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**Ditch Interim Measure Work Plan
Material Sciences Corporation
460 West Main Street
Canfield, Ohio 44406
OHD000810283
August Mack Project No. JY2380.372
November 15, 2024**

August Mack Environmental, Inc. (August Mack), on behalf of Materials Sciences Corporation (MSC), has prepared this work plan (plan) to provide additional details for a proposed ditch lining plan for the stormwater ditch directly adjacent to the MSC facility in Canfield, Ohio. This plan has been prepared in response to the request by the Ohio Environmental Protection Agency (OEPA) following review of the *Ditch Interim Measures Plan* submitted to the OEPA on October 7, 2024, and revised and submitted to the OEPA on October 31, 2024. The purpose of this ditch lining plan is to describe the proposed Interim Measure (IM) for the ditch located along the eastern side of and adjacent to the MSC facility. The ditch lining proposed in this plan will separate stormwater flow within the ditch from potential subsurface groundwater impacts and eliminate the direct contact potential of the ditch soils to both human and ecological sensitive receptors. The approximate 1,125 linear foot ditch section proposed for lining is depicted on the attached **Figure 1**.

Construction Sequencing

August Mack proposes a series of construction activities to complete the ditch lining. The proposed ditch lining construction activities include:

- Brush and Tree Removal
- Surveying
- Public and Private Utility Locates
- New Upstream and Downstream Dam Installation
- Ditch Soil Removal and Shaping to Enable Placement of the Liner
- Ditch Liner Installation
- Ditch Line Recovery Sumps No. 1 Through 4 Abandonment and Red, Green, and Yellow Line Plugging
- Ditch Liner Cover Protection
- Recovery Sump No. 5 Upgrade and Redundant Sump Installation
- Waste Disposal
- Ditch Lining Completion Report



- Schedule Update

Additional details for each activity are provided in the following sections.

Brush and Tree Removal

The existing brush and trees, typically less than 10-inches in diameter, within the ditch line and adjacent banks will be removed to the extent necessary for construction using a brush cutter attached to an excavator. The cutter will mulch the brush and trees down to the ground surface. The mulch will be left in place within the ditch and on the banks. If an excessive volume of mulch is produced that will interfere with the ditch lining activities, the excess mulch will be moved to the wooded area located west of the ditch and stockpiled. Care will be taken during the brush and tree removal to not disturb the orange flags marking the former ditch soil sampling evaluation locations conducted during the first week of October.

Surveying

A surveyor will be subcontracted to install construction benchmarks stakes at 25 feet intervals along the entire length of the ditch to be lined. The benchmarks will provide the construction crew with appropriate bank and ditch bottom elevation and ditch offset information needed to guide soil removals and ditch grade completion.

Public and Private Utility Locates

Both a public utility locate (Ohio811), and a private utility locate will be performed within all proposed ditch work areas to identify underground utilities before any subsurface work activities begin. Soft digging techniques will be utilized for any construction work within 3 feet of any identified utility. Care will also be taken when working under power lines located at the ditch. The power lines will be de-energized when work is occurring under them.

New Upstream and Downstream Dam Installation and Mill Creek Outfall Piping

At both the upstream (Transect 0) and the downstream (Transect 1125) ends of the ditch liner, a new dam will be installed to secure the ends of the liner. The new upstream dam will be constructed concurrently with the ditch liner installation beginning at Transect 0. The new downstream dam will be constructed at the completion of the downstream section of the liner at Transect 1125.

The new dams will be constructed of a low-permeability soil core and covered in rip rap for stormwater erosion protection. The new upstream dam will have approximate dimensions of 4 to 8 feet wide perpendicular to the flow channel, 4 to 6 feet wide parallel to the flow channel, and 3 to 4 feet high. The new downstream dam will have approximate dimensions of 12 to 16 feet wide perpendicular to the flow channel, 8 to 10

feet wide parallel to the flow channel, and 4 to 6 feet high. The final dimensions for both new dams will be determined at the time of installation. Typical details for these two new check dams are provided as **Details A and B** on **Figure 2**.

For the upstream dam, a one-foot diameter solid section of PVC pipe or drainage tile will be installed in the core of the new dams to allow stormwater to enter/exit and flow across the new liner. Following the new upstream dam installation at Transect T0 and during the subsequent installation activities, the pipe on the new upstream dam will be plugged and clean surface water upstream will be diverted as needed. The plug will be removed from the new upstream dam when construction is complete.

The new downstream dam will have an 18-inch diameter solid section of PVC pipe or drainage tile installed through its core that will transmit clean water from the lined section of the ditch. The piping will be installed and continue overland through the surface water feature to Sawmill Creek (See **Figure 1** for the approximate location of the 18-inch diameter pipe). The drainage pipe will transmit clean water from the lined ditch to Sawmill Creek at the headwall just prior to flowing under the bike trail. The drainage pipe will be field located for best location and will be ground anchored periodically along its length with rip rap or some other anchoring system to prevent the pipe from being dislodged in case of flooding in the surface water feature. See **Figure 2, Detail B** for additional details on the new downstream dam.

Ditch Soil Removal and Shaping to Enable Placement of the Liner

Field sampling to characterize ditch impacts was conducted by August Mack during the first week of October 2024. Samples were collected at transects spaced every 125 feet along the entire 1,125 feet of ditch length. At each transect, samples were collected from multiple locations (e.g. east bank, center, and west bank of the ditch) and depths (e.g., surface, 2 feet, and 4 feet). A total of 78 samples have been collected to date to characterize the ditch with total cyanide results ranging from non-detect at <0.63 milligrams per kilogram (mg/kg) to 3,700 mg/kg.

In accordance with standard remedial practices and conversations with OEPA, the MSC Ditch Interim Measure will utilize a total cyanide concentration of 150 mg/kg as the remedial goal for excavation efforts. This concentration is derived from the U.S. EPA Regional Screening Level for Industrial Soil with a target carcinogenic risk of 1×10^{-5} . Total cyanide ditch results have been included in **Table 1**.

Total Cyanide concentrations in excess of 150 mg/kg are observed in surface samples collected throughout the 1,125 foot long expanse of the ditch to be lined. August Mack will remove the upper 6-inches of the ditch soils in the entire 1,125 foot length with the lateral width of the excavations to be guided by the previous soil sampling results. In addition, one stretch of the ditch will be removed down to 2.5 feet to address impacts

observed in sample Outfall #2 North. This location will be excavated to 2.5 feet in an area of 10 feet wide and 10 foot long from the ditch. Removal efforts detailed above result in an approximate removal volume of 324 tons of impacted material. The soil sample locations were marked with orange flags at the time of sampling allowing for the sample locations to guide the extents of the soil excavations. A plan view of the proposed soil excavations along with the approximate soil sampling locations are shown on the attached **Figure 3**.

In addition to these soils, both the existing upstream and downstream dams at Transects T0 and T1125 and previously installed ditch check dams at Recovery Sumps 2 through 4 will be removed. The existing dams will be removed as they are encountered either during the 6-inch soil excavations or during subsequent liner installation, if located outside of the 6-inch soil excavation areas. Finally, other ditch obstructions, such as pieces of concrete, will also be removed and placed in roll-off boxes for disposal if they are deemed to potentially interfere with ditch liner placement. All excavated soils will be placed in roll-off boxes for proper off-Site disposal at a permitted hazardous waste facility. In addition to the soil excavations and dam removals, the ditch channel will be graded to establish the flow line, as needed, to prepare the ditch for liner installation.

Suspected impacted water observed during ditch soil removal and subsequent ditch lining activities will be managed by collection and placement into the dedicated on-Site storage tanks for disposal or treatment.

Ditch Liner Installation

August Mack will begin installation of the liner at the south Transect T0 and work downstream towards Transect T1125. August Mack plans to install the ditch liner in 100 foot to 200 foot sections. This section installation method is an approach that August Mack has successfully implemented on other similar ditch and creek lining projects¹. Pot marks or holes present in the ditch bottom after soil excavation and bottom shaping will be filled with sand or other suitable material to create a smooth surface for installation of the ditch liner.

A 20-mil thick reinforced polyethylene (RPE) liner will be installed from the field-selected elevation on one ditch bank side across the ditch bottom and onto the opposing bank. RPE is impermeable to water flow and is tear and puncture resistant. Six-inch long stakes will be driven on 2.5-foot centers into the liner edge at each ditch bank to secure the liner in place until the stone protective covering is placed. The RPE liner was purchased in 30-foot wide by 100-foot long rolls to allow for easy handling and positioning of the liner into the ditch. Due to the varying elevation of ditch sidewalls, the edges of the RPE will

¹ This section installation approach allows for a step-wise completion of the liner including all stone covering and limits damage to the liner before it is protected by stone covering.

be cut to fit the needed width of the ditch and will vary from a width of approximately 10 feet at Transect T0 to up to 30-feet at Transect T1125.

As each subsequent 100-foot section of liner is placed, the seams between rolls will be heat-fusion welded with an approximate 1-foot seam overlap. Heat-fusion welding physically melts the RPE material together to make a watertight seam between each roll section. An August Mack Field Engineer will be present to oversee and document all ditch lining activities and to provide quality control of the welded seam between each liner roll. A typical cross-section illustrating the proposed ditch lining is shown on **Figure 2 as Cross-Section A-A'**. Note the profile of the liner will be adjusted in the field to fit the current ditch profile.

Field reconnaissance to prepare this plan identified two sanitary sewer manholes on the banks within the central portion of the ditch to be lined. The RPE liner will be cut and laid around these features when these manholes are encountered along with trees greater than 10-inches in diameter.

Ditch Line Recovery Sump No. 1 Through 4 Abandonment and Red, Green, and Yellow Line Plugging

Recovery Sump Nos. 1 through 4 will be abandoned sequentially as ditch liner installation proceeds from Transect 0 to Transect 1125. See **Figure 1** for the approximate recovery sump locations. The recovery sumps are being removed to allow for the ditch liner installation. The pumping elevations for the recovery sumps are below the bottom of the proposed lined ditch bottom and were previously used to limit groundwater upwelling and mixing with surface water during rain events. The liner installation eliminates the need for groundwater extraction from beneath the ditch since it will physically separate the groundwater from surface water.

The four recovery sumps will be abandoned by removing both their subsurface pumps and subsurface drainage tile and backfilling their location with bentonite. Note, if the drainage tile cannot be removed, it will cut off below the surface and filled with bentonite. An upgraded Recovery Sump No. 5 located north of Transect 1125 will remain in place to allow recovery of groundwater that may flow beneath the ditch and into the surface water feature located at the north end of the ditch. Details on the upgraded Recovery Sump 5 are provided later in this plan. In addition, a hydraulic control system is being evaluated for potential future installation to control groundwater at the Site, if deemed necessary.

At the south end of the ditch, the liner will be installed along the west bank to cover the exit points for the Yellow Line, the Red Line, and the former Roof Drain (Green) Line. The sewer plug in the Yellow Line will be removed and grouted from the nearest on-Site manhole to the ditch. The Red Line and the Roof Drain Line were previously capped and

hydro-cemented in place. At each former entry point of the three lines into the ditch, an approximate 3 foot by 3 foot by 2 foot deep excavation will be made and the three excavations will be backfilled with cement prior to liner installation. The placement of the cement will eliminate potential groundwater leakage around the backfill for each drain line.

Ditch Liner Cover Protection

An approximate 4-inch layer of Ohio Department of Transportation No. 1 Stone (nominal size between 3.5 inches and 1.5-inches) will be placed over the entire liner and will extend approximately 1-foot beyond the edges of the liner on the ditch banks. The stone will be placed following the installation of each 100 to 200 foot section of ditch liner. The stone will protect the liner from surface tears and ultraviolet sun damage and keep the ditch liner in place. At approximate 200-foot intervals, a layer of 6-inch to 8-inch diameter riprap will also be placed instead of the stone to reduce flow velocity within the ditch channel. Reduction of flow velocity within the ditch channel will limit the long-term potential of displacement of the stone and the liner within the ditch.

Recovery Sump No. 5 Upgrade and Redundant Sump Installation

Existing Recovery Sump No. 5 will be upgraded from a single vertical drainage point to a horizontal subsurface drain tile with a width equivalent to the width of the new downstream dam. The upgraded sump will be placed immediately downstream of the downstream dam in the approximate location shown on **Figure 1**. Two horizontal pieces of drain tile will be placed at a depth that is below the depth of the ditch liner and combined into a vertical recovery pipe, allowing for groundwater flowing from beneath the ditch to be recovered. Both the top and the downgradient vertical side of the sump will be covered with the RPE liner. Two electronic transducers will be installed in a separate vertical standpipe to control automatic operation of a diesel-powered pump to recover groundwater from the upgraded sump into dedicated storage for future disposal. **Detail C on Figure 2** provides additional information on the proposed sump upgrade.

An additional sump, designated as the Redundant Sump, will be installed approximately 20 feet north of upgraded Recovery Sump No. 5 to provide for an additional groundwater recovery location for groundwater recovery if the first sump fails. The Redundant Sump will be constructed in the same manner as upgraded Recovery Sump No. 5 except the liner will not continue horizontally between the two sumps. A vertical RPE liner will be installed on the downstream side in the Redundant Sump. **Detail C on Figure 2** provides additional information on the proposed Redundant Sump.

Waste Disposal

The soil removed from the ditch line will be placed into roll-off boxes and properly disposed of at a permitted hazardous waste facility.

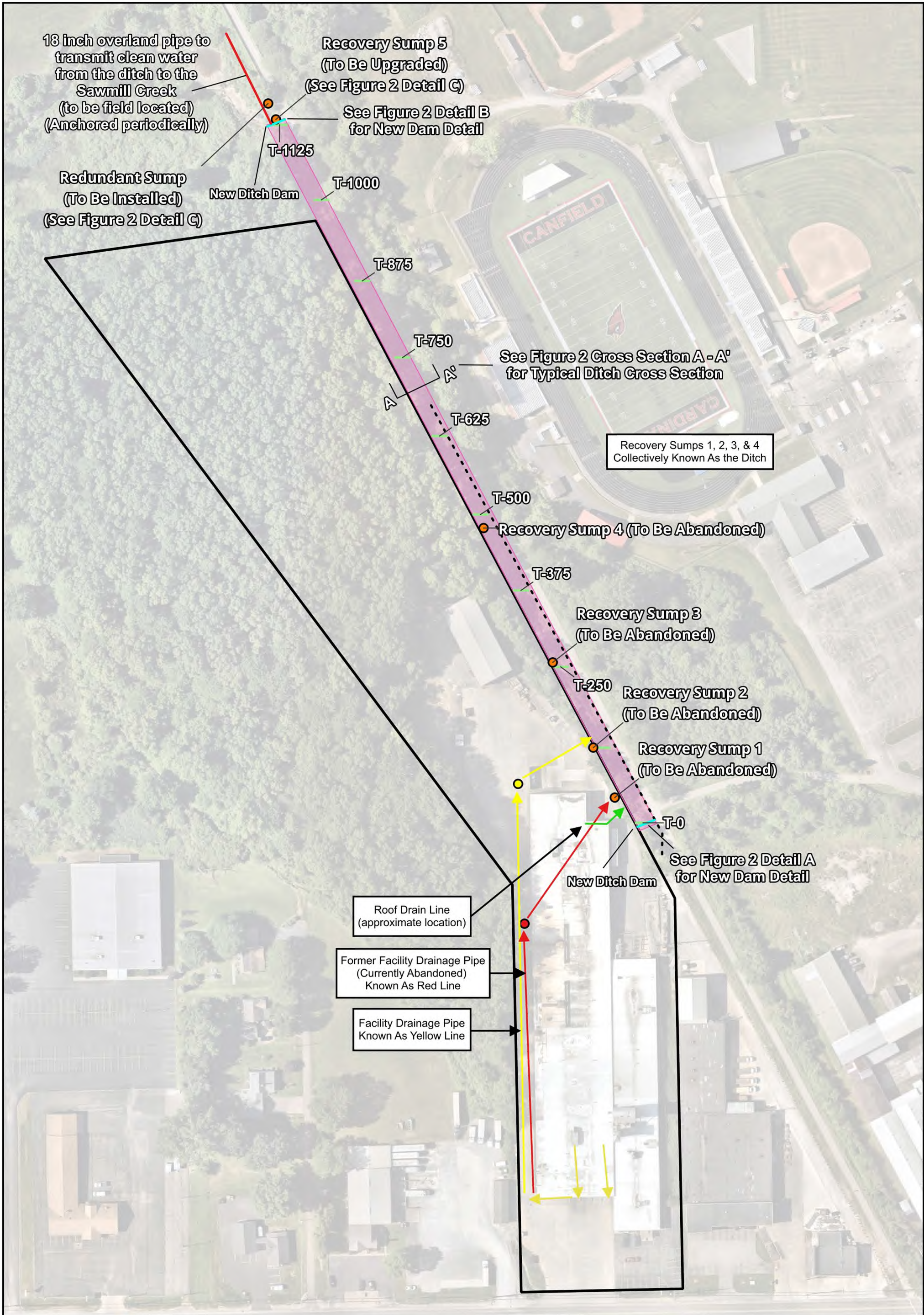
Ditch Lining Interim Measure Completion Report

A ditch lining IM completion report will be prepared and submitted to the OEPA following completion of the ditch lining field activities. The report will document the field activities and will outline any installation changes made in the field during construction that deviate from this plan. The report will also provide as-build drawings and photos documenting the installation activities.

Schedule Update

The RPE has previously been purchased and is on-site awaiting installation. Brush and tree removal of the ditch was completed from October 23, 2024 through November 1, 2024. Ditch excavation prep including equipment staging, road buildouts, surveying, centerline ditch markings, and roll-off delivery was completed from November 4, 2024, through November 8, 2024. Grouting and capping efforts of the green, red, and yellow line commenced on November 11, 2024. Ditch removal, grading and liner installation is slated to begin on November 18, 2024 following completion of grouting and capping efforts. The installation time needed to complete the ditch lining is estimated at approximately 30 construction days, excluding weather delays. Stormwater diversion and recovery efforts will continue throughout the duration of IM implementation.

FIGURES



18 inch overland pipe to transmit clean water from the ditch to the Sawmill Creek (to be field located) (Anchored periodically)

Recovery Sump 5 (To Be Upgraded) (See Figure 2 Detail C)
See Figure 2 Detail B for New Dam Detail

Redundant Sump (To Be Installed) (See Figure 2 Detail C)

T-1125
New Ditch Dam
T-1000

T-875

T-750

See Figure 2 Cross Section A - A' for Typical Ditch Cross Section

A
A'

T-625

Recovery Sumps 1, 2, 3, & 4 Collectively Known As the Ditch

T-500

Recovery Sump 4 (To Be Abandoned)

T-375

Recovery Sump 3 (To Be Abandoned)

T-250

Recovery Sump 2 (To Be Abandoned)

Recovery Sump 1 (To Be Abandoned)

T-0

See Figure 2 Detail A for New Dam Detail

New Ditch Dam

Roof Drain Line (approximate location)

Former Facility Drainage Pipe (Currently Abandoned) Known As Red Line

Facility Drainage Pipe Known As Yellow Line

- Subject Property
- Ditch Section to be Lined
- Temporary Fence
- New Ditch Dam
- Transect Sample
- Recovery Sump
- MH-R (Manhole Red)
- MH-Y (Manhole Yellow)

**Material Sciences Corporation
Canfield**
Proposed Ditch Liner

460 West Main Street
Canfield, Ohio 44406



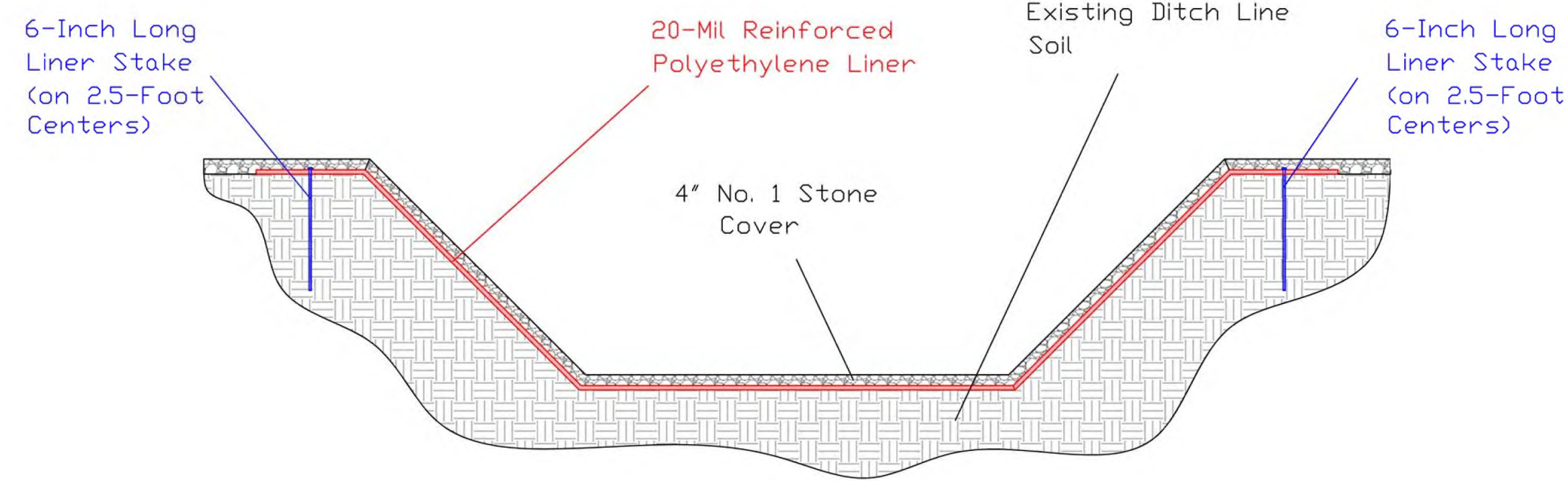
4401 Rockside Road, Suite 300
Independence, Ohio 44131 (330) 576-3229

August Mack
ENVIRONMENTAL

PROJECT NO.: JY2380.372	DATE: 11/15/2024
FIGURE: 1	SCALE: 1:1,500
	CREATED BY: CC

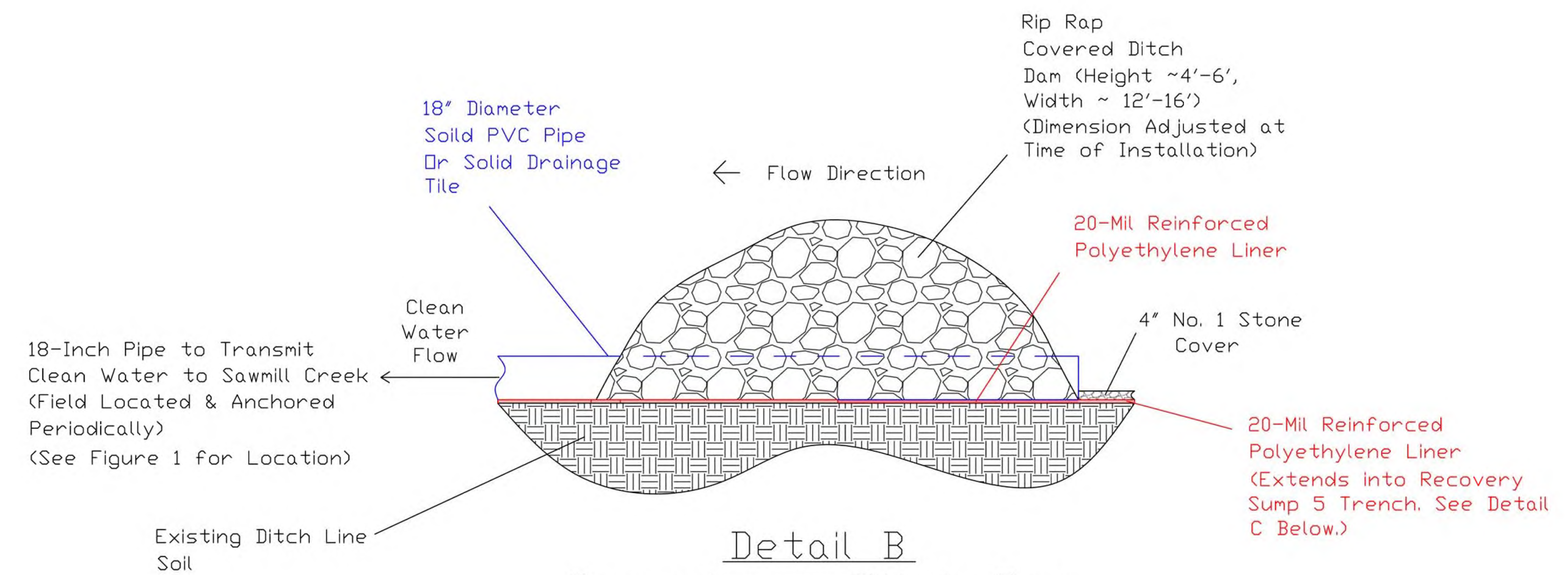
Nearmap Aerial Imagery:
June 15, 2024

Please Note: All approximate locations are subject to change once survey is completed. Recovery Sumps 1 to 4 will be Abandoned.

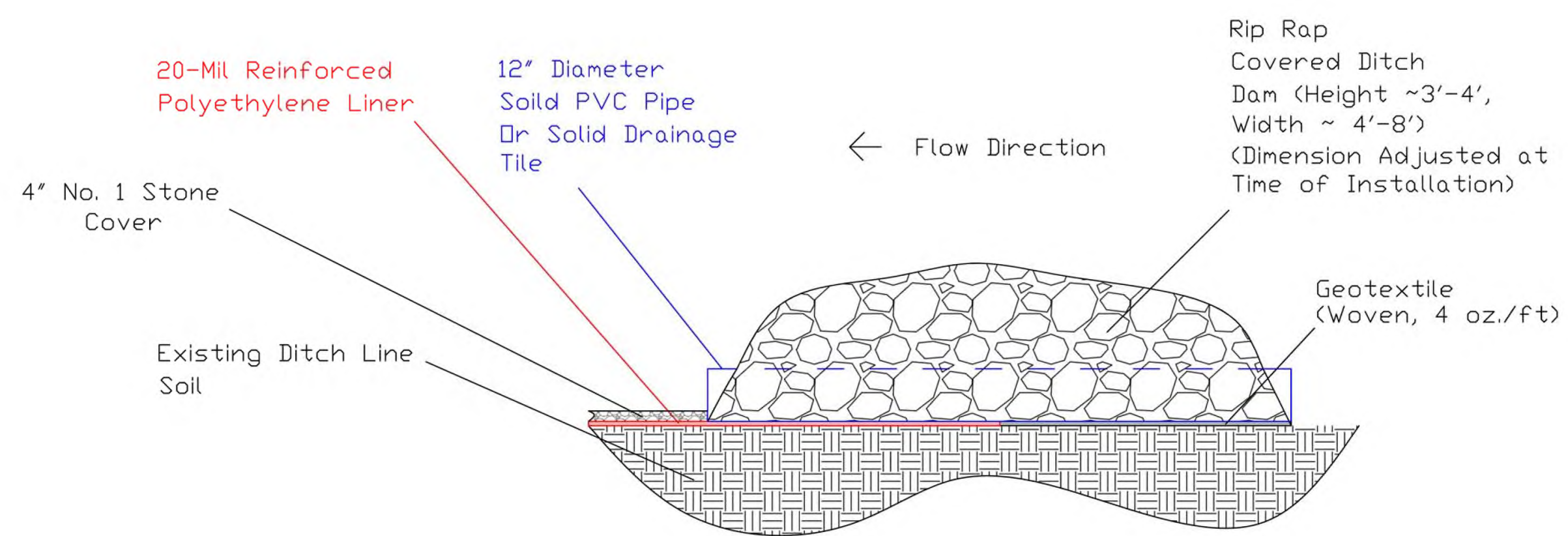


Section A - A'
Typical Lined-Ditch Profile

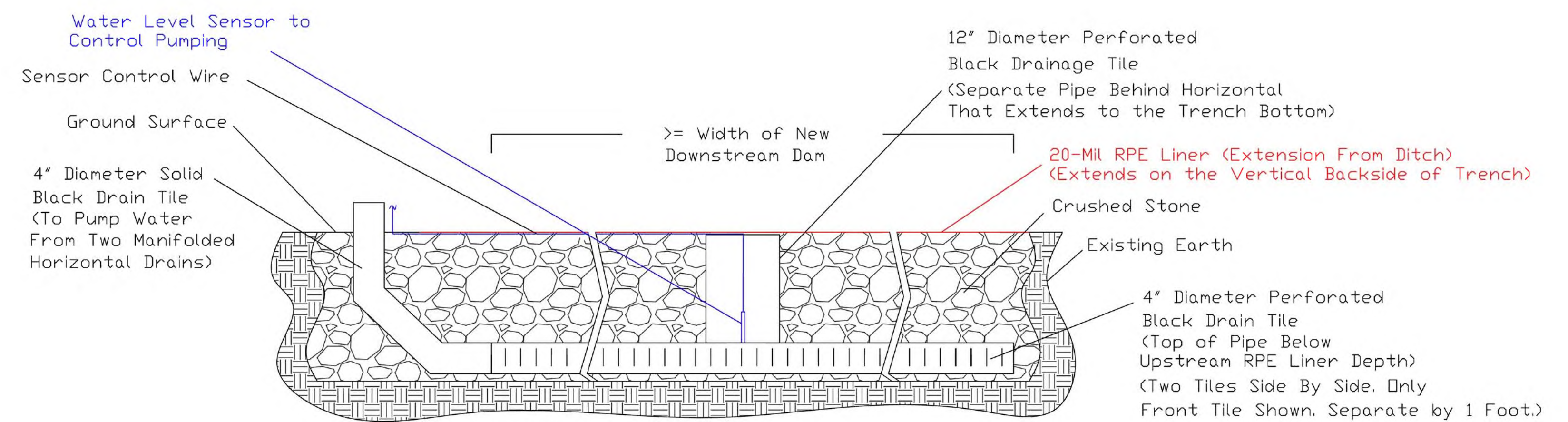
Notes: Existing ~1,125 Foot Section of Ditch Line Shown on Figure 1 Will Be Cleared of Brush and Dams, and Smoothed Out By Adding Sand or Gravel Before Installing the 20-Mil Reinforced Polyethylene Liner (RPE). The RPE Liner Will Be Placed Within the Ditch Line and Secured with ~6-Inch Long Stakes Driven Into the Banks. An ~4" Layer of ODOT No. 1 Stone Will Be Placed in the Ditch Bottom to Hold the Liner in Place. A Layer of 6" to 8" Diameter Rip Rap Will Be Placed at 200 Foot Intervals In Lieu of the Stone.



Detail B
Downstream Ditch Dam
(Looking Perpendicular to Ditch Line)
(See Figure 1 for Location)
(Low Permeability Soil Core)

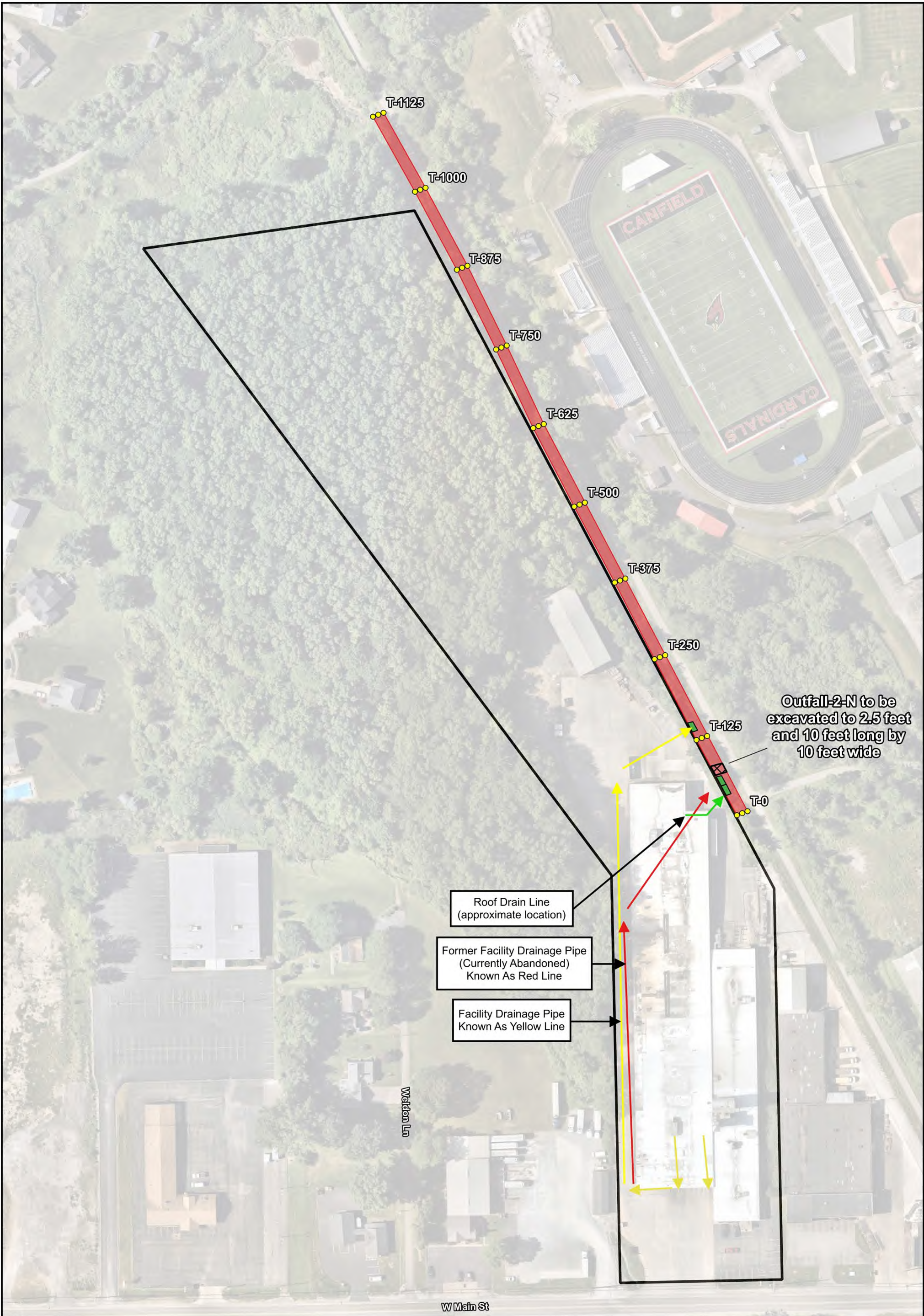


Detail A
New Upstream Ditch Dam
(Looking Perpendicular to Ditch Line)
(See Figure 1 for Location)
(Low Permeability Soil Core)



Detail C
Upgraded Recovery Sump No. 5/
Redundant Sump
(Looking North & Parallel to Ditch Line)
(See Figure 1 for Location)
(Not To Scale)

Notes: The Redundant Sump will be installed 20 feet north of the upgraded Recovery Sump No. 5. The Redundant Sump will be installed the same as the upgraded Recovery Sump No. 5 except that the horizontal liner will not be continued between the upgraded Recovery Sump No. 5 and the Redundant Sump.

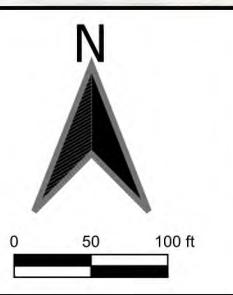


- Subject Property
 - Transect Sample
 - Approximate area with cyanide equal to or greater than 150 ppm to dig out to 6 inches and approximately 10 feet wide in the ditch channel
 - 3' by 3' by 2' deep area to be excavated at drain outlets and filled with cement
- Nearmap Aerial Imagery:
June 15, 2024

**Material Sciences Corporation
Canfield**

**Proposed Ditch Soil
Removal Areas**


460 West Main Street
Canfield, Ohio 44406



4401 Rockside Road, Suite 300 Independence, Ohio 44131		(330) 576-3229
PROJECT NO.: JY2380.372	DATE: 11/11/2024	
	SCALE: 1:1,500	
FIGURE: 3	CREATED BY: CC	

TABLES

CYANIDE DITCH SOIL ANALYTICAL RESULTS

			Potential Contaminants:	Cyanide via U.S. EPA Method 9012
Sample / Transect ID	Transect Location	Sample Depth (ft bg)	Sample Date	Total Cyanide
PROPOSED PRINCIPAL THREAT VALUE (#)				150
Outfall #1 - South	NA	2.5	08/08/2024	1.2
Outfall #2 - North	NA	2.5	08/08/2024	220 #
Outfall #3 - North	NA	2.5	08/08/2024	38
Transect (-290)	Background	Surface	07/24/2024	3.8
Transect 0	West	Surface	10/02/2024	2.0
Transect 0	West	2.0	10/02/2024	<30
Transect 0	Center	Surface	10/02/2024	2.3
Transect 0	East	Surface	10/02/2024	1.5
Transect 0	East	2.0	10/02/2024	<0.63
Transect 125	West	Surface	10/02/2024	610 #
Transect 125	West	2.0	10/04/2024	63
Transect 125	Center	Surface	10/03/2024	780 #
Transect 125	East	Surface	10/02/2024	240 #
Transect 125	East	2.0	10/03/2024	14
~Transect 190	SS#1	Surface	07/24/2024	3,700 #
Transect 250	West	Surface	10/03/2024	1,300 #
Transect 250	West	2.0	10/04/2024	34
Transect 250	West	2.0 [DUP-4]	10/04/2024	45
Transect 250	West	4.0	10/04/2024	32 J
Transect 250	Center	Surface	10/03/2024	710 #
Transect 250	Center	Surface [DUP-1]	10/03/2024	530 #
Transect 250	East	Surface	10/03/2024	1,400 #
Transect 250	East	2.0	10/04/2024	240 #
Transect 375	West	Surface	10/03/2024	1,300 #
Transect 375	West	2.0	10/04/2024	49
Transect 375	West	4.0	10/04/2024	<38
Transect 375	East	Surface	10/03/2024	1,200 #
Transect 375	East	2.0	10/04/2024	<32
Transect 375	East	4.0	10/04/2024	<36
~Transect 375	SS#2	Surface	07/24/2024	2,500 #
~Transect 375	SS#2 - North	2.5	08/08/2024	14
Transect 500	West	Surface	10/03/2024	540 #
Transect 500	West	2.0	10/05/2024	2.8
Transect 500	West	4.0	10/05/2024	14
Transect 500	East	Surface	10/03/2024	370 #
Transect 625	West	Surface	10/03/2024	740 #
Transect 625	West	2.0	10/05/2024	78
Transect 625	Center	Surface	10/03/2024	160 #
Transect 625	Center	2.0	10/05/2024	12 J
Transect 625	Center	2.0 [DUP-5]	10/05/2024	0.92

Abbreviations & Notes

DUP = Duplicate Sample

ft bg = feet below grade

J = Reported value is estimated

NA = Not Applicable/Not Analyzed


U.S. EPA = United States Environmental Protection Agency

The following denote the symbol and color of threshold level exceedances:

= At or Above Proposed Principal Threat Value

Results and Proposed Principal Threat Values are reported in milligrams per kilogram (mg/kg).

CYANIDE DITCH SOIL ANALYTICAL RESULTS

			Potential Contaminants:	Cyanide via U.S. EPA Method 9012
Sample / Transect ID	Transect Location	Sample Depth (ft bg)	Sample Date	Total Cyanide
PROPOSED PRINCIPAL THREAT VALUE (#)				150
Transect 625	Center	4.0	10/05/2024	3.2
Transect 625	East	Surface	10/03/2024	10
Transect 625	East	2.0	10/05/2024	40
Transect 625	East	4.0	10/05/2024	7.3
~Transect 675	SS#3	Surface	07/24/2024	990 #
~Transect 675	SS#3 - North	2.5	08/08/2024	41
Transect 750	West	Surface	10/03/2024	39
Transect 750	West	Surface [DUP-2]	10/03/2024	43
Transect 750	West	2.0	10/05/2024	52
Transect 750	West	2.0 [DUP-6]	10/05/2024	48
Transect 750	East	Surface	10/03/2024	20
Transect 750	East	2.0	10/05/2024	<15
Transect 750	East	4.0	10/05/2024	<15
~Transect 875	SS#4	Surface	07/24/2024	1,900 #
~Transect 875	SS#4-North	2.5	08/08/2024	79
Transect 875	West	Surface	10/03/2024	23
Transect 875	West	2.0	10/05/2024	4.0
Transect 875	West	4.0	10/06/2024	5.4
Transect 875	Center	Surface	10/03/2024	170 #
Transect 875	East	Surface	10/03/2024	1.4
Transect 875	East	2.0	10/05/2024	1.8
Transect 875	East	2.0 [DUP-7]	10/05/2024	1.2
Transect 875	East	4.0	10/05/2024	14 J
Transect 1000	West	Surface	10/03/2024	370 #
Transect 1000	West	2.0	10/06/2024	6.3
Transect 1000	Center	Surface	10/03/2024	1.9
Transect 1000	Center	2.0	10/06/2024	11
Transect 1000	Center	4.0	10/06/2024	21
Transect 1000	East	Surface	10/03/2024	29
~Transect 1100	SS#5	Surface	07/24/2024	89
~Transect 1100	SS#5 North	2.5	08/08/2024	38
Transect 1125	West	Surface	10/03/2024	66
Transect 1125	West	2.0	10/06/2024	<17
Transect 1125	Center	Surface	10/03/2024	570 #
Transect 1125	East	Surface	10/03/2024	70
Transect 1125	East	Surface [DUP-3]	10/03/2024	140
Transect 1125	East	2.0	10/06/2024	16
Transect 1125	East	4.0	10/06/2024	18

Abbreviations & Notes

DUP = Duplicate Sample

ft bg = feet below grade

J = Reported value is estimated

NA = Not Applicable/Not Analyzed

U.S. EPA = United States Environmental Protection Agency

The following denote the symbol and color of threshold level exceedances:

= At or Above Proposed Principal Threat Value

Results and Proposed Principal Threat Values are reported in milligrams per kilogram (mg/kg).