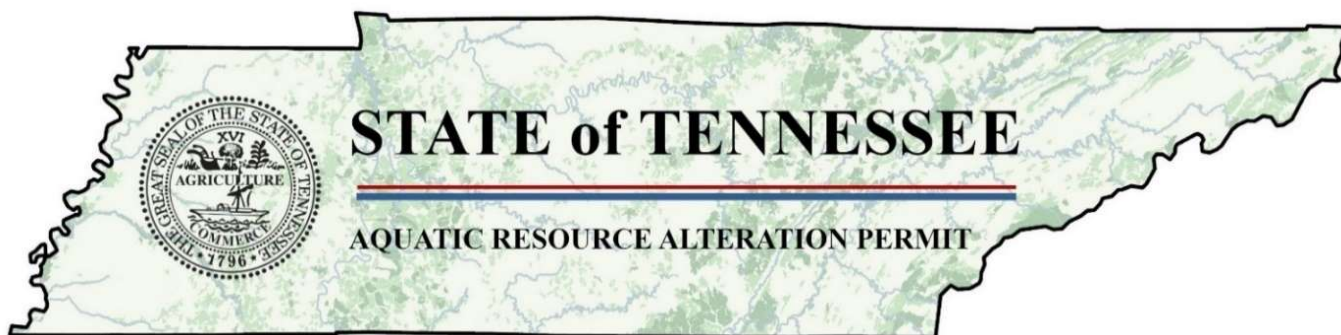




Aquatic Resource Alteration Permit
NRS26.194 DRAFT
§401 Water Quality Certification

Issued by
Department of Environment and Conservation
Division of Water Resources
Davy Crockett Tower, 9th Floor
500 James Robertson Parkway
Nashville, Tennessee 37243

Pursuant to the Tennessee Water Quality Control Act (TNWQA) of 1977 (T.C.A. §§ 69-3-101 et seq.) and supporting regulations, a permit is required to alter the properties of waters of the state. Also, pursuant to §401 of the Clean Water Act (33 U.S.C. 1341), an applicant for a Federal license of permit which may result in a discharge into the waters of the U.S., shall provide the federal licensing or permitting agency a certification from the State in which the discharge will originate.

Subject to conformance with accepted plans, specifications, and other information submitted in support of the application, the State of Tennessee hereby authorizes the activity described below, pursuant to T.C.A. § 69-3-108(b):

Permittee: Crucible Metals, LLC

Authorized Work: Crucible Metals proposes permanent impacts to 21.5 linear feet of stream (encapsulation) and fill of 2.08 acres of wetlands to construct a new materials offloading facility (MOF), heavy haul road (HHR), surface water intake structure, and discharge-diffuser associated with the development of a new integrated non-ferrous smelting and refining facility otherwise known as Project Crucible. Wetland mitigation will be provided by a purchase of 3.87 credits from Bumpus Mills Mitigation Bank and 0.32 credits from Tennessee Mitigation Fund In-Lieu Fee Program.

Location: 1800 Zinc Plant Road
Clarksville, Montgomery County, Tennessee
Latitude: 36.516259 Longitude: -87.406368

Effective Date: Draft

Expiration Date: Draft

DRAFT

for April Grippo
Director, Division of Water Resources

DRAFT

Table of Contents

PART 1.....	1
1. Permit Conditions.....	1
1.1. Authorized Alterations	1
1.2. Special Conditions	2
1.2.1. Permanent Wetland Fill	2
1.2.2. State and Federally Listed Species	3
1.2.3. Encapsulation	3
1.2.4. EPSC.....	3
1.2.5. Water Withdrawal.....	4
1.2.6. Reporting Requirements	4
1.3. General Conditions.....	4
PART 2.....	9
1. Mitigation, Monitoring, and Reporting Requirements	9
1.1. Third-Party Mitigation	9
PART 3.....	11
2. General Permit Requirements.....	11
2.1. Duty to Comply	11
2.2. Duty to Reapply	11
2.3. Duty to Provide Information.....	11
2.4. Property Rights	11
2.5. Right of Entry	11
2.6. Water Rights.....	12
2.7. Other Permits	12
2.8. Other Information	12
2.9. Records Retention	12
2.10. Changes Affecting the Permit	13
2.10.1. Permit Transfer/Change of Ownership.....	13
2.10.2. Change of Mailing Address	14
2.11. Noncompliance	14
2.11.1. Effect of Noncompliance	14
2.11.2. Reporting of Noncompliance.....	14

2.12.	Adverse Impact	15
2.13.	Falsifying Results and/or Reports	15
2.14.	Liabilities	15
2.14.1.	Civil and Criminal Liability	15
2.14.2.	Liability Under State Law	15
2.15.	Reopener Clause	16
2.16.	Appeal	16
Part 4 - Definitions		17
Part 5 – Resources, Hyperlinks, and web pages.....		21
Appendix 1 – Site Map, Design Drawings, and Photos		22
Draft PERMIT RATIONALE		R1
1.	Permit Summary.....	R1
2.	Status of Affected Waters – Streams.....	R1
3.	Status of Affected Waters – Wetlands.....	R2
4.	Authorized Alterations	R2
5.	Alternatives Analysis and Selection of Least Impactful Practicable Alternative	R3
6.	Existing Conditions/Authorized Loss of Resource Values	R6
7.	Mitigation Required.....	R7
8.	Antidegradation.....	R8

PART 1

This permit is issued to authorize alterations to waters of the State of Tennessee pursuant to the Tennessee Water Quality Control Act of 1977 (T.C.A. §§ 69-3-101 et seq.) and pursuant to § 401 of the Clean Water Act (33 U.S.C 1341). The activity authorized by this permit complies with Tennessee's water quality standards and public notice procedures.

1. PERMIT CONDITIONS

1.1. AUTHORIZED ALTERATIONS

This permit authorizes the permittee to perform the following alterations:

Stream 4 (S-4): Unnamed Tributary to Cumberland River/Barkley Reservoir

Latitude, longitude: 36.519541, -87.406059

Authorized Alterations: Permanent impacts to 21.5 linear feet of stream (S-4 Encapsulation) Installation of a 21.5 linear foot corrugated metal pipe for the construction of heavy haul road.

Wetland 1 (W-1): Unnamed Wetland

Latitude, longitude: 36.519509 -87.412552

Authorized Alterations: Permanent impacts (fill) 1.12 acres of low quality non-isolated scrub-shrub wetland.

Wetland 2 (W-2): Unnamed Wetland

Latitude, longitude: 36.519954 -87.410611

Authorized Alterations: Permanent impacts (fill) 0.12 acres of low quality non-isolated scrub-shrub wetland.

Wetland 3 (W-3): Unnamed Wetland

Latitude, longitude: 36.522671 -87.405907

Authorized Alterations: Permanent impacts (fill) 0.28 acres of moderate quality non-isolated forested wetland.

Wetland 8 (W-8): Unnamed Wetland

Latitude, longitude: 36.520564, -87.407111

Authorized Alterations: Permanent impacts (fill) 0.56 acres of low quality non-isolated scrub-shrub wetland.

Water Withdrawal: Cumberland River/Barkley Reservoir

Authorized Alterations: Utilize and improve the existing water intake structure and associated infrastructure to increase water withdrawal from approximately 1,200 gallons per minute (1.7 million gallons per day) to 6,160 GPM (8.8 MGD).

Water Intake & Discharge Diffuser Structure Improvements: Cumberland River/Barkley Reservoir

Authorized Alterations: Upgrade existing water intake screens and pumps. The system will continue using the existing raw water pipeline and may add two above-ground pipelines for additional conveyance. Intake pumps will be located at elevation 379.00, with new intake screens installed below them at elevation 349.00.

Barge Access, Material Offloading & Associated Structures: Cumberland River/Barkley Reservoir

Authorized Alterations: The use of sheet piling and construction of two mooring dolphins to stabilize the bank and support safe barge docking.

1.2. SPECIAL CONDITIONS

1.2.1. Permanent Wetland Fill

1. Only earthen materials comprising native, uncontaminated soil or rock, or a combination thereof shall be "Acceptable Fill" to be placed as fill in the wetlands. Acceptable Fill shall consist of only soil or rock in which all substances naturally occurring therein are present in concentrations not exceeding the concentrations of such substances occurring naturally in the local area. Acceptable Fill shall not contain any sewage, industrial wastes, additives or materials such as refuse, rubble, muck, metal, glass, concrete pieces, bricks, or asphalt paving materials, wood or other wastes. For the purposes of this permit, "other wastes" means any and all other substances or forms of energy, including, but not limited to, decayed wood, sand, garbage, silt, municipal refuse, sawdust, shavings, bark, lime, ashes, offal, oil, hazardous materials, tar, sludge, or other petroleum byproducts, radioactive material, chemicals, heated substances, dredged spoil, solid waste, incinerator residue, sewage sludge, munitions, biological materials, wrecked and discarded equipment, and cellar dirt.
2. Culverts shall be installed as needed to retain hydrologic connectivity within each wetland impacted by the road crossing. Documentation of the location of these culverts and evidence of the maintenance of hydrologic connectivity within each wetland shall be submitted in a monitoring report to the Division within two years of the project's completion.

1.2.2. State and Federally Listed Species

3. When federally listed species are present, the permittee is responsible for obtaining prior authorization from the United States Fish and Wildlife Service (USFWS) as required by the Endangered Species Act of 1973.
4. The permittee shall comply with the recommendations set forth by the Tennessee Wildlife Resources Agency (TWRA) and TDEC Division of Natural Areas (DNA) as a result of any previous or future species coordination.

1.2.3. Encapsulation

5. The bottom of culverts shall be constructed below the stream bed elevation, in a manner that allows natural substrate to reestablish.
6. Culverts shall not be constructed in a manner that would permanently disrupt the movement of fish and aquatic life.
7. Compensatory mitigation shall be completed prior to or commensurate with roadway construction.
8. The excavation and fill activities associated with the encapsulation shall be kept to a minimum and shall be separated from flowing waters except in instances involving only the placement of clean rock. The encapsulation shall be constructed in the dry to the maximum extent practicable, by diverting flow utilizing cofferdams, berms, temporary channels or pipes. Temporary diversion channels shall be protected by non-erodible material and lined to the expected high-water level.

1.2.4. EPSC

9. Wetlands and streams outside of the permitted impact area shall be clearly marked with signs, high visibility fencing, or similar structures so that all work performed by the contractor is solely within the permitted impact area.
10. To minimize wildlife entanglement and plastic debris pollution, temporary EPSC products that either do not contain netting, or that contain netting manufactured from 100 percent biodegradable non-plastic materials such as jute, sisal, or coir fiber shall be specified within thirty feet of Waters of the State. Netting used in these products should have a loose-weave wildlife-safe design with movable joints

between the horizontal and vertical twines, allowing the twines to move independently. Degradable, photo-degradable, UV-degradable, oxo-degradable, or oxo-biodegradable plastic netting (including polypropylene, nylon, polyethylene, and polyester) are not allowable alternatives.

11. All dewatering activities shall be conducted in such a manner as to prevent the discharge of sediment-laden water into waters of the state.
12. All riprap areas shall be placed as to mimic the existing/proposed contours of the stream channel. Riprap shall be countersunk and placed at the grade with the existing stream substrate. Riprap shall not be placed in a manner that would permanently disrupt the movement of fish and aquatic life.
13. Voids within the riprap shall be filled with suitable substrate to prevent loss of stream within the riprap areas. Do not over-excavate for placement of riprap. Grouting of riprap is prohibited.
14. Streambeds shall not be used as transportation routes for construction equipment. Temporary stream crossings shall be limited to one point in the construction area and EPSC measures shall be utilized where stream banks are disturbed.

1.2.5. Water Withdrawal

15. The withdrawal at river shall not exceed 6,160 Gallons per minute (GPM) (8.8 million gallons per day (MGD)).
16. Raw water withdrawal volumes shall be monitored and recorded daily.
17. Withdrawal data shall be reported to the Division of Water Resources, Natural Resources Unit via email at ARAP.Permits@tn.gov

1.2.6. Reporting Requirements

18. The permittee shall notify this office of project completion and supply as-constructed or record drawings and photographs of the final structure within 45 days of completion.

1.3. GENERAL CONDITIONS

1. All activities must be accomplished in conformance with the approved plans, specifications, data, and other information submitted in support of the ARAP application (form CN-1091 and all supplemental materials) and the limitations,

requirements, and conditions set forth herein. Changes to the authorized activity relative to plans and designs reviewed to date by TDEC will require application for and receipt of a permit modification prior to start of work. Failure to comply with the terms and conditions of this permit is a violation of the Tennessee Water Quality Control Act.

2. It is the responsibility of the permittee to convey all terms and conditions of this permit to all contractors. A copy of this permit, approved plans, and any other documentation pertinent to the activities authorized by this permit shall be maintained on site at all times during periods of construction activity.
3. The permittee must provide written notification of the commencement of authorized work to the Nashville Environmental Field Office prior to beginning work, or within 24 hours after initiation.
4. Work shall not commence until the permittee has obtained all necessary authorizations pursuant to applicable provisions of Section 10 of The Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, Section 26a of The Tennessee Valley Authority Act, Section 402 of the Clean Water Act, or any other federal, state, or local laws.
5. The permittee is responsible for obtaining coverage under the National Pollutant Discharge Elimination System (NPDES) *General Permit for Stormwater Discharges Associated with Construction Activity* (CGP) where clearing, grading, or excavation results in an area of disturbance of one or more acres, or activities that result in the disturbance of less than one acre if it is part of a larger common plan of development or sale. Work shall not commence until required permits are obtained.
6. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in [Rule 0400-40-03](#) of the Rules of the Tennessee Department of Environment and Conservation. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the uses of waters of the state as designated by [Rule 0400-40-04](#). Uses include fish and aquatic life, livestock watering and wildlife, recreation, irrigation, industrial water supply, domestic water supply, and navigation.
7. The authorized alterations shall not cause measurable degradation to resource values and classified uses of hydrologically connected wetlands or other waters of the state, including disruption of sustaining surface or groundwater hydrology. Adjacent wetlands or streams determined likely to be measurably degraded by

such hydrological alteration, or by partial fill, must be included in the cumulative impact calculation, even if not filled or otherwise directly altered physically.

8. Impacts to waters of the state other than those specifically addressed in the plans and this permit are prohibited. All streams, springs, and wetlands shall be fully protected prior to, during, and after construction until the area is stabilized. Any questions, problems, or concerns that arise regarding any stream, spring, or wetland either before or during construction shall be addressed to the Division of Water Resources at the Nashville Environmental Field Office by phone at 1-888-891-8332. Alternatively, contact the permit writer Theron Binford at theron.binford@tn.gov, or direct questions to the Division's Natural Resources Unit at ARAP.Permits@tn.gov.
9. This permit does not authorize the removal of riparian trees or shrubs along the banks of the stream or wetland vegetation beyond the approved scope of work. Coverage under this permit does not serve to waive any local riparian buffer protection requirement, and permittees are responsible for obtaining any necessary local approval.
10. Sediment shall be prevented from entering waters of the state. Erosion prevention and sediment control (EPSC) measures shall be designed according to the size and slope of disturbed or drainage areas to detain runoff and trap sediment and shall be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. Moreover, EPSC measures must be in place and functional before earth moving operations begin and shall be designed according to the Department's [EPSC Handbook](#).
11. To minimize wildlife entanglement and plastic debris pollution, temporary erosion and sediment control products that either do not contain netting, or that contain netting manufactured from 100 percent biodegradable non-plastic materials such as jute, sisal, or coir fiber shall be specified. Netting used in these products should have a loose-weave wildlife-safe design with movable joints between the horizontal and vertical twines, allowing the twines to move independently. Degradable, photodegradable, UV-degradable, oxo-degradable, or oxo-biodegradable plastic netting (including polypropylene, nylon, polyethylene, and polyester) are not acceptable alternatives.
12. Where practicable, all activities shall be accomplished in the dry or during drier times of year. All surface water flowing towards or from the construction activity shall be diverted using cofferdams and/or berms constructed of sandbags, clean rock (containing no fines or soils), steel sheeting, or other non-erodible, non-toxic material. All such diversion materials shall be located outside of the wetlands

and/or streams and removed upon completion of the work. If approved after Division review, activities may be conducted in flowing water if working in the dry will likely cause additional degradation. If work is conducted in the water, it must be of a short duration and with minimal impact and conform to Division-approved methodology.

13. Work within the waters of the state by heavy equipment shall be kept to a minimum. Equipment shall be free of noticeable leaks of fluids and oils; e.g., hydraulic, transmission, crankcase, and engine coolant, fluids, and oils.
14. Equipment staging and maintenance areas shall be developed a sufficient distance from any surface water or wetland to ensure that oil, gas, or other petroleum products, or other hazardous materials do not enter waters of the state.
19. Clearing, grubbing, and other disturbance to riparian and/or wetland vegetation shall be kept to the minimum necessary for construction and equipment operations. Unnecessary riparian or wetland vegetation removal, including trees, is prohibited.
15. Blasting within 50 feet of a jurisdictional stream or wetland is prohibited.
16. Excavated material may not be placed in a location or manner so as to impair surface water flow into or out of any wetland area. Excavated material may not be placed in an area that is likely to discharge into waters of the state for the purposes of dewatering or otherwise.
17. Best Management Practices (BMPs) shall be implemented throughout the construction period to prevent sediments, oils, or other project-related pollutants from being discharged into waters of the state. All spills must be reported to the Nashville Environmental Field Office and appropriate emergency management agency, and measures shall be taken immediately to prevent the pollution of waters of the state, including groundwater, should a spill occur.
18. Temporary or permanent soil stabilization shall be accomplished within 14 days after final grading or other earth work. Permanent stabilization with perennial vegetation or other permanently stable, non-eroding surface shall replace any temporary measures as soon as practicable. Vegetative species must be on an approved native species planting list, including but not limited to, [*Landscaping with Native Plants*](#). The permittee must request written approval from the Division prior to using an alternate native species planting list. Note that native grasses take longer to germinate and mature than invasive exotics such as fescue. Non-native,

non-invasive annuals may be used as temporary cover crops until native species can be established.

19. Erosion prevention and sediment control (EPSC) measures such as silt fences shall be removed following completion of the project.
20. Adverse impact to formally listed state or federal threatened or endangered species or their critical habitat is prohibited. Activities occurring in known or likely habitat of state or federally listed threatened, endangered, deemed in need of management, or species of special concern may not be authorized without prior coordination with the Tennessee Wildlife Resources Agency (TWRA) and TDEC Division of Natural Areas (DNA) to determine if any special conditions are required to avoid and/or minimize harm to the listed species or their habitat. The permittee is responsible for obtaining prior authorization from the United States Fish and Wildlife Service (USFWS) as required by Section 7 or Section 10 under the Endangered Species Act.
21. This permit does not authorize adverse impacts to cultural, historical, or archeological features or sites.
22. This permit shall not be used incrementally to combine with other activities resulting in an appreciable permanent loss of water resource values.
23. This permit does not authorize access to public or private property. Arrangements concerning the use of public or private property shall be made with the landowner. The permittee is responsible for obtaining any additional permitting or maintenance agreements with other government or public agencies or lands.

PART 2

1. MITIGATION, MONITORING, AND REPORTING REQUIREMENTS

Compensatory mitigation activities shall be carried out utilizing best professional efforts to comply with approved plans and the conditions of this permit.

The goal of this permit and its mitigation success criteria is to ensure there is no net loss of resource value due to the impacts of the permitted activity. In accordance with adaptive management, the Division incorporates safety factors into compensatory mitigation requirements. Therefore, once successful mitigation has been achieved, the Division reserves the right to revise performance standards and mitigation criteria to account for any changes documented in the compensatory mitigation project. While final mitigation activities may not result in a net loss of resource value, they may be revised to reflect approved changes from the original mitigation proposal and the success criteria in the permit. Upon acceptance of closure of the project, the Division shall record any such revisions of the mitigation plan or success criteria through formal modification of the permit conditions with public notice.

Total permanent cumulative impacts include 21.5 linear feet of stream impacts. Per Tennessee Code Annotated §69-3-141, no stream mitigation is required.

Total permanent wetland impacts include 2.08 acres to non-isolated low and moderate resource value wetlands. Per Tennessee Code Annotated §69-3-141, in equivalent of 3.96 wetland mitigation credits are required. The applicant has proposed a total of 3.996 wetland mitigation credits.

1.1. THIRD-PARTY MITIGATION

Wetland mitigation:

To offset permanent impacts to 2.08 acres of low and moderate resource value wetlands, the permittee shall purchase the equivalent of 3.96 wetland mitigation credits at a 2:1 ratio. The applicant has reserved 3.87 wetland credits from Bumpus Mills Mitigation Bank, whose [primary/secondary] service area encompasses the impact site. Documentation from the Bumpus Mills MB reservation of these credits dated 09-25-26 was supplied to the Division. To offset the remaining 0.09 acres of low/moderate resource value wetlands, the permittee shall purchase wetland mitigation credit at a 2:1 ratio with an additional 12% temporal loss factor and 1.25x proximity factor (a total of 0.126-acre credits). Documentation from the Tennessee

Mitigation Fund of the reservation of these credits dated 09-17-26 was supplied to the Division. With the purchase of mitigation credits, legal responsibility for completion of the mitigation is legally transferred to the Bumpus Mills MB and Tennessee Mitigation Fund.

Please be advised that the impacts associated with this mitigation are not authorized to proceed until all of the specified mitigation credits have been fully purchased. Payment must be made within 60 days of invoice, or on an alternate schedule as approved by the Division. Proof of the completed credit purchase shall be submitted to this office within 30 days of payment.

DRAFT

PART 3

2. GENERAL PERMIT REQUIREMENTS

2.1. DUTY TO COMPLY

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

2.2. DUTY TO REAPPLY

The permittee is not authorized to discharge or conduct an activity that alters the properties of waters of the state after the expiration date of this permit.

If any portion of the permitted activities, including the authorized impacts to water resources, compensatory mitigation requirements, or post-project monitoring is not completed before the expiration date of this permit **the permittee must apply for permit extension or re-issuance**. The permittee shall submit such information and forms as are required to the Director of the Division of Water Resources at least ninety (90) days prior to its expiration date. Such applications must be properly signed and certified.

2.3. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, upon request, copies of records required to be kept by this permit.

2.4. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

2.5. RIGHT OF ENTRY

The permittee shall allow the Director, the Regional Administrator of the U.S. Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials, to:

- a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records shall be kept under the conditions of this permit;
- b) Have access to and copy, at reasonable times, any records that shall be kept under the conditions of this permit;
- c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d) Sample or monitor at reasonable times for the purposes of assuring permit compliance or as otherwise authorized by the Director.

2.6. WATER RIGHTS

The waters of Tennessee are the property of the state and are held in public trust for the use of the people of the state. This permit does not grant or convey any prescriptive rights, appropriation, or allocation of water, nor does it authorize any injury to the riparian rights of others.

2.7. OTHER PERMITS

This permit does not preclude requirements of other federal, state, or local laws. This permit serves as both a section 401 certification and as a state of Tennessee Aquatic Resource Alteration Permit (ARAP) pursuant to the Tennessee Water Quality Control Act of 1977 (T.C.A. §69-3-101 to -148).

2.8. OTHER INFORMATION

If the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Director, then it shall promptly submit such facts or information.

2.9. RECORDS RETENTION

All records and information resulting from the monitoring activities required by this permit, including all records of analyses performed and calibration or maintenance of instrumentation, shall be retained for a minimum of five (5) years, or longer, if requested by the Division.

2.10. CHANGES AFFECTING THE PERMIT

2.10.1. Permit Transfer/Change of Ownership

This permit may be transferred to another party, provided:

1. There are no activity or project modifications, no pending enforcement actions, or any other changes which might affect the permit conditions contained in the permit.
2. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date.
 - a) The notice must consist of a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and contractual liability between them; and
 - b) The Director does not, within 30 days, notify the current permittee and the new permittee of his or her intent to modify, revoke, reissue, or terminate the permit, or require that a new application be filed rather than agreeing to the transfer of the permit.
3. The permittee must provide the following information to the Division in its formal notice of intent to transfer ownership:
 - a) The permit number of the subject permit,
 - b) The effective date of the proposed transfer,
 - c) The name and address of the transferor,
 - d) The name and address of the transferee,
 - e) The names of the responsible parties for both the transferor and transferee,
 - f) A statement that the transferee assumes responsibility for the subject permit,
 - g) A statement that the transferor relinquishes responsibility for the subject permit,
 - h) The signatures of the responsible parties for both the transferor and transferee, and
 - i) A statement regarding any proposed modifications to the permitted activities or project, its operations, or any other changes which might affect the permit conditions contained in the permit.

2.10.2. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice, the original address of the permittee will be assumed to be correct.

2.11. NONCOMPLIANCE

2.11.1. Effect of Noncompliance

All discharges shall be consistent with the terms and conditions of this permit. Any permit noncompliance constitutes a violation of applicable state and federal laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

2.11.2. Reporting of Noncompliance

24-hour Reporting:

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources at the Nashville Environmental Field Office within 24-hours from the time the permittee becomes aware of the circumstances. The EFO should be contacted for names and phone numbers of the Environmental Response Team.

A subsequent written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

1. A description of the discharge and cause of noncompliance;
2. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
3. The steps being taken to reduce, eliminate, and prevent recurrence of the non-complying discharge.

Scheduled Reporting:

For instances of noncompliance which are not reported under conditions described above, the permittee shall report the noncompliance by contacting the permit coordinator. The permittee shall provide all information concerning

the steps taken or planned to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

2.12. ADVERSE IMPACT

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including but not limited to, accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2.13. FALSIFYING RESULTS AND/OR REPORTS

Knowingly making any false statement on any report required by this permit or falsifying any result may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Clean Water Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

2.14. LIABILITIES

2.14.1. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including, but not limited to, fish kills and losses of aquatic life and/or wildlife as a result of the discharge of pollutants to any surface or subsurface waters. Additionally, notwithstanding this permit, it shall be the responsibility of the permittee to conduct its discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2.14.2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or the Federal Clean Water Act, as amended.

This permit does not preclude requirements of other federal, state, or local laws. This permit also serves as a State of Tennessee Aquatic Resource Alteration Permit (ARAP) pursuant to the Tennessee Water Quality Control Act of 1977 (T.C.A. §69-3-101 et seq.)

2.15. REOPENER CLAUSE

This permit may be modified, suspended, or revoked for cause, including:

1. Violation of any of the terms or conditions of this permit or of T.C.A. §§ 69-3-101 to -148,
2. Obtaining the permit by misrepresentation or failing to disclose fully all relevant facts, or
3. A change in any condition that requires either a temporary or permanent change in the conditions of this permit.

2.16. APPEAL

An appeal of this action may be made as provided in T.C.A. § 69-3-105(i) and Rule 0400-40-07-.04(9) by submitting a petition for appeal in accordance with the following conditions:

1. The petition must be filed within 30 days after notification of the issuance of the permit.
2. The petition must specify the basis for the appeal and state a claim for relief based on an alleged violation of the Tennessee Water Quality Control Act or the rules promulgated thereunder. Third parties shall specify facts sufficient to establish that they have satisfied the statutory and regulatory preconditions and otherwise have standing to appeal.
3. The petition should be submitted electronically to TDEC.Appeals@tn.gov. Alternatively, an appeal may be submitted to the technical secretary of the Tennessee Board of Water Quality, Oil and Gas at the following address: April Grippo, Director, Division of Water Resources, Davy Crockett Tower, 500 James Robertson Parkway, Nashville, TN 37243. Any hearing would be in accordance with T.C.A. §§ 69-3-110 and 4-5-301 et seq.

PART 4 - DEFINITIONS

The following definitions are as provided in [Rule 0400-40-07-.03](#):

Act means The Tennessee Water Quality Control Act of 1977, as amended, T.C.A. §§ 69-3-101 et seq.

Activity means any and all work or acts associated with the performance, or carrying out of a project or a plan, or construction of a structure.

Appreciable permanent loss of resource values means a reduction in resource values that is expected to continue without fundamental change and is large enough to be observed and measured as resulting in more than minimal adverse effects.

Aquatic Resource Alteration Permit or **ARAP** means a permit issued pursuant to T.C.A. § 69-3-108 of the Act, which authorizes the alteration of properties of waters of the state that result from activities other than discharges of wastewater through a pipe, ditch, or other conveyance.

Best management practices or **BMPs** means a schedule of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. BMPs include methods, measures, practices, and design and performance standards.

Certification means an Aquatic Resource Alteration Permit under the Act, when required by § 401 of the federal Water Pollution Control Act, which certifies, either unconditionally or through imposition of terms under which the activity must be carried out, that the activity will comply with applicable provisions of §§ 301, 302, 303, 306, and 307 of the federal Water Pollution Control Act and Chapter 0400-40-01 of the rules of the Board of Water Quality, Oil and Gas and the Department of Environment and Conservation and the Act.

Channelization means the alteration of stream channels including but not limited to straightening, widening, or enlarging.

Constructed wetland means a wetland intentionally designed, built and operated on previously non-wetland sites for the primary purpose of wastewater treatment or stormwater retention; such wetlands are not created to provide mitigation for adverse impacts or other wetlands.

Cumulative impacts means the impact on resource values which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Debris means woody materials, trash, flotsam, dislodged vegetation, and other potentially mobile materials which may, when located within a stream channel, contribute to flow blockage. This does not include gravel, sand, soil or its constituents such as silt, clay, or other sediments.

Ditch means a man-made excavation for the purpose of conveying water. Ditches do not include streams, modified streams, or canals.

Division means the Division of Water Resources within the Tennessee Department of Environment and Conservation.

Dredging (sand and gravel dredging) means the removal of sand, gravel, and similar sediments or deposits from a stream, river, or lakebed or wetland by any method.

Emergency means a situation where life, public health, the environment, or substantive improvements to real property is in immediate danger.

Erosion means the process by which the land surface is worn away by the action of water, wind, gravity, chemicals, or a combination thereof.

Existing conditions means the biological, chemical, bacteriological, radiological, and physical conditions of a stream or wetland at the time the project is proposed as measured by a quantitative assessment tool or other defensible scientific method as approved or determined by the Division.

General Permit means a permit issued under the Act and this rule authorizing an alteration to state waters within the state for a specified category of activities that are substantially similar in nature.

Ground water means water beneath the surface of the ground within the zone of saturation, whether or not flowing through known and definite channels.

HUC means the hydrologic unit code assigned by the United States Geological Survey.

Individual Permit means a permit issued by the Division to a specified person to conduct specified activities at a specified location. This type of permit does not authorize an activity by a class of persons or the public in general.

In the dry means in such a manner that no equipment or dredged material is in contact with the stream or wetland and that the soil water boundary is not disturbed by equipment or that no infiltration is pumped to the stream from the dredge site.

Minimal impacts means an activity for which the scope is very limited in area, the impact is very short in duration, and that has no appreciable impact to waters just downstream of the location of the activity.

Mitigation means the restoration, creation, enhancement, and/or preservation of aquatic resources to compensate for unavoidable impacts as provided by paragraph (7) of Rule 0400-40-07-.04.

Practicable alternative is an alternative that is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Resource values are the physical, chemical, and biological properties of the water resource that help maintain classified uses. These properties may include, but are not limited to, the ability of the water resource to:

- a. Filter, settle, and/or eliminate pollutants;
- b. Prevent the entry of pollutants into downstream waters;
- c. Assist in flood prevention;
- d. Provide habitat for fish, aquatic life, and wildlife;
- e. Provide drinking water for wildlife and livestock;
- f. Provide and support recreational and navigational uses; and
- g. Provide both safe quality and adequate quantity of water for domestic water supply and other applicable classified uses.

Sediment means soil or its constituents that has been deposited in water, is in suspension in water, is being transported, or has otherwise been removed or disturbed from its site of origin.

Sedimentation or **Siltation** mean the process by which sediment is deposited in or by the waters of the state.

Stabilize means the proper placing, grading, and/or covering of soil, rock, or earth to ensure their resistance to erosion, sliding, or other movement.

Stream means a surface water that is not a wet weather conveyance. For purposes of this chapter, and permits issued pursuant to this chapter, a wetland is not a stream. See definition of wetland.

Structure means any building, pier, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, mooring structure, moored floating vessel, piling, aid to navigation, bridge, culvert, or any other obstacle or obstruction.

Wetland means an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wet weather conveyances are man-made or natural watercourses, including natural watercourses that have been modified by channelization, that flow only in direct response to precipitation runoff in their immediate locality, whose channels are at all times above the groundwater table, that are not suitable for drinking water supplies, and in which hydrological and biological analyses indicate that, under normal weather conditions, due to naturally occurring ephemeral or low flow there is not sufficient water to support fish, or multiple populations of obligate lotic aquatic organisms whose life cycle includes an aquatic phase of at least two months.

PART 5 – RESOURCES, HYPERLINKS, AND WEB PAGES

Division of Water Resources Aquatic Resource Alteration Permit (ARAP) Webpage

<https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html>

Division of Water Resources ARAP General Permits

<https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-/permit-water-aquatic-resource-alteration-list-of-general-permits.html>

Division of Water Resources Data & Map Viewers

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-resources-data-map-viewers.html>

Landscaping with Native Plants

https://www.tnipc.org/wp-content/uploads/2017/10/landscaping_2016_forweb.pdf

Rules of the TN Department of Environment and Conservation, Chapter 0400-40

<https://publications.tnsosfiles.com/rules/0400/0400-40/0400-40.htm>

TDEC Division of Natural Areas (DNA)

<https://www.tn.gov/environment/program-areas/na-natural-areas.html>

TDEC Water Quality Rules, Reports, and Publications

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html>

Tennessee Erosion & Sediment Control (TN EPSC) Handbook

<https://tnepsc.org/handbook.asp>

Tennessee Wildlife Resources Agency (TWRA)

<https://www.tn.gov/twra.html>

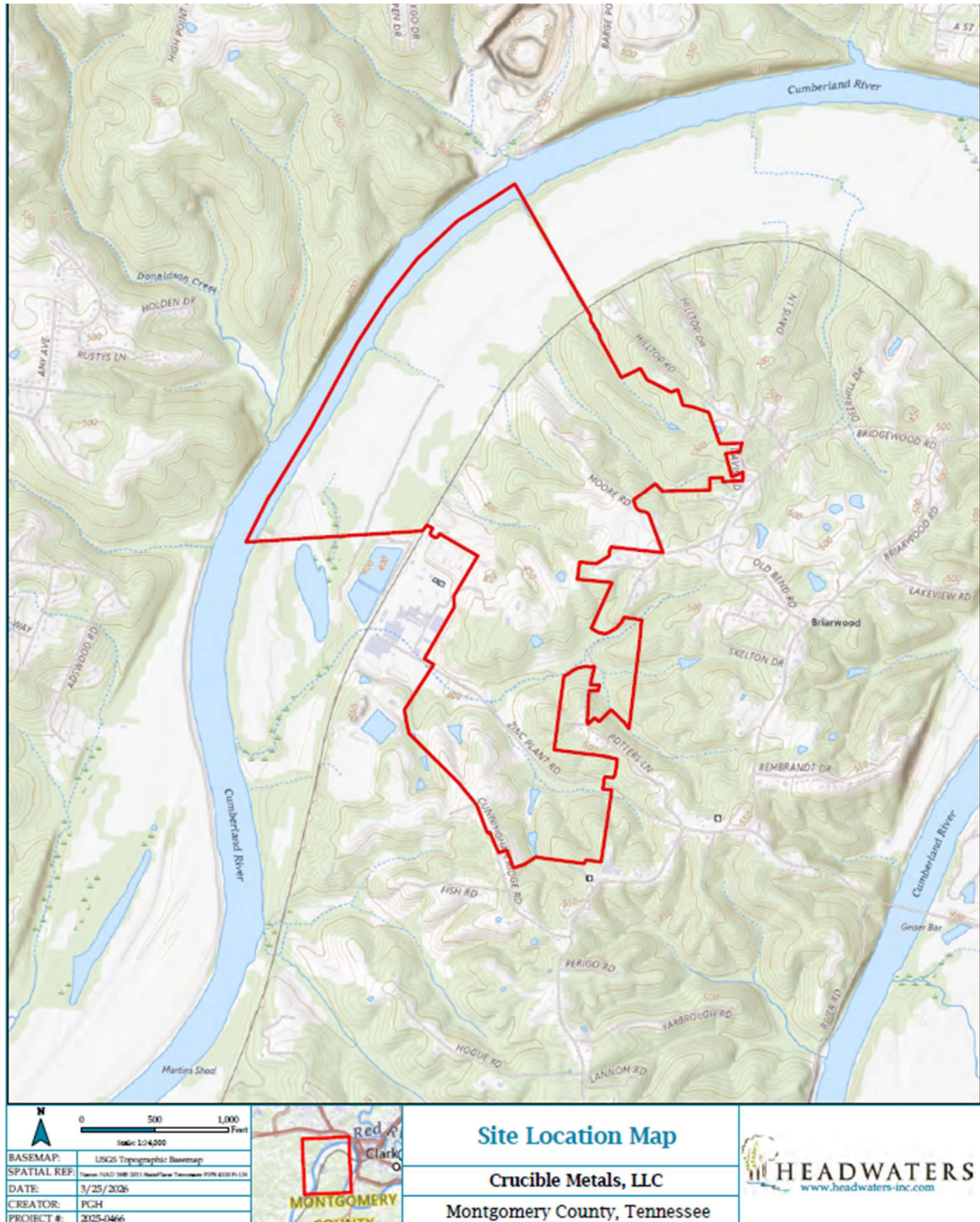
U.S. EPA Overview of CWA Section 412 Certification

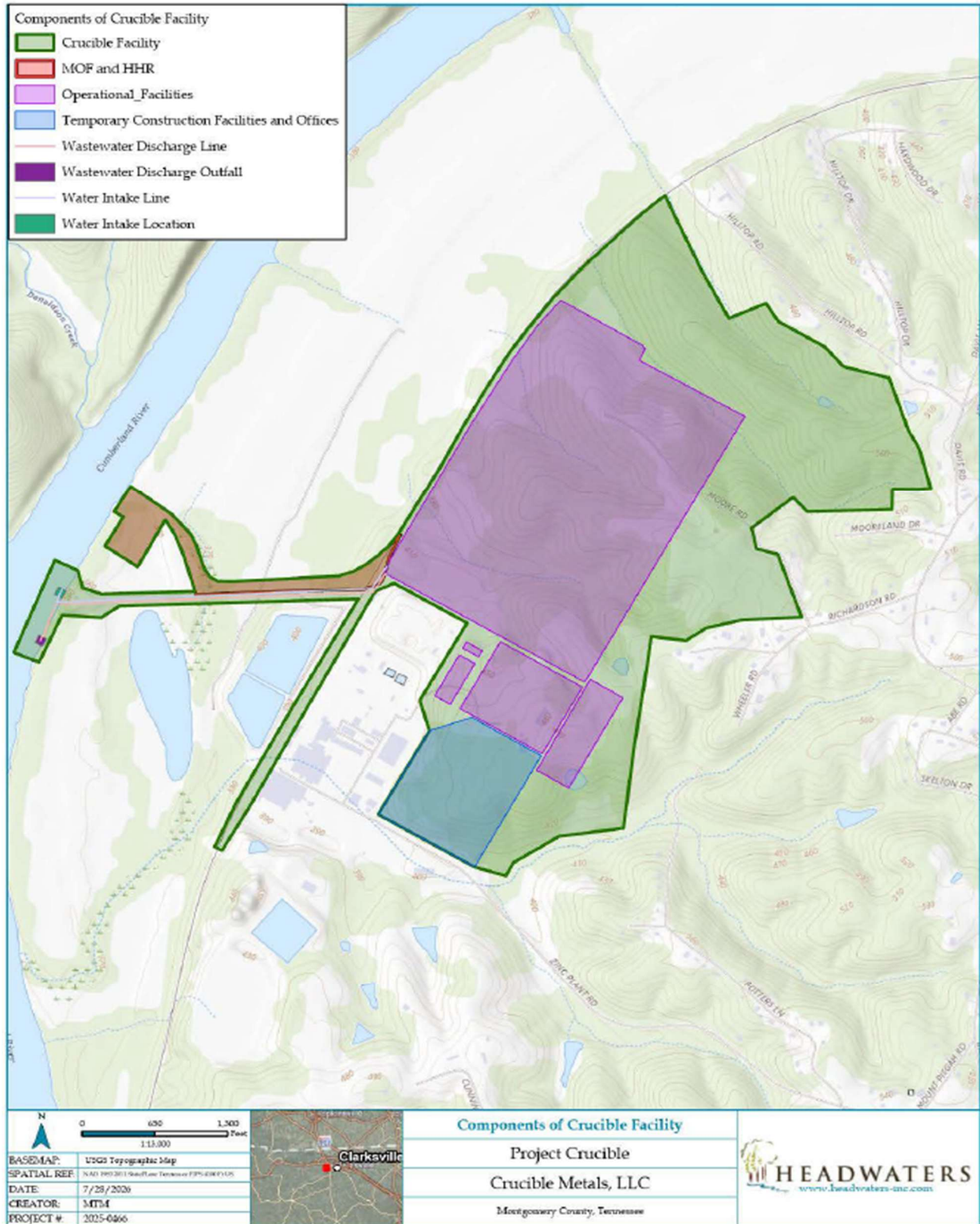
<https://www.epa.gov/cwa-401/overview-cwa-section-401-certification>

U.S. Fish & Wildlife Service Tennessee Ecological Services Field Office (TFO)

<https://www.fws.gov/office/tennessee-ecological-services>

APPENDIX 1 – SITE MAP, DESIGN DRAWINGS, AND PHOTOS







Project Crucible Montgomery County, Tennessee

PHOTOGRAPH #2



Location:	WP1: 36.519416, -87.412106
Date Taken:	December 18, 2025
Looking southwest at scrub/shrub wetland habitat (W-1).	

Project Crucible Montgomery County, Tennessee

PHOTOGRAPH
#14



Location:	WP6: 36.519433, -87.410685
Date Taken:	December 18, 2025
Looking north (up gradient) at scrub/shrub wetland (W-2).	

Project Crucible Montgomery County, Tennessee

PHOTOGRAPH #26



Location:	WP11: 36.519671, -87.408997
Date Taken:	December 18, 2025
Looking northeast at forested wetland habitat (W-3).	

Project Crucible Montgomery County, Tennessee

PHOTOGRAPH
#85



Location:	WP37: 36.519925, -87.406796
Date Taken:	December 18, 2025
Looking east (up gradient) at intermittent tributary (S-4)	

Frequency_Statistics_report_Cumberland River Below Cheatham Dam.txt

```

1  Program SWStat          U.S. GEOLOGICAL SURVEY          Seq 00001
2  Ver. 5.0      Log-Pearson & Pearson Type III Statistics  Run Date / Time
3  03/13/2018          based on USGS Program A193          8/24/2020 9:50 AM
4
5  Notice -- Log-Pearson Type III or Pearson Type III distributions are used
6             for these computations. Users are responsible for assessment
7             and interpretation.
8
9
10         Description: 03435000 CUMBERLAND RIVER BELOW CHEATHAM DAM, TN
11         Year Boundaries: October 1 - September 30
12         Period in report: October 1, 1971 - September 30, 1991
13         Parameter: 7-day low
14         Non-zero values: 20
15         Zero values: 0
16         Negative values: 0 (ignored)
17
18         Input time series (zero and negative values not included in listing.)
19
20         2747.100  4590.000  2684.300  3234.300  4784.300  3642.900  5797.100  3425.700
21         2905.700  2812.900  8548.600  5271.400  4524.300  2894.300  5005.700  4892.900
22         3661.400  3267.100  5802.900  4427.100
23
24
25         LOG PEARSON TYPE III Frequency Curve Parameters
26         (based on logs of the non-zero values)
27
28         Mean (logs)                      3.607
29         Variance (logs)                   0.018
30         Standard Deviation (logs)         0.136
31         Skewness (logs)                   0.539
32         Standard Error of Skewness (logs) 0.512
33         Serial Correlation Coefficient (logs) -0.079
34         Coefficient of Variation (logs)    0.038
35
36
37         Frequency Curve - Parameter values at selected probabilities
38
39         Non-          Variance      95-Pct Confidence
40         exceedance      of          Intervals
41         Probability      Estimate    Lower      Upper
42         -----
43         0.1000          10.00      2772.400    1.008    2256.600    3175.500

```

Frequency_Statistics_report_Red River at Port Royal.txt

1	Program SWStat	U.S. GEOLOGICAL SURVEY	Seq 00001
2	Ver. 5.0	Log-Pearson & Pearson Type III Statistics	Run Date / Time
3	03/13/2018	based on USGS Program A193	8/24/2020 9:57 AM
4			
5	Notice -- Log-Pearson Type III or Pearson Type III distributions are used		
6	for these computations. Users are responsible for assessment		
7	and interpretation.		
8			
9			
10	Description: 03436100 RED RIVER AT PORT ROYAL, TN		
11	Year Boundaries: October 1 - September 30		
12	Period in report: October 1, 1991 - September 30, 2019		
13	Parameter: 7-day low		
14	Non-zero values: 22		
15	Zero values: 0		
16	Negative values: 6 (ignored)		
17			
18	Input time series (zero and negative values not included in listing.)		
19			
20	122.290	77.143	71.286
21	118.570	57.829	51.286
22	116.860	107.600	123.430
23			
24			
25	LOG PEARSON TYPE III Frequency Curve Parameters		
26	(based on logs of the non-zero values)		
27			
28	Mean (logs)	2.038	
29	Variance (logs)	0.038	
30	Standard Deviation (logs)	0.195	
31	Skewness (logs)	0.371	
32	Standard Error of Skewness (logs)	0.491	
33	Serial Correlation Coefficient (logs)	0.445	
34	Coefficient of Variation (logs)	0.096	
35			
36			
37	Frequency Curve - Parameter values at selected probabilities		
38			
39	Non-		Variance
40	exceedance	Recurrence	of
41	Probability	Interval	Estimate
42	-----	-----	-----
43	0.1000	10.00	62.580



September 25, 2026

Crucible Metals, LLC
C/O Elliot Smith
Headwaters, Inc.
167 Orchard Lane
Madison, MS 39110

RE: Bumpus Mills Mitigation Bank Letter of Reservation
TDEC Permit No.: NRS26.194
USACE Permit No.: LRN-2015-00436
Project: Project Crucible

Dear Mr. Smith,

This letter serves to verify that Westervelt Ecological Services, LLC has entered into an agreement with Crucible Metals, LLC for the reservation of the following mitigation credits available at Bumpus Mills Mitigation Bank for the above-referenced project.

Agency	Quantity	Credit Type
TDEC/USACE	3.87	Wetland

We will issue a Bill of Sale and request that the credits be withdrawn from the bank's ledger once payment is received. Please contact me at ksands@westervelt.com or at (850) 661-4292 if you have questions.

Respectfully,

Kelly Sands
Business Development Manager, Southeast

cc: Kiwon Park, Crucible Metals, LLC

Westervelt Ecological Services, LLC



1143 Columbia Avenue, B20
Franklin, TN 37064



O: 615-807-2194



wesmitigation.com



September 17, 2026

Crucible Metals LLC
1795 Zinc Plant Road
Clarksville, TN 37040

Dear Sir/Madam,

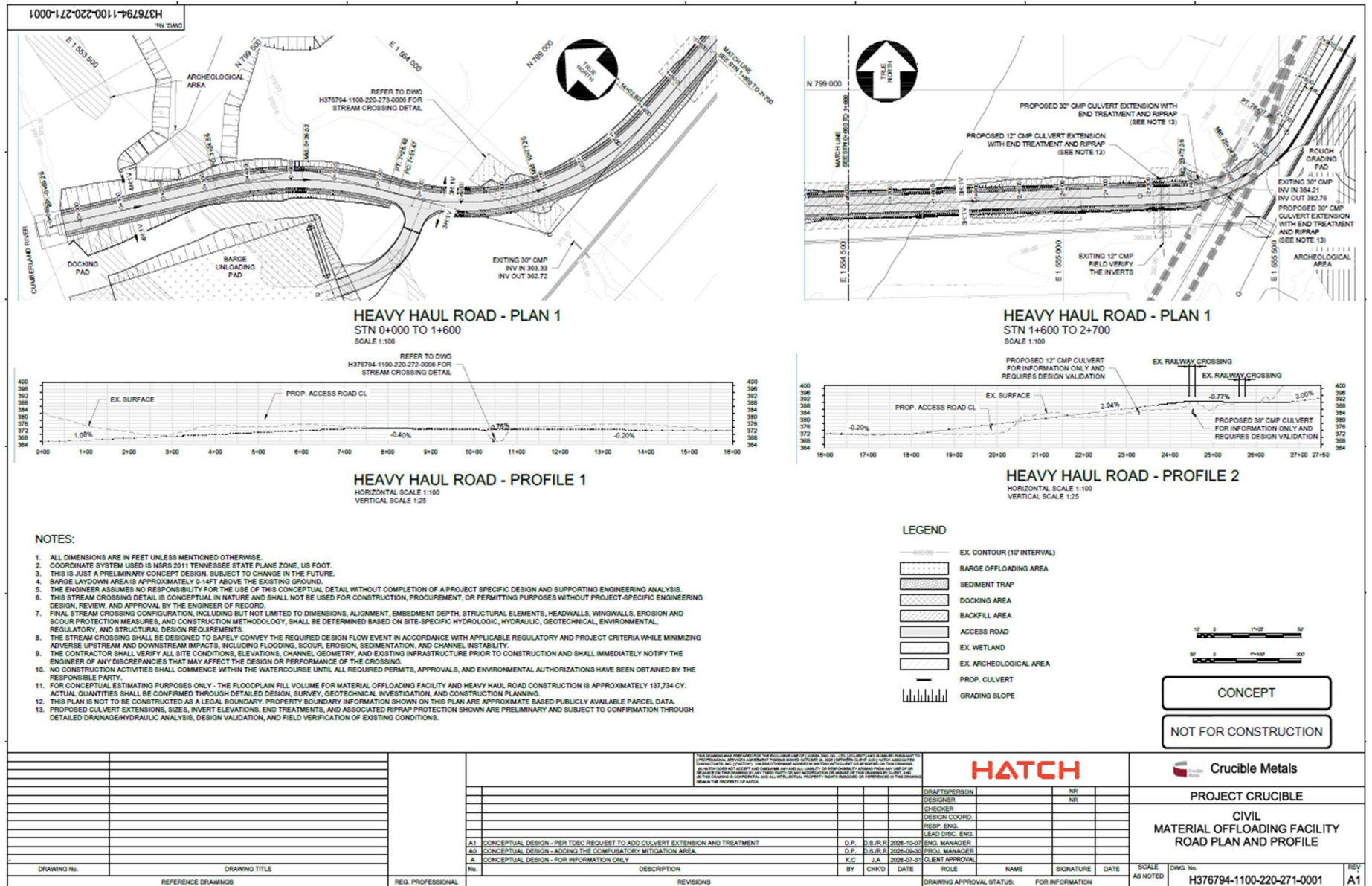
The Tennessee Mitigation Fund has reserved 0.32 wetland mitigation credits in the Lower Cumberland River Service Area for the Crucible Metals project in Montgomery County, Tennessee. We will reserve the credits for 6 months unless otherwise extended. If you have any questions, please give me a call at 615-979-5840.

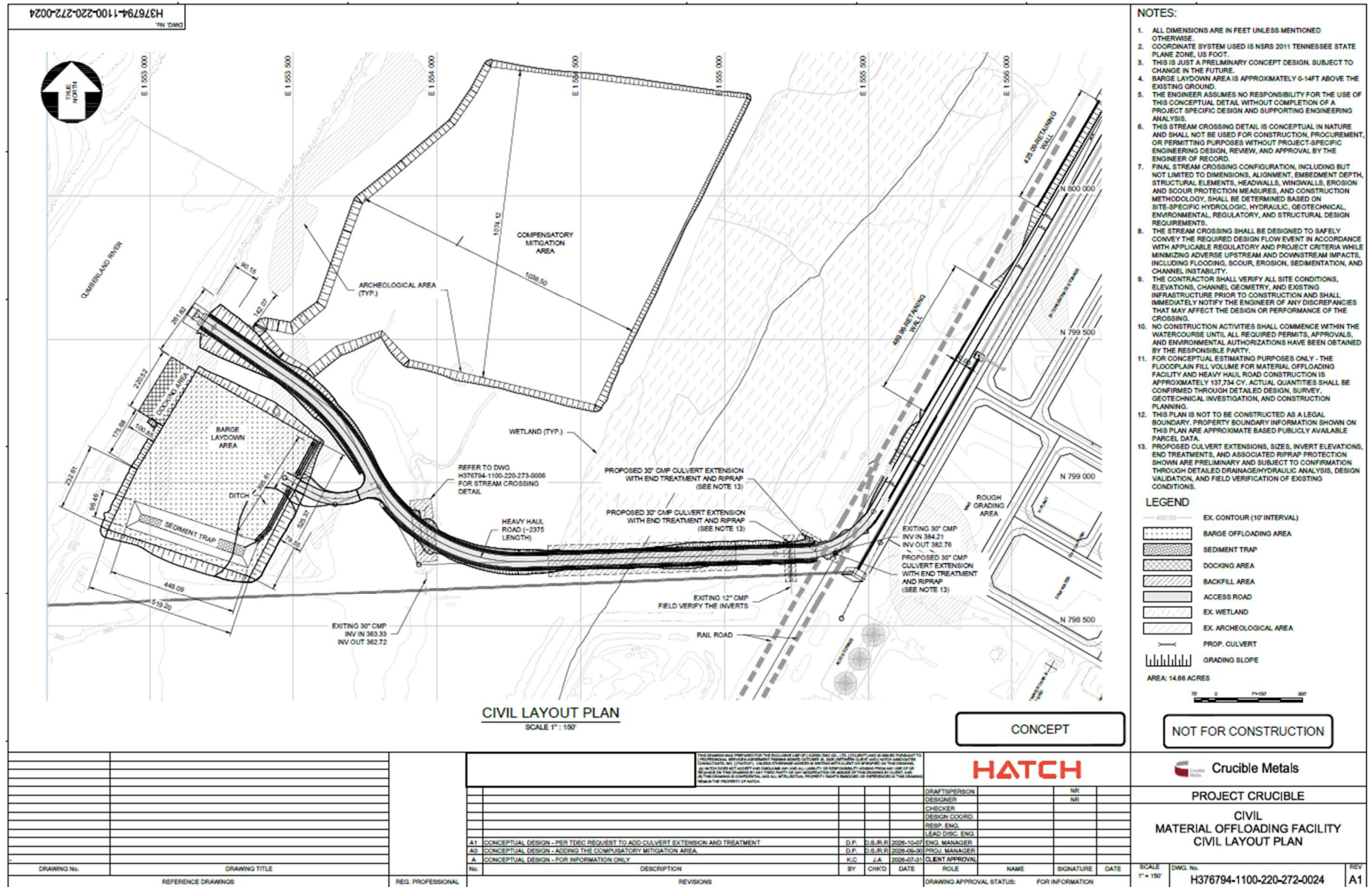
Sincerely,

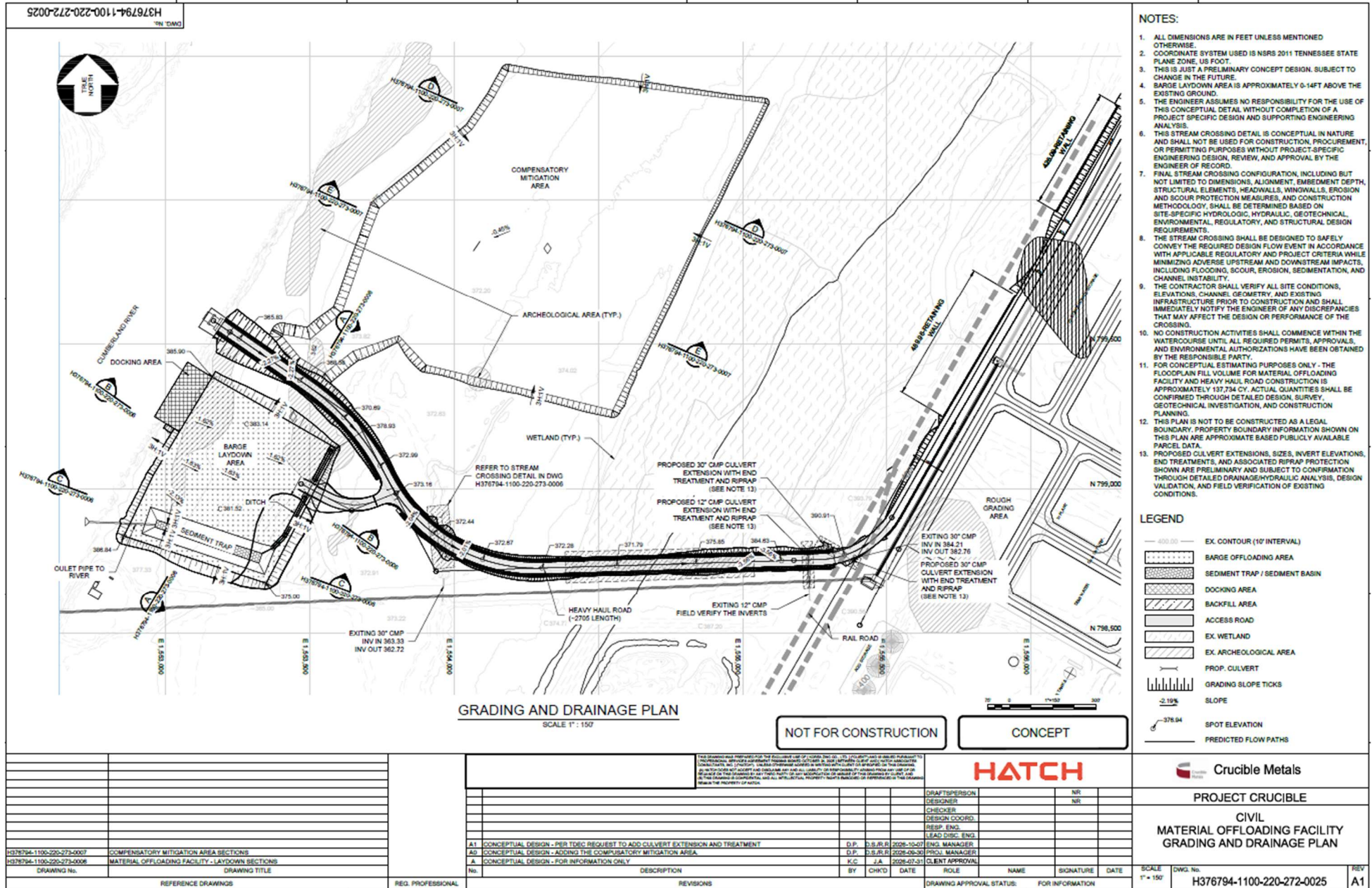
A handwritten signature in blue ink, appearing to read 'Chris Roberts', is placed above the printed name.

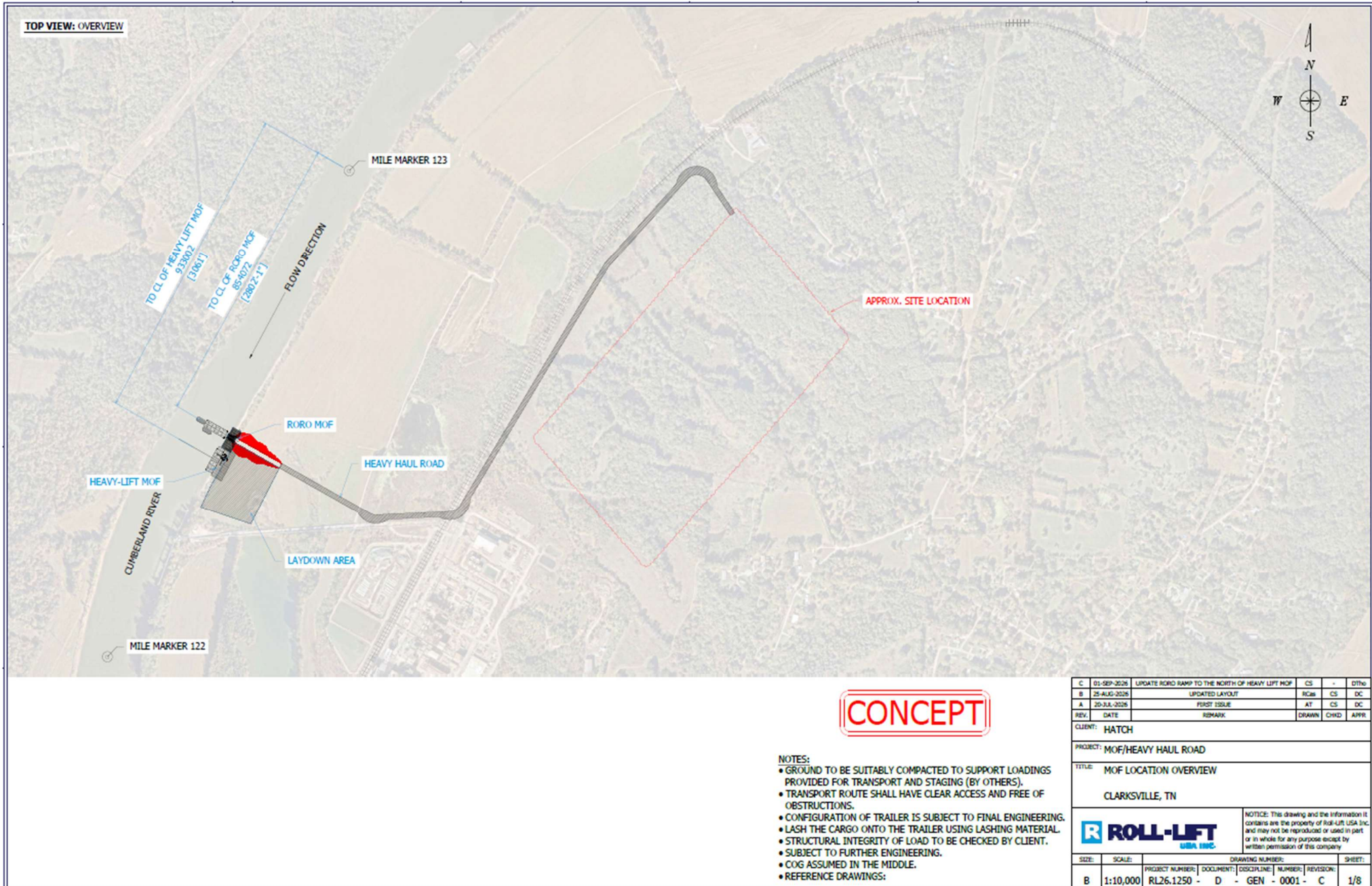
Chris Roberts
Director of Conservation

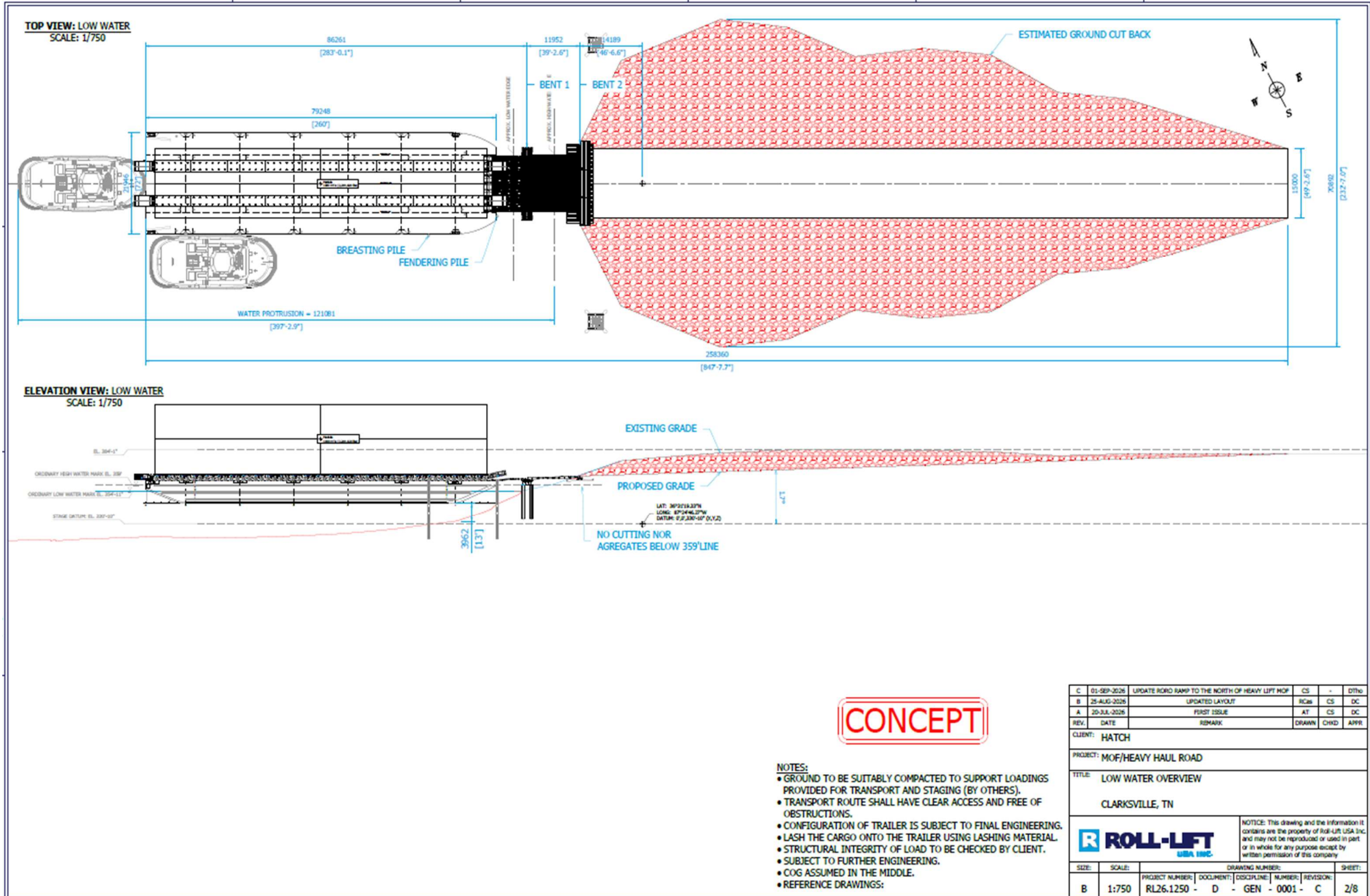
300 Orlando Avenue • Nashville, TN 37209 • Telephone: 615-353-1133 • Fax: 615-353-0083

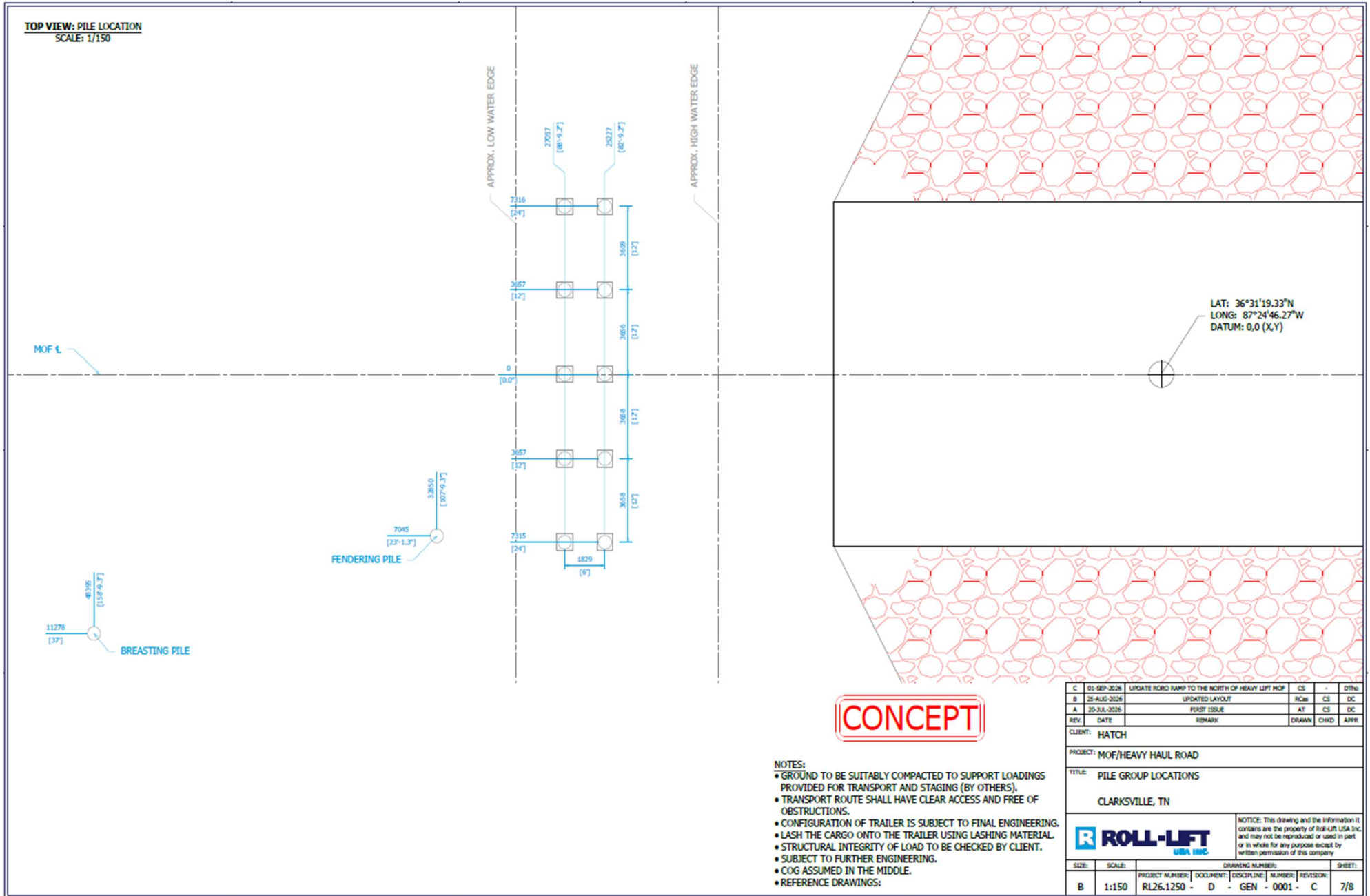


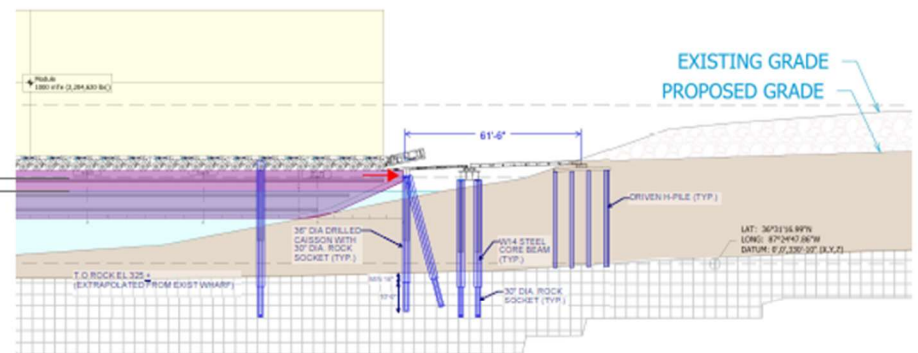
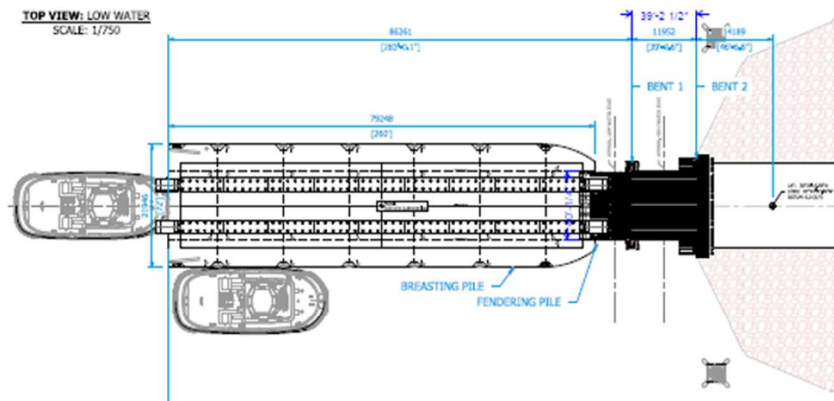
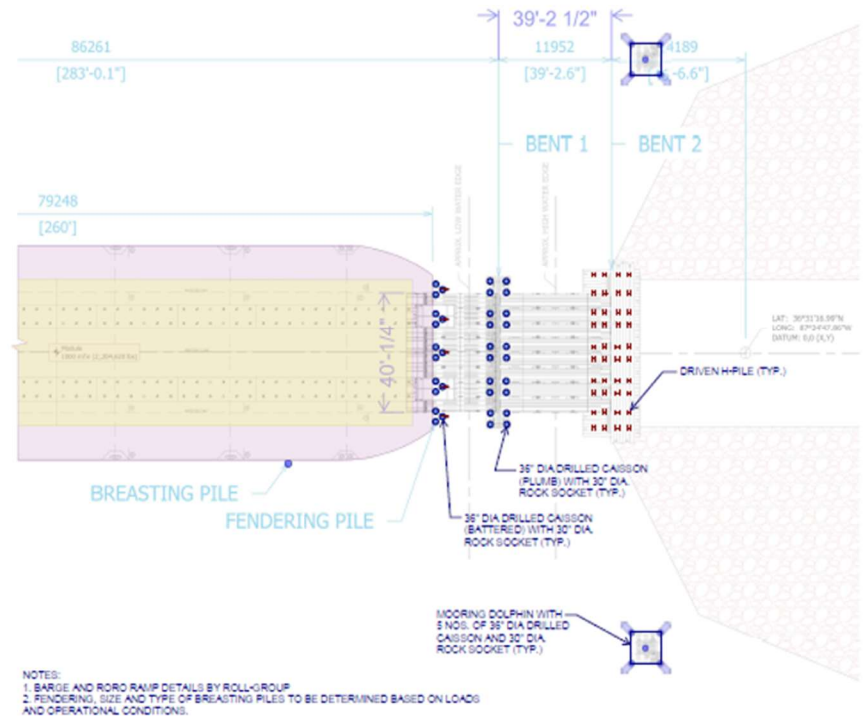
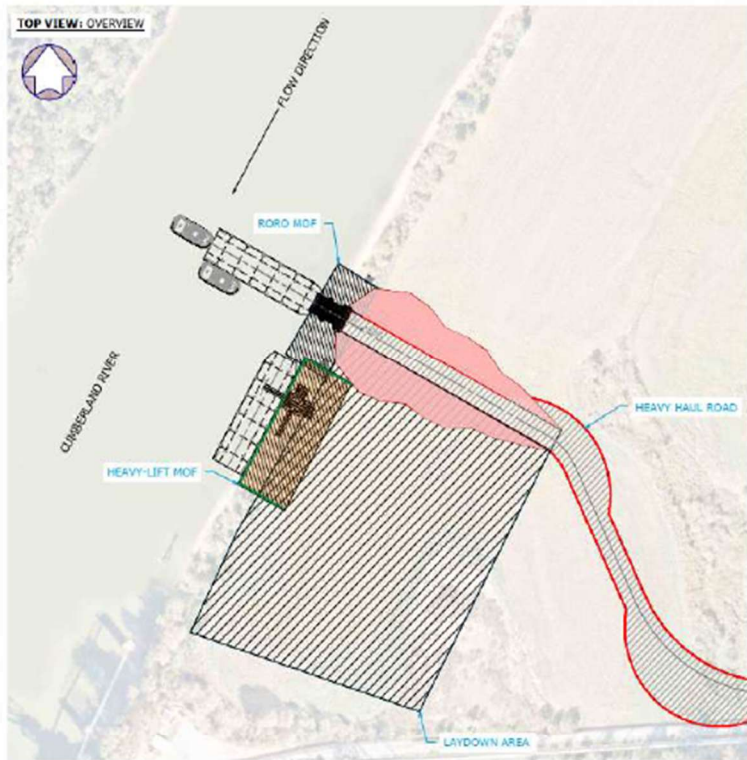


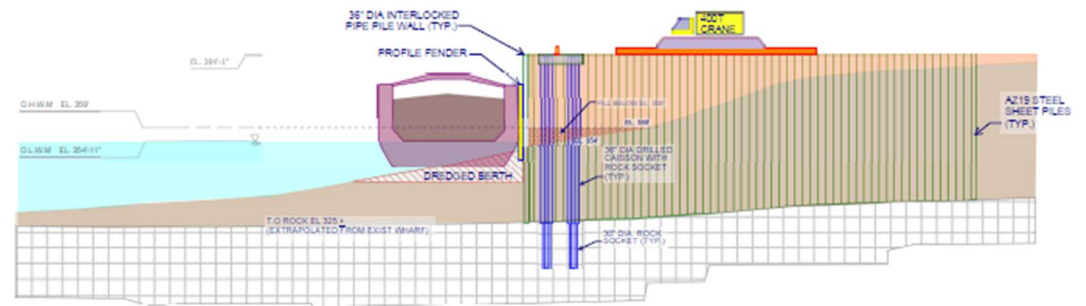
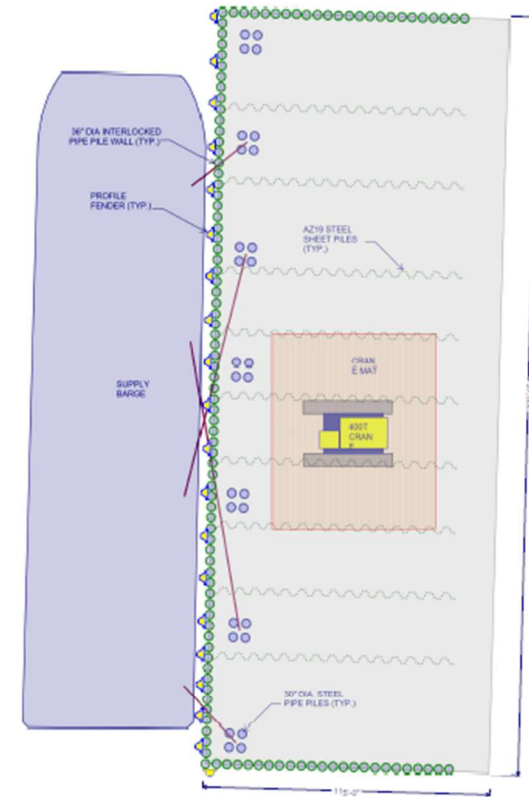
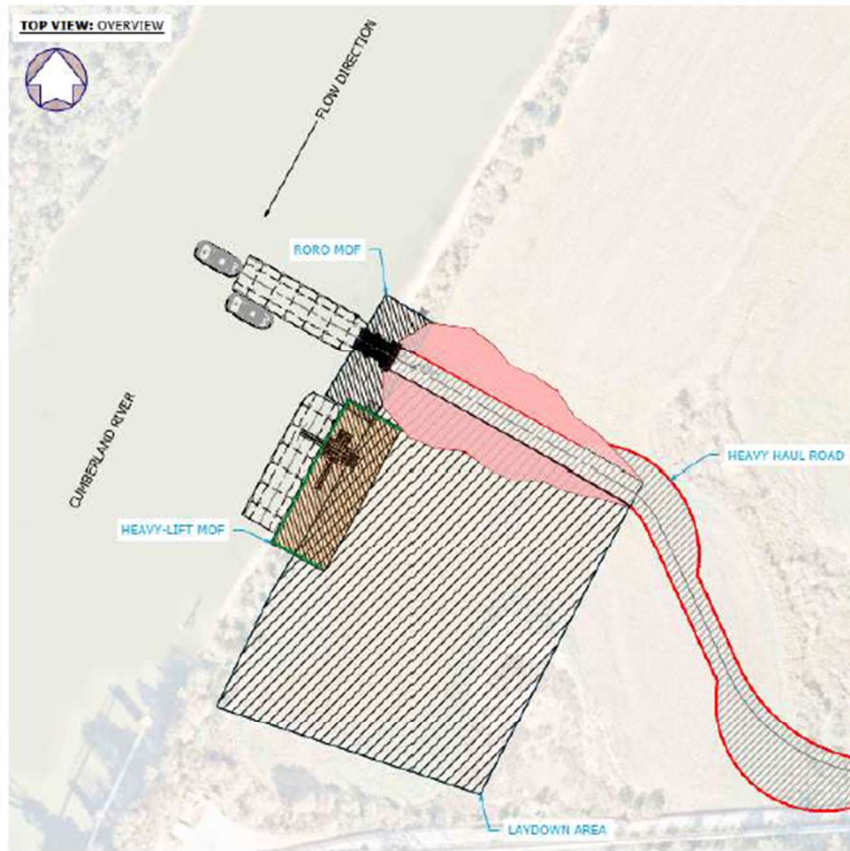




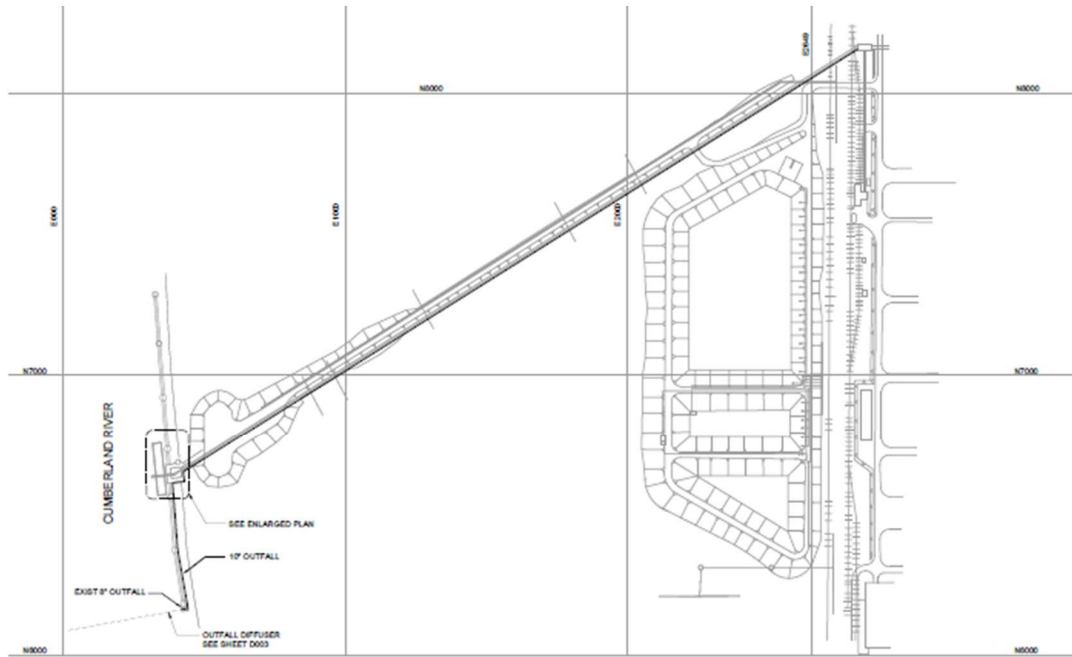




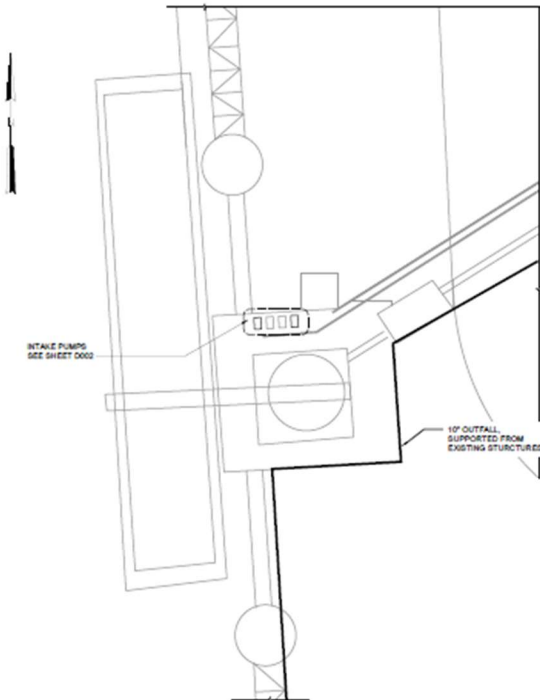






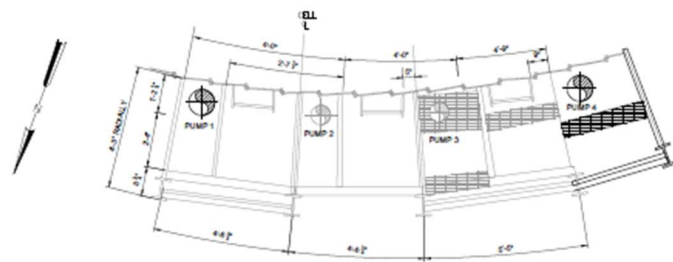


OVERALL PLAN
NTS

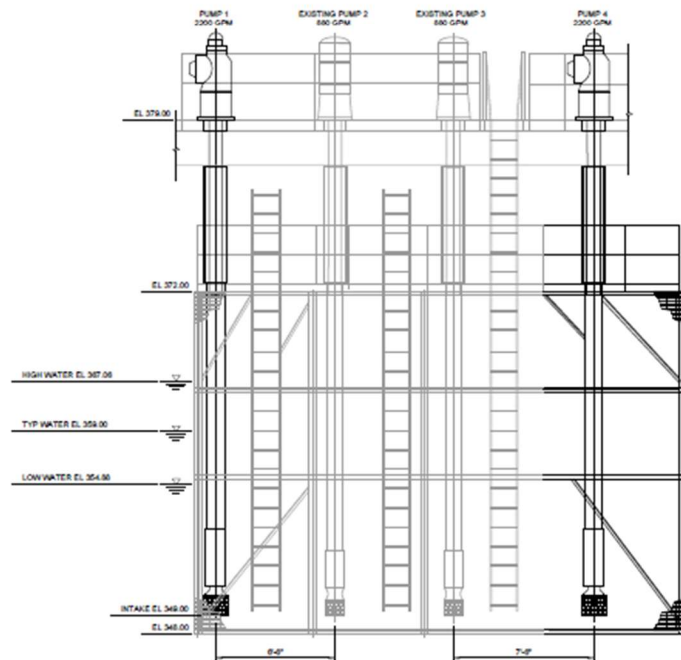


ENLARGED PLAN
NTS

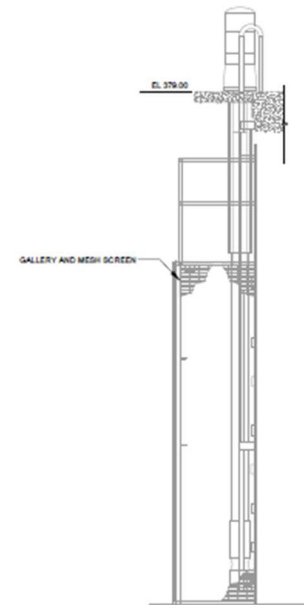
REV	ISSUED FOR	DATE	BY	PROJECT ENGINEER: S. HICKEY	PRELIMINARY DRAWING DO NOT USE FOR CONSTRUCTION	Hazen HAZEN AND SAWYER 545 MAINSTREAM DRIVE, SUITE 320 NASHVILLE, TENNESSEE 37228	HEADWATERS, INC.	MECHANICAL	DATE: AUGUST 2026
				DESIGNED BY: J. VAN DYKE					HAZEN NO.: 50265-000
				DRAWN BY: D. HAGEMAN					CONTRACT NO.: X
				CHECKED BY: S. HICKEY					DRAWING NUMBER:
				IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE					D001



PLAN
NTS



FRONT SECTION
NTS



SIDE SECTION
NTS

NOTES:

1. CUMBERLAND RIVER NORMAL POOL ELEVATION IS EL. 354.85 FT. WATER DEPTHS SHOWN ARE REFERENCED TO THE NORMAL POOL WATER SURFACE UNLESS OTHERWISE NOTED.
2. INTAKE PUMP SUCTION INLETS ARE LOCATED AT EL. 349.00 AND REMAIN SUBMERGED UNDER NORMAL OPERATING CONDITIONS.
3. MAXIMUM RIVER WATER WITHDRAWAL RATE IS 6.0 MGD.
4. INTAKE STRUCTURE SHALL BE PROVIDED WITH SCREENING DESIGNED TO PREVENT THE ENTRAPMENT OF FISH AND DEBRIS. FINAL SCREEN DESIGN SHALL BE COORDINATED WITH APPLICABLE REGULATORY REQUIREMENTS.
5. THE PROPOSED INTAKE FACILITIES ARE LOCATED OUTSIDE THE FEDERAL NAVIGATION CHANNEL AND DO NOT IMPAIR NAVIGABLE USE OF THE WATERWAY.
6. NORMAL OPERATION OF THE INTAKE SYSTEM DOES NOT REQUIRE ROUTINE DREDGING OF THE RIVERBED.

					PROJECT ENGINEER:	S. HICKEY
					DESIGNED BY:	J. VAN DYKE
					DRAWN BY:	D. HAGEMAN
					CHECKED BY:	S. HICKEY
					IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE 	
REV	ISSUED FOR			DATE	BY	

PRELIMINARY DRAWING
DO NOT USE FOR
CONSTRUCTION

Hazen
HAZEN AND SAWYER
545 MAINSTREAM DRIVE, SUITE 320
NASHVILLE, TENNESSEE 37228

HEADWATERS, INC.

PROJECT CRUCIBLE

MECHANICAL

INTAKE PUMPS
PLAN AND SECTIONS

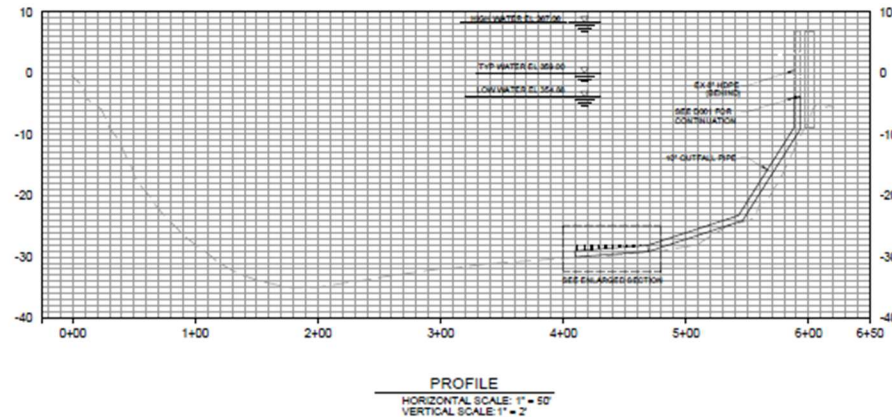
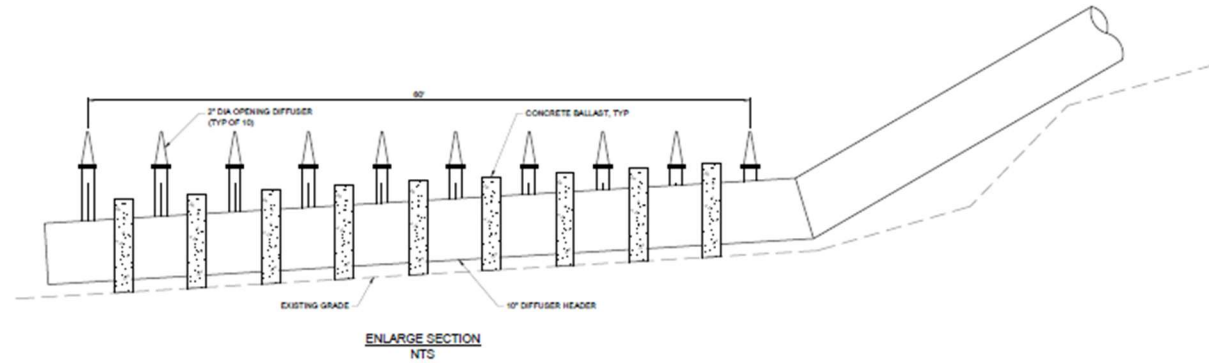
DATE: AUGUST 2026

HAZEN NO.: 50265-000

CONTRACT NO.: X

DRAWING NUMBER:

D002



NOTES:

1. DIFFUSER LOCATION, ORIENTATION, AND PORT CONFIGURATION SHOWN ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING FINAL DESIGN.
2. WATER DEPTHS SHOWN IN PROFILE ARE REFERENCED TO THE CUMBERLAND RIVER NORMAL POOL ELEVATION OF EL. 358.74 FT. THE NORMAL POOL WATER SURFACE IS NOT EXPLICITLY DEPICTED ON THE PROFILE VIEWS.
3. TOP OF DIFFUSER SYSTEM IS LOCATED 38 FEET BELOW NORMAL POOL ELEVATION (EL. 358.00 FT), PROVIDING APPROXIMATELY 6 FEET OF CLEARANCE FOR NAVIGATION.
4. SUBMERGED PIPELINES SHALL BE INSTALLED ON OR BELOW THE RIVERBED AND PROVIDED WITH APPROPRIATE BALLAST, ANCHORAGE, AND/OR SCOUR PROTECTION TO MAINTAIN STABILITY DURING DESIGN FLOW CONDITIONS. FINAL PIPELINE BALLASTING, ANCHORAGE, AND SCOUR PROTECTION REQUIREMENTS SHALL BE VERIFIED DURING FINAL DESIGN BASED ON SITE-SPECIFIC GEOTECHNICAL, HYDRAULIC, AND CONSTRUCTABILITY CONSIDERATIONS.
5. THE PROPOSED OUTFALL DIFFUSER SYSTEM IS DESIGNED FOR A MAXIMUM DISCHARGE RATE OF 2.1 MGD.
6. ALL IN-WATER WORK SHALL BE COMPLETED IN ACCORDANCE WITH APPLICABLE USACE, TDEC, AND OTHER REGULATORY PERMIT CONDITIONS.
7. THE OUTFALL DIFFUSER SYSTEM SHALL NOT ENCRUSCH UPON OR INTERFERE WITH THE FEDERAL NAVIGATION CHANNEL.

PROJECT ENGINEER:	S. HICKEY
DESIGNED BY:	J. VAN DYKE
DRAWN BY:	D. HAGEMAN
CHECKED BY:	S. HICKEY
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE	
REV	ISSUED FOR
DATE	BY

PRELIMINARY DRAWING
DO NOT USE FOR
CONSTRUCTION

Hazen
HAZEN AND SAWYER
545 MAINSTREAM DRIVE, SUITE 320
NASHVILLE, TENNESSEE 37228

HEADWATERS, INC.

PROJECT CRUCIBLE

MECHANICAL

DIFFUSER HEADER
PROFILE

DATE:	AUGUST 2026
HAZEN NO.:	50265-000
CONTRACT NO.:	X
DRAWING NUMBER:	D003

DRAFT PERMIT RATIONALE

ARAP Permit No. NRS26.194

Crucible Metals, LLC

Project Crucible

Lake Barley Watershed

Clarksville, Montgomery County, Tennessee

1. Permit Summary

Permittee:	Crucible Metals, LLC Kiwon Park 1795 Zinc Plant Rd. Clarksville, TN 37040 82-10-6776-5011
Contact:	
Activity Location:	1800 Zinc Plant Road
Nature of Business:	Construction of non-ferrous smelting and refining facility. Crucible Metals proposes permanent impacts to 21.5 linear feet of stream (encapsulation) and fill of 2.08 acres of wetlands to construct a new materials offloading facility (MOF), heavy haul road (HHR), surface water intake structure, and discharge-diffuser associated with the development of a new integrated non-ferrous smelting and refining facility otherwise known as Project Crucible. Wetland mitigation will be provided by a purchase of 3.87 credits from Bumpus Mills Mitigation Bank and 0.32 credits from Tennessee Mitigation Fund In-Lieu Fee Program.
Authorized Activity:	
Permit Writer:	Theron Binford, theron.binford@tn.gov

Effective Date:	Draft
Expiration Date:	Draft
Application Received:	04-SEP-26
Application Complete:	07-OCT-26

2. Status of Affected Waters – Streams

Stream 4 (S-4): Unnamed Tributary to Cumberland River/Barkley Reservoir; TN05130205015_2000					
Designated Use	Fully	Not	Not	Causes	Sources
	Supporting	Assessed	Assessed		
Domestic Water Supply	☐	☐	☒		
Fish and Aquatic Life	☐	☐	☒		
Recreation	☐	☐	☒		
Livestock Watering & Wildlife	☐	☐	☒		
Irrigation	☐	☐	☒		
Industrial Water Supply	☐	☐	☒		
Assessment Date: NA					

Cumberland River/Barkley Reservoir; TN05130205015_2000					
Designated Use	Fully	Not	Not	Causes	Sources
	Supporting	Assessed	Assessed		
Domestic Water Supply	☒	☐	☐		
Fish and Aquatic Life	☐	☐	☒		
Recreation	☒	☐	☐		
Livestock Watering & Wildlife	☒	☐	☐		
Irrigation	☒	☐	☐		
Industrial Water Supply	☒	☐	☐		
Assessment Date: 11/03/23					

The affected waters have available parameters for habitat alteration.

The affected waters are not known Exceptional Tennessee Waters.

3. Status of Affected Waters – Wetlands

Wetland 1/W-1: Unnamed Wetland					
Latitude:	36.519509	Longitude:	-87.412552	Acreage:	1.12
Wetland Description: low-quality non-isolated scrub-shrub wetland					

Wetland 2/W-2: Unnamed Wetland					
Latitude:	36.519954	Longitude:	-87.410611	Acreage:	0.12
Wetland Description: low-quality non-isolated scrub-shrub wetland					

Wetland 3/W-3: Unnamed Wetland					
Latitude:	36.522671	Longitude:	-87.405907	Acreage:	0.28
Wetland Description: moderate quality non-isolated forested wetland					

Wetland 8/W-8: Unnamed Wetland					
Latitude:	36.520564	Longitude:	-87.407111	Acreage:	0.56
Wetland Description: low-quality non-isolated scrub-shrub wetland					

The affected waters have available parameters for habitat alteration.

The affected waters are not known Exceptional Tennessee Waters.

4. Authorized Alterations

Unavoidable permanent impacts to 21.5 linear feet of stream and permanent impacts to 2.08 acres of wetland fill necessary to construct and develop a new integrated non-ferrous smelting and refining facility located on Zinc Plant Road in Clarksville, Montgomery County, TN. To offset permanent impacts to 2.08 acres of wetland, the

permittee shall purchase 3.96 acres of wetland mitigation credits from both Bumpus Mills Mitigation Bank and Tennessee Mitigation Fund In-lieu Fee program.

Updated water intake system to withdrawal at 6,160 Gallons per minute (GPM) (8.8 million gallons per day (MGD)) from the Cumberland River/Barkler Reservoir.

5. Alternatives Analysis and Selection of Least Impactful Practicable Alternative

The stated goal and purpose of the authorized activity is to develop a new integrated non-ferrous smelting and refining facility located on Zinc Plant Road, Clarksville, TN. The permittee has submitted an analysis of potentially practicable alternatives to the authorized activity and provided the following discussion of those alternatives:

1) Alternative 1: Original Material Offload Facility (MOF) and Heavy Haul Road (HHR)

This alternative meets the purpose and need within the required timelines and at the desired production capacity, while also integrating with existing industrial infrastructure for maximized process streams. Contiguous land is available under this alternative and is able to accommodate required facilities and construction activities, without requiring significant additional land acquisition or introducing excessive Project Crucible 8 construction complexity. Multimodal transportation is available via existing rail and roads, as well as barge via the proposed MOF and HHR, which will facilitate the unloading of bulk materials and oversized modular components of the facility. This alternative would result in impacts to 0.2 acres of emergent wetlands and 440 linear feet of the Cumberland River through the construction of the MOF and HHR. This alternative would result in approximately 13.5 acres of fill within the USACE flowage easement at the Barkley Dam and Lake Barkley (Chatham Lake and Dam) Civil Works project, introducing potential construction complexity and real estate requirements imposed by a consent to easement from USACE, as well as impacts to FEMA's regulatory floodway. Construction of this alternative would involve substantial ground disturbance activities. As such cultural resource surveys were conducted by the Project Sponsor for the Crucible Facility and the original MOF and HHR locations. Surveys revealed three eligible sites (40MT1420, 40MT1424, and 40MT1427) on the Crucible Facility (Manning et al., 2026a). Adverse effects to these three sites cannot be avoided and are included in all alternatives evaluated herein. For the original MOF and HHR location in this alternative, surveys revealed two additional eligible sites (40MT1425 and 40MT1426), one of which includes an a culturally sensitive site at 40MT1425 (Manning et al., 2026b). While this site was recorded, surveys, including full delineation of 40MT1425, ceased upon the unanticipated discovery, and was never completed at the request of consulting parties' recommendation to conduct no further invasive testing within the floodplain in which the MOF and HHR were sited. In this configuration, adverse effects of these sites could not be avoided.

2) Alternative 2: Alternate MOF and HHR (chosen alternative)

This alternative meets the purpose and need within the required timelines and at the desired production capacity, while also integrating with existing industrial infrastructure for maximized process streams. Contiguous land is available under this alternative and is able to accommodate required facilities and construction activities, without requiring significant additional land acquisition or introducing excessive construction complexity. Multimodal transportation is available via existing rail and roads, as well as barge via the proposed MOF and HHR, which will facilitate the unloading of bulk materials and oversized modular components of the facility. This alternative would result in impacts to 2.08 acres of wetlands, 21.50 linear feet of intermittent streams, and 500 linear feet of the Cumberland River through the construction of the MOF and HHR. This alternative would result in approximately 14 acres of fill within the USACE flowage easement at the Barkley Dam and Lake Barkley (Chatham Lake and Dam) Civil Works project, introducing potential construction complexity and real estate requirements imposed by a consent to easement from USACE, as well as impacts to FEMA's regulatory floodway. This alternative would have unavoidable adverse effects on three historic properties (40MT1420, 40MT1424, and 40MT1427) on the Crucible Facility (Manning et al., 2026a). For this alternate MOF and HHR location, previous surveys conducted by parties not associated with the Project Sponsor revealed one additional eligible site (Johnson et al., 2016). The alternate MOF and HHR were configured to completely avoid adverse effects to this archaeological site, as well as the two archaeological sites located within the original MOF and HHR.

3) Alternative 3: Interim MOF and HHR

This alternative meets the purpose and need within the required timelines and at the desired production capacity, while also integrating with existing industrial infrastructure for maximized process streams. Contiguous land is available under this alternative and is able to accommodate required facilities and construction activities, without requiring significant additional land acquisition or introducing excessive construction complexity. Multimodal transportation is available via existing rail and roads, as well as barge via the proposed MOF and HHR, which will facilitate the unloading of bulk materials and oversized modular components of the facility. This alternative would result in impacts to 1.19 acres of wetlands, 130 feet of intermittent streams, and 500 linear feet of the Cumberland River through the construction of the MOF and HHR. This alternative would result in approximately 28.5 acres of fill within the USACE flowage easement at the Barkley Dam and Lake Barkley (Chatham Lake and Dam) Civil Works project, introducing potential construction complexity and real estate requirements imposed by a consent to easement from USACE, as well as impacts to FEMA's regulatory floodway. This alternative would have unavoidable adverse effects on three historic properties (40MT1420, 40MT1424, and 40MT1427) on the Crucible Facility (Manning et al., 2026a). For this interim MOF and HHR location, previous surveys conducted by parties not associated with the Project Sponsor revealed one additional eligible site (Johnson et al., 2016). The interim MOF was configured to completely avoid adverse effects to this archaeological site. However, the HHR in this

alternative traverses portions of the Cumberland River floodplain that have not had cultural resource surveys conducted as of the date of the permit application submission to USACE. Although these areas do not have current surveys, it was determined that there is a high likelihood of identifying additional archaeological sites based on available resources, including input by consulting parties during the Section 106 Consultation process, previous regional surveys (Jolley, 1980), current surveys and background information contained in those (Manning et al., 2026a; Manning et al., 2026b; Johnson et al., 2016), and the location of these features on landforms in the floodplain (e.g., historic ridges and natural levees along the Cumberland River and its historic channels). Additionally, the identification and delineation of potential archaeological sites within this area would require invasive testing methods (e.g., shovel testing and geoarchaeological investigations); consulting parties requested avoidance of invasive testing methods within the floodplain due to the culturally sensitivity of the area.

4) Alternative 4: No Discharge/No MOF and HHR

A “no discharge” and no MOF and HHR alternative would remove the ability to have materials, equipment, and modular components of the facility during construction. Under this approach, delivery of all construction materials, equipment, and modules would rely on road and rail transport. As described above, Project Crucible requires delivery of large, heavy, and oversized components, including major process equipment, which have typical dimensions of 45x15x15m and weigh around 500 tons. Delivery of these modular components would not only place additional demand on local road infrastructure (e.g., River Road has a weight capacity of 10 tons), these large components would exceed the load capacity of many of the regional bridges (e.g., the legal gross weight allowed in Tennessee is 40 tons) as well as standard North American freight rail cars (100-115 tons). As such, this alternative does not meet the criterion related to transport and logistics feasibility. Construction would also require the delivery of construction materials (e.g., fill material, aggregate, and 48,000 tons of steel). The capacity of one barge is equivalent to 35 rail cars and 134 trucks (USACE, 2026), Project Crucible 10 enabling efficient delivery of these materials to meet the required scale and timeframe required of this project. However, in the absence of a MOF, material delivery would be slowed, constraining construction sequencing and material handling, requiring increased on-site assembly of large components, and significantly extending the construction schedule. Furthermore, these constraints do not meet the criteria related to constructability and site suitability, and would limit the ability to deliver and install key equipment required for Project implementation, impacting the required schedule to deliver critical minerals to meet national defense demands. This alternative would result in no adverse impacts to waters of the U.S. and no construction activities within the USACE flowage easements at the Barkley Dam and Lake Barkley (Chatham Lake and Dam) Civil Works project. This alternative would have unavoidable adverse effects on three historic properties (40MT1420, 40MT1424, and 40MT1427) on the Crucible Facility (Manning et al., 2026a).

Attribute	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Transport and logistics feasibility	High	High	High	Low
Wetland impacts	0.2	2.08	1.19	0
Cumberland River impacts (lf)	440	500	500	0
Stream impacts (linear feet)	0	21.50	130	0
Flowage easement/floodway impacts (acres)	13.5	14	28.5	0
Relative cultural resources impacts	High	Moderate	Moderate	Moderate
Cultural resources uncertainty	Low	Low	High	Low
Practicable under 404(b)(1)	Yes	Yes	Yes	No
Meets project purpose	Yes	Yes	Yes	No

Table 1. Comparison of relevant screening criteria and factors.

Based on the available information, the Division has preliminarily determined that the authorized activities represent the least impactful practicable alternative to accomplish the project's purpose and goals.

6. Existing Conditions/Authorized Loss of Resource Values

Streams:

Stream 4 (s-4): has a drainage area that was not returned from Stream Stats. It does not appear as a stream on the USGS topographic map. It is also not shown on the Natural Resources Conservation Service (NRCS) soil survey maps. The channel is relatively straight and maintains a 4 feet width for most of the reach. The sinuosity ratio is 1.1. There was visible flow in the channel during the site visit. Photographs 83, 84, 85 and 86 are representative of Stream 4 and are included in the HD report in Attachment II. It received a secondary indicator score of 23.50 and would be classified as an intermittent stream. TN Stream Quantification Tool (TN SQT) was not run on the stream since cumulative impacts are less than 200 feet of stream.

Wetlands:

*Wetlands (W-1, W-2, W-3, and W-8) were determined to be jurisdictional (non-isolated) as these features maintain a continuous surface connection to relatively permanent, standing, or continuously flowing bodies of water. Within the proposed limits of the MOF and HHR, W-1, W-2, and W-8 are classified as palustrine scrub-shrub (PSS), while W-3 is classified as palustrine forested (PFO). Primary hydrology indicators observed within the identified wetlands include surface water, saturation, sediment deposits, iron deposits, and oxidized rhizospheres along living roots. The primary vegetative components observed within the wetland habitats include sweetgum (*Liquidambar styraciflua*), sugarberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*), black willow (*Salix nigra*), American sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), water smartweed (*Persicaria amphibia*), butterweed (*Packera glabella*), broadleaf cattail (*Typha latifolia*), boxelder (*Acer negundo*), sedge (*Carex* spp.), buttonbush (*Cephalanthus occidentalis*), and soft rush (*Juncus effusus*), among others.*

The soil matrix color observed within the wetlands was observed as 4/1 (dark gray), 4/2 (dark grayish brown), 5/1 (gray), and 5/2 (grayish brown) on the 10YR Munsell Soil Color chart. Additionally, distinct, or prominent redox concentrations were present (~10-20%) with a soil color of 4/6 (dark yellowish brown) on the 10YR chart. According to the Tennessee Rapid Assessment Method (TRAM) for wetlands score, W-1, W-2, and W-8 have a low resource value determination. W-3 has a moderate resource value determination.

The Division has preliminarily determined that the activity, if conducted in accordance with submitted plans and permit conditions, will not result in an appreciable permanent loss of resource values.

7. Mitigation Required

Total permanent cumulative impacts include 21.5 linear feet of stream impacts. Per Tennessee Code Annotated §69-3-141, no stream mitigation is required.

Total permanent wetland impacts include 1.8 acres to non-isolated low resource value wetlands and 0.28 acres to non-isolated moderate resource value wetlands. Total wetland mitigation required for the authorized work is 3.96 Wetland Mitigation Credits.

Wetlands:

To offset permanent impacts to 2.08 acres of low and moderate resource value wetlands, the permittee shall purchase the equivalent of 3.96 wetland mitigation credits at a 2:1 ratio. The applicant has reserved 3.87 wetland credits from Bumpus Mills Mitigation Bank, whose [primary/secondary] service area encompasses the impact site. Documentation from the Bumpus Mills MB reservation of these credits dated 09-25-26 was supplied to the Division. To offset the remaining 0.09 acres of low/moderate resource value wetlands, the permittee shall purchase wetland mitigation credit at a 2:1 ratio with an additional 12% temporal loss factor and 1.25x proximity factor (a total of 0.126-acre credits). Documentation from the Tennessee Mitigation Fund of the reservation of these credits dated 09-17-26 was supplied to the Division. With the purchase of mitigation credits, legal responsibility for completion of the mitigation is legally transferred to the Bumpus Mills MB and Tennessee Mitigation Fund.

Based on the available information, the Division has made a preliminary determination that the stream mitigation is sufficient to offset any appreciable permanent loss of water resource value.

8. Antidegradation

Wetlands:

In accordance with the Tennessee Antidegradation Statement (Rule 0400-40-03-.06), the Division has made a preliminary determination that the proposed activities will result in *de minimis* degradation of waters with available parameters the applicant proposes to provide in-system mitigation to offset any appreciable permanent loss of resource values.

Water withdrawal:

The Department's rules state a single water withdrawal will be considered *de minimis* if it removes less than five percent of the minimum 7-day average streamflow with a 10-year recurrence interval (7Q10) flow of the stream. If more than one withdrawal has been authorized or proposed in a segment and the total of the authorized and proposed withdrawals uses no more than 10% of the assimilative capacity, or 7Q10 low flow, they are presumed to be *de minimis*.

The 7Q10 flow of the Cumberland River below Cheatham Dam was calculated utilizing the United States Geological Survey's (USGS) Hydrologic Toolbox v1.1.3 for the period of record from October 1, 1971 to September 30, 1991 at USGS gage 03435000. The 7Q10 in this river segment is 2772.4 cubic feet per second (CFS) or 1,244,343.40 GPM.

The 7Q10 flow of the Red River at Port Royal was calculated utilizing the United States Geological Survey's (USGS) Hydrologic Toolbox v1.1.3 for the period of record from October 1, 1991 to September 30, 2019 at USGS gage 03436100. The 7Q10 in this river segment is 62.58 cubic feet per second (CFS) or 28,087.94 GPM.

The proposed withdrawal is 13.724 CFS or 6,160 GPM up to 88 MGD. The withdrawal is 0.4 percent of the 7Q10 flow (combining both 7Q10 flows between the Cumberland River below Cheatham Dam and Red River at Port Royal). In accordance with Rule 0400-40-03-.04 (3) and the Tennessee Antidegradation Statement Rule 0400-40-03-.06, the Division has made the preliminary determination that the proposed activity will result in no more than *de minimis* degradation.

For more information, please refer to Tennessee's Antidegradation Statement which is found in Chapter 0400-40-03 of the [Rules of the Tennessee Department of Environment and Conservation](#).