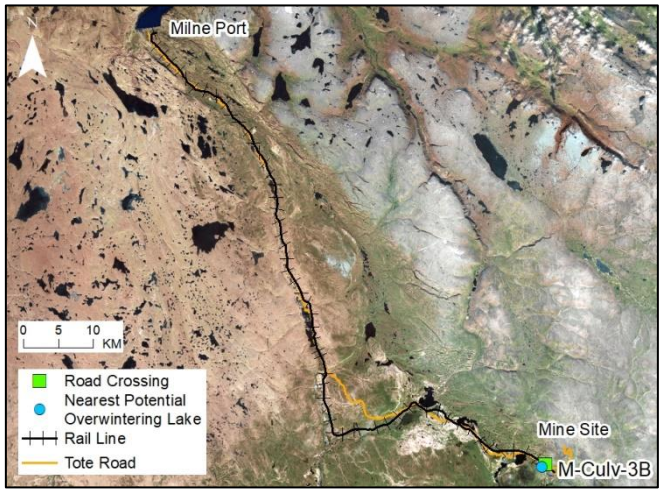
ROAD M-CULV-3B

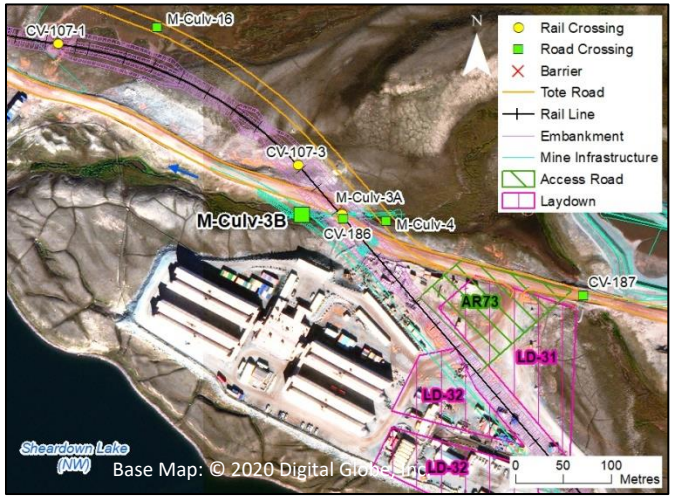
LOCATION AND CROSSING DESCRIPTION

Site ID:	M-Culv-3B	**Dates Surveyed:**	28-Jun-19; 19-Aug-19	**Waterbody Type:**	Stream
Project Interaction:	Road Plate Arch Culvert	**Centreline UTM Coordinates:**	17W 560664 E 7913503 N	**Culvert Length (m):**	27.706
Number of Barrels:	1	**Culvert Diameter/Span (mm):**	4,260	**Slope (%):**	2.4

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal **Stream Order:** 3 **Drainage Basin Area (km^2):** 0.9022





SUMMARY

The Tote Road realignment crosses the main inflow stream to Sheardown Lake (also known as Sheardown Lake Tributary 1) at M-Culv-3B. This stream flows west towards Sheardown Lake approximately 430 m downstream. This stream is also crossed by the rail at M-Culv-3A (which is at the same location as the existing Tote Road crossing CV-186) and another road crossing at M-Culv-4, 40 and 80 m upstream, respectively. Plate arch culverts will be installed at both M-Culv-3A and M-Culv-3B; a CSP culvert will be installed at M-Culv-4.

This stream at the M-Culv-3A site has low to moderate depths and velocities and riffle/pool morphology and has a predominantly cobble substrate. A permanent subsurface flow barrier underneath vegetation-covered boulders is present approximately 900 m upstream from the rail crossing. There are no natural downstream barriers to fish movement.

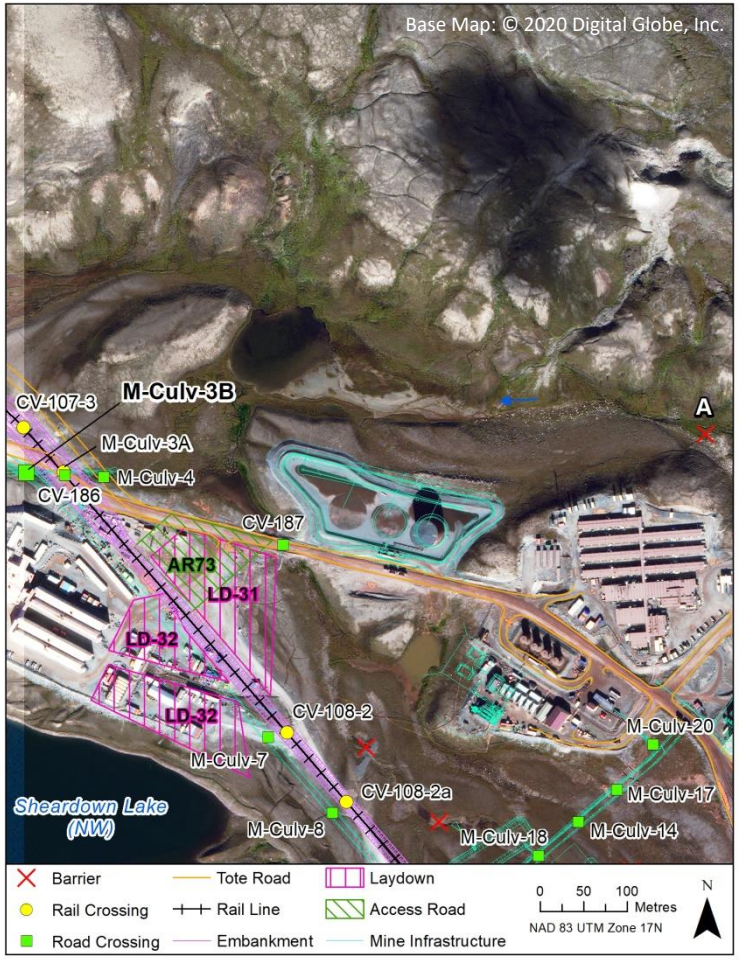
This stream provides open-water season rearing habitat for juvenile Arctic Char from Sheardown Lake upstream to the barrier. The stream does not provide overwintering or spawning habitat for char due to lack of flow and sufficient depth in winter.

Ninespine Stickleback have been captured at the confluence with Sheardown Lake downstream, but not at or upstream of the Tote Road crossing, since field studies began in 2006. The velocities are too high and the habitat generally unsuitable for stickleback to reach the Tote Road from Sheardown Lake.

ROAD M-CULV-3B

BARRIERS

Upstream/ Downstream	UTM		Barrier Type			Height (m)	Gradient (°)	Description	Site Label
	Easting	Northing	1	2	3				
Downstream	NO BARRIERS								
Upstream	561444	7913547	SSF					Permanent Barrier: Subsurface flow under boulders overgrown with vegetation	A



A

ROAD M-CULV-3B

FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: Sheardown Lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): ~0.43

Overwintering Habitat Upstream of Site - ARCH (Y/N): No

Species	Spawning	Overwintering	Rearing	Adults Present
ARCH	N	N	Y	N
NNST	N	N	N	N

FISHING SITES

ROAD M-CULV-3B

FISHERIES DATA

Date: 28-Jun-19 **Temperature (°C):** NR **Gear Used:** Visual

Distance Fished (m): N/A **Duration Fished (seconds):** N/A

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Spring	-	-	0	many	-	-
NNST	Spring	-	-	0	0	-	-

Date: 19-Aug-19 **Temperature (°C):** 12.0 **Gear Used:** Backpack Electrofisher/Visual

Distance Fished (m): 70 **Duration Fished (seconds):** 304

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Summer/Fall	1	304	10	many	1.97	70 – 250 (estimated)
NNST	Summer/Fall	1	304	0	0	-	-

COMMENTS

During spring and summer/fall, char were captured upstream of the Tote Road and were observed throughout the surveyed reach from downstream of the road to as far upstream as the large upstream pond (~310 m upstream). Additional Tote Road monitoring electrofishing data from July 1, 2019 included 36 char captured downstream (CPUE 10.14 fish/minute, 44-76 mm length range) and six captured upstream (1.88 fish/minute, not measured for length) of the Tote Road culverts. Stickleback were not present in the survey area. These results are consistent with previous surveys of this stream since annual monitoring of the Tote Road crossing and baseline field programs began in 2006. Fisheries data are shared among the three sites on this stream.

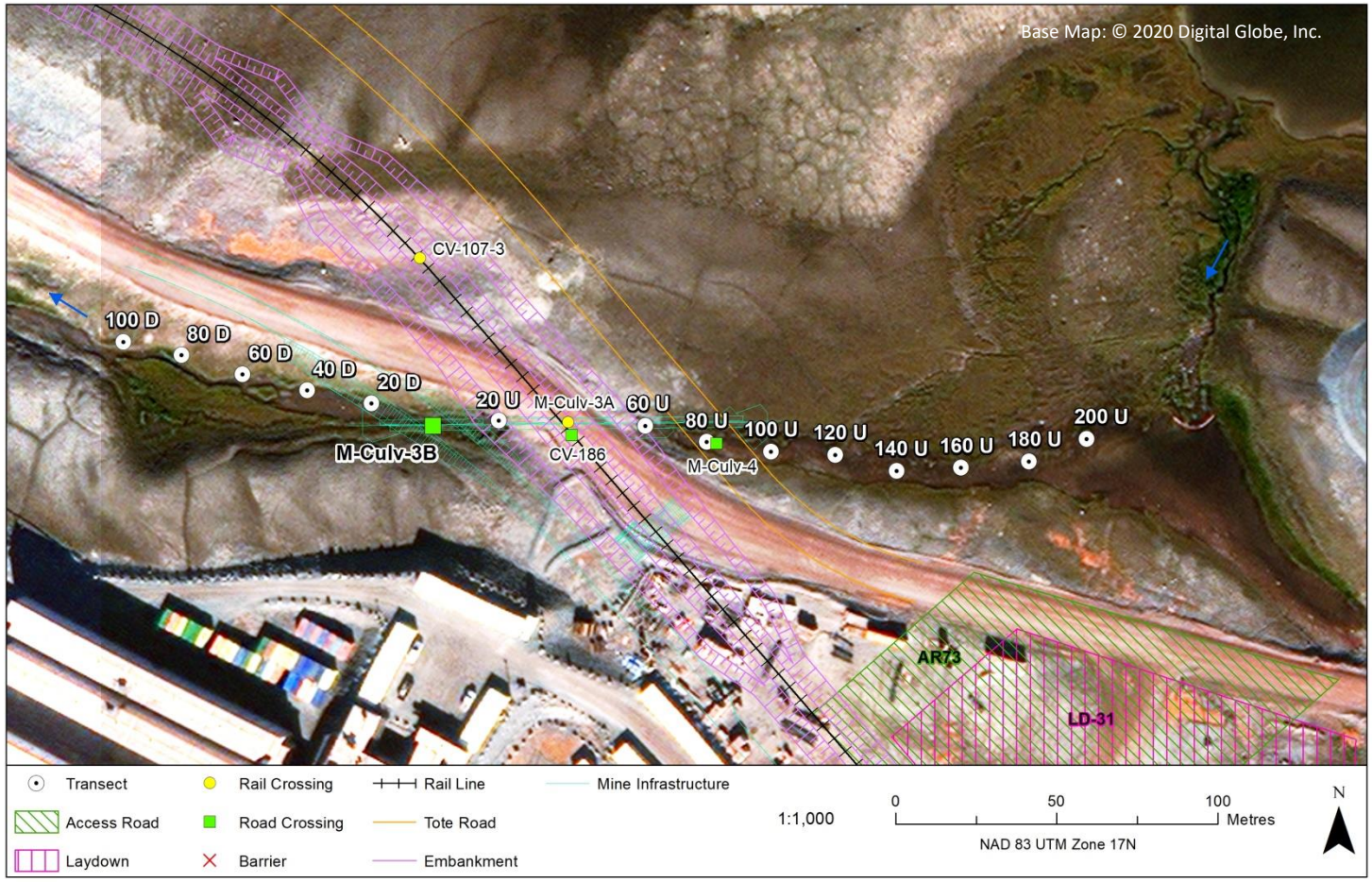
ROAD M-CULV-3B

GENERAL HABITAT CHARACTERISTICS

Channel Confinement: PC **Stream Morphology:** Sinuous **Riparian Vegetation Type (%):** Grass 70, Willow 20, Other 10

Centreline	Height (m)	Stability	Materials (%)	Shape
LHB	0.30	Moderate	CGS 20, Organic 80	Sloping
RHB	0.30	Moderate	CGS 20, Organic 80	Sloping

HABITAT SURVEY SITES



ROAD M-CULV-3B

HYDROLOGY & HABITAT CHARACTERISTICS: 28-JUN-19

Wetted/Dry/Shallow (<0.02 m)/Unconnected Pools: Wetted **Stage:** Low

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	9.0	6.3	0.10	0.17	0.17	0.17	0.00	0.09	0.21	0.43
80D	8.0	4.1	0.29	0.28	0.26	0.55	0.12	0.11	0.19	0.19
60D	7.0	3.8	0.14	0.18	0.19	0.24	0.28	0.17	0.32	0.32
40D	16.0	11.0	0.05	0.04	0.11	0.23	0.18	0.44	0.58	0.58
20D	11.0	6.0	0.08	0.04	0.08	0.08	0.13	0.07	0.38	0.38
0 (Centreline)	11.0	4.0	0.05	0.12	0.05	0.12	0.35	0.45	0.22	0.45
20U	11.0	4.0	0.14	0.18	0.13	0.18	0.04	0.47	0.10	0.68
40U	TRANSECT OVERLAPS WITH EXISTING TOTE ROAD									
60U	7.0	4.0	0.16	0.17	0.12	0.19	0.10	0.17	0.03	0.78
80U	11.0	5.0	0.05	0.09	0.07	0.09	0.31	0.08	0.11	0.50
100U	15.0	10.0	0.06	0.09	0.02	0.16	0.14	0.15	0.28	0.43

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	-	10	20	-	-	-	-	20	50	20	10
80D	20	-	50	30	-	-	-	-	-	20	40	40
60D	60	-	-	40	-	-	-	-	-	20	70	10
40D	80	20	-	-	-	-	-	5	10	20	60	5
20D	90	10	-	-	-	-	-	10	20	20	40	10
0 (Centreline)	100	-	-	-	-	-	-	10	20	30	30	10
20U	100	-	-	-	-	-	-	10	20	30	30	10
40U	TRANSECT OVERLAPS WITH EXISTING TOTE ROAD											
60U	100	-	-	-	-	-	-	20	-	10	50	20
80U	30	-	-	-	70	-	-	-	-	20	50	30
100U	-	-	100	-	-	-	-	70	-	-	20	10

OTHER NOTES / OBSERVATIONS

This stream has generally low to moderate depths and velocities with riffle/ pool over cobble substrate habitat. The 40U transect overlaps with the existing Tote Road and the proposed rail M-Culv-3A centreline while the 80U transect overlaps with the the road realignment crossing at M-Culv-4. Data are shared among sites.

ROAD M-CULV-3B

HYDROLOGY & HABITAT CHARACTERISTICS: 19-AUG-19

Wetted/Dry/Shallow (<0.02 m)/Unconnected Pools: Wetted **Stage:** Low

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	5.9	3.8	0.20	0.16	0.15	0.20	0.16	0.33	0.16	0.60
80D	2.0	1.9	0.20	0.15	0.17	0.45	0.22	0.23	0.30	0.65
60D	3.5	3.5	0.11	0.11	0.06	0.18	0.60	0.22	0.32	0.60
40D	9.0	9.0	0.06	0.04	0.05	0.06	0.60	0.06	0.38	0.60
20D	6.5	6.2	0.06	0.05	0.05	0.08	0.63	0.10	0.22	0.63
0 (Centreline)	2.8	2.5	0.04	0.06	0.10	0.10	0.40	0.94	0.74	0.94
20U	TRANSECT OVERLAPS WITH TOTE ROAD									
40U										
60U	5.2	3.5	0.13	0.15	0.19	0.19	0.11	0.24	0.18	0.68
80U	5.0	4.8	0.06	0.05	0.07	0.12	0.23	0.10	0.33	0.42
100U	7.8	7.0	0.08	0.03	0.04	0.16	0.28	0.16	0.09	0.57

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	40	40	-	20	-	-	-	10	10	50	30	-
80D	30	20	30	20	-	-	-	5	5	20	65	5
60D	50	20	10	20	-	-	-	5	5	20	70	-
40D	70	30	-	-	-	-	-	5	20	50	25	-
20D	70	30	-	-	-	-	-	5	20	55	20	-
0 (Centreline)	70	30	-	-	-	-	-	5	20	55	20	-
20U	TRANSECT OVERLAPS WITH TOTE ROAD											
40U												
60U	50	50	-	-	-	-	-	-	15	70	10	5
80U	50	35	-	-	15	-	-	5	45	40	5	5
100U	40	35	-	-	25	-	-	10	30	50	9	1

OTHER NOTES / OBSERVATIONS

Slightly higher measured velocities during summer/fall, but otherwise similar habitat between seasons. As the 20 m upstream transect essentially overlaps with the downstream end of the road culvert, it was not assessed during summer/fall. Habitat was highly influenced by road materials and erosion at this location.

ROAD M-CULV-3B

28-JUN-19

A

B

C

D

E

F

Photos 1. Photos taken at the crossing centreline (top) and 20 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank).

ROAD M-CULV-3B

28-JUN-19

A

B

C

D

E

F

Photos 2. Photos taken 40 m downstream (top) and 60 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank).

ROAD M-CULV-3B

28-JUN-19

A

B

C

D

E

F

Photos 3. Photos taken 80 m downstream (top) and 100 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank).

ROAD M-CULV-3B

28-JUN-19

A

B

C

D

E

F

Photos 4. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank).

ROAD M-CULV-3B

28-JUN-19

A

B

C

D

E

F

Photos 5. Photos taken 80 m upstream (top) and 100 m upstream (bottom) in spring: (A) facing upstream; (B) facing downstream; (C) across (right bank looking at left bank).

ROAD M-CULV-3B

19-AUG-19

A

B

C

D

E

F

Photos 6. Photos taken at the crossing centerline in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank); (D) diagonal from right bank above the centreline looking downstream; (E) across (right bank looking at left bank); and (F) diagonal from right bank below the centreline looking upstream.

ROAD M-CULV-3B

19-AUG-19

A

B

C

D

E

F

Photos 7. Photos taken 20 m downstream (top) and 40 downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

ROAD M-CULV-3B

19-AUG-19

A

B

C

D

E

F

Photos 8. Photos taken 60 m downstream (top) and 80 downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

ROAD M-CULV-3B

19-AUG-19

A

B

C

Photos 9. Photos taken 100 m downstream in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank).

ROAD M-CULV-3B

19-AUG-19

A

B

C

D

E

F

Photos 10. Photos taken 60 m upstream (top) and 80 m upstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (left bank looking at right bank).

ROAD M-CULV-3B

19-AUG-19

A

B

C

Photos 11. Photos taken 100 m upstream in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank).

ROAD M-CULV-3B

HYDROLOGY & HABITAT CHARACTERISTICS: UPSTREAM SURVEY

Date: 19-Aug-19

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
120U	UPSTREAM DATA ARE INCLUDED IN THE ASSESSMENT FOR M-CULV-4									
140U										
160U										
180U										
200U										

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
120U	UPSTREAM DATA ARE INCLUDED IN THE ASSESSMENT FOR M-CULV-4											
140U												
160U												
180U												
200U												

OTHER NOTES / OBSERVATIONS

Detailed habitat data for the upstream area were collected during the survey for the M-Culv-4 road crossing assessment; see the assessment sheet for information. In general, habitat from 100 m downstream of M-Culv-3B to upstream of M-Culv-4 is similar until reaching the first upstream pond approximately 200 m upstream from the M-Culv-3B centreline. A second larger pond is present approximately 350 m upstream of the centreline; the area between this second pond and the upstream permanent barrier is comprised of a stretch of sandy flats and then boulder/riffle/pool habitat.