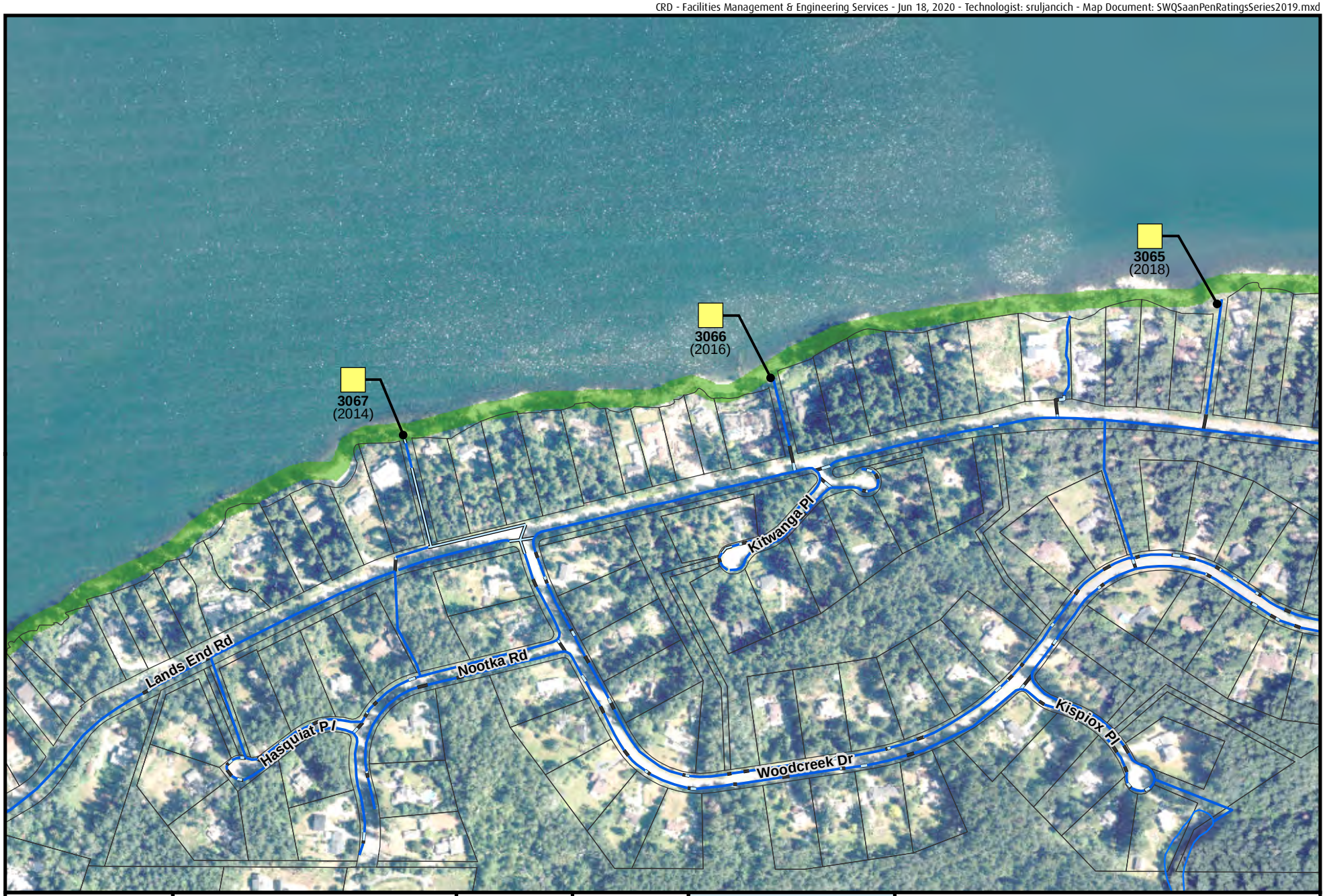

Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

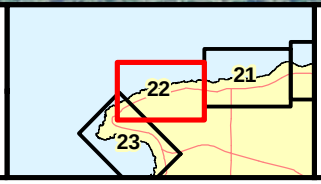

Figure 22

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

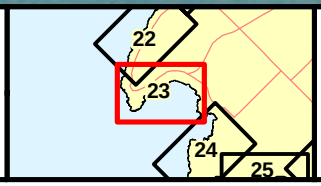
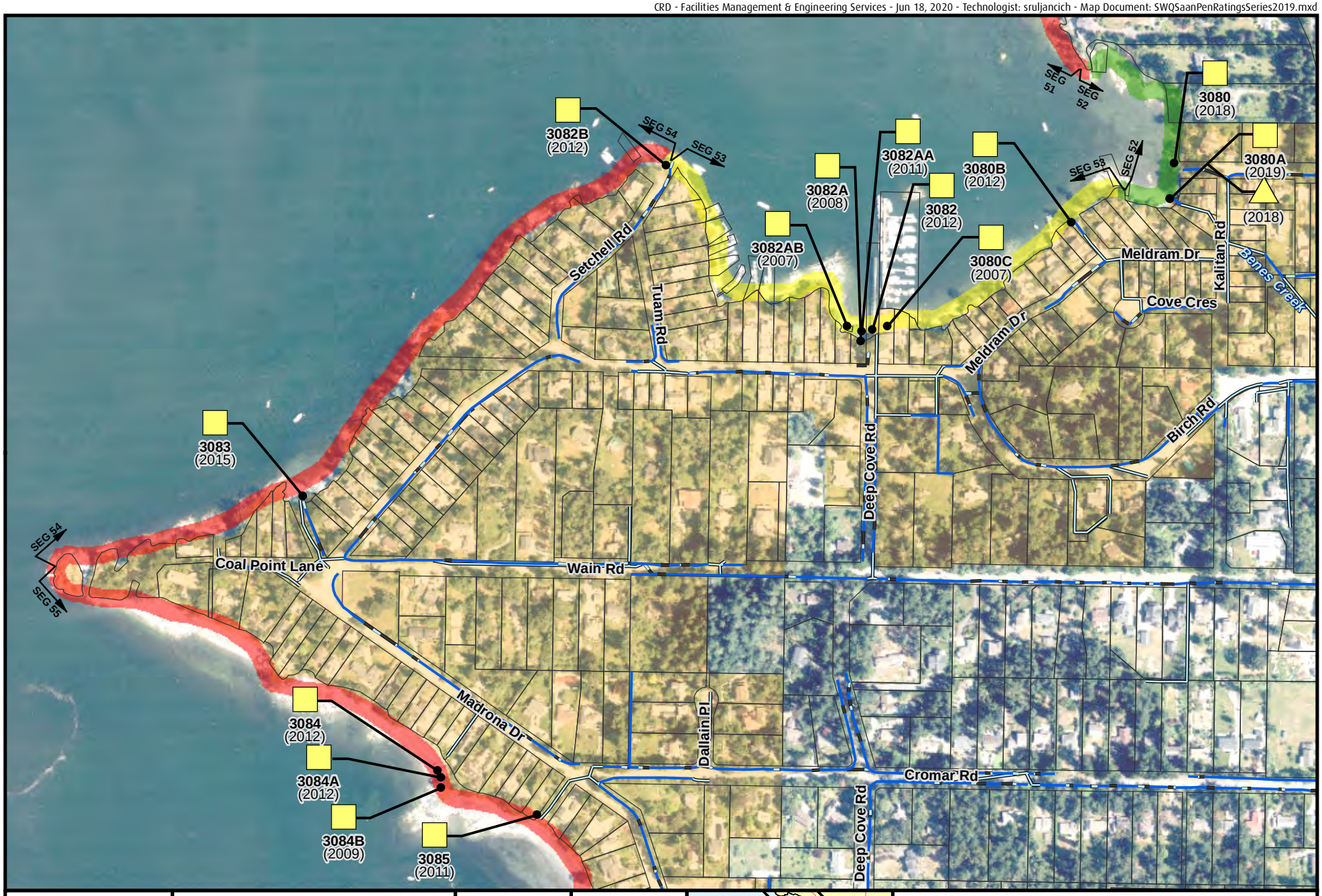


Figure 23

Saanich Peninsula 2019
Stormwater Discharge Location
and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

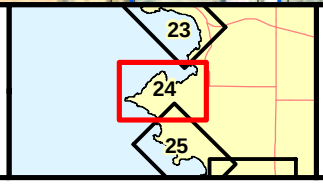

Figure 24

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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N E S W

For Key Index and Legend See Figure 1

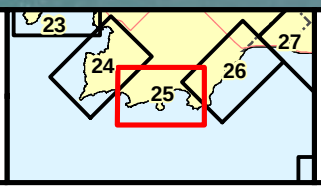

Figure 25

Saanich Peninsula 2019
Stormwater Discharge Location
and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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N

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For Key Index and Legend See Figure 1

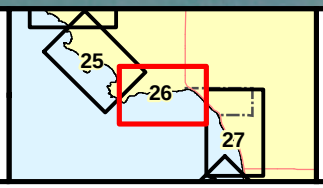
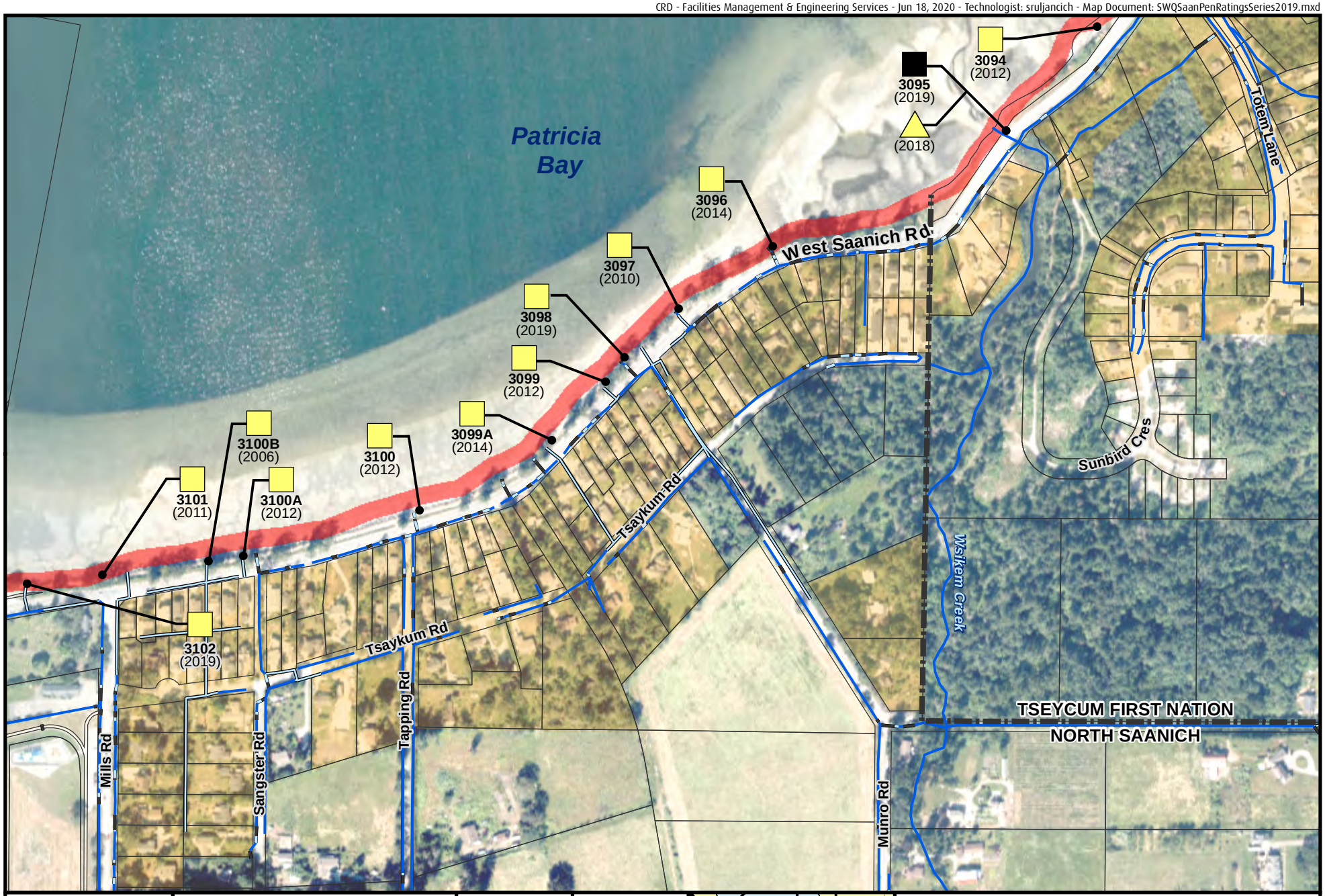


Figure 26

Saanich Peninsula 2019
Stormwater Discharge Location
and Level of Concern



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

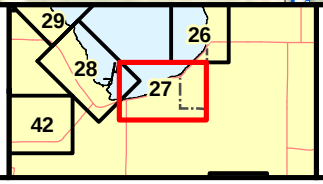

Figure 27

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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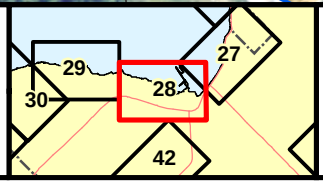
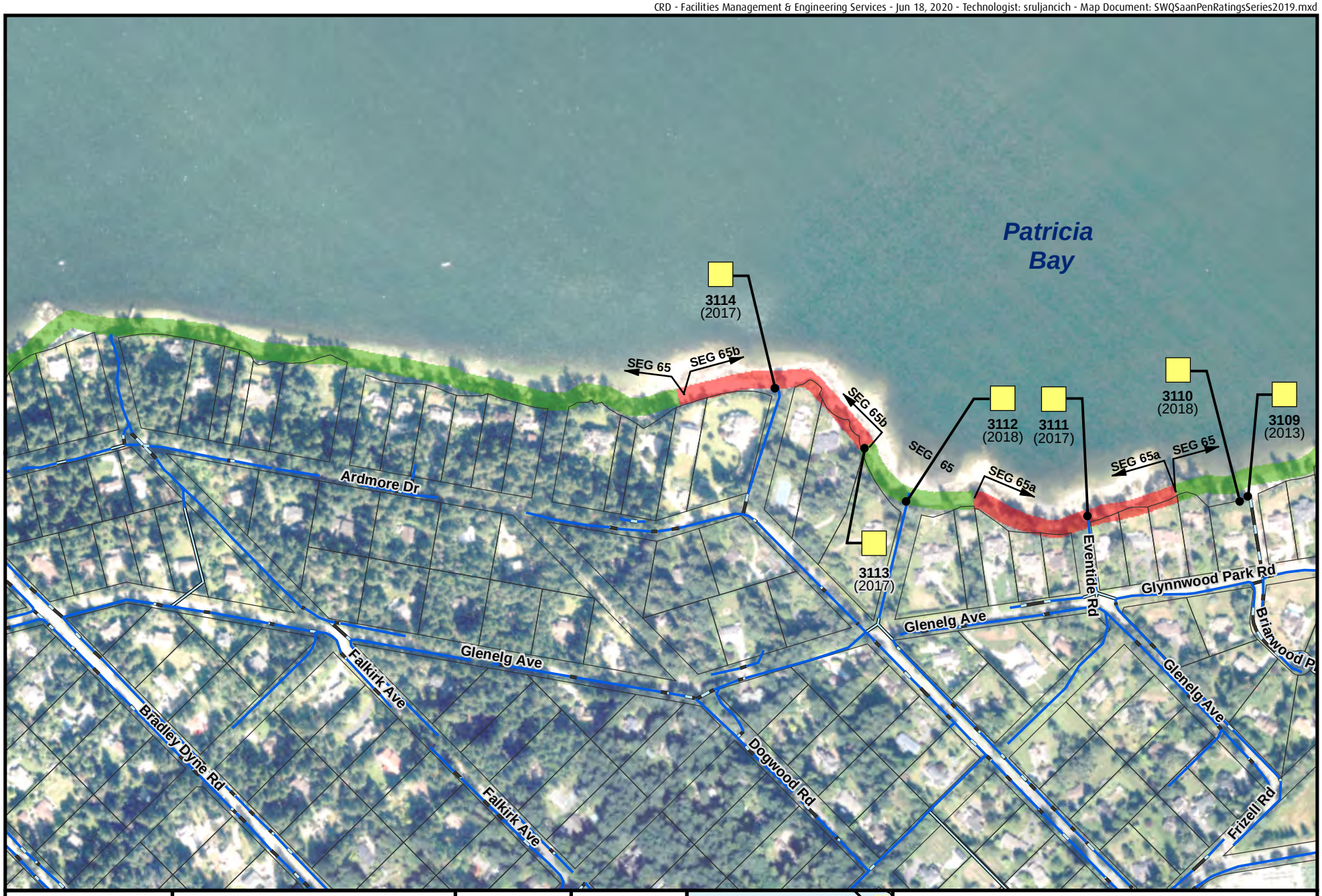


Figure 28
Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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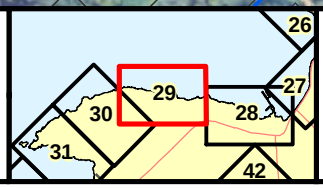
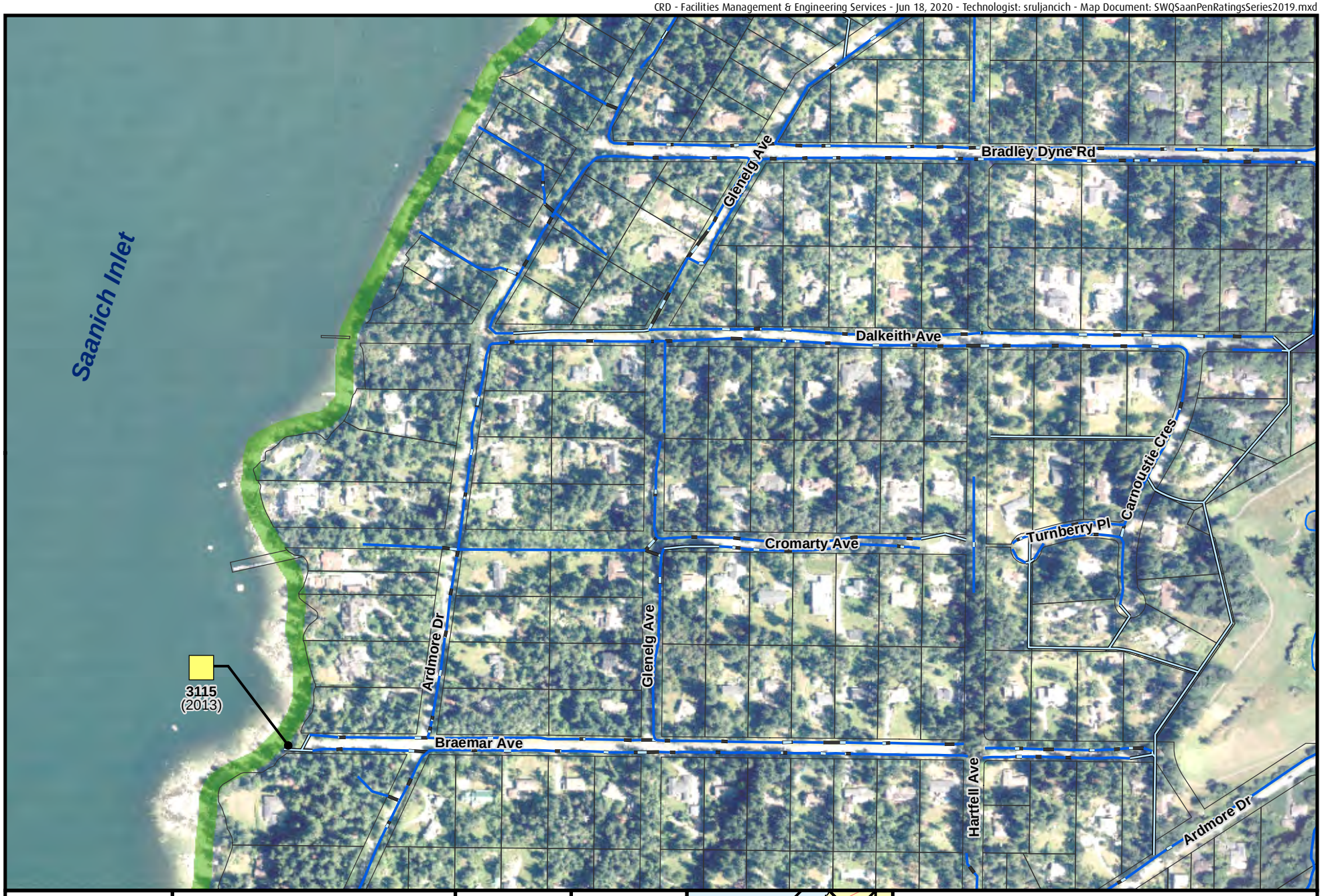


Figure 29

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

N W E S

For Key Index and Legend See Figure 1

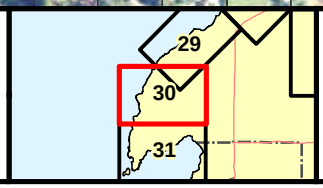


Figure 30

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

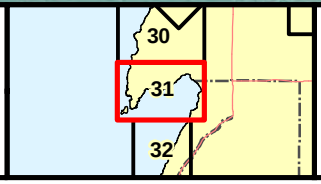
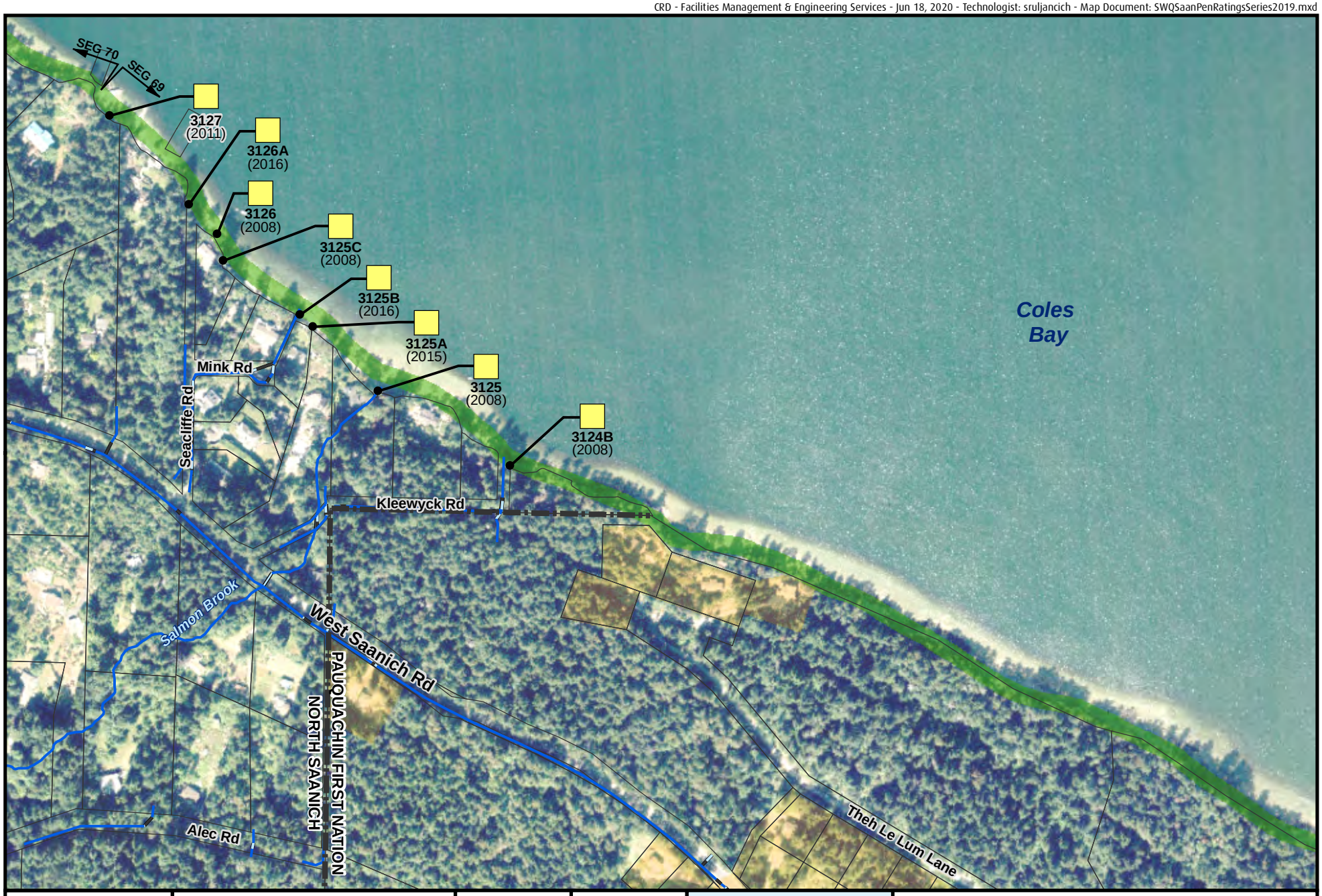


Figure 31

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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W S N E

For Key Index and Legend See Figure 1

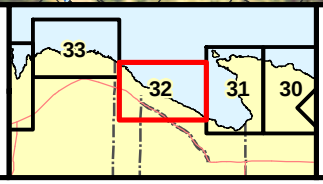

Figure 32

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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W S N E

For Key Index and Legend See Figure 1

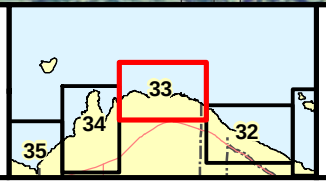

Figure 33

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

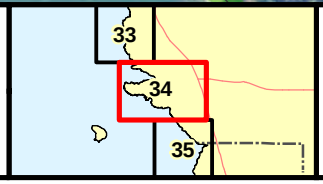

Figure 34

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

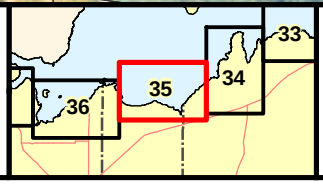
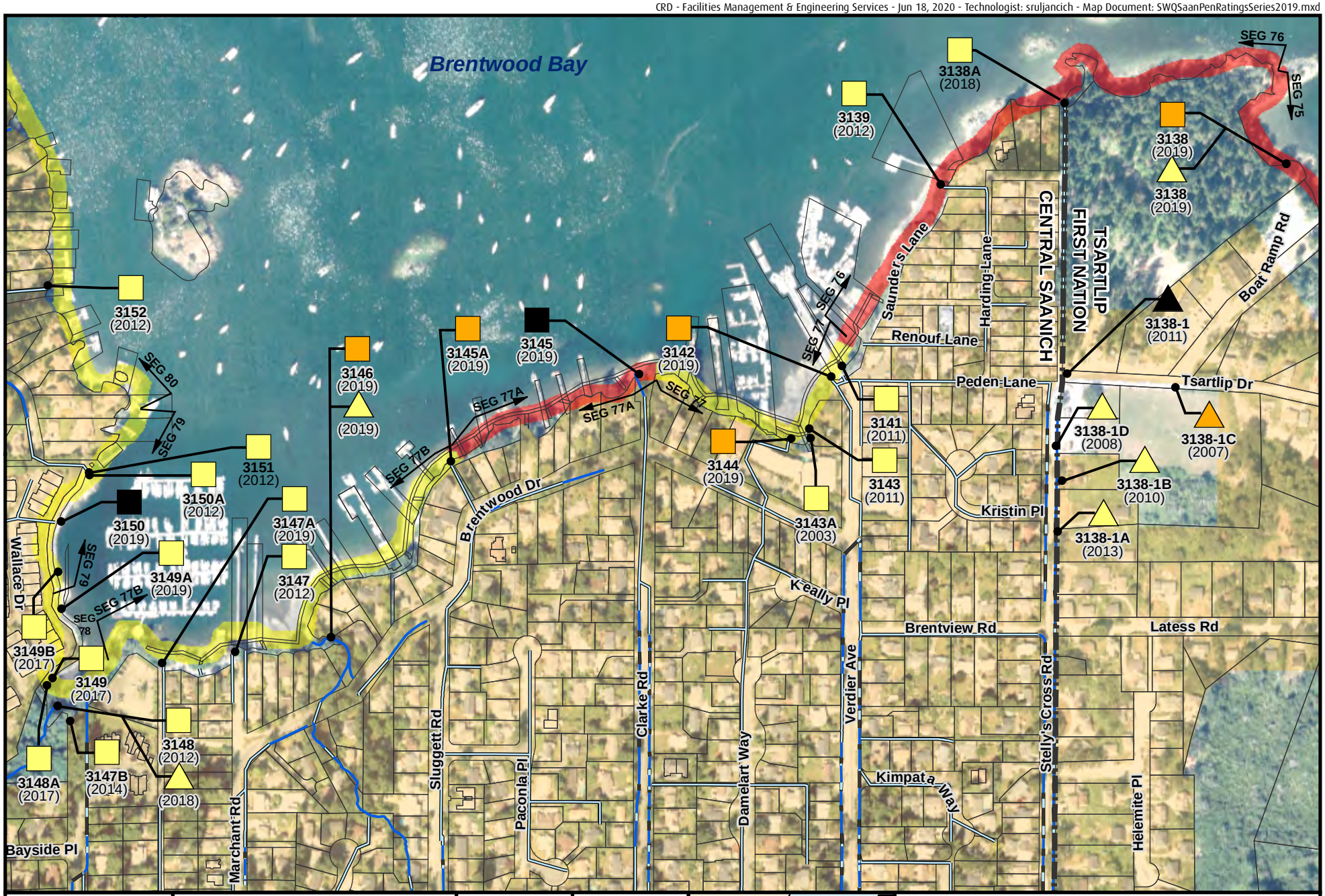


Figure 35

Saanich Peninsula 2019
Stormwater Discharge Location
and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

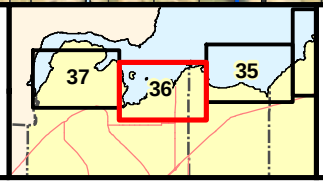

Figure 36

Saanich Peninsula 2019
Stormwater Discharge Location and Level of Concern

Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

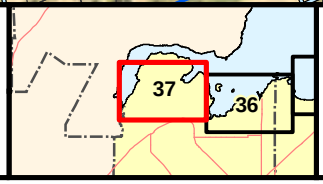
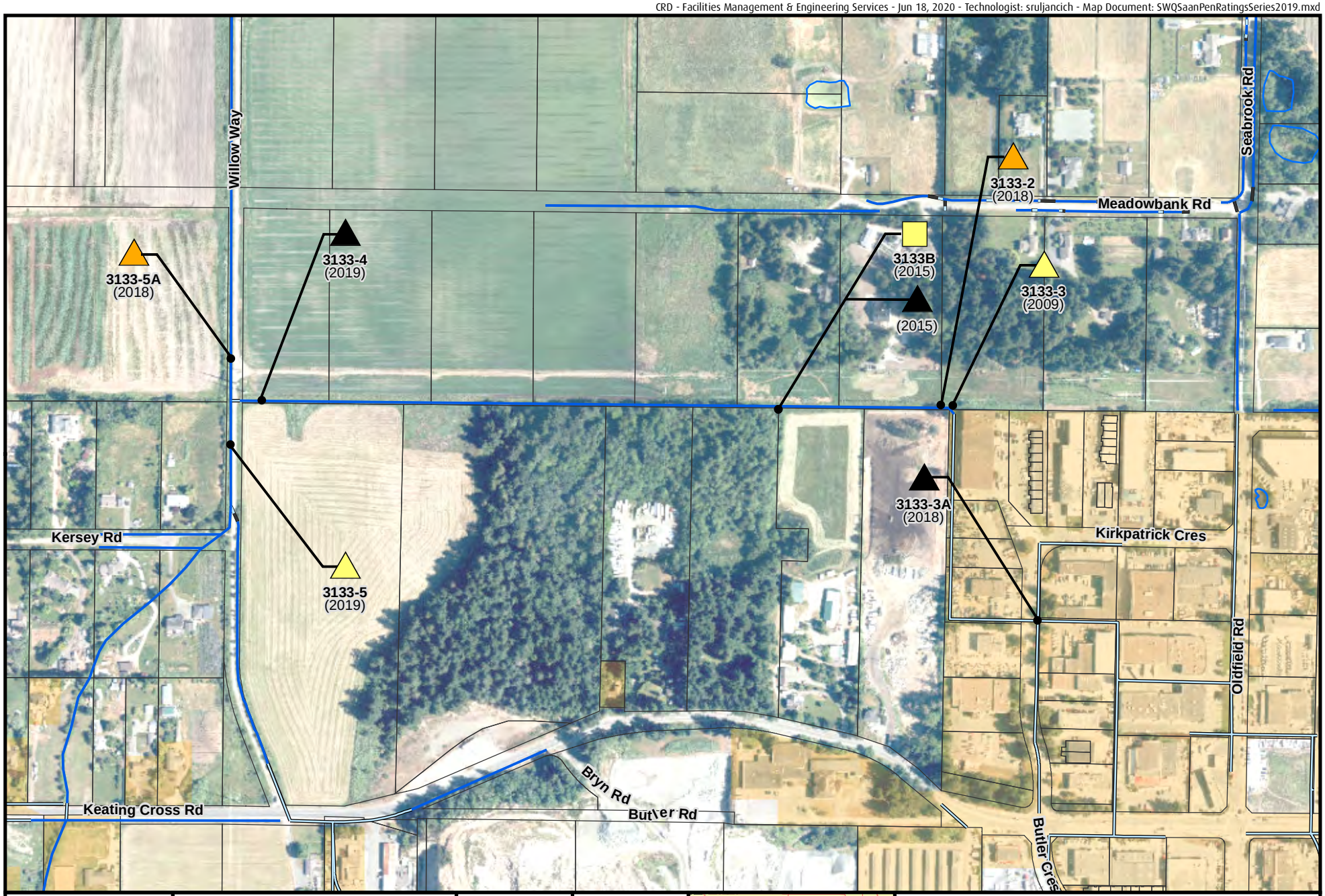


Figure 37

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



CRD Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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N
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For Key Index and Legend See Figure 1

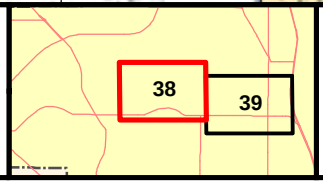
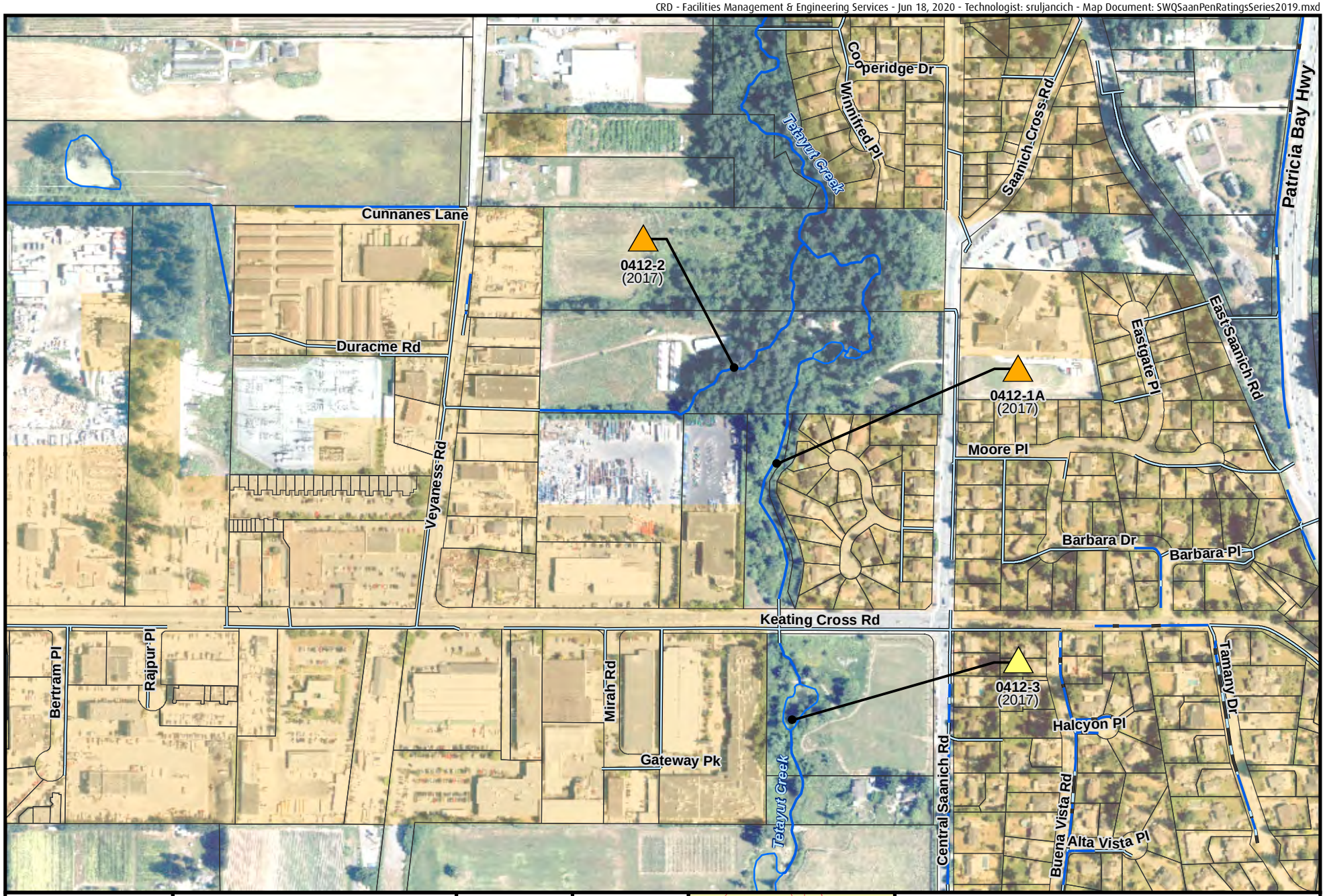


Figure 38

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

N W E S

For Key Index and Legend See Figure 1

38 39

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Figure 39

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

N W E S

For Key Index and Legend See Figure 1

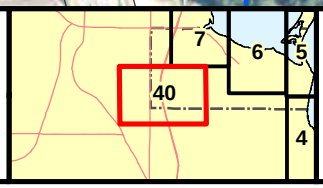

Figure 40

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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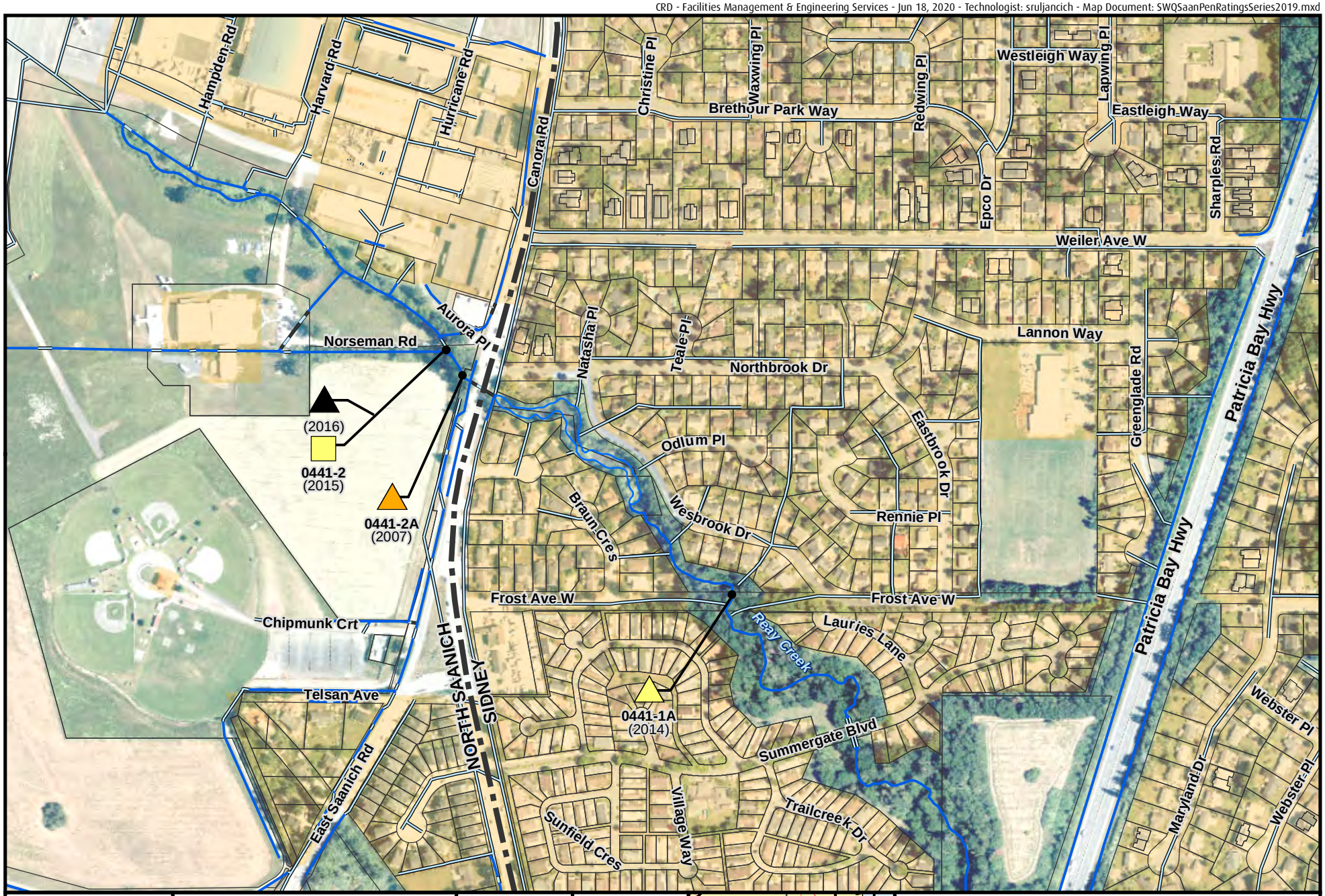

Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

N
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For Key Index and Legend See Figure 1

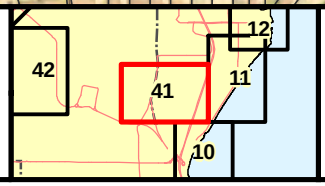

Figure 41
Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

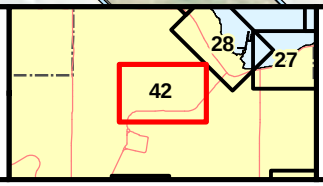
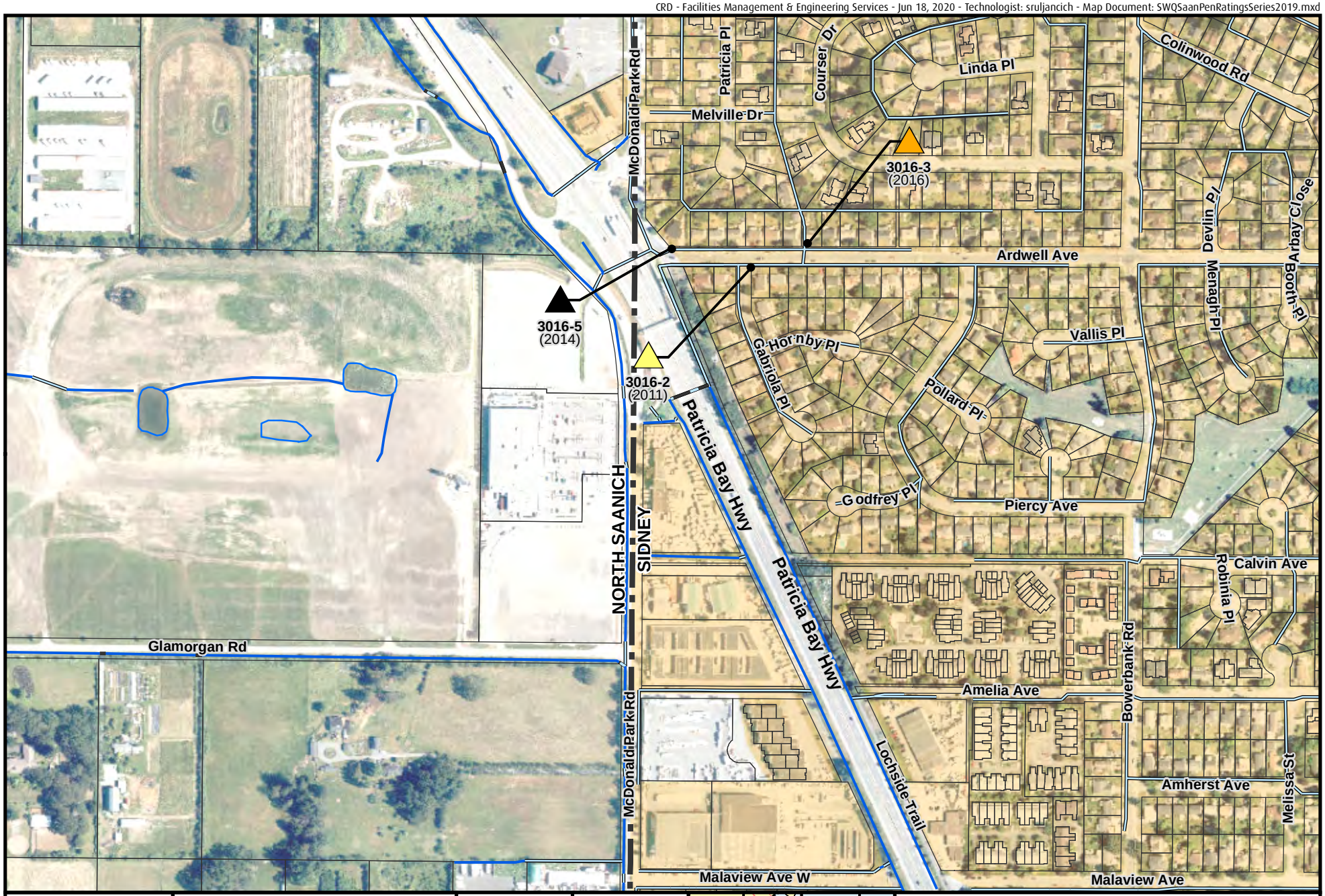


Figure 42
Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

N

W E

S

For Key Index and Legend See Figure 1

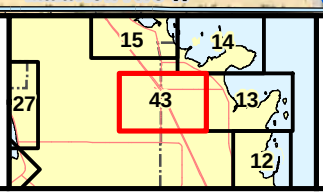


Figure 43

Saanich Peninsula 2019 Stormwater Discharge Location and Level of Concern

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APPENDIX B

BACTERIAL AND FLOW DATA 2019

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0405	North of Island View beach parking lot, past trail	2017-03-03	19	null	no odour, very amber, pooled with flow
		2017-07-04	320	null	no odour, very amber, pooled
		2018-02-19	10	null	no odour, very amber, unknown flow
		2018-08-16	20	null	no odour, amber, pooled
		2019-02-27	40	null	no odour, amber, pooled
		2019-07-11	220	30	no odour, amber/rusty
		2019-10-10	48	null	no odour, amber, pooled flow
		2020-02-13	2	> 40	no odour, very amber, pooled with flow
SW0407	SA-SU Road east corner of Saanichton Bay	2017-02-28	< 10	100	no odour, amber, tidally influenced
		2017-08-18	20	80	no odour, amber, probably tidally influenced
		2018-02-05	< 10	250	no odour, amber
		2018-02-19	20	200	no odour, amber
		2018-02-26	20	null	no odour, clear, tidally influenced
		2018-08-16	50	30	no odour, murky
		2019-02-27	10	120	no odour, clear, potential marine influence
		2019-07-11	70	120	no odour, yellow
		2020-03-26	32	> 500	no odour, clear
SW0409C	2788 SA-SU Road corner of driveway	2019-10-28		0	no flow, not sampled
SW0409CA	Intersection SA-SU Road and Jimmy Road	2020-01-23	170	60	no odour, clear
SW0410	20 m north of 2764 SA-SU Road	2018-02-05	40	30	no odour, clear
		2018-02-19	30	24	no odour, clear
		2018-02-26	40	12	no odour, clear
		2018-08-16		0	dry, not sampled
		2019-02-27	30	48	no odour, clear
		2019-07-11	150	5	no odour, clear
		2019-10-10	6	20	no odour, clear
		2020-01-23	82	> 120	no odour, amber
SW0411	Near SA-SU Road and Mt. Newton X Road intersection	2019-02-27	< 10	1	no odour, clear
		2019-07-11		null	flow too low to sample
		2020-01-23	1000	7	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0411A	Across from 2721 Mt. Newton X Road	2017-02-28	< 10	12	no odour, clear
		2017-08-18		0	dry, not sampled
		2018-02-05	10	10	no odour, clear
		2018-02-19	< 10	10	no odour, clear
		2018-02-26	< 10	18	no odour, clear
		2018-08-16		0	dry, not sampled
		2019-02-27	10	18	no odour, clear
		2019-07-11	50	3	no odour, clear
		2020-01-23	120	24	no odour, clear
		2020-05-28	10	4	no odour, murky brown
SW0411AA	Between church and 2769 Mt Newton Road	2017-03-03	1	20	no odour, clear
		2017-08-18	860	1	no odour, clear
		2018-02-05	10	8	no odour, clear
		2018-02-19	< 10	12	no odour, clear
		2018-02-26	10	10	no odour, clear
		2018-08-16		0	dry, not sampled
		2019-02-27	10	15	no odour, clear
		2019-07-11	< 10	4	no odour, slight amber
		2020-01-23	18	38	no odour, murky amber
		2020-05-28	30	3	no odour, slight amber
SW0412	Tetayut Creek, under 2499 Helmsen's Hollow	2017-03-03	26	> 2000	no odour, slightly brown
		2017-07-25	160	> 300	no odour, clear
		2018-02-05	40	> 2000	no odour, clear
		2018-02-19	40	> 1200	no odour, clear
		2018-02-26	30	> 400	no odour, clear
		2018-08-16	150	> 300	no odour, clear
		2019-03-19	40	> 500	no odour, clear
		2019-07-11	140	> 1000	no odour, clear
		2019-10-10	46	> 500	no odour, clear
		2020-03-23	100	> 2000	no odour, clear
SW0412-1A	Tetayut Creek, 2240 Keating Cross Road	2017-10-24	230	10	no odour, clear
		2017-11-02	380	40	no odour, clear
		2017-11-10	30	40	organic odour, clear
		2017-12-05	70	40	organic odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0412-2B	Tetayut Creek at 2230 Cooperidge Drive	2017-10-24	90	30	no odour, clear
		2017-11-10	100	80	organic odour, clear
		2017-12-05	50	140	organic odour, clear
SW0412-2E	Tetayut Creek, upstream of Tetayut Road	2019-09-30	340	null	no odour, clear, flow not estimated
SW0413	Mt. Newton X Road beach access	2018-02-19		null	flow too low to sample
		2018-08-16		0	dry, not sampled
SW0414	Mt. Newton X Road beach access east of Lochside Drive	2017-02-01	10	20	no odour, clear
		2017-08-18	140	3	no odour, clear
		2018-02-19	10	10	no odour, clear
		2018-08-16	70	8	no odour, clear
		2019-09-30	18	null	no odour, clear, flow not estimated
SW0416	Ferguson Road beach access	2017-02-01	60	14	no odour, clear
		2017-07-04	40	8	no odour, clear
		2017-07-17	40	6	no odour, clear
		2018-02-19	< 100	18	no odour, very turbid from construction
		2018-03-06	160	10	no odour, turbid brown
		2018-08-01	< 10	18	no odour, clear
		2019-02-27	40	100	no odour, clear
		2019-06-19	350	10	no odour, clear
		2019-10-10	2	9	no odour, clear
		2020-01-23	130	> 200	slight sewer odour, murky
SW0419	2654 Lancelot Drive, Turgoose Pt. Estates, near #14	2017-02-01	< 10	8	no odour, clear
		2017-07-04	210	6	no odour, clear
		2018-02-19	40	10	no odour, clear
		2018-08-01	140	6	no odour, clear
SW0421A	Foot of Arthur Drive	2019-03-19		null	flow too low to sample
		2019-06-19		null	flow too low to sample
		2020-02-19		null	flow too low to sample
SW0423	Foot of Newman Road, 8 m north of boat house	2018-02-19	160	80	no odour, clear
		2018-08-01	80	3	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0424	Between 8475 and 8443 Lochside Drive	2017-02-01	110	25	no odour, clear
		2017-08-23		null	flow too low to sample
		2018-02-19	< 10	60	no odour, clear
		2018-08-01		0	dry, not sampled
		2019-03-19	30	32	no odour, clear
		2019-06-19		null	flow too low to sample
		2020-01-23	50	> 200	no odour, amber
SW0426	Wardle Road beach access	2017-02-01	40	20	no odour, clear
		2017-02-01	50	20	no odour, clear
		2017-06-27		8	no odour, clear
		2017-07-04	10	8	no odour, clear
		2017-07-17		3	no odour, clear
		2017-07-25	130	< 5	no odour, clear
		2017-11-09	90	20	no odour, clear
		2018-02-19	60	40	no odour, clear
		2018-04-30	< 10	60	no odour, clear
		2018-08-01	10	2	no odour, clear
		2019-02-27	40	80	no odour, clear
		2019-06-19	10	3	no odour, clear
		2020-01-23	60	> 200	no odour, amber
SW0428	3 m north of beach access steps at foot of Amity Dr	2017-02-01	< 10	24	no odour, clear
		2017-06-27		12	no odour, clear
		2017-07-04	10	10	no odour, clear
		2017-07-17		6	no odour, clear
		2017-07-25	10	10	no odour, clear, potential otter influence
		2017-11-09	40	22	no odour, clear
		2018-02-19	< 10	65	no odour, clear
		2018-04-30	80	60	no odour, clear
		2018-08-01	20	1	no odour, clear
		2019-02-27	< 10	80	no odour, clear
		2019-06-19	< 10	5	no odour, clear
		2020-01-23	220	> 200	no odour, amber
SW0428A	4 m north of top of stairs at foot of Amity Drive	2017-02-01		null	flow too low to sample
		2017-07-04		0	dry, not sampled

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0430	Ditch at south end of Bazan Bay Park	2017-02-01	20	200	no odour, clear
		2017-06-27		24	no odour, clear
		2017-07-04	< 10	32	no odour, clear
		2017-07-17		24	no odour, clear
		2017-07-25	70	50	no odour, clear
		2018-02-19	20	160	no odour, clear
		2018-08-01	40	80	no odour, clear
		2019-02-27	< 10	120	no odour, clear
		2019-06-19	10	38	no odour, clear
		2020-01-23	80	> 300	no odour, clear
SW0430A	10 m north of grass area at foot of beach access	2017-06-27		2	no odour, clear
		2017-07-17		0	dry, not sampled
		2017-07-25	5500	5	no odour, clear
		2017-11-09	60	2	no odour, clear
		2018-04-30	180	3	no odour, clear
		2019-02-27	50	8	no odour, clear
		2019-06-19	< 10	2	no odour, clear
		2020-01-23	40	12	no odour, clear
SW0430AA	Cy Hampton Park 10 m south of picnic tables	2019-03-19	10	7	no odour, clear
		2019-06-19		null	flow too low to sample
SW0431	Bazan Bay Park 20 m north of dirt path	2017-02-01	< 10	200	no odour, clear
		2017-06-27		50	no odour, clear
		2017-07-04	110	40	no odour, clear
		2017-07-17		20	no odour, clear
		2017-07-25	960	50	no odour, clear
		2017-11-09	60	46	no odour, clear
		2018-02-19	10	120	no odour, clear
		2018-04-30	50	140	no odour, clear
		2018-08-01	270	30	no odour, clear
		2019-02-27	20	> 200	no odour, clear
		2019-06-19	130	55	no odour, clear
		2020-01-23	70	> 300	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0432	Foot of Bazan Bay Road	2017-02-01	10	120	no odour, clear
		2017-06-27		140	no odour, clear
		2017-07-04	70	120	no odour, clear
		2017-07-17		80	no odour, clear
		2017-07-25	370	100	no odour, clear
		2017-11-09	130	60	no odour, clear
		2018-02-19	20	120	no odour, clear
		2018-04-30	200	160	no odour, clear
		2018-08-01	40	70	no odour, clear
		2019-02-27	50	> 250	no odour, clear
		2019-06-19	240	70	no odour, clear
		2020-01-23	29	> 600	no odour, clear
SW0435	Discharge at NE property line of 9165 Lochside Drive	2017-06-27		80	no odour, clear
		2017-07-17		40	no odour, clear
		2017-07-25	20	200	no odour, clear
		2019-04-26	150	80	no odour, clear
		2019-06-19	500	68	no odour, clear
		2020-02-13	13	100	no odour, clear, otter influence
SW0441	Reay Creek, beach access; 9265 Lochside	2017-03-08	70	> 500	no odour, clear
		2017-06-27		> 250	no odour, clear
		2017-07-17		> 120	no odour, clear
		2017-07-25	200	80	no odour, clear, possible tidal influence
		2017-08-24	80	80	no odour, clear
		2018-03-26	260	250	no odour, clear
		2018-05-15	140	> 250	no odour, clear
		2018-06-21	480	120	no odour, clear
		2018-08-16	90	140	no odour, clear
		2019-04-26	2700	> 250	no odour, clear
		2019-07-05	280	100	no odour, clear
		2020-02-13	77	> 800	no odour, clear
SW0441-1A	Reay Creek, foot of Frost Avenue, 20 m d/s of bridge	2018-06-21	200	100	no odour, clear
		2019-07-05	60	60	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0442	9334 Lochside Drive beach access	2017-02-01	< 10	null	no odour, clear, pooled flow
		2017-07-05	200	null	no odour, clear, pooled
		2018-02-20	< 10	< 1	no odour, clear
		2018-08-02		null	flow too low to sample
		2019-02-28	< 10	null	no odour, clear, flow too low to estimate
		2019-06-21		null	flow too low to sample
		2020-02-13	20	2	no odour, clear
SW0443	9348 Lochside Drive	2017-02-01		0	dry, not sampled
		2017-07-05		0	dry, not sampled
		2018-02-20		null	flow too low to sample
		2018-08-02		0	dry, not sampled
		2019-02-28		null	flow too low to sample
		2019-06-21		0	dry, not sampled
		2020-02-13	40	8	no odour, murky/sudsy, surge flow
SW0445	20 m north of steps across from 9388 Lochside Drive	2017-02-01	< 10	8	no odour, clear
		2017-07-05	60	1	no odour, clear
		2018-02-20	20	6	no odour, clear
		2018-08-02		null	flow too low to sample
		2019-02-28	< 10	6	no odour, clear
		2019-06-19	550	7	no odour, amber with suds
		2019-10-10	43	2	no odour, clear
		2020-02-13	< 1	9	no odour, clear
SW0446	15 m south of beach access; 9462 Lochside Drive	2017-02-01	< 10	2	no odour, clear
		2017-07-05	20	1	no odour, clear
		2018-02-20	< 10	4	no odour, clear, evidence of animal activity
		2018-08-02		null	flow too low to sample
		2019-02-28	< 10	6	no odour, clear
		2019-06-19	2600	2	no odour, amber with suds
		2020-02-13	< 1	5	no odour, clear
		2020-03-02	3	3	no odour, slight amber

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0447	Across from 9498 Lochside Drive	2017-02-01	490	6	no odour, clear
		2017-02-01	460	6	no odour, clear
		2017-07-05	90	1	no odour, clear
		2018-02-20	50000	4	no odour, clear
		2018-03-06	570	3	no odour, clear
		2018-05-02	2100	5	no odour, clear
		2018-08-02	40	2	no odour, clear
		2019-02-28	5900	8	no odour, clear
		2019-06-21	20000	1	no odour, slightly amber
		2020-02-13	1400	9	no odour, clear
SW0448	Foot of Weiller Road, Tulista Park	2017-02-01	60	4	no odour, clear
		2017-03-03	79	24	no odour, murky
		2017-07-05	640	1	no odour, amber
		2018-02-20	160	8	no odour, clear
		2018-08-02	540	< 1	no odour, amber yellow
		2019-02-28	< 10	6	no odour, clear
		2019-06-21	< 100	< 1	no odour, amber
		2020-02-13	560	5	no odour, clear
SW0449	Ditch along west and south side of Tulista Park	2017-02-01	220	22	no odour, clear
		2017-03-03	710	> 300	no odour, very muddy brown
		2017-03-03	690	> 300	no odour, very muddy brown
		2017-07-05	10	30	no odour, amber
		2018-02-20	10	80	no odour, clear
		2018-08-02	200	14	no odour, slight amber
		2019-02-28	30	80	no odour, clear
		2019-06-21	2800	8	no odour, amber
		2020-02-13	53	70	no odour, murky
SW0449-2D	MH153F on Fifth Street near boat launch entrance	2019-10-10	160	null	no odour, turbid, couldn't estimate flow
SW0449A	Manhole at corner of Oakville and Eighth Street	2017-02-01	40	null	no odour, clear, pooled flow
		2017-07-05	< 10	null	no odour, clear, pooled
		2018-02-20	10	null	no odour, clear
		2018-08-16			could not sample due to construction
		2019-02-28	10	null	no odour, clear, flow too low to estimate
		2019-06-21	140	12	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2019-07-05	200	48	no odour, clear, MH131, very low tide
		2020-02-13	710	60	no odour, clear
SW0450	Below Ocean Avenue and Second Street intersection	2017-02-01	< 10	8	no odour, clear
		2017-03-03	420	180	no odour, brown
		2017-07-05	< 10	16	no odour, clear
		2018-02-20	< 10	40	no odour, clear
		2018-08-16	240	46	no odour, clear
		2019-02-28	< 10	65	no odour, clear
		2019-06-21	40	48	no odour, clear
		2020-02-13	4400	100	no odour, murky
SW0456A	20 m north of condos near Eastview Park	2018-02-20		null	flow too low to sample
		2018-08-02		0	dry, not sampled
		2019-03-18		0	dry, not sampled
		2019-06-21		0	dry, not sampled
		2020-02-19	16	1	no odour, clear
SW0457	North end of Eastview Park, south of dock	2017-02-15	10	6	no odour, clear
		2017-07-05	< 10	1	no odour, clear
SW0458	Foot of Beacon Avenue below Sidney Museum	2017-02-15	< 10	30	no odour, clear
		2017-07-05	< 10	40	no odour, clear
		2018-02-20	< 10	32	no odour, clear
		2018-08-02	50	60	no odour, clear
		2018-11-19	30	80	no odour, clear
		2019-02-28	10	60	no odour, clear
		2019-06-21	< 10	32	no odour, clear
		2020-02-13	1	38	no odour, clear
SW0458A	End of Seaport Road, west side of pub	2017-02-15		null	flow too low to sample
		2017-03-03	100	8	no odour, murky
		2017-07-05		0	dry, not sampled
		2018-02-20		0	dry, not sampled
		2018-08-16		null	flow too low to sample
		2019-03-18		null	flow too low to sample
		2019-06-21		0	dry, not sampled
		2020-02-13		0	dry, not sampled

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0459	Behind 9901-3rd Street south of beach access	2018-02-20	< 10	6	no odour, clear
		2018-08-02	550	1	no odour, clear
		2019-02-28	< 10	5	no odour, clear
		2019-06-21	340	2	no odour, clear
		2020-02-13	45	7	no odour, clear
SW0462	Beach access at 10003 3rd Street	2020-02-19		null	flow too low to sample
SW0468	Beach access at Amherst	2019-02-28	< 10	1	no odour, clear
		2019-06-21		0	dry, not sampled
		2020-02-19	< 1	1	no odour, clear
SW0469	Beach access at Amherst, 8 m south of steps	2017-02-15	560	6	no odour, clear
		2017-07-06	60	< 1	no odour, clear
		2018-02-20	130	2	no odour, clear
		2018-08-02	140	2	no odour, clear
		2019-02-28	30	2	no odour, clear
		2019-06-21	100	< 1	no odour, clear
		2020-02-19	< 1	3	slight sewer odour, clear
SW0471	South of beach access at Surfside Place	2017-02-15	< 10	1	no odour, clear
		2017-07-06		0	dry, not sampled
SW3001	Access at 10232 Sommerset Place, 5 m west of boat launch	2020-02-19	1	1	no odour, clear
SW3002	Robert's Bay beach access at Third Street	2018-02-20	< 10	0	dry, not sampled
		2018-08-02		0	dry, not sampled
SW3003	Robert’s Bay beach access at Third Street, 2.5 m west	2017-02-15	20	10	no odour, clear
		2017-07-06	60	1	no odour, clear
		2018-02-20	< 10	4	no odour, clear
		2018-08-02	490	2	no odour, slight amber
		2019-03-14	50	3	no odour, clear
		2019-06-21	250	1	no odour, clear
		2020-02-19	< 1	4	no odour, clear
SW3003A	Foot of Third Street, 5 m west of bottom of stairs	2018-02-20	< 10	1	no odour, clear
		2018-08-02	< 10	< 1	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3005	Foot of Fifth Street, Mermaid Canal	2017-02-15	10	150	no odour, dirty amber
		2017-08-18	580	null	no odour, clear, pooled
		2018-02-28	8600	null	no odour, clear, couldn't estimate flow
		2018-08-03	950	12	no odour, clear
		2019-03-14	230	60	no odour, clear
		2019-06-21	600	8	no odour, clear
		2020-01-22	1600	80	no odour, clear, likely marine influenced
		2020-03-24	2600	> 120	no odour, clear
		2020-05-28	70	> 120	no odour, clear
		2020-06-18		> 150	no odour, clear, low tide
SW3005-2A	Manhole at 2356/2362 Malaview Avenue property line	2019-12-06	23	30	no odour, clear, potential marine influenced
SW3006	Foot of Ardwell Avenue	2017-02-15	800	120	no odour, dirty amber
		2017-07-06	1100	5	no odour, clear
		2018-02-28	< 10	10	no odour, clear
		2018-08-03	370	3	no odour, clear
		2019-03-14	40	8	no odour, clear
		2019-06-21	120	3	no odour, clear
		2020-02-19	7	12	no odour, clear
SW3007	Foot of Bowden, 9 m west of beach access	2017-02-15	1000	18	no odour, clear
		2017-07-06	2200	< 1	no odour, clear
		2018-02-28	< 10	6	no odour, clear
		2018-08-03	29000	1	no odour, clear
		2019-03-14	10	4	no odour, clear
		2019-06-21	240	1	no odour, clear
		2019-10-22	72	18	no odour, clear
		2020-02-19	49	7	no odour, clear
SW3014	Eastern pipe, DFO Small Craft Harbour Branch	2017-03-03	81	60	no odour, brown
		2017-07-06	240	< 1	no odour, clear
		2018-03-06	< 10	3	no odour, clear
		2018-08-03	100	< 1	no odour, clear
		2019-04-17	110	3	no odour, clear
		2019-06-21	100	1	no odour, clear
		2020-03-24	3	1	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3015	Western pipe, DFO Small Craft Harbour Branch	2017-03-03	39	60	no odour, brown
		2017-03-03	67	60	no odour, brown
		2017-07-06	2900	< 1	no odour, clear
		2018-03-06	< 10	5	no odour, clear
		2018-08-03	6400	< 1	no odour, clear
		2019-04-17	30	6	no odour, clear
		2019-06-21	2800	2	no odour, clear
		2020-03-24	140	2	no odour, clear
SW3016	Behind 10462 Resthaven Road	2017-03-08	250	40	no odour, clear
		2017-07-06	70	null	no odour, clear, pooled
		2018-03-06	320	18	no odour, clear
		2018-08-03	180	6	no odour, clear
		2019-04-17	2400	10	no odour, clear
		2019-06-21	360	2	no odour, clear
		2020-03-24	690	24	no odour, clear
SW3017D	Northern tip of Peninsula; Tseychum Harbour	2017-03-08	60	3	no odour, clear
		2017-07-06	40	1	no odour, slight amber
SW3017E	NE end of townhouses; corner of Resthaven	2018-03-06		null	flow too low to sample
		2018-08-03		0	dry, not sampled
SW3018	Behind 2056 White Birch	2020-03-24	< 1	2	no odour, clear
SW3019	Access through 2056 White Birch, west end of grass	2020-03-24	19	2	no odour, clear
SW3020	Capital City Yacht Club (Blue Heron Road), NE pipe	2019-03-14	90	8	no odour, clear
		2019-06-21	110	2	no odour, clear
		2020-02-19	90	40	no odour, clear
		2020-05-28	10	6	no odour, clear
SW3020A	Capital City Yacht Club (Blue Heron Road), SW pipe	2020-02-19	1	10	no odour, clear
		2020-05-28	3	2	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3021	Near corner of McDonald Park Road, Bayfield Road	2017-02-16	40	120	no odour, clear
		2017-07-06	270	4	no odour, clear
		2018-03-06	< 10	20	no odour, clear
		2018-08-03	110	6	no odour, clear
		2019-03-14	20	12	no odour, clear
		2019-06-24	70	8	no odour, clear
		2019-10-28	4	10	no odour, clear
		2020-02-13	3	80	no odour, clear
SW3021A	1835 Marina Drive, SW corner of N. Saanich Marina	2017-02-16	60	16	no odour, clear
		2017-02-16	40	16	no odour, clear
		2017-07-06	910	5	no odour, clear
		2018-02-28	< 10	8	no odour, clear
		2018-08-03	1100	6	no odour, clear
		2019-03-14	140	6	no odour, clear
		2019-06-24	600	5	sulphur odour, amber
		2020-03-02	46	15	no odour, slight amber
SW3022	North Saanich Marina, 6 m west from parking area	2019-03-14	20	3	no odour, yellow (iron bacteria)
		2019-06-24		null	flow too low to sample
SW3028	McDonald Park Road and Highway	2018-02-28	40	12	no odour, clear
		2018-08-03		0	dry, not sampled
SW3029	Corner of McDonald Park Road and Highway	2018-02-28	30	16	no odour, clear
		2018-08-03		0	dry, not sampled
SW3033	West of foot of Swartz Bay Road	2018-03-06	< 10	22	no odour, clear
		2018-08-03	30	6	no odour, clear
SW3034	Foot of Swartz Bay Road near highway	2017-02-16	0	0	dry, not sampled
		2017-07-10		null	flow too low to sample
SW3034D	Riprap north of parking lot, Westport Marina	2017-02-16	90	50	no odour, clear
		2017-07-10		0	dry, not sampled
		2018-02-28	20	14	no odour, clear
		2018-08-03	2500	< 1	no odour, clear
		2019-03-14	10	6	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2019-06-24	40	2	no odour, clear
		2020-03-02	77	60	no odour, clear
SW3034E	Under parking area, north end of Westport Marina	2018-03-06		0	dry, not sampled
		2018-08-03		null	flow too low to sample
		2019-03-14		null	flow too low to sample
		2019-06-24		0	dry, not sampled
		2020-03-02	< 1	4	no odour, clear
SW3035C	West side of foot of Tyron Road	2017-02-16	100	12	no odour, clear
		2017-02-16	60	12	no odour, clear
		2017-07-10		null	flow too low to sample
		2018-02-28	10	< 1	no odour, clear
		2018-08-03		null	flow too low to sample
		2019-03-14	870	< 1	no odour, clear
		2019-06-24	20	< 1	no odour, clear
		2020-03-02	18	4	no odour, clear
SW3037A	In corner of concrete wall located below restroom	2017-02-16	10	6	no odour, clear
		2017-07-10		0	dry, not sampled
SW3037AA	Canoe Cove Marina 7 m north of D dock in rip rap	2018-03-06		null	flow too low to sample
		2018-08-03		0	dry, not sampled
SW3041	6 m west of A dock, Canoe Cove Marina	2019-03-14	1400	4	no odour, amber
		2019-06-24		0	dry, not sampled
		2020-03-02	110	8	no odour, amber
SW3042	Foot of Barnacle Road, 5 m east of government dock	2019-03-14	10	1	no odour, amber
		2019-06-24		0	dry, not sampled
		2020-03-02	10	3	no odour, amber
SW3050	Right-of-Way from Ravenscroft Place	2017-02-16	180	22	no odour, clear
		2017-07-10	220	2	no odour, clear
		2018-03-01	< 10	18	no odour, clear
		2018-08-03		0	dry, not sampled
SW3054	Foot of Dawson Way	2019-03-18	30	88	no odour, clear
		2019-06-24	50	13	no odour, clear
		2020-03-19	6	40	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3055	35 m east of wharf, Lands End Road and Sylvan Place	2019-03-18	40	16	no odour, clear
		2019-06-24	40	3	no odour, amber
		2020-03-19	760	6	no odour, clear
		2020-05-28	69	7	no odour, clear
SW3065	Foot of access through property west of Seatrout	2018-03-01	860	42	no odour, clear
		2018-08-16	160	< 1	no odour, clear
SW3076	200 m west of beach access at foot of Tatlow Road	2017-04-05	260	60	no odour, clear
		2017-07-10		0	dry, not sampled
		2017-11-21	2200	> 250	no odour, turbid brown
		2017-12-01	200	32	no odour, clear
		2018-03-01	70	18	no odour, clear
		2018-05-15		0	dry, not sampled
		2018-08-16		0	dry, not sampled
		2019-03-14	20	12	no odour, clear
		2019-06-24	60	< 1	no odour, clear
		2020-03-19	1	4	no odour, slight murky
SW3077	50 m west of beach access at Tatlow Road	2017-04-05	430	20	no odour, clear
		2017-07-10	4300	2	no odour, clear
		2017-11-21	1300	80	no odour, turbid brown
		2018-03-01	90	4	no odour, clear
		2018-05-15	430	4	no odour, clear
		2018-08-16	310	< 1	no odour, clear
		2019-03-14	360	4	no odour, clear
		2019-06-24	200	< 1	no odour, clear
		2019-08-06	460	< 1	no odour, clear
		2020-03-19	75	< 1	no odour, clear
SW3078A	Beach access at foot of Tatlow Road, property line	2017-02-28	510	8	no odour, clear
		2017-04-05	4300	28	no odour, clear
		2017-07-10	27000	4	no odour, clear
		2017-11-21	3200	60	no odour, turbid brown
		2017-12-01	1600	8	no odour, clear
		2018-03-01	960	6	no odour, clear
		2018-05-15	770	3	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2018-08-16	280	1	no odour, clear
		2019-03-14	150	10	no odour, clear
		2019-06-24	60	4	no odour, amber
		2019-08-06	900	< 1	no odour, clear
		2020-03-19	740	1	no odour, clear
SW3078B	Foot of Tatlow, north of Tatlow Creek in rock wall	2019-03-14		0	dry, not sampled
		2019-06-24		0	dry, not sampled
SW3079	Beach access at foot of Tatlow Road, Tatlow Creek	2017-02-28	40	> 400	no odour, clear
		2017-07-10	360	14	no odour, clear
		2018-03-01	30	240	no odour, clear
		2018-08-16	220	60	no odour, clear
		2019-03-14	80	> 500	no odour, clear
		2019-06-24	100	22	no odour, clear
		2020-03-19	34	> 200	no odour, clear
SW3080	Foot of Danton Road	2017-02-17	40	28	no odour, clear
		2017-07-11		0	dry, not sampled
		2018-03-01	80	24	no odour, clear
		2018-09-27		0	dry, not sampled
SW3080A	Bennes Creek, 10992 Kalitan Road, under stairs	2017-02-17	200	200	no odour, clear
		2017-07-11	60	16	no odour, clear
		2018-03-01	20	8	no odour, clear
		2018-09-27	350	< 1	no odour, clear
		2019-03-18	40	60	no odour, clear
		2019-06-26	40	3	no odour, clear
		2020-03-19	4	32	no odour, clear
SW3086	2 m south of beach access stairs at Norris Road	2019-03-18	10	8	no odour, clear
		2019-06-26		0	dry, not sampled
		2020-03-19	42	7	no odour, clear
SW3087	1 m south stairs at Towner Road beach access	2017-02-17	30	18	no odour, clear
		2017-07-11	< 10	4	no odour, clear
SW3088	10608 Towner Road, 4 m south of beach access	2017-02-17	< 10	1	no odour, clear
		2017-07-11		0	dry, not sampled

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3089	South side of 645 Private Drive off Towner Park Road	2017-07-11		null	flow too low to sample
		2017-12-15	30	40	no odour, clear
SW3089AA	East side of stairs below 693 Finlayson	2018-03-01	410	< 1	no odour, clear
		2018-09-27		0	dry, not sampled
		2019-03-18	80	2	no odour, clear
		2019-06-26		0	dry, not sampled
		2020-03-19		0	dry, not sampled
SW3090	100 m north of 10429 West Saanich Road	2018-03-01	20	18	no odour, clear
		2018-09-27		0	dry, not sampled
		2019-03-18	30	42	no odour, clear
		2019-06-26		0	dry, not sampled
		2019-10-28	6	6	no odour, clear
		2020-03-19	< 1	10	no odour, clear
SW3091	25 m north of 10425 West Saanich Road	2019-03-18	10	10	no odour, clear
		2019-06-26		0	dry, not sampled
		2020-03-19		0	dry, not sampled
SW3092	100 m south of 10429 West Saanich Road	2018-03-26		null	flow too low to sample
		2018-09-27		0	dry, not sampled
		2019-03-18		null	flow too low to sample
		2019-06-26		0	dry, not sampled
		2020-03-19		0	dry, not sampled
SW3095	Tseycum Creek 10 m north of 1036 West Saanich Road	2017-03-16	490	> 500	no odour, amber
		2017-07-17	40	null	no odour, slight amber, pooled
		2018-03-26	44000	200	no odour, clear
		2018-09-27	110000	32	no odour, clear
		2018-10-03	5200	32	no odour, clear
		2019-03-19	860	80	no odour, clear
		2019-06-26	3000	12	no odour, clear
		2019-10-28	3600	40	no odour, clear
		2020-03-19	34000	> 80	sewer odour, murky

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3098	10 m south of Munro Road beach access stairs	2018-03-01		0	dry, not sampled
		2018-09-27		0	dry, not sampled
		2019-03-19	< 10	< 1	no odour, clear
		2019-06-26		0	dry, not sampled
SW3102	Middle of cemetery, convergence of two paths	2019-03-19	50	< 1	no odour, clear
		2019-06-26		0	dry, not sampled
		2020-03-19	< 1	1	no odour, clear
SW3102A	Below south side of Patricia Bay Park	2019-03-19		0	dry, not sampled
		2019-06-26		0	dry, not sampled
		2020-03-19		0	dry, not sampled
SW3102B	Ditch, north corner of chain link fence for seaplane	2019-03-19		0	dry, not sampled
		2019-06-26		0	dry, not sampled
		2020-03-19		0	dry, not sampled
SW3104	North end of seaplane base, Tén Tén Creek	2017-03-16	140	> 400	no odour, clear
		2017-08-23	170	70	no odour, slightly murky
		2018-03-26	10	< 250	no odour, clear
		2018-09-27	240	40	no odour, clear
		2018-11-01	120	50	no odour, clear
		2018-11-08	80	50	no odour, clear
		2018-11-15	290	100	no odour, clear
		2018-11-20	140	80	no odour, clear
		2019-04-17	70	180	no odour, clear
		2019-07-11	160	> 80	no odour, slight amber
		2019-12-03	9	> 300	no odour, clear
		2020-03-23	24	> 1000	no odour, clear
SW3110	10 m west of beach access at Briarwood Place	2018-03-01	< 10	3	no odour, clear
		2018-09-28		0	dry, not sampled
SW3111	Beach access at Glenelg Avenue	2017-02-22	< 10	12	no odour, clear
		2017-07-11		0	dry, not sampled
SW3112	Below road allowance at Glenelg and Ardmore	2017-02-22	< 10	34	no odour, clear
		2017-07-11	250	20	no odour, clear
		2018-03-01	10	24	no odour, clear
		2018-09-28		0	dry, not sampled

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3113	East of beach access across from 9655 Ardmore	2017-02-22		0	dry, not sampled
		2017-07-11		0	dry, not sampled
SW3114	1.5 m west of beach access; 9655 Ardmore	2017-02-22	70	14	no odour, clear
		2017-07-11		null	flow too low to sample
SW3116	Ardmore Drive	2018-03-01			could not access property
		2018-09-28		0	dry, not sampled
SW3117		2018-03-01			could not access property
		2018-09-28		0	dry, not sampled
SW3118	Foot of Hartfell Avenue	2017-01-31	670	40	no odour, clear
		2017-02-22	500	34	no odour, clear
		2017-03-19	80	30	no odour, clear
		2017-03-30	70	80	no odour, clear
		2017-07-12	230	< 1	no odour, clear
		2017-11-21	5500	> 300	no odour, amber
		2017-12-01	220	38	no odour, slight amber
		2018-03-02	900	90	no odour, slightly amber
		2018-09-20		0	dry, not sampled
		2019-02-19	520	80	no odour, clear
		2019-06-27	7400	8	no odour, slight amber
		2019-08-31		0	dry, not sampled
		2020-03-20	89	24	no odour, clear
SW3118A	20 m east of Hartfell beach access	2020-04-28	< 1	3	no odour, clear
SW3118D	50 m east of Hartfell beach access	2019-07-15	220	< 1	no odour, clear
		2020-04-28	440	12	no odour, slightly murky
SW3119	East of Coles Bay Regional Park beach access	2017-11-21	5200	> 400	no odour, amber to brown
		2017-12-01	20	80	no odour, amber
		2018-03-02	90	200	no odour, brown
		2018-09-20		0	dry, not sampled
		2019-02-19	150	68	no odour, clear
		2019-06-27	5600	18	no odour, slight amber
		2019-07-15		null	flow too low to sample
		2019-08-31		null	flow too low to sample
		2020-03-20	7	40	no odour, clear
		2020-04-28	41	20	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3120	5 m south of wood steps at foot of McTavish Road	2017-02-22	70	100	no odour, clear
		2017-02-22	90	100	no odour, clear
		2017-11-21	3500	> 300	no odour, amber to brown
		2017-12-01	460	100	no odour, amber
		2018-03-02	390	> 300	no odour, slightly amber
		2018-09-20		0	dry, not sampled
		2019-02-19	310	240	no odour, clear
		2019-06-27	9600	20	no odour, slight amber
		2019-07-15	170	4	no odour, clear
		2019-08-31		0	dry, not sampled
		2020-03-20	25	40	no odour, clear
		2020-04-28	79	20	no odour, clear
SW3122	40 m south of Pauquachin First Nation boat ramp	2019-10-28	600	< 1	no odour, clear
SW3123	50 m south of Pauquachin First Nation boat ramp	2017-02-22	10	12	no odour, clear
		2017-07-12		0	dry, not sampled
		2018-03-05	20	18	no odour, clear
		2018-09-20		0	dry, not sampled
		2019-03-22	10	36	no odour, clear
		2019-06-27		0	dry, not sampled
		2020-03-20	2	22	no odour, clear
SW3124	200 m south of Pauquachin First Nation boat ramp	2017-02-22	< 10	> 500	no odour, clear
		2017-07-12	280	22	no odour, clear
		2018-03-05	< 10	350	no odour, clear
		2018-09-20		null	flow too low to sample
		2019-03-22	< 10	> 250	no odour, clear
		2019-06-27	540	52	no odour, clear
		2019-08-31	790	8	no odour, clear
		2020-03-20	30	> 200	no odour, clear
SW3124-2	Off West Saanich Road; Pauquachin First Nation	2020-06-04	1	7	slight sewer odour, clear
SW3127A	30 m east of large grey boat house	2017-03-13	< 10	80	no odour, clear
		2017-07-12		null	flow too low to sample

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3127AA	Between 530 and 531 Salmon Road	2017-03-14	100	10	no odour, clear
		2017-07-12		0	dry, not sampled
		2018-03-05		null	flow too low to sample
		2018-09-20		0	dry, not sampled
SW3131	20 m east of concrete patio at 675 Senanus Drive	2017-03-13	70	> 300	no odour, clear
		2017-08-24		null	flow too low to sample
SW3132	100 m south of concrete patio at 675 Senanus Drive	2017-03-13	20	200	no odour, slight amber
		2017-08-24	40	1	no odour, clear
		2018-03-05	30	12	no odour, clear
		2018-09-20		0	dry, not sampled
SW3133	South side of Woodwyn Farm, Hagan Creek	2017-03-13	100	> 2000	no odour, murky (amber)
		2017-03-13	140	> 2000	no odour, murky (amber)
		2017-08-24	220	> 400	no odour, clear
		2018-03-05	80	> 500	no odour, clear
		2018-09-20	10	> 300	no odour, clear
		2019-03-22	10	> 300	no odour, clear
		2019-06-27	170	> 500	no odour, clear
		2019-10-17	250	> 2000	no odour, slight amber
		2019-11-26	9	> 3000	no odour, clear
		2020-03-20	14	> 2000	no odour, clear
SW3135	Above viewing platform on Tsartlip First Nation	2018-03-05	< 10	24	no odour, clear
		2018-09-20		0	dry, not sampled
SW3136	Intersection of Ettiene and Tsartlip Drive	2017-03-13	20	2	no odour, clear
		2017-07-12		0	dry, not sampled
SW3136A	Shoreline west of Tsartlip Drive	2017-03-13	20	24	no odour, clear
		2017-07-12		0	dry, not sampled
		2018-03-05	< 10	8	no odour, clear
		2018-09-20		0	dry, not sampled
		2019-03-22	30	< 1	no odour, clear
		2019-06-27		null	flow too low to sample
		2020-03-24		null	flow too low to sample

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3138	South side of Tsartlip boat launch parking lot	2017-03-13	30	40	no odour, clear
		2017-07-12		0	dry, not sampled
		2018-03-05	40	18	no odour, clear
		2018-09-20		0	dry, not sampled
		2018-11-05	4800	1	no odour, clear, animal organs upstream
		2019-02-19	140	8	no odour, clear, upgraded pipe
		2019-06-27	360	9	no odour, brown
		2019-10-17	230	10	no odour, clear
		2020-03-24	1	8	no odour, clear
SW3138A	Beach access at end of Stelly's Cross Road	2018-06-28		0	dry, not sampled
		2018-09-07		0	dry, not sampled
		2018-10-22		0	dry, not sampled
		2018-11-05		0	dry, not sampled
		2019-02-19		null	flow too low to sample
		2019-06-27		0	dry, not sampled
SW3142	North of ferry wharf at foot of Verdier Avenue	2017-01-31	10	60	no odour, clear
		2017-03-13	20	80	no odour, clear
		2017-07-12	200	7	no odour, clear
		2018-03-05	20	42	no odour, clear
		2018-06-25	230	20	no odour, slightly sudsy/murky
		2018-09-20	40	18	no odour, clear
		2019-02-19	100	12	no odour, clear
		2019-06-27	2000	10	no odour, clear
		2019-07-15	20	6	no odour, clear
		2020-02-27	17	20	no odour, clear
SW3143	North end of Brentwood Inn on Verdier Avenue	2019-04-26		0	sampling site discontinued
SW3143A	2 m SE of Willow Tree on south side of Verdier Avenue	2019-04-26		0	sampling site discontinued
SW3144	15 m north of Brentwood Inn wharf	2019-07-15	230	10	taken due to high flow, no odour, clear
SW3144A	East of Brentwood Inn wharf, white pvc pipe	2019-07-15	< 10	18	new location, no odour, clear
SW3145	Foot of Clarke Road	2017-06-15	500	12	no odour, clear
		2017-06-22	40	8	no odour, clear
		2018-03-05	< 10	18	no odour, clear
		2018-05-22	10	6	no odour, clear

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Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2018-06-25	140	16	no odour, clear
		2018-06-28		0	dry, not sampled
		2018-07-11		0	dry, not sampled
		2018-09-20		0	dry, not sampled
		2018-11-05	150	18	no odour, clear
		2019-06-27	2200	3	no odour, clear
		2019-07-17	2400	2	no odour, olive colour
		2019-08-06		null	flow too low to sample
		2019-08-31		0	dry, not sampled
		2020-02-27	1	30	no odour, clear
		2020-06-04	10	4	slight sewer odour, clear
SW3145A	Devonshire beach access, S of 7078 Brentwood Drive	2018-05-22	300	8	no odour, clear
		2018-09-28		0	dry, not sampled
		2019-02-19	390	48	no odour, clear
		2019-07-05	10	6	no odour, clear
		2020-02-27	50	18	no odour, clear
SW3146	Brentwood Drive near Marchant Road	2017-01-31	280	160	no odour, clear
		2017-08-23	120	4	no odour, clear
		2018-03-05	190	70	no odour, clear
		2018-09-20	350	20	no odour, clear
		2019-02-19	3700	> 500	no odour, clear
		2019-07-05	920	45	no odour, clear
		2019-10-28	700	140	no odour, clear
		2020-02-27	3500	> 500	no odour, clear
SW3147	Foot of Marchant Road	2020-02-27	3	18	no odour, clear
SW3147A	End of Grilse Lane	2017-01-31		null	flow too low to sample
		2017-08-23		0	dry, not sampled
		2018-03-26	190	2	no odour, clear
		2018-09-28		0	dry, not sampled
		2019-04-17	40	1	no odour, clear
		2019-07-05		DRY 0	dry, not sampled
SW3148A	10 m west of bridge; Angler's Anchorage walkway	2017-03-14		0	dry, not sampled
		2017-08-23		0	dry, not sampled

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3149	East end of Port Royale at Anglers Lane	2017-03-14	30	1	no odour, clear
		2017-08-23		0	dry, not sampled
SW3149A	Middle of Port Royale in riprap	2018-03-05		null	flow too low to sample
		2018-09-28		0	dry, not sampled
		2019-04-17		DRY 0	dry, not sampled
		2019-07-05		DRY 0	dry, not sampled
SW3149B	Riprap between bench and wall, Delamere Road	2017-03-14		0	dry, not sampled
		2017-08-23		0	dry, not sampled
SW3150	Below Port Royale Walkway, 40 m east of wharf	2017-03-14	210	60	no odour, clear
		2017-08-23	580	3	no odour, clear
		2018-03-05	20	14	no odour, clear
		2018-09-28	97000	6	no odour, clear
		2018-10-03	450	7	no odour, clear
		2019-02-19	30	> 200	no odour, clear, potential tidal influence
		2019-04-17	30	8	no odour, clear
		2019-07-05	770000	2	no odour, clear
		2019-07-15	110000	1	no odour, clear
		2019-07-17	24000	2	no odour, clear
		2019-08-06		null	flow too low to sample
		2020-03-24	140000	9	no odour, clear
		2020-06-04	87	7	slight sewer odour, clear, sampled before surge
		2020-06-04	1100	48	earthy sewer odour, dirty, sampled after surge
SW3153	Small bay at Butchart Gardens	2017-03-14	100	45	no odour, clear
		2017-08-23	4400	3	no odour, slightly murky
		2018-03-26	10	10	no odour, clear
		2018-09-28		0	dry, not sampled
		2019-04-26	40	3	no odour, clear
		2019-07-05		0	dry, not sampled
		2020-03-24	4	8	no odour, clear
SW3154	South of Butchart Gardens in Tod inlet, Tod Creek	2017-03-14	150	> 2000	no odour, clear
		2017-08-14	30	20	no odour, clear
		2017-08-22	60	20	no odour, clear
		2017-08-29	50	20	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (January 2017 to December 2019)

Station ID	Station Description	Sample Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2017-09-05	80	15	no odour, clear
		2017-09-11	160	60	no odour, clear
		2017-10-18	140	150	no odour, clear
		2017-10-24	40	300	no odour, clear
		2017-10-31	40	300	no odour, clear
		2017-11-06	60	600	no odour, clear
		2017-11-14	220	1800	no odour, clear
		2018-03-26	< 10	> 2000	no odour, clear
		2018-09-28	10	80	no odour, clear
		2019-04-26	140	> 2000	no odour, amber
		2019-07-05	340	80	no odour, clear
		2020-03-24	6	> 2000	no odour, clear

Notes:
Flow is visually estimated
Null means the measurement was attempted but due to conditions, flow could not be estimated or sample could not be collected.
Shaded cells have an *E.coli* count >400 CFU/100 mL; British Columbia Ministry of Environment's guideline for primary recreational activities is a maximum of 400 CFU/100 mL and a geometric mean of 200 CFU/100 mL based on a minimum of 5 samples

APPENDIX C

PUBLIC HEALTH CONCERN RATINGS 2019

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	*E.coli* Rating	Public Shoreline Use Rating	Overall Rating	2017 Level of Concern	2018 Level of Concern	2019 Level of Concern	Comments	Recommendations
405	4	Central Saanich	2	2	4	low	low	moderate	Pooled water; Island View beach	Continue monitoring
414	7	Central Saanich	1	2	3	low	low	low		Resample in 2024
416	7	Central Saanich	1	3	4	moderate	low	low	Slightly elevated in summer	A source eliminated; monitor for change
421A	8	Central Saanich	2	1	3	NA	NA	low	No flows	Resample in 2024
3133	35	Central Saanich	2	3	5	moderate	moderate	moderate	SPSO, Hagan Creek	Source found upstream; monitor for change
3138A	36	Central Saanich	1	3	4	NA	low	low		Resample in 2024
3142	36	Central Saanich	2	2	4	moderate	moderate	moderate	Elevated intermittently; suds observed	Continue monitoring
3144	36	Central Saanich	2	2	4	NA	NA	moderate		Confirm rating
3145	36	Central Saanich	2	3	5	moderate	low	**high**	Elevated in summer	Confirm rating and continue investigations
3145A	36	Central Saanich	2	2	4	NA	moderate	moderate	Dry in summer	Continue monitoring
3146	36	Central Saanich	2	2	4	moderate	moderate	moderate	SPSO	Continue monitoring
3147A	36	Central Saanich	1	2	3	low	low	low	Dry	Resample in 2024
3149A	36	Central Saanich	1	2	3	NA	low	low	Dry	Resample in 2024
3150	36	Central Saanich	3	2	5	moderate	**high**	**high**	Brentwood Bay	Continue monitoring and source investigations
3153	37	Central Saanich	1	2	3	moderate	moderate	low	Low flow	Confirm rating
3154	37	Central Saanich	2	2	4	low	low	moderate	Tod Creek	Continue monitoring
424	8	North Saanich	1	1	2	low	low	low	No flow in summer. Bazan Bay	Continue monitoring
426	9	North Saanich	1	1	2	low	low	low	Bazan Bay	Continue monitoring
428	9	North Saanich	1	1	2	low	low	low	Bazan Bay	Continue monitoring
430	9	North Saanich	1	1	2	low	low	low	Bazan Bay	Continue monitoring
430A	9	North Saanich	1	1	2	low	low	low	Bazan Bay; high counts intermittently	Continue monitoring
431	9	North Saanich	1	1	2	low	low	low	Bazan Bay; elevated counts intermittently	Continue monitoring
432	10	North Saanich	2	1	3	low	low	low	Bazan Bay	Continue monitoring
435	10	North Saanich	2	1	3	low	NA	low	Bazan Bay	Continue monitoring
441	10	North Saanich	2	3	5	moderate	**high**	**high**	Reay Creek	Continue monitoring
442	10	North Saanich	1	3	4	moderate	moderate	low		Continue monitoring

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	*E.coli* Rating	Public Shoreline Use Rating	Overall Rating	2017 Level of Concern	2018 Level of Concern	2019 Level of Concern	Comments	Recommendations
3020	15	North Saanich	1	2	3	NA	NA	low		Confirm rating
3021	15	North Saanich	1	2	3	moderate	low	low	Construction nearby; low flow in summer	Continue monitoring
3021A	16	North Saanich	2	2	4	moderate	moderate	moderate		Continue monitoring
3022	16	North Saanich	1	2	3	NA	NA	low		Resample in 2024
3034D	16	North Saanich	1	1	2	low	moderate	low	EC elevated in summer; flow low	Confirm rating
3035C	17	North Saanich	2	1	3	low	low	low	Bryden Bay	Resample in 2024
3037AA	18	North Saanich	1	2	3	NA	low	low		Resample in 2024
3041	18	North Saanich	2	2	4	NA	NA	moderate		Confirm rating
3054	19	North Saanich	1	1	2	NA	NA	low		Resample in 2024
3076	23	North Saanich	1	3	4	**high**	moderate	low	Deep Cove; dry, elevated in past	Confirm rating
3077	23	North Saanich	2	3	5	**high**	**high**	**high**	Deep Cove; counts lower in 2018	Continue monitoring and source investigations
3078A	23	North Saanich	2	3	5	**high**	**high**	**high**	Deep Cove; human bacteria present	Continue monitoring and source investigations
3078B	23	North Saanich	1	3	4	NA	NA	low	Dry	Resample in 2024
3079	23	North Saanich	1	3	4	moderate	moderate	moderate	Tatlow/Chalet Creek; human bacteria present	Continue monitoring
3080A	24	North Saanich	1	1	2	low	low	low	Benes Creek	Continue monitoring
3089AA	26	North Saanich	1	3	4	NA	moderate	moderate		Confirm rating
3098	27	North Saanich	1	3	4	NA	low	low	Pat Bay; dry	Resample in 2024
3102	27	North Saanich	1	3	4	NA	NA	low	Dry	Confirm rating
3102A	28	North Saanich	1	3	4	NA	NA	low	Dry	Confirm rating
3102B	28	North Saanich	1	2	3	NA	NA	low	Dry	Confirm rating
3104	28	North Saanich	1	2	3	low	low	low	SPSO, Tén Tén Creek	Continue monitoring
3118	31	North Saanich	2	3	5	**high**	**high**	**high**	EC high, due to ruminant and human sources	Continue monitoring and source investigations
3119	31	North Saanich	1	3	4	moderate	moderate	moderate	Coles Bay	Continue monitoring
3120	31	North Saanich	1	3	4	moderate	moderate	moderate	Coles Bay	Continue monitoring
443	10	Sidney	1	3	4	low	low	low	EC low, low flows	resample in 2024
445	11	Sidney	1	3	4	low	low	low	SPSO	Continue monitoring
446	11	Sidney	2	3	5	low	low	moderate	Suds in discharge	Confirm rating

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	*E.coli* Rating	Public Shoreline Use Rating	Overall Rating	2017 Level of Concern	2018 Level of Concern	2019 Level of Concern	Comments	Recommendations
447	11	Sidney	3	3	6	**high**	**high**	**high**	Very high count; low upon resampling	Continue monitoring and source investigations
448	11	Sidney	1	3	4	moderate	moderate	moderate	Low flow in summer. SPSO	Continue monitoring
449	11	Sidney	2	3	5	moderate	moderate	**high**	Counts fluctuate	Continue monitoring and source investigations
449A	11	Sidney	1	3	4	low	moderate	moderate	Low flows; lower counts; extended outfall	Confirm rating
450	11	Sidney	1	3	4	moderate	moderate	low	Cross connection repaired in 2016	Continue monitoring
456A	12	Sidney	1	3	4	NA	low	low		Resample in 2024
458	12	Sidney	1	3	4	moderate	moderate	low	Foot of Beacon Ave.	Confirm rating
458A	12	Sidney	1	2	3	low	low	low	Low flows	Resample in 2024
459	12	Sidney	2	2	4	NA	low	moderate	Elevated count	Continue monitoring
468	13	Sidney	1	2	3	NA	NA	low	Low flow	Resample in 2024
469	13	Sidney	1	2	3	moderate	low	low	Low flow	Confirm rating
3003	13	Sidney	2	2	4	low	moderate	moderate	Low flow	Confirm rating
3005	13	Sidney	2	2	4	moderate	moderate	moderate	Occasionally elevated, SPSO	Continue monitoring
3006	13	Sidney	1	2	3	moderate	moderate	low	SPSO	Continue monitoring
3007	14	Sidney	2	2	4	moderate	**high**	moderate	Foot of Bowden	Continue monitoring
3014	14	Sidney	1	2	3	low	moderate	low	Low EC, low flows	Confirm rating
3015	14	Sidney	3	1	4	moderate	moderate	moderate	High count; low flows	Continue monitoring
3016	14	Sidney	2	2	4	moderate	moderate	moderate	Elevated EC in summer, SPSO	Continue monitoring
3090	26	Tseycum/ North Saanich	1	3	4	NA	low	low		Continue monitoring
3091	26	Tseycum/ North Saanich	1	3	4	NA	NA	low	Dry in summer	Confirm rating
3092	26	Tseycum/ North Saanich	1	3	4	NA	low	low	Dry in summer	Continue monitoring
3095	27	Tseycum/ North Saanich	3	3	6	**high**	**high**	**high**	Tseycum Creek, SPSO	Continue monitoring; start investigations
3123	31	Pauquachin/ North Saanich	1	3	4	low	low	low	Dry in summer	Continue monitoring

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	*E.coli* Rating	Public Shoreline Use Rating	Overall Rating	2017 Level of Concern	2018 Level of Concern	2019 Level of Concern	Comments	Recommendations
3124	31	Pauquachin/ North Saanich	2	2	4	low	low	moderate	Elevated in summer; bathing may occur upstream	Continue monitoring; start investigations
3136A	35	Tsartlip/ Central Saanich	1	3	4	NA	low	low		Continue monitoring
3138	36	Tsartlip/ Central Saanich	2	3	5	low	moderate	moderate	Dry in summer	Continue monitoring
407	5	Tsawout/ Central Saanich	1	3	4	low	low	low	Tsawout Creek	Confirm rating
410	6	Tsawout/ Central Saanich	1	3	4	NA	low	low		Continue monitoring
411	6	Tsawout/ Central Saanich	1	3	4	NA	NA	low		Confirm rating
411AA	6	Tsawout/ Central Saanich	1	3	4	NA	low	low		Continue monitoring
411A	6	Tsawout/ Central Saanich	1	3	4	low	low	low	Dry in summer	Continue monitoring
411AA	6	Tsawout/ Central Saanich	1	3	4	low	low	low		Continue monitoring
412	7	Tsawout/ Central Saanich	1	2	3	moderate	low	low	Tetayut Creek	Continue monitoring

Notes
Level of Concern determined by sum of the E.coli and shoreline ratings. Low = sums of 2 and 3, moderate= sum of 4 and high = sums of 5 and 6.
EC = E.coli counts
NA = Not rated because it was not one of the discharges assessed this year
SPSO = This discharge acts as a sewage pump station overflow

APPENDIX D

***E. COLI* SAMPLING QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM 2019**

APPENDIX D
***E. COLI* SAMPLING QUALITY ASSURANCE**
AND QUALITY CONTROL PROGRAM
2019

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APPENDIX D

E. COLI SAMPLING QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM FOR 2019

1.0 INTRODUCTION

Quality Assurance and Quality Control (QA/QC) programs are protocols adopted to ensure that results of any study are valid, internally consistent and comparable with similar projects. These protocols are set out in writing and based on current and relevant research on related topics.

Data collected for the quality assurance (QA) program are used to ensure consistency in field handling and analytical methods. If data exceed a specified precision criterion then the lab is notified of a potential problem in the procedure and steps are taken to resolve the issue.

2.0 METHODS FOR BACTERIAL SAMPLING

All water samples were collected in 250-mL wide-mouth polypropylene bottles supplied by the analytical laboratories (Bureau Veritas Laboratories formerly Maxxam Analytics International Corporation in Victoria). Labelled samples were stored in an insulated cooler with ice packs for protection from prolonged exposure to UV light and delivered the same day to the laboratory. *Escherichia coli* bacteria (*E. coli*) were analyzed following the procedures in Standard Methods (APHA, 1998) and reported as colony forming units per 100 mL (CFU/100 mL).

2.1 Stormwater Discharge Sampling

Where possible, stormwater samples were collected from the point of discharge. Where this was not possible, the stormwater system was followed back to the nearest point where samples could be taken.

2.2 Quality Assurance

2.2.1 Stormwater Sample Replicates (Field Splits)

Ten percent of the total number of samples collected were replicated in the field (field replicates) and are identified in this report as field splits. A single sample was collected in a laboratory-prepared 1-litre sample bottle and inverted 30 times to ensure that the sample was homogeneous. The sample was split evenly into two sample bottles. The two bottles were labelled and sent to the lab for analysis as separate samples, but not identified as field splits.

2.2.2 Quality Control Assessment

To establish the precision criteria 18 replicates (field splits) were analyzed for *E. coli* bacteria. Field splits were collected from six stormwater discharges on the Saanich Peninsula. Discharges were chosen based on previous results, specifically high, moderate or low levels of *E. coli* concentrations. The QA sampling for the assessment was for all *E. coli* samples analyzed by Maxxam. The three levels of *E. coli* concentrations were selected to represent the variance in the samples analyzed during the sampling program. Three grab samples were taken at each of the six stations and split into two replicate sample bottles. Three blank samples of potable water were also collected as part of the assessment. Samples were supplied to the lab with individual numbers.

2.2.3 Calculation of Quality Assurance Results

Laboratory precision for *E. coli* analysis is determined by analyzing several pairs of field samples (field splits). The following procedure is the same as that used for fecal coliforms from Standard Methods, 20th edition (APHA, 1998).

The data are arranged in pairs (D1 and D2). The log of each field measurement is determined (L1, L2) and the difference (range) in the log value between each pair of field splits is calculated: R = (L2 - L1). An average range (Mean-R) is then determined for all of the pairs.

The precision criterion is calculated by multiplying the Mean-R by 3.27 and is rounded to 1 decimal place.

The log range (R) is calculated for each of the field splits and compared to the precision criterion, to determine whether the sample is acceptable or not, according to the following criteria:

Acceptable (A) If the calculation is less than the precision criterion, then the field data are within normal variability.

Unacceptable (U) If the calculation is greater than the precision criterion, then the field data are outside of the normal variability. Data collected after the last "acceptable" set of data should be discarded and no further analysis should be done until the source of the problem is identified by the lab.

It is important not to put too severe an interpretation on the results, especially when they are close to the "unacceptable" guideline. Each result represents a value within a 95% confidence interval, which gets proportionately larger as the actual result gets smaller. Therefore, one can expect, through randomness, 5% of the samples to be outside of the precision criterion. Also, bacterial counts under 200 CFU/100 mL are considered too small to accurately calculate or compare to a precision criterion (APHA, 1998). It is also important to note that discharges with *E. coli* counts lower than 200 CFU/100 mL receive a low public health concern rating.

The results should be rounded to 1 decimal place and compared to the precision criterion (e.g., 0.3). If the calculated value from the duplicate results still exceeds the criterion, then an informal investigation of the laboratory should be initiated. If only a few duplicates are unacceptable (i.e., one out of every 20 pairs of duplicates), the lab is probably meeting the guideline.

The overall process is intended to act as an alarm, alerting the study group to potential problems with the sampling and analytical procedures.

3.0 RESULTS

CRD staff collected 18 pairs of stormwater samples from six discharges having high, moderate or low levels of bacteria. Samples were analyzed for *E. coli* concentration used to calculate the precision criterion.

3.1 Blanks

Staff submitted three blank samples (tap water) to the lab for *E. coli* analysis. Blanks were reported as having <1 CFU/100 mL. Therefore, the results meet the QA requirements.

3.2 Precision Criteria

Table 1 shows lab results of the 18 pairs of samples used to determine the precision criterion. The calculated precision criterion was low (0.2).

3.3 Field Splits

Table 2 presents results for the field splits collected during the wet period. Data were compared to the precision criterion of 0.2. Two of the field splits exceeded the precision criterion; however, it is acceptable for field splits with low results (<200 CFU/100 mL) to exceed the criterion. Therefore, the data are acceptable.

Table 3 presents results for the field splits collected during the dry period. Four of the eight field splits exceeded the precision criterion; however, the counts were less than 200 CFU/100 mL. Therefore, the data are acceptable.

Table 1. 2019 Precision Criterion Calculation

Date	Discharge No.	Pair No.	1st Duplicate D1	2nd Duplicate D2	Log of D1 L1	Log of D2 L2	Range of Logs (Rlog) (Log L1 - Log L2)
27-Feb	411A	1	10	20	1.0000	1.3010	0.3010
		2	30	20	1.4771	1.3010	0.1761
		3	<10	10	1.0000	1.0000	0.0000
28-Feb	468	1	<10	<10	1.0000	1.0000	0.0000
		2	10	<10	1.0000	1.0000	0.0000
		3	<10	<10	1.0000	1.0000	0.0000
19-Feb	3118	1	520	710	2.7160	2.8513	0.1353
		2	570	720	2.7559	2.8573	0.1015
		3	680	690	2.8325	2.8388	0.0063
7-Feb	503	1	430	400	2.6335	2.6021	0.0314
		2	440	400	2.6435	2.6021	0.0414
		3	390	440	2.5911	2.6435	0.0524
7-Feb	222	1	39,000	34,000	4.5911	4.5315	0.0596
		2	29,000	37,000	4.4624	4.5682	0.1058
		3	38,000	28,000	4.5798	4.4472	0.1326
7-Feb	777A	1	160,000	180,000	5.2041	5.2553	0.0512
		2	150,000	160,000	5.1761	5.2041	0.0280
		3	150,000	140,000	5.1761	5.1461	0.0300
	Mean - R_{log} (Sum R_{log}/18)						0.0696
	Precision Criterion (3.27 x Mean - R_{log})						0.2275

Table 2. Comparison of Field Splits to Precision Criterion – 2019 Dry Period

Date	Discharge	Bacterial Counts (CFU/100 mL)	Log	Log Range	Acceptable (A) or Unacceptable (U)
19-Jun	416	350	2.5441	0.1635	A
		510	2.7076		
19-Jun	432	240	2.3802	0.3010	U*
		120	2.0792		
21-Jun	458	<10	1.0000	0.4771	U*
		30	1.4771		
24-Jun	3021A	600	2.7782	0.0792	A
		500	2.6990		
5-Jul	3146	920	2.9638	0.0776	A
		1,100	3.0414		
5-Jul	3150	770,000	5.8865	0.0669	A
		660,000	5.8195		
		350	2.5441		

Notes:
A: calculated data is less than the precision criterion and, therefore, falls within normal variability.
U: calculated data is greater than the precision criterion and, therefore, falls outside normal variability.
A*: any *E. coli* count under 200 is considered too small an amount to calculate precision.

Table 3. Comparison of Field Splits to Precision Criterion – 2019 Wet Period

Date	Discharge	Bacterial Counts (CFU/100 mL)	Log	Log Range	Acceptable (A) or Unacceptable (U)
27-Feb	416	40	1.6021	0.6021	U*
		10	1.0000		
28-Feb	449	30	1.4771	0.1761	A
		20	1.3010		
14-Mar	3021A	140	2.1461	0.4472	U*
		50	1.6990		
17-Apr	3015	30	1.4771	0.1249	A
		40	1.6021		
17-Apr	3104	70	1.8451	0.2430	U*
		40	1.6021		
17-Apr	3150	30	1.4771	0.4260	U*
		80	1.9031		
26-Apr	435	150	2.1761	0.1347	A
		110	2.0414		
26-Apr	3154	140	2.1461	0.0000	A
		140	2.1461		

Notes:
CFU: Colony forming units
A: calculated data is less than the precision criterion and, therefore, falls within normal variability.
U: calculated data is greater than the precision criterion and, therefore, falls outside normal variability.
A*: any *E. coli* count under 200 is considered too small an amount to calculate precision.

4.0 CONCLUSIONS

All requirements for the stormwater monitoring QA/QC program were carried out in 2019. All QA/QC results were acceptable for rating stormwater discharges for public health concerns.

5.0 REFERENCES

APHA, 1998. American Public Health Association, American Water Works Association, Water Pollution Control Federation, 20th Edition. Standard Methods for the Examination of Water and Wastewater.

APPENDIX E

Contaminant Data and Ratings for Environmental Concern

Table 1. 2019 Stormwater Sediment Contaminant Concentrations

		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Silver	Zinc	HPAH	LPAH
Marine Sediment Quality Guidelines	**CRD MSQG**	57	5.1	260	390	450	0.41	6.1	410	12	5.2
	CCME ISQG	7.24	0.7	52.3	18.7	30	0.13	1	124	-	-
	CCME PEL	42	4.2	160	108	112	0.7	2.2	271	-	-
Vancouver Island Background		4	0.95	65	100	40	0.15	1	150	-	-
SW0405	2019-10-10	3.82	0.171	21.5	10.4	2.31	<0.05	<0.05	34.9	<0.001	0.0048
SW0409C	2019-10-28	3.04	0.232	25.1	*57.8*	21	<0.05	0.083	156	0.13	0.068
SW0410	2019-10-10	1.92	0.066	17.2	16.4	11.5	<0.05	<0.05	66.9	0.35	0.049
SW0412	2019-10-10	1.83	0.058	19.5	12.4	3.63	<0.05	<0.05	59.7	0.046	0.0091
SW0416	2019-10-10	5.62	0.144	36.1	*45*	8.52	<0.05	0.072	88.1	0.021	0.0022
SW0445	2019-10-10	-	-	-	-	-	-	-	-	-	-
SW0449-2D	2019-10-10	2.85	0.127	43.8	*40.6*	11.5	<0.05	<0.05	163	0.36	0.11
SW3021	2019-10-28	4.17	0.291	24.7	*33.1*	26.2	0.254	0.185	*127*	0.25	0.044
SW3090	2019-10-28	7	0.075	45.3	*49.9*	8.77	0.061	<0.05	107	0.01	0.016
SW3104	2019-12-03	5.54	0.182	24	*38.2*	7.53	0.05	0.127	*143*	0.92	0.22
SW3104-2	2019-12-03	14	0.402	46.5	130	17.4	0.089	0.154	360	0.75	0.12
SW3122	2019-10-28	4.62	0.23	32	*48*	23.7	0.061	0.094	100	0.15	0.029
SW3122-2	2019-10-28	7.46	0.088	46.9	*48.7*	8.4	0.054	<0.05	77	0.0099	0.0041
SW3133	2019-10-17	2.74	0.107	19.7	17.6	5.24	<0.05	<0.05	67.7	0.023	0.0043
SW3133-2	2019-10-17	2.2	0.158	226	*77.9*	9.03	<0.05	<0.05	121	0.054	0.019
SW3133-4	2019-10-17	6.56	1.23	237	191	49.3	0.117	0.348	459	1.7	0.38
SW3133-5	2019-10-17	6.21	0.109	43	*54.4*	6.82	0.061	0.082	92.1	0.052	0.023
SW3136A	2019-10-17	-	-	-	-	-	-	-	-	-	-
SW3136A-2	2019-10-17	4.15	0.272	32	*46.7*	17.9	0.054	0.096	*138*	0.061	0.014
SW3136B	2019-10-17	-	-	-	-	-	-	-	-	-	-
SW3138	2019-10-17	6.88	0.214	33.9	*44.9*	12	<0.05	0.052	82.7	0.17	0.019
SW3146	2019-10-28	3.05	0.095	16.9	*34.3*	6.92	<0.05	<0.05	*142*	<0.001	<0.001
SW3153	2019-12-03	6.8	0.251	43.1	*40*	19.1	<0.05	0.105	*105*	0.053	0.24

Notes on next page

Table 1, continued

Notes:

Concentrations are in mg/kg dry weight
CRD MSQG =Marine sediment quality guidelines adopted from Washington State's Department of Ecology for protection of aquatic life.
LPAH and HPAH are low and high molecular weight polycyclic aromatic hydrocarbons, respectively.
CCME = Canadian Council of Ministers of the Environment
ISQG = interim sediment quality guideline; concentrations above this level but below the PEL will occasionally result in adverse effects on aquatic life.
PEL = probable effects level; concentrations above this level will frequently result in adverse effects to aquatic life.
Vancouver Island background concentrations are regional estimates (95^{th} percentiles) from BC ENV; https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/protocols/protocol_4.pdf
Italicized values are those that exceed a guideline but are below the Vancouver Island background concentration.
value is greater than or equal to the CCME ISQG
value is greater than or equal to the CCME PEL
value it greater than or equal to CRD MSQG and adverse effects to aquatic life are likely to occur
For mercury only, the CRD MSQG is lower than the CCME PEL
No sediment was available in SW0445, SW3136A and SW3136B.
Some samples are not collected at the discharge to marine and therefore marine guidelines are not applicable but are used for screening purposes.
Carbon normalized PAH guideline comparison was done separately.

Table 2. 2019 Sediment Contaminant Ratings

		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Silver	Zinc	HPAH	LPAH	Sum of Ratios	Contaminant Rating
	CRD MSQG	57	5.1	260	390	450	0.41	6.1	410	12	5.2		
Station	Date	Ratios of Concentration to Guideline											
SW0405	2019-10-10	0.07	0.03	0.08	0.03	0.01	0.12	0.01	0.09	0.00	0.00	0.43	Low
SW0409C	2019-10-28	0.05	0.05	0.10	0.15	0.05	0.12	0.01	0.38	0.01	0.01	0.93	Low
SW0410	2019-10-10	0.03	0.01	0.07	0.04	0.03	0.12	0.01	0.16	0.03	0.01	0.51	Low
SW0412	2019-10-10	0.03	0.01	0.08	0.03	0.01	0.12	0.01	0.15	0.00	0.00	0.44	Low
SW0416	2019-10-10	0.10	0.03	0.14	0.12	0.02	0.12	0.01	0.21	0.00	0.00	0.75	Low
SW0449-2D	2019-10-10	0.05	0.02	0.17	0.10	0.03	0.12	0.01	0.40	0.03	0.02	0.95	Low
SW3021	2019-10-28	0.07	0.06	0.10	0.08	0.06	0.62	0.03	0.31	0.02	0.01	1.36	Moderate
SW3090	2019-10-28	0.12	0.01	0.17	0.13	0.02	0.15	0.01	0.26	0.00	0.00	0.88	Low
SW3104	2019-10-29	0.10	0.04	0.09	0.10	0.02	0.12	0.02	0.35	0.08	0.04	0.95	Low
SW3104-2	2019-10-30	0.25	0.08	0.18	0.33	0.04	0.22	0.03	0.88	0.06	0.02	2.08	**High**
SW3122	2019-10-28	0.08	0.05	0.12	0.12	0.05	0.15	0.02	0.24	0.01	0.01	0.85	Low
SW3122-2	2019-10-28	0.13	0.02	0.18	0.12	0.02	0.13	0.01	0.19	0.00	0.00	0.80	Low
SW3133	2019-10-17	0.05	0.02	0.08	0.05	0.01	0.12	0.01	0.17	0.00	0.00	0.50	Low
SW3133-4	2019-10-17	0.12	0.24	0.91	0.49	0.11	0.29	0.06	1.12	0.14	0.07	3.54	**High**
SW3133-5	2019-10-17	0.11	0.02	0.17	0.14	0.02	0.15	0.01	0.22	0.00	0.00	0.85	Low
SW3136A-2	2019-10-17	0.07	0.05	0.12	0.12	0.04	0.13	0.02	0.34	0.01	0.00	0.90	Low
SW3138	2019-10-17	0.12	0.04	0.13	0.12	0.03	0.12	0.01	0.20	0.01	0.00	0.78	Low
SW3146	2019-10-28	0.05	0.02	0.07	0.09	0.02	0.12	0.01	0.35	0.00	0.00	0.72	Low
SW3153	2019-12-03	0.12	0.05	0.17	0.10	0.04	0.12	0.02	0.26	0.00	0.05	0.93	Low

Notes:

CRD MSQG =Marine sediment quality guidelines adopted from Washington State's Department of Ecology for protection of aquatic life.

These are ratios of the measured value over the MSQG.

LPAH and HPAH are low and high molecular weight polycyclic aromatic hydrocarbons, respectively.

values are approaching the guideline (i.e. ratio of >0.75)

values exceed the MSQG

Some samples are not collected at the discharge to marine and therefore marine guidelines are not applicable but are used for screening purposes.

Table 3. Summary of Contaminant Ratings for Environmental Concern

Discharge # (Location)	Figure #	Jurisdiction	Contaminant Rating by Year							Comments & Recommendations
			2013	2014	2015	2016	2017	2018	2019	
405 (Island View Beach)	4	Central Saanich	Low	-	-	-	-	Low	Low	Resample in 2024 to monitor for change.
407 (Saanichton Bay)	5	Tsawout First Nation	-	-	-	-	Low	-	-	Rated low in 2005, 2011 and 2017. Resample in 2022 to monitor for change.
409C (Saanichton Bay)	6	Tsawout First Nation	Low	-	-	-	-	Low	Low	Resample in 2024 to monitor for change.
410 (Saanichton Bay)	6	Tsawout First Nation	Low	Low	-	-	-	-	Low	Elevated lead in 2012. Resample in 2020 to confirm low concentrations.
411A (Saanichton Bay)	6	Tsawout First Nation	-	-	-	Low	-	-	-	Rated low in 2011 and 2016. Rated moderate in 2008. Resample in 2021 to confirm rating.
412 (Tetayut Creek)	7	Tsawout First Nation	-	-	Low	Low	Low	-	Low	Low at discharge, but elevated levels upstream. Resample discharge in 2024 to monitor for change.
416 (Foot of Ferguson Rd)	7	Central Saanich	-	-	-	Moderate	-	Low	Low	Rated low in 1999, 2000 & 2011. Resample in 2024 to monitor for change.
435 (Bazan Bay)	10	North Saanich	-	-	-	-	Low	Low	-	High upstream near highway, but low at discharge and in marine. Resample in 2023 to monitor for change.
441 (Reay Creek)	10	North Saanich	High	High	High	High	-	-	-	Rated high at POD 2004-2016, due to cadmium and zinc. Mercury elevated in 2012. Transport Canada looking at options for remedial work to be completed. **Action Required** (higher priority). CRD to sample after remedial work complete
445 (Foot of Frost Ave.)	11	Sidney	-	-	-	-	-	-	-	Rated high yearly (2002-2007), due to zinc. HPAH elevated in 2005. U/S: 445-2 high in 2007, due to mercury and PAHs. No sediment available in since 2009. Discontinue sampling if no sediment available
449 (Tulista Park)	11	Sidney	Low U/S	-	-	-	Moderate	Low	Moderate	Tidally influenced at discharge. Sample 449-2D for rating. In 2017 and 2018: Zn low in sediment, but copper and zine elevated in water at 449-2D. Confirm rating. Lower zinc, multiple sources.
450 (Foot of Ocean Ave.)	11	Sidney	-	-	-	-	Low	-	-	Rated moderate in 2005 and 2007, due to cumulative contaminants. Rated low in 2011, 2012 and 2017. Resample in 2022 to monitor for change.
467 (Foot of Shoreacres)	12	Sidney	-	-	-	-	Low	-	-	Resample in 2022 to monitor for change.

Table 3, continued

Discharge # (Location)	Figure #	Jurisdiction	Contaminant Rating by Year							Comments & Recommendations
			2013	2014	2015	2016	2017	2018	2019	
3005 (Mermaid Canal)	13	Sidney	High	-	-	-	**High**	-	-	Rated high due to zinc and PAH. POD has tidal influence. Discharge data indicates marine impact (>CCME ISQG) from Cu, Pb, Hg and Zn. Sediment trap at 3005-3 in 2011 high, due to As, Cu, Pb and Zn. No sediment in 2014, 2015, 2016, 2018 at 3005-3. **Action Required** (higher priority). Continue source investigations, if possible.
3006 (Roberts Bay)	13	Sidney	-	-	-	-	Low	-	-	Resample in 2022 to monitor for change.
3016 (All Bay)	14	Sidney	Moderate	Moderate	Low	Low	Moderate	Moderate	-	Rated moderate, due to Cu and Zn > CCME ISQG. Upstream arsenic concentrations lower Sidney flushed line in fall 2015. Resample in 2020.
3021 (Tsehum Harbour)	15	North Saanich	Moderate	-	-	-	-	**High**	Moderate	2018: elevated Pb and slightly elevated Ar, Cd, Hg and Zn. Rated high in 2005, due to Cu & Pb. Low in 1998. Confirm rating.
3077 (Deep Cove)	23	North Saanich	-	-	-	-	-	-	-	Rated low in 2001, 2006 and 2010. Pipe buried; measure aqueous metals.
3079 (Tatlow Creek)	23	North Saanich	Low	-	-	-	-	Low	-	Rated low in 2000 and 2008. Resample in 2023 to monitor for change.
3080A (Benes Creek)	24	North Saanich	-	-	High	Low	Low	Low	-	Rated high in 2015, due to mercury; possible lab error. Resample in 2023 to monitor for change.
3090 (Patricia Bay)	26	Tseycum First Nation	-	-	-	-	Low	Low	Low	Rated low in 2001, 2005 and 2010. Resample in 2024 to monitor for change.
3095 (Tseycum Creek)	27	Tseycum First Nation	-	Low	-	-	Low	Low	-	Rated low in previous years. Resample in 2023 to monitor for change.
3104 (Tén Tén Creek)	28	North Saanich	-	-	-	-	**High**	Moderate High u/s	Low High u/s	Zn and Cu above the PEL at Willingdon Road, but low at discharge. Transport Canada remediated gross contaminants in the catchment area. Resample discharge and upstream above 3104-2 in 2020.
3118 (Coles Bay)	31	North Saanich	-	Low	-	-	-	-	-	Rated low in 2001, 2005 and 2011. Rated moderate in 2006, 2008 and 2012. Resample in 2020.
3119 (Coles Bay)	31	North Saanich	-	-	High	-	Low	Low	-	Rated low in 1998, 2004 and 2011. Rated high in 2015, due to mercury; possible lab error. Resample in 2023 to monitor for change.
3120 (Coles Bay)	31	North Saanich	-	-	-	Low	-	-	-	Rated low in 1999, 2006, 2011 and 2016. Resample in 2021 to monitor for change.
3122 (Coles Bay)	31	Pauquachin First Nation	-	-	High	Low	**High**	Low	Low	Rated low in past. Rated high in 2015, due to Hg and in 2017, due to Ca. Resample in 2024.
3124 (Coles Bay)	31	Pauquachin First Nation	Low	-	-	-	-	Low	-	Rated low in 2001 and 2005. Resample in 2023 to monitor for change.
3133 (Hagan Creek)	35	Tsartlip First Nation	-	Low	High U/S	-	Low to High U/S	Low to High U/S	Low but High U/S	Rated low at point of discharge. Elevated As, Ca, Cr, Cu, Pb and Zn upstream. Continue investigations.

Table 3, continued

Discharge # (Location)	Figure #	Jurisdiction	Contaminant Rating by Year							Comments & Recommendations
			2013	2014	2015	2016	2017	2018	2019	
3135 (South of Hagan Bight)	35	Tsartlip First Nation	-	-	-	-	Moderate	-	-	Rated low in 2005, 2006, 2007 and 2012. U/S: stations were rated low. Resample in 2020 to monitor for change.
3136A (Stream, south of Hagan Bight)	35	Tsartlip First Nation	-	High	Moderate	Moderate	-	-	Low	No exceedances of guidelines in 2015. Rated high in 2014, due to zinc. Confirm low rating in 2020.
3136B (North of Tsartlip boat launch)	35	Tsartlip First Nation	Low	-	-	-	-	-	-	Rated low in 2002 and 2008. Resample in 2020 to monitor for change.
3138 (Brentwood Bay, north of boat ramp)	36	Tsartlip First Nation	High	-	High	High	-	**High**	Low	Rated high between 2004-2013, due to zinc. Elevated zinc at 3138-1 (Tsartlip Drive & Stelly's X Road). Tsartlip replaced pipes. **Action Required**. Confirm low rating.
3146 (Brentwood Drive)	36	Central Saanich	Low	Low	-	-	-	-	Low	Rated low in 2006 and 2007. Resample in 2020.
3148 (Brentwood Bay)	36	Central Saanich	-	-	-	-	-	Low	-	Rated low in 2000, 2005, 2010 and 2011. Resample in 2023 to monitor for change.
3153 (Brentwood Bay)	37	Central Saanich	-	-	-	-	Moderate	-	-	Elevated levels of Zn, but rated moderate because the sediment is pumped out. U/S: in 2008 and 2009, station 3153-1 rated low. Remedial action undertaken, confirm sediment is still being removed in 2020.
3154 (Tod Creek)	43	Central Saanich	-	-	Low	-	Moderate	-	-	Rated high in 2006, due to zinc. As, Cu, Pb and Zn are greater than CCME ISQG. U/S: station 3154-1 rated low. As, Cd, Cu, Pb, Zn elevated above CCME ISQG at mouth. Resample in 2022 to monitor for change.

Notes:
POD = Point of discharge; U/S = upstream
CCME = Canadian Council of Ministers of the Environment
ISQG = Interim sediment quality guidelines

Table 4. 2019 Stream Sediment Data

			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Silver	Zinc	HPAH	LPAH
		CCME (ISQG)	5.9	0.6	37.3	35.7	35	0.17	0.5	123	0.1	0.1
		CCME (PEL)	17	3.5	90	197	91	0.486	-	315		
		Vancouver Island Background	4	0.95	65	100	40	0.15	1	150	-	-
Tén Tén Creek	SW3104	2019-12-03	14	0.402	*46.5*	130	17.4	0.089	0.154	360	0.75	0.12
	SW3104-2	2019-12-03	4.62	0.23	32	*48*	23.7	0.061	0.094	100	0.15	0.029
Hagan Creek	SW3133	2019-10-17	2.74	0.107	19.7	17.6	5.24	<0.05	<0.05	67.7	0.023	0.0043
	SW3133-2	2019-10-17										
	SW3133-4	2019-10-17	6.56	1.23	237	191	49.3	0.117	0.348		1.7	0.38
	SW3133-5	2019-10-17	6.21	0.109	*43*	*54.4*	6.82	0.061	0.082	92.1	0.052	0.023
Stream	SW3136A-2	2019-10-17	4.15	0.272	32	*46.7*	17.9	0.054	0.096	*138*	0.061	0.014
Aubrey Creek	SW3146	2019-10-28	3.05	0.095	16.9	34.3	6.92	<0.05	<0.05	*142*	<0.001	<0.001

Notes:

Concentrations are in mg/kg

CRD MSQG =Marine sediment quality guidelines adopted from Washington State's Department of Ecology for protection of aquatic life.

LPAH and HPAH are low and high molecular weight polycyclic aromatic hydrocarbons, respectively.

CCME = Canadian Council of Ministers of the Environment.

ISQG = interim sediment quality guideline; concentrations above this level but below the PEL will occasionally result in adverse effects on aquatic life.

PEL = probable effects level; concentrations above this level will frequently result in adverse effects to aquatic life.

Vancouver Island Background Concentrations are regional estimates (95th percentiles) from BC ENV; https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/protocols/protocol_4.pdf

Italicized values are those that exceed a guideline but are below the Vancouver Island background concentration.

value is greater than or equal to the CCME ISQG

value is greater than or equal to the CCME PEL

value it greater than or equal to CRD MSQG and adverse effects to aquatic life are likely to occur

For mercury only, the CRD MSQG is lower than the CCME PEL

Some samples are not collected at the discharge to marine and therefore marine guidelines are not applicable but are used for screening purposes.

Carbon normalized PAH guideline comparison was done separately.

Table 5. 2019 Freshwater Sediment Data for Stormwater Discharges and Creeks

Data for Stormwater Discharges			Aluminum	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Zinc
Marine Aquatic Life Guidelines		max	-	12.5	0.12	-	3	-	140	10
		average	-	-	-	-	2	-	2	-
Freshwater Aquatic Life Guidelines		max	100 [1]	5	-	1/9	6.7	1000	34	33
		average	50 [1]	-	-	-	2	-	5	7.5
405	North of Island View beach		*224*	0.78	0.246	1.22	1.08	2470	<0.1	14
410	20 m north of 2764 Sa-Su Rd		*117*	0.388	<0.005	0.29	1.96	199	0.081	5.5
412	Tetayut Creek, under 2499 Helmsen's Hollow		99.6	0.575	0.0823	*1.41*	1.62	429	0.072	2.5
416	Ferguson Road beach access		86.1	0.924	0.015	0.33	3.71	92.6	0.087	5.6
445	20 m north of steps near 9388 Lochside Drive		*189*	0.626	0.0134	0.41	6.56	186	0.121	15.8
449-2D	MH153F; Fifth Street near boat launch entrance		*2980*	1.63	0.076	*4.87*	21.7	4070	5.17	56.7
3005-2A	Manhole; 2356/2362 Malaview Avenue		*106*	0.53	0.0176	0.34	12.5	117	0.171	23.8
3021	Corner of McDonald Park and Bayfield roads		25.5	0.39	<0.005	0.12	3.59	284	0.043	3.4
3090	100 m north of 10429 West Saanich Road		*331*	0.384	0.0062	0.56	5.03	367	0.204	10.9
3095	Tseycum Creek; near 1036 West Saanich Road		78.2	0.736	0.018	0.33	1.66	166	0.043	3
3104	North end of seaplane base, Tén Tén Creek		23.8	0.674	0.0259	0.17	2.66	324	0.0434	8.23
3122	40 m south of boat ramp; Pauquachin FN land		*142*	0.316	0.0089	0.24	2.32	134	0.106	2.6
3133	South of Woodwyn Farm, Hagan Creek		*184*	0.452	0.0063	0.57	3.39	336	0.309	3.8
3138	South side of Tsartlip boat launch parking lot		*161*	1.06	0.0281	0.64	3.86	188	0.103	2.3
3146	Brentwood Drive near Marchant Road		19.5	0.491	0.0184	0.13	3.7	32.6	0.0309	21.1

Data for Creeks			Aluminum	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Zinc
Freshwater Aquatic Life Guidelines		max	100 [1]	5	-	1/9	6.7	1000	34	33
		average	50 [1]	-	-	-	2	-	5	7.5
3133	South side of Woodwyn Farm, Hagan Creek		*184*	0.452	0.0063	0.57	3.39	336	0.309	3.8
3133-2	Hagan Creek, ditch downstream of Industrial Park		*2290*	1.64	0.114	*6.77*	26.7	2860	2.6	60.1
3133-4	Stevens Creek, ditch on Willow Way		*2570*	1.89	0.11	*5.64*	22.8	3400	3.81	76.1
3133-5	Graham Creek above Stevens Creek confluence		*624*	0.641	0.01	*1.91*	5.6	838	0.716	8.6
3104	North end of seaplane base, Tén Tén Creek		23.8	0.674	0.0259	0.17	2.66	324	0.0434	8.23
3104-2	Tén Tén Creek at Willingdon Road		*268*	1.56	0.027	0.58	5.6	667	0.253	18.4

Notes:

All data is in total state and in ug/L

BC Ministry of Environment and Climate Change Strategy water quality guidelines for protection of freshwater and marine aquatic life were used.

Guidelines protective of marine and freshwater aquatic life are not fully applicable to stormwater pipes, but still used for comparison.

[1] Guideline is for dissolved aluminum

X	exceeds guidelines protective of marine aquatic life
X	exceeds guidelines protective of freshwater aquatic life
X	exceeds both marine and freshwater aquatic life guidelines
X	exceeds a guideline that is only partially applicable; more investigation required

APPENDIX F

WATERCOURSE MONITORING DATA
2017 to 2020

Table 1. Creek Water Quality Data Collected Twice per Year (2017-2020)

		Oxygen	*E. Coli*	Flow Rate[1]	Nitrate	Phosphorus		pH	Conductivity	Temp.	Turbidity	Comments
		(dissolved)			(dissolved)	(ortho) [2]	(total) [3]		at 25°C			
		mg/L	CFU/100 mL	L/min	mg/L	mg/L	mg/L	pH	µS/cm	°C	NTU	
BC Water Quality Guidelines[4]	**max**	5	400		32.9	0.01		6.5-9.0		17	9	
	average	8	200		3	0.005					6	
SW0412	2017-03-03	11.88	26	>2000	1.3	0.0587	-	7.47	310.7	6.3	12.6	no odour, slightly brown discharge
	2017-07-25	5.81	160	>300	1	0.0848	-	7.92	317.2	17.6	5.4	no odour, discharge clear
	2018-02-05	12.06	40	>2000	1.1	0.0913	-	7.46	216.4	7.8	11.6	no odour, discharge clear
	2018-02-19	12.26	40	>1200	1	0.1011	-	7.53	251	2.8	12.7	no odour, discharge clear
	2018-02-26	12.27	30	>400	1	0.0717	-	7.61	266.3	3.3	8.48	no odour, discharge clear
	2018-08-16	10.45	150	>300	0.8	0.0848	-	6.94	292.2	11	3.43	no odour, discharge clear
	2019-03-19	12.73	40	>500	0.9	0.0587	-	7.75	307	6.6	4.21	no odour, discharge clear
	2019-07-11	8.26	140	>1000	0.4	0.0293	-	7.78	306	-	7.9	no odour, discharge clear
	2020-03-23	12.13	100	>2000	0.9	0.0554	-	7.65	326.1	7.5	4.88	no odour, discharge clear
SW0441	2017-03-08	9.38	70	>500	1.1	0.0261	-	7.34	269.8	5.3	11.3	no odour, discharge clear
	2017-08-24	7.57	80	80	1	0.0522	-	7.48	403.6	16.3	1.38	no odour, discharge clear
	2018-03-26	11.24	260	250	1	0.0522	-	7.64	430.4	7.4	3.88	no odour, discharge clear
	2018-05-15	8.04	140	>250	0.9	0.0391	-	7.74	5997	14.4	6.2	no odour, discharge clear
	2018-06-21	7.93	480	120	0.7	0.0945	-	7.87	4175	16.1	4.35	no odour, discharge clear
	2018-08-16	8.1	90	140	0.9	0.0685	-	7.05	262.5	12.6	3.71	no odour, discharge clear
	2019-04-26	11.17	2700	>250	1	0.0424	-	7.54	254.6	11.4	2.33	no odour, discharge clear
	2019-07-05	8.9	280	100	0.8	0.0587	-	7.18	6047	15.2	2.3	no odour, discharge clear
	2020-02-13	11.12	77	>800	0.6	0.1597	-	7.3	5290	7.3	5.64	no odour, discharge clear
SW3079	2017-02-28	12.9	40	>400	0.2	0.0326	-	7.49	301.3	3.3	6.68	no odour, discharge clear
	2017-07-10	8.59	360	14	0.5	0.1239	-	7.56	338.6	13	8.93	no odour, discharge clear
	2018-03-01	12.11	30	240	1	0.0359	-	7.65	282.7	4.6	10.1	no odour, discharge clear
	2018-08-16	8.67	220	60	0.9	0.0848	-	7.51	1669	16.9	10.4	no odour, discharge clear
	2019-03-14	12.42	80	>500	0.5	0.0163	-	7.82	279.7	5.1	7.29	no odour, discharge clear
	2019-06-24	8.68	100	22	0.6	0.0717	-	7.68	268.4	15	8.55	no odour, discharge clear
	2020-03-19	12.12	34	>200	0.9	0.0391	-	7.96	338.4	4.9	4.67	no odour, discharge clear
SW3095	2017-03-16	8.55	490	>500	1.2	0.1011	-	7.39	452.7	8.1	11.8	no odour, amber discharge
	2017-07-17	4.66	40	-	0.7	0.3681	-	7.55	778	15.4	4.7	no odour, slight amber discharge, pooled with unknown flow
	2018-03-26	10.3	44000	200	1	0.26	-	7.73	559.7	6.8	5.67	no odour, discharge clear
	2018-09-27	5.32	110000	32	1	0.4434	-	7.23	664	12.4	1.68	no odour, discharge clear
	2018-10-03	5.86	5200	32	0.8	0.74	-	7.38	687.4	10.2	1.73	no odour, discharge clear
	2019-03-19	10.64	860	80	1	0.1076	-	7.68	594.3	7.7	7.95	no odour, discharge clear
	2019-06-26	5.4	3000	12	0.9	0.3162	-	7.8	661.2	16.1	6.09	no odour, discharge clear
	2019-10-28	5.21	3600	40	1	0.3847	-	7.65	600.7	6.5	2.24	no odour, discharge clear
	2020-03-19	10.16	34000	>80	0.9	0.1304	-	7.6	620.1	5.2	10.6	sewer odour, murky discharge
SW3104	2017-03-16	11.22	140	>400	1.2	0.0782	-	7.21	286.5	8.6	8.7	no odour, discharge clear
	2017-08-23	8.18	170	70	1.8	0.2673	-	6.78	526	15	6.3	no odour, slightly murky discharge
	2018-03-26	11.05	10	<250	1	0.0913	-	7.58	284.3	7.5	3.29	no odour, discharge clear
	2018-09-27	7.79	240	40	1.2	0.1467	-	7.24	605.4	14.4	2.38	no odour, discharge clear
	2018-11-01	8.95	120	50	0.763	-	0.187	7.37	221.6	12.2	14.8	no odour, discharge clear
	2018-11-08	6.77	80	50	0.82	-	0.273	7.54	621.5	8.8	5.38	no odour, discharge clear
	2018-11-15	8.75	290	100	5.5	-	0.198	7.34	465.7	9.8	14.5	no odour, discharge clear
	2018-11-20	7.62	140	80	3.02	-	0.175	7.46	523	5.5	2.82	no odour, discharge clear
	2019-04-17	10.47	70	180	1	0.0391	-	7.77	290.1	12	2.91	no odour, discharge clear
	2019-07-11	9.39	160	>80	1.3	0.2706	-	7.69	513.6	18.8	11	no odour, slight amber discharge
	2019-12-03	9.22	9	>300	-	-	-	7.72	629.5	6.7	-	no odour, discharge clear
	2020-03-23	10.89	24	>1000	0.9	0.0717	-	7.68	384.2	8.5	5.24	no odour, discharge clear
SW3133	2017-03-13	9.26	100	>2000	0.6	0.0359	-	7.4	187	7.4	17	no odour, murky (amber) discharge
	2017-08-24	8.26	220	>400	0.8	0.3912	-	7.37	331.6	16.4	3.38	no odour, discharge clear
	2018-03-05	11.97	80	>500	1.2	0.0652	-	7.53	231.3	6.2	8.89	no odour, discharge clear
	2018-09-20	9.03	10	>300	0.8	0.0717	-	7.4	277.8	11.3	1.19	no odour, discharge clear

Watercourse Monitoring Data

Table 1, continued

		Oxygen	*E. Coli*	Flow Rate[1]	Nitrate	Phosphorus		pH	Conductivity	Temp.	Turbidity	Comments
		(dissolved)			(dissolved)	(ortho) [2]	(total) [3]		at 25°C			
		mg/L	CFU/100 mL	L/min	mg/L	mg/L	mg/L	pH	µS/cm	°C	NTU	
BC Water	**max**	5	400		32.9	0.01		6.5-9.0		17	9	
Quality Guidelines[4]	**average**	8	200		3	0.005					6	
	2019-03-22	11.93	10	>300	0.6	0.0228	-	7.92	234.4	8.9	4.44	no odour, discharge clear
	2019-06-27	6.95	170	>500	1.1	0.1271	-	7.73	294.5	15.4	2.77	no odour, discharge clear
	2020-03-20	11.08	14	>2000	0.9	0.0391	-	7.69	280.2	6.5	5.24	no odour, discharge clear
SW3154	2017-03-14	11.75	150	>2000	0.7	0.0456	-	7.42	118.1	8.2	10.8	no odour, discharge clear
	2017-08-14	8.53	30	20	0.232	-	0.0864	7.63	261.5	14.6	8.28	no odour, discharge clear
	2017-08-22	7.7	60	20	0.186	-	0.0757	7.52	295.6	14.4	4.6	no odour, discharge clear
	2017-08-29	7.6	50	20	0.196	-	0.0813	8	252.8	14.9	4.49	no odour, discharge clear
	2017-09-05	6.75	80	15	0.231	-	0.0866	7.92	255.6	16.5	3.44	no odour, discharge clear
	2017-09-11	10	160	60	0.153	-	0.0885	7.96	241.3	12.9	3.03	no odour, discharge clear
	2017-10-18	10.3	140	150	0.129	-	-	7.95	289	8.4	5.01	no odour, discharge clear
	2017-10-24	11.8	40	300	1.05	-	-	7.82	327.2	9.3	2.34	no odour, discharge clear
	2017-10-31	12.43	40	300	0.094	-	-	7.93	337.2	6.8	5.92	no odour, discharge clear
	2017-11-06	14.22	60	600	0.334	-	-	7.91	342.4	3.2	3.12	no odour, discharge clear, but too slow to estimate
	2017-11-14	12.57	220	1800	1.65	-	-	7.79	289.2	8	6.81	no odour, discharge clear
	2018-03-26	11.74	<10	>2000	0.8	0.0359	-	7.57	198.6	6.7	9.37	no odour, discharge clear
	2018-09-28	9.9	10	80	0.8	0.0945	-	7.43	343.7	11.9	1.87	no odour, discharge clear
	2019-04-26	12.79	140	>2000	1.4	0.0522	-	7.32	221.2	10.8	5.29	no odour, amber discharge
	2019-07-05	8.66	340	80	0.8	0.0717	-	7.54	277.6	15.7	3.33	no odour, discharge clear
	2020-03-24	11.72	6	>2000	0.7	0.0456	-	7.73	212.8	7.8	6.51	no odour, discharge clear

Notes:

[1] Flow is visually estimated.

[2] Results are for ortho-phosphorus (a fraction of total phosphorus), it does not have a guideline, and therefore, results are compared to the total phosphorus guidelines.

[3] Total phosphorus as measured in the lab.
The total phosphorus guideline is only applicable during the growing season (May to September).

[4] BC Ministry of Environment and Climate Change Strategy guidelines for protection of freshwater aquatic life. *E.coli* measurements compared to primary contact guidelines for public health.
Grey shaded values exceed the maximum guideline; the average guideline is showed for comparison and applicable to average results of samples collected 5 times in 30 days.
Black shaded values exceed a maximum guideline by more than 10X

Samples were collected at the discharge point except for the following stations collected upstream in Tén Tén Creek.

SW3104-2 Tén Tén Creek at Willingdon Road
SW3104-3 Tén Tén Creek, downstream of confluence of ditch flow from north boundary of 9469 West Saanich Road and pond flow from south west corner of Victoria Airport property.
SW3104-4 Tén Tén Creek, upstream of pond at the south west corner of Victoria Airport property.

APPENDIX G

CRD Public Health and Environmental Concern Rating System

STORMWATER DISCHARGE RATING SYSTEM

The CRD evaluates stormwater discharges for public health and environmental concerns using a rating system for stormwater discharges developed by the CRD titled Stormwater *Discharge Rating System for the Capital Regional District* (Drinnan, 1997). As part of the rating system, the following study was used to determine levels of public use, coastline habitat sensitivity and flushing characteristics of the marine receiving waters:

- *An Evaluation of the Coastline Sensitivity Associated with Stormwater Discharges on the Saanich Peninsula (Drinnan, 1997)*

Public shoreline use ratings indicate the potential for public contact with stormwater. These ratings were updated in 2010.

The rating of discharges allows the jurisdictions involved to better manage limited funds and undertake remedial measures where necessary. A copy of the rating system and the coastline sensitivity evaluations are available upon request from the CRD. A brief explanation of the stormwater discharge rating system follows.

1.1 Public Health Concern

IWMP staff rate each discharge as a high, moderate or low level of concern for public health based on the level of bacterial contamination in the stormwater and the potential for human contact. The parameters used to assess the level of concern for public health are:

- Escherichia coli (*E.coli*) concentrations in the stormwater discharge
- discharge flow rate
- location of the discharge (e.g., below high-water line)
- public use of the shoreline (uses such as swimming, fishing, or kayaking)

The level of contamination is used to assign a bacterial rating. Public shoreline use ratings are used to indicate the potential for public contact with stormwater and depends on the type of activities carried out on the shoreline. Table 1 shows criteria for the bacterial and public shoreline use ratings.

Table 1 Fecal Coliform and Public Shoreline Use Rating Criteria

Rating	Bacterial Rating Criteria	Rating	Public Shoreline Use Rating Criteria
1	No flow measured or *E.coli* count consistently under 200 CFU/100 mL	1	Low contact (e.g., inaccessible, beach walking)
2	*E.coli* count between 200 and 5,000 CFU/100 mL	2	Secondary contact (e.g., kayaking)
3	*E.coli* count greater than 5,000 CFU/100 mL	3	Primary contact (e.g., swimming, scuba diving)

Note: *E.coli* counts above 200 CFU/100 mL (on average) indicate the potential to cause adverse public health effects from primary recreational activities such as swimming or diving.

1.2 Environmental Concern

Environmental concerns are based on a contaminant rating of discharge sediments. The contaminant rating is determined by comparing the sediment concentration of each of 8 metals and 2 groups of organic contaminants (Cn) with the CRD MSQG to obtain a ratio (Cn/MSQG). To account for potential additive effects, these ratios are summed to calculate the toxic equivalent unit (TEU). Table 2 provides the criteria for determining the contaminant rating.

Table 2 Criteria for Determining the Contaminant Rating

Contaminant Rating	Criteria for Determining the Contaminant Rating
Low	Sum of the individual ratios of Cn/MSQG (TEU) is less than 1.0
Moderate	Sum of the individual ratios of Cn/MSQG (TEU) is greater than or equal to 1.0, but no individual parameter exceeds, or is equal to, a value of 0.75
High	The ratio Cn/MSQG is greater than, or equal to, 0.75 for any single parameter

Discharges evaluated are located near environmentally sensitive areas, in creeks or near heavily settled areas where there is an increased probability of pollution. All discharges sampled for environmental concern are sampled for at least 2 years to confirm the contaminant concentrations and contaminant(s) of concern. Only a small number of discharges can be sampled each year due to budgetary constraints; therefore, each discharge selected for sampling can only be sampled once per year.

Discharges with a confirmed high contaminant rating are investigated to determine the source(s) of contamination. The priority in which high-rated discharges are investigated and problems mitigated is determined by calculating a habitat rating (high, moderate or low). The habitat rating is based on the habitat sensitivity, discharge flow and marine flushing characteristics. The following briefly describes the rating criteria for the habitat rating.

Table 3 Criteria for Determining Ratings for Habitat Sensitivity, Discharge Flow and Marine Flushing

Habitat Sensitivity Rating		Discharge Flow Rating		Marine Flushing Ratings	
Rating	Criteria	Rating	Criteria	Rating	Criteria
1	Low productivity; less diverse habitats	0.5	Less than 50 L/minute	0.5	Open shoreline; high flushing
2	Moderate productivity; diverse habitats	1	Between 50 to 500 L/minute	1	Partially enclosed area; moderate flushing
3	High productivity or endangered or protected habitats	1.5	Greater than 500 L/minute	1.5	Enclosed area; poor flushing

These 3 ratings (habitat sensitivity, discharge flow and marine flushing) are summed to determine a habitat rating as shown in Table 4. The habitat rating assigned to each discharge will allow limited resources to be spent in a prioritized manner.

Table 4 Criteria for Establishing the Habitat Rating

Habitat Rating and Mitigative Priority	Sum of Criteria (Habitat + Flow + Flushing)
Low	2.0-3.0
Moderate	3.5-4.5
High	5.0-6.0

OTHER CONCERNS

There are a number of other concerns that have been jointly reviewed and discussed by staff from IWMP and the other jurisdictions involved. This review and discussion assists in setting priorities for remediation of discharges with a high level of concern for public health and the environment. These include:

- the cost of remediation
- the likelihood that remediation will be successful
- compatibility with the priorities of the jurisdictions
- public interest