Memorandum

2121 Innovation Court, Suite 100
P.O. Box 5095
De Pere, WI 54115-5095
(920) 497-2500
foth.com

March 27, 2024

TO: Molly Gardner – Wisconsin Department of Natural Resources

CC: Leland Roberts and Laura Vedral – Rio Tinto
Steve Donohue – Foth Infrastructure & Environment, LLC
Bill Adams – Red Cap Consulting
Bob Gensemer, Jennifer Lynch, and Ashley Romero – GEI Consultants, Inc.

FR: Nick Glander, Mark Ciardelli, and Sharon Kozicki – Foth Infrastructure & Environment, LLC

RE: Fall 2023 Stream C Sampling Results Summary
Reclaimed Flambeau Mine, Ladysmith, Wisconsin

1. Introduction

Foth Infrastructure & Environment, LLC (Foth) and GEI Consultants, Inc. (GEI) prepared a plan to evaluate Stream C, located on the Reclaimed Flambeau Mine site in Ladysmith, WI (see Figure 1). The *Stream C Evaluation Work Plan – Revision 1* (*Work Plan*) (Foth and GEI, 2023) was submitted to the Wisconsin Department of Natural Resources (Department) on September 1, 2023.

This memorandum presents the activities and results from the fall 2023 Stream C monitoring.

2. Scope of Work

Due to the dry climatic conditions and lack of flow, the anticipated work, as outlined in the *Work Plan* (Foth and GEI, 2023), most of the fall scope of work was cancelled for 2023. The only task that was conducted in fall 2023 was flow monitoring. The monitoring locations are shown on Figure 2.

Notification to postpone the fall 2023 work was accepted by the Department on October 13, 2023.

The scope of work outlined in the *Work Plan* will resume in spring 2024.

2.1 Flow

Flow monitoring consisted of visual observations and flow rate determination. Visual observations were documented using a combination of field notes, pictures, and videos.

When there was flow, the flow rate was manually monitored near the mouth of Stream C with a hand-held velocimeter unit, which records velocity and depth at multiple locations at a stream cross-section and automatically calculates flow rate. The location of flow monitoring near the

mouth of Stream C, at SW-STM, was established during the first event based on field observations; and the same location was used during subsequent flow monitoring. Its location is shown on Figure 2.

Flow rates were monitored with a hand-held velocimeter unit at the Highway 27 (Hwy 27) and Copper Park Lane culverts until dedicated pressure transducers were installed to continuously monitor the pressure/flow. The pressure transducers were installed on May 17, 2023, in the existing staff gauge brackets at the two culverts and set to record water depth every 15 minutes. Pressure-to-flow conversion was accomplished with a combination of continuous depth monitoring and known flow hydraulics associated with the culvert characteristics using the standard operating procedure (SOP) established in the *Work Plan*.

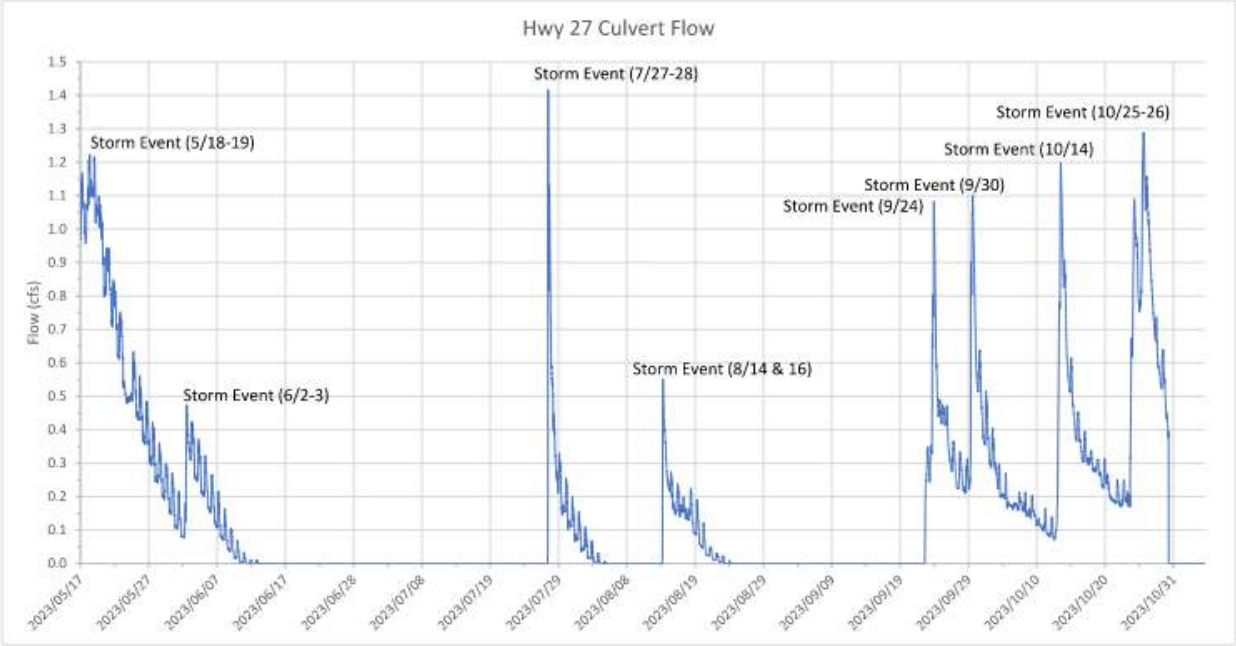
The results are presented in Section 3.

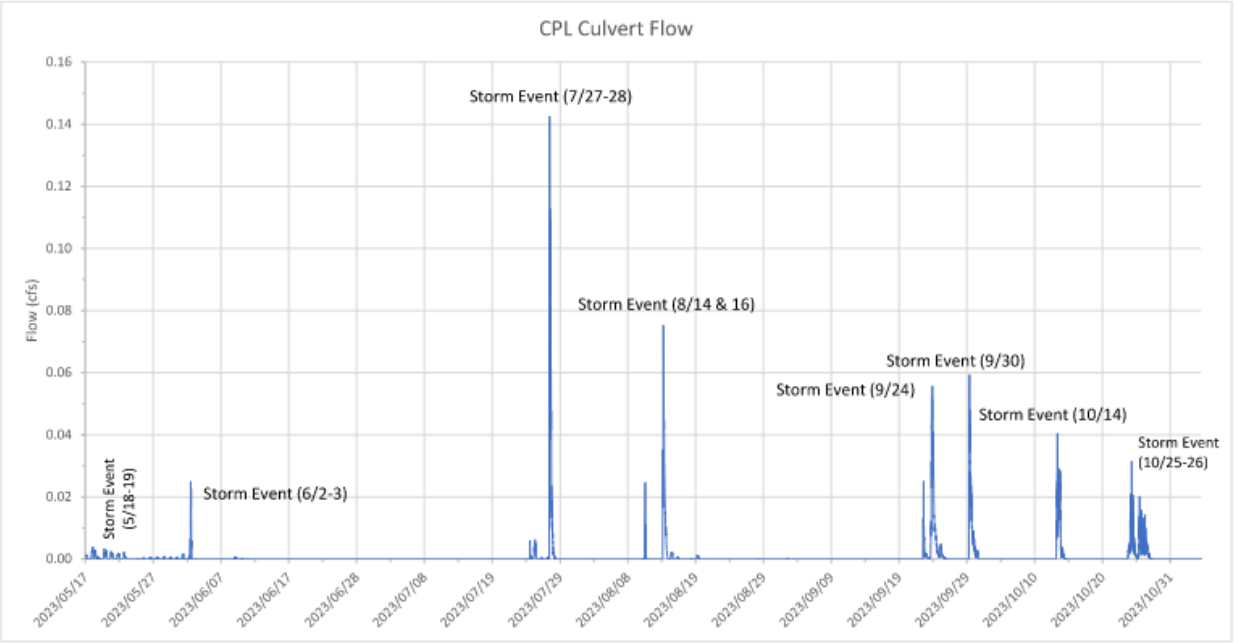
3. Fall 2023 Stream C Activities

3.1 Flow Inspections

Flow observations are completed on a bi-monthly schedule. The field forms for these events are provided in Attachment 1. Flow was manually monitored during flow inspection events at both the upstream or inlet side of each culvert and at SW-STM. The flow results are provided on the respective inspection form in Attachment 1. Some events did not have manual flow results due to flow being too low to be measured with the propellers of a velocimeter.

Transducers were installed at the upstream or inlet side of the culverts at both Hwy 27 and Copper Park Lane culverts. The transducers started collecting data on May 17, 2023. The two flow charts from installation through November 4, 2023, are provided below.





Some points to note are as follows:

- Due to dry weather conditions, flow was noted to have stopped at Hwy 27 on June 11, 2023 through July 2, August 4 through August 14, and August 23 through September 24.
- The daily cycling observed in the Hwy 27 culvert is most likely explained by a temperature-related effect related to evapotranspiration.
- No daily cycling is observed at the Copper Park Lane culvert. This is likely because there is no standing water in or adjacent to this culvert; therefore, evapotranspiration effects are not as prominent.
- The fall storm events noted show a maximum flow of about 1.42 cubic feet per second (cfs) in the Hwy 27 culvert and are relatively short-lived with the majority of flow dissipating after 24 hours.
- The Copper Park Lane culvert shows low flow during the runoff events, and events last for only a few hours at most. The maximum flow noted was about 0.143 cfs. Zero flow is observed during non-event periods.
- The flow observed at Copper Park Lane during storm events compared to Hwy 27 suggests that flow dissipates (infiltrates, evaporates, gets lost to storage, etc.) between the two culverts.

4. Future Sampling Events

Due to the lack of qualifying rain events and flow in Stream C, the fall events have been postponed until 2024. The next Stream C sampling event will commence in spring 2024 following a qualifying rain event.

5. References

Foth Infrastructure & Environment, LLC, 2020. *Quality Assurance Project Plan* for the Long-Term Care Monitoring for the Reclaimed Flambeau Mine. August 10, 2020.

Foth Infrastructure & Environment, LLC and GEI Consultants, Inc., 2023. *Steam C Evaluation Work Plan – Revision 1*. September 1, 2023.

Attachments

Figure 1	Site Location Map
Figure 2	Stream C Evaluation Locations
Attachment 1	Flow Inspection Forms

Figures

NOTES:

1. Base imagery from esri.com, courtesy of the Microsoft Corporation and its data suppliers.
2. Horizontal datum based on NAD 1983. Horizontal coordinates based on Wisconsin State Plane North (Feet).

LEGEND

- Surface Water Sampling Locations
- Groundwater Wells - MONITORED FOR WATER LEVELS ONLY
- Groundwater Wells
- Flambeau River Surface Water Monitoring Location
- Approximate Culvert Location
- Approximate Rail Spur
- Intermittent Stream
- Flambeau Project Area
- Intermittent Stream C Drainage Area

N

Foth

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

PREPARED BY:	MCC2	DATE:	MAR.'23
CHECKED BY:	SVF	DATE:	MAR.'23
APPROVED BY:	SVF	DATE:	MAR.'23

FLAMBEAU MINING COMPANY

FIGURE 1

SITE LAYOUT MAP
STREAM C EVALUATION WORK PLAN

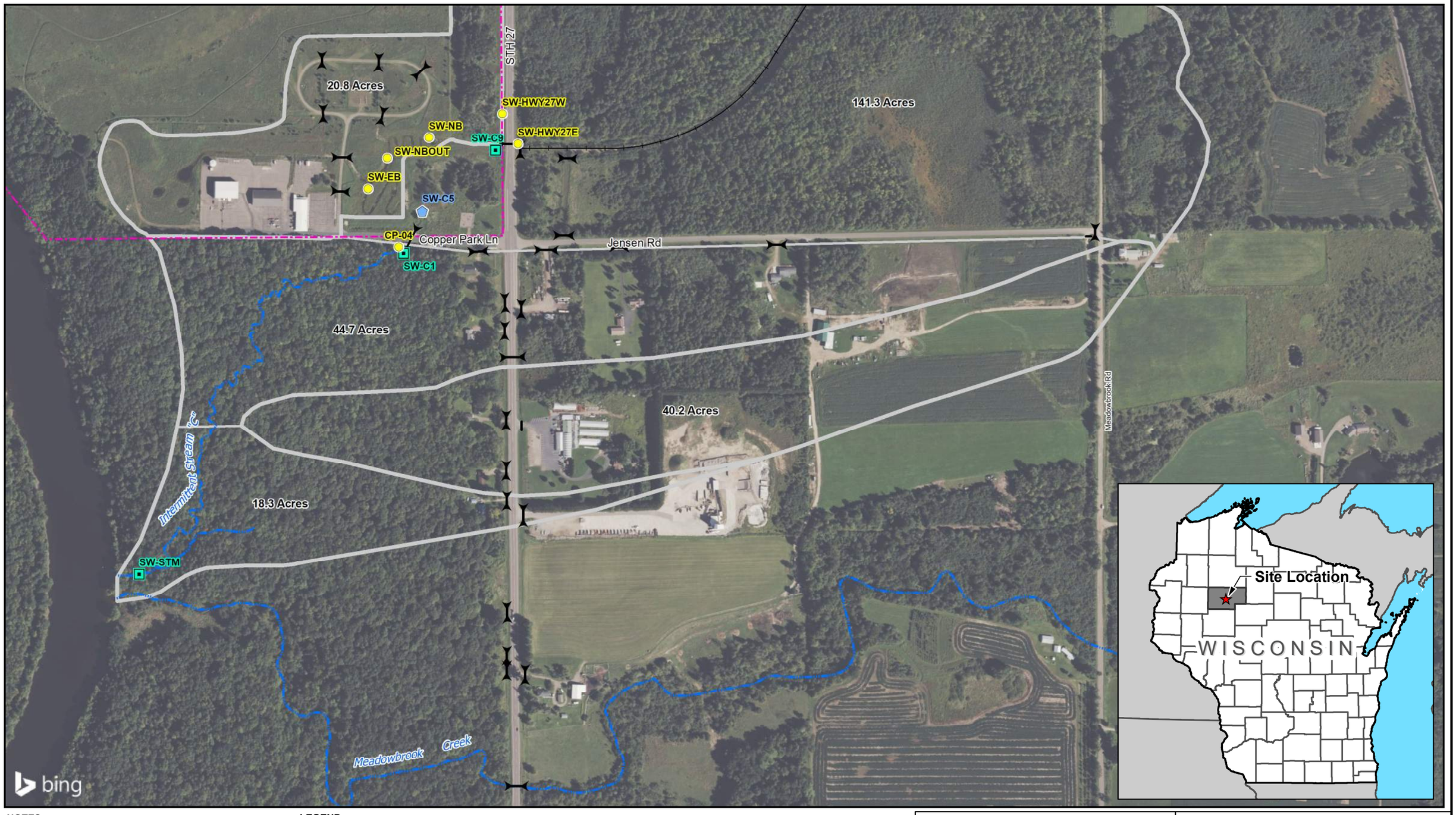
Scale: 0 350 700 Feet

Drafted by: DAT

Date: MARCH 2023

Project No: 17F777.23

Path: Q:\Flambeau Mining Company\17F777\GIS\mxd\Stream C Evaluation Work Plan\Figure 1 - Site Location Map.mxd Date: 3/1/2023



NOTES:

1. Base imagery from esri.com, courtesy of the Microsoft Corporation and its data suppliers.
2. Horizontal datum based on NAD 1983. Horizontal coordinates based on Wisconsin State Plane North (Feet).

LEGEND

Surface Water Sampling Type

- Flow, Visual Oberservation, Water Quality, WET Test
- Visual Oberservation, Water Quality, WET Test
- Visual Oberservation, Water Quality
- Approximate Culvert Location
- Intermittent Stream
- Flambeau Project Area
- Intermittent Stream C Drainage Area

N

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

PREPARED BY:	MCC2	DATE:	MAR.'23
CHECKED BY:	SVF	DATE:	MAR.'23
APPROVED BY:	SVF	DATE:	MAR.'23

FLAMBEAU MINING COMPANY

FIGURE 2

STREAM C EVALUATION LOCATIONS
STREAM C EVALUATION WORK PLAN

Scale: 0 200 400 Feet

Date: MARCH 2023

Drafted by: DAT

Project No: 17F777.23

Path: Q:\Flambeau Mining Company\17F777\GIS\mxd\Stream C Evaluation Work Plan\Figure 2 - Stream C Evaluation Locations.mxd Date: 8/21/2023

Attachment 1

Flow Inspection Forms

Client:	Flambeau Mining Company	**Scope ID**	17F777.23
Project:	Stream C – Flow Monitoring	**Prepared by:**	Jim Engelhardt/Merjent
Date:	July 28, 2023	**Time:**	1100
Weather:	82°, Sunny, 5 mph southwest wind, 1.80 in. precip event on evening of July 27, 2023		

Inspection Notes

Stream C flow observed July 28, 2023, following a 1.80 inch precipitation event starting on the evening of July 27, 2023 through the morning of July 28, 2023. This precipitation event follows a period of multiple smaller precipitation events that have saturated the ground surface and lead to moderate runoff over the site. Flow was observed at both the upstream and downstream ends of the culvert under Copper Park Lane and at both the upstream and downstream ends of the culvert under Hwy 27. An attempt at measuring the flow velocity at both the upstream ends of the two culverts was not successful as the propeller on velocity meter either didn't register to the small amount of flow or the water was too shallow to properly spin the meter. At the request of Sharon Kosicki with Foth, Temperature, pH and specific conductance was measured at the upstream ends of the Copper Park Lane and Hwy 27 culverts. Conditions at SW-STM were also observed and a flow measurement was obtained. Conditions within the basin near sampling point SW-NBOUT was also observed. The west side ditch along Hwy 27 north of the culvert is heavily vegetated with approximately 6 inches of standing water. Pockets of standing water are present within the two basins, and it appears that water is moving continuously through these areas. Surface water sampling was not conducted, and the next round will be conducted in the Fall of 2023. Photographs of site conditions and surface water chemistry and flow measurements are attached.

END OF NOTES

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 1	Date: 7-28-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Copper Park Lane.

Photo No. 2	Date: 7-28-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Downstream end of culvert under Copper Park Lane.

Photo No. 3	Date: 7-28-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Downstream (west) end of culvert under Hwy 27.

Photo No. 4	Date: 7-28-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: Upstream (east) end of culvert under STH 27.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 5	Date: 7-28-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Ditch along West side of Hwy 27 north of culvert.

Photo No. 6	Date: 7-28-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Hwy 27.

Photo No. 7	Date: 7-28-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Stream C downstream of the Cooper Park Lane culvert.

Photo No. 8	Date: 7-28-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: Standing water near sample point SW-NBOUT.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 9	Date: 7-28-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: View upstream from SW-C1.

Photo No. 11	Date: 7-28-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: View downstream from SW-C1.

Photo No. 10	Date: 7-28-23

Direction Photo Taken: South

Photo Taken By: Jim Engelhardt

Description: Flow at SW-C1.

Photo No. 12	Date: 7-28-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 13	Date: 7-20-23

Direction Photo Taken: South

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Photo No. 14	Date: 7-20-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Hwy 27.

Photo No. 15	Date: 7-20-23

Direction Photo Taken: Notheast

Photo Taken By: Jim Engelhardt

Description: View downstream at SW-STM at the confluence of the Flambeau River.

Photo No. 16	Date: 7-20-23

Direction Photo Taken: West

Photo Taken By: Jim Engelhardt

Description: View upstream at SW-STM at the confluence of the Flambeau River.

Client: Flambeau Mining Co Scope ID.: 17F777.23
Project: Flambeau Stream C - Flow Monit.
Prepared by: Jim Engelhardt Date: 07/28/23
Checked by: Date:

SUMMARY OF FIELD PARAMETERS

Location	Sample Date	Sample Time	pH (SU)	Specific Conductance (mS/cm)	Temperature (^{0}C)	Depth (Ft.)	Velocity (Ft./s)	Odor (visual)	Turbidity (visual)	Color (visual)
Hwy27 Culvert	7/28/2023	1615	6.44	0.170	24.50	0.94	*	Organic	Slight	Stained lt. Brown
Copper Culvert	7/28/2023	1645	6.10	0.210	22.10	0.13	*	None	None	Stained lt. Brown
SW-STM	7/28/2023	1530	~	~	~	0.33	0.36	None	None	Stained lt. Brown

Note:
ORP = Oxidation Reduction Potential
µmhos/cm = micromhos/centimeter
SU = Standard Unit
mV = Millivolts
°C = Degrees Celsius
NA = not applicable

(~) = Not measured
(*) = Flow too low to measure with propellar on velocimeter

Stream C - Flow Monitoring Inspection Report

Client:	Flambeau Mining Company	**Scope ID**	17F777.23
Project:	Stream C – Flow Monitoring	**Prepared by:**	Jim Engelhardt/Merjent
Date:	August 15, 2023	**Time:**	1230
Weather:	86°, Partly Sunny, 5 mph southwest wind, 1.02 in. precip event on evening of August 13, 2023		

Inspection Notes

Stream C flow observed August 15, 2023, following a 1.02-inch precipitation event starting on the evening of August 13, 2023 through the morning of August 14, 2023. This precipitation event follows a period of very little precipitation with events rarely exceeding a few 10ths of an inch. Flow was observed at both the upstream and downstream ends of the culvert under Copper Park Lane and at both the upstream and downstream ends of the culvert under Hwy 27. An attempt at measuring the flow velocity at both the upstream ends of the two culverts was not successful as the propeller on velocity meter either didn't register to the small amount of flow or the water was too shallow for it to properly spin the velocimeter. The west side ditch along Hwy 27 north of the downstream end of the culvert is heavily vegetated with approximately 4 to 6 inches of standing water. Conditions within the basin near sampling point SW-NBOUT was also observed and standing water continues to be present in this area. Pockets of standing water are still present within the two basins, and it appears that water is moving continuously through these areas. Conditions at SW-STM were also observed and a flow measurement was also not obtained due to shallow water conditions. Photographs of site conditions, water quality and water depths are attached.

END OF NOTES

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 1	Date: 8-15-23
Direction Photo Taken: North	
Photo Taken By: Jim Engelhardt	
Description: Upstream end of culvert under Copper Park Lane.	

Photo No. 3	Date: 8-15-23
Direction Photo Taken: Southwest	
Photo Taken By: Jim Engelhardt	
Description: Downstream (west) end of culvert under Hwy 27.	

Photo No. 2	Date: 8-15-23
Direction Photo Taken: Southwest	
Photo Taken By: Jim Engelhardt	
Description: Downstream end of culvert under Copper Park Lane.	

Photo No. 4	Date: 8-15-23
Direction Photo Taken: Northeast	
Photo Taken By: Jim Engelhardt	
Description: Upstream (east) end of culvert under STH 27.	

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 5	Date: 8-15-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Ditch along West side of Hwy 27 north of culvert.

Photo No. 7	Date: 8-15-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Stream C downstream of the Cooper Park Lane culvert.

Photo No. 6	Date: 8-15-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Hwy 27.

Photo No. 8	Date: 8-15-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: Standing water near sample point SW-NBOUT.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 9	Date: 8-15-23
Direction Photo Taken: West	
Photo Taken By: Jim Engelhardt	
Description: View upstream at SW-STM at the confluence of the Flambeau River.	

Photo No. 10	Date: 8-15-23
Direction Photo Taken: Northeast	
Photo Taken By: Jim Engelhardt	
Description: View upstream at SW-STM at the confluence of the Flambeau River.	

Photo No. 11	Date: 8-15-23
Direction Photo Taken: South	
Photo Taken By: Jim Engelhardt	
Description: Flow in Steam C upstream of the Flambeau River confluence.	

Photo No. 12	Date: 8-15-23
Direction Photo Taken: North	
Photo Taken By: Jim Engelhardt	
Description: Flow in Steam C upstream of the Flambeau River confluence.	

Client: Flambeau Mining Co Scope ID.: 17F777.23
Project: Flambeau Stream C - Flow Monit.
Prepared by: Jim Engelhardt Date: 08/15/23
Checked by: Date:

SUMMARY OF FIELD PARAMETERS

Location	Sample Date	Sample Time	pH (SU)	Specific Conductance (mS/cm)	Temperature (^{0}C)	Depth (inches)	Velocity (Ft./s)	Odor (type)	Turbidity (visual)	Color (visual)
Hwy27 Culvert	8/15/2023	1350	~	~	~	11.24	*	Organic	Slight	Stained lt. Brown
Copper Culvert	8/15/2023	1256	~	~	~	0.51	*	None	None	Stained lt. Brown
SW-STM	8/15/2023	1410	~	~	~	0.64	*	None	None	Stained lt. Brown

Note:
ORP = Oxidation Reduction Potential
µmhos/cm = micromhos/centimeter
SU = Standard Unit
mV = Millivolts
°C = Degrees Celsius
NA = not applicable

(~) = Not measured
(*) = Flow too low to measure with propellar on velocimeter

Stream C - Flow Monitoring Inspection Report

Client:	Flambeau Mining Company	**Scope ID**	17F777.23
Project:	Stream C – Flow Monitoring	**Prepared by:**	Jim Engelhardt/Merjent
Date:	August 29, 2023	**Time:**	1300
Weather:	74°, Partly Sunny, 5 mph West wind, 0.30 in. precip event on evening of August 28, 2023		

Inspection Notes

Stream C flow observed August 29, 2023, following a 0.03-inch precipitation event starting on the evening of August 28, 2023. This precipitation event follows a period of little to no precipitation since the previous monitoring round in mid-August. No flow was observed at the upstream end of the culvert under Copper Park Lane. A small amount of flow was observed on the downstream end of the Copper Lane culvert but it was not coming from the culvert itself. It appeared that water was slowly seeping in around the west side of the culvert. Whether this was shallow groundwater flow or leakage around the perimeter of the culvert is unknown. Standing water was present in the ditch on the upstream end of the Hwy 27 culvert but no flow was observed or measured at this location. The west side ditch along Hwy 27 north of the downstream end of the culvert is heavily vegetated with approximately 2 inches of standing water. Conditions within the basin near sampling point SW-NBOUT was also observed and standing water continues to be present in this area but is considerably lower than the previous visit. Pockets of standing water are still present within the two basins, and it appears that water is not moving through these areas at this time. Conditions at SW-STM were also observed and no water was observed in the waterway. Photographs of site conditions, water quality and water depths are attached.

END OF NOTES

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 1	Date: 8-29-23
Direction Photo Taken: North	
Photo Taken By: Jim Engelhardt	
Description: Upstream end of culvert under Copper Park Lane.	

Photo No. 2	Date: 8-29-23
Direction Photo Taken: Southwest	
Photo Taken By: Jim Engelhardt	
Description: Downstream end of culvert under Copper Park Lane.	

Photo No. 3	Date: 8-29-23
Direction Photo Taken: Southwest	
Photo Taken By: Jim Engelhardt	
Description: Downstream (west) end of culvert under Hwy 27.	

Photo No. 4	Date: 8-29-23
Direction Photo Taken: Northeast	
Photo Taken By: Jim Engelhardt	
Description: Upstream (east) end of culvert under STH 27.	

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 5	Date: 8-29-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Ditch along West side of Hwy 27 north of culvert.

Photo No. 6	Date: 8-29-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Hwy 27.

Photo No. 7	Date: 8-29-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Stream C downstream of the Cooper Park Lane culvert.

Photo No. 8	Date: 8-29-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: Standing water near sample point SW-NBOUT.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 9	Date: 8-29-23

Direction Photo Taken: West

Photo Taken By: Jim Engelhardt

Description: View upstream at SW-STM at the confluence of the Flambeau River.

Photo No. 11	Date: 8-29-23

Direction Photo Taken: South

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Photo No. 10	Date: 8-29-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: View upstream at SW-STM at the confluence of the Flambeau River.

Photo No. 12	Date: 8-29-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Client: Flambeau Mining Co Scope ID.: 17F777.23
Project: Flambeau Stream C - Flow Monit.
Prepared by: Jim Engelhardt Date: 08/29/23
Checked by: Date:

SUMMARY OF FIELD PARAMETERS

Location	Sample Date	Sample Time	pH (SU)	Specific Conductance (mS/cm)	Temperature (^{0}C)	Depth (inches)	Velocity (Ft./s)	Odor (type)	Turbidity (visual)	Color (visual)
Hwy27 Culvert	8/29/2023	1300	~	~	~	6.12	*	Organic	Slight	Stained lt. Brown
Copper Culvert	8/29/2023	1402	~	~	~	0.00	*	NA	NA	NA
SW-STM	8/29/2023	1450	~	~	~	0.00	*	NA	NA	NA

Note:
ORP = Oxidation Reduction Potential
µmhos/cm = micromhos/centimeter
SU = Standard Unit
mV = Millivolts
°C = Degrees Celsius
NA = not applicable

(~) = Not measured
(*) = Flow too low to measure with propellar on velocimeter

Stream C - Flow Monitoring Inspection Report

Client:	Flambeau Mining Company	**Scope ID**	17F777.23
Project:	Stream C – Flow Monitoring	**Prepared by:**	Jim Engelhardt/Merjent
Date:	September 15, 2023	**Time:**	1300
Weather:	67°, Overcast, 15 mph West Southwest wind, 0.04 in. precip event in the early afternoon of September 15, 2023		

Inspection Notes

Stream C flow observed September 15, 2023, following a 0.04-inch precipitation event starting in the early afternoon of September 15, 2023. An email was sent to Molly Gardner with the WDNR inviting her to observe site conditions and field monitoring, but she was unable to make it work with her schedule. Another invitation will be sent prior to the next monitoring round. This precipitation event follows a period of little to no precipitation since the previous monitoring round in late August. No flow was observed at the upstream end of the culvert under Copper Park Lane. A small amount of flow was observed on the downstream end of the Copper Lane culvert but, like it was on the previous monitoring event, it was not coming from the culvert itself. It appeared that water was slowly seeping in around the west side of the culvert. Whether this was shallow groundwater flow or leakage around the perimeter of the culvert is unknown. Shallow standing water (0.25 ft.) was present in the ditch on the East or upstream end of the Hwy 27 culvert but no flow was observed or able to be measured at this location. The west side ditch along Hwy 27 north of the downstream end of the culvert is heavily vegetated with no measurable standing water. Conditions within the basin near sampling point SW-NBOUT was also observed and standing water continues to be present in this area but is once again considerably lower than the previous visit. Pockets of diminishing standing water are still present within the two basins, and it appears that water is still not moving through these areas at this time. Conditions at SW-STM were also observed and no water was observed in the waterway. Photographs of site conditions, water quality and water depths are attached.

END OF NOTES

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 1	Date: 9-15-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Copper Park Lane.

Photo No. 2	Date: 9-15-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Downstream end of culvert under Copper Park Lane.

Photo No. 3	Date: 9-15-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Downstream (west) end of culvert under Hwy 27.

Photo No. 4	Date: 9-15-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: Upstream (east) end of culvert under STH 27.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 5	Date: 9-15-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Ditch along West side of Hwy 27 north of culvert.

Photo No. 6	Date: 9-15-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Hwy 27.

Photo No. 7	Date: 9-15-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Stream C downstream of the Cooper Park Lane culvert.

Photo No. 8	Date: 9-15-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: View from upstream end of culvert under Copper Park Lane.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 9	Date: 9-15-23

Direction Photo Taken: West

Photo Taken By: Jim Engelhardt

Description: View upstream at SW-STM at the confluence of the Flambeau River.

Photo No. 11	Date: 9-15-23

Direction Photo Taken: South

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Photo No. 10	Date: 9-15-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: View upstream at SW-STM at the confluence of the Flambeau River.

Photo No. 12	Date: 9-15-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Client: Flambeau Mining Co Scope ID.: 17F777.23
Project: Flambeau Stream C - Flow Monit.
Prepared by: Jim Engelhardt Date: 09/15/23
Checked by: Date:

SUMMARY OF FIELD PARAMETERS

Location	Sample Date	Sample Time	pH (SU)	Specific Conductance (mS/cm)	Temperature (^{0}C)	Depth (inches)	Velocity (Ft./s)	Odor (type)	Turbidity (visual)	Color (visual)
Hwy27 Culvert	9/15/2023	1415	~	~	~	3.02	*	Organic	Slight	Stained lt. Brown
Copper Culvert	9/15/2023	1505	~	~	~	0.00	*	NA	NA	NA
SW-STM	9/15/2023	1610	~	~	~	0.00	*	NA	NA	NA

Note:
ORP = Oxidation Reduction Potential
µmhos/cm = micromhos/centimeter
SU = Standard Unit
mV = Millivolts
°C = Degrees Celsius
NA = not applicable
(~) = Not measured
(*) = Flow too low to measure with propellar on velocimeter

Stream C - Flow Monitoring Inspection Report

Client:	Flambeau Mining Company	**Scope ID**	17F777.23
Project:	Stream C – Flow Monitoring	**Prepared by:**	Jim Engelhardt/Merjent
Date:	September 25, 2023	**Time:**	1330
Weather:	63°, Overcast, 10 mph West wind, 3.25 in. multi day precipitation event tapering off on the morning of September 25, 2023		

Inspection Notes

Stream C flow observed September 25, 2023, following a 3.25-inch multi day precipitation event starting in the early afternoon of September 22, 2023 and ending the morning of September 25, 2023. An email was sent to Molly Gardner with the WDNR inviting her to observe site conditions and field monitoring but was unable to make it work with a busy work schedule. Another invitation will be sent prior to the next monitoring round. This multi day precipitation event follows a period of little precipitation since the previous monitoring round two weeks earlier. Flow was observed at the upstream end of the culvert under Copper Park Lane measuring 3.36 inches in depth and 0.7 fps of flow. A small amount of flow was observed on the downstream end of the Copper Lane culvert. Standing water measuring 13.3 in. was present in the ditch on the East/upstream end of the Hwy 27 culvert but no measurable flow was able to be measured at this location. The west side ditch along Hwy 27 north of the downstream end of the culvert is heavily vegetated with approximately 6 in. standing water. Conditions within the basin near sampling point SW-NBOUT was also observed and standing water continues to be present in this area but is noticeably higher than the previous visit. Conditions at SW-STM were also observed with water depths of 2.21 in. and flow measured at 0.6 fps. Photographs of site conditions and water quality are attached.

END OF NOTES

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 1	Date: 9-25-23
Direction Photo Taken: North	
Photo Taken By: Jim Engelhardt	
Description: Upstream end of culvert under Copper Park Lane.	

Photo No. 2	Date: 9-25-23
Direction Photo Taken: Southwest	
Photo Taken By: Jim Engelhardt	
Description: Downstream end of culvert under Copper Park Lane.	

Photo No. 3	Date: 9-25-23
Direction Photo Taken: Southwest	
Photo Taken By: Jim Engelhardt	
Description: Downstream (west) end of culvert under Hwy 27.	

Photo No. 4	Date: 9-25-23
Direction Photo Taken: Northeast	
Photo Taken By: Jim Engelhardt	
Description: Upstream (east) end of culvert under STH 27.	

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 5	Date: 9-25-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Ditch along West side of Hwy 27 north of culvert.

Photo No. 6	Date: 9-25-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Hwy 27.

Photo No. 7	Date: 9-25-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Stream C downstream of the Cooper Park Lane culvert.

Photo No. 8	Date: 9-25-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: View from upstream end of culvert under Copper Park Lane.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 9	Date: 9-25-23
Direction Photo Taken: West	
Photo Taken By: Jim Engelhardt	
Description: View upstream at SW-STM at the confluence of the Flambeau River.	

Photo No. 10	Date: 9-25-23
Direction Photo Taken: Northeast	
Photo Taken By: Jim Engelhardt	
Description: View upstream at SW-STM at the confluence of the Flambeau River.	

Photo No. 11	Date: 9-25-23
Direction Photo Taken: South	
Photo Taken By: Jim Engelhardt	
Description: Flow in Steam C upstream of the Flambeau River confluence.	

Photo No. 12	Date: 9-25-23
Direction Photo Taken: North	
Photo Taken By: Jim Engelhardt	
Description: Flow in Steam C upstream of the Flambeau River confluence.	

Client: Flambeau Mining Co Scope ID.: 17F777.23
Project: Flambeau Stream C - Flow Monit.
Prepared by: Jim Engelhardt Date: 09/25/23
Checked by: Date:

SUMMARY OF FIELD PARAMETERS

Location	Sample Date	Sample Time	pH (SU)	Specific Conductance (mS/cm)	Temperature (^{0}C)	Depth (inches)	Velocity (Ft./s)	Odor (type)	Turbidity (visual)	Color (visual)
Hwy27 Culvert	9/25/2023	1510	~	~	~	13.30	*	Organic	Slight	Stained lt. Brown
Copper Culvert	9/25/2023	1605	~	~	~	3.36	0.70	Organic	None	Stained lt. Brown
SW-STM	9/25/2023	1715	~	~	~	2.21	0.60	None	None	Stained lt. Brown

Note:
ORP = Oxidation Reduction Potential
µmhos/cm = micromhos/centimeter
SU = Standard Unit
mV = Millivolts
°C = Degrees Celsius
NA = not applicable

(~) = Not measured
(*) = Flow too low to measure with propellar on velocimeter

Stream C - Flow Monitoring Inspection Report

Client:	Flambeau Mining Company	**Scope ID**	17F777.23
Project:	Stream C – Flow Monitoring	**Prepared by:**	Jim Engelhardt/Merjent
Date:	October 14, 2023	**Time:**	1410
Weather:	54°, Overcast, 6 mph West wind, 1.55 in. multi day precipitation event through mid-day of October 14, 2023		

Inspection Notes

Stream C flow observed October 14, 2023, following a 1.55-inch multi-day precipitation event starting in the early morning of October 13, 2023 and ending in the early afternoon of October 14, 2023. This precipitation event follows a period of several small precipitation events since the previous monitoring round in late September. Flow was observed at the upstream end of the culvert under Copper Park Lane measuring 2.66 inches in depth and 0.5 fps of flow. Standing water measuring 13.75 in. was observed in the ditch on the East/upstream end of the Hwy 27 culvert but no measurable flow was obtained at this location. The west side ditch along Hwy 27 north of the downstream end of the culvert is heavily vegetated with approximately 6-7 in. of standing water. Conditions within the basin near sampling point SW-NBOUT was also observed and standing water continues to be present in this area but appears to be dropping due to the visual water mark on the vegetation. Conditions at SW-STM were also observed with water depths of 5.22 in. and flow measured at 0.6 fps. Photographs of site conditions and water quality are attached.

END OF NOTES

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 1	Date: 10-14-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Copper Park Lane.

Photo No. 2	Date: 10-14-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Downstream end of culvert under Copper Park Lane.

Photo No. 3	Date: 10-14-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Downstream (west) end of culvert under Hwy 27.

Photo No. 4	Date: 10-14-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: Upstream (east) end of culvert under STH 27.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 5	Date: 10-14-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Ditch along West side of Hwy 27 north of culvert.

Photo No. 6	Date: 10-14-23

Direction Photo Taken: East

Photo Taken By: Jim Engelhardt

Description: Upstream end of culvert under Hwy 27.

Photo No. 7	Date: 10-14-23

Direction Photo Taken: Southwest

Photo Taken By: Jim Engelhardt

Description: Stream C downstream of the Cooper Park Lane culvert.

Photo No. 8	Date: 10-14-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: View from upstream end of culvert under Copper Park Lane.

Foth

Photographic Log

Client's Name:	Site Location:	Project No.
Flambeau Mine Company	FMC - Stream C	17F777.23

Photo No. 9	Date: 10-14-23

Direction Photo Taken: West

Photo Taken By: Jim Engelhardt

Description: View upstream at SW-STM at the confluence of the Flambeau River.

Photo No. 11	Date: 10-14-23

Direction Photo Taken: South

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Photo No. 10	Date: 10-14-23

Direction Photo Taken: Northeast

Photo Taken By: Jim Engelhardt

Description: View upstream at SW-STM at the confluence of the Flambeau River.

Photo No. 12	Date: 10-14-23

Direction Photo Taken: North

Photo Taken By: Jim Engelhardt

Description: Flow in Steam C upstream of the Flambeau River confluence.

Client: Flambeau Mining Co Scope ID.: 17F777.23
Project: Flambeau Stream C - Flow Monit.
Prepared by: Jim Engelhardt Date: 10/14/23
Checked by: Date:

SUMMARY OF FIELD PARAMETERS

Location	Sample Date	Sample Time	pH (SU)	Specific Conductance (mS/cm)	Temperature (^{0}C)	Depth (inches)	Velocity (Ft./s)	Odor (type)	Turbidity (visual)	Color (visual)
Hwy27 Culvert	10/14/2023	1405	~	~	~	13.75	*	Organic	Slight	Stained lt. Brown
Copper Culvert	10/14/2023	1440	~	~	~	2.66	0.5	None	None	Stained lt. Brown
SW-STM	10/14/2023	1535	~	~	~	5.22	0.6	None	None	Stained lt. Brown

Note:
ORP = Oxidation Reduction Potential
µmhos/cm = micromhos/centimeter
SU = Standard Unit
mV = Millivolts
°C = Degrees Celsius
NA = not applicable

(~) = Not measured
(*) = Flow too low to measure with propellar on velocimeter