ENVIRONMENTAL ASSESSMENT
Redwood Materials, Inc., McCarran, Nevada

Construction of Production Facilities for High-Quality Cathode Active Materials and High-Performance, Ultra-Thin Battery Copper Foil

Final Environmental Assessment and Finding of No Significant Impact

November 2023

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
APE	area of potential effect
ATV	advanced-technology vehicle
ATVM	Advanced-Technology Vehicle Manufacturing
BAPC	Bureau of Air Pollution Control
BLM	Bureau of Land Management
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
BSMM	Bureau of Sustainable Materials Management
CAM	cathode active materials
CAPP	Chemical Accident Prevention Program
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO2 equivalent
DMRs	discharge monitoring reports
DOE	U.S. Department of Energy
EA	environmental assessment
EHS	environmental, health, and safety
EIS	environmental impact statement
EJ	environmental justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EV	electric vehicle
FEMA	Federal Emergency Management Agency
FONSI	finding of no significant impact
GHG	greenhouse gas
GIS	geographic information system
HAP	Hazardous air pollutant
HFCs	hydrofluorocarbon
I	Interstate
IPaC	Information for Planning and Consultation
ISO	International Organization for Standardization
KEC	Kautz Environmental Consultants
kV	kilovolt
LPO	Loan Programs Office
LQG	large-quantity generator
MBTA	Migratory Bird Treaty Act of 1918

Acronym	Definition
MOU	Memorandum of Understanding
MT/yr	metric tonnes per year
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NATA	National Air Toxics Assessment
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act of 1966, as amended
NO_2	nitrogen dioxide
NOSHA	Nevada Occupational Safety and Health Act
NRS	Nevada Revised Statutes
O_3	ozone
OSHA	Occupational Safety and Health Administration
Pb	lead
pCAM	precursor cathode active materials
PFC	perfluorocarbon
PM	particulate matter
PM_{10}	diameter of 10 micrometers or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 micrometers or less
PPE	personal protective equipment
Primary Facilities	the copper-foil facility, the CAM facility, and the hydromet-refining facility
PTE	potential to emit
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RO	reverse osmosis
SAD	Surface Area Disturbance
SF_6	sulfur hexafluoride
SHPO	State Historical Preservation Officer
SO_2	sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
TRIC	Tahoe-Reno Industrial Center
TRI-GID	Tahoe–Reno Industrial General Improvement District
TROA	Truckee River Operating Agreement
TSDF	treatment, storage, and disposal facility
UP	Union Pacific
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VOCs	volatile organic compounds

Acronym	Definition
VRM	Visual Resource Management
WD	Written Determination
WWSP	Written Workplace Safety Program

1.0 PURPOSE AND NEED

1.1 Purpose and Need for Agency Action

The purpose and need for agency action is to comply with the U.S. Department of Energy (DOE) mandate under Section 136 of the Independence and Security Act of 2007, which established the Advanced-Technology Vehicle Manufacturing (ATVM) Program, by selecting projects eligible for financial assistance that are consistent with the goals of the act (DOE 2023).

Redwood Materials, Inc. (Redwood Materials), is proposing to produce sustainable battery components, consisting of high-quality cathode active materials (CAM) and high-performance, ultra-thin battery copper foil for electric vehicles (EVs) at a facility near McCarran, Nevada. Redwood Materials proposes to offer large-scale sources of domestic battery copper foil and CAM to U.S.-based battery manufacturing partners.

Redwood Materials has applied for a loan pursuant to the ATVM Program, which was established to provide loans to automobile and automobile-parts manufacturers for the cost of re-equipping, expanding, or establishing manufacturing facilities in the United States to produce advanced-technology vehicles or qualified components. The primary goal of the ATVM Program is to improve fuel economy for light-duty vehicles and thereby reduce ozone (O_3) precursors, greenhouse gas (GHG) emissions, and particulate matter (PM) emissions associated with vehicle operation. The ATVM Program is designed to stimulate development of the technology required to meet program objectives.

Redwood Materials would use the loan to produce battery components, including through processes that would convert end-of-life products into feedstock, thereby helping to drive electrification of the U.S. economy and put the United States on the path toward net-zero emissions through sustainable domestic manufacturing. This, in turn, would reduce air emissions, such as O_3 precursors, PM, and GHGs, that contribute to global warming, consistently with the primary goal of the ATVM Program. Financially supporting the Redwood Materials project would help bring the production of sustainable battery components for EVs to market domestically, encourage greater use of EVs, and reduce overall national emissions of air pollutants and human-caused GHGs.

1.2 Background

The ATVM Program is administered by the DOE's Loan Programs Office (LPO). The LPO originates, underwrites, and services loans to eligible automotive manufacturers and component manufacturers to finance re-equipping, expanding, or establishing manufacturing facilities in the United States that produce advanced-technology vehicles (ATVs) and qualifying components, along with the cost of associated engineering integration performed in the United States.

To fund its project, Redwood Materials applied to the DOE ATVM Program for financial assistance. The LPO determined that the application is substantially complete, per the rules governing the ATVM Program in 10 Code of Federal Regulations (CFR) Part 611. Redwood Materials was subsequently invited to enter the LPO's due diligence process.

1.3 Scope of the Environmental Assessment

The LPO prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.), Council on Environmental Quality (CEQ) NEPA-implementing regulations (40 CFR Parts 1500–1508), and

DOE NEPA-implementing procedures (10 CFR Part 1021) to inform its decision-making process regarding whether to issue an ATVM loan to Redwood Materials.

This EA allows the LPO to consider the environmental impacts of its action (i.e., financial assistance/ATVM loan) to support the construction and tooling of a facility to produce battery components, including through processes that would convert end-of-life products into new feedstock, near McCarran, Nevada. Therefore, the scope of the Proposed Action (i.e., providing a loan to Redwood Materials) encompasses the construction and tooling of the new facility.

For the Proposed Action, referred to in this document as "the Project," several factors influence the scope of issues analyzed in this EA, as follows.

- The location of the new facility within the Tahoe–Reno Industrial Center (TRIC), which Storey County has designated as a heavy industrial zone (see Appendix E, *Land Use and Special Management Area Information*)
- The site conditions at the onset of the federal action
- The permits that have been issued or are in the process of being issued by regulatory authorities (see Appendix A, *Permits and Approvals*)

Any permits not currently held by Redwood Materials, but necessary for forthcoming facility operations, would be obtained from the appropriate federal, state, or local regulating authority prior to such facility operations.

This EA describes the Project and its potential impacts on multiple resource areas that could result from construction and operation of the new facility. Several factors were reviewed to determine the scope of the issues and resources for analysis in this EA and identify non-significant issues and resources. Based on the LPO's review of the scope of the Project (i.e., construction and tooling of the new facility), the existing site conditions, and permit status, the scope of the issues analyzed in this EA includes the following.

- Air Quality
- Climate Change – GHG Emissions
- Transportation
- Visual Resources
- Water Resources
- Biological Resources
- Cultural Resources
- Native American Interests
- Socioeconomics and Environmental Justice
- Health and Safety
- Waste Management

Resource areas not included in the scope of issues analyzed in detail in this EA include soils and geology, terrestrial vegetation, floodplains, land use, and noise. Because the Project is located within the TRIC, which Storey County designated as a heavy industrial zone, and adjacent to existing industrial facilities within a previously disturbed property, impacts related to

soils and geology, land use, noise, and terrestrial vegetation are not anticipated. The Project area is not in a flood zone or floodplain, according to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Numbers 32029CIND0A and 32029C0100D, and no federally designated or non-jurisdictional wetlands are within or near the Project area (see Appendix D, *Draft Aquatic Resources Delineation Report*, USFWS 2022a and 2022b). The Project area is in an existing industrial area where the main sources of noise are associated with industrial operations, the construction of new buildings, and road traffic. No sensitive noise receptors are near the Project area because there are no residences within 5 miles and no areas zoned as residential within 10 miles of the project area. No significant impacts related to soils and geology, terrestrial vegetation, floodplains, land use, or noise are anticipated. Therefore, these resource areas are not included in the scope of this EA.

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2.0 DESCRIPTION OF PROPOSED ACTION

Under the Proposed Action, the DOE LPO would issue an ATVM loan to Redwood Materials for the Project, which would include construction and operation of a manufacturing-facility complex near McCarran, Nevada (see Figure 2-1, *Site Location*). The manufacturing-facility complex would produce battery components (i.e., battery copper foil and CAM, including precursor cathode active materials [pCAM]) through processes that would convert recycled end-of-life products into feedstock. The battery components would supply Redwood Materials' U.S. battery-manufacturing partners. The manufacturing-facility complex would include a battery copper foil–production facility, a CAM-production facility, hydrometallurgy (i.e., hydromet) refining facilities, and associated infrastructure (i.e., administrative offices, laboratory and security buildings, warehouses, an electrical switchyard, onsite roads, parking areas, construction laydown and staging areas, stormwater control features) on approximately 173 acres within the TRIC in Storey County, Nevada (see Figure 2-2, *Site Layout*).

The 173-acre project area comprises a 100-acre parcel and an adjacent 73-acre parcel, acquired by Redwood Materials in March 2021 and July 2022, respectively. Portions of the 100-acre parcel (approximately 73 acres) were cleared and rough-graded prior to initiation of the LPO's federal action (i.e., consideration of providing federal financial assistance [a loan] to Redwood Materials); the entire 73-acre parcel was cleared and rough-graded prior to Redwood Materials' acquisition. As such, the affected environmental and impact analyses presented in Section 3.0, *Environmental Consequences*, consider the developed condition of the 173-acre project site.

As shown on Figure 2-2, the administrative and laboratory buildings, as well as the general parking area, are in the central portion of the project site; the access points are to the north–northwest, off Battery Boulevard (formerly Norway Drive). The battery copper foil–production facility, general material-storage area, hydromet-refining facilities, electrical switchyard, and initial CAM-production facility are on the western portion of the project site, and the second CAM-production facility is on the eastern side.

Redwood Materials would also construct certain facilities on site that would not be subject to federal financial assistance (i.e., loan). These facilities include a recycling calcination operation in which used lithium-ion batteries and off-spec materials from lithium-ion battery manufacturing would be recycled and a warehouse space on an adjacent leased property northeast of the project site. In addition, an electric transmission line would be extended to connect the project site to NV Energy's Comstock Substation, directly south of the project area, and a reclaimed water/sewer line would be extended to connect the project site to the Tahoe–Reno Industrial General Improvement District (TRI-GID) main potable water- and wastewater-treatment system. These facilities are not included as part of the Project under consideration for financial assistance by the DOE and are not part of the Project assessed in this EA. To the extent that the aforementioned facilities may result in cumulative effects subject to this EA, see Section 4.0, *Cumulative Effects*.

Figure 2-1. Site Location

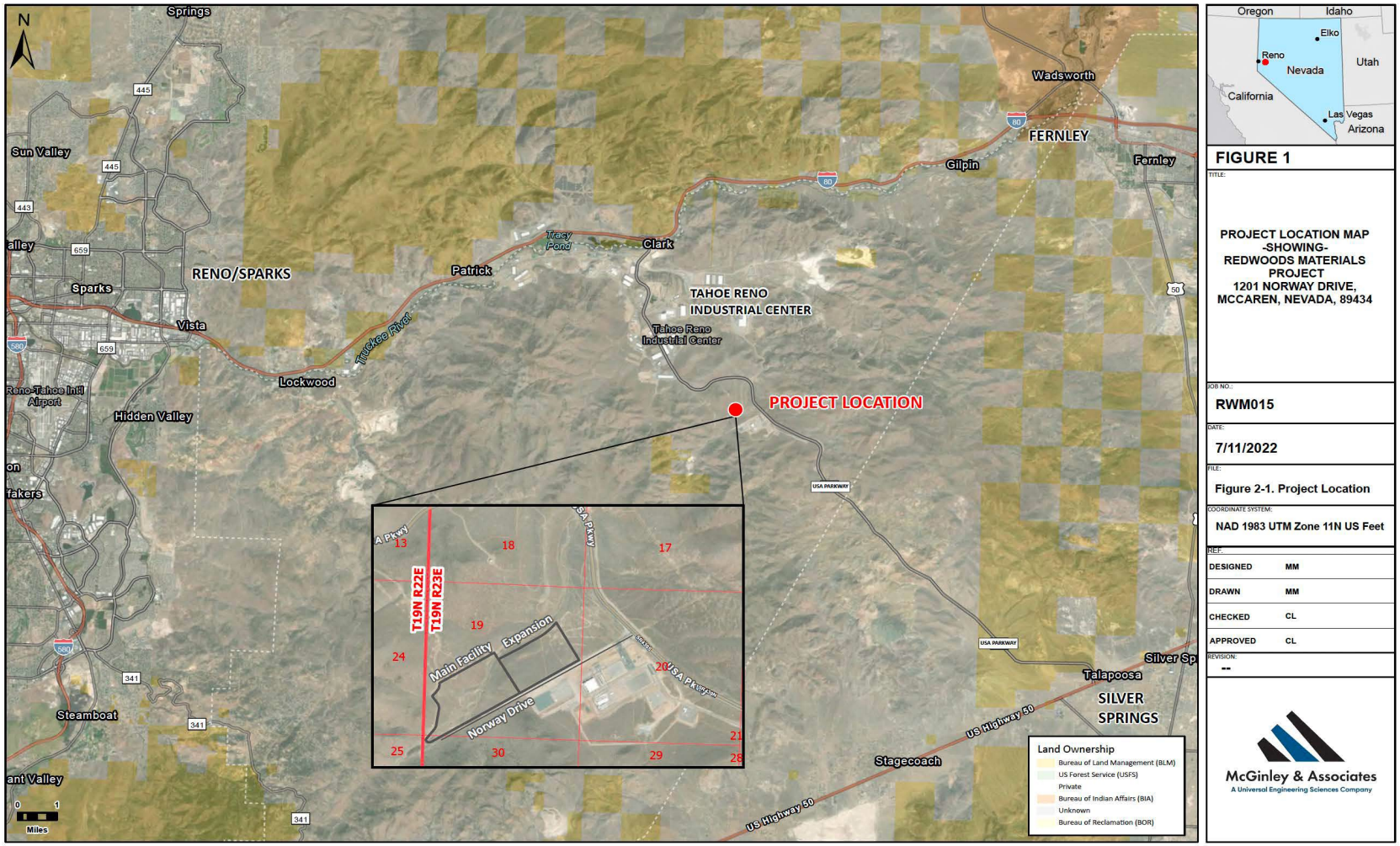
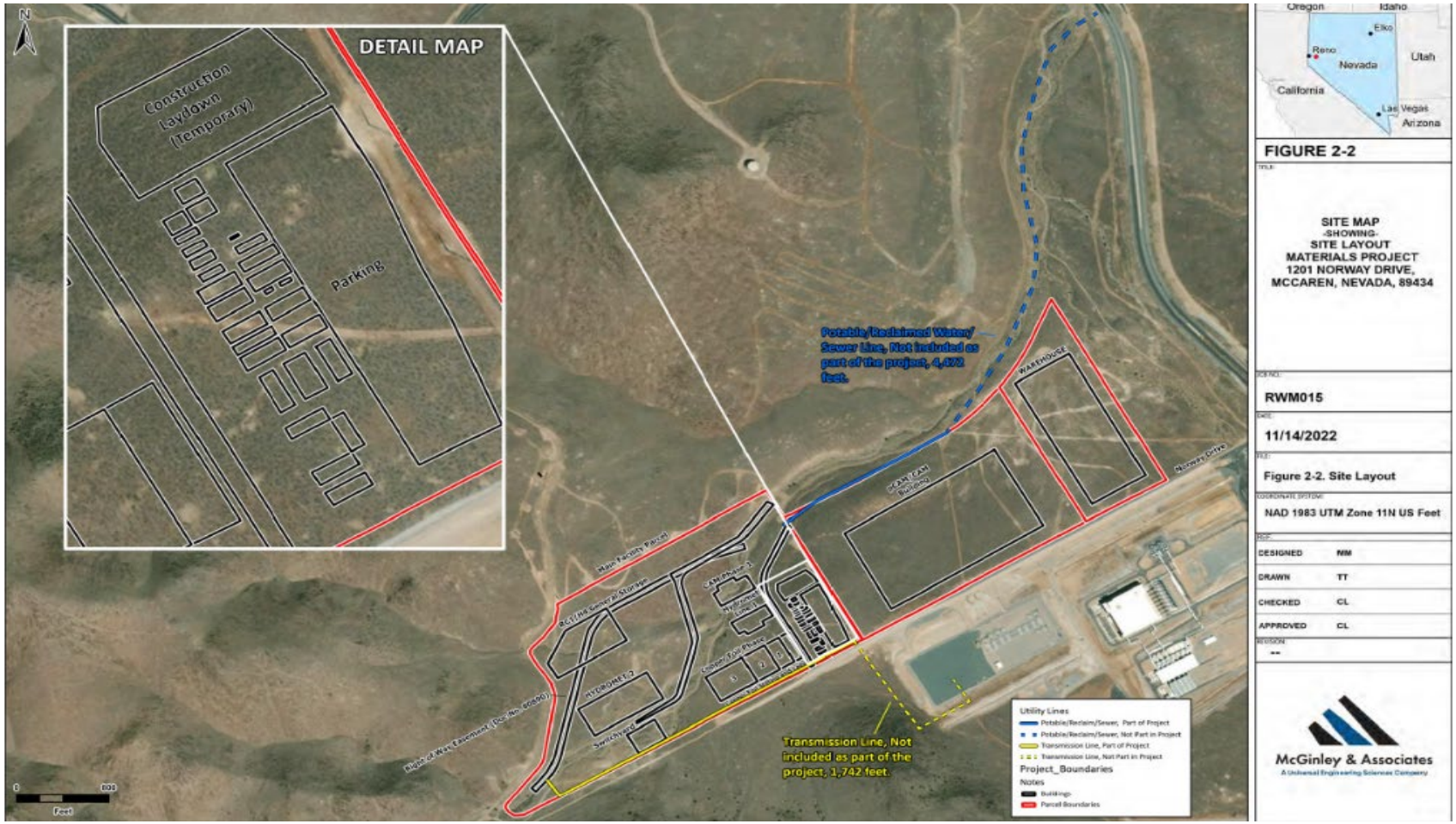


Figure 2-2. Site Layout



The raw materials and feedstocks for the various processes at the manufacturing-facility complex would include the following.

- **Battery Copper Foil**: Recycled copper from both Redwood Materials' recycling operations and third-party recyclers
- **CAM/pCAM**: A variety of metal salts (e.g., nickel, cobalt, aluminum, manganese) and lithium salts sourced from both third-party vendors and recycled materials processed at the onsite hydromet-refining facility
- **Hydromet Refining**: The refining of battery-manufacturing scrap, concentrates, and recycled or residual materials from battery-recycling processes and the refining of virgin materials

Redwood Materials would feed the copper-foil facility with recycled and secondary copper.

In order to achieve the scale needed to provide downstream partners with critical battery components, the CAM-manufacturing facility would be fed by a mix of both recycled and nonrecycled materials. Redwood Materials expects that the percentage of recycled feedstock used across all of its process facilities would increase over time, both as its operations scale up and as additional recycling inputs become available. Redwood Materials intends to have virgin mined metals sourced from sustainably mined sources.

The hydromet refining facility would be fed feedstock materials, such as battery-manufacturing scrap, concentrates, and recycled or residual materials from battery-recycling processes. Hydrometallurgy refining involves the use of aqueous solutions for the recovery of metals from ores, concentrates, and recycled or residual materials. The hydromet-refining facility would process the feedstock material(s) delivered to the project site to obtain the desired metals for both the CAM and battery copper-foil facilities.

The battery copper foil–production facility would process the copper products from the hydromet facility to create ultra-thin copper foil. The CAM facility would produce both pCAM and a finished CAM, both of which are key components in lithium-ion batteries and amount to more than half of a battery's value. The CAM-manufacturing process consists of using metal salts to synthesize the pCAM, which is then mixed with lithium salts and oxidized to produce CAM. The resulting product is then stabilized to enhance safety and lifetime. The metal and lithium salts used in the CAM-production process are among the products used in the hydromet-refining process; these recycled products would be supplemented with purchased metal and lithium salts, as necessary.

Operation of the Project would require several utility connections for electricity, potable and reclaimed water, non-process discharge water (i.e., sanitary wastewater), and communications. Electricity would initially be provided by an existing 25-kilovolt (kV) distribution line from the nearby NV Energy Comstock Substation. This would ultimately be replaced by a new, onsite, 120-kV switchyard that would be connected to the substation. All process and potable water would be supplied to the Project by TRI-GID, the water, wastewater-treatment, and water-reclamation/reuse utility serving the TRIC, including the project site.

TRI-GID-supplied water for the Project would be in addition to the reclaimed/recycled process water that Redwood Materials would produce at an onsite process water–recycling facility (see Sections 2.1, *Project Construction*, and 2.2.4, *Water Use/Consumption and Recycling*). In addition, a telecommunications trench would be excavated adjacent to the onsite water infrastructure during utility upgrades.

As presented in the following subsections (i.e., Sections 2.1, *Project Construction*, and 2.2, *Operations*), Redwood Materials would construct and operate the Project in phases before reaching full production capacity. The descriptions presented in Sections 2.1 and 2.2 discuss the phased approach to construction and the nature of the resulting operations, and Section 3.0, *Environmental Consequences*, presents the impacts associated with full development and production capacity.

2.1 Project Construction

As discussed in Section 2.0, a large portion of the 173-acre project site was cleared and graded as of initiation of the LPO's federal action (i.e., consideration of providing federal financial assistance [i.e., loan] to Redwood Materials). Currently, approximately 7.5 acres of the project site remain undisturbed; however, Redwood Materials' construction plans contemplate disturbing the entirety of the 173-acre project site. The construction activities that are subject to federal financial assistance (i.e., loan) include the following.

- Final grading and landscaping
- Installation of stormwater-management features
- Installation of buildings, structures, utilities, roads, and parking areas
- Installation of process lines and equipment into the buildings
- Start-up and commissioning of the various production lines

As discussed in Section 2.0, the onsite calcination operation would not be subject to federal financial assistance (i.e., loan), nor would any offsite construction (i.e., construction of the warehouse space on an adjacent leased property northeast of the project site and the extension of utility infrastructure to the project site).

Redwood Materials is developing the Project with a phased approach to construction. Phased development accommodates both the long lead times for critical components associated with the CAM and copper-foil facilities, as well as the permitting necessary for construction and operation of the Project (see Appendix A, *Permits and Approvals*). Overall construction of the facility began in December 2021 and is expected to be completed in the first half of 2027. Phased construction is expected to meet the following targets for production.

- Copper Foil
  - 250 metric tonnes per year (MT/yr) currently online
  - >10,000 MT/yr expected in the second half of 2026
  - >20,000 MT/yr expected in the second half of 2027
  - >35,000 MT/yr expected in the second half of 2028
- CAM
  - CAM Phase 1: 200 MT/yr expected in the first half of 2023
  - CAM Phase 2: >20,000 MT/yr expected in the second half of 2026; > 60,000 MT/yr expected in the first half of 2028; > 100,000 MT/yr expected in the second half of 2028
- Hydromet
  - Line 1: >2,500 MT/yr currently online
  - Line 2: >10,000 MT/yr expected in the second half of 2024

Phased construction would generally include both the construction of new building space to accommodate new production lines (see Figure 2-2), as well as the installation of additional production lines and equipment in existing facilities.

Construction activity at the site began in December 2021, with general site preparation, consisting of the installation of temporary facilities, access roads, parking lots, and temporary construction-laydown area, earth work (i.e., rough-grading), and foundation work for the copper-foil facility, the CAM facility, and the hydromet-refining facility (referred to in this document as the *Primary Facilities*). By March 2022, all roads, parking areas, and foundations for the Primary Facilities were completed, and the routes and locations for the permanent roads, parking areas, utilities, and other site infrastructure had been established.

Initial site preparation was followed by the installation of utilities and the construction, outfitting, and commissioning of the initial production lines within each of the Primary Facilities. The copper-foil and hydromet-refining buildings were the first of the Primary Facilities to be constructed.

The copper-foil facility is an approximately 40,000-square-foot, steel-frame building on a concrete foundation; the walls and metal roof are insulated. The building frame is sized to support two bridge cranes, each operating in its own dedicated bay. The building's floor is a thick concrete slab that is designed to accommodate the operation of processing machinery and process materials. At full production capacity, the copper-foil facility would expand to an approximately 90,000-square-foot build-out of similar construction and design.

The Hydromet Line 1 facility is a 44,800-square-foot, steel-framed building on a concrete foundation. The walls of the facility have an interior polyethylene liner and an exterior polyvinyl chloride (PVC) fabric liner with insulation in between. The facility is designed to accommodate the operation of machinery, process tanks, and material-handling activities. Hydromet Line 2 is expected to be an approximately 200,000-square-foot building with similar construction and design.

The CAM facility, inclusive of two separate buildings dedicated to CAM and pCAM production, respectively, with a total combined area of 61,000 square feet, consists of steel-framed buildings on a concrete foundation with polyethylene and PVC fabric on exterior walls. The CAM facility is designed to accommodate the operation of processing machinery and the materials needed to produce both pCAM and CAM. CAM Phase 2 is expected to be an approximately 600,000-square-foot building with similar construction and design.

Following the construction, installation, and commissioning of the initial production lines in each respective Primary Facility, construction would shift to the installation and commissioning of additional production lines and buildings, consistent with the phased approach and capacities described above.

The project site would also include a variety of other ancillary buildings and facilities, including the following.

- **Switchyard** (77,000 square feet): Constructed on an aggregate base, with electrical equipment stationed on concrete foundations, surrounded by a chain-link fence

- **Process Water Recycling Facility** (initially 5,000 square feet, with potential expansion to up to 15,000 square feet):[1] Constructed on a concrete foundation to support process water treatment equipment and treatment and storage tanks
- Various administrative/office spaces, warehouses, and support facilities

Water would be used during construction, primarily for dust-suppression purposes. Other water uses during the construction phase would include hydrostatic testing, commissioning, and other construction-related activities. Peak water demand during construction is expected to require 3 to 5 acre-feet of water per month during heavy construction, less than the allotment available to Redwood Materials from TRI-GID (see Section 2.2.4, *Water Use/Consumption and Recycling*). During construction, all water would be sourced from a nearby TRI-GID water main and supplied to the site by existing underground fire-system piping and 12 onsite fire hydrants. When available, in accordance with temporary discharge permits issued by the Nevada Department of Environmental Protection (NDEP) (see Appendix A, *Permits and Approvals*), water recovered from other onsite uses (e.g., hydrostatic testing) would be reused for dust-suppression purposes to minimize water consumption during construction.

Although no permanent surface-water features are on the project site, a recent Draft Aquatic Resources Delineation Report (USFWS 2022a and 2022b) identified a single, non-federally jurisdictional "dry ephemeral stream" within the project area (Appendix D, *Draft Aquatic Resources Delineation Report*). Construction activity in the area of this dry ephemeral stream would be subject to Nevada's Working in Waterways Temporary Permit Program, which covers temporary work or routine maintenance, such as channel clearing, in surface waters of the State of Nevada and operating earthmoving equipment. Permits issued under the Working in Waterways Temporary Permit Program are valid only for a period of 6 months and cannot be extended. Redwood Materials has already obtained one Working in Waterways Temporary Permit for the site, which covered work occurring from July 18, 2022, through January 14, 2023 (see Appendix A, *Permits and Approvals*).

Redwood Materials applied for a second Working in Waterways Temporary Permit related to the same dry ephemeral stream on January 11, 2023; NDEP approved and issued that permit on April 19, 2023; it expired on October 16, 2023.

Redwood Materials applied for a third Working in Waterways Temporary Permit, related to the same dry ephemeral stream, which was made effective on October 16, 2023. Working in Waterways Temporary Permits require a permittee to abide by best management practices (BMPs) to prevent soil erosion, sediment transport, and water-quality degradation. The permits also cover erosion-control measures, bank/channel stabilization, and revegetation to minimize harmful impacts on surface-water resources. A permittee must submit monthly discharge monitoring reports (DMRs) to NDEP. DMRs include, among other things, the results of BMP visual inspections, flow-rate data, and turbidity numbers for plume events. The third permit expired on April 13, 2024.

The Project is expected to create approximately 3,400 construction jobs. During peak construction of the Project (currently expected to occur during 2024), the estimated workforce would require between 800 and 1,400 people daily across two shifts, with the majority of the workers coming from the local or regional area. Construction workers would park on site in

[1] The onsite process-water recycling facility would expand in accordance with the phased construction schedule,with the aggregate onsite water treatment demand ultimately determining the final size of the process-water treatment facility. Note, process water *treatment* equipment and process water *treatment* operations refer to the equipment and processes associated with the water-recycling facility. At the Redwood Materials facility, water is reclaimed and recycled through the water recycling–plant operations for recovery of product materials and reuse of water in process.

designated employee and contractor parking lots. During construction, approximately 10 to 15 commercial vehicle trips would occur per day. To facilitate the movements of the workforce and commercial vehicles, additional temporary entrances would be installed at the eastern and western ends of the Project site (see Figure 2-2).

2.2 Operations

On completion, the initial production facilities would operate 24 hours a day, 365 days per year. As presently designed, the facility has an estimated operational life of 25 to 30 years. When fully constructed, the proposed facilities would produce battery components for approximately 1 million EVs annually.

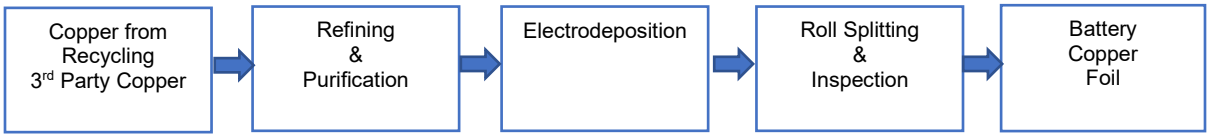
Due to phased development and operations, the number of employees would ramp up over time, once all production facilities are fully operational, from an initial workforce of approximately 200 employees over four shifts per day to approximately 1,600 full-time employees over four shifts per day. At full operation, up to 3,200 employee vehicle trips per day and up to 40 commercial vehicle trips per day would occur (see Section 3.3, *Transportation*).

The following sections provide a brief discussion of operations at each of the Primary Facilities, along with a summary of the processes associated with each facility. A discussion of water use/consumption and recycling, hazardous materials and waste streams, and shipping and receiving for the Project as a whole follows the discussion of the Primary Facilities.

2.2.1 Copper Foil Facility

The copper-foil facility produces battery copper foil for anode current collectors used in lithium-ion batteries. Currently, feedstock is delivered directly to the copper-foil facility and staged for production; in the future, feedstock would initially be received at an onsite warehouse location (see Figure 2-2) prior to intra-facility transport to the copper-foil facility, where the material would be staged for production. The copper feedstock is dissolved in an acidic solution, creating an electrolyte. The electrolyte is then electrodeposited as ultra-thin copper foil onto a metal drum. Then, the ultra-thin copper foil is peeled off the metal drum, resulting in customer-specific rolls of the copper product. Currently, the rolls are stored in the copper-foil facility until ready to ship to customers; in the future, a subset of certain finished products, including the rolls of copper product (see Figure 2-3), would be stored at an onsite warehouse location (see Figure 2-2) as an inventory buffer, and then loaded for shipment to customers from that location. At full production, the copper-foil facility would require more than 35,000 MT/yr of copper feedstock and be capable of producing an approximately equivalent amount of foil product.

Figure 2-3. Battery Copper Foil Production, Simplified Block Flow Diagram



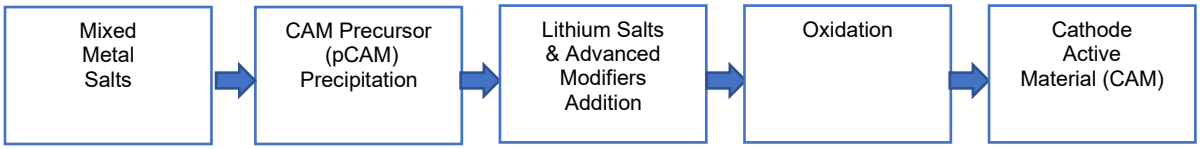
The main safety hazards associated with the copper foil process arise from the use of acids and oxidizers and the associated vapors generated in the course of the process. To control these hazards, the process is enclosed and serviced by a process gas-handling system that directs the vapors to a scrubber; scrubber water is routed back to the process for facility reuse or routed to the onsite process water-recycling facility, when necessary. In addition, Redwood Materials would perform job hazard analyses to identify and assess hazards associated with particular job tasks and mitigate those hazards according to the hierarchy of controls, including use of personal protective equipment (PPE), where appropriate. In addition, Redwood Materials

would conduct exposure sampling, both annually and as needed, in accordance with an internal industrial hygiene sampling plan. All emissions control systems would be fully compliant with applicable regulatory requirements and the terms of the permits held by the facility.

2.2.2 CAM Facility

The CAM facility processes a mix of metal salts through a complex and multistep process to ultimately produce CAM precursor and final CAM components for lithium batteries (see Figure 2-4). Initially, feedstock for the CAM process would be delivered directly to the CAM facility and staged within the facility for production; in the future, feedstock would initially be received at an onsite warehouse location (see Figure 2-2) prior to intra-facility transport to the CAM facility, where the material would be staged for production. In the CAM-production process, the metal salts are processed through co-precipitation to form the CAM precursor (also known as pCAM).

Figure 2-4. pCAM, Intermediate Products, and CAM Production, Simplified Block Flow Diagram



Lithium salts and other customer-specific modifiers are added to the pCAM, which is then oxidized under controlled atmosphere one or more times. The resulting product is then milled, classified by size, and dried to stabilize it, thereby enhancing safety and lifetime. At full production, the CAM facility would produce approximately 100,000 MT/yr. of CAM.

The main safety hazard associated with the CAM facility stems from potential exposure to chemical particulates and ammonia vapors during processing. Emissions of particulates within the facility are controlled through the use of dust-tight equipment connections and continuous emissions capture into airborne-particulate control systems. Particulate matter collected by the air emission control systems is, where feasible, recycled on site or disposed of by a licensed vendor. Ammonia vapors within the facility are controlled through continuous vapor-collection systems and routed to a scrubber; scrubber water is discharged to the onsite process treatment facility.

Redwood Materials would conduct exposure sampling, both annually and as needed, in accordance with an internal industrial-hygiene sampling plan. Redwood Materials would perform job hazard analyses to identify and assess hazards associated with particular job tasks and mitigate those hazards according to the hierarchy of controls, including use of PPE, where appropriate. All emissions-control systems would be fully compliant with applicable regulatory requirements and the terms of the facility permits.

2.2.3 Hydrometallurgy-Refining Facility

When fully constructed, the Redwood Materials facility would include two hydromet lines capable of processing non-live battery manufacturing scrap (i.e., scrap without electrolyte) and/or electrolyte-containing scrap. Feedstock for hydromet process would include recycled materials that would be calcined on site, then mechanically separated to remove various alloys.

The processes for both hydromet lines are generally the same. Inputs for each hydromet process are first turned into slurry by mixing with water or recycled solutions. The slurry is then pumped into acid leaching tanks. Next, sulfuric acid and other reagents are added to the tanks

to dissolve the metals into solution. This solution is sent to a filter press, where graphite is removed. The filtrate (i.e., solution remaining after the filter) is rich in metal sulfates and therefore directed to various downstream steps to purify and separate the metals. The resulting products are used in various stages of the pCAM- and CAM-production processes.

The main safety hazards associated with the hydromet facility stem from potential exposure to chemical particulates and vapors generated from the use of acids in the course of the process. Emissions of particulates within the facility are controlled through the use of dust-tight equipment connections and continuous-emissions capture into airborne particulate-control systems. Redwood Materials would conduct exposure sampling, both annually and as needed, in accordance with an internal industrial-hygiene sampling plan. Redwood Materials would perform job-hazard analyses to identify and assess hazards associated with particular job tasks and mitigate those hazards according to the hierarchy of controls, including use of PPE, where appropriate. All emissions-control systems would be fully compliant with applicable regulatory requirements and the terms of the facility permits.

2.2.4 Water Use/Consumption and Recycling

During operation, all water used at the project site would be provided by TRI-GID, pursuant to an agreement between Redwood Materials and TRI-GID in which TRI-GID has agreed to provide Redwood Materials up to 550 acre-feet of water per year at full build-out, which is consistent with the Project's maximum anticipated demand at full build-out (i.e., with all equipment, processes, and capacities as set forth in the phased construction schedule in Section 2.1, *Project Construction*). Redwood Materials does not anticipate a need for additional water resources or water withdrawal agreements in connection with the Project. In 2023, TRI-GID will begin to supply reclaimed water as process water to Redwood Materials and other users within the industrial park. Additional volumes of reclaimed/recycled process water would be produced at Redwood Materials' onsite process water–treatment facility, which would be capable of recycling approximately 90 percent of all water used on site (i.e., that is not lost to evaporation).

Redwood Materials is targeting a zero-process-water-discharge manufacturing plant. The water-treatment system utilizes reverse osmosis (RO) and deionized water systems. The process water–treatment system utilizes a chemical reaction unit, a microfiltration unit, and another RO system. Phase I of the water-treatment system, which is associated with the initial copper foil- and hydromet-production facilities, has a capacity of approximately 7,200 gallons per day; the system is currently operational. Phase II of the process water–treatment system, associated with the remainder of the copper foil-production facilities and Hydromet Line 1 expansion, would have a capacity of approximately 65,000 to 70,000 gallons per day and supply 90 percent of the Project's process-water needs at full capacity. The remainder of the Project's process-water needs would be supplied by TRI-GID. As the additional hydromet and CAM facilities come online (see Section 2.1, *Project Construction*), Redwood Materials would further increase the capacity of the process water–treatment facility. Redwood Materials has applied to TRI-GID to authorize a "zero-discharge" permit (see Appendix A, *Permits and Approvals*); industrial process-related process-water discharges are not expected because onsite reclamation of process water would occur at the process-water treatment facility, described above. Non-process (i.e., sanitary) wastewater would be discharged to and treated by the TRI-GID.

2.2.5 Hazardous Materials and Waste Streams

Redwood Materials obtained an U.S. Environmental Protection Agency (EPA) identification number for the project site and registered the site as a large-quantity generator (LQG) of hazardous waste (i.e., general laboratory waste resulting from research-and-development

work, as further described below). Redwood Materials does not anticipate that its steady-state operations would generate quantities of hazardous waste that would exceed the LQG threshold; however, Redwood Materials' written determination (WD) of hazardous/universal waste recycling issued by the NDEP Bureau of Sustainable Materials Management (BSMM) nonetheless requires registration as an LQG.

The overall mission of Redwood Materials is to source clean energy, use energy-efficient technology, and reduce or eliminate waste streams or wastewater whenever possible. Nonetheless, Redwood Materials expects that its nonrecycling operations would generate a small amount of additional hazardous waste in the form of laboratory analysis waste, generally high-PH and low-PH liquids with ignitability (D001) or corrosivity (D002) characteristics, off-spec chemicals, spent cleaning products, and certain contaminated PPE. It is estimated that these streams would produce approximately 1,000 gallons of liquid waste with corrosivity characteristics (D002) and approximately 1,000 pounds of solid waste per month. Liquid waste with corrosivity characteristics (D002) would be neutralized at the process water–treatment facility. Hazardous waste containers would be consolidated at the central accumulation area, where they would be subject to weekly inspections and storage requirements, per 40 CFR Part 262. All hazardous waste generated would be shipped off site within 90 days from the date of generation.

Consistently with Redwood Materials' mission, many waste streams would be recovered, recycled, or reused on site. For example, the process water–recycling facility would receive and treat process-water streams on site, thereby avoiding industrial process-related water discharges and enabling reclamation and reuse of process water on site. Similarly, miscellaneous packaging waste from incoming feedstock and parcels would be reused or recycled (e.g., boxes, plastic, pallets).

Redwood Materials currently expects that its operations would generate the additional waste streams specified below in Table 2-1. This waste, which would not be able to be recovered on site, recycled, or reused, would consist primarily of scrap consumables, including PPE, filter materials, and cleaning solutions. Redwood Materials expects that each of these streams would be nonhazardous, pursuant to the waste characterization determinations to be completed in accordance with 40 CFR 262.11. All such streams would be containerized and labeled at the point of generation and collected by a reputable, licensed waste-handling company, which would transport the waste to an appropriately permitted disposal facility. Operational process-waste streams that Redwood Materials anticipates would be reused, recycled, or treated on site are identified in Table 2-2.

Table 2-1. Operational/Process Waste Streams

Facility (Basis of Estimate)	Waste	Estimated Volume (if available)[a]	Collection	Anticipated Disposition
CAM (Phase 2)	Scrap-equipment consumables, including filter cloths and filter cartridges	3,000 pounds per month	Drums or roll-off bins, depending on generation rate and vendor pricing	Collected by a licensed waste handling company
CAM (Phase 2)	Scrap PPE and spent cleaning supplies	1,500 pounds per month	Drums or roll-off bins, depending on generation rate and vendor pricing	Collected by a licensed waste handling company
Copper Foil (250 MT/yr)	Scrap-equipment consumables, including filter cloths and filter cartridges	6,000 pounds per month	Roll-off bins	Collected by a licensed waste handling company
Copper Foil (250 MT/yr)	Scrap PPE and spent cleaning supplies	240 per month	Roll-off bins	Collected by a licensed waste handling company
Hydromet (Line 1)	Process cleaning solutions	150 pounds per month	Drums or totes	Routed to process water recycling facility
Hydromet (Line 1)	Scrap-equipment consumables, including filter cloths and filter cartridges	60 pounds per month	Drums or roll-off bins, depending on generation rate and vendor pricing	Collected by a licensed waste handling company
Hydromet (Line 1)	Scrap PPE and spent cleaning supplies	240 pounds per month	Drums or roll-off bins, depending on generation rate and vendor pricing	Collected by a licensed waste handling company

[a] *Estimates reflect volumes associated with the initial production lines for each facility.*
MT/ye = Million tons per year; PPE = personal protective equipment.

Table 2-2. Operational Recycling and On-site Treatment Streams

Facility (Basis of Estimate)	Material	Estimated Volume (if available)[a]	Collection	Anticipated Disposition
CAM	Various solutions containing dissolved metal salts	160 gallons per month	Drums or totes	Routed to process water recycling facility
CAM	Ferrous waste	60 grams per every 1 kilogram of raw material	Drums or totes	Collected by a licensed waste handling company
CAM	Scrubber bleed-off	14,000 gallons per month	Tanks or totes	Routed to process water recycling facility
Copper Foil	Various brines, wastewaters, and sludges	2,000 gallons per day	Tanks or totes	Routed to process water recycling facility
Copper Foil	Filter solids	10,000 pounds per month	Roll-off bins	Collected by a licensed waste handling company
Hydromet	Miscellaneous packaging waste from incoming battery scrap parcels (e.g., boxes, plastic, pallets)	23,850 pounds per month	Roll-off bins	Reused and recycled on site, where possible. Otherwise, it **would** be disposed with third-party handling company.
Hydromet	Various brines and bleed-off solutions	7,200 gallons per day	Tanks and totes	Routed to process water recycling facility
Process Water Treatment	Filter-press solids	1,800 pounds per month	Roll-off bins	Routed to process water recycling facility
Process Water Treatment	Brine water	5,000 gallons per week	Tanks or totes	Routed to process water recycling facility

a. *Estimates reflect volumes associated with the initial production lines for each facility.*

The Nevada State Fire Marshall has issued a Hazardous Material Permit for the site, subject to annual renewal. In addition, the Nevada Chemical Accident Prevention Program (CAPP) specifies requirements that are applicable to the storage of extremely hazardous chemicals above specified thresholds. Certain Redwood Materials processes would utilize various substances that are subject to the CAPP. Initial operations would utilize these substances only in quantities that remain below the applicable CAPP threshold. However, phased development of the Project for additional production capacity would require a review of the CAPP-regulated substances to determine if future quantities may exceed applicable CAPP thresholds. The CAPP requires an applicant to obtain both a Permit to Construct prior to commencing process construction and a Permit to Operate prior to process start-up. Redwood Materials would obtain the appropriate CAPP permits from NDEP for processes that utilize CAPP-regulated substances in quantities above the applicable thresholds.

Redwood Materials may receive certain feedstocks regulated as hazardous waste or universal waste. Accordingly, an application for a WD of hazardous/universal waste recycling was submitted to the NDEP BSMM in June 2022. Pursuant to the requirements of a WD, no storage of Resource Conservation and Recovery Act (RCRA)–manifested hazardous waste or universal waste can occur at a destination facility. Any such material would be received on a just-in-time basis for recycling; thus, a full RCRA treatment, storage, and disposal facility (TSDF) permit is not required to authorize Redwood Materials' operations. NDEP BSMM issued the WD to

Redwood Materials on March 16, 2023 (see Appendix A, *Permits and Approvals*). Redwood Materials currently has one large-quantity universal waste–handling facility for receipt and short-term storage (i.e., less than 1 year) of universal waste. With respect to these shipments, Redwood Materials would abide by all applicable requirements related to manifesting, storing the materials consistent with applicable regulations, and managing the materials in a way that prevents releases to the environment.

2.2.6 Shipping and Receiving

Feedstocks are delivered to the Project site using a network of logistics providers, as well as Redwood Materials' own internal fleet for local transportation. In general, Redwood Materials leverages full-truckload, less-than-truckload, and intermodal rail transportation for shipments to and from the project site. Currently, feedstock materials are stored both on site and at offsite warehouse locations for delivery directly to the Primary Facilities, where the materials are offloaded and staged for processing.

Products are shipped from the project site according to customer destination. To date, Redwood Materials has shipped most products by highway and rail, using 53-foot dry vans and intermodal containers. During the Project's construction phase, approximately 10 to 15 commercial vehicle trips would occur per day. During operation, up to approximately 3,200 personal vehicle trips and 40 commercial vehicle trips would occur per day. Redwood Materials would use existing roads, as well as existing railways and transfer facilities for intermodal shipments, to receive feedstock and ship final products from the project site.

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

The following sections describes the affected environment relevant to potential impacts associated with the Project, analyzes the potential environmental impacts that could result from the Project, identifies and characterizes cumulative impacts that could result from the Project in relation to other ongoing or proposed activities in the surrounding area, and provides the DOE with environmental information for use in decision-making to protect, preserve, and enhance the human environment and natural ecosystems. In each of the following sections, a specific resource area is addressed with both qualitative and, where applicable, quantitative information to concisely describe the nature and characteristics of the resource that the Project may be affect, as well as the potential impacts on that resource from the Project given the project design features. A conclusion regarding the significance of impacts is provided for each resource area.

The project area is in northwestern Nevada, in the Great Basin Range physiographic region, which covers much of the state between the Sierra Nevada to the west and the Sleek and Deep Creek mountains to the east, on the Utah border. The area is characterized by north/south-trending mountains and intervening broad valleys, creating tremendous elevation relief. The project area is also within the Central Basin and Range ecoregion, as defined by EPA. The area is a temperate desert with hot, dry summers and snowy winters. The biological communities in the ecoregion differ due to elevation, transitioning from salty dry lakes to rolling sagebrush valleys and pinyon–juniper forests. The project area is within a sagebrush valley approximately 0.2 mile north of a sparse pinyon–juniper forest. Approximately 500 feet north of the project area is Martin Canyon, which has an elevation of 5,082 feet. Approximately 0.7 mile to the southeast is Gooseberry Tailings Reservoir, which has an elevation of 5,394 feet.

3.2 Air Quality

The project area is in the Virginia Range, near Sparks, Nevada, which is in Hydrographic Basin Area 83 (i.e., HA-83), which is listed as being in attainment with respect to the National Ambient Air Quality Standards (NAAQS)—the allowable concentrations and exposure limits for criteria pollutants, as established by EPA. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), O_3, particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). In November 2021, Redwood Materials submitted a Class II Air Quality Operating Permit application to the NDEP Bureau of Air Pollution Control (BAPC) for the initial copper foil–production line and Hydromet Line 1 operations at the facility. NDEP BAPC is the delegated authority of the Clean Air Act in Nevada for all areas outside of Washoe and Clark counties. Criteria pollutants anticipated to be emitted at the project site include PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, and volatile organic compounds (VOCs), which are precursors to O_3. Hazardous air pollutants (HAPs) and GHGs would also be emitted in minor quantities. The anticipated potential air emissions from the initial copper foil–production line and Hydromet Line 1 operations at the project site are listed in Table 3-1, with the combined and individual HAP inventories set forth separately in Table 3-2. Issuance of the NDEP BAPC Class II Air Quality Operating Permit for the initial copper foil–production line and Hydromet Line 1 operations occurred on August 30, 2022. The phased construction approach described in Section 2.1, *Project Construction*, would require additional revisions to the facility's air permit to incorporate air-emissions sources associated with the new copper foil-, hydromet-, and CAM-production lines and the equipment Redwood Materials intends to install on the schedule set forth in that section. As further described in Section 2.1, new production lines and equipment would be

added to existing facilities, whereas other production lines and associated equipment would be installed in newly constructed buildings (see Figure 2-2). Future processes incorporated at the facility as part of the forthcoming phases of the Project described in Section 2.1 would be appropriately permitted through the NDEP BAPC.

Table 3-1. Estimated Facility-Wide PTE Summary (tons per year)[a]

Permit Status	Issued August 2022	Issued March 2023	
Pollutant	Initial Class II Air Quality Operating Permit (Copper Foil Phase 1 and Hydromet Line 1)	CAM and pCAM Phase I Process Emission Contributions (tons per year)[b]	Total Emissions Permitted (March 2023)
Particular Patter (PM)	8.75	4.12	25.47
PM_{10} (Fine PM)	6.49	4.12	23.20
$PM_{2.5}$ (Ultra-fine PM)	5.31	4.12	22.02
SO_2 (Sulfur Dioxide)	0.079	0.00	19.83
NO_2 (Nitrogen Dioxide)	0.22	0.00	30.52
CO (Carbon Monoxide)	0.19	0.00	85.34
VOC (Volatile Organic Compounds)	0.34	0.00	31.54
Hydrogen Sulfide (H_2S)	0.69	0.00	0.69
Sulfuric Acid (H_2SO_4)	0.031	0.00144	0.033
Total HAPs	2.81	3.37	13.26

a. *In addition to the permitting processes described above and the emissions set forth in Table 3-1, in December 2022, the Nevada Department of Environmental Protection Bureau of Air Pollution Control granted Redwood Materials' request for an "insignificant activity" determination (see Appendix A,* Permits and Approvals*). The emissions associated with the insignificant activity determination are below the thresholds identified in Nevada Administrative Code 445B.288(4) and, by definition, insignificant with respect to the analysis of air quality impacts discussed in this section.*

b. *Reported emissions are representative of only process-related emissions and are not facility-wide potential to emit values. These reported values do not include ancillary equipment (e.g., emergency generators), which is included in the total potential to emit reported in the Total Emissions Permitted column. The Total Emissions Permitted column includes the potential to emit for the project operations and the potential to emit for non-project operations.*

Table 3-2. Estimated Facility-Wide Hazardous Air Pollutant PTE Summary (tons per year)

Permit Status	Issued August 2022	Issued March 2023	
Pollutant	Initial Class II Air Quality Operating Permit (Copper Foil Phase 1 and Hydromet Line 1)	CAM and pCAM Phase I Process Emission Contributions	Total Emissions Permitted (March 2023)
Total Hazardous Air Pollutants (HAPs)	2.81	3.37	13.26
Combined Metal HAPs (MHAPs)[a]	2.70	3.37	9.65
Chromium	0.52	0.00	0.52
Nickel, Manganese, Cobalt	2.18	3.37	9.12
Hydrogen Fluoride (HF)[b]	0.00	0.00	2.10
Hydrochloric Acid (HCl)	0.00	0.00	1.15
Dioxins and Furans	0.00	0.00	0.000007

a. *When permitting these sources, Redwood Materials conservatively assumed that MHAP total emissions equal total PM. However, total particulate matter is not anticipated to be fully composed of only MHAPs because particulate matter would also contain non-MHAP compounds. In a similarly conservative decision, Redwood Materials' air permits also assume that each individual MHAP species (i.e., nickel, cobalt, manganese) would be equal to the total combined MHAPs, which helps to ensure that none of the constituent MHAP species would exceed applicable minor-source thresholds. This necessarily results in a conservative over-accounting of each individual MHAP species relative to the actual mass of the expected emissions. In other words, with respect to actual emissions, the constituent MHAP species can collectively only total 100 percent of combined MHAP emissions; it is a mathematical impossibility for each MHAP species to simultaneously constitute 100 percent of combined MHAP emissions, as Redwood Materials' permits and the figures in Table 3-2 conservatively assume. In addition, both actual MHAP emissions and individual metal species emissions would be lower than the numbers set forth in Table 3-2, given the compound nature of the materials being handled. For example, a material such as nickel sulfate is only 22 percent nickel but is currently conservatively assumed to be 100 percent nickel for purposes of Redwood Materials' permits and the figures in Table 3-2. Finally, the emission control regiment that Redwood Materials would implement is anticipated to offer removal efficiencies higher than those currently accounted for and control a substantial portion of potential MHAP emissions relative to the potential to emit figures set forth in Table 3-2, given the actual particle size distribution of the material relative to the anticipated size-exclusion performance of the control devices, adding another layer of conservatism to these estimates. For these reasons, actual MHAP emissions and individual metal species emissions are anticipated to be lower than the emission levels the Redwood Materials' permits and the figures in Table 3-2 conservatively assume. Future revisions to Redwood Materials' permits may revise the potential to emit figures downward following source testing to reflect anticipated performance and emissions profiles.*

b. *HF, HCl, and dioxin/furan HAP emissions are contributed by the calcination recycling operation at the facility, which is not a part of the Project addressed by this Environmental Analysis. For information regarding calcination operations that may result in cumulative effects subject to this Environmental Analysis, see Section 4.0,* Cumulative Effects.

Redwood Materials has already applied for revisions to its Class II Air Quality Operating Permit, including a September 2022 revision application to include air-emissions sources associated with CAM Phase 1 operations.[2] Issuance of the NDEP BAPC Class II Air Quality Operating Permit for CAM Phase 1 operations occurred on March 21, 2023. The anticipated potential air emissions associated with this revision are listed in Table 3-1, with the combined and individual HAP inventories set forth in Table 3-2. Compliance demonstration with the NAAQS and other federal standards would be assessed and applied during the NDEP BAPC permitting process. At this time, it is anticipated that the facility would remain a minor (i.e., Class II) source because

[2] In August 2022, Redwood Materials applied for a separate revision to its Class II Air Quality Operating Permit to include air emissions sources associated with its calcination operations. The permit revised was approved and the amended Class II Air Quality Operating Permit issued on January 17, 2023. The anticipated potential air emissions associated with this proposed revision are included in the Total Emissions Permitted column in Table 3-1 to demonstrate that total emissions would remain under the minor-source emissions thresholds set forth in Table 3-2, but they are not broken out separately. The calcination operation would not be included as part of the Project under consideration by the DOE and would not be a part of the Project. Therefore, it is outside the scope of this EA. For information regarding calcination operations that may result in cumulative effects subject to this EA, see Section 4.0, *Cumulative Effects*.

the emissions profiles of the sources permitted to date were calculated using an over-conservative approach with respect to their potential to emit (PTE) (e.g., by conservatively underestimating air pollution–control efficiencies, in some cases by orders of magnitude, and making other conservative assumptions [see, for example, table note "a" in Table 3-2]). As permitted equipment is brought online, site-specific source testing would be required; future revisions to the facility's air permit would be anticipated to refine and reduce the permitted PTE in light of those results relative to what is set forth in the tables below. In the unlikely event that future facility process expansions exceed the minor-source thresholds set forth in Table 3-3 and therefore trigger the need for Title V major-source permitting, Redwood Materials would apply for the appropriate permits in light of the revised facility-wide PTE. Pursuant to NDEP rules, all proposed air-permitting actions must go through an extensive regulatory-agency review, in which air dispersion modeling would be conducted and permit conditions developed to demonstrate that human health and the environment would not be adversely affected as a condition to approval prior to recommendation of permit issuance by the agency director.[3]

Table 3-3. Minor-Source Emission Threshold Summary

Pollutant	Minor-Source Emission Threshold (tons per year)
PM (Particulate Matter)	< 250
PM_{10} (Fine PM)	< 100
$PM_{2.5}$ (Ultra-Fine PM)	< 100
SO_2 (Sulfur Dioxide)	< 100
NO_2 (Nitrogen Dioxide)	< 100
CO (Carbon Monoxide)	< 100
VOC (Volatile Organic Compounds)	< 100
Single HAP (Hazardous Air Pollutants)	< 10
Combined HAP	< 25

Air pollution–control technologies would be implemented on select project facility operations to minimize potential air-quality impacts. In light of the anticipated controls, as well as Redwood Materials' current expectation that facility-wide PTE would remain at or below the minor-source thresholds summarized in Table 3-3 (or permitted appropriately, should future facility process expansions trigger the need for Title V major-source permitting), air-quality impacts associated with proposed facility operations are not anticipated to be significant.

3.2.1 Fugitive Emissions Controls

Implementation of several BMPs is anticipated to prevent, limit, and control fugitive dust resulting from surface area disturbance associated with construction activities at the Project location. These BMPs, which are set forth in *Redwood Materials' Summary of Environmental Compliance Measure*s (see Appendix F), involve, but are not limited to, the use of water trucks and limits on vehicle speeds in disturbed areas, along with additional BMPs implemented for the Project's site-specific conditions to minimize fugitive-dust emissions. These BMPs would be implemented in accordance with the Surface Area Disturbance (SAD) permit issued for construction activities, as well as the SAD conditions of the Class II Air Quality Operating Permit, in order to comply with the fugitive dust–emission standards outlined in Nevada Administrative Code (NAC) 445B.22037. Air-quality impacts resulting from fugitive emissions are not anticipated to be significant.

[3] See Nevada Revised Statutes (NRS) 445B.100; Nevada Administrative Code (NAC) 445B.308.

3.3 Transportation

Adequate transportation infrastructure (e.g., access roads, railroad links) is in place due to TRIC development, which includes the proposed Redwood Materials site. In response to a predicted increase in traffic volumes associated with development of the TRIC, the USA Parkway interchange (formerly known as the Tracey-Clark interchange) along Interstate (I) 80 was upgraded and relocated to the east in 2017; it is now the primary entrance to the TRIC (NDOT 2018). The intent of the upgrade was to assist in reducing travel times for commuters traveling via I-80 and U.S. 50 by up to 38 percent and reduce freight delay by 886,080 hours annually (Corona 2016). The Nevada Department of Transportation (NDOT) maintains this road, which reported an average annual daily traffic count of 18,800 near the I- 80 and USA Parkway interchange (NDOT 2020). With respect to rail service, the TRIC is served by Union Pacific (UP) (UP 2022) and Burlington Northern Santa Fe (BNSF) (BNSF 2022). UP owns the main east–west line along the I-80 corridor, approximately 15 miles north of the Project area. BNSF has haul rights on the UP line.

The primary access point to the Project area is approximately 0.5 mile northeast of USA Parkway. Exit 32 on I-80 leads to Battery Boulevard (formerly Norway Drive), the main entrance to the TRIC. Streets within the TRIC are designed to carry traffic associated with the "I-2 Heavy Industrial" zoning designation and therefore adequate with respect to accommodating traffic patterns associated with Redwood Materials' daily operations (Storey County 2022). Storey County maintains all improved public streets within the TRIC, including snow removal.

During the construction phase of the Project, it is estimated that be approximately 10 to 15 commercial vehicle trips per day would occur. Because the number of trips would vary based on construction schedule demands on transportation corridors, railways, and associated infrastructure, these trips would not overload existing systems.

At full operation, Redwood Materials expects a workforce of up to 1,600 employees. Therefore, at full operation, a maximum of approximately 3,200 vehicle trips per day would occur, plus approximately 40 commercial vehicle trips per day. Employees and materials would be transported to the project site via existing roads, railways, and associated infrastructure and utilities, all of which have been designed to accommodate a large industrial center. Because the facility would be located in an area that has been developed for a large industrial center, the demand on transportation corridors, railways, and associated infrastructure and utilities would not overload existing systems; therefore, impacts would not be significant.

3.4 Visual Resources

The project area is located within the TRIC, along USA Parkway and north of Silver Springs, in an area of sparse industrial development and shrubland. The area within the TRIC is zoned for heavy industrial use. Views to the north and south are barren, and views to the east include an industrial facility. The Gooseberry Gold Mine is to the west. The project area is not visible from any residence; the closest residence is approximately 10 miles away and separated from the project area by a mountainous area.

Three buildings, covering approximately 30 acres, would be constructed, as well as a quality assurance and control space, covering approximately 2 acres. The buildings would range from approximately 40 to 60 feet in height. No building would exceed 75 feet in height, per the Storey County Zoning Ordinance for the I-2 Heavy Industrial zone (Section 17.37.080) (Storey County 2020).

Construction would result in permanent visual changes in the vicinity of the project area from the erection of buildings on what is currently open industrial land. The buildings would have a white-

and-grey color scheme and be visually similar to the existing character of the landscape (i.e., a modified landscape with varying levels of industrial infrastructure). Visual elements related to the Project would be consistent with the current industrial setting of the area. Operations would result in minor increases in light at night.

Under NEPA and the Federal Land Policy and Management Act, visual and aesthetic lands are protected as a resource. Therefore, the Bureau of Land Management (BLM) developed a Visual Resource Management (VRM) classification. To retain the existing character of the landscape, the project area has been classified as VRM Class 2 (BLM 2022). Development activities would be visible, but would not be likely to attract attention; therefore, the level of change in the area should be low. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Based on the proposed design of the Project, the presence of existing industrial facilities, and the industrial nature of the surrounding area, impacts on aesthetic and visual resources resulting from the Project would not be significant.

3.5 Water Resources

The Project's water use is detailed in Section 2.2.4, *Water Use/Consumption and Recycling*, above. The Project does not own or operate any groundwater supply wells. Furthermore, there are no permanent surface water features on the project site. The recent *Draft Aquatic Resources Delineation Report* (USFWS 2022a and 2022b) identified only a single "dry ephemeral stream" and an upland swale with no primary ordinary high-water mark indicators that would indicate flowing surface water on the project site (Appendix D, *Draft Aquatic Resources Delineation Report*). As described in Section 2.1, *Project Construction*, construction activity at the site in the area of the dry ephemeral stream described above would involve work that would be subject to Nevada's Working in Waterways Temporary Permit Program. Because this permit program would require Redwood Materials to submit monthly DMRs and abide by BMPs to prevent soil erosion, sediment transport, water quality degradation, and harmful impacts on surface water resources, work that would be subject to a Working in Waterways Temporary Permit would not be expected to result in significant impacts on surface water resources.

The project site is within the TRI-GID, which provides potable water-, reclaimed water-, and wastewater-treatment services exclusively to commercial and industrial customers within the TRIC, consistently with the terms of Nevada Revised Statutes (NRS) 318. During operation, all water used at the project site would be provided by TRI-GID, pursuant to an agreement between Redwood Materials and TRI-GID. Because TRI-GID services commercial and industrial customers exclusively within the TRIC, Redwood Materials' use and consumption of water provided by TRI-GID would not affect water supplies designated for municipal or residential consumption. Redwood Materials would use reclaimed/recycled water for further in-process use following onsite treatment, beginning with its initial copper foil operations, as noted in Section 2.2.4. This supply of reclaimed/recycled water would reduce the use of TRI-GID-supplied water throughout the operational phase of the Project to minimize water usage.

Redwood Materials has applied to the TRI-GID water-treatment company to authorize a "zero-discharge" permit, pursuant to which industrial process-related wastewater discharges from the Project would not be expected due to the onsite reclamation of process water, as described above. Non-process wastewater (i.e., sanitary wastewater) would be discharged to and treated by the TRI-GID wastewater treatment company.

Redwood Materials has received three separate Temporary Discharge Permits from NDEP for the temporary discharge of reclaimed water produced through various hydrostatic testing, leach

rinse, and process activities. Prior to discharge, water would be removed from the applicable system and placed in holding tanks on site. Following analytical testing for total petroleum hydrocarbons and other constituents, the water would be pumped into water trucks for dust suppression purposes. Pooling and/or ponding are anticipated to be minimal, and no runoff from the site is anticipated to occur, in compliance with the Stormwater Pollution Prevention Plan (SWPPP). The results of analytical testing and the water volume used for dust suppression would be submitted to NDEP monthly following permit issuance on DMR forms. Redwood Materials also received a Temporary Discharge Permit from TRI-GID to allow the temporary discharge of commissioning-related clean deionized water from the process water–treatment plant through April 30, 2023; during steady-state operations, this water would be reused as process water on site.

The migration of pollutants from the project site to area water resources would be minimized by adhering to a SWPPP, as required by NDEP, pursuant to Nevada's Construction Stormwater General Permit, during the construction phase and Nevada's Multi-Sector General Permit during operations. The Redwood Materials SWPPP incorporates BMPs for stormwater control measures, as identified by NDEP in the *Nevada Best Management Practices Manual* (NDEP 2005). In addition, all hazardous materials and hazardous wastes associated with the Project's operational phase would be contained inside the facility, in tanks, or in closed containers stored with secondary containment operations.

Because of the current plans for: (1) TRI-GID water use, onsite treatment of process water to allow generation and reuse of reclaimed water, the lack of industrial process-related discharges, and the treatment of sanitary wastewater by the TRI-GID wastewater treatment company; (2) the absence of onsite wells or surface water features, as well as the controls required for construction work subject to a Working in Waterways Temporary Permit; (3) stormwater controls used during construction and operation; and (4) the control of onsite hazardous materials and hazardous wastes, impacts on water resources, including groundwater and surface waters, resulting from the Project would not be significant.

3.6 Biological Resources (Vegetation and Wildlife)

Vegetation species that occur in the vicinity of the project area are typical of shrubland cover types, which include mainly sagebrush species, but may also include other shrub and graminoid species, including scattered juniper (*Juniperus* ssp.), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), Sandberg bluegrass (*Poa secunda*), and Indian ricegrass (*Achnatherum hymenoides*) (NatureServe 2022).

A variety of common wildlife species have been documented in the vicinity of the project area, including great basin spadefoot (*Spea intermontane*), gopher snake (*Pituophis catenifer*), great basin fence lizard (*Sceloporus occidentalis*), great basin whiptail (*Aspidoscelis tigris tigris*), mountain garter snake (*Thamnophis elegans*), Nevada side-blotched lizard (*Uta stansburiana nevadensis*), striped whip snake (*Masticophis taeniatus*), tiger whiptail (*Cnemidophorus tigris*), western fence lizard (*Sceloporus occidentalis*), yellow-backed spiny lizard (*Sceloporus uniformis*), zebra-tailed lizard (*Callisaurus draconoides*), American kestrel (*Falco sparverius*), and golden eagle (*Aquila chrysaetos*). Occupied mule deer (*Odocoileus hemionus*) and bighorn sheep (*Orvis canadensis*) territory exists within the vicinity of the project area (NDOW 2022).

Approximately 165 acres within the project area have already been disturbed, consisting of both those areas of the "main facility parcel" (depicted on Figure 2-2) in the vicinity of building footprint and a neighboring parcel east–northeast of the "main facility parcel" for the pCAM/CAM building. That area was disturbed pursuant to the development plans of the previous owner and prior to Redwood Materials' acquisition of the property.

Storey County has zoned the general project area for heavy industrial use (Storey County 2017). Within the TRIC is a large industrial facility adjacent to the project area. Several other industrial complexes are located approximately 6 miles to the north. Despite this, the habitat immediately surrounding the project area is relatively diverse, with many species of forbs and shrubs and very few nonnative or noxious weeds. For the temporary project disturbance areas, such as the temporary staging and laydown areas that would support construction, the spread of noxious weeds would be monitored. If needed, these areas would be reclaimed or reseeded in accordance with the SWPPP.

Given the project area's zoning for heavy industrial use, existing disturbance within the area, and minimal density of observed wildlife within the area, impacts on wildlife from project activities would not be significant.

3.6.1 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) was consulted under Section 7 of the Endangered Species Act (ESA). A species list was provided that identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of the project area (Appendix B, *Organizations Contacted*). This list was verified using the USFWS Information for Planning and Consultation (IPaC) tool. The Nevada Department of Wildlife (NDOW) was also consulted because it compiles habitat and wildlife resource databases on threatened and endangered species (Appendix B, *Organizations Contacted*).

The following species were identified, using the USFWS IPaC tool, as having the potential to occur in the vicinity of the project area (these species are listed, proposed for listing, or candidates for listing under the ESA): cui-ui (*Chasmistes cujus*) and monarch butterfly (*Danaus plexippus*). In addition, NDOW noted that Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*), which is threatened under the ESA, is known to occur 8 miles west of the project area.

Cui-ui, listed as endangered under the ESA, is endemic at Pyramid Lake, Nevada; it typically uses the lower 12 miles of the Truckee River to spawn, unless there is adequate flow to allow passage above or around the delta (NatureServe 2022). Pyramid Lake is approximately 24 miles north of the project area. The National Hydrography Dataset (NHD) considers streams in the vicinity of the project area to be ephemeral; therefore, they do not provide year-round connectivity to the Truckee River nor support fish (see Appendix D, *Draft Aquatic Resources Delineation Report*). Cui-ui would not be affected by project activities.

Monarch butterfly is listed as a candidate species under the ESA. The project area is within the known geographic distribution of Monarch butterfly. Reproduction of this species is dependent on the presence of milkweed (*Asclepias*), the sole food source for monarch larvae. Monarch butterflies are known to utilize milkweed as habitat. Five species of milkweed have the potential to occur in the vicinity of the project area (BLM 2017). Milkweed was not found within the project area during the April 20, 2022, preconstruction field investigation; nonetheless, Redwood Materials would implement the BMPs set forth in Redwood Materials' Summary of Environmental Compliance Measures (see Appendix F) to either avoid disturbing milkweed encountered during construction or consider any unavoidable loss of any milkweed encountered during construction in reclamation seed mixes. Because milkweed was not detected, and disturbance activities are anticipated, monarch butterflies would very likely avoid the project area. Therefore, monarch butterflies would not be likely to be affected by project activities.

Lahontan cutthroat trout is listed as threatened under the ESA. Known occupied habitat for Lahontan cutthroat trout within the Truckee River watershed is found in Long Valley Creek,

approximately 8 miles west of the project area. Streams in the vicinity of the project area are considered ephemeral; they do not connect to Long Valley Creek nor support fish (Appendix D). Lahontan cutthroat trout would not be affected by project activities.

The USFWS IPaC tool did not identify any critical habitats within the project area for the abovementioned species. Moreover, the project area would not include habitat that would be suitable for or able to support these species. Therefore, project activities would not affect any threatened or endangered species or critical habitats.

3.6.2 Migratory Birds

All native migratory birds of the United States are protected under the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 USC 703–712 *et seq*.). Pursuant to Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, federal agencies are directed to take certain actions to implement the MBTA. In 2006, DOE and USFWS signed a Memorandum of Understanding (MOU) regarding implementation of EO 13186. This MOU requires DOE to integrate migratory-bird conservation principles, measures, and practices into DOE activities. The MOU also commits DOE to avoiding or minimizing, to the extent practicable, adverse impacts on migratory birds.

The MBTA requires the mitigation of impacts on migratory bird species within the United States. The disturbance of migratory birds, active nests, eggs, or nestlings during the breeding season may violate the MBTA, and actions resulting in take of migratory birds or eggs are violations of the MBTA. As a result, migratory-bird nest-clearance surveys are to be completed prior to any activity involving vegetation removal during the breeding season. The migratory-bird breeding season in the project area is approximately April 1 through August 31. A preconstruction clearance survey was conducted on April 20, 2022, which determined that no nests of migratory birds were present within the project area (McGinley & Associates 2022).

The Project would not alter migratory bird movement patterns nor result in substantial fragmentation of habitat because the project area has been previously disturbed. The species that are likely to be affected are common and widely distributed. As a result, construction of the Project would not affect the future viability of their populations. Nonetheless, remaining habitats could support migratory birds. If construction or ground-disturbing activities were to occur during the breeding season, then Redwood Materials would implement reasonable efforts to avoid, minimize, or mitigate adverse effects. Such measures would include following NDOW recommendations and conducting a preconstruction nest clearance survey within 10 days prior to vegetation removal. If active nests are found, then they should be avoided until young have fledged or the nest is no longer occupied. These measures are set forth in Redwood Materials' *Summary of Environmental Compliance Measures* (see Appendix F).

Based on the limited habitat that may support migratory birds within the project area and the fact that much of the project area has been previously graded, as well as the mitigation measures outlined above, impacts on migratory birds from project activities would not be significant.

3.7 Cultural Resources

In February 2022, McGinley and Associates contacted Jason Spidell of Kautz Environmental Consultants (KEC) to request a cultural resource inventory for 171 acres in the Virginia Range near Sparks, Nevada. For clarity, the approximately 173-acre project area outlined in Section 2.0, *Description of Proposed Action*, reflects an Assessor's Parcel Number, whereas the 171-acre cultural resources inventory area reflects geographic information system (GIS) data. The variation is a result of contours in the landscape where elevations differ. Because the Project includes the use of federal funds issued by the DOE, it constitutes a federal

"undertaking." This requires the Project to be in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) (54 USC 300101 *et seq*.).

On behalf of McGinley and Associates, KEC conducted a Class III pedestrian survey on 171 acres to assess the direct area of potential effect (APE). KEC also conducted an indirect effects assessment of 2,267 acres, constituting a 1-mile buffer around the direct APE. A total of five cultural resources were identified in the direct APE, but none of the resources in the direct APE were recommended for classification as historic properties. The indirect effects assessment identified a total of 13 resources; none of these resources were identified as having the potential to be adversely affected by indirect project effects.

As a result of identification efforts regarding historic properties, as well as the assessment of adverse effects, it was found that no historic properties within the direct and indirect APE have the potential to be adversely affected by the Project. The Nevada State Historical Preservation Officer (SHPO) concurred with the DOE finding by letter on November 11, 2022.

If unanticipated cultural resources were discovered during project construction, then reasonable efforts would be made to avoid, minimize, or mitigate adverse effects consistently with the procedures at 36 CFR 800.13 (b). Mitigation measures would include notifying the SHPO and DOE within 48 hours of the discovery. The notification would describe the assessment of eligibility for the property with respect to the National Register of Historic Places and the proposed actions to resolve adverse effects. Typically, regulatory agencies respond within 48 hours. These measures are set forth in Redwood Materials' *Summary of Environmental Compliance Measures* (see Appendix F).

Due to the absence of adverse impacts on cultural resources within and surrounding the project site, as well as the mitigation measures that are in place to ensure that appropriate action is taken in the event of an unanticipated discovery of such materials, impacts on cultural resources as a result of the Project would not be significant.

3.8 Native American Interests

In conjunction with this EA and the NHPA Section 106 historic and archeological review process, in September 2021, the DOE sent a NEPA letter to notify Native American tribes about the Project. This effort was intended to identify tribal interests on the project site and give the tribes an opportunity to provide comments or express concerns. The following Federally Recognized Tribes and councils were contacted (see Appendix C).

- Confederated Tribes of the Warm Springs Reservation of Oregon and Nevada
- Fort McDermitt Paiute and Shoshone Tribes of the Fort McDermid Indian Reservation
- Paiute–Shoshone Tribe of the Fallon Reservation
- Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation
- Reno–Sparks Indian Colony, Nevada
- Yerington Paiute Tribe of the Yerington Colony and Campbell Ranch, Nevada

Following submission of the NEPA letter, each tribe was contacted by telephone to ensure receipt of the letter and give the tribe an opportunity to express any immediate questions or concerns. No written responses to the letter have been received to date. The DOE contacted the aforementioned tribes on completion of the cultural resources survey for the project site. Only the Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation requested a copy of the cultural resources survey for review. No comments were received on the survey.

Due to the absence of adverse impacts on Native American interests within and surrounding the project site, impacts on Native American interests resulting from the Project would not be significant.

3.9 Socioeconomics and Environmental Justice

3.9.1 Socioeconomics

The project area is in an industrial area that is isolated from populated communities—specifically, the northwestern Nevada socioeconomic impact area (i.e., Storey and Washoe counties). Storey County had an estimated population of 4,143 in 2021; its projected population for 2025 is 5,098. Median household income was $64,000 in 2021. Washoe County had an estimated population of 471,519 in 2021; its projected population for 2025 is 518,651. Median income was $68,272 in 2021 (U.S. Census Bureau 2021) (Table 3-4).

The project area is located within the TRIC, 9 miles southeast of McCarran, Nevada, and is 28 miles east of the Reno–Sparks area and 17 miles northwest of Silver Springs. Due to the isolated and unpopulated nature of the project area, no accurate socioeconomic data is available. The Project is expected to create approximately 3,400 good-paying construction jobs and employ approximately 1,600 full-time staff, including laborers, technical staff, and onsite management personnel. Approximately 75 percent of the jobs are expected to be filled by residents from the Reno–Sparks area; an anticipated 425 to 475 workers are expected to relocate to the area. Workers could come from as far away as Carson City, a city with an estimated population of 58,993 in 2021 (U.S. Census Bureau 2021); Carson City is approximately 35 miles from the project area. Benefits to businesses and work forces in these nearby communities would very likely result from the addition of new jobs and the associated realization of additional wages within these communities.

Other than the potential beneficial effects on communities within the Reno–Sparks area discussed above, no significant impacts on socioeconomic resources are anticipated.

Table 3-4. Summary of Populations and Incomes in Storey County and Washoe County

Location	Population (2021)	Projected Population (2025)	Median Household Income (2021)
Storey County	4,143	5,098	$64,000
Washoe County	471,519	518,651	$68,272

3.9.2 Environmental Justice

LPO's review of environmental justice (EJ) issues focuses on EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. EO 12898 directs federal agencies to address the disproportionately high and adverse effects of their actions on minority and low-income populations, including effects on human health and the environment (National Archives 1994).

The DOE utilizes EJ Screen, an EPA EJ mapping and screening tool that provides a nationally consistent dataset and approach for combining environmental and demographic indicators (EPA 2022). The 12 indexes defined in EJ Screen are described below. EJ Screen also includes two of the National Air Toxics Assessment (NATA) criteria, as defined by EPA.

In accordance with EPA EJ guidelines, minority populations should be identified when either: (i) the minority population of the affected area exceeds 50 percent; or (ii) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (EPA 2022). No minority populations have been identified for this Project.

EJ Screen was used to perform an analysis for the Project. A 10-mile radius, covering 340 square miles around the project area, was applied to the analysis due to the rural nature of the surrounding area. Twelve EJ indexes were calculated for the area and compared to calculations for the state, the EPA region, and the U.S. The indices are as follows.

- $PM_{2.5}$
- O_3
- Diesel PM
- Air Toxics Cancer Risk (part of the NATA)
- Air Toxics Respiratory Hazard Index (part of the NATA)
- Traffic Proximity
- Lead Paint
- Superfund Proximity
- Risk Management Plan Facility Proximity
- Hazardous Waste Proximity
- Underground Storage Tank
- Wastewater Discharge

Most of the above indices have values that are lower than 66 percent of the state values and lower than 55 percent of the U.S. values. These indices are not discussed further because the screening values do not suggest potential EJ population concerns. The remaining four indices, which are set forth in Table 3-5, below, are above 45 percent in the U.S. percentile, with lead paint being the highest, at the 51st percentile (EPA 2022).

Table 3-5. Highest Percentile of Environmental Justice Index Results

Environmental Justice Indexes	State Percentile	EPA Region Percentile	U.S. Percentile
2017 Diesel PM	32	28	48
Lead Paint	15	26	51
Risk Management Project Facility Proximity	25	27	47
Hazardous Waste Proximity	34	32	46

Because the area is unpopulated, and no EJ communities are within 10 miles, no significant impacts associated with EJ concerns are anticipated.

3.10 Health and Safety

There is the potential for risks to public and occupational health and safety during project activities associated with construction and operations. Risks would be associated with the operation of heavy equipment, the use, production, and storage of hazardous materials and industrial wastes (described in Sections 2.2.5, *Hazardous Materials and Waste Streams*, and 3.12, *Waste Management*), vehicular traffic, and access to the project area. The facility would be operated in accordance with the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) standards during construction and operations.

During construction, which is already in progress (as described in Section 2.1), all personnel would comply with Nevada requirements and possess OSHA-10 or OSHA-30 certification, as applicable. Each construction area would be managed under a General Contractor Site-Specific Safety and Hazard Communication Plan that would meet applicable regulations, standards, and requirements, including those associated with Project permits and industry BMPs.

During operations, the Project would be subject to applicable OSHA and Nevada Occupational Safety and Health Act (NOSHA) standards and regulations (OSHA 1981). The *Redwood Materials Environmental, Health, and Safety Management System Manual* minimizes impacts on worker health and safety during operations and reduces potential accidents. The manual outlines compliance with the International Organization for Standardization (ISO) 14001 Environmental Management System, ISO 45001 Occupational Health and Safety Management System, and Nevada's' Written Workplace Safety Program (WWSP). The manual describes procedures for training, accident reporting, electrical safety, fire protection, and the use of appropriate PPE.

NDEP administers the CAPP, as described in Section 2.2.5, *Hazardous Materials and Waste Streams*, above. When storing CAPP-regulated substances above applicable thresholds, facilities must: (i) evaluate and mitigate hazards, understand the design parameters of their processes and operate within the appropriate design limits, prepare comprehensive operating procedures, thoroughly train operators in those procedures, and maintain facility equipment and instruments to prevent premature failure; and (ii) develop an action plan for dealing with potential emergency situations, and coordinate emergency response activities with local responders. NDEP administers these requirements through a CAPP permit program.

As described in Section 2.2.5, certain Redwood Materials processes would utilize substances that would be subject to the CAPP. The Primary Facilities' initial operations would utilize these substances in quantities that would be below the applicable CAPP threshold. However, Redwood Materials anticipates that, as additional production capacity is added, pursuant to the phased construction approach outlined in Section 2.1, *Project Construction*, certain processes may require CAPP-regulated substances in quantities above applicable CAPP thresholds. The CAPP requires a new CAPP-regulated process to obtain both a Permit to Construct prior to commencing process construction and a Permit to Operate prior to process start-up. Redwood Materials would obtain the appropriate CAPP permits from NDEP for any of its processes that would utilize CAPP-regulated substances in quantities above the applicable thresholds.

Emergency response and medical services for the project area would largely be provided from Sparks, Nevada, approximately 20 miles northwest (driving distance) of the project area. The local sheriff's department and fire department have the capability to respond to emergencies. Security measures for the project area would include perimeter fences and 24-hour-a-day, 7-day-a-week surveillance to prevent harm to the public. The DOE believes that the facility would present an unlikely target for intentionally destructive acts (e.g., terrorism, sabotage) and has an extremely low probability of being attacked. Thus, the potential for impacts from intentionally destructive acts is considered to be very low. In addition, during operations, an Emergency

Response Plan and a Project Security Plan would be developed as part of environmental, health, and safety (EHS) plans to address the response to potential injuries, fires, spills, hazardous material releases, and operational security and safety concerns. These plans would be used by personnel to minimize both human health and safety concerns and environmental impacts. Consistent with OSHA requirements, Redwood Materials would perform job-hazard analyses to identify and assess hazards associated with particular job tasks. Any risks identified would be further evaluated for appropriate mitigation measures, according to a hierarchy of controls, including use of PPE, where appropriate.

In light of the emergency and safety plans that are in place for construction (and would be implemented during operations), the CAPP permitting process applicable to the use of subject substances above applicable thresholds, and the regulation of worker safety through OSHA and NOSHA standards, no significant impacts related to health and safety are anticipated.

3.11 Waste Management

The waste streams associated with operations at the Redwood Materials facility are detailed in Section 2.2.5, *Hazardous Materials and Waste Streams*, above. As further described in Section 3.8, *Native American Interests*, process water would be treated, reclaimed, and reused on site. Non-process wastewater would be discharged to the TRI-GID wastewater treatment facility using a sewer line that would be extended to connect the project site to the TRI-GID system.

The project site already has an EPA identification number, pursuant to which Redwood Materials has notified EPA that it is an LQG of hazardous waste, generating more than 1,000 kilograms per month (EPA 2021). Redwood Materials has contracted with Clean Harbors, a reputable waste-handling company, to collect its waste materials and transport them to an appropriately permitted hazardous waste treatment and disposal facility.

Because non-process wastewater would be discharged to the TRI-GID wastewater treatment facility, the Redwood Materials facility has notified EPA of its hazardous waste–generation activities and would utilize a licensed and reputable waste handling company to handle collection, transport, and disposal, and required regulatory controls applicable to hazardous waste generators are in place, impacts related to the Project's waste-management activities would not be significant.

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4.0 CUMULATIVE EFFECTS

As defined in the CEQ regulations, “cumulative effect” is the impact on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). The cumulative effects analysis should address resources that may be subject to cumulative impacts from the Project in c2ombination with other actions that have taken place or are expected to take place in the area.

As discussed in Section 3.0, *Environmental Consequences*, impacts associated with the Proposed Action are not anticipated to be significant for any of the resources assessed in this EA. This section addresses potential cumulative effects associated with the following reasonably foreseeable future actions.

1. Construction and operation of Redwood Materials’ calcination operations on the project site
2. Construction of the warehouse space adjacent to the project site that Redwood Materials plans to lease
3. Extension of an electric transmission line to connect the project site to NV Energy’s Comstock Substation, which is directly south of the project area, and a reclaimed water/sewer line to connect the project site to the TRI-GID main system
4. TRI-GID’s sourcing of the water it would provide for Redwood Materials

The impact of these cumulative effects is not expected to be significant because they would arise within the context of the TRIC, which, for decades, has been developed and planned as a large industrial center. Most areas in the TRIC are undeveloped, arid, open spaces. In addition, minimal environmental resources or wildlife habitats have been identified within the Project area, as discussed in Section 3.0. Therefore, the Project, including reasonably foreseeable future actions, would result in development similar in nature to that of other nearby developments. Such nearby developments are likely to have similar effects on assessed resources.

The calcination process and other Redwood Materials facility processes that are not part of the Project represent a cumulative source of air emissions, process water, and waste generation collocated with project processes. Table 4-1 summarizes waste generation from the calcination process. Process water generated by the calcination process and other processes that are not part of the Project would be recycled on site or collected and disposed of at an appropriately permitted waste treatment and disposal facility.

Table 4-1. Calcination Waste Streams

Facility	Waste	Estimated Volume (if available)	Collection	Anticipated Disposition
Calcination	Air scrubber water	1,600 gallons per month	Tanks or totes	Routed to process water recycling facility
Calcination	Floor scrubber water	5,000 gallons per month	Tanks or totes	Routed to process water recycling facility
Calcination	Miscellaneous packaging waste from incoming material for recycling (e.g., boxes, drums, pallets)	23,000 pounds per month	Roll-off bin	Reused/recycled onsite or collected by a licensed waste handling company

Redwood Materials expects that each of the waste streams described above would be non-hazardous. Waste characterization determinations would be completed in accordance with 40 CFR 262.11. The TRIC is a mixed-use, nonresidential development that consists of a wide range of industrial, office, and commercial enterprises. It includes 30,000 acres of developable land, of which only 200 acres remain available for purchase (TRIC 2022). The remaining 77,000 acres is composed of land with slopes greater than 6 percent; it can be used for development, but not for industrial or manufacturing use (U.S. Department of Transportation 2014). Appendix E, *Land Use and Special Management Areas*, describes existing operating facilities near the project area and the adjacent land that is available for future development. The closest developed property is a Google facility directly adjacent to the project area to the southeast. As the TRIC continues to grow, it is projected that it would employ 23,500 people by 2035; full build-out is not expected to occur until after 2035 (U.S. Department of Transportation 2014). The Project is within this expanding industrial center and has an expected operational life of 25 to 30 years.

Construction of Redwood Materials' adjacent warehouse space, calcination facility, and electric transmission and reclaimed water/sewer lines would take place within the ambit of this industrial area. Impacts associated with this additional construction activity would be incremental and subject to the same practices, controls, and BMPs discussed in Section 3.0, *Environmental Consequences*. Operation of the calcination facility, in particular, would have incremental impacts on air emissions, but such impacts would not be significant. The expected emissions are already reflected in the "Total Emissions Permitted" column in Table 3-1, which demonstrates that currently permitted and pending emissions remain under major-source thresholds. For future facility expansion, Redwood Materials would apply for appropriate permits in light of its revised facility-wide PTE. To the extent that operation of the calcination operation would also result in incremental increases in GHG emissions, such emissions would most likely be offset as a result of the facility's proposed operations and associated reduction in impacts relative to the current environmentally intensive transport routes and processes associated with the battery-component supply chain. Finally, Redwood Materials would not generate hazardous waste from its calcination activities; process water associated with calcination air emissions–control equipment would be routed to the onsite water treatment facility and is anticipated to be non-hazardous.

NV Energy provides electrical power to the project area. Its utilities are oversized, allowing large industrial facilities and development in the area to grow. Currently, are five generating power plants are within the TRIC, generating 900 megawatts of power. In anticipation of growth within the TRIC, NV Energy put into place a new substation (i.e., Chukar) in 2018. The Chukar Substation has room for expansion as the area continues to grow (NV Energy 2018). Water and sewer services are in place and administered by TRI-GID (TRIC 2022).

TRI-GID provides potable water-, reclaimed water-, and wastewater-treatment services to commercial and industrial customers exclusively within the TRIC. As described in Section 2.2.4, *Water Use/Consumption and Recycling*, all potable and process water used at the project site would be provided by TRI-GID, pursuant to an agreement between Redwood Materials and TRI-GID. TRI-GID has the ability to source the water it would provide to Redwood Materials from a variety of sources and is responsible for maintaining and abiding by any associated permits that may be applicable. All water appropriations in Nevada must be permitted by the State Engineer. That permitting process includes a variety of procedural and substantive environmental protections to ensure that Redwood Materials' use of water provided by TRI-GID would not result in significant cumulative impacts.

For example, the State Engineer may require the following.

- A monitoring, management, and mitigation plan as a condition of appropriating water for a beneficial use, pursuant to NRS 533.353.
- May order a hydrological study, an environmental study, or any other study in connection with an application (or undertake such a study themself), pursuant to NRS 533.368.
- Is required, pursuant to NRS 533.370, to consider, among other things, whether a proposed action is "environmentally sound as it relates to the basin" and "an appropriate long-term use that would not unduly limit the future growth and development in the basin."[4]

Redwood Materials' use of waters supplied by TRI-GID is consistent with the purpose of TRI-GID, which is to serve commercial and industrial customers exclusively within the TRIC; thus, Redwood Materials' use and consumption of waters provided by TRI-GID would not affect water supplies designated for municipal or residential consumption. In light of the fact that TRI-GID maintains the appropriate permits to access the sources of water it provides to Redwood Materials and that such waters would be used by TRI-GID to service commercial and industrial customers, such as Redwood Materials, within the TRIC, no significant cumulative impacts are anticipated in connection with TRI-GID's sourcing of the water it would provide to Project.

Because reasonably foreseeable future actions would occur within an industrial and unpopulated area (zoned I-2 Heavy Industrial) with infrastructure and utilities in place and designed to serve a large industrial center, including reasonably foreseeable future actions, there are minimal environmental resources and wildlife habitats within the area, and any incremental impacts associated with construction, operation, or utility service related to the reasonably foreseeable future actions would either be subject to applicable permits or consistent with the practices, controls, and BMPs discussed in Section 3.0, *Environmental Consequences*, implementing the Project would not result in significant cumulative impacts.

The current state of climate science now indicates that it is "unequivocal" that observed global warming since the mid-twentieth century is influenced by human activities (Mason-Delmotte 2021). Since the industrial era began, around 1750, GHG emissions as a result of human activities have increased concentrations of atmospheric GHGs, such as carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbon (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Between 1990 and 2015, net emissions of GHGs from human activities increased by 43 percent, further contributing to rising global temperatures (EPA 2022). Warming global temperatures have been and would continue to be accompanied by changes in both weather and climate. Changes in rainfall amounts and patterns (i.e., frequency and intensity of both flooding and droughts), rising sea levels, Arctic Sea ice decline, and more intense and frequenter heat waves have all been established as impacts from rising GHG concentrations and subsequent warming (Mason-Delmotte 2021).

GHG emissions associated with construction of project facilities are anticipated to be minimal. The potential annual GHG emissions from facility operations associated with the Project are currently estimated to be approximately 303 MT/yr of CO_2 equivalent (CO_2e). Total GHG emissions were evaluated on the basis of global warming potential equivalence to CO_2. This

[4] Any waters from sources subject to the Truckee River Operating Agreement (TROA) would be subject to additional procedural and substantive protections consistent with the terms of that agreement, which includes several measures aimed specifically at the protection of cui-ui and Lahontan cutthroat trout. The TROA was the subject of a 2008 final environmental impact statement/environmental impact report undertaken by the U.S. Department of the Interior and the State of California (DOI 2008).

criterion establishes the global warming potential of CO_2 and assigns it a value of 1. Other pollutants are evaluated for global warming potential and assigned a value relative to the warming potential of CO_2 on a mass basis.

DOE estimates that the Project's output of copper foil and CAM can support up to approximately 2.1 million EVs per year. This number of EVs yields an annual fuel consumption savings of approximately 880 million gallons of petroleum per year.

The annual avoided CO_2 is calculated from the Project's annual fuel consumption savings (i.e., 880 million gallons) using the EPA's Greenhouse Gases Equivalences calculator. This calculator converts emissions and energy data into equivalent amount of CO_2 emissions avoided. Therefore, the use of copper foil and CAM produced by the Project and used in EVs would support a reduction of approximately 7,820,560 MT/CO_2 equivalent. Although potential annual GHG emissions from facility operations associated with the Project are currently estimated to be approximately 303 MT/CO_2 equivalent, the Project would still result in an overall 7,820,257 MT/CO_2 equivalent reduction. Given the cumulative GHG emissions accounted for in the proposed project activities, potential benefits associated with reducing CO_2 emissions would continue to support a greater reduction in GHG concentrations and reduce the associated climate change impacts. As such, potential GHGs and climate change impacts resulting from the Project are not anticipated to be significant.

5.0 FINDING

Based on this EA, DOE has determined that providing a federal loan to Redwood Materials to produce and store sustainable battery components, consisting of high-precision copper foil and high-energy CAM for EVs at the Redwood Materials facility near McCarran, Nevada, would not have a significant effect on the human environment. The preparation of an environmental impact statement (EIS) is therefore not required, and DOE is issuing this finding of no significant impact (FONSI).

TODD STRIBLEY

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November 28, 2023

Todd Stribley
NEPA Compliance Officer
DOE Loan Programs Office

Date

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6.0 LIST OF AGENCIES CONTACTED

The agencies and Native American tribes contacted during preparation of this EA are listed below.

6.1 Federal Agencies

- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers

6.2 State Agencies

- Nevada Department of Wildlife
- Nevada Division of State Lands
- Nevada State Historic Preservation Office
- State of Nevada, Department of Conservation and Natural Resources, Division of Natural Heritage
- Nevada Department of Environmental Protection
  - Bureau of Air Pollution Control
  - Bureau of Water Pollution Control
  - Bureau of Sustainable Materials Management

6.3 Native American Tribes

- Confederated Tribes of the Warm Springs Reservation of Oregon and Nevada
- Fort McDermitt Paiute and Shoshone Tribes of the Fort McDermid Indian Reservation
- Paiute–Shoshone Tribe of the Fallon Reservation
- Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation
- Reno–Sparks Indian Colony
- Yerington Paiute Tribe of the Yerington Colony and Campbell Ranch

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PERMITS AND APPROVALS

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ORGANIZATIONS CONTACTED

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CONSULTATION WITH AGENCIES AND NATIVE AMERICAN TRIBES

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REDWOOD MATERIALS' SUMMARY OF ENVIRONMENTAL COMPLIANCE MEASURES