



DOE/EA-2253

DRAFT Environmental Assessment

PyroThin® Aerogel Manufacturing Facility for
EV Battery Safety (Register, Georgia)

Department of Energy, Loan Programs Office –
Advanced Technology Vehicles Manufacturing

APRIL 2024

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AAC	acceptable ambient concentration
APE	area of potential effects
Aspen or Applicant	Aspen Aerogels Georgia, LLC
ATVM Program	Advanced Technology Vehicle Manufacturing Program
BMP	best management practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
Cr+6	hexavalent chromium
dBA	A-weighted decibels
DOE	U.S. Department of Energy
EA	Environmental Assessment
EHS	Environmental Health and Safety
EPA	U.S. Environmental Protection Agency
EPD	Environmental Protection Division
ESA	Endangered Species Act
EV	electric vehicle
FEMA	Federal Emergency Management Agency
GADNR	Georgia Department of Natural Resources
GDOT	Georgia Department of Transportation
GHG	greenhouse gas
gpd	gallons per day
GRAD	Georgia Ready for Accelerated Development
HAPs	hazardous air pollutants
HAZOP	hazards and operability
HPD	Historic Preservation Division
HUC	Hydrologic Unit Code
JD	jurisdictional determination
LOS	level of service
LPO	Loan Programs Office
MER	minimum emissions rate
N ₂	nitrogen
NAAQS	National Ambient Air Quality Standards
NATA	National-Scale Air Toxics Assessment
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O.C.G.A.	Official Code of Georgia Annotated
OSHA	Occupational Safety and Health Administration
PM	particulate matter

Acronym	Definition
PM ₁₀	particulate matter, less than 10 microns
PM _{2.5}	particulate matter, less than 2.5 microns
Project	PyroThin® aerogel manufacturing for EV battery safety
PSM	process safety management
RTO	regenerative thermal oxidizer
SESC	soil erosion and sedimentation control
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	sulfur dioxide
State	State of Georgia
TAPs	toxic air pollutants
tpy	tons per year
TSDf	treatment, storage, and disposal facility
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VOCs	volatile organic compounds

1. 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 Energy Independence and Security Act of 2007 to select projects for financial assistance that are consistent with the goals of the act. DOE is using the National Environmental Policy Act (NEPA) process to assist in determining whether to issue a loan to Aspen Aerogels Georgia, LLC (Aspen or Applicant), to support Aspen's PyroThin® aerogel manufacturing for electric-vehicle (EV) battery safety (Project).

Aspen Aerogels is the manufacturer of PyroThin®, a thermal barrier for EV batteries engineered to stop or mitigate thermal propagation, thereby improving mechanical durability and vehicle efficiency. The company's objective is to develop a manufacturing facility on a 90-acre property within an industrial park in Register, Georgia, to meet the growing demand for thermal barriers for use in EV batteries. The Project site is at 400 Rocky Road, Register, Georgia.

Aspen has applied for a loan pursuant to DOE's Advanced Technology Vehicle Manufacturing Program (ATVM Program), which was created by the Energy Independence and Security Act of 2007 to provide incentives for projects that retrofit, expand, or create manufacturing facilities in the United States for advanced-technology vehicles or qualifying components, including engineering costs. The primary goal of the ATVM Program is to improve fuel economy for light-duty vehicles and thereby reduce ozone precursor emissions, greenhouse gas (GHG) emissions, and particulate matter (PM) emissions associated with vehicle operation. The ATVM Program is designed to stimulate the technology required to meet program objectives.

Aspen is proposing the PyroThin® aerogel manufacturing facility to facilitate the production of an anticipated 243 million square feet of PyroThin® aerogel per year, enough for approximately 2 million EV batteries annually. This automotive application for EV batteries would reduce air emissions that contribute to global warming, consistent with the primary goal of the ATVM Program. Financially supporting the Project would help bring EVs to market and into greater use, thereby reducing overall national emissions of air pollutants and human-caused GHGs.

1.2 Background

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

Using private funds, Aspen has already completed overall site development activities, installed foundations, and partially erected two of the planned structures. Aspen has applied to the DOE ATVM Program for financial support to finish construction of its PyroThin® aerogel manufacturing facility, including completion of the existing structures, construction of four additional structures, installation of manufacturing equipment and associated general equipment and systems, completion of final site development activities, and startup of the facility. LPO has reviewed the application and determined that it is substantially complete per the rules governing the ATVM Program in 10 Code of Federal Regulations (CFR) Part 611. Aspen has entered LPO's due diligence process.

1.3 Scope of Environmental Assessment

LPO is preparing this Environmental Assessment (EA) to evaluate the completion of the existing structures, construction of four additional structures, installation of the manufacturing equipment and associated general equipment and systems, completion of final site development activities, and startup of the facility. DOE is preparing this EA to comply with NEPA, the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Parts 1500–1508), and the DOE NEPA implementing procedures (10 CFR Part 1021). If no significant impacts are identified during preparation of this EA, DOE will issue a Finding of No Significant Impact. If potentially significant impacts are identified, DOE will prepare an Environmental Impact Statement.

Section 1.3.1 of this EA provides an overview of the Project and describes the site development and construction activities that have been completed and are not subject to federal financial support. Section 1.3.2 establishes the scope of the environmental review, given LPO's Proposed Action (i.e., a federal loan for facility finalization activities and initial operational activities), existing site conditions, and permit status. As described in Section 1.3.2, natural, physical, and socioeconomic resources that may be subject to potentially significant environmental issues are identified, as are resources that would not be subject to potentially significant environmental effects; thereby, narrowing the scope of the environmental review to environmental issues deserving of study.

1.3.1 Project Overview and Development Status

Aspen is expanding its manufacturing capacity by developing an approximately 570,000-square-foot manufacturing facility to produce PyroThin® aerogel thermal insulation, enough for approximately 2 million EV batteries annually. The Project site is within the approximately 200-acre Southern Gate Commerce Park, an industrial park at 400 Rocky Road in Register, Bulloch County, Georgia (see Figure 1-1).

Development of the Southern Gateway Commerce Park was previously reviewed and permitted by the U.S. Army Corps of Engineers (USACE) in a 2012 EA and statement of findings for an individual permit (see Appendix A). The scope of the USACE environmental review included development of a master-planned industrial park that could accommodate manufacturing and industrial space. The USACE EA analyzed the construction of approximately 2,318,159 square feet of building area, installation of access roads, installation of stormwater management facilities, extension of utilities, and construction of employee, trailer, and equipment parking areas. The 2012 USACE EA and statement of findings for an individual permit is incorporated by reference in this EA.

Prior to Aspen leasing the Project site, the property was cleared, graded, and stabilized by the Bulloch County Development Authority in accordance with federal, State of Georgia (State), and local permits. Preconstruction permitting for the Project has included an application for and approval of National Pollutant Discharge Elimination System (NPDES) General Construction Permit No. GAR100001¹ to support stormwater discharges during construction. See Appendix B for a complete list of permits and approvals.

Since leasing the Project site, Aspen has conducted the following construction activities in accordance with all applicable permits and approvals:

- Establishing temporary erosion controls, roads, and construction work areas for parking and material/equipment storage;
- Pouring concrete slabs and foundations for the central utility plant and main manufacturing building;
- Installing underground utilities and completing mass grading for foundation preparation; and

¹ In February 2024, this permit was transferred from the Bulloch County Development Authority to Aspen.

- Installing basic building elements (i.e., steel supports, roofing, exterior wall panels) for the central utility plant and main manufacturing building.

The development and construction activities that have been completed are not subject to the federal financial support requested from LPO.

The current site conditions, as of March 2024, establish the baseline conditions for the Project that is the subject of the federal financial support request under review by LPO (i.e., completion of existing structures, construction of four additional structures, installation of manufacturing equipment and associated general equipment and systems, completion of final site development activities, and startup of the facility) (see Figure 1-2). In addition, Aspen will construct certain facilities on the site that will not be subject to federal financial support (i.e., outside the scope of LPO's Proposed Action); these facilities include the site entrance (1), guard booth (2), truck queuing/turnaround (5), raw goods warehouse (6), and future warehouse (10) (see Figure 2-1 for facility numbering).

Figure 1-1: Project Site Location Map

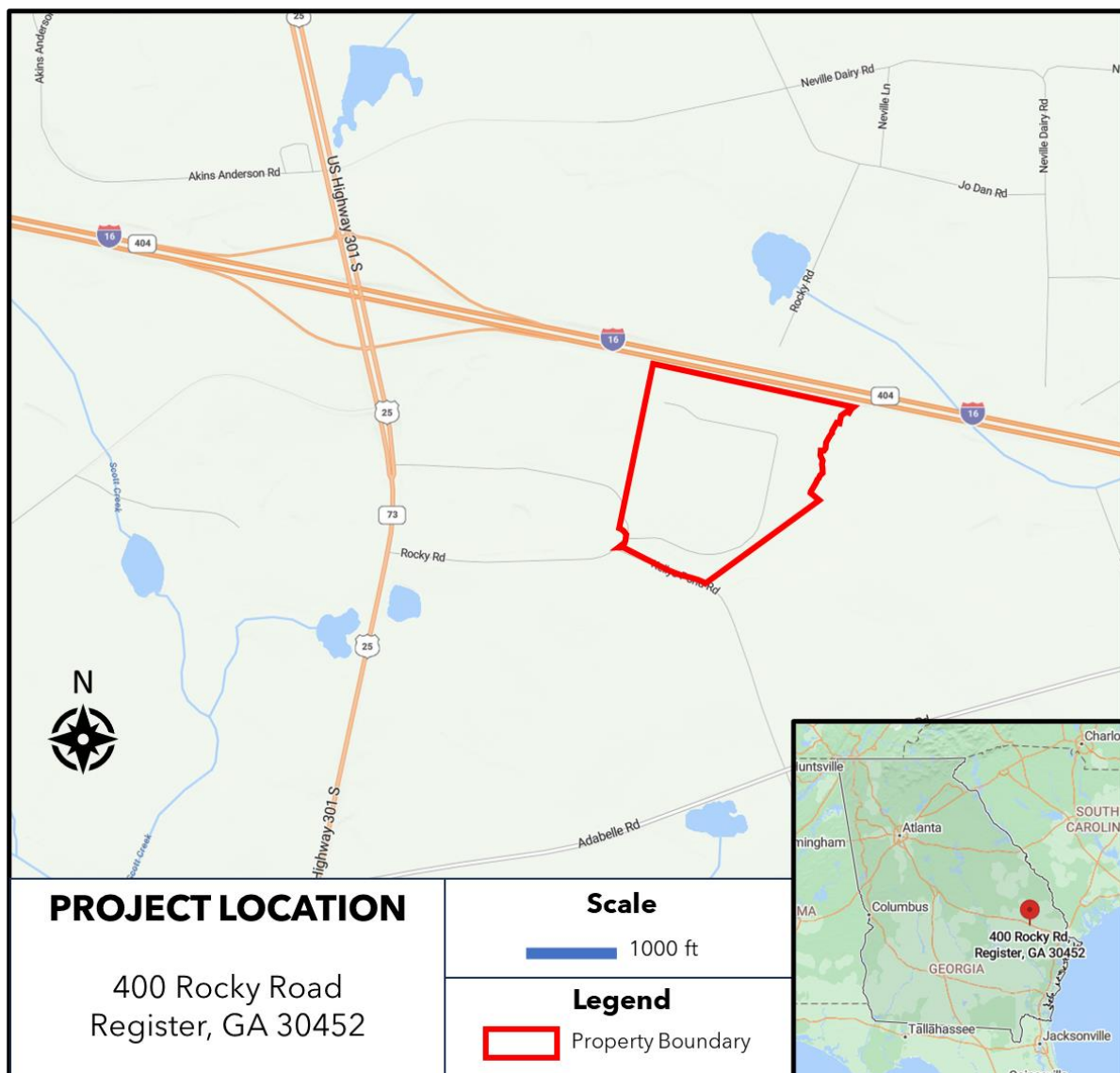


Figure 1-2: Existing Facilities for the Project

1.3.2 Resources Considered

This EA evaluates the LPO's Proposed Action (i.e., a loan for completion of existing structures, construction of four additional structures, installation of manufacturing equipment and associated general equipment and systems, completion of final site development activities, and startup of the facility) and its potential impacts on multiple resources. Based on the scope of LPO's Proposed Action, the USACE EA and statement of findings, the preconstruction permitting, and the existing site conditions, the following resource areas are assessed in this EA:

- Cultural Resources – Native American Interests
- Water Resources
- Air Quality
- Noise
- Transportation
- Socioeconomics and Environmental Justice
- Health and Safety
- Waste Management

These resources were identified as potentially being affected by the Project, and each was assessed to determine the nature, extent, and significance of those impacts (see Section 3). The assessment combined

desktop research and analysis of existing available information with select previously completed field studies, including site assessments related to the presence/absence of wetlands and water bodies (Resource & Land Consultants 2011); special-status species (Resource & Land Consultants 2010); recognized environmental conditions, as established by a Phase I environmental site assessment (Terracon Consultants, Inc. 2020); and cultural resources (Brockington and Associates, Inc. 2012).

Impacts on the resources outlined below are not anticipated to be significant and, therefore, are not included in the scope of this EA. A brief discussion of the rationale for each resource is provided below.

- **Recreation:** Impacts on recreation are not anticipated. The Project site is within an existing industrial development, the Southern Gateway Commerce Park. There are no recreational resources within the Project site, nor are there recreational resources in the vicinity of the Project site.
- **Cultural Resources:** Impacts on cultural resources were examined in the USACE EA for the Southern Gateway Commerce Park. In April 2012, Brockington and Associates performed an intensive cultural resource survey for the 200-acre industrial park, which includes the Project site, on behalf of the Development Authority of Bulloch County (Brockington and Associates, Inc. 2012). As a result of the Phase I cultural resource survey, one previously undocumented site and one isolated archaeological find were encountered within the area of potential effects (APE). There was no record of any extant aboveground architectural resources within the architectural APE. The resources were recommended as ineligible for the National Register of Historic Places (NRHP). Pursuant to USACE's National Historic Preservation Act (NHPA) Section 106 consultation, the recommendations were submitted to the State Historic Preservation Office (SHPO), part of the Georgia Department of Natural Resources (GADNR), Historic Preservation Division (HPD). In a letter dated October 29, 2012, HPD concurred with the finding that none of the identified sites are eligible for the NRHP; the Project site thus contains no resources that qualify for further treatment as historic properties under Section 106 of the NHPA. As a result, USACE determined that its undertaking would have "no effect" on historic resources (**Appendix A**). The APE and scope of the USACE undertaking encompass DOE's undertaking, which is a federal loan for the PyroThin® manufacturing facility within the Southern Gateway Commerce Park. On December 15, 2023, DOE informed HPD that DOE concurs with the USACE "no effect" finding pursuant to Section 106. HPD confirmed in a letter on January 12, 2024, that the Project would not affect historic resources (**Appendix B**).
- **Biological Resources:** Impacts on biological resources were examined in the USACE EA for the Southern Gateway Commerce Park. This process included surveys of threatened and endangered species completed in June 2010 by Resource & Land Consultants (USACE 2012). Based on the surveys, USACE determined that development of the Southern Gateway Commerce Park would have "no effect" on species listed under the Endangered Species Act (ESA). Consultation with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) under Section 7 of the ESA resulted in no objections to development of the Southern Gateway Commerce Park (**Appendix A**). Subsequent to USACE approval and permitting, the Southern Gateway Commerce Park, including the Project site, was cleared and graded for development. Natural habitats or communities are not present within the Project area. Based on the previous review and USACE's "no effect" finding and the current condition of the Project site, DOE has concluded that Federal financial support for the Project would have no effect on threatened or endangered species or critical habitat pursuant to Section 7.
- **Floodplains:** A review of the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer and FEMA Flood Insurance Rate Map (Number 13031C0325D) found that no FEMA-designated floodplains, special flood hazard areas, or other areas of flood hazard have been identified within the Project site.

- **Soils and Prime Farmlands:** DOE inquired with the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), regarding the Project's potential impacts associated with land use, soils, conservation, NRCS watershed dams, NRCS easements, and other potential environmental concerns of the USDA. USDA-NRCS responded with a letter dated December 21, 2023, stating that the Project would not convert farmland and, therefore, is exempt from Farmland Protection Policy Act assessment, also noting that there are no NRCS dams, NRCS easements, or additional concerns (**Appendix B**).
- **Aesthetics and Visual Quality:** Impacts on aesthetics and visual resources are not anticipated. The Project site is within an existing industrial development, the Southern Gateway Commerce Park. There are no scenic vistas or areas of aesthetic landscaping within the Project site. The Project site may be visible from at least four residences along Rocky Road/Kelly Pond Road, approximately 0.25 mile away; however, undeveloped forested areas to the east and south would screen the Project site from the surrounding landscape. While construction of the Project would introduce a visual change to the Project site, the new facility would be consistent with the existing land use within the Southern Gateway Commerce Park, an industrial park designated and zoned for industrial use.

2. PROJECT DESCRIPTION

2.1 Overall Project Description

The PyroThin® aerogel manufacturing facility is at 400 Rocky Road, Register, Georgia, within the Southern Gateway Commerce Park. The Project site consists of a 90-acre parcel, which is zoned for heavy industrial uses, at the intersection of Interstate 16 and U.S. Highway 301, 45 minutes from Savannah and 20 minutes from downtown Statesboro. The primary entrance is at the southwest corner of the site, off Rocky Road; a second entrance, part of a utility easement, is in the northwest corner of the site and available for access by utility providers.

Site buildout for the PyroThin® aerogel manufacturing facility will provide up to 348,200 square feet for manufacturing, processing, and offices; 85,000 square feet for a central utility plant; 10,900 square feet for carbon dioxide liquefaction; 23,000 square feet for chemical storage within a tank farm; and 103,000 square feet for raw goods storage, along with internal roads and parking, attendant structures, underground utilities, and a stormwater detention pond. The site is secured by an 8-foot-tall black chain-link perimeter fence, with a gate-controlled access point at the site access road.

Figure 2-1 provides an overall site plan for the Project. It shows the general location of the activities that are subject to the federal financial support request under review by LPO (i.e., the Proposed Action). The following items in Figure 2-1 are outside the scope of LPO's Proposed Action: the site entrance (1), guard booth (2), truck queuing/turnaround (5), raw goods warehouse (6) and future warehouse (10).

LPO's federal financial assistance will be used to finish and equip the buildings where construction has been initiated (i.e., the main manufacturing building [collectively, Buildings 7, 8, and 9] as well as the central utility plant [Building 13]). It will also be used to construct and equip two additional buildings (Buildings 4 and 14), the tank farm (12), and parking lot (3).

The following subsections describe facility construction and operational activities associated with the Proposed Action (i.e., completion of existing structures, construction of the remaining structures, installation of manufacturing equipment and associated general equipment and systems, completion of final site development activities, and startup of the facility).

Figure 2-1: Detailed Site Layout



2.1.1 Project Site Construction Subject to Federal Financial Support

2.1.1.1 Main Manufacturing Building

The main manufacturing building (Buildings 7, 8, and 9) will consist of three main areas: casting (7), extraction (8), and oven (9). Upon completion, it will be approximately 607 feet long by 350 feet wide, with a concrete floor, an internal steel frame to reduce the number of interior posts, and an insulated metal exterior. The height of the primary structure will vary between 20 and 30 feet in different areas. The main manufacturing building will house three separate rooms for casting, extraction, and ovens. The casting room will include a fluid dispensing system to dispense casting fluids onto casting tables. The extraction room will contain extractor vessels for the extraction process, along with support systems and equipment, such as a hydraulic system to open and close lids and separators to separate ethanol and carbon dioxide (CO₂) for recycling after discharge from the extractor. The extraction room will also have a crane to load and unload blankets from extractor vessels. The extractors will be in a pit that will allow process piping to be installed below grade; this will allow the operator to access the tops of the vessels at ground level. The oven room will have a three-pass conveyer and an enclosed turret system at the entrance and exit for dust control. On the south side of the oven room, a small room with a slit stand will be used for blanket inspection and cutting. On the north end of the oven room, a quality control lab will be equipped with the analytical instruments required for testing in-process fluids and finished blanket samples. Federal financial support will be used to finish construction of the main manufacturing building's exterior wall panels and roofing system and install the equipment needed to support the manufacturing process.

2.1.1.2 Tank Mezzanine

A 270- by 90-foot tank mezzanine (11) for storing chemicals will be located north of the main manufacturing building. The tank mezzanine will house day tanks during the initial phase; these will accept bulk silane deliveries until a tank farm is built. The tanks will feed fluid preparation systems, which will supply four fluid streams for sol preparation, ethanol supply, catalyst preparation and opacifier preparation, then feed into the casting tables. The catalyst and opacifier systems will have powder delivery systems that will accurately weigh powder from bulk sacks and deliver the contents into fluid batches. Berms will hold the acid totes used in the sol preparation, catalyst preparation, and ethanol processes. Other vessels will accept low-pressure discharges from the extraction process, then separate the ethanol and CO₂ so they can be sent for recycling. Ethanol recycling will be performed in vessels in the tank mezzanine, along with recycling of the fluid used in the aging process. Federal financial support will be used to finish construction of the Tank Mezzanine and install the equipment needed to support the manufacturing process.

2.1.1.3 Liquefaction Building

The 95- by 113-foot liquefaction building (14) will be north of the main manufacturing building and west of the central utility plant. The liquefaction building will house the equipment used to recycle CO₂ coming from the extraction process. It will then be delivered back into the bulk CO₂ vessels outside the central utility plant and used again as fresh CO₂ in the extraction process. Federal financial support will be used to construct and equip the liquefaction building.

2.1.1.4 Central Utility Plant

The 280- by 217-foot central utility plant (13) will house the control room for the manufacturing plant and associated utilities; a maintenance workshop; electrical switchgear; steam boilers; chillers, with cooling towers outside; a distribution system for three water temperatures; compressed air distribution system, nitrogen (N₂) distribution system, connected to a bulk tank outside; and CO₂ heat exchangers. CO₂ will be pumped from outside bulk tanks to the extraction process. Federal financial support will be used to finish

construction of the central utility plant and install the equipment needed to support the manufacturing process.

2.1.1.5 Office Space/Amenity Building

The amenity building (4) will be approximately 423 feet by 145 feet. It will include a 177- by 72-foot courtyard as well as a parking lot and access roads and be located south of the main manufacturing building. The office space/amenity building will house locker rooms, a uniform service room, cafeteria, room for nursing mothers, conference rooms, and offices/cubicles for support staff. Federal financial support will be used to construct and equip the office space/amenity building.

2.1.1.6 Parking Lot

An approximately 962- by 131-foot asphalt parking lot (3) and associated curb-and-gutter stormwater collection system will be constructed. The parking lot will accommodate 277 vehicles, including 32 electric vehicles. Charging infrastructure will be provided, as will 10 Americans with Disabilities Act-compliant parking spaces. Federal financial support will be used to construct the parking lot and install the curb-and-gutter stormwater collection system.

2.1.1.7 Tank Farm

The 146- by 161-foot tank farm (12) will be located east of the central utility plant. The tank farm will house vessels for bulk fluid storage, including silane and ethanol, which will be recycled in the tank mezzanine and then stored before use again in the manufacturing process. Bulk tanker loading and unloading capability will be provided. Federal financial support will be used to construct and equip the tank farm.

2.1.1.8 Stormwater Retention Pond

The site has an existing stormwater retention pond. The Project will grade around the perimeter and install appropriate outfalls from the site distribution system to ensure proper collection.

2.1.1.9 Utilities

The Project will install necessary underground infrastructure within the site boundary. Domestic water, wastewater, natural gas, electrical, and telecom systems will be connected near the property boundary to utility provider meters or demarcation points. Internal site distribution systems will be installed between buildings and around perimeter roads as appropriate. The utility systems to be installed will be for domestic water, wastewater, natural gas, electricity, telecommunications, and fire protection.

2.1.2 Construction Schedule

General construction began in the spring of 2022 and is expected to be completed in 2027. The main manufacturing building, tank mezzanine, liquefaction building, central utility plant, office space/amenity building, and parking lot will be completed first. Manufacturing equipment will begin to be installed in 2024; initial startup is planned for 2026. Startup for trial operations, debugging, and validation will occur sequentially throughout the build and be completed in 2026. Following initial startup, the site will ramp up capacity as part of the Project by adding additional equipment in the buildings and constructing a tank farm, which is scheduled for completion in 2027. Construction activities will typically take place between the hours of 5:00 a.m. and 5:00 p.m. Monday through Saturday. The peak construction workforce is expected to reach approximately 450. Typical equipment used on the site during construction will include bulldozers, track hoes, dump trucks, cranes, water trucks, concrete delivery and pump trucks, scissor lifts, rough-terrain forklifts, floor scrubbers, and boom lifts. During construction, an average of 10 truck trips per day to the Project site are expected for the delivery of materials and equipment during peak construction.

2.2 Operations

2.2.1 *Manufacturing Process*

The main manufacturing building is organized into areas for casting, aging/extraction, and drying. The production of aerogel blankets uses a continuous process that consists of four key steps. First, silica precursors are mixed in set formulas to deliver target properties for the resultant aerogel. Next, the mixture and batting are combined and formed into the initial blanket structure. The blankets are then bathed in fluids to impart desired physical and thermal properties. The liquid is then removed from the blanket using supercritical extraction to produce a dried aerogel blanket. The aerogel blankets are then dried to remove trace ethanol, salts, and water. The central utility plant provides the needed capacity for the manufacturing plant's production processes. These involve CO₂ distribution; water for heating and cooling; medium-temperature water for heating, ventilation, and air-conditioning systems; compressed air; nitrogen; and electricity for the site. A liquefaction plant adjacent to the central utility plant enables the recapture of CO₂ from the extraction process. The separated gas is then liquefied for in-process usage. The blankets are either shipped from the Georgia facility to another location or moved through a final step that involves coating, cutting, or otherwise converting them into components for customers.

2.2.2 *Utilities*

Aspen will connect its site utilities for domestic water, wastewater, and natural gas to infrastructure provided by the City of Statesboro. Georgia Power will provide power to the site. Telecommunication services are anticipated to be provided by Bulloch Solutions. Domestic water demand is estimated at 185,500 gallons per day (gpd). Wastewater is estimated at 59,400 gpd.

2.2.3 *Staffing and Operational Timeframe*

During the operational phase of the Project, Aspen estimates that the manufacturing facility will employ approximately 200. Aspen's intention is to hire its staff locally, to the extent feasible. Production assumes 24/7 operation of the multiple casting lines, extractors, and ovens. With anticipated expansion, which is beyond the scope of the Project, the number of jobs will increase to 272. The plant will operate with 12-hour shifts.

2.2.4 *Shipping and Receiving*

The Project site is at the intersection of Interstate 16 and U.S. Highway 301, 52 miles from the Port of Savannah. The majority of the needed raw materials will be brought in by truck. Dry goods (e.g., batting) will arrive at the raw materials warehouse, while wet chemicals will be delivered and stored in bulk chemical tanks. Outgoing finished goods will be transported by truck to an off-site warehouse and then to either the final domestic location or to the Port of Savannah for international ocean transit. Truck queuing will occur within the property boundary, not within a city or county right-of-way. Based on the estimated operational truck traffic, the peak operating time, 6:00 a.m. to 12:00 p.m., will yield four truck trips per hour. Ten or more trucks will be capable of stacking along the internal property roadway, at queuing stalls adjacent to the truck turn-around, and/or at building delivery destinations. Approximately 35 to 40 truck trips per day will be required to provide raw materials to and ship final products from the facility when operating at maximum capacity.

2.2.5 *Waste Management*

During operations, the facility will generate both solid and liquid hazardous and nonhazardous waste, associated with the manufacturing processes, as well as general solid nonhazardous waste, associated with routine building operations and maintenance. Hazardous waste streams will include ethanol solutions,

ethanol silica gel, and calcium sulfate that will be mixed with various amounts of ammonium and amine sulfate residue. Nonhazardous waste streams will include dry amorphous silica gel debris, inorganic waste for the salt filter press, sulfate salt from filter press neutralization, miscellaneous oily material, and municipal-type waste. The company will identify all sources of waste, assess the waste, collect the waste accordingly, and categorize hazardous waste according to source, constituents, hazards, and supporting analytical data. All wastes generated at the facility will be disposed of and/or recycled in accordance with all applicable federal, State, and local environmental regulations.

3. ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

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 may be affected by the Project as well as the potential direct and indirect impacts on that resource from the Project given the Project controls. A conclusion regarding the significance of impacts is provided for each resource area.

Section 3.11 provides a review of the present and reasonably foreseeable federal and nonfederal actions that may contribute to a cumulative impact when added to the impacts of the Proposed Action (i.e., the Project). The impacts of past actions were reviewed and included here as part of the affected environment to establish the current condition of the resource (i.e., the baseline condition) that may be affected by the Project.

3.2 Cultural Resources – Native American Interests

In conjunction with this EA and the NHPA Section 106 historic and archaeological review process, on November 22, 2023, DOE sent a request to the following federally recognized tribes for information on relevant cultural resources as well as any comments or concerns regarding the potential for the resources to be affected by construction of the facility at the Project site (letters are included in **Appendix B**):

- Alabama-Quassarte Tribal Town
- Coushatta Tribe of Louisiana
- Muscogee (Creek) Nation

A response was received from the Alabama-Quassarte Tribal Town on November 30, 2023, indicating that it had no knowledge of archaeological, cultural, or historic sites at the Project site. This communication also identified the tribe's desire for prompt notification should any cultural or archaeological items be uncovered. Follow-up attempts were made on January 26, 2024, to contact the other two tribes, either by voicemail or by resending the letter. No comments were received from the other two tribes.

Because of the absence of adverse impacts on Native American interests within and surrounding the Project site, as well as the controls that are in place to address an unanticipated discovery of such materials, impacts on Native American interests resulting from the Project would not be significant.

3.3 Water Resources

3.3.1 Wetlands

Mass grading of the Southern Gateway Commerce Park, including the Project site, was completed by the Bulloch County Development Authority in 2020, as authorized by a USACE permit (No. SAS-2011-00582), which allowed certain wetlands within the proposed park to be removed and properly backfilled. The permit was renewed in 2018 and extended through February 22, 2023 (USACE 2018). This work included the removal of the 3.56-acre wetland that was formerly located in the northwest corner of the Project site. The two remaining wetlands in the vicinity of the Project site, the 4.49-acre wetland along the eastern edge and the 3.07-acre wetland along the southern edge, were temporarily affected by utility crossings but were not removed. They remain forested wetland areas (USACE 2018).

Project site planning has avoided these two wetlands. No wetland intrusions or activities within wetlands are included under the Project. Therefore, there would be no direct impacts on wetland resources. Indirect

impacts would be minimized through implementation of erosion and sedimentation best management practices (BMPs) to reduce potential sediment-laden runoff into down gradient wetlands. Because of the low quality of the wetlands, the actions implemented to avoid wetland areas and direct impacts, and the proposed controls and BMPs to minimize indirect impacts, impacts on wetlands as a result of the Project would not be significant.

3.3.2 *Groundwater and Surface Water*

Water and sewer services are not present within the Project site but available for extension from U.S. Highway 301 (City of Statesboro 2021). As a result, the Project would obtain its water from the City of Statesboro municipal water distribution system and discharge to the City of Statesboro sewage treatment system. The Project, when operational, would have an industrial discharge permit from the City of Statesboro, including a pH adjustment for pre-treatment of discharge waters. A letter from the City of Statesboro dated February 21, 2021, indicates that the source has adequate capacity to serve the Project's anticipated potable water needs, estimated at approximately 185,500 gpd, and anticipated sewage treatment needs, estimated at approximately 59,400 gpd (City of Statesboro 2021; **Appendix B**). Required water would be obtained from a public water supply; therefore, there would be no impacts on groundwater levels, availability, or flow patterns associated with on-site groundwater use. The Project would not include groundwater wells or any groundwater discharges.

The use of construction materials and equipment can result in a release of liquids and associated impacts on groundwater quality. Such spills can include accidental releases of gasoline, diesel fuel, hydraulic fluid, or other related products used in construction equipment. However, proper engineering and design controls, including development of and adherence to BMPs, would reduce potential impacts on groundwater during construction.

There are no natural surface water features (i.e., streams or open waters) within the Project site (Resource & Land Consultants, Inc. 2012; USACE 2012). On-site surface waters are limited to two existing retention ponds, constructed by the Bulloch County Development Authority during previous grading for the Southern Gateway Commerce Park. The Project would include a stormwater collection system and associated retention pond along the northeastern and eastern portions of the Project site, between the manufacturing facility and the wetlands described in **Section 3.3.1 (Appendix C)**. This would expand the two existing retention ponds into a single larger retention pond to accommodate runoff from the Project site. Construction would be performed under terms of the NPDES Construction Stormwater General Permit (e.g., GAR100001 or GAR10003), along with a Bulloch County Land Disturbance Permit. BMPs for stormwater management would be implemented in accordance with the Georgia Stormwater Management Manual as well as local ordinances to minimize potential impacts on surface water.

The nearest mapped water body is Kirby Branch, a tributary to Lotts Creek and, subsequently, the Canoochee River. It is located off-site, approximately 0.15 mile north of the Project site. Kirby Branch is part of a larger watershed designated as the Canoochee River watershed (Hydrologic Unit Code [HUC] 03060203).

The Project would cause portions of the Project site to be converted to impervious surfaces. These would be associated with the new buildings and parking areas, the driveway, and sidewalks. The effect on stormwater infiltration in the vicinity of the Project site would not be significant in light of the remaining open space near the facility and the proposed stormwater system and retention pond, which would be sized to accommodate the Project. If necessary, the Project would apply for coverage under the NPDES Industrial Stormwater General Permit (e.g., GAR05000) for the discharge of industrial stormwater following construction. During plant operations, the Project would protect surface water by managing all hazardous liquids inside the facility, in tanks, or in closed containers stored within secondary containment structures.

(see **Section 3.10**). Potential spills or releases of liquids during delivery would be minimized using stormwater controls and BMPs.

Because of the current plans for municipal water use, the absence of identified floodplains, the avoidance of wetlands and surface waters, anticipated stormwater control and treatment during construction and operation, and the control of potentially hazardous on-site liquids, impacts on groundwater or surface waters as a result of the Project would not be significant.

3.4 Air Quality

Air quality impacts may occur because of the use of gasoline and diesel-powered construction vehicles (e.g., dump trucks, dozers) during construction. Fugitive dust emissions can occur during ground excavation, material handling and storage, the movement of equipment at the site, and the transport of material during construction. However, these impacts would be minor and temporary. Land development and building construction methods would implement BMPs to minimize fugitive dust emissions during construction. These would include watering as needed and using temporary construction entrances. Although the construction phase would have temporary impacts on air quality, the long-term effect of increased EV implementation would outweigh impacts from construction.

The Project site is located in Bulloch County, Georgia, which has been designated as an attainment area under the National Ambient Air Quality Standards (NAAQS) of the Clean Air Act (CAA). Conformity with the U.S. Environmental Protection Agency– (EPA-) approved State Implementation Plan (SIP) is demonstrated through the permitting process of GADNR’s Environmental Protection Division (EPD). The *de minimis* threshold values set by the SIP for Bulloch County are 100 tons per year (tpy) for the ozone precursors nitrogen oxides (NO_x), sulfur dioxide (SO₂), and volatile organic compounds (VOCs); particulate matter (PM) less than 10 microns (PM₁₀), PM less than 2.5 microns (PM_{2.5}), and carbon monoxide (CO) are also set at 100 tpy (40 CFR Part 93) (EPA 2023a). In addition to the NAAQS, EPD has set guidelines for hazardous air pollutants (HAPs) and/or toxic air pollutants (TAPs), along with minimum emissions rates (MERs) that trigger permitting reviews and acceptable ambient concentrations (AACs). The Project has the potential to emit HAPs, including ethanol, from the process and arsenic and hexavalent chromium (Cr+6) from combustion.

Uncontrolled Project emissions would have the potential to exceed some thresholds. As a result, Aspen submitted a SIP permit application to EPD for the Project; this included air pollution controls to limit potential impacts. Air modeling analysis, including a Georgia Air Toxics Impact Assessment, was completed as a component of the air permitting process and submitted to EPD for review and approval (**Appendix D**). EPD subsequently issued Aspen a minor-source synthetic air quality permit for the Project on September 28, 2023 (Permit No. 3296-031-0066-S-01-0), in accordance with the Georgia Air Quality Act (Official Code of Georgia Annotated [O.C.G.A.] Section 12-9-1). Potential emissions, along with actual anticipated emissions, given the Project controls, are presented in Table 3-1.

Table 3-1: Project Potential to Emit

Pollutant	Potential (Uncontrolled)	Actual (Controlled)
	tpy	tpy
CO	41.2	41.2
NO _x	1,413	53.0
PM (filterable only)	306	15.6
PM ₁₀	306	15.6
PM _{2.5}	306	15.6
SO ₂	0.28	0.28
VOC	1,281	87.8

Pollutant	Potential (Uncontrolled)	Actual (Controlled)
	tpy	tpy
GHG	57,418	57,418
HAPs	Combustion only (see below)	Combustion only (see below)
HAPs and TAPs	tpy	tpy
Ethanol (process)	1,275	< MER
Arsenic (combustion only)	0.0001	< 0.0001 ^a
Cr+6 (combustion only)	0.00003	< 0.00003 ^a
All other combustion byproducts	< MER	< MER

^a. Meets all risk goals for the Georgia Air Toxics Impact Assessment.

Controls that would be implemented during operation to minimize potential air quality impacts include:

- Dust collectors on equipment for removal of or limitations on PM, PM₁₀, and PM_{2.5} emissions
- One or more regenerative thermal oxidizer (RTO) for VOCs
- A NO_x scrubber for emissions from RTO process gas combustion

As stated above, Aspen received an air quality permit for the Project, a potential synthetic minor source of NO_x, VOCs, and PM/PM₁₀/PM_{2.5}. Operations would adhere to EPD permit conditions to avoid and minimize potential air impacts. In addition, the Georgia Air Toxics Impact Assessment indicates that emissions associated with operation of the Project would be below the MER or would meet all risk goals for TAPs. Furthermore, although GHGs are not regulated in the same manner as the other pollutants shown in Table 3-1, Project generated GHGs would be well below the major-source threshold (i.e., approximately 57,000 tpy) (**Appendix D**).²

Because of the location for the Project site and existing air quality conditions, the BMPs that would be implemented during construction as well as the controls that would be implemented during operation, the amount of anticipated air emissions, and EPD SIP permit conditions, which are protective of human health and the environment, impacts on air quality as a result of the proposed Project would not be significant.

3.5 Noise

Construction activities could have temporary effects on the noise environment. The use of heavy equipment for site preparation and development (e.g., grading, backfilling, crane operations) would expose people to short-term noise levels that would be above typical ambient levels within the surrounding vicinity. However, the noise generation would be typical for construction activities, short-term, and confined to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). In addition, construction noise could be reduced through the use of factory-installed devices for sound reduction, such as shrouds, sound enclosures, or mufflers. Given the types of construction activities (e.g., sporadic, daytime, short term), Project construction activities would not be expected to alter the ambient noise environment substantially. Consequently, the impacts of construction-related noise would be negligible, and no significant construction-related noise impacts would be expected to occur.

SLR International Corporation conducted a survey of the ambient sound level at the Project site in 2022 (**Appendix E**). Sound levels were measured to determine ambient sound levels prior to completion of the Project. The survey found that average ambient sound levels at the Project site ranged from 53.3 to 59.9 A-weighted decibels (dBA). The dominant sources included Interstate 16 and U.S. Highway 301 (SLR International Corporation 2022). The survey of the ambient sound level was conducted during preliminary

² Only major sources of GHG emissions (i.e., greater than 75,000 tpy) are regulated in Georgia.

construction activities; therefore, the measured sound levels include construction equipment operating at the site.

In addition to the ambient sound survey, SLR International Corporation developed a sound propagation model (i.e., noise model) for Project operations (**Appendix E**). The model considered anticipated sound levels, distances, air absorption, reflections, and other site factors to calculate expected sound levels at multiple locations along the southern property line of the Project site (i.e., areas closest to existing residences). The model-predicted sound levels associated with the Project ranged from 42 to 49 dBA, which are below the ambient sound levels for the Project site. The predicted sound level at the closest residence, which is approximately 0.25 mile away, is 47 dBA (SLR International Corporation 2022).

The Project site is zoned for heavy industrial use. The Bulloch County Industrial Performance Standard states that noise, as measured at the street or property line, may not exceed 60 dBA (Bulloch County 2024) and must comply with requirements of the Bulloch County Code of Ordinances (Bulloch County 2023). The predicted sound levels for the Project are between 42 and 49 dBA, while the predicted level at the closest residence is 47 dBA. These property-line contribution predictions are below ambient levels and well below the 60 dBA limit in the Bulloch County Industrial Performance Standard. Measurements during initial construction found that noise levels, including additive ambient sources, ranged from 54.2 to 59.8 dBA during the daytime (i.e., construction hours); these were similar to measured nighttime (i.e., non-construction hours) ambient noise levels, which ranged from 53.3 to 53.8 dBA. The survey indicates that the noise level associated with construction is similar to local ambient noise level and in conformance with the Bulloch County Code of Ordinances. Because of the controls that would be implemented during construction, the nature of the area surrounding the Project site (i.e., an existing industrial park adjacent to Interstate 16 and U.S. Highway 301), and the anticipated sound levels, which would be below current ambient sound levels at the Project site, noise impacts as a result of the Project would not be significant.

3.6 Transportation

Previously completed improvements that provided access to the Project site were made by the Bulloch County Development Authority during initial development of the Southern Gateway Commerce Park. U.S. Highway 301, on the west side of the industrial park, was widened and improved, providing turning lanes to Rocky Road and creating an unnamed road, referred to as the “North Entrance Road.” In addition, Rocky Road and the North Entrance Road were also recently improved. Rocky Road and the North Entrance Road are now four-lane roadways, designed to support and accommodate industrial traffic for a fully developed Southern Gateway Commerce Park, which includes the Project site (Bulloch County 2021). The Southern Gateway Commerce Park, including the Project site, is not currently served by rail, and there are no future plans to provide rail access to the park or Project site. Statesboro-Bulloch Municipal Airport is approximately 14 miles north of the Project site (Bulloch County 2021). A letter from the Bulloch County engineer dated February 15, 2021, indicates that U.S. Highway 301, Rocky Road, and Northern Entrance Road provide excellent vehicular access to the Project site and that they are capable of supporting industrial traffic (**Appendix B**). The letter also notes that Statesboro-Bulloch Municipal Airport poses no restrictions on development of the Project site (Bulloch County 2021).

A traffic impact study for the Southern Gateway Commerce Park was completed in 2014; an updated traffic impact study was conducted by Kimley-Horn and Associates for the Project site in 2022 (**Appendix F**). The study network, which consists of four unsignalized off-site intersections, was analyzed for the weekday AM and PM peak hours under existing conditions, projected 2024 no-build conditions, and projected 2024 build conditions (i.e., projected 2024 no-build conditions plus traffic generated by the Project). Study intersections were projected to operate at acceptable levels of service (LOS) overall during the AM and PM peak hours under no-build conditions, but the off-ramps from Interstate 16 to U.S. Highway 301 were projected to have low LOS during peak hours. The analysis indicated that projected traffic would be accommodated by the

existing storage length along the ramps; therefore, the maximum estimated queues would not extend to Interstate 16. In addition, it was noted that low LOS for side-street approaches are not uncommon, and vehicles may experience substantial delays while turning onto a major roadway (i.e., U.S. Highway 301).

Because of the roadway improvements that have been made in anticipation of development of the Southern Gateway Commerce Park, including the Project Site, the accommodations, and controls (e.g., travel lanes, turning lanes, intersection improvements) needed to serve Project-related traffic are already in place to minimize potential impacts on transportation. Although it is projected that the Interstate 16 off-ramps could experience low LOS during peak hours, this would not be uncommon for this intersection type. As a result, impacts on transportation from the Project would not be significant.

3.7 Socioeconomics and Environmental Justice

3.7.1 Socioeconomics

The Project site is in the city of Register, Bulloch County, Georgia. Specifically, the Project site lies within an area that is zoned for heavy industrial use and part of an existing industrial development, the Southern Gateway Commerce Park. The Project site is bordered by the industrial development to the west, Interstate 16 to the north, and agricultural fields, undeveloped areas, and scattered residences to the east and south. The nearest hospital is approximately 12.5 miles north of the Project site, and the nearest school is approximately 6.5 miles east of the Project site. Bulloch County has a population of approximately 83,059 (U.S. Census Bureau 2024). The influx of up to approximately 272 permanent workers would represent less than a 0.4 percent increase in population and would not have a significant impact on the resources that serve the county (e.g., medical facilities, schools, public services).

Beneficial socioeconomic impacts would occur from increased employment opportunities, tax revenue generation, and direct and indirect spending in the local economy. Development of the Project would generate approximately 200 jobs during initial operation, increasing to approximately 272 with anticipated post-Project expansion. Overall, approximately 500 jobs would be created for design, construction, and vendor support during Project execution.

A need for new housing or supporting infrastructure is not anticipated. Register and the surrounding commuter area (i.e., the greater Statesboro area) have ample housing and associated infrastructure to support an influx of residents due to job creation at the facility.

Given the jobs that would be created during construction and operation of the Project and the availability of housing and public services in the greater Statesboro area, no significant adverse socioeconomic impacts are expected.

3.7.2 Environmental Justice

LPO's review of environmental justice issues focuses on Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; the National-Scale Air Toxics Assessment (NATA) cancer risk and respiratory hazard index, as defined in EPA's environmental justice screening tool; and site-specific population centers (e.g., schools, day-care centers) near the Project site (Table 3-2) (EPA 2023b).

Table 3-2: EPA Environmental Justice Screen Report

	Value	State Average	Percentile in State	U.S. Average	Percentile in U.S.
NATA cancer risk (lifetime risk per million)	30	35	2	25	52
NATA respiratory hazard index	0.40	0.44	6	0.31	70

	Value	State Average	Percentile in State	U.S. Average	Percentile in U.S.
People-of-color population	36%	48%	41	39%	55
Low-income population	44%	34%	67	31%	74

Source: EPA 2023b; Census Tract 13031110800 approximate population: 2,994.

Executive Order 12898 directs federal agencies to address environmental and human health conditions in minority and low-income communities. The evaluation of environmental justice is dependent on determining if high and adverse impacts from the Project would disproportionately affect minority or low-income populations in the affected community.

In accordance with EPA's environmental justice guidelines, minority populations should be identified when either 1) the minority population of the affected area exceeds 50 percent or 2) 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.

The ethnic and racial composition of Bulloch County and the state is presented in Table 3-2. Minority populations make up less than 50 percent of the population in the county, a number that is not meaningfully different from the percentage of minority populations in the state. Within the census tract where the Project site is located (13031110800), the people-of-color population is approximately 36 percent (Table 3-3).

The percentage of persons in poverty is 11 percent higher in Bulloch County (23.8 percent) and nearly double the percentage of persons in poverty for the entire state (12.7 percent). In EPA's environmental justice screening tool, the low-income population is 44 percent, which is higher than the state average of 34 percent (67th percentile) and the U.S. average of 31 percent (74th percentile) (Table 3-3).

Table 3-3: Population, Ethnicity, and Poverty

	Bulloch County	State of Georgia
Total population	83,059	11,029,227
Race/Ethnicity		
White	66.1%	59.0%
Black or African American	29.5%	33.1%
American Indian and Alaska Native	0.5%	0.6%
Asian	1.4%	4.8%
Native Hawaiian and other Pacific Islander	0.2%	0.1%
Hispanic or Latino	4.6%	10.5%
Poverty	23.8%	12.7%

Source: U.S. Census Bureau 2023.

The NATA cancer risk and respiratory hazard indices are ways to see how local residents compare to everyone else in the state and the entire U.S. For the NATA respiratory hazard index and the NATA cancer risk index (i.e., lifetime risk per million), the Project site is in an area that is in the 52nd percentile in the U.S. The NATA percentile is higher in comparison to the rest of the U.S. but lower than the rest of the state. In addition, Project emissions were reviewed by the EPD for Aspen's air quality permit, as discussed in **Section 3.4**. Permitted emission levels of criteria pollutants and HAPs are considered to be protective of human health and the environment. Also, based on the permit, controls would be implemented during operation to minimize emissions and potential air quality impacts.

Given the jobs created during construction and the 200 permanent full-time jobs needed for operation, which would increase to 272, the Project would benefit the regional economy. There are no anticipated impacts that could give rise to disproportionate impacts on minority or low-income populations in the affected area; therefore, environmental justice impacts would not be significant.

3.8 Health and Safety

The potential for risks to public and occupational health and safety from Project-related activities during construction and operation were evaluated during hazard studies, including the Hazards and Operability (HAZOP) study. The identified risks included hazards associated with the manufacture of aerogel and the storage process for raw materials (e.g., contact or an accidental release, equipment failure, employee and facility operator errors, emergency or security situations). A final process hazard analysis would be completed prior to startup and conducted routinely during operations. To address these potential risks, the Project would be constructed and operated in accordance with applicable federal, State, and local regulations, standards, and requirements as well as industry BMPs. The current Project site design has incorporated measures to address the identified risks and meet Process Safety Management (PSM) requirements and industry BMPs. These measures include selecting equipment and materials appropriate for the generation, handling, and storage of ethanol and silane compounds; installing leak detection and emergency shutdown systems; and implementing emergency and fire response and suppression measures and plans.

During construction, contractors on the Project site would be required to develop and implement site-specific occupational health and safety plans that meet applicable regulations, standards, and requirements, including those associated with Proposed Action permits and industry BMPs. During operations, the Project would also establish standard operating procedures, based on BMPs; develop Environmental Health and Safety (EHS) plans; and maintain compliance with federal Occupational Safety and Health Administration (OSHA) regulations. Specifically, OSHA Standard 1910.119 regarding PSM requirements for flammable liquids with a flashpoint below 100 degrees Fahrenheit and a total on-site quantity above 10,000 pounds concerns preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. The PSM requirements are applicable to ethanol and silane use, as well as their storage, and are important to the design, construction, and operation of the Project. The list of hazardous chemicals that would be stored on the site is provided in Table . Chemicals would be stored in an interior mezzanine room or exterior contained storage area. Additional chemicals would be used during operations.

Compliance with the PSM requirements would serve to mitigate hazards for employees, the public, and the environmental. The Project would develop and maintain emergency response and site security plans as part of the EHS plans to address injuries, fires, spills, hazardous material leaks, and operational safety issues. The plans would be used by personnel to minimize both human health and safety concerns as well as environmental impacts. Details regarding the emergency response plans would be developed in conjunction with public emergency response services and neighboring communities. Emergency response and medical services for the Project site would be provided largely by Bulloch County from Register, which is approximately 6 miles from the Project site. The local sheriff's department and fire department both have the capability to respond to emergencies. If necessary, the fire department can triage injuries until emergency personnel from East Georgia Regional Medical Center arrive and transport the injured to the most appropriate medical services location. The local fire department would be informed of potential Project-related hazards associated with operations and provided with a Project site plan, ensuring that first responders and the public would be protected from an exposure to potentially hazardous situations in the event of a fire or industrial accident.

Security-related concerns would be addressed through development and implementation of a site security plan that includes 24-hour controlled access. Permanent fencing would be installed around the perimeter of the site, and badge-entry access points would be established. Public access to the Project site would be restricted to the gated main entrance. In addition, lights would be installed for added nighttime security. The Project site would be under 24-hour surveillance from on-site security personnel.

Table 3-4: Project Chemical/Materials Usage

Chemical/Material	CAS Number	Maximum Capacity	Container	Location
Base catalyst precursor	—	6,000 lbs	Supersacks	IMR
Silicon carbide powder	—	6,000 lbs	Supersacks	IMR
Inorganic base catalyst activator	—	6,000 lbs	Supersacks	IMR
95% sulfuric acid	7664-93-9	1,650 gal	Totes (275 gal)	IMR
Orthophosphoric acid	7664-38-2	550 gal	Totes (275 gal)	IMR
S40 (acid mixture)	—	27,000 gal	Day tanks (13,500 gal)	IMR
Hydrophobic silane 1 – ethanol based	—	27,000 gal	Day tanks (13,500 gal)	IMR
Hydrophobic silane 2 – ethanol based	—	8,300 gal	Day tank (8,300 gal)	IMR
Aqueous ammonia (< 20% concentrate)	7664-41-7	10,000 gal	Tank (10,000 gal)	ECS
Ethanol	64-17-5	58,000 gal	In-process vessels (6)	IMR
Liquid CO ₂	124-38-9	21,232 gal	Storage vessel (1)	ECS
Liquid nitrogen	7727-37-9	12,000 gal	Tanks (10,616 gal)	ECS

CAS = Chemical Abstracts Service; ECS = exterior contained storage; IMR = inside mezzanine room; gal = U.S. gallons; lbs = pounds; “—” = not available.

By meeting applicable federal, State, and local regulations, including OSHA PSM requirements, and establishing EHS plans during operation to promote a safe and healthy workplace, the Project would not represent a significant risk to employees, contractors, or nearby businesses and communities or represent a significant impact on the environment.

3.9 Waste Management

During construction, general waste would be generated, such as cardboard, pallets, and spare material. Roll-off dumpsters would be located on the site and overseen by the construction manager. During commissioning, some chemical waste would be generated; however, major volumes of intermediate waste, outside the wastes listed in Table 3-5, would not be expected. Chemical waste generated during commissioning would be disposed of in totes and drums by qualified vendors (e.g., US Ecology, Clean Harbors, Veolia).

When operational, the Project would have an EPA waste generator identification number; the number has not yet been acquired. The Project site would be a large-quantity generator of hazardous waste. Therefore, the facility would implement a hazardous waste contingency plan that would cover the various hazardous streams. The plan would cover storage, waste labeling, and inspections and be in compliance with the Resource Conservation and Recovery Act (40 CFR Part 262). Pre-engineered self-contained storage units would be installed to accommodate staging of waste between pickups from the qualified vendor.

Hazardous waste generated during the production process would be sent to a permitted treatment, storage, and disposal facility (TSDF). Non-hazardous production waste would be sent to a landfill that can accommodate the waste profile or a TSDF. Municipal-type wastes from the facility, ranging from food waste to discarded personal protection equipment, would be sent to the local landfill. Any recyclable waste generated by the Project would be recycled.

An ethanol/water mixture that ranges between 8 percent ethanol/92 percent water and 18 percent ethanol/82 percent water would be removed monthly from a tank that holds a maximum of 7,900 gallons. The Project, when operational, would have an industrial discharge permit from the City of Statesboro, including a pH adjustment for pre-treatment of discharge waters, estimated at 59,400 gpd.

Hazardous production waste streams and estimated drum quantities are identified in Table 3-5, while non-hazardous production waste streams are identified in Table .

Table 3-5: Hazardous Waste Streams

Waste Type	Monthly Average (drums)	Weekly Average (drums)	Gallons (per year)	Frequency	Percent Solids	pH Range	Physical State	Hazardous Properties
Ethanol solution	4.3	1	2,858	Continual	90	1–2	Sludge	Flammable
Ethanol solution	8.7	2	5,716	Continual	100	1–2	Solid	Flammable
Ethanol to recycle	4.3	1	2,858	Continual	10	12–13	Slurry	Flammable/Corrosive
Ethanol silica debris	173	40	114,312	Continual	100	10	Solid	Flammable
Methanol-based titrate with iodine	—	—	60	Continual	0	7	Liquid	Flammable
THF	—	—	60	Continual	0	7	Liquid	Flammable/Explosive
Silane	—	—	60	Continual	0	7	Liquid	Flammable
Ethanol silica gel	88.3	20.3	58,013	Continual	90	10–10.5	Solid	Flammable
Calcium sulfate with various ammonium and amine sulfate residues	13	3	8,573	Continual	80	12.5	Solid	Corrosive
Ethanol and water, KOH solution	1.3	0.3	857	Continual	0	6-8	Liquid	Flammable

“—” = not applicable.

Table 3-6: Non-Hazardous Waste Streams

Waste Type	Monthly Average (drums)	Weekly Average (drums)	Gallons (per Year)	Frequency	Percent Solids	pH Range	Physical State	Hazardous Properties
Inorganic salt filter press waste	0	0	277,200	Continual	85	12.5	Solid	Corrosive
Sulfate salt from filter press neutralization	8.7	2	5,716	Continual	100	12.5	Solid	Corrosive
Miscellaneous oily solids	1.3	0.3	857	Continual	100	7	Solid	—
Miscellaneous oily liquids	1.3	0.3	857	Continual	10	7	Liquid	—
Miscellaneous waste	1.3	0.3	857	Continual	50	7	Slurry	—
VOC abatement filter cake	— ^a	— ^a	— ^a	Continual	85	7	Slurry	—

^a. VOC abatement filter cake waste stream estimate is 27.4 tons per year.

“—” = not applicable.

3.10 Cumulative Impacts

Cumulative impacts are potential effects on the environment from the incremental impact of the Project when added to other past, present, and reasonably foreseeable future actions undertaken by other agencies (federal or nonfederal) or persons (40 CFR Part 1508.1[g]). Projects were identified through a review of active project lists and planning documents from the Development Authority of Bulloch County, Bulloch County Commission, City of Register, City of Statesboro, and Georgia Department of Transportation (GDOT), with additional information provided by the Applicant. The review identified the following current and reasonably foreseeable future projects:

- **Southern Gateway Commerce Park:** Bulloch County has invested \$16 million for land acquisition, roads, utilities, and site work, which has helped to generate interest in the site, including the Project site. It is anticipated that the remaining areas of the Southern Gateway Commerce Park would be developed. Known upcoming projects include completion of the Joon Georgia project. Joon is a unit of automotive body parts manufacturer Ajin USA and a supplier to Hyundai Motor Group. Joon Georgia has committed to investing approximately \$317 million and employing approximately 630 people at a plant, which is currently under construction on an 83-acre parcel within the Southern Gateway Commerce Park adjacent to the western edge of the Project site.
- **Gateway Industrial Park:** Land is still available, though limited, for development at Gateway Industrial Park, located north of the Project site along U.S. Highway 301 between Statesboro and Interstate 16. The available land is expected to be absorbed within the next 10 years. Known upcoming projects include Revalyu Resources and Hanon Systems. Revalyu Resources has committed to investing approximately \$200 million to build a recycling plant for plastic bottles on a 43-acre site in the Gateway Industrial Park. Hanon Systems manufactures a variety of automotive air control systems and will be a tier-one supplier to the Hyundai Motor Group Metaplant, which will be building EVs in Ellabell, Georgia. Hanon Systems has committed to investing approximately \$40 million to build a factory in the Gateway Industrial Park that will employ approximately 160 people.
- **Ecoplastic America Corporation:** Ecoplastic America Corporation, a supplier of injection-molded plastic automotive body parts to Hyundai Motor Group, intends to build a \$205 million plant and employ approximately 456 people. Plant construction would be phased over 8 years, occurring north of the Project site along U.S. Highway 301 between Statesboro and Interstate 16.
- **Northpoint Development:** Northpoint Development has proposed building 10 warehouses with 3 million square feet of industrial warehousing space on approximately 360 acres on the south side of Rocky Road, directly south of the Southern Gateway Commerce Park.

LPO reviewed the identified projects in the region to determine the resources that may be subject to a cumulative impact. The review focused on resources affected by the Project as well as resources that may be affected by both the Project and other projects in the region. Based on this review, the following resources were evaluated for cumulative impacts:

- Water Resources
- Air Quality and Climate Change
- Noise
- Transportation

The Project, when considered together with the identified projects in the region, would not have the potential to result in significant cumulative impacts on other resources because of the geographic location

and separation of the projects, the disturbed nature of the Project area, and/or the lack of construction or operational overlap.

3.10.1 Water Resources

As discussed in **Section 3.3**, the Project would not include activities within wetlands; therefore, there would be no direct impacts on wetland resources. In addition, there are no natural surface water features on the Project site; on-site surface waters are limited to retention ponds. All water would be obtained from the public water supply; therefore, there would be no impacts related to groundwater levels, availability, or flow patterns associated with on-site groundwater use. The Project would include a stormwater collection system and an associated retention pond to accommodate runoff from Project site impervious surface areas. Project development and subsequent operation would be subject to the NPDES Construction Stormwater General Permit and, as required, NPDES Industrial Stormwater General Permit. In addition, the Project would be subject to BMPs and soil erosion and sedimentation control (SESC) permit requirements.

Because of the current plans for municipal water use, the absence of identified floodplains, avoidance of wetlands and surface waters, anticipated stormwater control and treatment during construction and operation, and the control of potentially hazardous liquids on-site, impacts on water resources as a result of the Project would not be significant. In addition, cumulative impacts on water resources from the Project and the other projects in the region would not be significant.

3.10.2 Air Quality and Climate Change

The Project could overlap with development of the Southern Gateway Commerce Park and Gateway Industrial Park as well as the potential Northpoint Development warehouses. Emissions associated with operation of the Project could result in cumulative impacts on regional air quality. As discussed in **Section 3.4**, Bulloch County is in attainment for the NAAQS; in accordance with the CAA, the State has developed a SIP to maintain compliance with the NAAQS. Any new emissions in the airshed from projects that would be subject to CAA permitting, including the identified projects in the region, would need to be in compliance with CAA regulations and reviewed, thereby ensuring that air quality in the region would remain in compliance with the NAAQS. Therefore, the cumulative impacts on air quality associated with operation of the Project and the other projects in the region would not be significant.

The current science and study of the Earth's climate now shows with 95 percent certainty that human activity has been the dominant cause of observed global warming since the mid-twentieth century. Since the beginning of the industrial era, human activities have increased the concentration of GHGs, primarily CO₂, NO_x, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, in the atmosphere. The rising global temperatures have been accompanied by changes in weather and climate (e.g., changes in rainfall that result in more floods, droughts, or intense rain; rising sea levels; Arctic sea ice decline; more frequent and severe heat waves). It is now well established that rising atmospheric GHG emission concentrations are significantly affecting the Earth's climate (Intergovernmental Panel on Climate Change 2013, U.S. Council on Environmental Quality 2016).

As discussed in Section 2, the Project would produce thermal barriers for use primarily in EV batteries. EVs result in long-term reductions in GHGs by reducing fossil fuel usage for transportation. GHG emissions associated with construction of the Project would be minimal compared to the savings resulting from the use of EVs, for which the Project would produce a component. Project operations would generate average annual GHG emissions of approximately 57,000 tpy from the combustion of natural gas and use of CO₂ for the manufacturing process. As discussed in **Section 3.4**, this would be well below the threshold for a major source; as such, the Project would be in compliance with the SIP and EPD air

quality permit. In addition, the Southern Gateway Commerce Park and Gateway Industrial Park developments, as well as other potential regional developments, would be subject to the SIP and CAA.

Thermal barriers in an EV automotive application would aid in reducing air emissions such as ozone precursors, PM, and GHGs that contribute to global warming, which is consistent with the primary goal of the ATVM Program. Therefore, cumulative impacts related to GHGs and climate change from operation of the Project and the other projects in the region would not be significant. The Project would serve to reduce overall GHG emissions on a national basis.

The magnitude of the potential annual reduction in petroleum usage would depend on the number of EVs with battery cells that contain the product produced by the Project. Based on projections for full capacity, as well as different assumptions regarding end-customer vehicle mix, the Project is expected to produce enough thermal barriers to supply more than 2 million EVs annually with this critical battery component, or about 20 million EVs over a 10-year period. Therefore, it is expected that the petroleum displaced (i.e., saved) would total approximately 1.91 million gallons per year, based on an annual average of 11,467 miles driven and the projected (2025) average fuel economy for light-duty vehicles of 31.5 miles per gallon, after the first year of full production. Annual displaced CO₂ for the first year is then calculated from the Project's annual fuel consumption savings (1.91 million gallons), which is multiplied by the U.S. Energy Information Administration's fuel emission factor of 19.37 pounds of CO₂ per gallon of gasoline (U.S. Energy Information Administration 2023). Therefore, the use of EV battery cells containing thermal barriers produced by the Project would reduce highway-generated CO₂ by approximately 0.018 million tons per year after the first year, with additional reductions from new production in each following year over 10 years, which is the average anticipated life of an EV battery. After 10 years, the Project would have assisted in a cumulative reduction in highway-generated CO₂ totalling 1.02 million tons of avoided CO₂, while the production of aerogel would have produced 0.57 million tons of CO₂, which represents an overall potential reduction of approximate 0.45 million tons of CO₂ over a 10-year period. In general, the potential benefits associated with reducing highway CO₂ emissions would support a reduction in atmospheric GHG concentrations and reduce the associated climate change impacts (e.g., increases in atmospheric temperature, changes in precipitation, increases in the frequency and intensity of extreme weather events, rising sea levels). Because the Project would result in an overall benefit by contributing to a reduction in GHG concentrations as a result of future EV use, it is anticipated that cumulative impacts related to GHGs and climate change associated with the operation of the Project would not be significant.

3.10.3 Noise

As discussed in **Section 3.5**, the sound level survey results, which included ambient noise sources as well as construction activities, ranged from 53.3 to 53.8 dBA, while the model-predicted sounds levels associated with Project operation ranged from 42 to 49 dBA, which is below Bulloch County Code of Ordinances thresholds and below the existing background noise levels measured at the Project site. As a result, Project operations are not anticipated to contribute to additive noise in the vicinity; therefore, the cumulative impacts on noise associated with the Project and the other projects in the region would not be significant.

3.10.4 Transportation

As discussed in **Section 3.6**, previously completed improvements that provided access to the Project site were made during initial development of the Southern Gateway Commerce Park. These included roadway improvements along U.S. Highway 301, Rocky Road, and Northern Entrance Road. The traffic study indicated that the improvements would accommodate the potential traffic associated with the Project. However, the improvements were designed to support the Southern Gateway Commerce Park; the traffic study did not include future development or the potential Northpoint Development warehouses. The Applicant and GDOT would continue to coordinate throughout development and implementation of

the Project, ensuring that potential impacts related to traffic delays would be minimized. In addition, Project improvements would be designed to support the Southern Gateway Commerce Park. Although the Project, in conjunction with the identified projects in the region, would lead to an incremental increase in overall traffic, no significant adverse cumulative effects on the region's overall transportation network are anticipated.

4. DRAFT FINDING

Based on this EA, DOE has determined that providing a federal loan to Aspen Aerogels to construct a manufacturing plant near the town of Register, Bulloch County, Georgia, would not have a significant effect on the human environment. Preparation of an environmental impact statement is therefore not required, and DOE is issuing this Finding of No Significant Impact.

This Finding of No Significant Impact should not be construed as a final decision about issuance of a federal loan.

Todd Stribley
NEPA Compliance Officer
DOE Loan Programs Office

Date

5. REFERENCES

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- 11) U.S. Army Corps of Engineers. 2012. *Memorandum for Record: CESAS-RD Application SAS-2011-00582*. December 13, 2012.
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- 14) U.S. Census Bureau. 2024. *QuickFacts – Bulloch County, Georgia*. Available: <https://www.census.gov/quickfacts/fact/table/bullochcountygeorgia/>. Accessed: March 4, 2024.
- 15) U.S. Council on Environmental Quality. 2016. *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*. August 1. 33 pp.
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- 17) U.S. Environmental Protection Agency. 2023a. *General Conformity De Minimis Levels*. Available: <https://www.epa.gov/general-conformity/de-minimis-tables>. Accessed: December 21, 2023.

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- 19) U.S. Fish and Wildlife Service. 2023. *National Wetland Inventory: Surface Waters and Wetlands*. Available: <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>. Accessed" December 4, 2023.

6. LIST OF AGENCIES CONTACTED

Federal Emergency Management Agency

Georgia Department of Natural Resources, Environmental Protection Division

Georgia Department of Natural Resources, Historic Preservation Division

Georgia Department of Natural Resources, Wildlife Resources Division

National Oceanic and Atmospheric Administration, Fisheries

U.S. Army Corps of Engineers

U.S. Department of Agriculture, Natural Resource Conservation Service

U.S. Fish and Wildlife Service

7. LIST OF PREPARERS

7.1 DOE

Elyse Mize, B.S., Natural Resource Management, 14 years of experience

Sarah Glasgow, B.S., Integrated Science and Technology, 10 years of experience

7.2 APPLICANT

Mary Lynn Seremet, Master of Science, 35 years of experience

Kenneth Paul Haywood III, M.S., Environmental Science, 15 years of experience

Jonathan A. Bourdeau, M.S., Management Science, 26 years of experience

APPENDIX A USACE ENVIRONMENTAL ASSESSMENT

MEMORANDUM FOR RECORD

SUBJECT: Department of the Army Environmental Assessment and Statement of Finding for Above-Numbered Permit Application

This document constitutes the Environmental Assessment, 404(b)(1) Guidelines Evaluation, Public Interest Review, and Statement of Findings.

A. APPLICATION AS DESCRIBED IN THE PUBLIC NOTICE:

1. Applicant: Mr. Benjy Thompson
Development Authority of Bulloch County
Post Office Box 303
Statesboro, Georgia 30459

2. Waterway & Location: The 203.83 acre project site is located in the southeast quadrant of the intersection of US Highway 301 and Interstate Highway 16, in Bulloch County, Georgia (Latitude 32.301, Longitude -81.864). The project area contains 17.55 acres of jurisdictional wetland and open water.

3. Latitude & Longitude: North 32.301, West -81.864.

4. Project Purpose:

- a. Applicant's Stated Purpose: The overall project purpose is to develop a master planned industrial park adjacent to Interstate 16 within Bulloch County to enable Development Authority of Bulloch County (DABC) to compete with regional development authorities, support future industrial needs of DABC, create additional jobs, and sustain the economic development success for Statesboro-Bulloch County. According to the applicant, the logistics of industrial and manufacturing businesses are directly tied to access and transportation, interstate access is critical. Any industrial development authority that does not currently offer sites adjacent to major interstates is at a competitive disadvantage. The DABC continually markets industrial sites to major industries. While DABC has experienced great success within the existing industrial park, several opportunities to secure new industry have been lost because DABC cannot offer industrial and manufacturing space adjacent to a major interstate. DABC will only be able to realize the benefits of these businesses when a fully entitled property can accommodate future industry along I-16. These entitlement obligations include but are not limited to providing adequate access through the site, creating pods of developable area suitable to accommodate large facilities typical for industrial and manufacturing business operation, and installation of utilities. Recognizing the need for fully entitled manufacturing and industrial space adjacent to Interstate 16, the concept of the proposed Industrial Park began in 2010 with the acquisition of the 203.83 acre project area.

b. Basic: Develop a master planned industrial park.

c. Overall: Develop a master planned industrial park that can accommodate manufacturing and industrial space adjacent to an interstate highway

5. Water Dependency Determination: The basic purpose of the proposed project is to develop a master planned industrial park. It is assumed that that there would be an available alternative where a master planned industrial park could be developed, and not require impacts to a special aquatic site. Pursuant to the 404(b)(1) Guidelines, the US Army Corps of Engineers, Savannah District (CORPS) has determined that the proposed project is not a water dependent activity. Therefore, the applicant is required to consider alternative sites for construction of the proposal where less adverse impact to the aquatic environment would potentially be required.

6. Proposed Work: The project proposes 7.38 acres of permanent wetland fill, 1.25 acres of permanent open water pond fill, and 0.35 acre of temporary fill for utility installation. The project area contains 17.55 acres of jurisdictional wetland and open water, of which 8.57 acres will be avoided and remain undisturbed. The applicant proposes that the project will require 8.98 acres of wetland and open water impact to accommodate the master plan for development of the proposed industrial park. The project will include construction of approximately 2,318,159 square feet of building area, installation of access roads, installation of stormwater management facilities (within upland only), extension of utilities, and construction of employee, trailer, and equipment parking areas. Road crossings will include double 48'' and 54'' RCP culverts. Additional impacts include two temporary utility crossings totaling 0.35 acre. Impacts will create area suitable in size to support the large buildings, parking, and access roads associated with the proposed industrial park site development.

7. Compensatory Mitigation: The applicant is proposing to purchase mitigation credits for the entire 8.98 acres of jurisdictional impact from a mitigation bank. Preliminary mitigation credit calculations indicate that the proposed wetland impact requires 67.3 wetland mitigation credits to compensate for the 8.98 acres of unavoidable impact. The applicant is planning to purchase 67.3 wetland mitigation credits from Margin Bay Wetland Mitigation Bank, Wilhelmina-Morgan Mitigation Bank and/or Black Creek Mitigation Bank whose primary service area is the Ogeechee River watershed. However, the project site is located in the Canoochee River basin, Hydrologic Unit Code (HUC) 03060203. This HUC is also in the primary service area to the Ogeechee River watershed. Any permits issued for this project would have a Special Condition that states: Prior to the commencement of any work in jurisdictional water of the United States, you will purchase 67.3 wetland mitigation credits from a CORPS approved mitigation bank that services the project area. Guidance for selection of an appropriate mitigation bank can be found at: <http://www.sas.usace.army.mil/regulatory/documents/bankcreditpurchaseguide.pdf> Upon our written approval of the selected mitigation bank(s), you or the mitigation bank must provide this office with documentation of this purchase. The notice shall reference the CORPS file number assigned for this project. You shall provide a copy of this Standard Permit to the bank sponsor (or their agent). The credits must be purchased from the mitigation bank(s)

specified in the written approval of the selected mitigation bank. If the correct number and type of mitigation credits are not available at the time of project inception, a permit modification will be required.

It should be noted that a final rule on compensatory mitigation was published in the Federal Register on April 10, 2008. In that document a new hierarchy for mitigation was established. Specifically, the final rule states: “the most preferred option is mitigation bank credits, which are usually in place before the activity is permitted. In-lieu fee program credits are second in the preference hierarchy, because they may involve larger, more ecologically valuable compensatory mitigation projects as compared to permittee-responsible mitigation. Finally, permittee-responsible mitigation represents the third option, with three possible circumstances: (1) conducted under a watershed approach, (2) on-site and in kind, and (3) off-site/out-of-kind.” Based on this, the applicant did not investigate any other mitigation alternatives within the Canoochee River basin.

Based on the Savannah District’s Compensatory Mitigation SOP, the applicant has satisfactorily calculated the necessary credits needed to compensate for wetland and open water impacts. Since there were no opportunities for onsite restoration or enhancement on this property or adjacent properties, the applicant’s proposed compensatory mitigation plan meets the intent of the 404(b)(1) Guidelines (i.e., mitigation should be up-front, on-site and in-kind), consideration or review of alternative mitigation sites or plans is not warranted.

The applicant has proposed the use of an approved mitigation bank the services the Canoochee River, HUC 03060203. Any banks approved would need to be located within the primary or secondary service area of the project site, and consist of riverine bottomland hardwood wetlands and includes vegetative species such as sweetgum (*Liquidambar styraciflua*), sycamore (*Platanus occidentalis*), and various oak species (*Quercus spp.*).

In reviewing the applicant’s proposed mitigation plan, the CORPS has determined that the compensatory mitigation plan would meet the requirement of the final rule on compensatory mitigation and is adequate to replace function and value lost by the project, as required by the 404(b) (1) Guidelines, and would satisfy the mitigation requirements in accordance with the “Standard Operating Procedure Compensatory Mitigation Wetlands, Open Water & Streams” dated March 2004.

8. Existing Conditions: In preparation for this application the environmental consulting firm of Resource & Land Consultants (RLC) prepared supporting documentation of the site and its existing environmental conditions. The descriptions below are taken from the permit application:

The project site contains habitats common for the Coastal Plain of Georgia and typical for Bulloch County. The majority of the 203.83 acre tract consists of open agriculture field and upland.

A wetland delineation was completed within the tract by Resource & Land Consultants and verified by the U.S. Army Corps of Engineers (CORPS) in December 2011 under Regulatory Branch #SAS-2011-00582). Based on this jurisdictional determination, the project site contains 17.55 acres of jurisdictional area including wetlands and pond. The property has been and continues to be managed for agriculture and timber production. The following provides a brief description of each habitat within the property.

Upland Field: *Approximately 136.59 acres of the project site contains agricultural field. Since purchase of the property in 2010, the agricultural fields have remained active with the planting and harvesting of crops. These areas contain a variety of crops which include, but are not limited to corn, cotton, soybean, wheat, rye, etc.*

Forested Upland: *The forested upland areas total an estimated 49.96 acres and are primarily located between existing agricultural fields and forested wetlands. This habitat is dominated by loblolly pine (Pinus taeda), pignut hickory (Carya glabra), sweetgum (Liquidambar styraciflua), and water oak (Quercus nigra). The understory contains scattered wax-myrtle (Myrica cerifera), water oak, and swamp ty-tyi (Cyrilla racemiflora). It should be noted that a portion of upland consisting of pine plantation was clear-cut in 2010.*

Forested Wetland: *Wetland areas within the site total 16.30 acres and contain a mixed overstory and understory. The overstory is dominated by sweetgum, red maple (Acer rubrum), Swamp ty-tyi (Cyrilla racemiflora), and swamp tupelo (Nyssa sylvatica). The shrub and herbaceous layer contains wax myrtle, Chinese privet (Ligustrum sinense), wool grass (Dichanthelium scabriusculum), cat-tail (Typha latifolia), greenbrier (smilax spp.), sedges (Carex spp.), and netted chain-fern (Woodwardia areolata).*

Open Water Pond: *The pond area totals 1.25 acres and consists of open water habitat common for man-made farm ponds. Depth varies from 1 foot to 8 feet deep with shrub and herbaceous species along the water's edge and no vegetation present within the pond limits.*

On November 14, 2012, US Army Corps of Engineers, Savannah District personnel visited the site and verified the above descriptions to be accurate.

B. AUTHORITY:

☐ Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403).

☒ Section 404 of the Clean Water Act (33 U.S.C. §1344).

☐ Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

C. SCOPE OF ANALYSIS:

1. National Environmental Policy Act (NEPA):

a. Factors:

(1) Whether or not the regulated activity comprises "merely a link" in a corridor type project: No

(2) Whether there are aspects of the upland facility in the immediate vicinity of the regulated activity which affect the location and configuration of the regulated activity: The proposed project would be located over an area interspersed with jurisdictional waters. The scope and layout of this master planned industrial park requires unavoidable impacts to regulated waters of the US.

(3) The extent to which the entire project will be within the CORPS jurisdiction: The wetlands within the entire project site are within the CORPS jurisdiction under Section 404 of the Clean Water Act.

(4) The extent of cumulative Federal control and responsibility: Not all of the entire project is within Federal control; due to most of the project being proposed and constructed on areas not under Federal control.

b. Determined scope:

☐ Only within the footprint of the regulated activity within the delineated water.

☒ Over entire property.

2. National Historic Preservation Act (NHPA) "Permit Area":

a. Tests. Activities outside the waters of the United States ☒ are/☐ are not included because all of the following tests ☒ are/☐ are not satisfied:

(1) Such activity ☐ would occur regardless of the authorization of work or structures within waters of the United States/☒ would not occur but for the authorization of the work or structures within the waters of the United States;

(2) Such activity ☒is/☐is not integrally related to the work or structures to be authorized within waters of the United States (or, conversely, the work or structures to be authorized must be essential to the completeness of the overall project or program); and

(3) Such activity ☒is/☐is not directly associated (first order impact) with the work or structures to be authorized.

b. Determined Scope: In April 2012, Brockington and Associates, Inc. performed an intensive cultural resource survey at the 204-acre proposed project site in Bulloch County, Georgia, on behalf of the Development Authority of Bulloch County. The goal of the survey was to locate, identify, delineate, and evaluate all cultural resources within the property, including prehistoric and historic archaeological sites, as well as historic structures. The cultural resource assessment survey included a pedestrian inspection of the entire parcel combined with systematic shovel testing at 30-meter intervals where possible.

As a result of the Phase I cultural resource survey, one previously undocumented site and one isolated archaeological find were encountered. However, it is the opinion of the investigator that these resources are ineligible for the National Register of Historic Places. By letter dated October 29, 2012, the Georgia Department of Natural Resources, Historic Preservation Division concurred with the finding that none of the identified sites are eligible for the National Register of Historic Places. Thus, the CORPS has determined that the proposed project would have a no effect on cultural resources within the property, including prehistoric and historic archaeological sites, as well as historic structures.

3. Endangered Species Act (ESA) "Action Area":

a. Action Area: Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.

b. Determined Scope: A threatened and endangered species survey within the project area was completed in June 2010, by RLC, for the applicant. Based on this survey, the CORPS determined that the proposed project would have no effect on Federally listed threatened or endangered species. Neither the US Fish & Wildlife Service (USFWS) nor the National Marine Fisheries Service (NMFS) objected to the proposed action. By letter dated October 10, 2012, the USFWS responded to our Joint Public Notice. They mentioned a possible minor effect on foraging Wood Storks, but made no formal objection to the project. In reviewing our determination the requirements of Section 7 of the ESA have been satisfied. Thus, the CORPS has determined that the proposed project would have a no effect on listed species.

D. PUBLIC NOTICE: On September 5, 2012, the CORPS issued a Joint Public Notice (JPN) on the proposed work. We mailed notices to Federal, State, and local agencies and the public.

1. Comments Received in Response to Public Notice: ☐ NA/ ☒ Yes
2. Other Comments: ☒ NA/ ☐ Yes - The public also provided comments at ☐ public hearing, ☐ public meeting, and/or ☐ .
3. Commenter: See Table 1
4. Site Inspection: Site ☒ was/ ☐ was not visited by the CORPS to obtain information in addition to delineating jurisdiction.
5. Issues Identified by the CORPS: ☒ NA/ ☐ Yes
6. Issues/Comments Forwarded to the Applicant: ☒ NA/ ☐ Yes.
7. Applicant Replied/Provided Views: ☒ NA/ ☐ Yes.

Table 1. Summary of Comments

COMMENTOR	OBJECT	3(b) Y/N	NO OBJECT	NO OBJECT W/CONDITION	DATE
Federal Agencies					
1. US Environmental Protection Agency					
2. US Fish and Wildlife Service			X		10/10/2012
3. National Marine Fisheries Service					
Savannah District					
4. Office of Counsel					
5. Operations Division Navigation Section					
6. Engineering Division Hydrology Branch					
State of Georgia					
7. State Clearinghouse					
8. Georgia Department of Transportation					
9. Soil and Water Commission					
Georgia Department of Natural Resources					
10. Environmental Protection Division					
11. Coastal Resources Division					
12. Historic Preservation Division			X		10/29/2012
13. Flood Plain Management Section					
14. Wildlife Resources Division					
Others					

* No date indicates no comment received.

8. Discussion of Comments and Issues Raised:

- a. US Environmental Protection Agency (USEPA): The USEPA provided no comments.
- b. US Fish and Wildlife Service (USFWS): By letter dated October 10, 2012, the USFWS cautions that red-cockaded woodpeckers, wood storks, and eastern indigo snakes may be

encountered in the area. But that this project is not expected to impact fish or wildlife under the USFWS's jurisdiction.

CORPS's Position: We have considered these comment. It is our determination that the loss of 8.98 acres of wetland and open water will have no adverse effect on endangered or threatened species.

- c. State Clearinghouse: Provided no comments.
- d. Georgia Department of Transportation (GDOT): GDOT provided no comments.
- e. Georgia Department of Natural Resources, Environmental Protection Division (GAEPD): No comments or water quality certification have been received as of the date of the document.
- f. Georgia Department of Natural Resources, Coastal Resources Division (GACRD): GACRD provided no comments.
- g. Georgia Department of Natural Resources, Historic Preservation Division: By letter dated October 29, 2012, the Georgia Department of Natural Resources, Historic Preservation Division concurred with the finding that none of the identified sites in the survey provided by the applicant are eligible for the National Register of Historic Places.

CORPS's Position: The CORPS has considered these comments and determined that the proposed project would have a no effect on cultural resources within the property, including prehistoric and historic archaeological sites, as well as historic structures.

E. ALTERNATIVES ANALYSIS

The applicant provided the following:

ALTERNATIVE ANALYSIS:

Prior to preparation of this permit application and during design of the project, the applicant considered both off-site and on-site alternatives. The following provides a description of other tracts considered during the development plan review process as well as on-site alternatives considered in an effort to avoid and minimize on-site wetlands to the greatest extent practicable.

Site Screening Criteria: *As part of the alternative site analysis, the following site screening criteria were applied to the overall project.*

Geographic Location. *Interstate 16 is the only major interstate which extends through Bulloch County. Bulloch County contains two interchanges along I-16 including one at Highway 301 and I-16 and one at Highway 67 and I-16. DABC determined that creation of an industrial park adjacent to I-16 is necessary to enable the applicant to compete with neighboring development authorities and to create an industrial park affording immediate access to and visibility from the*

Interstate. Because of these parameters, geographic location was limited to major exit ramps along Interstate 16 within Bulloch County.

Size. *The project site must be of suitable size to accommodate large contiguous areas of developable land necessary to accommodate parking, buildings, roads, etc. associated with manufacturing and distribution facilities. In addition, the cost associated with development and infrastructure installation needed to support an industrial site is significantly higher than most other development projects and a project site must be of suitable size to support numerous industries to allow site development cost sharing. For this reason, the size restriction placed on the project was a minimum of 150 acres and a maximum of 350 acres.*

Zoning. *As with any project, land use restrictions associated with current zoning is a major consideration. For this site screening criteria, tracts that are currently zoned for the intended use or that could be reasonably re-zoned to accommodate the proposed project were considered practicable.*

Utilities. *With any development project, utility services or access to utility services (water, sewer, electrical, gas, phone, cable, etc.) are required. For this reason, location of existing utilities and cost associated with servicing the project site if those utilities were not already available was a consideration in the site screening criteria.*

Access. *Because industrial parks include operation of large trucks and trailers, public safety and traffic management is always a consideration. Entrance and exit points for the site and travel corridors to and from the interstate were determined to be an important site screening criteria.*

Summary of Alternative Sites Screened for Practicability: *Considering the site screening criteria above, the applicant reviewed development alternatives for eight alternative tracts. The following provides a summary of each alternative site and application of the project site screening criteria.*

Applicants Preferred Alternative: *The applicant's preferred alternative site totals 203.83 acres located in the southeast quadrant of I-16 and Highway 301. This site is located within the identified geographic area of review and falls within the size limit criteria. The property is currently zoned for industrial use and re-zoning would not be required. Water, sewer and electrical services are not present within the site but available for extension from Highway 301. Access to the site is suitable to support the proposed land use.*

Alternative Site 1. *This site totals 201.29 acres and falls within the prescribed project area size criteria. This site is located in the northeast quadrant of I-16 and Highway 301 which is within the identified geographic area of review. The property is currently zoned HC (Heavy Commercial) but could be rezoned for the intended industrial use. Utilities are not currently*

servicing the site but extension of public utilities from Highway 301 would be feasible. Access to the site is suitable to support the proposed land use. Alternative 1 is a practicable alternative.

Alternative Site 2. *This tract totals 182.13 acres and falls within the size criteria. The tract is located in the northwest quadrant of I-16 and Highway 301 which is within the identified geographic area of review. The site is currently zoned AG-5 (Agriculture). Rezoning from AG-5 to industrial would be more difficult and could potentially be prohibited. Utilities are not currently servicing the site but extension of public utilities from Highway 301 would be feasible. Site 2 is approximately 2,200 linear feet west of Highway 301. Creating suitable access to this site would require significant improvements to an existing dirt road including right of way acquisition for widening, acquisition of utility easements, paving, etc to accommodate the industrial truck traffic and industrial site development. Due to the zoning and site access issues that may prohibit development of the tract, Alternative 2 did not meet the site screening criteria and is not a practicable alternative.*

Alternative Site 3. *This tract totals 314.13 acres and is located in the southwest quadrant of I-16 and Highway 301. The site is located within the identified geographic area of review and meets the size criteria. The property is currently zoned AG-5 and HC (Heavy Commercial) but could likely be rezoned for the intended industrial use because of the existing HC zoning. Utilities are not currently servicing the site but extension of public utilities from Highway 301 would be feasible. Access to the site is suitable to support the proposed land use. Alternative 3 is a practicable alternative.*

Alternative Site 4. *Site 4 totals 270 acres. The tract is located north of Stilson, Georgia, approximately 10 miles north of Interstate 16. This tract was included within the alternative site review because it is currently listed for sale (no other sites within the size restriction were listed for sale) and falls within the acreage requirement. However, the subject property is outside of the identified geographic area. Due to the location of the site, the applicant did not perform further consideration of utilities, zoning, or access. Alternative 4 is not a practicable alternative.*

Alternative Site 5. *This tract totals 195.07 acres and falls within the size criteria. The tract falls within the identified geographic area of review and is located within the northeast quadrant of I-16 and Highway 67. The property is currently zoned AG-5 and HC but could likely be rezoned for the intended industrial use because of the existing HC zoning. Utilities are not currently servicing the site but extension of public utilities from Highway 67 would be feasible. Access to the site is suitable to support the proposed land use. Alternative 5 is a practicable alternative.*

Alternative Site 6. *This tract totals 120 acres and is located in the northwest quadrant of I-16 and Highway 67. While this site is located within the identified geographic area of review, this tract falls below the minimum 150 acre size requirement for the project. Due to the size restriction, no further consideration was given to zoning, access, or utilities. Alternative Site 6 is not a practicable alternative.*

Alternative Site 7. This tract totals 236 acres and falls within the size criteria. The tract is located in the southwest quadrant of I-16 and Highway 67 and within the identified geographic area of review. The property is currently zoned AG-5 and HC but could likely be rezoned for the intended industrial use because of the existing HC zoning. Utilities are not currently servicing the site but extension of public utilities from Highway 67 would be feasible. Access to the site is suitable to support the proposed land use. Alternative 7 is a practicable alternative.

Alternative Site 8. This tract totals 168.35 acres and falls within the size criteria. The tract is located in the southeast quadrant of I-16 and Highway 67 and within the identified geographic area of review. The property is currently zoned AG-5 and HC but could likely be rezoned for the intended industrial use because of the existing HC zoning. Utilities are not currently servicing the site but extension of public utilities from Highway 67 would be feasible. Access to the site is suitable to support the proposed land use. Alternative 8 is a practicable alternative.

Based on the site analysis above, a total of 6 sites were determined to be practicable including the Preferred Alternative, Alternative Site 1, Alternative Site 3, Alternative Site 5, Alternative Site 7, and Alternative Site 8. Table 3 provides an overall summary of site screening criteria to each alternative site.

Table 3.

Site Screening Selection Criteria	Applicant's Preferred	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8
Geographic Location	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Size	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Zoning	Yes	Yes	No	Yes	N/A	Yes	N/A	Yes	Yes
Utilities	Yes	Yes	Yes	Yes	N/A	Yes	N/A	Yes	Yes
Access	Yes	Yes	No	Yes	N/A	Yes	N/A	Yes	Yes
Practicable Alternative	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes

Review of Practicable Alternatives: Following consideration of alternative sites using the site screening criteria, the applicant completed an analysis of practicable alternatives to identify the least environmentally damaging practicable alternative pursuant to 40 CFR 230.7(b)(1). The purpose of the below analysis is to ensure that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem". The applicant evaluated potential environmental impacts that would result from construction of the proposed facility. This evaluation was completed by considering several environmental factors listed below as well as additional non-environmental factors which could impact development of the site.

Environmental Factors:

Stream Impacts (quantitative). The linear footage of potential stream impact was evaluated for each practicable alternative.

Stream Impacts (qualitative). The functional value of potential stream impact areas was evaluated for each practicable alternative.

Wetland Impacts (quantitative). The acreage of potential wetland impact was evaluated for each practicable alternative.

Wetland Function (qualitative). The functional value of potential wetland impact areas was evaluated for each practicable alternative.

Impacts to Other Waters (quantitative). The acreage of open water impact for each site was considered during review of each practicable alternative.

Other Waters Functions (qualitative). The functional value of any open water impact areas was evaluated for each practicable alternative.

Federally Listed Threatened or Endangered Species. A preliminary assessment of each practicable alternative was conducted to determine the potential occurrence of animal and plants species (or their preferred habitats) currently listed as threatened or endangered by state and federal regulations [Federal Endangered Species Act of 1973 (16 USC 1531-1543)]. The U.S. Fish and Wildlife Service (USFWS) lists the following plant and animal species as endangered or threatened in Bulloch County, Georgia:

PLANTS

Georgia plume (Elliottia racemosa)

Parrot pitcher-plant (Sarracenia psittacina)

Sweet pitcher-plant (Sarracenia rubra)

BIRDS

Bald eagle (Haliaeetus leucoce)

Red-cockaded woodpecker (Picoides borealis)

Wood stork (Mycteria americana)

REPTILES

Eastern indigo snake (Drymarchon corias couperi)

Gopher tortoise (Gopherus polyphemus)

INVERTEBRATE

None Listed

Cultural Resources. A preliminary assessment of cultural resources was conducted for each site by reviewing available State Historic Preservation Office information at <http://www.nr.nps.gov/>.

Flood Plain Impact. The acreage of potential flood plain impact was evaluated for each practicable alternative.

Stream Buffer Impact. The linear footage of potential stream buffer impact was evaluated for each practicable alternative.

Other Factors:

Parcel Assemblage: Some of the practicable alternatives would require assemblage of several parcels to create a suitable size development tract. For the purposes of this analysis, alternatives requiring acquisition of numerous tracts were noted.

Applicant Owned: Any tracts currently owned by the applicant were noted.

Proposed Action or Applicant's Preferred Alternative: The applicant's preferred alternative totals 203.83 acres and is located within the southeast quadrant of the intersection of Interstate 16 and U.S. Highway 301, within Statesboro, Bulloch County, Georgia (32.301831°, -81.864769°). The majority of the 203.83 acre tract consists of open agriculture field. As described above, the site contains habitats typical of Bulloch County and the Coastal Plain of Georgia including agricultural field, forested wetland and upland, and man-made open water ponds. The following provides a brief assessment of factors associated with the proposed and preferred alternative.

Environmental Factors:

Stream Impacts (quantitative). No stream impacts are associated with this alternative.

Stream Impacts (qualitative). No stream impacts are associated with this alternative.

Wetland Impacts (quantitative). The applicant's preferred alternative includes 7.73 acres of wetland impact.

Wetland Function (qualitative). Based on the field delineation, review of the NWI, topographic survey, and historic aerial photography the wetland areas would have experienced minor impacts associated with fragmentation from construction of I-16, installation of farm pond, and general agricultural, silvicultural and land management practices. While these actions may have resulted in the minor degradation of these wetlands, the overall function and value would be satisfactory.

Impacts to Other Waters (quantitative). Impacts include 1.25 acres to an open water pond. Other Waters Functions (qualitative). This open water pond was constructed by a combination of excavation and fill within a wetland drain. Considering the historic and natural condition of this area as a forested wetland, the functional value of the open water pond would be low.

Federally Listed Threatened or Endangered Species. RLC conducted a threatened and endangered species survey to determine the potential occurrence of animal and plants species (or their preferred habitats) currently listed as threatened or endangered by state and federal regulations [Federal Endangered Species Act of 1973 (16 USC 1531-1543)]. Neither the listed species nor habitat typically associated with these species was observed during the survey. Due to the condition and location of the project area (majority of the subject site is open agriculture field) and absence of habitat and listed species, the proposed project is not likely to adversely impact any threatened or endangered species.

Cultural Resources. A Phase I cultural resource survey for the project area was completed by Brockington & Associates. There were no previously recorded cultural resources within or near the project area. One undocumented archaeological site and one isolated archaeological find were identified during field investigations. However, these resources are considered ineligible for the NHRP. Brockington & Associates has recommended that no further cultural resource investigations are necessary for this undertaking.

Flood Plain Impact. According to the Bulloch County GIS, the applicant's preferred site requires no flood plain impacts.

Stream Buffer Impact. No stream buffer impacts are associated with this alternative.

Other Factors:

Parcel Assemblage: The preferred alternative consists of a single parcel and no additional land acquisition is required.

Applicant Owned: Yes.

No Action Alternative: Obviously with every project, a "no action" alternative must be considered. The proposed project has been initiated to facilitate the establishment of an industrial site. This region has attracted many new businesses, created jobs, and produced many economic benefits for Statesboro, Bulloch County, and the surrounding areas. Today, industries review numerous sites throughout the southeast prior to construction of a new facility and many development authorities compete for each of these projects. Factors which play an important role in site selection are location, site access, tract size, purchase price, zoning, utilities, wetland area, floodplain, development costs, etc. The most critical factor is often permitting requirements and timeframe for construction. In order for the subject site to become a viable candidate for any prospective business, available parcels must be created with all entitlements in

place. Without development of this master plan project adjacent to I-16, DABC will continue to be at a competitive disadvantage and will continue to be eliminated from the candidate site list for many large industries and corporation. While the "no-action alternative" avoids any impacts to wetland resources, this alternative would not meet the overall project purpose to sustain industrial development within the county and would negatively affect Bulloch County with loss of tax revenue and job creation. For this reason, the "no-action" alternative is not feasible.

Off-Site Alternatives: *As discussed above, industrial developments of this scale require consideration of many factors. These types of storage and manufacturing businesses require manufacturing and warehousing of products on-site and frequent hauling and distribution of products to retail locations throughout the southeast. For this reason, appropriate site location and site access is critical. The site must be within close distance to major arterial roads. The site must avoid to the greatest extent practicable residential areas. The site must contain access which can support the high volume of large truck traffic. The site must contain large pods of developable land on which large warehousing and manufacturing facilities can be constructed. Once site location and access issues are satisfied, factors such as wetlands, soils, stormwater management, water, sewer, power, zoning, topography, floodplain etc. must be considered. It is all of these basic site requirements that greatly limit opportunities to construct these types of facilities.*

Preliminary consideration of off-site alternatives included parcel size and geographic location within Bulloch County and adjacent to I-16. The applicant then evaluated other practicable off-site alternatives that fit within the parameters prescribed above for construction of an industrial site. This evaluation was conducted to confirm that the project complies with Section 404(b)(1) Guidelines. The guidelines are sequential and require that permit applicants avoid unnecessary environmental impacts by preparing an analysis of available off-site alternatives that would potentially result in less adverse impacts than the proposed project to the maximum extent practicable.

Since the project site was chosen for its access to Interstate 16, the alternative site analysis was generally restricted to parcels located at major exit ramps along Interstate 16 and within Bulloch County. While infrastructure does not currently service any of the sites, all required infrastructure necessary is available along Highway 301/67 and can be easily routed to the site.

Alternative Site 1: *This tract consists of approximately 201.29 acres of agricultural land. The site is located within the northeastern quadrant of the intersection of Interstate 16 and Highway 301, directly north of the preferred site. Based on review of aerial photography the majority of the tract consists of agricultural fields and habitats appear typical of Bulloch County, Georgia.*

Environmental Factors:

Stream Impacts (quantitative). No stream impacts are associated with this alternative.

Stream Impacts (qualitative). No stream impacts are associated with this alternative.

Wetland Impacts (quantitative). This tract contains approximately 17 acres of wetlands. Because the size of the wetland present and its location within the tract, any industrial site master plan would require impacts to the majority of the jurisdictional wetlands.

Wetland Function (qualitative). Based on review of the NWI, topographic survey, and aerial photography the historic limits of the wetlands have been impacted by standard agricultural practices in the area. Therefore, the functional value of the wetland would be relatively low.

Impacts to Other Waters (quantitative). The tract contains approximately 10 acres of open water ponds. Facilitating the proposed site plan would require impacts to approximately 5 acres of these ponds.

Other Waters Functions (qualitative). Functions for open water ponds are relatively low.

Federally Listed Threatened or Endangered Species. Based on location of the tract and current site conditions, neither listed species nor habitat typically associated with these species are present within Alternative Site 1. Thus, no adverse impacts to federally listed threatened and endangered species are expected.

Cultural Resources. A Phase I cultural resource survey has not been completed within the site. However, based on a query of the NHR database, no sites are known to occur within this site.

Flood Plain Impact. According to the Bulloch County GIS, Alternative Site 1 would not require any flood plain impacts.

Stream Buffer Impact. No stream buffer impacts are associated with this alternative.

Other Factors:

Parcel Assemblage. Alternative Site 1 would require the assemblage of 3 separate parcels.

Applicant Owned: No.

Alternative Site 3: *This tract consists of approximately 314.13 acres. The site is located within the southwest quadrant of the intersection of Interstate 16 and Highway 301, directly west of the Preferred Site. Based on review of aerial photography the tract consists of open field, hardwood forest, and pine forest.*

Environmental Factors:

Stream Impacts (quantitative). No stream impacts are associated with this alternative.

Stream Impacts (qualitative). No stream impacts are associated with this alternative.

Wetland Impacts (quantitative). This tract contains approximately 103.7 acres of wetlands. For the size and configuration of the tract, it contains a large amount of jurisdictional wetland and is likely that wetland impacts exceeding 30 acres would be required to facilitate the proposed master plan.

Wetland Function (qualitative). Based on review of the NWI, topographic survey, and aerial photography the historic limits of the wetlands may have been impacted by standard silviculture practices on the tract. The functional value of the wetland would be in the medium range.

Impacts to Other Waters (quantitative). The tract contains approximately 2.6 acres of open water pond. Facilitating the proposed site plan would require impacts to approximately 2.6 acres of the pond.

Other Waters Functions (qualitative). No "Other Waters" impacts are associated with Alternative Site 3.

Federally Listed Threatened or Endangered Species. Based on location of the tract and current site conditions, neither listed species nor habitat typically associated with these species are present within Alternative Site 3. Therefore, no adverse impacts to federally listed threatened and endangered species are expected.

Cultural Resources. A Phase I cultural resource survey has not been completed within the project area. However, based on a query of the NHR database, no sites are known to occur within this site.

Flood Plain Impact. According to the Bulloch County GIS, Alternative Site 3 would require significant flood plain impacts.

Stream Buffer Impact. No stream buffer impacts are associated with this alternative.

Other Factors:

Parcel Assemblage: Alternative Site 3 would require the assemblage of 4 separate parcels.

Applicant Owned: No.

Alternative Site 5: This tract consists of approximately 195.07 acres. The site is located within the northeast quadrant of the intersection of Interstate 16 and Highway 67, approximately 10 miles east of the Preferred Site. Based on review of aerial photography the tract consists of open water pond, hardwood forest, and pine forest typical of Bulloch County, Georgia.

Environmental Factors:

Stream Impacts (quantitative). No stream impacts are associated with this alternative.

Stream Impacts (qualitative). No stream impacts are associated with this alternative.

Wetland Impacts (quantitative). This tract contains approximately 46 acres of wetlands. For the size and configuration of the tract, it contains a large amount of jurisdictional wetland and is likely that wetland impacts exceeding 25 acres would be required to facilitate the proposed master plan.

Wetland Function (qualitative). Based on review of the NWI, topographic survey, and aerial photography the historic limits of the wetlands have been impacted by the upstream and downstream damming of wetland systems to create open water ponds. The functional value of the wetland would be in the low.

Impacts to Other Waters (quantitative). "Other Waters" impacts are associated with open water ponds for Alternative Site 5 and would total approximately 32 acres.

Other Waters Functions (qualitative). "Other Waters" impacts would include open water pond whose function would be low.

Federally Listed Threatened or Endangered Species. Based on location of the tract and current site conditions, neither listed species nor habitat typically associated with these species are present within Alternative Site 5. Therefore, no adverse impacts to federally listed threatened and endangered species are expected.

Cultural Resources. A Phase I cultural resource survey has not been completed within the project area. However, based on a query of the NHR database, no sites are known to occur within this site.

Flood Plain Impact. According to the Bulloch County GIS, Alternative Site 5 would require significant flood plain impacts.

Stream Buffer Impact. No stream buffer impacts are associated with this alternative.

Other Factors:

Parcel Assemblage: Alternative Site 5 would require the assemblage of 2 separate parcels.

Applicant Owned: No.

***Alternative Site 7:** This tract consists of approximately 236 acres. The site is located within the southwest quadrant of the intersection of Interstate 16 and Highway 67, approximately 10 miles east of the Preferred Site. Based on review of aerial photography the tract consists of open field, hardwood forest, and pine forest typical of Bulloch County, Georgia.*

Environmental Factors:

Stream Impacts (quantitative). No stream impacts are associated with this alternative.

Stream Impacts (qualitative). No stream impacts are associated with this alternative.

Wetland Impacts (quantitative). This tract contains approximately 58 acres of wetlands. For the size and configuration of the tract, it contains a large amount of jurisdictional wetland and is likely that wetland impacts exceeding 35 acres would be required to facilitate the proposed master plan.

Wetland Function (qualitative). Based on review of the NWI, topographic survey, and aerial photography the historic limits of the wetlands have been impacted by historical silviculture practices. The functional value of the wetland would be in medium.

Impacts to Other Waters (quantitative). No "Other Waters" are present within Alternative Site 7.

Other Waters Functions (qualitative). No "Other Waters" are present within the Alternative Site 7.

Federally Listed Threatened or Endangered Species. Based on location of the tract and current site conditions, neither listed species nor habitat typically associated with these species are present within Alternative Site 7. Therefore, no adverse impacts to federally listed threatened and endangered species are expected.

Cultural Resources. A Phase I cultural resource survey has not been completed within the project area. However, based on a query of the NHR database, no sites are known to occur within this site.

Flood Plain Impact. According to the Bulloch County GIS, Alternative Site 7 would require flood plain impacts.

Stream Buffer Impact. No stream buffer impacts are associated with this alternative.

Other Factors:

Parcel Assemblage: Alternative Site 7 would require the assemblage of 4 separate parcels.

Applicant Owned: No.

Alternative Site 8: This tract consists of approximately 168.35 acres. The site is located within the southeast quadrant of the intersection of Interstate 16 and Highway 67, approximately 10 miles east of the Preferred Site. Based on review of aerial photography the tract consists of open field, hardwood forest, and pine forest typical of Bulloch County, Georgia.

Environmental Factors:

Stream Impacts (quantitative). No stream impacts are associated with this alternative.

Stream Impacts (qualitative). No stream impacts are associated with this alternative.

Wetland Impacts (quantitative). This tract contains approximately 54.5 acres of wetlands. For the size and configuration of the tract, it contains a large amount of jurisdictional wetland and is likely that wetland impacts exceeding 21.1 acres would be required to facilitate the proposed master plan.

Wetland Function (qualitative). Based on review of the NWI, topographic survey, and aerial photography the historic limits of the wetlands have been impacted by historical silviculture practices. The functional value of the wetland would be medium.

Impacts to Other Waters (quantitative). "Other Waters" consisting of open water ponds are located within Alternative Site 8 and approximately 3.9 acres of impacts to these waters would be required to achieve the proposed site plan.

Other Waters Functions (qualitative). "Other Waters" present within the Alternative Site 8 are open water ponds whose functions are low due to the open water nature of these ponds.

Federally Listed Threatened or Endangered Species. Based on location of the tract and current site conditions, neither listed species nor habitat typically associated with these species are present within Alternative Site 8. Therefore, no adverse impacts to federally listed threatened and endangered species are expected.

Cultural Resources. A Phase I cultural resource survey has not been completed within the project area. However, based on a query of the NHR database, no sites are known to occur within this site.

Flood Plain Impact. According to the Bulloch County GIS, Alternative Site 8 would require flood plain impacts.

Stream Buffer Impact. No stream buffer impacts are associated with this alternative.

Other Factors:

Parcel Assemblage: Alternative Site 8 would require the assemblage of 4 separate parcels.

Applicant Owned: No.

Summary of Off-Site Alternatives Analysis: The “No Action” alternative would not satisfy the goals of the proposed project. When comparing the practicable alternatives, the Applicant’s Preferred Alternative requires less wetland and floodplain impact than the other alternative sites. When considering environmental impacts, the Applicant’s Preferred Alternative represents the least environmentally damaging. It should also be noted that the project site contains 17.55 acres of jurisdictional waters including wetland and pond. This equates to 8% jurisdictional area and 92% upland. As was demonstrated by the off-site alternatives analysis, it would not be feasible to find another site adjacent to I-16 that would require less jurisdictional area impact.

In addition to the decreased overall environmental impact, the Applicant’s Preferred Alternative site is located in the desired geographic location and provides visibility to Interstate 16, as well as immediate access to the Interstate. Alternative sites would require capital investments to secure the properties and the assemblage of numerous parcels to meet the minimum acreage requirement. The majority of Alternative Site 1 consists of open agriculture field similar to the Applicant’s Preferred Site, while clearing of mature forested areas would be required for the remaining alternative parcels. Current zoning regulations of the Applicant’s Preferred Site allow for the use of industry, whereas all alternative sites would necessitate re-zoning. Existing conditions within all sites would necessitate the establishment of utilities (water, sewer, and power); however, all sites are within close proximity to existing utility lines along Highway 301 or Highway 67. All sites analyzed would require construction of infrastructure to facilitate the goals of the proposed industrial facility.

Based on the assessment of alternatives analysis completed above, the Corps has determined the Applicant’s Preferred Alternative is the least damaging practicable alternative. The Applicant’s Preferred Alternative is also the only property currently owned by the Bulloch County Development Authority. Any selection and acquisition of an alternative site would require the sale of the Applicant’s Preferred Site. Table 4 provides a summary of the practicable alternatives and the values for each factor.

Table 4.

FACTORS							
Environmental Factors	No Action Alternative	Applicant's Preferred (proposed & permitted)	Alt 1	Alt 3	Alt 5	Alt 7	Alt 8
Stream Impacts (Linear Feet)	None	None	None	None	None	None	None
Loss in Stream Function	None	None	None	None	None	None	None
Wetland Impacts (Acres)	None	7.73 ac	17 ac	30 ac	25 ac	35 ac	21.1 ac
Loss in Wetland Function	None	Low	Low	Med	Low	Med	Med
Impacts to Other Waters (Acres)	None	1.25 ac	5 ac	2.6	32	No	3.9
Loss of Other Waters Functions	None	Low	Low	No	Low	No	Low
Federal Endangered Species	N/A	No	No	No	No	No	No
Cultural Resources	N/A	No	No	No	No	No	No
Flood Plain	N/A	No	No	Yes	Yes	Yes	Yes
Stream Buffer	N/A	No	No	No	No	No	No
Other Factors							
Assemblage of Parcels	N/A	No	Yes	Yes	Yes	Yes	Yes
Ownership by BCDA	N/A	Yes	No	No	No	No	No
LEDPA	N/A	Yes	No	No	No	No	No

CORPS's Position: We have considered these alternatives. It is our determination that the applicant's preferred alternative is the least environmentally damaging practicable alternative (LEDPA). We have also concluded that this off-site alternatives analysis complies with the 404 (b)(1) Guidelines.

On-Site Alternatives & Avoidance/Minimization: In addition to the determination that the proposed project site was the most practicable and least damaging alternative, the applicant considered on-site alternatives in an effort to avoid and minimize jurisdictional area impacts to the greatest extent practicable. The proposed project includes the construction of an industrial park which will support large manufacturing and distribution facilities. The footprint of these

facilities often requires large contiguous development area anywhere from a minimum of 350,000 square feet to over 1,000,000 square feet. The land plan proposed as a part of this project maintains these design requirements while avoiding wetlands to the maximum extent practicable.

According to the applicant, the proposed plan is the result of numerous design alternatives where the applicant focused on least environmentally damaging options while still meeting the needed requirements for the master plan. The applicant, engineer, and environmental consultant narrowed the on-site alternatives for consideration to three alternatives. Table 5 provides an outline of the three on-site alternatives which were considered.

Table 5.

Alternative	Project Area (Acres)	Wetland Impact (acres)	Pond Impact (acres)	Total (acres)
Scenario 1 (Proposed)	203.83	7.73	1.25	8.98
Scenario 2	203.83	11.43	1.25	12.68
Scenario 3	203.83	14.82	1.25	16.07

When considering the overall development plan, location of proposed impacts compared to location and quality of preservation areas, the applicant continually considered opportunities for avoidance and minimization. Although alternative plans, which provided flexibility for general design, were preferred, these alternative site plans required a greater acreage of wetland impact. The applicant's plan restricts and limits the activities to upland area, avoids and preserves the larger wetland systems, avoids and preserves forested wetland systems to the greatest extent practicable, and proposes impacts to the minimal acreage of wetland.

Corps' Position: We have considered these alternatives. It is our determination that the applicant's the preferred alternative and is the LEDPA. We have also concluded that this avoidance and minimization analysis complies with the 404 (b)(1) Guidelines.

MINIMIZATION ALTERNATIVES:

STORM WATER MANAGEMENT:

According to the applicant, Maxwell-Reddick & Associates, Inc., the consulting engineer is designing the stormwater master plan for the project. Although this plan has not yet been finalized, preliminary design includes construction of stormwater management ponds that are being designed to accommodate the stormwater volume associated with development of the site. The final plan will meet any and all storm water management requirements of the local and state authorities. No impact to wetland and/or stream is proposed as a result of the construction of the

storm water detention ponds and all stormwater management facilities will be constructed in upland area.

COMPENSATORY MITIGATION:

As indicated above, the proposed project requires 7.38 acres of permanent wetland fill, 1.25 acres of permanent open water pond fill, and 0.35 acre of temporary fill for utility installation. The applicant is proposing to purchase mitigation credits for the entire 8.98 acres of jurisdictional impact. Preliminary mitigation credit calculations indicate that the proposed wetland impact requires 67.3 wetland mitigation credits to compensate for the 8.98 acres of unavoidable impact. Upon approval of the proposed project and prior to initiation of authorized wetland impacts, the applicant would purchase 67.3 wetland mitigation credits from Margin Bay Wetland Mitigation Bank, Wilhelmina-Morgan Mitigation Bank and/or Black Creek Mitigation Bank whose primary service area is the Canoochee River Watershed.

Corps' Position: In summary, the DABC is proposing the construction of an industrial development with immediate access and visibility to Interstate 16 located near Statesboro, Bulloch County, Georgia. The proposed project is the result of numerous design plan reviews during which the applicant, engineer, and environmental consultant were able to further avoid and minimize wetland impacts. While the applicant has avoided and minimized impacts to jurisdictional waters to the greatest extent practicable, the project will require 8.98 acres of jurisdictional wetland and open water impacts to facilitate implementation of the overall site plan. As compensatory mitigation for the proposed impacts, the applicant is proposing the purchase of 67.3 wetland mitigation credits from an CORPS approved mitigation bank within the Canoochee River Service Area. All development activities will be conducted using best management practices to prevent unintended or secondary impacts to wetlands and waters adjacent to the project site. Any permits issued for this project would contain a Special Condition that states: All work conducted under this permit shall be located, outlined, designed, constructed and operated in accordance with the minimal requirements as contained in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications as contained in the "Manual for Erosion and Sediment Control, (Latest Edition)," published by the Georgia Soil and Water Conservation Commission or their equivalent, will aid in achieving compliance with the aforementioned minimal requirements.

F. EVALUATION OF THE 404(B)(1) GUIDELINES:

1. Part V, Subpart C – Potential Effects on Physical and Chemical Characteristics of the Aquatic Ecosystem:

a. Substrate (40 CFR Section 230.20): Where needed for construction, mucky soils will be removed and replaced with sandy and clayey soils more suitable for the project. There would be a change in substrate at the fill sites, due to the replacement of hydric soils with structural backfill material to support the access roads and building pads. For any permit issued for the proposed project, special conditions would be included to require the fill material to be from

clean, uncontaminated sources, and that no fill material is placed outside of the permitted areas. Therefore, the proposed project would have a negligible impact on substrate.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

b. Suspended Particulates/Turbidity (40 CFR Section 230.21): Best Management Practices would be employed and water quality monitored during and after construction would be conducted to ensure that suspended particulates and turbidity will be negligible and have only the minutest effects. There would also likely be some associated short-term non-point source erosion from cleared upland areas. Project construction would be subject to the Georgia Erosion and Sedimentation Control Act of 1975, as amended, which requires that measures be taken to control erosion, sedimentation, and turbidity. Once construction is completed and the area permanently stabilized, turbidity downstream of the project would likely decrease. For any permit issued for the proposed project, special conditions would be included to require the permittee to comply with applicable sections of the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications as contained in "Manual for Erosion and Sediment Control, (Latest Edition)," published by the Georgia Soil and Water Conservation Commission or their equivalent will aid in achieving compliance with the aforementioned minimal requirements. With implementation of special permit conditions, project-related adverse environmental impacts associated with suspended particulates and turbidity would be short term and minor.

FINDINGS: ☐ No Effect ☐ Negligible ☐ Major (Significant)
☒ Short Term Minor ☐ Long Term Minor

c. Water (40 CFR Section 230.22): The proposed project would cause a minimal, temporary and localized disturbance of water quality parameters in the immediate vicinity of the proposed project site during construction. For any permit issued for the proposed project, special conditions would be included to require the applicant to receive a Section 401 Water Quality Certification, and that the permittee obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. With implementation of these special permit conditions, the CORPS has determined that this project would have a negligible effect on sediment transport, concentration of chemical contaminants, and other associated water quality effects.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

d. Currents Patterns & Water Circulation (40 CFR Section 230.23): Some adjacent wetland areas may suffer minor changes and impacts due to changes in drainage. However, these changes are not expected to alter the overall ecological character of the area in general, or water

circulation in particular. For any permit issued for the proposed project, special permit conditions would be included to require the permittee to obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. The project would be expected to have a negligible impact on current patterns and water circulation.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

e. Normal Water Fluctuations (40 CFR Section 230.24): The proposed project would feature some impervious surfaces that would increase storm water runoff and increase water fluctuations. The proposed action will require vegetation removal and grubbing and grading the footprint until level. The design also consists of erosion and sedimentation control measures for site disturbance. These best management practices include, but are not limited to, dry detention ponds, outlet control structures, dust control measures, silt fencing, temporary stabilization with mulch (as work proceeds), and permanent seeding. No significant effect to local water fluctuation is expected. For any permit issued for the proposed project, special permit conditions would be included to require the permittee to obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. The project would be expected to have a negligible impact on current normal water fluctuations.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

f. Salinity Gradients (40 CFR Section 230.25): The proposed project would only impact fresh-water wetlands. No effect to salinity is expected.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

2. Part V, Subpart D – Potential Effects on Biological Characteristics of the Aquatic Ecosystem:

a. Threatened or Endangered Species (40 CFR Section 230.30): In the April 25, 2012, Joint Public Notice for this project, the CORPS determined that the proposed project would have no effect on Federally listed threatened or endangered species. Neither the US Fish & Wildlife Service (USFWS) nor the National Marine Fisheries Service (NMFS) objected to the proposed action. USFWS responded to our Joint Public Notice by a letter dated October 10, 2012, indicating that they concurred with our determination that the proposed project would not affect any Federally listed threatened or endangered species. However, in viewing our determination the requirements of Section 7 of the ESA have been satisfied.

FINDINGS: ☒ No Effect ☐ May Effect Not Likely to Adversely Effect
☐ Adverse Effect ☐ Jeopardy

b. Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in Food Web (40 CFR Section 230.31): The wetlands proposed for impact are low-quality wetlands. Thus, the proposed loss of wetlands would not appreciably contribute to any impacts on food chain organisms. Therefore, the CORPS has determined that the project would have a negligible effect on any food chain organisms.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

c. Other Wildlife (40 CFR Section 230.32): Noise and activity during construction, operation, and maintenance would result in disturbance to wildlife primarily within the project footprint, but habitat fragmentation and edge effects could extend into adjacent habitat. With the increase in noise and activity, there would be a corresponding increase in potential disturbance to wildlife. Increased activity within already disturbed areas would not significantly affect wildlife given the ongoing activity to which they are already exposed. Overall, the loss of 7.73 acres of terrestrial aquatic habitat would have a negligible impact on wildlife.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

3. Part V, Subpart E – Potential Effects on Special Aquatic Sites:

a. Sanctuaries and Refuges (40 CFR Section 230.40): There are no sanctuaries or refuges located within a 20 mile radius of the proposed project. Therefore, based on the location of these sanctuaries and refuges with respect to the project site, the project would have no impact on sanctuaries or refuges.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

b. Wetlands (40 CFR Section 230.41): Proposed project impacts would require 7.73 acres of wetland impact. To compensate for these impacts, the applicant is proposing to purchase 67.3 wetland mitigation credits from a CORPS approved mitigation bank. This is a ratio of greater than 1:1 for the wetland loss to replacement. Therefore, the CORPS has determined that the project would result in a negligible impact to wetlands.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

c. Mud Flats (40 CFR Section 230.42): There are no mud flats in the proposed project area. The proposed project would not impact mud flats.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

d. Vegetated Shallows (40 CFR Section 230.43): There are no vegetated shallows in the proposed project area. The proposed project would not impact vegetated shallows.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

e. Coral Reefs (40 CFR Section 230.44): There are no marine habitats in the proposed project area, and the proposed project would not impact coral reefs.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

f. Riffle and Pool Complexes (40 CFR Section 230.45): There are no riffle and pool complexes in the proposed project area. The proposed project would not impact any riffle and pool complexes.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

4. Part V, Subpart F – Potential Effects on Human Use Characteristics:

a. Municipal and Private Water Supplies (40 CFR Section 230.50): The project as currently proposed will not impact any existing water supplies. The Upper Floridian aquifer (a water-bearing rock formation) provides most of the fresh water for cities and communities throughout southeastern Georgia. No major water users are identified in the permit application. Local human water consumption supply is not drawn from waters directly associated with this project. No effect to this resource is projected.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

b. Recreational and Commercial Fisheries (40 CFR Section 230.51): This project is located on private property, so recreational fishing in the 1.25 acre pond is minimal. The proposed project would not impact recreational and commercial fisheries.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

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c. Water-related Recreation (40 CFR Section 230.52): No recreational waters occur in the project footprint. The proposed project would not impact any water related recreational activities.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

d. Aesthetics (40 CFR Section 230.53): Within the scope and context of this review, the proposed project is consistent with overall growth and land use patterns in the local area, and the CORPS has determined the proposed project would have a negligible effect on the surrounding aesthetics.

FINDINGS: ☐ No Effect ☒ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

e. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites and Similar Preserves (40 CFR Section 230.54): No areas of these types will be affected by the proposed project. There are no preserve lands within a 20-mile radius of the proposed project. There are no wilderness areas or wild and scenic rivers within the region. Due to the distance of the project site from any designated preserves there would be no potential for impacts to these areas.

FINDINGS: ☒ No Effect ☐ Negligible ☐ Major (Significant)
☐ Short Term Minor ☐ Long Term Minor

f. Cultural Resources: In April 2012, Brockington and Associates, Inc. performed an intensive cultural resource survey at 204-acre proposed project site in Bulloch County, Georgia, on behalf of the Development Authority of Bulloch County. The goal of the survey was to locate, identify, delineate, and evaluate all cultural resources within the property, including prehistoric and historic archaeological sites, as well as historic structures. The cultural resource assessment survey included a pedestrian inspection of the entire parcel combined with systematic shovel testing at 30-meter intervals where possible.

As a result of the Phase I cultural resource survey, one previously undocumented site and one isolated archaeological find were encountered. However, it is the opinion of the investigator that these resources are ineligible for the National Register of Historic Places. Therefore there will be no effect on previously recorded archaeological sites or historic structures. By letter dated October 29, 2012, the Georgia Department of Natural Resources, Historic Preservation Division concurred with the finding that none of the identified sites are eligible for the National Register of Historic Places. Thus, the CORPS has determined that the proposed project would have a no

effect on cultural resources within the property, including prehistoric and historic archaeological sites, as well as historic structures.

FINDINGS: ☒ **No Effect**

☐ **No Adverse Effect**

☐ **Adverse Effect**

5. Part V, Subpart G – Evaluation and Testing:

a. General Evaluation of Dredged or Fill Material (40 CFR Section 230.60): The material used for construction would be obtained from a source free of contaminants. The majority of the dredged and fill material will be obtained from within the property boundary. Any permit, if issued, would include the following special permit condition: “All dredged or borrowed material used as fill on this project will be from clean uncontaminated sources and free from cultural resources.” The CORPS has no reason to believe that any potential borrow area located within the project site would contain any chemical contaminants of concern. There is no information available concerning past land uses of this area that would indicate any potential for contamination.

b. Chemical, Biological, and Physical Evaluation and Testing (40 CFR Section 230.61): Not applicable (see paragraph F. 5. a. above).

6. Part VI, Subpart H, Actions to Minimize Adverse Effects: The following special conditions would be included in any permit issued for this project.

a. That no construction activity or stockpiling will occur in waters of the United States, including wetland areas, outside of the areas authorized for filling under this permit.

b. Prior to the commencement of construction activities for this project, the limits of the proposed fill areas in jurisdictional waters shall be clearly flagged and staked by you and/or your contractors. All construction personnel shall be shown the location(s) of all wetland and/or stream areas outside of the construction area to prevent encroachment from heavy equipment into these areas.

c. Borrow site or sites for stockpiling fill dirt shall be prohibited within 200 feet of streambanks, 50 feet of wetlands and open waters or elsewhere runoff from the site would increase sedimentation in waters of the United States unless specifically authorized by this permit. Normal grading activities such as cutting and filling within 200 feet of streams or 50 feet of wetlands/open waters are authorized.

d. Construction debris, liquid concrete, old riprap, old support materials, or other litter shall not be placed in areas where migration into streams and/or wetlands could reasonably be expected.

e. Staging areas and equipment maintenance areas will be located at least 200 feet from streambanks to minimize the potential for wash water, petroleum products, or other contaminants from construction equipment entering the streams.

f. The permittee shall ensure that the project's master drainage plan is designed and implemented to avoid inadvertent drainage of wetlands and inadvertent water diversion resulting in a reduction of hydrology in wetlands. The permittee shall also ensure that secondary road ditches and/or small after-project drainage ditches do not inadvertently impact wetlands or waters of the US.

g. The permittee shall minimize bank erosion and sedimentation in construction areas by utilizing BMPs for stream corridors, installing and maintaining significant erosion and sediment control measures, and providing daily reviews of construction and stream protection methods. Check dams and riprap placed in streams and wetlands as erosion control measures are considered a fill and not authorized under this permit unless they were specifically authorized by this permit.

h. All work conducted under this permit shall be located, outlined, designed, constructed and operated in accordance with the minimal requirements as contained in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications as contained in "Manual for Erosion and Sediment Control, (Latest Edition)," published by the Georgia Soil and Water Conservation Commission or their equivalent will aid in achieving compliance with the aforementioned minimal requirements.

i. You shall obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. A stream buffer variance may be required. Variances are issued by the Director of the Georgia Environmental Protection Division (EPD), as defined in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. It is our understanding that you may obtain information concerning variances at the Georgia EPD's web site at www.gaepd.org or by contacting the Watershed Protection Branch at (404) 675-6240.

The following special conditions would be included in any permit issued for this project to ensure that the permittee completes the compensatory mitigation necessary to offset the loss in aquatic function that would result from unavoidable project related impacts.

j. Prior to the commencement of any work in jurisdictional water of the United States, you will purchase 67.3 wetland mitigation credits from a CORPS approved mitigation bank that services the project area. Guidance for selection of an appropriate mitigation bank can be found at: <http://www.sas.usace.army.mil/regulatory/documents/bankcreditpurchaseguide.pdf> Upon our written approval of the selected mitigation bank(s), you or the mitigation bank must provide this office with documentation of this purchase. The notice shall reference the CORPS file number assigned for this project. You shall provide a copy of this Standard Permit to the bank sponsor (or their agent). The credits must be purchased from the mitigation bank(s)

specified in the written approval of the selected mitigation bank. If the correct number and type of mitigation credits are not available at the time of project inception, a permit modification will be required.

A listing of all proposed special permit conditions is located at Paragraph K. 4. of this document.

7. Part VI, Determination of Cumulative Effects on the Aquatic Environment (40 CFR Section 230.11(G)): According to Title 40 Code of Federal Regulation Parts 1508.7, cumulative impacts are the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Based on an analysis of all available information, the CORPS has determined that the proposed project would not result in a significant impact on the environment; considering the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. A detailed cumulative impacts assessment for this action is located at Section H. 5 of this document.

8. Part VIII, Determination of Secondary Impacts on the Aquatic Environment (40 CFR Section 230.11(H)): The project was reviewed for potential secondary/indirect impacts such as those associated with utility relocation, satellite development and new infrastructure needs, etc. No other known secondary/indirect impacts exist other than what is documented as a direct or cumulative impact in this document. A detailed analysis of secondary impacts is located at paragraph H. 6 of this document.

9. Evaluation of Compliance with the 404(B)(1) Guidelines (Restrictions on Discharge, 40 CFR Section 230.10). (A check in a block denoted by an asterisk indicates that the project does not comply with the guidelines):

a. Alternatives Test:

☐ ☒
Yes No

(a) Based on the discussion in section E. 9. of this document, are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the US" or at other locations within these waters?

☒ ☐
Yes No

(b) Based on the discussion in paragraph E.7. of this document, if the project is in a special aquatic site and is not water-dependent, has the applicant clearly demonstrated that there are no practicable alternative sites available which would not involve special aquatic sites?

b. Special Restrictions: Will the discharge:

☐ Yes ☒ No

(a) Violate state water quality standards? [Note: Section 401 Water Quality Certification has not been issued by Georgia EPD.]

☐ Yes ☒ No

(b) Violate toxic effluent standards (under Section 307 of the Act)?

☐ Yes ☒ No

(c) Jeopardize endangered or threatened species or their critical habitat?

☐ Yes ☒ No

(d) Violate standards set by the Department of Commerce to protect marine sanctuaries?

☒ Yes ☐ No

(e) Evaluation of the information in paragraph F. indicates that the proposed discharge material meets testing exclusion criteria for the following reason(s).

☒ based on the above information, the material is not a carrier of contaminants.

☐ the levels of contamination are substantially similar at the extraction and disposal sites and the discharge is not likely to result in degradation of the disposal site and pollutants will not be transported to less contaminated areas.

☐ acceptable constraints are available and will be implemented to reduce contamination to acceptable levels within the disposal site and prevent contaminants from being transported beyond the boundaries of the disposal site.

c. Other Restrictions: Will the discharge contribute to significant degradation of "waters of the US" through adverse impacts to:

☐ Yes ☒ No

(a) Human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites?

☐ Yes ☒ No

(b) Life states of aquatic life and other wildlife?

☐ Yes ☒ No

(c) Diversity, productivity and stability of the aquatic ecosystem, such as the loss of fish or wildlife habitat, or loss of the capacity of wetland to assimilate nutrients, purify water or reduce wave energy?

☐ Yes ☒ No

(d) Recreational, aesthetic and economic values?

d. Actions to Minimize Potential Adverse Impacts (Mitigation): All appropriate and practicable steps (40 CFR 23.70-77) ☒ have been/ ☐ have not been taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystem? If yes, measures are shown in Section F.

G. PUBLIC INTEREST REVIEW: All public interest factors have been reviewed as summarized here. Both cumulative and secondary impacts on the public interest were considered. Public interest factors that have had additional information relevant to the decision are discussed in Section H.

Table 2 Public Interest Factors Evaluation Summary

Table 2 Public Interest Factors Evaluation Summary					
x No effect					
+ Beneficial effect					
0 Negligible effect					
- Adverse effect					
M Neutral as result of mitigative action					
X	+	0	-	M	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	a. Economics/Social.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	b. Education/Scientific.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	c. Aesthetics.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	d. Food-Fiber Production.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	e. Historic/Architectural/Archaeological
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	f. Recreation.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	g. Land Use.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	h. Mineral Resources.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	i. Soil Conservation.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	j. Water Supply Conservation.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	k. Water Quality.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	l. Air Quality.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	m. Noise Levels.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	n. Public Safety.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	o. Energy Needs.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	p. National Security.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	q. Navigation.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	r. Shoreline Erosion/Accretion.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	s. Flood Hazards and Flood Plain.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	t. Wetlands and Streams.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	u. Refuges.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	v. Fish.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	w. Wildlife.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	x. Food Chain Organisms.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	y. Shellfish Production.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	z. Threatened and Endangered Species
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	aa. General Environmental Concerns.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	bb. Property Ownership.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	cc. Mineral Needs.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	dd. Sea Level Rise
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ee. Other

H. EFFECTS, POLICIES, AND OTHER LAWS:

1. Public Interest Factors:

a. Economics/Social: According to the applicant, the proposed project would result in development a master planned industrial park adjacent to Interstate 16 within Bulloch County to enable DABC to compete with regional development authorities, support future industrial needs of DABC, create additional jobs, and sustain the economic development success for Statesboro-Bulloch County.

b. Education and Scientific: This project would focus on development of a master planned industrial park. No educational or scientific opportunities exist with respect to this project. Therefore, the CORPS has determined that this project would have no effect on education/scientific factors.

c. Aesthetics: Aesthetics is a very subjective factor since some individuals place a higher value on developed aesthetics and some place a higher value on natural areas. The property is now zoned for industrial/manufacturing use. Therefore, the construction of a master planned industrial park within the project area would not constitute a land use change. Therefore, the CORPS has determined that this project would have a negligible impact on aesthetics.

d. Food and Fiber Production: The project would be located on a property which has been historically utilized for agriculture production. The change in land use would result in a loss of approximately 200 acres of potential agricultural production. It should be noted that this region of Georgia's coastal plain is still dominated by agricultural and silvicultural practices, and conversion of this property to an industrial use would have little effect on food/fiber production. Therefore, the CORPS has determined that the removal of 200 acres from potential use would have a negligible impact on food/fiber production.

e. Historical/Architectural/Archeological: In April 2012, Brockington and Associates, Inc. performed an intensive cultural resource survey at 204-acre proposed project site in Bulloch County, Georgia, on behalf of the Development Authority of Bulloch County. The goal of the survey was to locate, identify, delineate, and evaluate all cultural resources within the property, including prehistoric and historic archaeological sites, as well as historic structures. The cultural resource assessment survey included a pedestrian inspection of the entire parcel combined with systematic shovel testing at 30-meter intervals where possible.

As a result of the Phase I cultural resource survey, one previously undocumented site and one isolated archaeological find were encountered. However, it is the opinion of the investigator that these resources are ineligible for the National Register of Historic Places. Therefore there will be no effect on previously recorded archaeological sites or historic structures. By letter dated October 29, 2012, the Georgia Department of Natural Resources, Historic Preservation Division concurred with the finding that none of the identified sites are eligible for the National Register

of Historic Places. Thus, the CORPS has determined that the proposed project would have a no effect on cultural resources within the property, including prehistoric and historic archaeological sites, as well as historic structures.

f. Recreation: The 204 acres of private property involved in this project have been used by certain individuals for recreational activities such as hunting with the owner's approval. Recreational use of this land is not open to the public. Recreational opportunities would permanently cease on this site after completion of this project. Therefore, the CORPS has determined that this project would have a minor adverse effect on recreation.

g. Land Use: The property is now zoned for industrial/manufacturing use. Therefore, the construction of a master planned industrial park within the project area would not constitute a land use change. However, the project would be located on a property which has been historically utilized for agriculture production. The change in land use would result in a loss of approximately 200 acres of potential agricultural production. It should be noted that this region of Georgia's coastal plain is still dominated by agricultural and silvicultural practices, and conversion of this property to an industrial use would have little effect on food/fiber production. Therefore, the CORPS has determined that the removal of 200 acres from potential use would have a negligible impact on food/fiber production.

h. Mineral Resources: Construction of this project would not require any significant removal of mineral resources from the project site. Mining activities are not included as activities associated with construction of the proposed project. Therefore, the CORPS has determined that this project would have no effect on mineral resources.

i. Soil Conservation: The applicant has indicated that erosion control measures would be installed to reduce/eliminate the transport of sediments/suspended solids off the project site. This would ensure that appropriate erosion and silt control measures are in place and maintained in effective operating condition during construction. Once construction activities were completed, further soil loss from the project area would not be likely. In addition, any permit issued by this office would include a special condition that requires that permittee to, "use appropriate erosion and siltation controls and maintain them in effective operating condition during construction. All exposed soil and other fills shall be permanently stabilized at the earliest practicable date." With inclusion of this condition in any permit that may be issued, the CORPS has determined that this project would be negligible to soil conservation.

j. Water Supply Conservation: It is not likely that the project would require water withdrawals and ultimately a permit from GAEPD, Water Resources Management Branch. The proposed master planned industrial park would represent a minor addition of water usage when compared to the number of existing residential lots and commercial facilities already in existence within the Bulloch County. The CORPS has determined that this project would have a negligible effect on water supply conservation.

k. Water Quality: The State of Georgia, Department of Natural Resources, Environmental Protection Division is responsible for issuing a conditioned Water Quality Certification (WQC) for this project pursuant to Section 401 of the Clean Water Act. No comments or water quality certification have been received as of the date of this document. However, the State of Georgia, Department of Natural Resources, Environmental Protection Division has indicated that WQC will be issued for this project. The certification usually includes the following conditions: (1) All work performed during construction will be done in a manner so as not to violate applicable water quality standards, and (2) No oils, grease, materials or other pollutants will be discharged from the construction activities which reach public waters. Any permits issued for this proposed project would require a WQC, in order to be valid. Once issued, the State has verified that this project would meet all applicable state water quality standards and also complies with Section 401 of the Clean Water Act. The WQC, including all conditions stated therein, would be made a part of any permit which may be issued for this project. Therefore, the CORPS has determined that the proposed project would have negligible effect on water quality concerns.

l. Air Quality: During construction there would be a temporary contribution of airborne particulates and petroleum byproducts from heavy equipment operation. However, background concentrations of airborne particulates and petroleum byproducts are already elevated given that the project site is located on a heavily-traveled highway corridor. The emissions from current truck traffic would negate any contribution introduced by the heavy equipment during construction. Therefore, the CORPS has determined that any impact to the factor of air quality would be negligible.

m. Noise Levels: The project would result in temporary disturbance on noise levels within the vicinity of the project due to operation of heavy equipment. However, this is a short-term effect. In addition, the proximity of Interstate Highway 16, etc. also represents a continuous source of long-term noise that would far exceed activities associated with development or operation of the site. Therefore, the CORPS has determined that any impact to noise levels would be negligible.

n. Public Safety: This part of Bulloch County, Georgia is a moderately rural area. No specific activity has been identified that would present particular risk to public safety. However, the project would substantially increase human use of the land. And it can be supposed that any increase in human use would have an associated potential for an increase in impacts to public safety. Bulloch County would have the responsibility of providing fire protection and emergency services for the proposed industrial facilities. Additional truck and automobile traffic resulting from the facilities would represent a negligible change in the current public safety concerns for this area. Therefore, the CORPS has determined that the overall effect of this project on public safety would be negligible.

o. Energy Needs: Energy in the form of electricity, petroleum fuels, natural gas, etc. would be used during the construction and operation of the proposed facilities. These energy sources are readily available and are expected to be available in the future. Although maintenance and

use of this project would require energy needs/resources for normal use and operation, the amount of energy necessary would be insignificant with respect to the current energy needs required by other entities already in the area. Therefore, the CORPS has determined that the proposed project would have a negligible effect on energy needs.

p. National Security: The proposed facility is not in close proximity to any military installation. Given the large number of industrial facilities already in existence in Georgia, the addition of one more is not expected to result in a greater threat and/or risk to any military installations. Therefore, the CORPS has determined that the proposed project poses a negligible threat to national security.

q. Navigation: There are no navigable waterways within the project area. The CORPS has determined there would be no effect to navigation.

r. Shoreline Erosion/Accretion: This project is not located in close proximity to a coastal shoreline, river system, or creek. The CORPS has determined that no shoreline erosion/accretion is associated with this project. Therefore no effect is expected.

s. Flood Hazards and Flood Plain: The construction of a master planned industrial park would contribute a negligible effect with respect to promoting a flood hazard or incurring damage in the event of minor flooding. In addition, the applicant would be responsible for ensuring that the project complies with all rules, regulations and/or requirements of the Federal Emergency Management Agency (FEMA) with regard to flood plains and flood ways. A special condition requiring compliance with applicable FEMA regulations would be included in any permit which may be issued for this project. With these conditions in place, the project is expected to have a negligible impact on this factor. The CORPS has determined that there is a negligible effect associated with these flood hazards and flood plain factors.

t. Wetlands and Streams: There are no streams located near the project area. The project site is composed of habitats commonly found within Bulloch County and the Coastal Plain of Georgia. As verified by the CORPS, the 203.83-acre project area contains 17.55 acres of waters of the US, including wetlands. These wetlands are a palustrine, forested, broad-leaved deciduous system with a seasonally flooded hydrologic regime. By definition these type wetlands are not exclusive, "coastal" wetlands. Rather, these wetland systems exist throughout the coastal counties as well as interior counties located in the coastal plain. The proposed project would result in an unavoidable adverse impact to approximately 7.38 acres of permanent wetland fill, 1.25 acres of permanent open water pond fill, and 0.35 acre of temporary fill. Given the information provided, the CORPS is satisfied that no other practicable alternatives exist for the proposed project, and the applicant has satisfied all requirements of the 404(b)(1) guidelines. Utilizing the Savannah District's "Standard Operation Procedure for Compensatory Mitigation (SOP)," the proposed compensatory mitigation plan would generate 67.3 wetland credits. Even with the applicant's proposed mitigation plan, however, the project would result in minor direct impacts to wetlands. Minor indirect impacts to adjacent wetlands could also occur as a result of

increased storm water conveyance and temporary disturbances as a result of construction activities. Therefore, the CORPS has determined that the project would result in a minor adverse impact to wetlands.

u. Refuges: The proposed project site is located just south of Interstate Highway 16 in southwestern Bulloch County, Georgia, and there are no wildlife refuges within a 10-mile minimum radius. Therefore, the CORPS has determined that the project would have no effect on refuges.

v. Fish: Impacts to wetlands would occur as a result of fill placement for building pads, parking lots and roadways. The wetlands proposed for fill do not directly support fish species. However, indirectly these wetlands may provide some beneficial function such as retention of storm water coupled with the prevention of off-site sheet flow. It is not likely that the non-point source runoff associated with this project would contribute significantly to the existing loading of downstream storm water. Therefore, the CORPS has determined that the proposed project would have a negligible effect associated with any fish species concerns.

w. Wildlife: Since the wetlands of interest are surrounded by an already existing row-cropped agricultural area, it is not likely that a large population of wildlife resides in this area. Overall, CORPS has determined that this project would be expected to have a negligible effect on wildlife due to displacement and loss of habitat.

x. Food Chain Organisms: The wetlands proposed for impact are low-quality wetlands. Thus, the proposed loss of wetlands would not appreciably contribute to any impacts on food chain organisms. Therefore, the CORPS has determined that the project would have a negligible effect on any food chain organisms.

y. Shellfish Production: Any decrease in water quality associated with this project would likely have a detrimental impact on aquatic life, including shellfish. However, the project area is located in an agricultural area. Therefore, it is not likely that the existing wetlands contribute greatly to any improvement in coastal water quality. Due to the distance between the project site and major shellfish-producing areas, this project would be expected to have a negligible effect on shellfish production.

z. Threatened and Endangered Species: A threatened and endangered species survey within the project area was completed in June 2010, by RLC for the applicant. Based on this survey, the CORPS determined that the proposed project would have no effect on Federally listed threatened or endangered species. Neither the US Fish & Wildlife Service (USFWS) nor the National Marine Fisheries Service (NMFS) objected to the proposed action. By letter dated October 10, 2012, the USFWS responded to our Joint Public Notice. They mentioned a possible minor effect on foraging Wood Storks, but made no formal objection to the project. This implies that USFWS concurs with our determination that the proposed project would not affect any Federally listed threatened or endangered species and that in reviewing our determination the

requirements of Section 7 of the ESA have been satisfied. Thus, the CORPS has determined that the proposed project would have a no effect on listed species.

aa. General Environmental Concerns: The environmental concerns for this project focus on the potential impacts of the proposed project on wetlands, cultural resources, fish, wildlife, and food chain organisms. Each of these concerns was discussed above. No other adverse environmental impacts are anticipated. The net adverse effect of this project on the environmental factors, which were evaluated above, would be negligible.

bb. Property Ownership: The applicant will have possession of the subject property. No eminent domain has been enforced as a result of this proposed project. Therefore, there would be no adverse effect on property ownership. In addition, none of the adjacent property owners provided written comments or opposition to the project. The CORPS has determined that no effect is anticipated on property ownership.

cc. Mineral Needs: Construction of the project would require considerable amounts of construction material such as sand, gravel, concrete, etc. However, mineral resources are readily available and in ample supply. The CORPS has determined that the construction of this project would have a negligible impact on this factor.

dd. Sea Level Rise: The project would not be constructed in coastal or tidal waters. Therefore, the CORPS has determined that there would be no effect on sea level rise.

ee. Other: All other known impacts have been discussed above. However, there may be other unknown project related impacts that are not discussed.

2. Endangered Species Act: ☐ NA

a. The Proposed Project: A threatened and endangered species survey within the project area was completed in June 2010, by RLC for the applicant. Based on this survey, the CORPS determined that the proposed project would have no effect on Federally listed threatened or endangered species. Neither the US Fish & Wildlife Service (USFWS) nor the National Marine Fisheries Service (NMFS) objected to the proposed action. By letter dated October 10, 2012, the USFWS responded to our Joint Public Notice. They mentioned a possible minor effect on foraging Wood Storks, but made no formal objection to the project. Thus, the CORPS has determined that the proposed project would have a no effect on listed species.

(1) Will not affect these threatened or endangered species: ☒ Any/☐ .

(2) May affect, but is not likely to adversely affect: Species: Wood Stork.

(3) ☐ Will/☒ Will not adversely modify designated critical habitat for the Red Cockaded Woodpecker foraging habitat.

(4) ☐ Is/☒ Is not likely to jeopardize the continued existence of the Red Cockaded Woodpecker.

(5) The Services ☒ concurred/☐ provided a Biological Opinion(s).

3. Essential Fish Habitat: Adverse impacts to Essential Fish Habitat ☐ will/☒ will not result from the proposed project.

4. Historic Properties: The proposed project ☐ will/☒ will not have any effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state, or local significance based on ☐ letter from SHPO/☒ a Phase I cultural resource survey of the entire 203.83-acre tract conducted by Brockington and Associates, Inc.. Based on the findings of the survey, we determined that the proposed project would not adversely affect historic archaeological sites under National Register eligibility status.

5. Cumulative Impacts: The Council on Environmental Quality (CEQ) defines cumulative impacts as the “impact on the environment which results from the incremental impact of the action(s) when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

a. Geographic Scope/Region of Influence (ROI): The National Environmental Policy Act (NEPA) requires that the impacts of each proposed project be considered within the appropriate geographical area/region of influence (ROI). The geographic area/ROI for purposes of consideration of the proposed project is the Canoochee River basin and United States Geological Service, Georgia Hydrologic Unit Code (HUC) 3060203. This area includes portions of Bryan, Bulloch, Candler, Emanuel, Evans, Jenkins, Liberty, Long, and Tattnall counties in Georgia. The CORPS determined that actions taken in the Canoochee River basin and HUC 3060203 would be sufficiently similar in location, topography, watershed impacts, habitat types, etc., to be considered in a cumulative impacts assessment. To properly scope this analysis, the CORPS has identified target resources for evaluation based on public and agency comments. Target resources are important resources that could be cumulatively affected by activities in the identified scoping area.

The CORPS identified the following target resources because of their scarcity and regional importance: (1) wetlands and streams; (2) water quality; and (3) aquatic species. Below we have assessed the cumulative impacts of the proposed project on these target resources. In doing this, we considered the impacts of this project, past projects, as well as all reasonably foreseeable impacts in the Canoochee River basin and HUC 3060203.

The proposed action, in addition to other projects in the geographic area of consideration/ROI (i.e., HUC 3060203), has the possibility to result in either negative or positive impacts in a cumulative manner. Cumulative impacts are most likely to occur when a relationship exists between a proposed action, or alternative, and other actions expected to occur in a similar location, time period, and/or involving similar actions, i.e., past, present, and reasonably foreseeable future actions.

In addition to the information submitted by the applicant, we have examined other large projects that have been permitted in the Canoochee River basin and HUC 3060203, which are part of typical urban activities or development. These projects can be categorized generally as construction, maintenance, or demolition. This analysis takes into account the proposed project/action along with the larger projects in the ROI.

(1) Wetlands: According to Savannah District Regulatory Division databases- from 1990 to July 2006, the CORPS has permitted 565.88 acres of non-tidal wetland impact in the 9 counties located at least partially in the Canoochee River watershed. The type of impact could vary from fill to shading and durations for these impacts could range from temporary to permanent. The Regulatory Analysis and Management System (RAMS) also shows that approximately 3054.07 acres of mitigation was required for these impacts. RAMS was used to record all Savannah District Regulatory permit actions until July 2006. At that time a new program was adopted. To date, no method to calculate permitted impact or mitigation is available with this new system.

There were 482,552 acres of non-tidal wetlands in these nine counties as of 1988-1990 based on data in a 1996 document titled, "State of Georgia Land Cover Statistics by County, Project Report 26" published by the Georgia Department of Natural Resources. If you deduct the 565.88 acres of impact recorded in our RAMS database since 1990, there should be at least 481,986.12 acres of non-tidal wetlands remaining in the basin. This equals a loss of 0.74 percent of the wetlands in these 9 counties since 1990, not counting the wetland mitigation associated with these past impacts.

Table 6: Authorized Wetland Impacts, Mitigation and Totals

COUNTY	SUMMARY OF WETLAND STATISTICS		
	CUMULATIVE IMPACTS	CUMULATIVE MITIGATION	BASELINE NON-TIDAL WETLAND
Bryan, GA	44.08	236.29	85,032
Bulloch, GA	124.13	211.2	76,299
Candler, GA	12.15	6.45	16,948
Emanuel, GA	67.78	269.26	41,895
Evans, GA	21.28	34.81	12,380
Jenkins, GA	56.34	230.22	35,154
Liberty, GA	90.23	648.88	97,060
Long, GA	118	1343.68	83,995
Tattnall, GA	31.89	73.28	33,789
TOTALS	565.88	3054.07	482,552

Each year there are other impacts to wetlands that do not require authorization by the CORPS. These impacts are normally associated with agricultural activities, such as irrigation ponds and canals, or silvicultural activities, all of which are exempted from Section 404 of the Clean Water Act. Such impacts are greater in counties where silviculture and farming are a primary land use. Farm ponds convert wetland areas from vegetated wetlands to open water habitat and fragment the stream, if they are constructed on a stream. These impacts have been reduced in recent years due to the swampbuster and wetland conservation provisions of the US Department of Agriculture's Farm Bill and efforts of the Georgia Forestry Commission.

Even when considered cumulatively with impacts that the CORPS does not authorize, the proposed impacts to 8.98 acres of wetland and open water would have only a minor impact to wetland habitat in these 9 counties and in the Canoochee River basin. Impacts to wetlands from this proposed project are further diminished by the applicant's proposed mitigation plan, to purchase 67.3 wetland mitigation credits from Margin Bay Wetland Mitigation Bank, Wilhelmina-Morgan Mitigation Bank and/or Black Creek Mitigation Bank. Also mitigated are the other 565.88 acres of impact with approximately 3054.07 acres of wetland mitigation. Therefore, this project, with the proposed mitigation, would have minimal impacts on wetlands in the basin when considered alone or in concert with the other past, present and reasonably foreseeable future projects in the basin.

(2) Water Quality: Water quality is affected by changes to the environment (referred to as stressors) that adversely affect aquatic life or impair human uses of a water body. Point sources are municipal and industrial wastewater discharge. Non-point sources consist of sediment, litter, bacteria, pesticides, fertilizers, metals, oils, grease, and a variety of other pollutants that are washed from rural and urban lands by storm water. Expected growth in population and

employment in the basin will mean more potential stress from storm water runoff as well as non-point source loading.

(a) Wetland Loss: The impacts to wetlands discussed above would be expected to have an adverse impact on water quality due to the loss of associated aquatic functions (flood water retention, filtration, contaminant removal, sediment retention, etc.). The compensatory mitigation for these impacts would help to offset these impacts to water quality.

(b) Reservoirs: There are no large reservoirs in the Canoochee River basin that would have impacted water quality in areas downstream of the dam due to release of low oxygen water, elevated nutrient levels, reduced flows downstream, etc.

(c) Point Source Discharges: Impacts from municipal wastewater, agricultural, and industrial discharges were greater prior to the 1970's. Due to increased regulation, these discharges have been reduced but continue to introduce pollutants into the system, which lower water quality when considered cumulatively. Georgia's "2004 303(d) List" for the Canoochee River basin has several waterways listed as impaired or partially impaired, for nutrients, dissolved oxygen, fecal coliform, and/or mercury in fish tissue. The proposed project would likely add to water quality problems in the Canoochee River basin, which is listed as partially impaired due to nutrients, dissolved oxygen, fecal coliform, and mercury in fish tissue problems.

(d) Non-point Source Discharges: Residential, commercial, and industrial development results in an increase in impervious surfaces (roof tops, paved roads, parking lots, etc.), which affects storm water discharges. Development results in an increase in non-point source contaminant loading through associated increases in urban landscaping (pesticides and fertilizers), increased traffic (oil, grease and metals), and other associated activities. There would be an anticipated incremental increase in adverse impacts to water quality as impervious surfaces increase. The following table is a summary of anticipated population growth-induced increases in impervious surfaces in the Canoochee River basin. The amount of impervious surface coverage is increasingly recognized as a valuable predictor of overall water quality within a watershed. In general, as population increases, so does impervious surface. As impervious surface area increases, water quality decreases. Table 7 shows population and impervious surface area growth over time for the Canoochee River basin.

The impervious surface data was generated by the US Environmental Protection Agency and provided to the CORPS via a table titled "Total Impervious Area Calculations by 12-Digit Hydrologic Unit Code Watershed (based upon National Land Cover Data, 1993). Using simple linear regression analysis, the CORPS utilized county population projection data to estimate percent increase in impervious surface, by county. The data contained in Table 7 indicates that as the population of each county continues to increase, there will be an associated increase in impervious surfaces. All counties in the study area would be anticipated to experience an increase of less than one percent impervious surface by the year 2030. However, each county is responsible for regulating non-point source storm water discharges pursuant to Section 402 of

the Clean Water Act. These county storm water management programs should help to minimize the anticipated adverse impacts to water quality.

Table 7: Projected Population Growth and Associated Projected Approximate Impervious Surface Increases

County		Year						
		2007	2008	2010	2020	2030	2040	2050
Bryan	Population / square mile	66	69	70	88	106	124	142
	% impervious Surface Coverage	2.33	2.37	2.39	2.68	2.97	3.26	3.55
Bulloch	Population / square mile	96	98	101	120	139	157	176
	% impervious Surface Coverage	2.81	2.84	2.89	3.20	3.50	3.79	4.09
Candler	Population / square mile	42	43	44	50	56	62	67
	% impervious Surface Coverage	1.94	1.95	1.97	2.07	2.16	2.26	2.34
Emanuel	Population / square mile	32	33	33	34	36	37	38
	% impervious Surface Coverage	1.77	1.79	1.79	1.81	1.84	1.85	1.87
Evans	Population / square mile	61	62	65	74	84	93	102
	% impervious Surface Coverage	2.24	2.26	2.31	2.46	2.62	2.76	2.91
Jenkins	Population / square mile	24	24	25	25	25	25	26
	% impervious Surface Coverage	1.64	1.64	1.66	1.66	1.66	1.66	1.68
Liberty	Population / square mile	100	97	105	109	114	119	124
	% impervious Surface Coverage	2.87	2.83	2.95	3.02	3.10	3.18	3.26
Long	Population / square mile	28	28	31	38	46	53	60
	% impervious Surface Coverage	1.71	1.71	1.76	1.87	2.00	2.11	2.23
Tattnall	Population / square mile	47	48	50	57	63	70	76
	% impervious Surface Coverage	2.02	2.03	2.07	2.18	2.28	2.39	2.49

(e) Summary: This effect, when combined with other projects in the geographical area of influence, has the potential to result in adverse cumulative impacts; however, it is expected that future projects would be implemented as follows: projects will use erosion control measures, silt fencing, and other Best Management Practices; sufficient storm water management structures will be constructed as part of new construction; erosion and sedimentation control plans will be filed in accordance with Georgia's Sedimentation Pollution Control Act; and all projects will be undertaken in accordance with federal, state, and local laws.

In view of the above, the CORPS has determined that the proposed project, with proposed special permit conditions, would have minimal impacts on water quality when considered alone or in concert with the other past, present and reasonably foreseeable future projects in the basin.

(4) Aquatic Species: Impacts from this project to wetlands and water quality would have negligible effects on fish and other small invertebrate food chain organisms as discussed above in Paragraph H.

The proposed project would not result in a direct adverse impact to Scott Creek or Kirby Creek, or to aquatic species in the waterways. Rather, the project would result in an unavoidable loss of 8.98 acres of wetland and open water and a loss of the function, qualities and values provided by these resources. However, this project-related wetland loss would be minor when considered cumulatively with all other past and planned wetland losses discussed above. In addition, the compensatory wetland mitigation ratios proposed for this project are greater than 1:1.

A method to predict direct future impacts on aquatic species in these 9 counties is not available. However, it is likely that some aquatic species would be adversely impacted from predicted impacts to water quality and wetlands. As discussed above, the CORPS has determined that when considering this project and other past, present and reasonably foreseeable future affects on water quality or wetlands, any impacts would be minimal.

Summary: In view of the above, the CORPS determined that the proposed project, with proposed special permit conditions, would not have a significant impact on aquatic species when considered alone or in concert with the other past, present and reasonably foreseeable future projects in the basin.

(5) Overall Summary: In view of the above, the CORPS determined that the proposed project, with proposed special permit conditions, would not have a significant impact on the human environment when considered alone or in concert with the other past, present and reasonably foreseeable future projects in the basin.

6. Secondary / Indirect Effects: The project was reviewed for potential secondary/indirect impacts such as those associated with utility relocation, new infrastructure needs, water quality issues, etc. The only known secondary and/or indirect impact that would be necessary for the construction of the industrial park would be impacts to water quality associated with storm water discharges. The acreage of impervious surface coverage for existing residential, commercial, and industrial development in the Canoochee River basin is orders of magnitude higher than what is proposed for the current project. In regard to impacts on water quality issues in the receiving waters of Scott Creek or Kirby Creek, it is likely that non-point source contributions from the existing agricultural areas would have already contributed to a loss of downstream riverine function. Therefore, it is not likely that the non-point source runoff associated with this project would contribute significantly to the current storm water loading and/or have a significant impact on the downstream, riverine system. Therefore, secondary and/or indirect impacts associated with the proposed project would be expected to be minimal.

Environmental harm would be minimized by standard sedimentation and erosion and hydrological control measures. Although the applicant intends to install utilities adjacent to new entrance roads whenever possible; it is likely that there would be some secondary impacts due to the clearing of right-of-ways for utilities leading to the site from where they terminate now. The project area has an adequate supply for electrical power to service a project of this size and any secondary needs.

It is anticipated that the proposed project would increase large truck traffic to and from the industrial park. This area of Bulloch County is zoned industrial and this use would be in character with other industrial uses in the vicinity.

In conclusion, secondary and/or indirect impacts associated with the proposed project would be expected to be minimal. It is unlikely that non-point source contributions from project construction could contribute to a loss of downstream riverine function. The project related wetland losses would be minor when considered cumulatively with all other past and planned wetland losses discussed above. Therefore, secondary and/or indirect impacts associated with the proposed project would be expected to be minimal.

7. US Army Corps of Engineers' Wetland Policy: Based on the public interest review herein, the beneficial effects of the project outweigh the detrimental impacts of the project.

8. Effect on Federal Projects: We have determined the proposed activity would not have an adverse effect on any Federal Project (33 CFR 320.4(g)).

9. Water Quality Certification: Water Quality Certification under Section 401 of the Clean Water Act ☐ has/☒ has not yet been issued by ☒ State/☐ Commonwealth.

10. Coastal Zone Management (CZM) Consistency / Permit: No comments or Coastal Zone Management certification have been received as of the date of the document. ☒ There is no evidence or indication from the Georgia Department of Natural Resources that the project is inconsistent with their CZM plan.

11. Other Authorizations: NA

12. Significant Issues of Overriding National Importance: (☒ NA)

I. COMPENSATION AND OTHER MITIGATION ACTIONS:

1. Compensatory Mitigation:

a. Is compensatory mitigation required? ☒ yes ☐ no [If "no," explain and do not complete the rest of this section]

b. Is the impact in the service area of an approved mitigation bank? ☒ yes ☐ no
Does the mitigation bank have appropriate number and resource type of credits available? ☒ yes ☐ no

c. Is the impact in the service area of an approved in-lieu fee program? ☐ yes ☒ no
Does the in-lieu fee program have appropriate number and resource type of credits available? ☐ yes ☐ no

d. Check the selected compensatory mitigation option(s):

- ☒ mitigation bank credits
- ☐ in-lieu fee program credits
- ☐ permittee-responsible mitigation under a watershed approach
- ☐ permittee-responsible mitigation, on-site and in-kind
- ☐ permittee-responsible mitigation, off-site and out-of-kind

e. If a selected compensatory mitigation option deviates from the order of the options presented in §332.3(b)(2)-(6), explain why the selected compensatory mitigation option is environmentally preferable. Address the criteria provided in §332.3(a)(1) (i.e., the likelihood for ecological success and sustainability, the location of the compensation site relative to the impact site and their significance within the watershed, and the costs of the compensatory mitigation project): N/A

f. Other Mitigative Actions: N/A

J. GENERAL EVALUATION CRITERIA UNDER THE PUBLIC INTEREST REVIEW: We considered the following within this document:

1. We have considered the relative extent of the public and private need for the proposed structure or work. The basic purpose of this project is to develop a master planned industrial park. Local public benefits include employment opportunities at the facility and a potential increase in the local tax base. There are no appreciable private benefits.

2. ☒ There are no unresolved conflicts as to resource use. (☐ There are unresolved conflicts as to resource use. One or more of the alternative locations and methods described above are reasonable or practicable to accomplish the objectives of the proposed structure or work but are not being accepted by the applicant.) (☐ There are unresolved conflicts as to resource use however there are no practicable reasonable alternative locations and methods to accomplish the objective of the purposed work.)

3. The extent and permanence of the beneficial and/or detrimental effects, which the proposed work is likely to have on the public, and private uses to which the area is suited. ☒ Detrimental impacts are expected to be minimal although they would be permanent in the construction area. The beneficial effects associated with utilization of the property would be permanent.

K. PERMIT ACTION ALTERNATIVES:

1. To Issue the Permit in Accordance With the Plans Submitted by the Applicant: This course of action by itself would be inappropriate because it does not include provision for special conditions (See paragraph K.4. below).

2. To Deny the Request for a Permit: Denial of the permit would not be an appropriate course of action. The proposed activity would not have significant adverse effects on navigation, the environment, or other public interest factors.

3. To Issue the Permit After Submittal of Modified Plans by the Applicant With Special Conditions: This course of action would not be warranted. Our review of the applicant's plans and alternatives showed the applicant's proposed activity to be the most practicable way to accomplish the applicant's overall purpose.

4. To Issue the Permit in Accordance with the Plans Submitted by the Applicant With Special Conditions: This would be the appropriate course of action to follow. In order to protect the public interest the following special conditions would be placed on any permit issued:

1. That no construction activity or stockpiling will occur in waters of the United States, including wetland areas, outside of the areas authorized for filling under this permit.

2. Borrow site or sites for stockpiling fill dirt shall be prohibited within 200 feet of streambanks, 50 feet of wetlands and open waters or elsewhere runoff from the site would increase sedimentation in waters of the United States unless specifically authorized by this permit. Normal grading activities such as cutting and filling within 200 feet of streams or 50 feet of wetlands/open waters are authorized.

3. Construction debris, liquid concrete, old riprap, old support materials, or other litter shall not be placed in areas where migration into streams and/or wetlands could reasonably be expected.

4. Staging areas and equipment maintenance areas will be located at least 200 feet from streambanks to minimize the potential for wash water, petroleum products, or other contaminants from construction equipment entering the streams.

5. The permittee shall ensure that the project's master drainage plan is designed and implemented to avoid inadvertent drainage of wetlands and inadvertent water diversion resulting in a reduction of hydrology in wetlands. The permittee shall also ensure that secondary road ditches and/or small after-project drainage ditches do not inadvertently impact wetlands or waters of the US.

6. The permittee shall minimize bank erosion and sedimentation in construction areas by utilizing BMPs for stream corridors, installing and maintaining significant erosion and sediment control measures, and providing daily reviews of construction and stream protection methods. Check dams and riprap placed in streams and wetlands as erosion control measures are considered a fill and not authorized under this permit unless they were specifically authorized by this permit.

7. You shall obtain and comply with all appropriate Federal, state, and local authorizations required for this type of activity. A stream buffer variance may be required. Variances are issued by the Director of the Georgia Environmental Protection Division (EPD), as defined in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. It is our understanding that you may obtain information concerning variances at the Georgia EPD's web site at www.gaepd.org or by contacting the Watershed Protection Branch at (404) 675-6240.
9. Prior to the commencement of any work in jurisdictional water of the United States, you will purchase 67.3 wetland mitigation credits from a CORPS approved mitigation bank that services the project area. Guidance for selection of an appropriate mitigation bank can be found at: <http://www.sas.usace.army.mil/regulatory/documents/bankcreditpurchaseguide.pdf>. Upon our written approval of the selected mitigation bank(s), you or the mitigation bank must provide this office with documentation of this purchase. The notice shall reference the CORPS file number assigned for this project. You shall provide a copy of this Standard Permit to the bank sponsor (or their agent). The credits must be purchased from the mitigation bank(s) specified in the written approval of the selected mitigation bank. If the correct number and type of mitigation credits are not available at the time of project inception, a permit modification will be required.
10. The permittee shall obtain a Section 401 Water Quality Certification from the State of Georgia. This requirement cannot be waived by time limitations, exception, exemption or any other means. No work authorized by this permit will be performed until the CORPS has received a copy of the Water Quality Certification.
11. A copy of this permit, including the approved drawings and plans; special conditions; the Section 401 Water Quality Certification, and any amendments, shall be maintained at the work site whenever work is being performed. The permittee shall assure that all contractors, subcontractors, and other personnel performing the permitted work are fully aware of the permit's terms and conditions.
12. The culvert pipes must be, (1) be sufficiently oversized to pass base flows without increasing water velocity in the structure; (2) be embedded 15-20% of their width to allow natural substrate to colonize the structure's bottom and encourage fish movement.
13. The permittee shall notify the issuing office, in writing (electronic facsimile is acceptable), **at least ten days in advance of their intent to commence work in waters of the United States** for the permitted activity. The permittee shall also notify this office in writing 30 days after this project is completed on the enclosed **Certification of Compliance** form.
14. Prior to the commencement of construction activities for this project, the limits of the proposed fill areas in jurisdictional waters shall be clearly flagged and staked by you and/or your contractors. All construction personnel shall be shown the location(s) of all wetland and/or

stream areas outside of the construction area to prevent encroachment from heavy equipment into these areas.

15. All work conducted under this permit shall be located, outlined, designed, constructed and operated in accordance with the minimal requirements as contained in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications as contained in the "Manual for Erosion and Sediment Control, (Latest Edition)," published by the Georgia Soil and Water Conservation Commission or their equivalent, will aid in achieving compliance with the aforementioned minimal requirements.

16. Prior to the commencement of any construction activities for this project, you shall ensure compliance with all applicable rules, regulations, and requirements of the Federal Emergency Management Agency and/or Georgia Floodplain Management Office pertaining to construction activities in designated floodplains and/or floodways prior to commencement of work activity, to include revisions to National Flood Insurance Program maps if required.

17. If you or your contractors discover any Federally listed threatened or endangered species and/or their habitat while accomplishing the activities authorized by this permit, you must immediately STOP work in the area and notify the issuing office of what you have found. We will initiate the Federal and state coordination required to determine if the species and/or habitat warrant further consultation with the US Fish and Wildlife Service.

18. All dredged or borrowed material used as fill on these projects shall be from clean, uncontaminated sources and free from cultural resources.

L. DETERMINATIONS:

1. Public Hearing Request: ☒ NA

☐ I have reviewed and evaluated the requests for a public hearing. There is sufficient information available to evaluate the proposed project; therefore, the requests for a public hearing are denied.

2. Section 176(C) of the Clean Air Act General Conformity Rule Review: The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit will not exceed de minimis levels of direct or indirect emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the CORPS's continuing program responsibility and generally cannot be practicably controlled by the CORPS. For these reasons a conformity determination is not required for this permit action.

3. Relevant Presidential Executive Orders:

a. EO 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians: ☒ This action has no substantial direct effect on one or more Indian tribes.

b. EO 11988, Floodplain Management: ☒ Not in a floodplain. (☐ Alternatives to location within the floodplain, minimization, and compensation of the effects were considered above.)

c. EO 12898, Environmental Justice: In accordance with Title III of the Civil Rights Act of 1964 and Executive Order 12898, it has been determined that the project would not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin nor would it have a disproportionate effect on minority or low-income communities.

d. EO 13112, Invasive Species:

☒ There were no invasive species issues involved.

☐ The evaluation above included invasive species concerns in the analysis of impacts at the project site and associated compensatory mitigation projects.

☐ Through special conditions, the permittee will be required to control the introduction and spread of exotic species.

f. EO 13212 and 13302, Energy Supply and Availability: ☒ The project was not one that will increase the production, transmission, or conservation of energy, or strengthen pipeline safety. [☐ The review was expedited and/or other actions were taken to the extent permitted by law and regulation to accelerate completion of this energy-related (including pipeline safety) project while maintaining safety, public health, and environmental protections.]

4. Finding of No Significant Impact (FONSI): Having reviewed the information provided by the applicant and all interested parties and an assessment of the environmental impacts, I find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement will not be required.

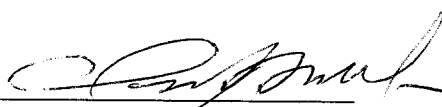
5. Compliance with the Section 404 (b)(1) Guidelines: ☐ NA Having completed the evaluation in paragraph F., I have determined that the proposed discharge ☒ complies/☐ does not comply with the 404(b)(1) guidelines.

CESAS-RD - Application SAS-2012-00582

SUBJECT: Department of the Army Environmental Assessment and Statement of Findings for the Above-Numbered Permit Application

6. Public Interest Determination: I find that issuance of a Department of the Army permit ☒ is not/☐ is contrary to the public interest.


PREPARED BY:



Alan J. Miller
Project Manager, Coastal Branch
Regulatory Division

Date: 12/13/2012

APPROVED BY:



Kelly C. Finch
Chief, Coastal Branch
Regulatory Division

Date: 12/13/12

APPENDIX B APPROVALS AND CORRESPONDENCE

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- From DOE to Jeff Cown, Georgia Department of Natural Resources, November 22, 2023
- From DOE to Stacy Rieke, Georgia Department of Community Affairs, Historic Preservation Division, December 15, 2023
- From Stacy Rieke, Georgia Department of Community Affairs, to DOE, January 12, 2024
- From Georgia Department of Natural Resources, to DOE, December 21, 2023
- From USACE to Benjy Thompson, Development Authority of Bulloch County, December 1, 2011
- From City of Statesboro to Georgia Department of Economic Development, February 18, 2021
- From Bullock County Board of Commissioners to Georgia Department of Economic Development, February 15, 2021
- From Alabama-Quassarte Tribal Town, to DOE, received November 30, 2023.



Department of Energy

Washington, DC 20585

November 22, 2023

Wilson Yargee
Chief
Alabama-Quassarte Tribal Town
PO Box 187
Wetumka, Oklahoma 74883

SUBJECT: U.S. Department of Energy (DOE), Aspen Aerogels. PyroThin®
Manufacturing Facility in Register, Georgia

Dear Chief Yargee,

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to assist in determining whether to issue a Federal loan to Aspen Aerogels (Aspen) to support the construction and initial startup of a proposed PyroThin® manufacturing facility in Register, Georgia (the Project). DOE has determined that issuance of this loan constitutes an undertaking subject to Section 106 of the National Historic Preservation Act (NHPA). Therefore, as a part of this environmental review process, DOE is also conducting a historic resource review in compliance with Section 106 of the NHPA.

The proposed project involves the development of a PyroThin® manufacturing facility in an industrial park on a 90-acre site located at 400 Rocky Road, Register, Georgia 30452 (see Figure 1). The manufacturing facility would produce PyroThin®, which is an aerogel-based cell-to-cell thermal barrier for use in electric vehicle (EV) batteries. The proposed project is expected to produce 243 million square feet of PyroThin® per year, which will be capable of supporting approximately 2.23 million EV batteries annually. Site buildout for the proposed project includes up to 365,000 square feet for manufacturing, processing, offices; an 85,000 square foot central utility plant; 95,000 square feet for carbon dioxide liquefaction; 62,000 square feet for raw goods storage; internal roads and parking; and attendant structures. The proposed project is anticipated to create over 250 new jobs and is scheduled to be operational in 2026.

The proposed PyroThin® manufacturing facility will be entirely located in an industrial park that was previously reviewed and permitted by the United States Army Corps of Engineers (USACE) in an EA and Statement of Findings for an Individual Permit. USACE determined their undertaking, issuance of an Individual Permit for a master planned industrial park, was subject to Section 106 of the NHPA. USACE conducted a historic resources review in compliance with Section 106 of the NHPA, and USACE determined their undertaking would have “no effect” on historic resources. DOE independently

evaluated USACE's historic resources review for the industrial park and concurs with the USACE's "no effect" finding pursuant to Section 106.

While the Section 106 consultation was completed by USACE, DOE invites you to comment on the proposed project and engage with DOE in government-to-government consultation. Any comments or concerns you provide will help ensure that DOE considers Tribal interests and complies with its NEPA responsibilities. I would greatly appreciate notification if you do or do not have an interest in the project sites, as well as any comments or concerns you may have, within thirty (30) days of receipt of this letter (December 22, 2023). Should you have an interest in the project site, I will provide you with additional information pursuant to NEPA as it becomes available. Please provide your notification of interest and any comments or concerns by email at lpo_environmental@hq.doe.gov, or contact me at 202-578-4573.

Respectfully,

Elyse Mize
NEPA Document Manager
Loan Programs Office

Attachments:

Figure 1: Project Location

Figure 2: Proposed Site Layout

cc: Ben Yahola, THPO



Department of Energy

Washington, DC 20585

Figure 1. Project Location





Department of Energy

Washington, DC 20585

Figure 2. Proposed Site Layout





Department of Energy

Washington, DC 20585

November 22, 2023

Jonathan Cernek
Chairman
Coushatta Tribe of Louisiana
1940 C.C. Bel Road
Elton, Louisiana 70532

SUBJECT: U.S. Department of Energy (DOE), Aspen Aerogels. PyroThin®
Manufacturing Facility in Register, Georgia

Dear Chairman Cernek,

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to assist in determining whether to issue a Federal loan to Aspen Aerogels (Aspen) to support the construction and initial startup of a proposed PyroThin® manufacturing facility in Register, Georgia (the Project). DOE has determined that issuance of this loan constitutes an undertaking subject to Section 106 of the National Historic Preservation Act (NHPA). Therefore, as a part of this environmental review process, DOE is also conducting a historic resource review in compliance with Section 106 of the NHPA.

The proposed project involves the development of a PyroThin® manufacturing facility in an industrial park on a 90-acre site located at 400 Rocky Road, Register, Georgia 30452 (see Figure 1). The manufacturing facility would produce PyroThin®, which is an aerogel-based cell-to-cell thermal barrier for use in electric vehicle (EV) batteries. The proposed project is expected to produce 243 million square feet of PyroThin® per year, which will be capable of supporting approximately 2.23 million EV batteries annually. Site buildout for the proposed project includes up to 365,000 square feet for manufacturing, processing, offices; an 85,000 square foot central utility plant; 95,000 square feet for carbon dioxide liquefaction; 62,000 square feet for raw goods storage; internal roads and parking; and attendant structures. The proposed project is anticipated to create over 250 new jobs and is scheduled to be operational in 2026.

The proposed PyroThin® manufacturing facility will be entirely located in an industrial park that was previously reviewed and permitted by the United States Army Corps of Engineers (USACE) in an EA and Statement of Findings for an Individual Permit. USACE determined their undertaking, issuance of an Individual Permit for a master planned industrial park, was subject to Section 106 of the NHPA. USACE conducted a historic resources review in compliance with Section 106 of the NHPA, and USACE determined

their undertaking would have “no effect” on historic resources. DOE independently evaluated USACE’s historic resources review for the industrial park and concurs with the USACE’s “no effect” finding pursuant to Section 106.

While the Section 106 consultation was completed by USACE, DOE invites you to comment on the proposed project and engage with DOE in government-to-government consultation. Any comments or concerns you provide will help ensure that DOE considers Tribal interests and complies with its NEPA responsibilities. I would greatly appreciate notification if you do or do not have an interest in the project sites, as well as any comments or concerns you may have, within thirty (30) days of receipt of this letter (December 22, 2023). Should you have an interest in the project site, I will provide you with additional information pursuant to NEPA as it becomes available. Please provide your notification of interest and any comments or concerns by email at lpo_environmental@hq.doe.gov, or contact me at 202-578-4573.

Respectfully,

Elyse Mize
NEPA Document Manager
Loan Programs Office

Attachments:

Figure 1: Project Location

Figure 2: Proposed Site Layout

cc: Kristian Poncho, THPO



Department of Energy

Washington, DC 20585

Figure 1. Project Location





Department of Energy

Washington, DC 20585

Figure 2. Proposed Site Layout





Department of Energy

Washington, DC 20585

November 22, 2023

David Hill
Principal Chief
Muscogee (Creek) Nation
1007 East Eufaula Street
Okmulgee, Oklahoma 74447

SUBJECT: U.S. Department of Energy (DOE), Aspen Aerogels. PyroThin®
Manufacturing Facility in Register, Georgia

Dear Principal Chief Hill,

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to assist in determining whether to issue a Federal loan to Aspen Aerogels (Aspen) to support the construction and initial startup of a proposed PyroThin® manufacturing facility in Register, Georgia (the Project). DOE has determined that issuance of this loan constitutes an undertaking subject to Section 106 of the National Historic Preservation Act (NHPA). Therefore, as a part of this environmental review process, DOE is also conducting a historic resource review in compliance with Section 106 of the NHPA.

The proposed project involves the development of a PyroThin® manufacturing facility in an industrial park on a 90-acre site located at 400 Rocky Road, Register, Georgia 30452 (see Figure 1). The manufacturing facility would produce PyroThin®, which is an aerogel-based cell-to-cell thermal barrier for use in electric vehicle (EV) batteries. The proposed project is expected to produce 243 million square feet of PyroThin® per year, which will be capable of supporting approximately 2.23 million EV batteries annually. Site buildout for the proposed project includes up to 365,000 square feet for manufacturing, processing, offices; an 85,000 square foot central utility plant; 95,000 square feet for carbon dioxide liquefaction; 62,000 square feet for raw goods storage; internal roads and parking; and attendant structures. The proposed project is anticipated to create over 250 new jobs and is scheduled to be operational in 2026.

The proposed PyroThin® manufacturing facility will be entirely located in an industrial park that was previously reviewed and permitted by the United States Army Corps of Engineers (USACE) in an EA and Statement of Findings for an Individual Permit. USACE determined their undertaking, issuance of an Individual Permit for a master planned industrial park, was subject to Section 106 of the NHPA. USACE conducted a historic resources review in compliance with Section 106 of the NHPA, and USACE determined

their undertaking would have “no effect” on historic resources. DOE independently evaluated USACE’s historic resources review for the industrial park and concurs with the USACE’s “no effect” finding pursuant to Section 106.

While the Section 106 consultation was completed by USACE, DOE invites you to comment on the proposed project and engage with DOE in government-to-government consultation. Any comments or concerns you provide will help ensure that DOE considers Tribal interests and complies with its NEPA responsibilities. I would greatly appreciate notification if you do or do not have an interest in the project sites, as well as any comments or concerns you may have, within thirty (30) days of receipt of this letter (December 22, 2023). Should you have an interest in the project site, I will provide you with additional information pursuant to NEPA as it becomes available. Please provide your notification of interest and any comments or concerns by email at lpo_environmental@hq.doe.gov, or contact me at 202-578-4573.

Respectfully,

Elyse Mize
NEPA Document Manager
Loan Programs Office

Attachments:

Figure 1: Project Location

Figure 2: Proposed Site Layout

cc: Turner Hunt, THPO



Department of Energy

Washington, DC 20585

Figure 2. Proposed Site Layout





Department of Energy

Washington, DC 20585

November 22, 2023

Mr. Jeff Cown
Director, Environmental Protection Division
Georgia Department of Natural Resources
2 Martin Luther King Jr. Drive, SE
14th Floor East Tower – Suite 1456
Atlanta, Georgia 30334-9000

SUBJECT: The U.S. Department of Energy's (DOE's) Intent to Prepare an Environmental Assessment (EA) for a Proposed Federal Loan to Aspen Aerogels (Aspen) for a PyroThin® Manufacturing Facility in Register, Bulloch County, Georgia (the Project).

Dear Mr. Cown,

Under Section 136 of the Energy Independence and Security Act of 2007, which established the Advanced Technology Vehicles Manufacturing Loan (ATVM) program, the U.S. Department of Energy is evaluating whether to provide a Federal loan to Aspen to support the construction and initial startup of a PyroThin® manufacturing facility in Register, Bulloch County, Georgia. The Project would produce electric vehicle thermal barriers intended to stop or mitigate battery thermal propagation and provide mechanical durability and improve vehicle efficiency.

The DOE Loan Programs Office (LPO) is preparing an EA for the Project. The decision to prepare an EA for the Project was made in accordance with the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] parts 1500-1508), and DOE's implementing regulations for compliance with NEPA (10 CFR part 1021).

The purpose and need for agency action is to comply with DOE's mandate under Section 136 of the Energy Independence and Security Act to select projects for financial assistance that are consistent with the goals of the Act. Pursuant to the Act, the ATVM program was established to provide loans to automobile and automobile parts manufacturers for the cost of establishing, expanding, or re-equipping manufacturing facilities in the United States to produce advanced technology vehicles or qualified components. DOE LPO has determined that the development of the PyroThin® manufacturing facility, as proposed by Aspen, is consistent with the goals of the Act. DOE LPO is using the NEPA process to assist in determining whether to issue a loan to Aspen.

The proposed project involves the development of a PyroThin® manufacturing facility in an industrial park on a 90-acre site located at 400 Rocky Road, Register, Georgia 30452 (see Figure 1). The manufacturing facility would produce PyroThin®, which is an aerogel-based cell-to-cell thermal barrier for use in electric vehicle (EV) batteries. The proposed

project is expected to produce 243 million square feet of PyroThin® per year, which will be capable of supporting approximately 2.23 million EV batteries annually. Site buildout for the proposed project includes up to 365,000 square feet for manufacturing, processing, and offices; an 85,000 square foot central utility plant; 9,500 square feet for carbon dioxide liquefaction; 62,000 square feet for raw goods storage; internal roads and parking; and attendant structures. The proposed project is anticipated to create over 250 new jobs and is scheduled to be operational in 2026.

The DOE NEPA implementing regulations provide for the notification of host states of NEPA determinations and for the opportunity for host states to review EAs prior to DOE approval. This process is intended to improve coordination and facilitate early and open communication. DOE will provide the draft EA to you for your review and comment.

If you or your staff would like to receive further information concerning this project or DOE's NEPA process, please contact me at 202-578-4573, or via email at LPO_Environmental@hq.doe.gov.

Sincerely,

Elyse Mize
NEPA Document Manager
Loan Programs Office

Attachments:

Figure 1: Project Location

Figure 2: Proposed Site Layout



Department of Energy

Washington, DC 20585

Figure 1. Project Location





Department of Energy

Washington, DC 20585

Figure 2. Proposed Site Layout





Department of Energy

Washington, DC 20585

December 15, 2023

Stacy Rieke
Environmental Program Manager
Georgia Department of Community Affairs, Historic Preservation Division
2 Martin Luther King Jr. Drive, SE
14th Floor East Tower – Suite 1456
Atlanta, Georgia 30334-9000

SUBJECT: The U.S. Department of Energy's Intent to Prepare an Environmental Assessment for a Proposed Federal Loan to Aspen Aerogels for a PyroThin® Manufacturing Facility in Register, Bulloch County, Georgia.

Dear Ms. Rieke,

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to assist in determining whether to issue a Federal loan to Aspen Aerogels (Aspen) to support the construction and initial startup of a PyroThin® manufacturing facility in Register, Bulloch County, Georgia (Project). The Project would produce electric vehicle thermal barriers intended to stop or mitigate battery thermal propagation and provide mechanical durability and improve vehicle efficiency.

The Project involves the development of a manufacturing facility in an industrial park on a 90-acre site located at 400 Rocky Road, Register, Georgia 30452 (see Figure 1). The manufacturing facility would produce PyroThin®, which is an aerogel-based cell-to-cell thermal barrier for use in electric vehicle (EV) batteries. The proposed project is expected to produce 243 million square feet of PyroThin® per year, which will be capable of supporting approximately 2.23 million EV batteries annually. Site buildout for the proposed project includes up to 365,000 square feet for manufacturing, processing, and offices; an 85,000 square foot central utility plant; 9,500 square feet for carbon dioxide liquefaction; 62,000 square feet for raw goods storage; internal roads and parking; and attendant structures (see Figure 2). The proposed project is anticipated to create over 250 new jobs and is scheduled to be operational in 2026.

The 90-acre proposed PyroThin® manufacturing facility will be entirely located in an approximately 200-acre industrial park that was previously reviewed and permitted by the United States Army Corps of Engineers (USACE) in an EA and Statement of Findings for an Individual Permit. The USACE determined their undertaking, issuance of an Individual Permit for a master planned industrial park, was subject to Section 106 of the National Historic Preservation Act (NHPA). USACE conducted a historic resources review in compliance with Section 106 of the NHPA; see Figure 3 for the limits of the APE for the USACE historic resources review. USACE determined their undertaking would have "no effect" on historic resources. DOE independently evaluated USACE's historic resources

review for the industrial park. The area of potential effect and scope of the USACE undertaking encompass DOE's undertaking, which is a Federal loan for the PyroThin® manufacturing facility within the industrial park. **DOE concurs with the USACE's "no effect" finding pursuant to Section 106.**

We ask that you evaluate the information that DOE has provided and determine whether DOE's concurrence with the USACE "no effect" determination is sufficient to satisfy DOE's Section 106 responsibilities. We also ask that you respond within thirty (30) days of receipt of this letter. Should you have an interest in the project site, I will provide you with additional information, pursuant to NEPA, as it becomes available. Please provide your notification of interest and/or any comments or concerns by email at lpo_environmental@hq.doe.gov, or contact me at 202-578-4573.

Sincerely,

Elyse Mize
NEPA Document Manager
Loan Programs Office

Attachments:

Figure 1: Project Location

Figure 2: Proposed Site Layout

Figure 3: USACE Historic Resources Review APE



Department of Energy

Washington, DC 20585

Figure 1. Project Location





Department of Energy

Washington, DC 20585

Figure 2. Proposed Site Layout

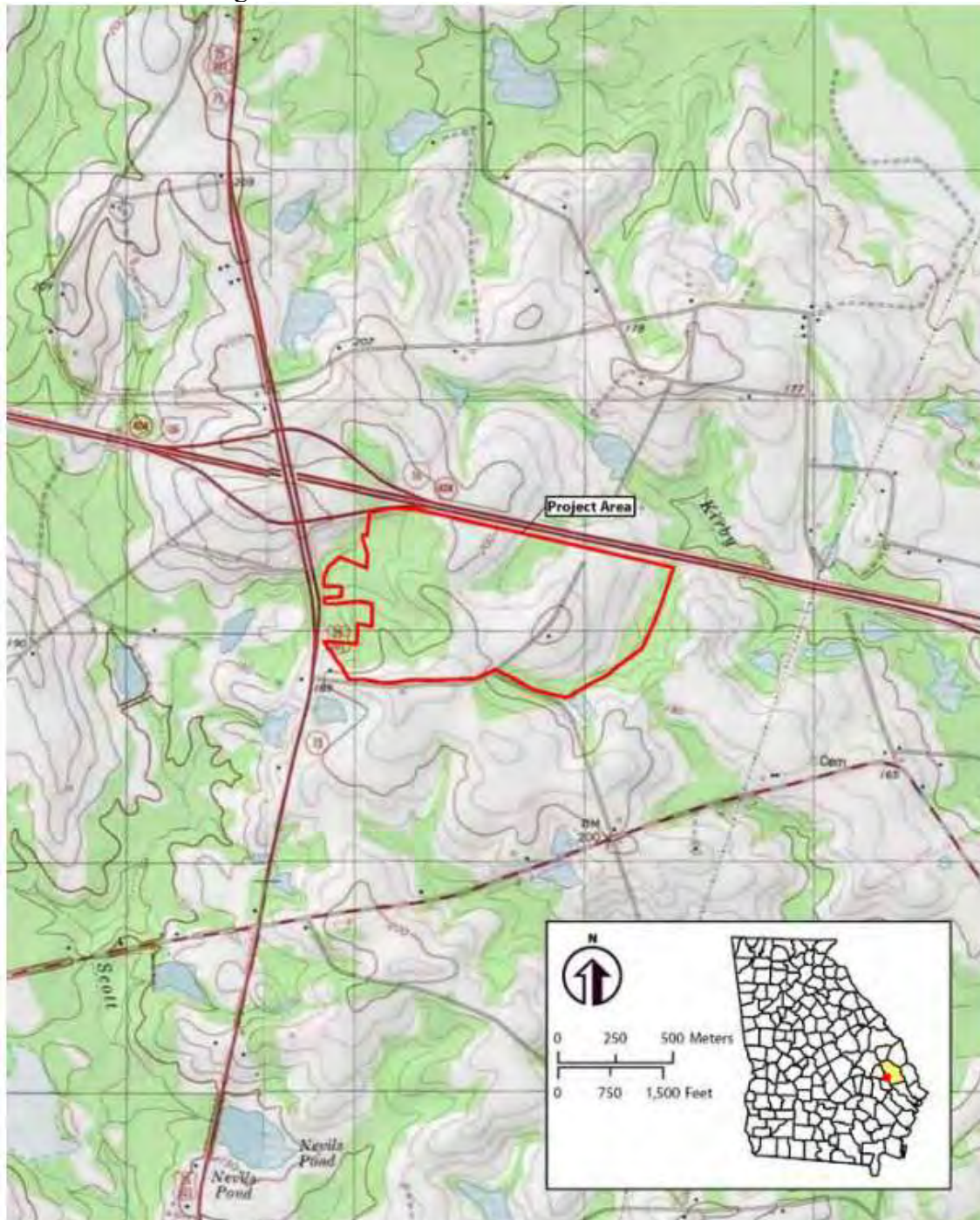




Department of Energy

Washington, DC 20585

Figure 3. USACE Historic Resources Review APE



January 12, 2024

Elyse Mize
Environmental Compliance
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C 20585

**RE: Construct Manufacturing Facility, 400 Rocky Road, Register
Bulloch County, Georgia
HP-231215-010**

Dear Ms. Mize:

The Historic Preservation Division (HPD) has received the information submitted concerning the above referenced project. Our comments are offered to assist the U.S. Department of Energy (DOE) and its applicants in complying with provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

The subject project consists of constructing a manufacturing facility of an unknown design, size, scale, massing, and height on an approximately 90-acre site within Bulloch County parcel 050 000037 003 located at 400 Rocky Road in Register. Based on the submitted information and desktop research, HPD finds that archaeological site 9BU74, within the proposed project's area of potential effect (APE), is not eligible for listing in the National Register of Historic Places (NRHP). Therefore, it is HPD's opinion that no historic properties that are listed or eligible for listing in the NRHP will be affected by this undertaking, as defined in 36 CFR Part 800.4(d)(1).

This letter evidences consultation with our office for compliance with Section 106 of the NHPA. Please note that historic and/or archaeological resources may be located within the project's APE. However, at this time it appears that they will not be impacted by the above-referenced project, due to the scope and location of work and previous ground disturbance. It is important to remember that any changes to this project as it is currently proposed will require additional consultation. HPD encourages federal agencies and project applicants to discuss such changes with our office to ensure that potential effects to historic resources are adequately considered in project planning.

Please refer to project number **HP-231215-010** in any future correspondence regarding this project. If we may be of further assistance, please contact Olivia Kendrick, Environmental Review Historian, at Olivia.Kendrick@dca.ga.gov or (404) 486-6425 or Noah Bryant Compliance Review Archaeologist, at Noah.Bryant@dca.ga.gov or (404) 679-0649.

Sincerely,



Stacy Rieke, MHP
Program Manager
Environmental Review & Preservation Planning

SMR/olk

cc: Meagan Jones, Coastal Georgia Regional Commission
Jennifer Fordham, DCA Regional Services, Region 12



December 21, 2023

Elyse Mize, NEPA Document Manager
Department of Energy
Washington, DC
20585

Re: Executive Order 12372 Request for a PyroThin® Manufacturing Facility, Bulloch County.

Dear Ms. Mize:

This letter is in reference to your request for information on the possible impacts the proposed a PyroThin® manufacturing facility may have on land use, conservation, water quality and other general environmental concerns that may be of interest to our agency. The following outlines our concerns with the proposed project with regards to farmland protection, and Natural Resources Conservation Service (NRCS) watershed dams and project easements.

Farmland Protection

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. For the purpose of FPPA, farmland includes areas located within soil map units rated as prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land uses, but not water or urban built-up land. It should be noted that the FPPA does not authorize the Federal Government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners.

NRCS uses a Land Evaluation and Site Assessment (LESA) system to establish a farmland conversion impact rating score on proposed sites of federally funded and assisted projects. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level. It is our understanding that the proposed project involves federal funds or assistance, and thus could be subject to this assessment. Please note, FPPA considers indirect as well as direct conversion. The acres directly converted will be the project area. Areas planned for direct or indirect conversion should be indicated on plans or maps included in the packet of materials for the project. **However, this project does not convert farmland and is thus exempt from this assessment. You need take no further action for FPPA purposes.**

Natural Resources Conservation Service

Georgia State Office
355 East Hancock Avenue - Athens, GA - 30601-2775
Voice: 706-546-2272 Fax: 855-417-8490

NRCS Watershed Dams

More than 50 years ago, the U.S. Department of Agriculture was authorized by Congress to help local communities with flood control and watershed protection through the Watershed Program (PL-534 Flood Control Act of 1944 and PL-566 Watershed Protection and Flood Prevention Act). As a result, local communities, with NRCS assistance, have constructed over 11,000 dams in 47 states since 1948. These dams were originally constructed for protection of farmlands from flooding impacts. In 2000, PL-566 was amended to provide NRCS authorization to assist communities with rehabilitation of their aging dams. The legislation authorizes NRCS to work with local communities and watershed project sponsors to address public health and safety concerns and potential environmental impacts of aging dams.

We have reviewed our records and have determined that there are no such structures downstream of the proposed project that could be affected by these activities.

NRCS Easements

NRCS easements relate to our Wetland Reserve Program and the Farm and Ranchland Protection Program. **We have reviewed our records and have determined that there are no such easements downstream or in the near vicinity of the proposed project that could be affected by these activities.**

NRCS appreciates this opportunity to comment. If you have questions or need any additional information, please contact me at (706) 546-2056 or nelson.velazquezgotay@usda.gov.

Sincerely,

NELSON VELÁZQUEZ GOTAY
SOIL SCIENTIST

cc: David Walden, Assistant State Conservationist (FO), NRCS, Baxley, GA
Jason Gatch, District Conservationist, NRCS, Statesboro, GA
Casey Sowell, Resource Soil Scientist, NRCS, Statesboro, GA



DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

DECEMBER 13 2011

Regulatory Division
SAS-2011-00582

Development Authority of Bulloch County
Attention: Mr. Benjy Thompson
Post Office Box 303
102 South Main Street
Statesboro, Georgia 30459

Dear Mr. Thompson:

I refer to a letter dated July 20, 2011, submitted on your behalf by Mr. Jim Bennett of Resource and Land Consultants, requesting a jurisdictional determination for a 250 acre site located in the southeast quadrant of the intersection of Interstate 16 and Highway 301, Bulloch County, Georgia (Latitude 32.3028, Longitude -81.8645). This project has been assigned number SAS-2011-00582 and it is important that you refer to this number in all communication concerning this matter.

We have completed an Expanded Preliminary Jurisdictional Determination (EPJD) for the site pursuant to the March 4, 2009, Public Notice entitled, "Characterization of Jurisdictional Determinations: Purpose, Application and Documentation Requirements as Defined by the Savannah District, US Army Corps of Engineers." I have enclosed a "JD Check Sheet" that summarizes the JD, delineation verification and appeals process.

The wetlands/other waters on the subject property may be waters of the United States within the jurisdiction of Section 404 of the Clean Water Act (CWA) (33 United States Code 1344). The placement of dredged or fill material into any waterways and/or their adjacent wetlands or mechanized land clearing of those wetlands would require prior Department of the Army authorization pursuant to Section 404.

If you intend to sell property that is part of a project that requires Department of the Army Authorization, it may be subject to the Interstate Land Sales Full Disclosure Act. The Property Report required by Housing and Urban Development Regulation must state whether, or not a permit for the development has been applied for, issued or denied by the US Army Corps of Engineers (Part 320.3(h) of Title 33 of the Code of Federal Regulations).

This communication does not convey any property rights, either in real estate or material, or any exclusive privileges. It does not authorize any injury to property, invasion of rights, or any infringement of federal, state or local laws, or regulations. It does not obviate your requirement to obtain state or local assent required by law for the development of this property. If the

information you have submitted, and on which the US Army Corps of Engineers has based its determination is later found to be in error, this decision may be revoked.

A copy of this letter is being provided to the following party: Resource and Land Consultants, Attention: Mr. Jim Bennett, 41 Park of Commerce Way, Suite 303, Savannah, Georgia 31405.

Thank you in advance for completing our Customer Survey Form. This can be accomplished by visiting our web site at <http://per2.nwp.usace.army.mil/survey.html> and completing the survey on-line. We value your comments and appreciate your taking the time to complete a survey each time you interact with our office. If you have any questions, please call me at 912-652-6210.

Sincerely,

A handwritten signature in dark ink, appearing to read "Donald W. Hendrix", written in a cursive style.

Donald W. Hendrix
Regulatory Specialist, Coastal Branch

Enclosures



DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, US ARMY CORPS OF ENGINEERS
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

JURISDICTION DELINEATION CHECK SHEET
USACE FILE NUMBER: SAS-2011-00582
DATE: December 9, 2011

A. SECTION 1 - PRELIMINARY JURISDICTIONAL DETERMINATIONS

1. JURISDICTIONAL DETERMINATION (JD). A "preliminary JD" form was completed for the site in accordance with the March 4, 2009, Public Notice entitled, "Characterization of Jurisdictional Determinations: Purpose, Application and Documentation Requirements as Defined by the Savannah District, US Army Corps of Engineers." The form details whether streams, wetlands and/or other waters present on the site may be subject to the jurisdiction of the US Army Corps of Engineers (USACE). In summary, the USACE has determined the following with regard to waters present on the site:

_____ There may be navigable waters of the United States (US) within Rivers and Harbors Act (RHA) jurisdiction present.

_____ There may be waters of the US within Clean Water Act (CWA) jurisdiction present.

2. DELINEATION VERIFICATION. With regard to the location and extent of potentially jurisdictional areas present on the site, the USACE has made the following determinations:

_____ Wetlands were delineated in accordance with criteria contained in the 1987 "Corps of Engineers Wetland Delineation Manual," as amended by the most recent regional supplements to the manual.

_____ Drawings submitted with a Pre-Construction Notification (or other application) depict the approximate location/boundaries of all potentially jurisdictional waters on the project site. The USACE has verified the accuracy of the depicted boundaries of potentially jurisdictional waters in only the immediate vicinity of waters to be impacted. A complete jurisdictional delineation request, including a jurisdictional waters survey, would be required in order for the USACE to consider final verification of all other jurisdictional boundaries on the project site.

_____ The drawing entitled "_____", dated _____ is an acceptable sketch of the approximate location/boundaries of all the potentially jurisdictional waters in the project area. This sketch can be used for initial real estate planning; projects with temporary impacts to waters; projects involving minor amounts of fill in waters; or work only subject to our jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899. A complete jurisdictional delineation request, including a jurisdictional waters survey, would be required in order for the USACE to consider final verification of all other jurisdictional boundaries on the project site.

3. APPEALS OF PRELIMINARY JURISDICTIONAL DETERMINATIONS: The preliminary JD is a "non-binding" written indication that there may be waters of the US on a parcel. Preliminary JDs are advisory in nature and may not be appealed (See 33 CFR 331.2)." If you are not in agreement with this preliminary JD, then you may request an approved jurisdictional determination for your project site or review area.

B. SECTION - EXPANDED PRELIMINARY JURISDICTIONAL DETERMINATIONS:

1. JURISDICTIONAL DETERMINATION (JD). An "expanded preliminary JD" form was completed for the site in accordance with the March 4, 2009, Public Notice entitled, "Characterization of Jurisdictional Determinations: Purpose, Application and Documentation Requirements as Defined by the Savannah District, US Army Corps of Engineers." The form details whether streams, wetlands and/or other waters present on the site may be subject to the jurisdiction of the USACE. In summary, the USACE has determined the following with regard to waters present on the site:

_____ There may be navigable waters of the United States (US) within Rivers and Harbors Act (RHA) jurisdiction present.

 X There may be waters of the US within Clean Water Act (CWA) jurisdiction present.

2. DELINEATION VERIFICATION. With regard to the location and extent of potentially jurisdictional areas present on the site, the USACE has made the following determinations:

 X Wetlands were delineated in accordance with criteria contained in the 1987 "Corps of Engineers Wetland Delineation Manual," as amended by the most recent regional supplements to the manual.

_____ The Global Positioning System (GPS) delineation entitled "_____", dated _____, is an accurate delineation of the location/boundaries of all the potentially jurisdictional waters on the site. If you have not already done so, I recommend that you place a statement on this delineation to the effect that, **"WETLANDS AND OTHER WATERS SHOWN ON THIS DRAWING ARE POTENTIALLY UNDER THE JURISDICTION OF THE US ARMY CORPS OF ENGINEERS AS SHOWN IN USACE FILE NUMBER SAS-2011-00582. OWNERS MAY BE SUBJECT TO PENALTY BY LAW FOR DISTURBANCE TO THESE WATERS WITHOUT PROPER AUTHORIZATION."** This delineation will remain valid for a period of 5 years unless new information warrants revision prior to that date.

 X The survey entitled "WETLANDS MAP PREPARED FOR DEVELOPMENT AUTHORITY OF BULLOCH COUNTY", dated June 20, 2011, and signed by Georgia Registered Land Surveyor John A. Dotson, is an accurate delineation of the location/boundaries of all the potentially jurisdictional waters on the site. If you have not already done so, I

recommend that you place a statement on the final surveyed property plat to the effect that, **"WETLANDS AND OTHER WATERS SHOWN ON THIS DRAWING ARE POTENTIALLY UNDER THE JURISDICTION OF THE US ARMY CORPS OF ENGINEERS AS SHOWN IN USACE FILE NUMBER SAS-2011-00582. OWNERS MAY BE SUBJECT TO PENALTY BY LAW FOR DISTURBANCE TO THESE WATERS WITHOUT PROPER AUTHORIZATION."** This delineation will remain valid for a period of 5-years unless new information warrants revision prior to that date.

3. APPEALS OF PRELIMINARY JURISDICTIONAL DETERMINATIONS: The expanded preliminary JD is a "non-binding" written indication that there may be waters of the US on a parcel. Expanded Preliminary JDs are advisory in nature and may not be appealed (See 33 CFR. 331.2)." If you are not in agreement with this expanded Preliminary JD, then you may request an approved jurisdictional determination for your project site or review area.

C. SECTION 3 - APPROVED DETERMINATIONS: As defined in Regulatory Guidance Letter 08-02, an approved JD is an official Savannah District determination that jurisdictional "waters of the United States" or "navigable waters of the United States," or both, are either present or absent on a particular site. An approved JD precisely identifies the limits of those waters on the project site determined to be jurisdictional under the Clean Water Act (CWA) and/or the Rivers and Harbors Act (RHA).

1. JURISDICTIONAL DETERMINATION (JD). An "approved JD" form was completed for the site pursuant to the June 5, 2007, "US Army Corps of Engineers (USACE) JD Form Instructional Guidebook." The form details whether streams, wetlands and/or other waters present on the site are subject to the jurisdiction of the USACE. In summary, the USACE has determined the following with regard to waters present on the site:

_____ There are navigable waters of the (US) within (RHA) jurisdiction present.

_____ There are waters of the US within (CWA) jurisdiction present.

_____ There are non-jurisdictional waters of the US located in the project area.

_____ There are no jurisdictional waters of the US located in the project area.

2. APPROVED DETERMINATION - ISOLATED, NON-JURISDICTIONAL WATERS. If Appendix E of the March 4, 2009, Public Notice entitled, "Characterization of Jurisdictional Determinations: Purpose, Application and Documentation Requirements as Defined by the Savannah District, US Army Corps of Engineers" was submitted, you have requested that the USACE verify the presence of isolated, non-jurisdictional waters located at the project site or within the review area. The completed Appendix E form is available at <https://sasweb.sas.usace.army.mil/JD/>, under the above listed file number. You may also request that a printed copy of the form be mailed to you. This isolated, non-jurisdictional determination

will remain valid for a period of 5-years unless new information warrants revision prior to that date. In summary, the USACE has determined the following with regard to isolated, non-jurisdictional waters that are present on the site:

_____ Wetlands were delineated in accordance with criteria contained in the 1987 "Corps of Engineers Wetland Delineation Manual," as amended by the most recent regional supplements to the manual.

_____ There are isolated non-jurisdictional waters present that are not subject to CWA jurisdiction. Specifically, wetland(s) [letter of wetlands here], as identified on the exhibit entitled "_____" is/are isolated, non-jurisdictional wetlands. Department of the Army authorization, pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344), is not required for dredge and/or fill activities in these areas.

3. APPROVED DETERMINATION. (other than isolated, non-jurisdictional waters): If Appendix B of the March 4, 2009, Public Notice entitled, "Characterization of Jurisdictional Determinations: Purpose, Application and Documentation Requirements as Defined by the Savannah District, US Army Corps of Engineers" was submitted, you have requested that the USACE verify the presence of jurisdictional waters located at the project site or within the review area. The completed Appendix B form is available at <https://sasweb.sas.usace.army.mil/JD/>, under the above listed file number. You may also request that a printed copy of the form be mailed to you. This jurisdictional determination will remain valid for a period of 5-years unless new information warrants revision prior to that date. In summary, the USACE has determined the following with regard to isolated, non-jurisdictional waters that are present on the site:

_____ Wetlands were delineated in accordance with criteria contained in the 1987 "Corps of Engineers Wetland Delineation Manual," as amended by the most recent regional supplements to the manual.

_____ The Global Positioning System (GPS) delineation entitled "_____", dated _____, is an accurate delineation of all the jurisdictional boundaries on the site. If you have not already done so, I recommend that you place a statement on this delineation to the effect that, **"JURISDICTIONAL WETLANDS AND OTHER WATERS SHOWN ON THIS DRAWING ARE UNDER THE JURISDICTION OF THE US ARMY CORPS OF ENGINEERS AS SHOWN IN USACE FILE NUMBER SAS-2011-00582. OWNERS MAY BE SUBJECT TO PENALTY BY LAW FOR DISTURBANCE TO THESE JURISDICTIONAL AREAS WITHOUT PROPER AUTHORIZATION."** This approved jurisdictional determination will remain valid for a period of 5-years unless new information warrants revision prior to that date.

_____ The survey entitled "_____", dated _____, and signed by Registered Land Surveyor _____, is an accurate delineation of all the

jurisdictional boundaries on the site. If you have not already done so, I recommend that you place a statement on the final surveyed property plat to the effect that, "**JURISDICTIONAL WETLANDS AND OTHER WATERS SHOWN ON THIS DRAWING ARE UNDER THE JURISDICTION OF THE US ARMY CORPS OF ENGINEERS AS SHOWN IN USACE FILE NUMBER SAS-2011-00582. OWNERS MAY BE SUBJECT TO PENALTY BY LAW FOR DISTURBANCE TO THESE JURISDICTIONAL AREAS WITHOUT PROPER AUTHORIZATION.**" This approved jurisdictional determination will remain valid for a period of 5-years unless new information warrants revision prior to that date.

4. APPEALS FOR APPROVED JURISDICTIONAL DETERMINATIONS: You may request an administrative appeal for any approved geographic jurisdictional determination under USACE regulations at 33 Code of Federal Regulation (CFR) Part 331. Enclosed you will find a Notification of Administrative Appeal Options and Process and Request for Appeal (RFA) Form.

If you request to appeal this/these determination(s) you must submit a completed RFA form to the South Atlantic Division Office at the following address:

US Army Corps of Engineers, South Atlantic Division
Attention: CESAD-PDS-O, Administrative Appeal Review Officer
60 Forsyth Street, Room 10M15
Atlanta, Georgia 30303-8801

In order for a RFA to be accepted by the USACE, the USACE must determine that it is complete, that it meets the criteria for appeal under 33 CFR, part 331.5, and that it has been received by the Division Office within 60 days of the date of this form. It is not necessary to submit an RFA form to the Division Office if you do not object to this jurisdictional determination.

D. SECTION 4 - APPLIES TO ALL OF THE ABOVE.

- US DEPARTMENT OF AGRICULTURE (USDA) PROGRAM PARTICIPANTS.
This delineation/determination has been conducted to identify the limits of USACE CWA jurisdiction for this site. This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

Attachments:

☒ **X** Verified Survey of Jurisdictional Streams, Wetlands and/or Other Waters

☐ Verified GPS Delineation of Jurisdictional Streams, Wetlands and/or Other Waters

_____ Drawing of Approximate Location of Streams, Wetlands and/or Other Waters

_____ Approved Jurisdictional Determination Form(s)

 X Notification of Administrative Appeal Options and Process and Request for Appeal Form

Donald W. Hendrix
Donald W. Hendrix
Regulatory Specialist, Coastal Branch

10-9-11
DATE

WETLANDS MAP

ALL TOWN AND NON-TOWN TERRITORIES, WASH. AREAS AND WETLANDS ARE UNDER THE JURISDICTION OF THE BOARD OF ENGINEERS AND/OR THE STATE OF WASHINGTON. THE BOARD OF ENGINEERS AND/OR THE STATE OF WASHINGTON ARE RESPONSIBLE FOR THE PROTECTION OF WETLANDS AND WETLANDS ARE PROTECTED BY THE BOARD OF ENGINEERS AND/OR THE STATE OF WASHINGTON. WETLANDS ARE PROTECTED BY THE BOARD OF ENGINEERS AND/OR THE STATE OF WASHINGTON.

BOUNDARY DISCONTINUITY CAUSED FROM PREVIOUS PLATS.
 1) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 2) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 3) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 4) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 5) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 6) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 7) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 8) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 9) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103
 10) PLAT BY JAMES ANDERSON DATED JUL. 1, 1884, PLAT BOOK 22, PAGE 103

INTERSECTION NO. 10

Channel	Starting	Distance
1	0+00	0.00
2	0+00	0.00
3	0+00	0.00
4	0+00	0.00
5	0+00	0.00
6	0+00	0.00
7	0+00	0.00
8	0+00	0.00
9	0+00	0.00
10	0+00	0.00

Channel	Starting	Distance
1	0+00	0.00
2	0+00	0.00
3	0+00	0.00
4	0+00	0.00
5	0+00	0.00
6	0+00	0.00
7	0+00	0.00
8	0+00	0.00
9	0+00	0.00
10	0+00	0.00

Channel	Starting	Distance
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3	0+00	0.00
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8	0+00	0.00
9	0+00	0.00
10	0+00	0.00

Channel	Starting	Distance
1	0+00	0.00
2	0+00	0.00
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4	0+00	0.00
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6	0+00	0.00
7	0+00	0.00
8	0+00	0.00
9	0+00	0.00
10	0+00	0.00

DEVELOPMENT AUTHORITY OF BULLOCH COUNTY

WETLANDS MAP

PROPOSED FOR

FILE NO.

SHEET 1 OF 3



RED CARPET INNS INTERNATIONAL INC.
2875 HIGHWAY 301 SOUTH
REGISTER, GA 30452
TAX MAP 50, PARCEL 000034A 000
CURRENTLY ZONED - AG-5

VIRGINIA ANNE LIPSCOMB
202 CHEVY PLACE
VIDALIA, GA 30474
TAX MAP 50, PARCEL 000034
CURRENTLY ZONED - HC

N 838955.07
E 747734.94

S 89°51'28"
359.06'

1.37 ACRES
WATERS/WETLANDS

N 838540.57
E 747664.64

CO. RD. NO. 190
OLD BOWEN STORE RD.

TO STATESBORO

60' ROAD EASEMENT

60' ROAD EASEMENT

MCB SERVICES LLC
3109 COLONIAL WAY
ATLANTA, GA 30341
PORTION OF TAX MAP 50, PARCEL
CURRENTLY ZONED - H

EVANS BRIGHTLEAF LLC
P.O. BOX 1037
CLAXTON, GA 30417
TAX MAP 50, PARCEL 000032 005
CURRENTLY ZONED - HC

0.07 ACRE
WATERS/WETLANDS
N 838139.91
E 747154.85

N 838105.03
E 747700.38

INMAN LANIER
125 LANIER DRIVE
STATESBORO, GA 30458
TAX MAP 50, PARCEL 000032 004
CURRENTLY ZONED - HC

290.38'
S 88°06'12"W
N 88°06'12"E
290.35'

60' ROAD EASEMENT

398.36'
S 88°06'08"W

219.25'
N 86°42'56"W

PAUL A. WHITLOCK, JR.
728 HILLWOOD LANE
STATESBORO, GA 30458
TAX MAP 50, PARCEL 000030
CURRENTLY ZONED - HC

N 837292.06

0.71 ACRE
WATERS/WETLANDS

N 02°41'19"E
396.84'

N 01°53'42"W
150.00'

N 01°56'05"W
60.00'

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WETLANDS NOTE

"ALL TIDAL AND NON-TIDAL TRIBUTARIES, MARSH AREAS AND WETLANDS UNDER THE JURISDICTION OF THE CORPS OF ENGINEERS AND/OR THE STATE OF GEORGIA DEPARTMENT OF NATURAL RESOURCES. OWNERS ARE SUBJECT TO BY LAW FOR DISTURBANCE OF THESE PROTECTED AREAS WITHOUT PROPER APPLICATION AND APPROVAL FROM THOSE AGENCIES."

WETLANDS WERE DELINEATED BY RESOURCE + LAND CONSULTANTS IN OF 2010. WETLAND FLAGS WERE LOCATED BY MAXWELL-REDDICK & ASSOCI

S 89°51'28"E
359.06'

S 78°36'32"E
861.58'

N 838990.15
E 748300.46

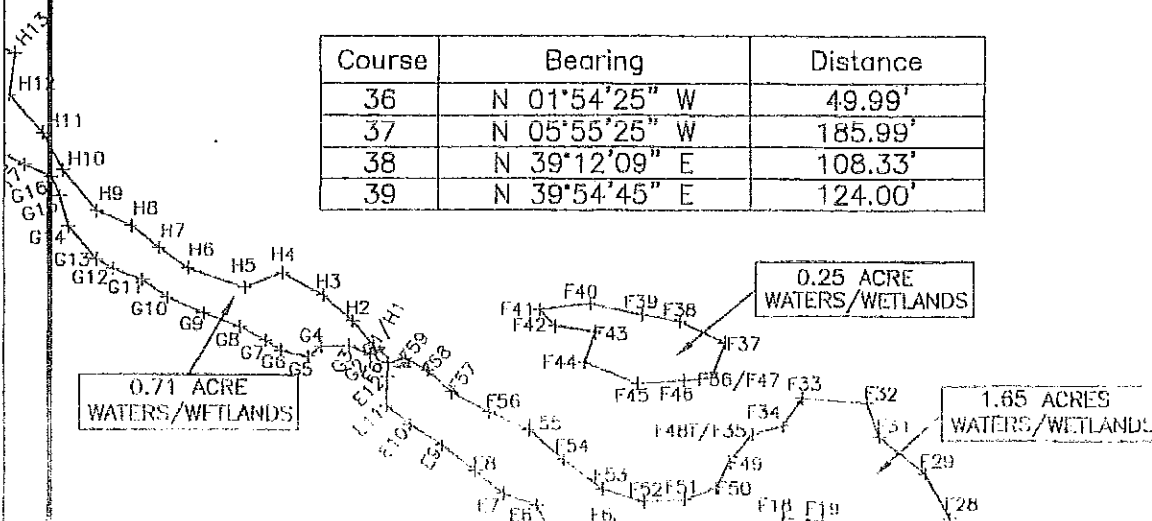
Course	Bearing	Distance
40	N 40°17'34" E	47.50'
41	N 43°06'36" E	35.11'
42	N 56°31'03" E	85.89'
43	N 10°17'24" E	63.52'
44	N 05°24'52" W	52.22'
45	N 20°01'09" W	67.09'
46	N 42°47'29" W	35.70'
47	N 06°01'23" W	53.59'
48	N 11°16'33" W	49.20'
49	N 80°07'00" E	209.57'

MCB SERVICES LLC
3109 COLONIAL WAY UNIT A
ATLANTA, GA 30341
OF TAX MAP 50, PARCEL 000032 006
CURRENTLY ZONED - HC

05.03
00.38

Course	Bearing	Distance
36	N 01°54'25" W	49.99'
37	N 05°55'25" W	185.99'
38	N 39°12'09" E	108.33'
39	N 39°54'45" E	124.00'

Course	Bearing
15	N 58°45'
16	N 70°42'
17	N 74°48'
18	N 71°53'
19	N 65°55'
20	N 63°33'
21	N 65°44'
22	N 72°12'
23	S 72°19'
24	S 63°40'



SHEET 4

AREAS AND WETLANDS ARE
S AND/OR THE STATE OF
S ARE SUBJECT TO PENALTY
S WITHOUT PROPER PERMIT

AND CONSULTANTS IN JUNE
-REDDICK & ASSOCIATES.

BOUNDARY INFORMATION OBTAINED FROM PREVIOUS PLATS.

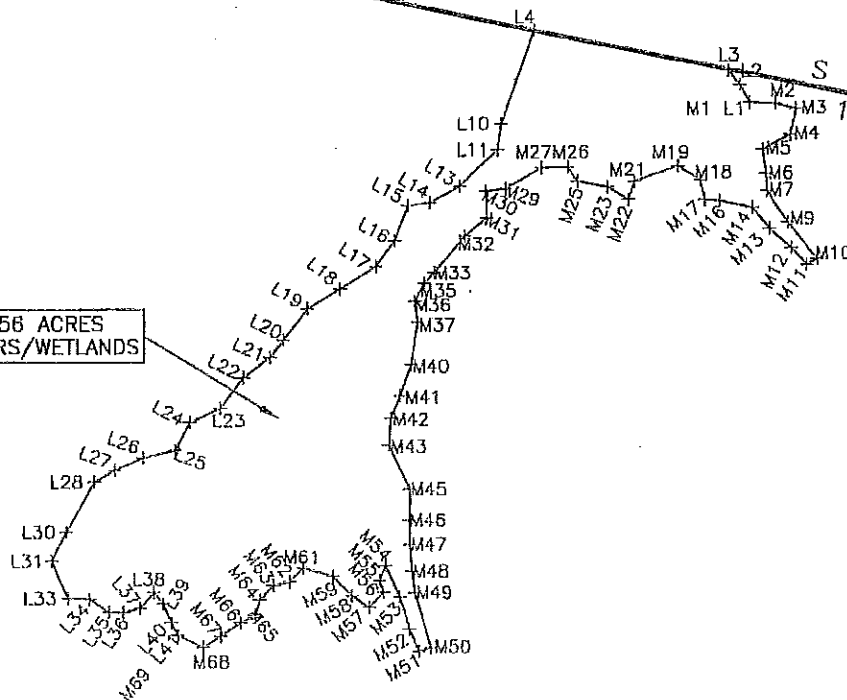
- 1) PLAT BY JAMES ANDERSON DATED JAN. 8, 1986. PLAT BOOK 22,
- 2) PLAT BY JAMES ANDERSON DATED MAY, 1, 1986. PLAT BOOK 28,
- 3) PLAT BY JAMES ANDERSON DATED FEB. 23, 1987. PLAT BOOK 28,
- 4) PLAT BY MARLIN NEVIL DATED JUNE 8, 1994. PLAT BOOK 46, PAG
- 5) PLAT BY JAMES ANDERSON DATED JULY 15, 1996. PLAT BOOK 53,
- 6) PLAT BY MARLIN NEVIL DATED JAN. 14, 2000. PLAT BOOK 59, PAG
- 7) PLAT BY TIM EASON DATED SEPT. 11, 2000. PLAT BOOK 61, PAGE

INTERSTATE NO. 16

S 78°36'06"E
999.22'

S 78°40'15"E
1000.64'

3.56 ACRES
WATERS/WETLANDS



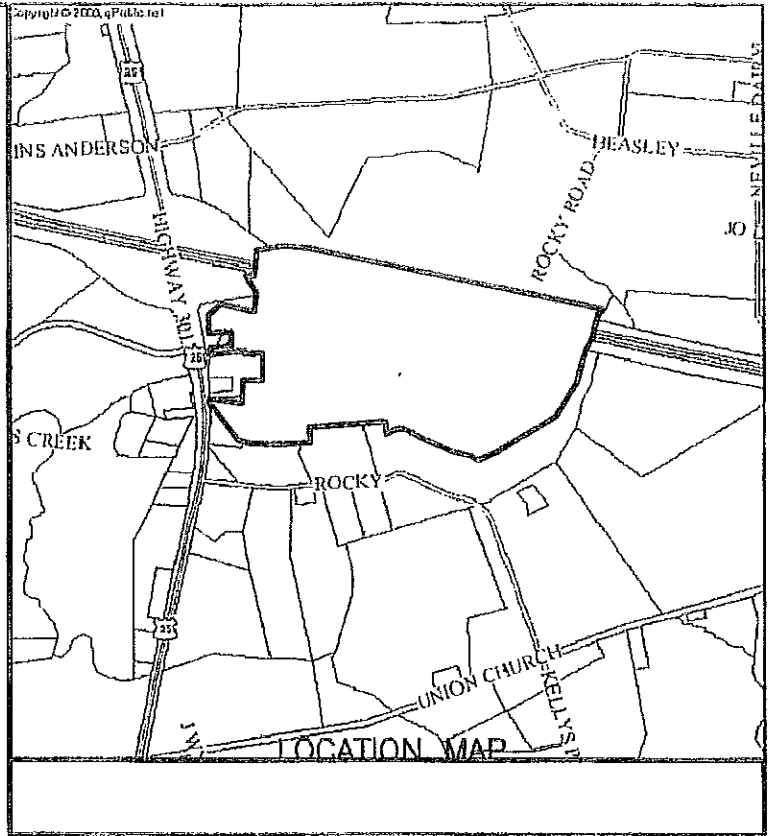
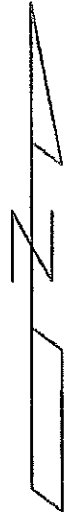
Course	Bearing	Distance
15	N 58°45'11" W	54.18'
16	N 70°42'44" W	55.60'
17	N 74°48'23" W	212.19'
18	N 71°53'31" W	90.88'
19	N 65°55'21" W	87.38'
20	N 63°33'15" W	276.66'
21	N 65°44'38" W	198.25'
22	N 72°12'48" W	72.86'
23	S 72°19'48" W	74.81'
24	S 63°40'21" W	161.65'
25	S 68°58'04" W	71.62'
26	S 68°40'51" W	460.11'

Course
1
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SHEET 5

5 PLATS.

- 6. PLAT BOOK 22, PAGE 101
- 6. PLAT BOOK 28, PAGE 177
- 87. PLAT BOOK 28, PAGE 193
- PLAT BOOK 46, PAGE 041
- 96. PLAT BOOK 53, PAGE 051
- PLAT BOOK 59, PAGE 204
- PLAT BOOK 61, PAGE 063

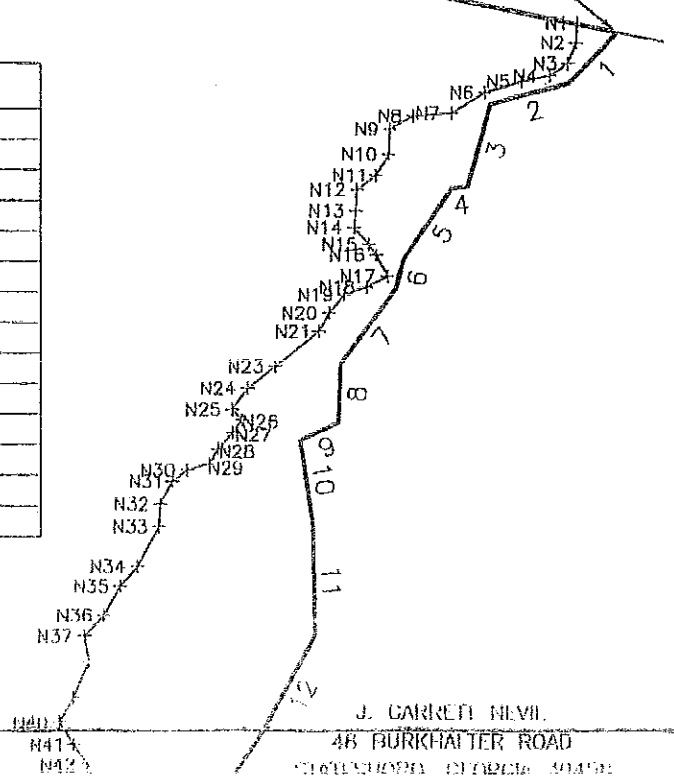


40°15'E
0.61'

S 78°35'22"E
1098.69'

N 838208.58
E 752182.70

Course	Bearing	Distance
1	S 43°16'22" W	80.51'
2	S 74°57'13" W	93.19'
3	S 15°48'30" W	98.06'
4	S 82°55'18" W	18.76'
5	S 33°35'56" W	97.44'
6	S 13°41'03" W	34.94'
7	S 36°22'51" W	106.54'
8	S 02°28'57" W	67.12'
9	S 64°36'20" W	47.62'
10	S 08°32'11" E	98.46'
11	S 01°14'58" E	124.75'
12	S 28°33'15" W	131.57'
13	S 33°12'13" W	128.51'
14	S 53°25'35" E	129.41'



SHEET 6

CHARLES M. NEVIL
CHARLES RICKY NEVIL
2585 SINKHOLE ROAD
REGISTER, GA 30452

PORTION OF TAX MAP 50, PARCEL 000037 001
CURRENTLY ZONED - HC & AG-5

J. GARRETT NEVIL
48 BURKHALTER ROAD
STATESBORO, GEORGIA 30458
TAX MAP 50, PARCEL 000040
CURRENTLY ZONED - AG-5

N 837218.43
E 751808.89

J. GARRETT NEVIL
48 BURKHALTER ROAD
STATESBORO, GEORGIA 30458
TAX MAP 50, PARCEL 000020
CURRENTLY ZONED - AG-5

DANNY DALE VICKERY, JR.
JENNIFER RENAE VICKERY
1260 KELLY POND ROAD
REGISTER, GA 30452
TAX MAP 50, PARCEL 000021 001
CURRENTLY ZONED - AG-5

N 836343.29
E 750531.53

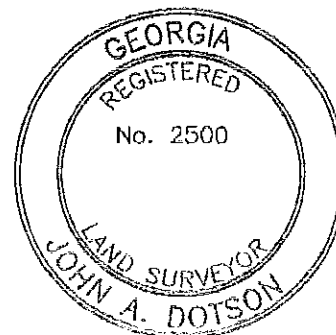
W. ROBERT RUSHING
P.O. BOX 22
REGISTER, GA 30452-0022
TAX MAP 50, PARCEL 000021
CURRENTLY ZONED - AG-5

ACREAGE SUMMARY
17.55 ACRES WETLANDS
186.28 ACRES UPLANDS
203.83 ACRES TOTAL

WETLAND AREAS
1.37 ACRES
0.07 ACRE
0.71 ACRE
1.65 ACRES
0.25 ACRE
1.25 ACRES
1.13 ACRES
3.56 ACRES
3.07 ACRES
4.49 ACRES
17.55 ACRES TOTAL

SHEET 1 of 9

MAXWELL-REDDICK & ASSOCIATES, INC.
ENGINEERS / LAND SURVEYORS
1203 BRAMPTON AVENUE
STATESBORO, GEORGIA
912-764-4214



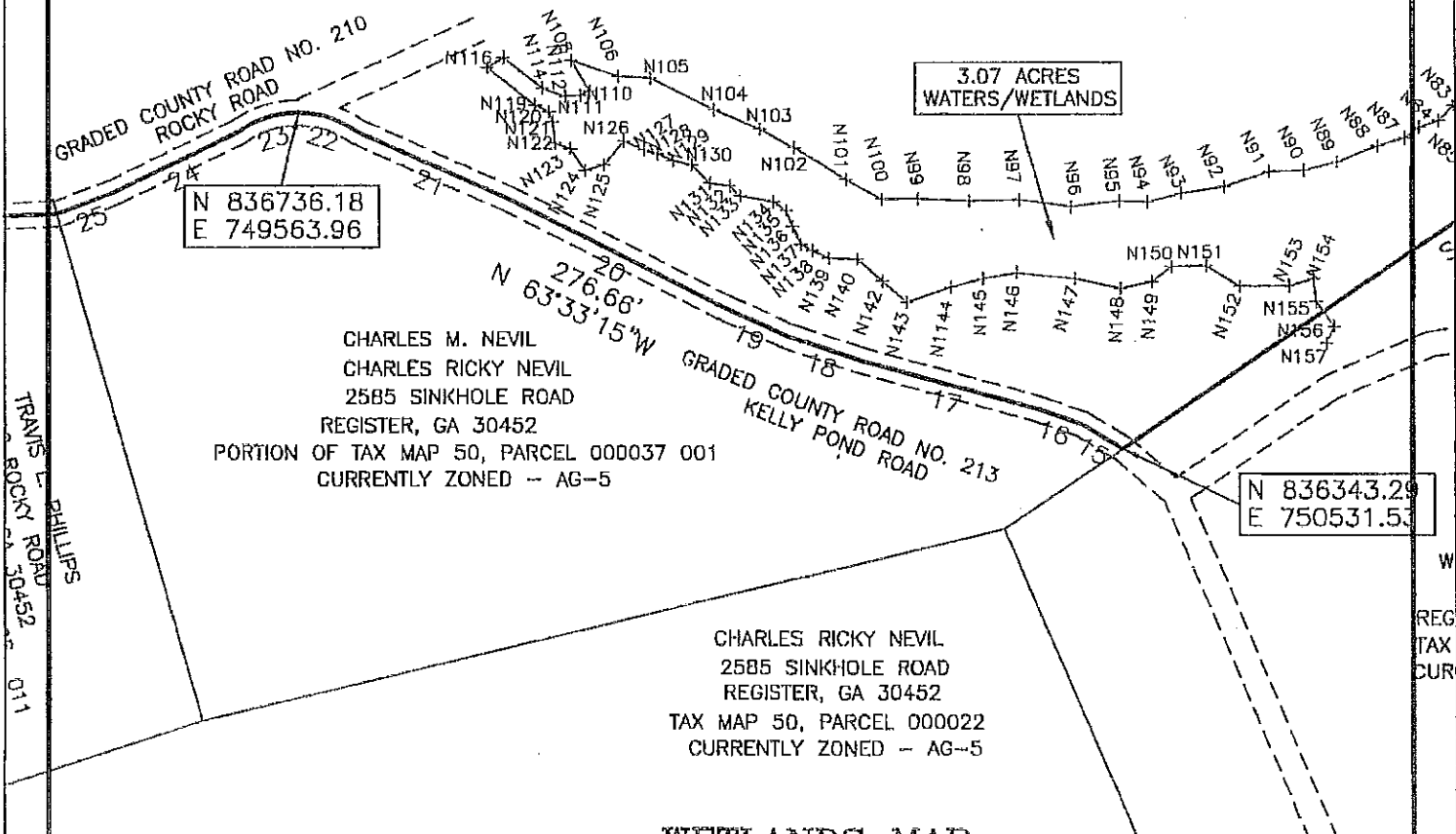
FILE NO. 06-11-059 DY RE

SHEET 6

24	S 63°40'21" W	161.65'
25	S 68°58'04" W	71.62'
26	S 86°49'11" W	360.16'
27	S 88°00'58" W	360.25'
28	S 88°00'59" W	100.00'
29	S 85°57'37" W	92.32'
30	S 83°03'26" W	114.97'
31	S 85°18'50" W	59.99'
32	S 87°20'12" W	100.84'
33	N 88°23'26" W	168.37'
34	N 84°52'53" W	136.65'
35	N 83°46'36" W	250.21'

SHEET 7

CHARLES M.
CHARLES R.
2585 SINKHOLE
REGISTER, GA
PORTION OF TAX MAP 5
CURRENTLY ZONED



WETLANDS MAP

PREPARED FOR

DEVELOPMENT AUTHORITY OF BULLOCH COUNTY

LOCATED IN THE 44th G.M.D. OF BULLOCH COUNTY, GEORGIA

JUNE 20, 2011

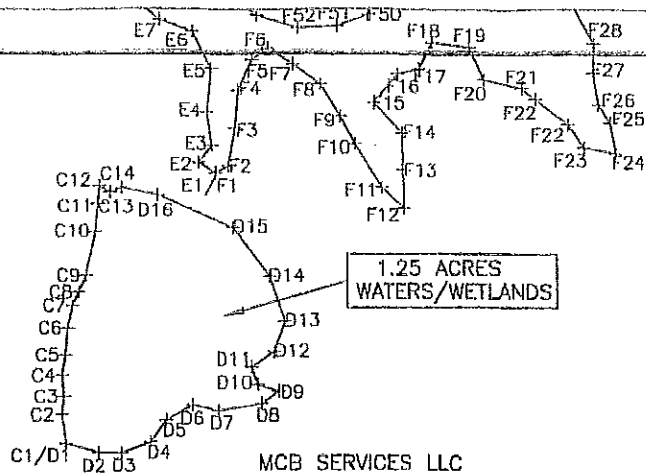
SCALE: 1" = 200'



SCALE IN FEET

SHEET 7

SHEET 8



1.25 ACRES
WATERS/WETLANDS

MCB SERVICES LLC
3109 COLONIAL WAY UNIT A
ATLANTA, GA 30341
PORTION OF TAX MAP 50, PARCEL 000029
CURRENTLY ZONED - AG-5

24	S 63°40'21"
25	S 68°58'04"
26	S 86°49'11"
27	S 88°00'58"
28	S 88°00'59"
29	S 85°57'37"
30	S 83°03'26"
31	S 85°18'50"
32	S 87°20'12"
33	N 88°23'26"
34	N 84°52'53"
35	N 83°46'36"

GRADED COUNTY ROAD NO.
ROCKY ROAD
25
N 83°46'36"
E 749°56'3"

ROAD NO. 210
ROCKY ROAD

BRANNEN
BRANNEN, JR.
ROAD
GA 30461
EL 000026 008
AG-5

JEANETTE R. BARKER
PATRICIA B. BRADLEY
264 ROCKY ROAD
REGISTER, GA 30452
TAX MAP 50, PARCEL 000027
CURRENTLY ZONED - AG-5

JUSTIN WAYNE SPREADLEY
405 ALBANY AVENUE
WAYCROSS, GA 31501
TAX MAP 50, PARCEL 000026
CURRENTLY ZONED - AG-5

TRANS L. PHILLIPS
300 ROCKY ROAD
REGISTER, GA 30452
TAX MAP 50, PARCEL 000025
CURRENTLY ZONED - AG-5

CHARLES RICKY NEVIL
2585 SINKHOLE ROAD
REGISTER, GA 30452
TAX MAP 50, PARCEL 000026 009
CURRENTLY ZONED - AG-5

SHEET 8

TAX MAP 50, PARCEL 000032
CURRENTLY ZONED - HC

SHEET 9

BINION TURNER
P.O. BOX 731
SWAINSBORO, GA 30401
TAX MAP 50, PARCEL 000032 002
CURRENTLY ZONED - HC

PENNY T. OREL
P.O. BOX 270
REGISTER, GA 30452-0270
TAX MAP 50, PARCEL 000028
CURRENTLY ZONED - AG-5

378.60'
S 86°42'10"E

N 35°03'45"W
641.16'

1.13 ACRES
WATERS/WETLANDS

N 83°59'42.22
E 74°54'1.48

DONNA W. BENTON
52 ROCKY ROAD SOUTH
REGISTER, GA 30452
TAX MAP 50, PARCEL 000026A
CURRENTLY ZONED - HC

KEITH COPELAND
PATRICIA COPELAND
652 PECAN LANE
CLAXTON, GA 30417
TAX MAP 50, PARCEL 000026 006
CURRENTLY ZONED - HC

THOMAS HAROLD BRANNEN
THOMAS HAROLD BRANNEN, JR.
971 BRANNEN ROAD
STATESBORO, GA 30461
TAX MAP 50, PARCEL 000026 008
CURRENTLY ZONED - AG-5

U.S. HIGHWAY NO. 301 RIGHT-OF-WAY VARIES

TO CLAXTON

SHEET 9

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Development Authority of Bulloch County
Attention: Mr. Benjy Thompson

File Number: SAS-2011-00582

Date: December 9, 2011

Attached is:

See Section below

<input type="checkbox"/>	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)
<input type="checkbox"/>	PROFFERED PERMIT (Standard Permit or Letter of permission)
<input type="checkbox"/>	PERMIT DENIAL
<input type="checkbox"/>	APPROVED JURISDICTIONAL DETERMINATION
<input checked="" type="checkbox"/>	PRELIMINARY JURISDICTIONAL DETERMINATION

A
B
C
D
E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/inet/functions/cw/cecwo/reg> or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. The division engineer must receive this form within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Donald Hendrix
US Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3640
912-652-6210

If you only have questions regarding the appeal process you may also contact:

Administrative Appeal Review Officer
CESAD-PDS-O
US Army Corps of Engineers, South Atlantic Division
60 Forsyth Street, Room 10M15
Atlanta, Georgia 30303-8801

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.

Date:

Telephone number:



City of Statesboro PUBLIC UTILITIES DEPARTMENT

P.O. Box 348
Statesboro, Georgia

30459 912.764.0693
912.764.0928

February 18, 2021

Georgia Department of Economic Development
75 5th Street NW, Suite 1200
Atlanta, GA 30308
Attn: Lindsay Martin

Re: G.R.A.D. Certification of Gateway Industrial Park

This letter is in reference to the availability of water, sanitary sewer and natural gas facilities to the property owned by the Development Authority of Bulloch County located in the southeastern quadrant of the intersection of Interstate Highway 16 and U. S. Highway 301 (Southern Gateway).

The City of Statesboro is the provider of water service to the above reference property. There is an existing 12" water main that parallels the main entrance to the Industrial Park and terminates at the 1,000,000 gallon elevated storage tank located on Rocky Road. The most recent Fire Flow test showed a static pressure of 68 psi, residual pressure of 61 psi at 1300 gpm of flow.

The City of Statesboro is also the provider of sanitary sewer service to the above referenced property. There is currently a 12" sanitary sewer main located on the south side of the main entrance to the Industrial Park. This main connects to the lift station on the west side of Highway 301 South and has a pumping capacity of 900 gallons per minute.

The City currently has six deep wells serving the water distribution system with capability of pumping a total of more than 7,500 gallons per minute. The water distribution system has six elevated water tanks with a combined capacity of 2.9 million gallons. The current Groundwater Withdrawal Permit issued to the City of Statesboro allows for a withdrawal of 7,345 million gallons per day average and a 5,875 million gallons per day annual average. The City of Statesboro's current annual average withdrawal of water is 3,425 gallons per day. Therefore, a reserve capacity of over 2.4 million gallons per day is available.

The City of Statesboro's Wastewater Treatment Plant is currently permitted to discharge 10 million gallons per day. The current annual average discharge of treated sewage is 3.25 million gallons per day. Therefore, a reserve capacity of over 6.7 million gallons per day is available.

Based upon this information, the City of Statesboro's water distribution and sewage treatment facilities have adequate capacity to support the future development of the subject property.

The City of Statesboro is also the the Natural Gas provider for the Gateway Industrial Park. Service is provided with a 6", 400 PSI main that is located on the south side of the main entrance to the Park. We can provide delivery pressure up to 200 PSI and flow rates of 100 MMBU per hour. We offer both Firm and Industrial Rate choices for service at this location.

Should you need any additional information regarding the City of Statesboro's Water, Sanitary Sewer and Natural Gas facilities, feel free to call me at 912-764-0693.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Steve Hotchkiss', with a long horizontal line extending to the right.

Steve Hotchkiss
Public Utilities Director

ROY THOMPSON
Chairman
JAPPY STRINGER
Commissioner
WALTER GIBSON
Commissioner
RAY MOSLEY
Commissioner
TIMMY RUSHING
Commissioner
ANTHONY D. SIMMONS
Commissioner
CURT DEAL
Commissioner



THOMAS M. COUCH
County Manager
WHITNEY RICHLAND
Chief Financial Officer
JEFF S. AKINS
Chief Legal Counsel
OLYMPIA GAINES
Clerk of the Board

BULLOCH COUNTY BOARD OF COMMISSIONERS

February 15, 2021

Georgia Department of Economic Development
75 5th Street NW, Suite 1200
Atlanta, GA 30308
Attn: Lindsay Martin

RE: GRAD Recertification – Roadway Access
Southern Gateway Commerce Park

Dear Mr. Martin:

I am writing to advise you of the current status of road capacity at the Southern Gateway Industrial Park. This property is located in the southeastern quadrant of Interstate Highway 16 and U.S. Highway 301 (GA State Route 73). Interstate 16 is a four lane, high-capacity freeway that provides access to the existing port located in Savannah, GA. U.S. Highway 301 is a four -lane, major arterial highway that provides access to Bulloch County and the surrounding areas. U.S. Highway 301 was recently widened in order to provide turning lanes that will benefit the proposed roadways into the property (Rocky Road and an unnamed entrance road).

The site is bound on the southern side by Rocky Road, which is an existing Bulloch County maintained four lane collector road that will serve the property. A second entrance road (currently unnamed) is located to the north of Rocky Road and south of Interstate 16. This second entrance is a four- lane roadway.

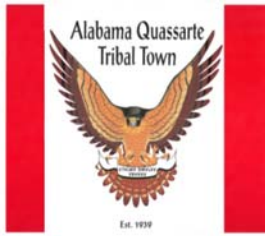
The roadway improvements to U.S. Highway 301, Rocky Road, and the unnamed entrance road provide excellent vehicular access to the site capable of supporting industrial traffic.

The park is not currently served by rail and there are no future plans to provide rail access to the park.

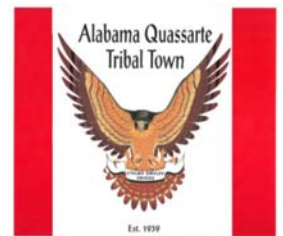
The Statesboro-Bulloch Municipal Airport is the closest air facility and is located 14 miles north of the park, and poses no restrictions on the development of the park.

Sincerely,

Brad Deal, PE
County Engineer



2122 Hwy 27, Wetumka, OK 74883
Ph: (405)452-3987 Fx:(405)452-3968
Chief Samuel Marshall **Second Chief Mary Tiger**



Elyse Procopio Mize
Environmental Compliance
Loan Programs Office
U.S. Department of Energy
1000 Independence Ave. SW., Washington, DC 20585

Dear Ms.Mize,

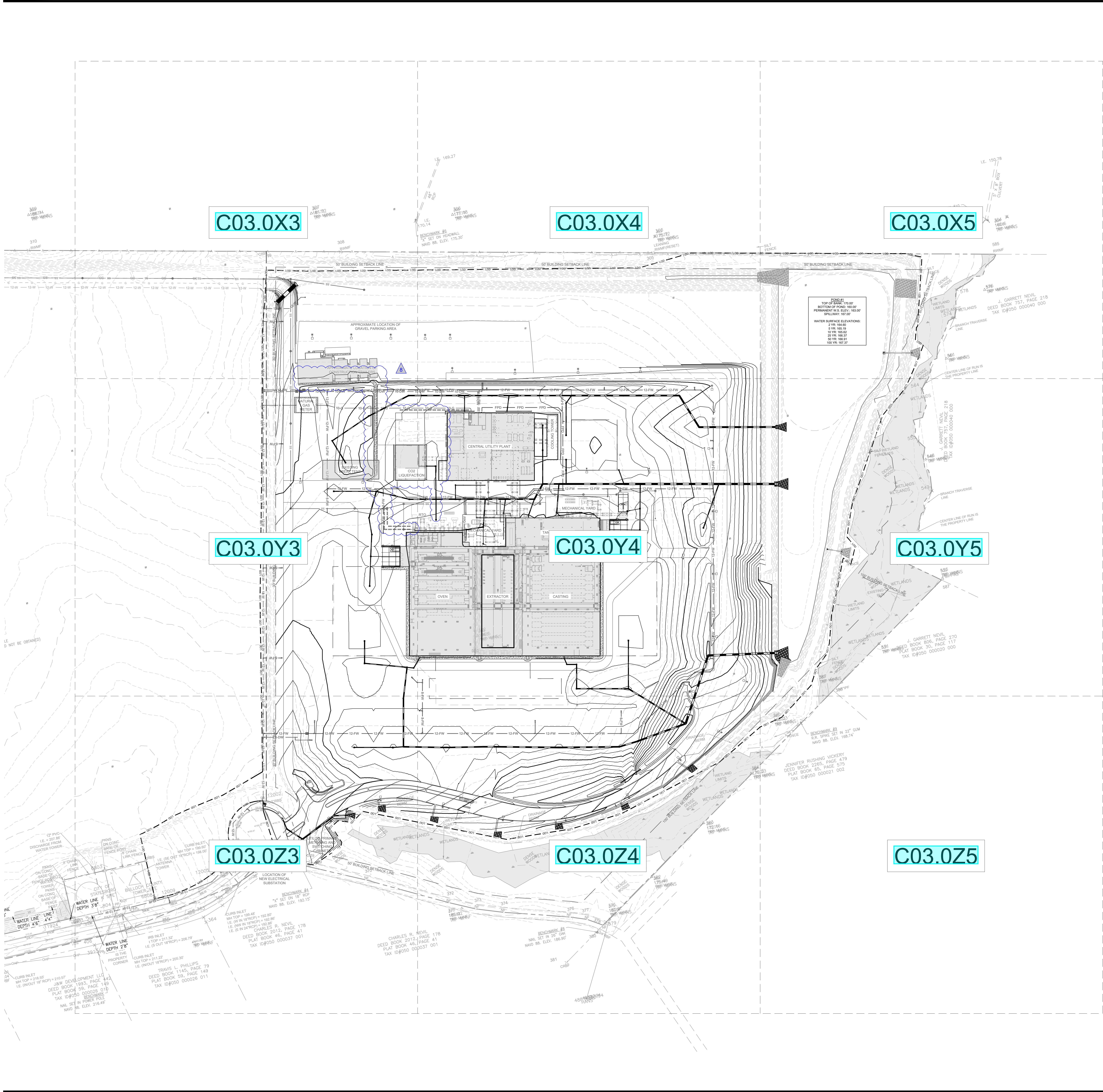
On Behalf of Chief Samuel Marshall, and in regard to the letter received from you for the **U.S. Department of Energy Notice of Intent to Prepare an Environmental Assessment..** We currently have no knowledge of archaeological, cultural or historic sites on this property. However, should there be any uncovering of such cultural or archaeological items your earliest notification of such findings will need to be reported immediately.

The office of the Alabama Quassarte Tribal Town Historical Program is under the current Program direction of Ms. Brina Williams. Should you have any further questions please call (405)452-3987, or you may email Ms. Williams at brina.williams@alabama-quassarte.org.

Regards,

Brina Williams, Historical Preservation Manager
Alabama Quassarte Tribal Town

APPENDIX C SITE PLANS



SHEET NOTES

GRADING LEGEND:

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED SPOT GRADE
- PROPOSED TOP GRADE AT WALL
- PROPOSED BOTTOM GRADE AT WALL
- PROPOSED TOP OF STAIR GRADE
- PROPOSED BOTTOM OF STAIR GRADE
- PROPOSED HIGH POINT GRADE
- PROPOSED LOW POINT GRADE
- PROPOSED TOP OF CURB GRADE
- PROPOSED BOTTOM OF CURB GRADE
- DRAINAGE FLOW ARROW

STORM DRAINAGE LEGEND:

- JUNCTION BOX (GDOT 1011)
- HOODED GRATE CURB INLET (GDOT 1018A, TYPE E)
- GRATE INLET (EAST JORDAN V5736)
- SINGLE WING CATCH BASIN (GDOT 1033D)
- DOUBLE WING CATCH BASIN (GDOT 1034D)
- YARD DRAIN (ADS NYLOPLAST OR COMPARABLE)
- CLEAN OUT (ADS NYLOPLAST OR COMPARABLE)
- 48" PEDESTAL INLET (POLEY OR COMPARABLE)
- FLARED END SECTION (GDOT 1120)
- TRENCH DRAIN (ACO OR COMPARABLE)
- PROPOSED ROOF DRAIN PIPE
- PROPOSED STORM PIPE

GENERAL NOTES

GRADING & DRAINAGE NOTES:

- SITE AREA: 78.8 ACRES. DISTURBED AREA: 52.1 ACRES.
- CRITICAL SPOT GRADES ARE TO PAVEMENT GRADE UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL CONSTRUCT ALL SIDEWALKS AND CROSSWALKS WITH A 2.0% MAXIMUM CROSS SLOPE AND A 5.0% MAXIMUM RUNNING SLOPE, UNLESS NOTED AS A RAMP. GRADES WITHIN ADA HANDICAP PARKING AREAS NOT TO EXCEED A 2% MAXIMUM SLOPE IN ANY DIRECTION.
- ALL ROOF DRAIN PIPING SHALL BE PVC UNLESS OTHERWISE NOTED.
- ALL ROOF DRAIN CLEANOUTS IN PAVED AREAS SHALL HAVE A BRASS CAP SET FLUSH WITH THE PROPOSED GRADE.
- ALL PIPE LENGTHS SPECIFIED IN THESE PLANS ARE THE HORIZONTAL DISTANCE AND ARE SHOWN FOR REFERENCE ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE ACTUAL LENGTHS BASED ON PROPOSED PIPE SLOPE. PIPE LENGTHS IN PLANS ARE MEASURED FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE, UNLESS OTHERWISE NOTED.
- THIS PROJECT DOES NOT LIE WITHIN A 100 YEAR FLOOD HAZARD ZONE AS DEFINED BY THE F.E.M.A. "FLOOD HAZARD BOUNDARY MAP" COMMUNITY PANEL NUMBER 13031C03260, DATED 08/05/2010.
- UTILITIES MAY EXIST WHICH ARE NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES HAVING UTILITIES WITHIN OR ADJACENT TO THE WORK AREA. THE CONTRACTOR SHALL HAVE THE UTILITIES FIELD LOCATED AND COORDINATE WITH THE UTILITY COMPANIES TO HAVE CONFLICTS RELOCATED WHEN NECESSARY OR ADAPTED FOR TI-EINS.
- CONTRACTOR TO FIELD VERIFY EXISTING INVERT FOR SANITARY SEWER AND STORM DRAINAGE SERVICE CONNECTIONS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL NOTIFY ENGINEER OF DISCREPANCY PRIOR TO PROCEEDING.
- NO GRADED SLOPE SHALL EXCEED 2H:1V.
- ALL WALLS GREATER THAN 30" IN HEIGHT SHALL BE DESIGNED AND PERMITTED BY AN ENGINEER LICENSED IN THE STATE OF GEORGIA.
- ALL WALLS GREATER THAN 30" IN HEIGHT SHALL HAVE FALL PROTECTION THROUGH FENCING OR HANDRAIL AT A MINIMUM OF 42" TALL, REFERENCE LANDSCAPE PLANS FOR DETAILS.

400 Rocky Road
Register, GA 30452

CONSULTANTS

MEP/PROCESS ENGINEERING:

TCI
525 Mill Street, Marion, MA 02738
Tel: 508.748.2620
www.TCIEngineers.com

ARCHITECTURAL:

Gensler
2 Houston Center
909 Fannin St.
Ste 200
Houston, TX 77010
Tel: 713.844.0000
Fax: 713.844.0001

STRUCTURAL ENGINEERING:

walter p moore
1201 Peachtree St NE
Ste 1000
Atlanta, GA 30308-6307
Tel: 404.898.9620

PROCESS HAZARDS:

ARUP
60 State Street
Boston, MA 02109
Tel: 617.866.2807

SECURITY AVE:

ib
390 Glenborough Dr, Ste 290
Houston, TX 77067
Tel: 832.248.9279
Fax: 832.248.9756

CIVIL ENGINEERING:

Kimley Horn
554 E Gordon St
Savannah, GA 31401
Tel: 912.231.4384

LIGHTING DESIGN:

ILLUMINART
A Division of Peter D'Amico Associates, Inc.
5145 Livemore, Ste 100
Troy, MI 48068
Tel: 248.879.5666
Fax: 248.879.0007

IT:

indigo
127 E Main Street, Ste B
Barrington, IL 60010
Tel: 847.304.7800
www.indigoconsulting.com

PROPRIETARY AND CONFIDENTIAL

Date	Description
2021.12.15	ISSUE FOR SCHEMATIC DESIGN
2022.03.10	ISSUE FOR PERMIT - SITE UTILITIES
2022.03.22	50% DESIGN DEVELOPMENT
2022.04.15	ISSUE FOR CONSTRUCTION - SITE UTILITIES
2022.05.06	ISSUE FOR DESIGN DEVELOPMENT
2022.06.23	25% CONSTRUCTION DOCUMENTS
2022.06.27	ISSUE FOR PERMIT CUP
2022.07.27	BULLETIN A - SITE UTILITIES
2022.08.08	75% CONSTRUCTION DOCUMENTS
2022.09.22	ISSUE FOR CONSTRUCTION
01 2022.11.01	BULLETIN 01
02 2022.11.22	BULLETIN 02
03 2022.12.28	BULLETIN 03
04 2023.01.31	BULLETIN 04
05 2023.02.28	BULLETIN 05
06 2023.03.28	BULLETIN 06
07 2023.04.25	BULLETIN 07
08 2023.05.30	BULLETIN 08

Turner Received 05/31/2023

Seal / Signature



Project Name

ASPEN AEROGELS PLANT 2 CAMPUS

Project Number

002.8918.000

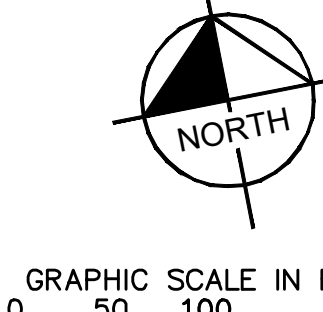
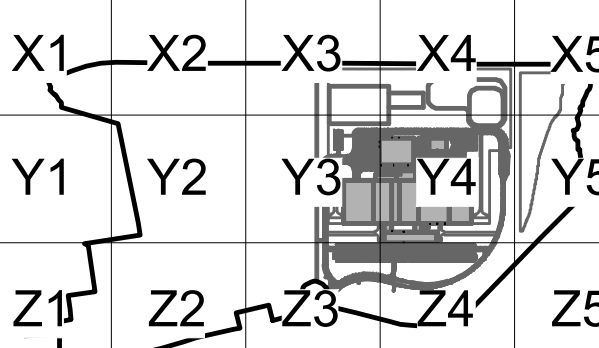
Package Name

SITE [SIT]

Description

OVERALL GRADING & DRAINAGE PLAN

KEY PLAN



Scale

AS SHOWN

VOL

V1

BLDG

SIT

SHEET

C03.00

APPENDIX D AIR ANALYSIS

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch



Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

SIP AIR PERMIT APPLICATION

EPD Use Only

Date Received: _____

Application No. _____

FORM 1.00: GENERAL INFORMATION

1. Facility Information

Facility Name: Aspen Aerogels, Inc.

AIRS No. (if known): 04-13- -

Facility Location: Street: 400 Rocky Road

City: Register Georgia Zip: 30452 County: Bulloch

Is this facility a "small business" as defined in the instructions? Yes: ☐ No: ☒

2. Facility Coordinates

Latitude: 32° 18' 7.45" **NORTH** Longitude: 81° 51' 43.9" **WEST**

UTM Coordinates: 418827.8 **EAST** 3574245.1 **NORTH** **ZONE** 17S

3. Facility Owner

Name of Owner: Aspen Aerogels, Inc.

Owner Address Street: 30 Forbes Road, Building B

City: Northborough State: MA Zip: 01532

4. Permitting Contact and Mailing Address

Contact Person: David Zopff Title: Consultant

Telephone No.: 502-643-7211 Ext. NA Fax No.: NA

Email Address: david.zopff@wsp.com

Mailing Address: Same as: ☐ Facility Location: ☐ Owner Address: ☐ Other: ☒

If Other: Street Address: 11003 Bluegrass Parkway #690 City: _____

Louisville State: KY Zip: 40299

5. Authorized Official

Name: Brian McCarter Title: Senior Director, Operations

Address of Official Street: 400 Rocky Road

City: Register State: GA Zip: 30452

This application is submitted in accordance with the provisions of the Georgia Rules for Air Quality Control and, to the best of my knowledge, is complete and correct.

Signature: _____

Brian McCarter

Date: 11-15-22

6. Reason for Application: (Check all that apply)

- ☒ New Facility (to be constructed)
 ☐ Revision of Data Submitted in an Earlier Application
☐ Existing Facility (initial or modification application)
 Application No.: _____
☒ Permit to Construct
 Date of Original Submittal: _____
☐ Permit to Operate
☐ Change of Location
☐ Permit to Modify Existing Equipment:
 Affected Permit No.: _____

7. Permitting Exemption Activities (for permitted facilities only):

Have any exempt modifications based on emission level per Georgia Rule 391-3-1-.03(6)(i)(3) been performed at the facility that have not been previously incorporated in a permit?

- ☒ No
 ☐ Yes, please fill out the SIP Exemption Attachment (See Instructions for the attachment download)

8. Has assistance been provided to you for any part of this application?

- ☐ No
 ☐ Yes, SBAP
 ☒ Yes, a consultant has been employed or will be employed.

If yes, please provide the following information:

Name of Consulting Company: WSP USA Environment & Infrastructure, Inc.)
 Name of Contact: David Zopff
 Telephone No.: (502) 643-7211 Fax No.: _____
 Email Address: david.zopff@wsp.com
 Mailing Address: Street: 11003 Bluegrass Parkway #690
 City: Louisville State: KY Zip: 40065

Describe the Consultant's Involvement:

The consultant assisted with the review of the emission data and prepared the permit application forms.

9. Submitted Application Forms: Select only the necessary forms for the facility application that will be submitted.

No. of Forms	Form
1	2.00 Emission Unit List
1	2.01 Boilers and Fuel Burning Equipment
1	2.02 Storage Tank Physical Data
	2.03 Printing Operations
	2.04 Surface Coating Operations
	2.05 Waste Incinerators (solid/liquid waste destruction)
1	2.06 Manufacturing and Operational Data
1	3.00 Air Pollution Control Devices (APCD)
1	3.01 Scrubbers
1	3.02 Baghouses & Other Filter Collectors
	3.03 Electrostatic Precipitators
1	4.00 Emissions Data
1	5.00 Monitoring Information
1	6.00 Fugitive Emission Sources
1	7.00 Air Modeling Information

10. Construction or Modification Date

Estimated Start Date: February 18, 2023

11. If confidential information is being submitted in this application, were the guidelines followed in the "Procedures for Requesting that Submitted Information be treated as Confidential"?

☐ No ☒ Yes

12. New Facility Emissions Summary

Criteria Pollutant	New Facility	
	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	41.2	41.2
Nitrogen oxides (NOx)	1,413	53
Particulate Matter (PM) (filterable only)	306	15.6
PM <10 microns (PM10)	306	15.6
PM <2.5 microns (PM2.5)	306	15.6
Sulfur dioxide (SO ₂)	0.28	0.28
Volatile Organic Compounds (VOC)	1280.7	87.8
Greenhouse Gases (GHGs) (in CO ₂ e)	57,418	57,418
Total Hazardous Air Pollutants (HAPs)	Combustion only, see below	Combustion only, see below
Georgia TAPs/ HAPs		
Ethanol (process)	1,275	87.8 tpy or 175,512 lb/yr (< MER 219,000 lb/yr)
Arsenic (combustion byproduct only)	0.201 lb/yr	<0.201 lb/yr (meets all risk goals)
Cr+6 (combustion byproduct only)	0.0564 lb/yr	<0.0564 lb/yr (meets all risk goals)
All other combustion byproducts	<MER	<MER

13. Existing Facility Emissions Summary

Criteria Pollutant	Current Facility		After Modification	
	Potential (tpy)	Actual (tpy)	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	NA			
Nitrogen oxides (NOx)				
Particulate Matter (PM) (filterable only)				
PM <10 microns (PM10)				
PM <2.5 microns (PM2.5)				
Sulfur dioxide (SO ₂)				
Volatile Organic Compounds (VOC)				
Greenhouse Gases (GHGs) (in CO ₂ e)				
Total Hazardous Air Pollutants (HAPs)				
Individual HAPs Listed Below:				

14. 4-Digit Facility Identification Code:

SIC Code: 3296 SIC Description: Mineral Wool
 NAICS Code: 327993 NAICS Description: Mineral Wool Manufacturing

15. Description of general production process and operation for which a permit is being requested. If necessary, attach additional sheets to give an adequate description. Include layout drawings, as necessary, to describe each process. References should be made to source codes used in the application.

See Attachment A for a written narrative description of the general process and operation.

See Attachment B for Figures, including Site Location Map, Preliminary Site Layout, Overall Plant Flow Diagram.

See Attachment C for Forms

See Attachment D for Calculations and Georgia Air Toxics Ambient Impact Evaluation

See Attachment E for Safety Data Sheets

16. Additional information provided in attachments as listed below:

Attachment A - Narrative General Description of Production Process and Operation
 Attachment B - Figures-Site Location Map / Preliminary Emission Unit Layout / Process Flow Diagrams
 Attachment C - Forms
 Attachment D - Calculations and Georgia Air Toxics Evaluation
 Attachment E - Safety Data Sheets
 Attachment F -

17. Additional Information: Unless previously submitted, include the following two items:

- ☒ Plot plan/map of facility location or date of previous submittal: Attachment B Figures 1, 2A, 2B
☒ Flow Diagram or date of previous submittal: Attachment B – Figure 3

18. Other Environmental Permitting Needs:

Will this facility/modification trigger the need for environmental permits/approvals (other than air) such as Hazardous Waste Generation, Solid Waste Handling, Water withdrawal, water discharge, SWPPP, mining, landfill, etc.?

☐ No ☒ Yes, please list below:

SWPPP, Wastewater Discharge, Hazardous Waste Generation, Solid Waste Handling

19. List requested permit limits including synthetic minor (SM) limits.

Synthetic minor - NOx <100 tons per year
Synthetic minor - VOC <100 tons per year
Synthetic minor - PM/PM10/PM2.5 <100 tons per year

20. Effective March 1, 2019, permit application fees will be assessed. The fee amount varies based on type of permit application. Application acknowledgement emails will be sent to the current registered fee contact in the GECO system. If fee contacts have changed, please list that below:

Fee Contact name: Rachael Weiskind

Fee Contact email address: rweiskind@aerogel.com

Fee Contact phone number: (508) 873-4969

Fee invoices will be created through the GECO system shortly after the application is received. It is the applicant's responsibility to access the facility GECO account, generate the fee invoice, and submit payment within 10 days after notification.

Attachment A

Narrative General Description of Production Process and Operation

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Aspen Aerogels, Inc. – Plant 2

Simplified Process Description

Overview

The facility will produce [REDACTED] thermal insulating blankets for various industrial applications. The facility is designed to operate up to 24 hours per day, and 365 days of the year. The process is a mixture of continuous processing steps and batch processing steps. The product is manufactured by creating a [REDACTED]-based [REDACTED] structure supported within a fabric cloth. The maximum design capacity of the extraction plant is [REDACTED] square feet / day of thermal blanket, or [REDACTED]. The actual product mix between blanket types, thicknesses, and grades may reduce this capacity significantly as the thicker blankets are up to [REDACTED] shorter in length. There is a high degree of redundancy within the process steps and the utility generation.

Planned air pollution controls include dust collectors for particulate matter (PM) control, one or more regenerative thermal oxidizer(s) (RTO, APCD No. TO01) for volatile organic compound (VOC) abatement, and a scrubber following TO01 for nitrogen oxides (NOx) control (APCD No. SC01).

Figure 1 presents a location map for the facility on a topographic vicinity map; Figure 2A presents an Emission Point Location Map with major process flows; Figure 2B presents Georgia Air Toxics Modeling distances on a site arrangement map; Figure 3 presents a process flow diagram of key processes.

Tank Farm

The production process starts with the manufacturing of the [REDACTED] which will provide the thermal barrier coating for the fabric blankets. The most significant raw materials used in the process are [REDACTED] and liquid ethanol, which are stored in tanks in the tank farm. Ethanol (EtOH), a VOC, which is the main virgin solvent used in the process, is also recovered for reuse following the extraction steps. When raw material tanks are filled from tanker trucks, a vapor return hose will return displaced vapor to the tankers. The vapor space of compatible EtOH tanks will be cross connected to reduce VOC emissions during transfers. The tanks will also be held slightly above atmospheric pressure with a nitrogen (N₂) blanket.

Tank farm tanks which are emission units are included on Form 2.02. Ethanol (VOC) emissions occur from tank transfer and breathing losses. Some tanks are vented to a process vent header (PVH) which routes emissions to TO01. Remaining tank farm tank emissions are vented via conservation vents to a common atmospheric vent header, but emissions are minimized by employing vapor unloading and balance piping, nitrogen blanketing, and conservation vents.

Production In Reactors (Mezzanine Area)

First, the [REDACTED] intermediate is produced in a low pressure two-stage batch reaction. The [REDACTED] is created in tanks R001-R003 by the reactions between [REDACTED] and water. The [REDACTED] is created in tanks R004-R006 by the reaction between [REDACTED] water and [REDACTED]. Finally, when the reactions are complete, the intermediate is added to the [REDACTED] tanks (R001-R003) for mixing. Then the [REDACTED] tanks are transferred to [REDACTED] Mix tanks (R007 - R009) for storage and distribution according to product recipe, from which [REDACTED] mix is circulated and delivered to the blanket casting lines.

Aspen Aerogels, Inc. – Plant 2

Simplified Process Description

Ethanol day tanks (T005, T014, T015) will also be installed on the Mezzanine Area along with [REDACTED] reactors to supply a constant flow of ethanol to the casting lines. Make up and distribution tanks will be installed on the Mezzanine Area along with [REDACTED] reactors. These tanks are API 650 tanks rated to 2.2 psig with N2 blanketing and cross-connected vapor spaces. The working volumes will be less than 70% of tank volume to allow for compression of the vapor space from empty at atmospheric pressure to 2.0 psig at working volume with emissions based on batch use of the [REDACTED] tanks and constant filling and emptying of others. The [REDACTED] reactors are pressurized vessels during normal operation and have no emissions.

A [REDACTED] liquid catalyst system consisting of tanks, raw material addition stations, and a dust collector will be used to prepare catalyst for the solution mixture provided to the casting lines. This system is an insignificant activity with no VOC emissions and PM emissions estimated to be less than 0.5 tons per year, potential to emit (PTE). This system is part of proposed insignificant activity IA01.

Finally, a 4th stream, called [REDACTED], an ethanol-based solution is delivered on the casting lines. The [REDACTED] system consists of tanks and equipment that mixes powdered agents into an ethanol solution. A bag dump station with vented rotary air locks and knife-gate isolation valves will be installed to supply the [REDACTED] powders while generating minimal dust. The vented rotary valve will be connected to dust collectors (DC10-DC13) which will be vented to atmosphere with estimated PM/PM10/PM2.5 emissions less than 0.5 tons per year. The VOC PTE from the [REDACTED] system is calculated at up to 0.5 tons per year, prior to controls, and is vented to the PVH. The [REDACTED] mixture provides [REDACTED] for the thermal blanket products. This system is proposed as part of insignificant activity IA01.

All mezzanine tank farm VOC emissions are vented via the PVH to TO01.

Casting Lines

The [REDACTED] mix, ethanol, liquid catalyst [REDACTED] and an ethanol-based [REDACTED] are circulated to any of nine (9) casting lines (EUs CL01-CL09) through continuous loops and mixed together and poured over the cloth batting fabric on the casting table, which is on a horizontal conveyor under a vent hood. The [REDACTED] mix forms a pool of liquid which infiltrates the fabric, while the ingredients gel over approximately 1 minute into the formed blanket. A series of [REDACTED] with adjustable settings and positions will be used to influence the final blanket thickness. The balance of the table length is used to cure the blankets. The casting table forms a [REDACTED] 'wet blanket' product. Spent casting solution is drained to an ethanol purification system to be recovered or may be sold as a waste fuel. Ethanol emissions from the casting tables are vented from the casting line hoods to a stack via a dedicated exhaust system.

Aging & Extraction

After the casting process, the [REDACTED], wet blankets are transferred into 60 extractor vessels using transfer cans to contain ethanol emissions. The first step in the extractor is a high temperature (up to [REDACTED]), enclosed aging process. Aging fluid (ethanol) is supplied from two dedicated aging fluid tanks (T006 and T007) with recirculating pumps and heat exchangers to maintain the fluid temperature. Following aging, the aging fluid is drained back to acid neutralization sparging tanks (AN01-AN09), where remaining dissolved carbon dioxide (CO₂) is removed from solution by sparging with nitrogen, and ethanol is later recovered.

Aspen Aerogels, Inc. – Plant 2

Simplified Process Description

The second step is extraction, emission unit REC1, which includes a high pressure and high temperature liquid-liquid extraction process that uses [REDACTED] CO₂ to draw out the ethanol from the 'wet blanket' without damaging the [REDACTED]. The CO₂ and extracted ethanol are continuously recovered in the CO₂/EtOH Recovery System (EU REC1), which consists of a water scrubber and 2 CO₂ liquefaction plants. The scrubber and CO₂ liquefaction plants, are inherent to the process design for continual reuse of ethanol and carbon dioxide. Excess ethanol is generated by the process and returned to the ANU tanks (AN01-AN09) in an aqueous solution, where some of it is emitted to the PVH and destroyed in TO01. The excess ethanol can be sold as a waste fuel or otherwise disposed. Also, in emission unit REC1, CO₂ is compressed in one of the 2 liquefaction plants and returned to a liquid CO₂ storage tank for reuse. Ethanol and CO₂ emissions from the liquefaction plants are vented to TO01.

Very small fugitive ethanol and CO₂ emissions are expected when extractors are opened during blanket loading and unloading operations. Removal of the blankets from the extractors is proposed insignificant activity IA02.

The aging tanks will be 87 psig rated vessels with N₂ blanketing of 50 psig and cross-connected vapor spaces. The working volumes will be less than 70% of tank volume to allow for compression of the vapor space from empty at atmospheric pressure to full at working volume. Aging ethanol tank emissions are routed through the PVH to the RTO control system.

Thermal Ovens

The 'dry blankets' are removed from the transfer cans and sent to thermal curing ovens (OV01-OV05) to [REDACTED] by-products of extraction and remove any residual ethanol. The ovens will operate at temperatures up to 660 °F. The wet blankets retain up to 3.5% free ethanol and 0.5% ethanol normally bound at lower temperatures, but all ethanol and other VOC compounds are released from the blankets as a result of [REDACTED] and other nitrogen containing compounds. Particulate matter (PM) is also emitted from the thermal oven, which will be vented to a dedicated dust collector for each oven, DC01 through DC05, which then exhaust to the RTO for destruction of the ethanol and other VOC emissions.

Finishing

The blankets are then sent through the converting process where the blanket rolls are trimmed and cut to its final size and shape. Four (4) [REDACTED] (TR01-TR04) will be used to cut the blankets to the required dimensions for some customers. Particulate emissions are expected in this process and the trimmer tables will vent to dedicated dust collectors for each trimmer table, DC06 through DC09.

ANU Sparging

The ANU tanks receive ethanol solutions from the casting tables and aging fluid from the extractors, which is then sparged with nitrogen after pH adjustment to remove dissolved CO₂ from ethanol. The ANU process requires working tanks dedicated to the pH adjustment, operated at [REDACTED] pH. Removal of dissolved CO₂ from aqueous ethanol solutions is accomplished by nitrogen sparging, which vents via the PVH to the RTO.

Aspen Aerogels, Inc. – Plant 2 Simplified Process Description

Utilities

Emissions for four natural gas fired steam boilers (BL01-BL04), one diesel emergency generator (GEN1), one diesel fire pump (FP01), and six cooling towers (IA03) are calculated and presented in the emissions summary.

Miscellaneous

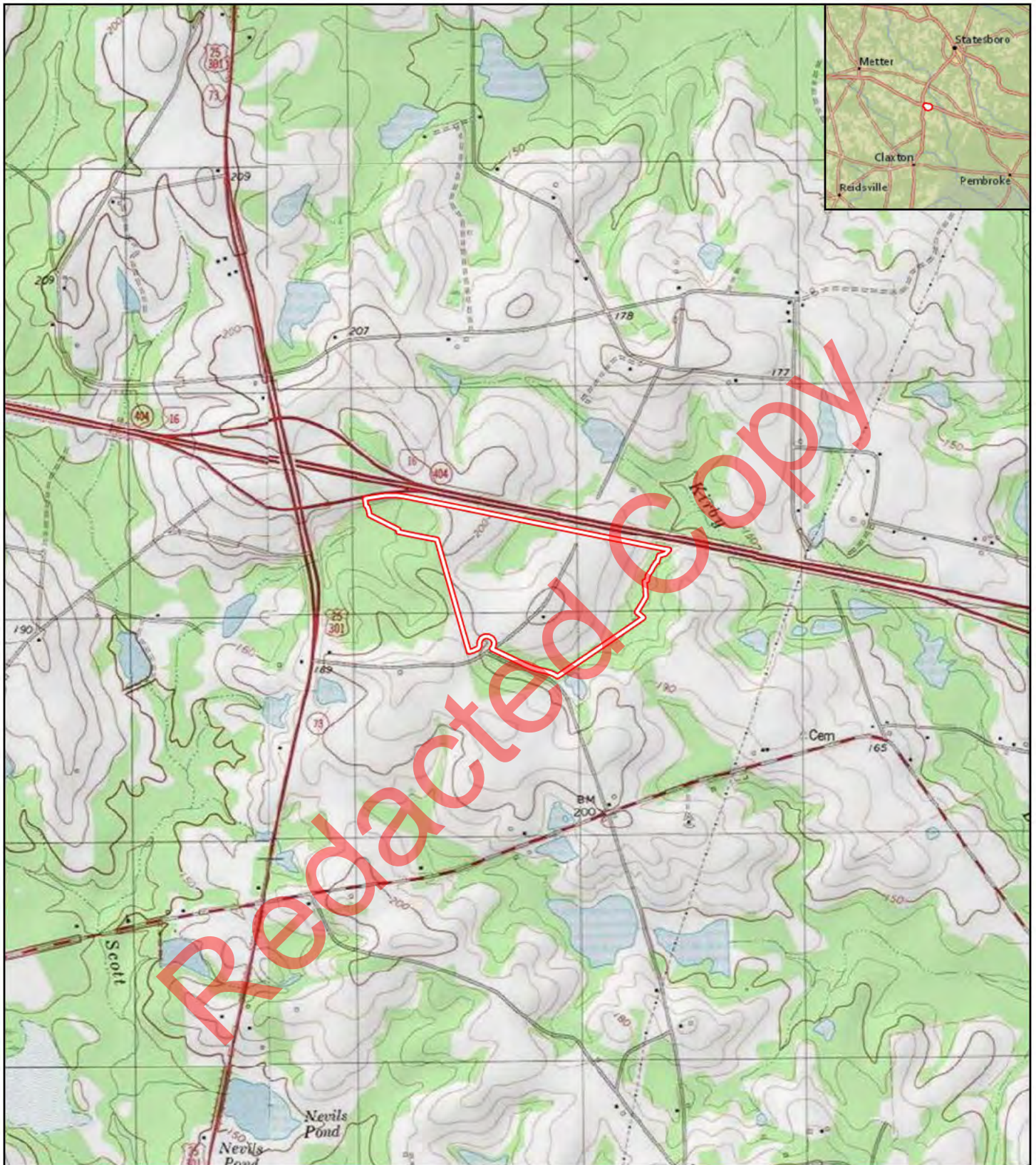
Plantwide valve and flange fugitive emissions are estimated and presented as insignificant activity IA04.


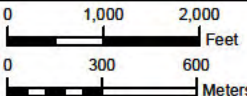

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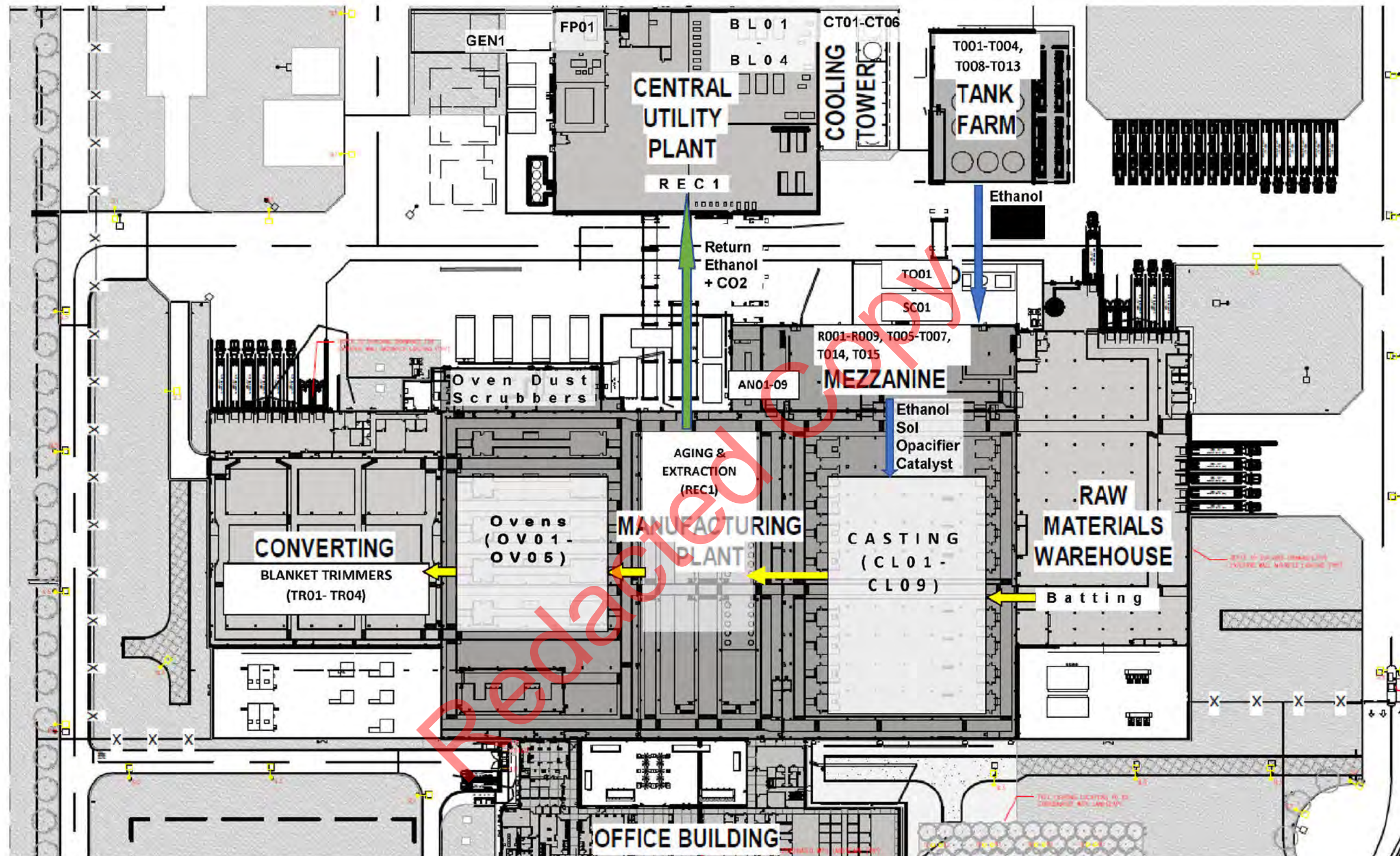
Attachment B

Figures-Site Location Map / Preliminary Emission Unit Layout / Process Flow Diagrams

Redacted Copy



		MAP BY: daniel.oonn CHK'D BY: MW	Aspen Aerogels, Inc. - Plant 2 Site Location Map	TIME: 1:07:54 PM DATE: 9/28/2022
WSP USA Environment & Infrastructure Inc. 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, KY 40299		DATUM: North American 1983 PROJECTION: NAD 1983 - StatePlane Georgia East FIPS 1001 SCALE: 1 in=2,000 ft		PROJECT #: 6166211854.008 FIGURE #: 1



WSP USA
Environment & Infrastructure Inc.
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, KY 40299

NORTH:



DRAWN BY:
daniel.conn
CHK'D BY:
DB
PROJECTION:
NAD 1983 Texas
Statewide Mapping
System
SCALE:
1 inch equals 1,000 feet
DATE:
10/14/2022 01:08 PM


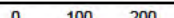
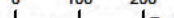





TITLE:

Figure 2A
Aspen Aerogels, Inc – Plant 2
Equipment Layout Plan

FIGURE:

2A



		 		MAP BY: daniel.conn		Aspen Aerogels, Inc. - Plant 2 Georgia Toxics Modeling Data		TIME: 1:55:50 PM			
				CHK'D BY: MW				DATE: 9/27/2022			
WSP USA Environment & Infrastructure Inc. 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, KY 40299						DATUM: North American 1983		LEGEND:  Origin - Destination  Linear Distance  Property Boundary  Features		PROJECT #: 6166211854.008	
						PROJECTION: NAD 1983 StatePlane Georgia East FIPS 1001				FIGURE #: 2B	
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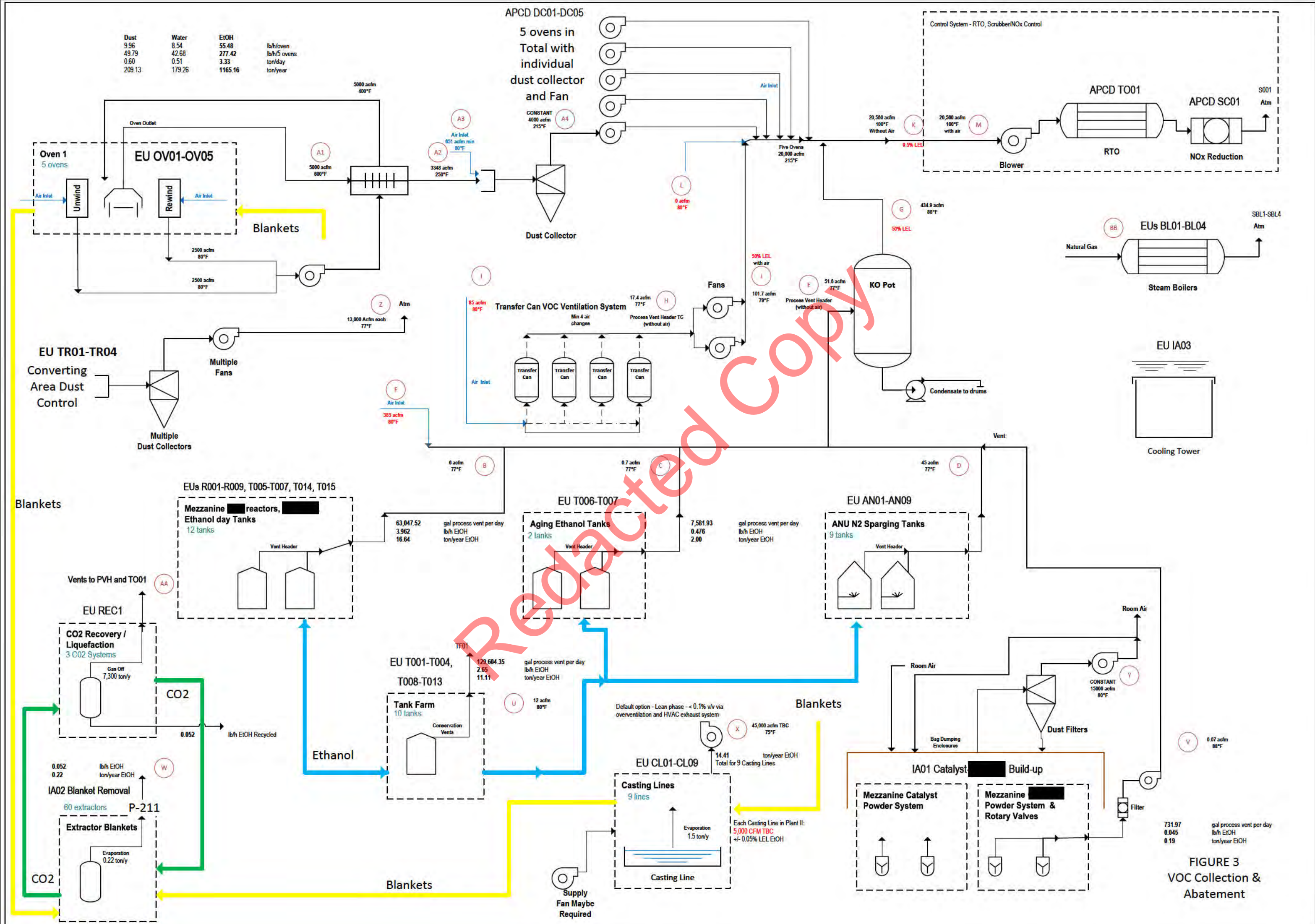


FIGURE 3
VOC Collection &
Abatement

Attachment C

Forms

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FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
R001-R003	Reactor Tanks	TBD	Reactor tanks (vent to PVH) - mezz
R004-R006	Reactor Tanks	TBD	Solution mix tanks (vent to PVH) - mezz
R007-R009	Distribution Tanks	TBD	Mix storage for distribution to casting (vent to PVH) -mezz
CL01-CL09	Casting Lines	TBD	Blanket casting and forming. (Vent to atmosphere via air sweep exhaust system)
REC1	Ethanol Extraction and CO2/EtOH Recycle	TBD, includes 60 Extractors, ethanol recovery scrubber and 3 CO2 Recycle / Liquefaction trains	CO2 extraction of residual EtOH from blankets; CO2/EtOH Recycle System (vents to atmosphere)
T001-T004	EtOH Tanks (Anhydr, Surge, Recovery)	TBD	1 Anhydrous, 1 Surge, 2 Recovery EtOH tanks - tank farm. Vent to atmospheric vent header
T005, T014, T015	EtOH Day Tanks 1, 2, 3	TBD	EtOH day tanks (vent to PVH) - mezz.
T006-T007	EtOH Aging Fluid Tanks	TBD	2 EtOH aging fluid tanks (Mezz). (Vents to PVH).
T008-T010	Tanks	TBD	3 storage tanks, Tank Farm (vent to atm vent header)
T011	Tank	TBD	1 storage tank - tank farm (vents to atm vent header)
OV01-OV05	Thermal Ovens 1-5	TBD	Electric ovens for drying and curing blankets (vents to DC01-DC05)
AN01-AN09	Acid Neutralization/N2 Sparging Tanks	TBD	Acid neutralization and N2 sparging. (Vents to PVH)
BL01-BL04	NG Boilers - steam	Cleaver Brooks, Model CBEX-2D 26.8 mmBtu/hr	4 Natural gas fired steam boilers, 26.8 mmBtu/hr each
T012-T013	Tanks	TBD	storage tanks (vent to atm vent header)
TR01-TR04	Blanket Trimmers	TBD	Blanket cutting/finishing. (Vents to DCs)
GEN1	Emergency Generator 1	Cummins, QSK60-DQKAA 1750kW	2333 hp Emergency Generator Diesel Engine
FP01	Diesel Fire Pump 1	TBD	150 hp emergency diesel engine

Date of Application: 11/15/2022

[illegible]

Georgia SIP Application Form 2.01, rev. June 2005

Facility Name: Aspen Aerogels, Inc. - Plant 2

Date of Application: 11/15/2022

FUEL DATA

Emission Unit ID	Fuel Type	Potential Annual Consumption				Hourly Consumption		Heat Content		Percent Sulfur		Percent Ash in Solid Fuel	
		Total Quantity		Percent Use by Season		Max.	Avg.	Min.	Avg.	Max.	Avg.	Max.	Avg.
		Amount	Units	Ozone Season May 1 - Sept 30	Non-ozone Season Oct 1 - Apr 30								
BL01-04	Natural Gas	115	MMscf/yr	40	60			1000 btu/scf	1020 btu/scf	<.005	<.005	nil	
TO01	Natural Gas	10	MMscf/yr	40	60			1000 btu/scf	1020 btu/scf	<.005	<.005	nil	
GEN1	Ultra Low Sulfur Diesel	30,000	gal/yr	40	60			136,000 btu/gal	136,000 btu/gal	<.0015	<.0015	0.01	0.01
FP01	Ultra Low Sulfur Diesel	2,500	gal/yr	40	60			136,000 btu/gal	136,000 btu/gal	<.0015	<.0015	0.01	0.01

Fuel Supplier Information

Fuel Type	Name of Supplier	Phone Number	Supplier Location			
			Address	City	State	Zip
Natural Gas	TBD					
ULSD	TBD					

Date of Application: 11/15/2022

[illegible]

Aspen Aerogels, Inc. Plant 2 - SIP FORM 2.02 Supplemental Tank Data

Emission Unit ID	Emission Unit Name/Description	Capacity (gal)	Material Stored	True Vapor (psi at F)	Storage Temp (F)	Filling Method	Construction / Modification Date	Roof Type	Seal Type	Process Area
R001	Prep Reactor 1	12,000	Ethanol, Water, [REDACTED]	50	115	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R002	Prep Reactor 2	12,000	Ethanol, Water, [REDACTED]	50	115	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R003	Prep Reactor 3	12,000	Ethanol, Water, [REDACTED]	50	115	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R004	Prep Reactor 1	6,000	Ethanol, Water, [REDACTED]	50	125	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R005	Prep Reactor 2	6,000	Ethanol, Water, [REDACTED]	50	125	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R006	Prep Reactor 3	6,000	Ethanol, Water, [REDACTED]	50	125	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R007	Mix Prep Reactor 1	12,000	Ethanol, Water, [REDACTED] Nitrogen	4	55	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R008	Mix Prep Reactor 2	12,000	Ethanol, Water, [REDACTED] Nitrogen	4	55	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
R009	Mix Prep Reactor 3	12,000	Ethanol, Water, [REDACTED] Nitrogen	4	55	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	[REDACTED] Mezz
T001	Tank Farm #1 - Anhydrous Ethanol Tank	60,000	Ethanol	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T002	Tank Farm #2 - Ethanol Recovery Tank 1	60,000	Ethanol	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T003	Tank Farm #3 - Ethanol Recovery Tank 2	60,000	Ethanol	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T004	Tank Farm #4 - Ethanol Surge Tank	60,000	Ethanol	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T005	Ethanol Day Tank 1	9,000	Ethanol	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	Mezz.
T006	Aging Ethanol Tank 1	60,000	Ethanol	2.5	260	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	Mezz
T007	Aging Ethanol Tank 2	60,000	Ethanol	2.5	260	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	Mezz
T008	Tank Farm #5 - [REDACTED] Storage Foreign Tank	60,000	[REDACTED]	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T009	Tank Farm #6 - [REDACTED] Storage Domestic Tank	60,000	[REDACTED]	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T010	Tank Farm #9 - [REDACTED] Storage Future Tank	60,000	[REDACTED]	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T011	[REDACTED] Storage Tank	10,000	[REDACTED]	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T012	[REDACTED] Storage Tank	60,000	[REDACTED]	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T013	[REDACTED] Storage Tank	60,000	[REDACTED]	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed Roof	N/A	Tank Farm
T014	Ethanol Day Tank 2	9,000	Ethanol	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	Mezz.
T015	Ethanol Day Tank 3	9,000	Ethanol	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	Mezz.
AN01	ANU Working Tank 1	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN02	ANU Working Tank 2	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN03	ANU Working Tank 3	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN04	ANU Working Tank 4	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN05	ANU Working Tank 5	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN06	ANU Working Tank 6	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN07	ANU Working Tank 7	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN08	ANU Working Tank 8	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System
AN09	ANU Working Tank 9	13,000	Ethanol, Dissolved CO2, [REDACTED] Nitrogen Gas	2.5	75	Dip Pipe or Bottom Fill	Est. Jan 2023	Fixed	N/A	ANU System

Facility Name: Aspen Aerogels, Inc. - Plant 2 Date of Application: 11/15/2022

FORM 2.06 – MANUFACTURING AND OPERATIONAL DATA

Normal Operating Schedule: 24 hours/day 7 days/week 365 weeks/yr
 Additional Data Attached? ☐ - No ☐ - Yes, please include the attachment in list on Form 1.00, Item 16.

Seasonal and/or Peak Operating Periods: NA

Dates of Annually Occurring Shutdowns: TBD

PRODUCTION INPUT FACTORS

Emission Unit ID	Emission Unit Name	Const. Date	Input Raw Material(s)	Annual Input	Hourly Process Input Rate		
					Design	Normal	Maximum
CL01 - CL09	Casting Lines 1-9	1/20/23	Batting Fabric	MM Linear feet	LF	LF	LF
R001-R003	Prep	1/20/23	Mixture Water, Ethanol,	gal/yr	g/h	g/h	g/h
T005, T014, T015	Ethanol day tank	1/20/23	Ethanol	gal/yr	g/h	g/h	g/h
IA01	Catalyst System	1/20/23	Catalyst Mixture (Water)	MM lb/yr	pph	pph	pph
IA01	System	1/20/23	Mixture (With Ethanol)	MM lb/yr	pph	pph	pph
OV01-OV05	Thermal Ovens 1-5	1/20/23	Blankets				
TR01-TR04	Blanket Trimmers 1-4	1/20/23	Blanket Trimmers				
REC1	Blanket Ethanol Extraction and CO2-EtOH Recycle System	1/20/23	Raw blankets w/bonded EtOH				
""	""	""	Liquid CO2	2,628,000 lb	300 lb/hr	200 lb/hr	300 lb/hr
AN01-AN09	ANU Sparging Tanks	1/20/23	Nitrogen sparge	23.7 mmcf	45 acfm	45 acfm	45 acfm
T011	Storage Tank	1/20/23					gal/hr
T008-T010	Storage tanks	1/20/23					
T001-T004	Ethanol Tanks	1/20/23	Ethanol virgin, surge, recovery	lb/yr each	lb/hr	lb/hr	lb/hr

PRODUCTS OF MANUFACTURING

Emission Unit ID	Description of Product	Production Schedule		Hourly Production Rate (Give units: e.g. lb/hr, ton/hr)			
		Tons/yr	Hr/yr	Design	Normal	Maximum	Units
All of the above	Blankets		8760				

Facility Name: Aspen Aerogels, Inc. - Plant 2Date of Application: 11/15/2022**Form 3.00 – AIR POLLUTION CONTROL DEVICES - PART A: GENERAL EQUIPMENT INFORMATION**

APCD Unit ID	Emission Unit ID	APCD Type (Baghouse, ESP, Scrubber etc)	Date Installed	Make & Model Number (Attach Mfg. Specifications & Literature)	Unit Modified from Mfg Specifications?	Gas Temp. °F		Inlet Gas Flow Rate (acfm)
						Inlet	Outlet	
TO01	OV01-05, AN01-09, PVH	Regenerative Thermal Oxidizer	est 1/20/23	TBD	No	500	750	25,000
SC01	OV01-05, AN01-09, PVH	NOx Scrubber	est 1/20/23	TBD	No	750	180	25,000
DC01-DC05	OV01-OV05	Dust Collectors; Thermal Oven Exhaust	est 1/20/23	Donaldson, DFE	No	215	215	4,000
DC06-DC09	TR01-TR04	Dust Collectors; Finishing	est 1/20/23	Donaldson, DFE	No	ambient	ambient	13,000
DC10-13	IA01	Dust Collectors; [REDACTED] / Catalyst Bag Dumping Enclosures	est 1/20/23	Donaldson, DFE	No	ambient	ambient	15,000 total

Facility Name: Aspen Aerogels, Inc. - Plant 2

Date of Application: 11/15/2022

Form 3.00 – AIR POLLUTION CONTROL DEVICES – PART B: EMISSION INFORMATION

[illegible]

Facility Name: Aspen Aerogels, Inc. - Plant 2Date of Application: 11/15/2022**FORM 3.01 – SCRUBBERS**

APCD Unit ID	Scrubber Type	Materials of Construction (Plastic, 1040 steel, etc.)	Scrubbant	pH Range	Pressure Drop Range (inches of H2O)	Minimum Scrubbant Flow Rate (Gal/min)	Is Scrubbant Recirculated?	Minimum Makeup Rate (Gal/min)	Size of Pond or Holding Tank (Acre-ft or gal)
SC01	Packed Column, 2-stage	Stainless Steel	Water, NaHS, NaOH	TBD	TBD	TBD	<input checked="" type="checkbox"/>	TBD	TBD
NA							<input type="checkbox"/>		
							<input type="checkbox"/>		
							<input type="checkbox"/>		
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							<input type="checkbox"/>		

11/15/2022

FORM 3.02 – BAGHOUSES & OTHER FILTER COLLECTORS[illegible]

Attach a physical description, dimensions and drawings for each baghouse and any additional information available such as particle size, maintenance schedules, monitoring procedures and breakdown/by-pass procedures. Explain how collected material is disposed of or utilized. Include the attachment in the list on Form 1.00 *General Information*, Item 16

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				Method of Determination
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	
R001-R003	TO01	S001	VOC, Ethanol	0.001	0.101	1.2E-05	1.21E-03	Engineering Estimate
R004-R006	TO01	S001	VOC, Ethanol	0.0005	0.0503	6.0E-06	6.04E-04	Engineering Estimate
R007-R009	TO01	S001	VOC, Ethanol	0.001	0.101	1.2E-05	1.21E-03	Engineering Estimate
T001-T004	Atm vent hdr	TF01	VOC, Ethanol	2.3	2.3	10.0	10.0	Engineering Estimate
T005,T014,T015	TO01	S001	VOC, Ethanol	0.002	0.2	.01	0.9	Engineering Estimate
T006-T007	TO01	S001	VOC, Ethanol	0.012	1.2	.053	5.3	Engineering Estimate
T008-T010	Atm vent	TF01	VOC, Ethanol	0.46	0.46	2.0	2.0	Engineering Estimate
T011	TO01	S001	VOC, Ethanol	0.001	0.1	.004	.44	Engineering Estimate
T012-T013	Atm vent hdr	TF01	VOC, Ethanol	0.46	0.46	2.0	2.0	Engineering Estimate
AN01-AN09	TO01	S001	VOC, Ethanol	1.37	45.8	6.02	200.5	Engineering Estimate
CL01-CL09	Bldg Vent	CL01	VOC, Ethanol	6.1	6.1	26.6	26.6	Engineering Estimate
OV01-OV05	TO01	S001	VOC	8.3	277	36.5	1,215	Engineering Estimate
OV01-OV05	DC01-DC05	S001	PM	1.1	21.4	4.7	93.6	Engineering Estimate
TR01-TR04	DC06-DC09	TR01-TR04	PM	2.4	48.5	10.6	212.4	Engineering Estimate
GEN1	Atm vent	GEN1	NOx	10.5	10.5	2.6	2.6	40 CFR 60 Sub. IIII
FP01	Atm vent	FP01	NOx	1.35	1.35	0.34	0.34	40 CFR 60 Sub. IIII
BL01-BL04	Atm Vent	BL01-BL04	NOx	2.6	2.6	11.5	11.5	Mfr. Estimate
REC1	Bldg Vent	REC1	VOC	0.05	0.05	0.22	0.22	Engineering Estimate
REC1	Bldg Vent	REC1	CO2	300	300	1314	1314	Mfr. Estimate

Date of Application: 11/15/2022

FORM 5.00 MONITORING INFORMATION

[illegible]

Comments:

FORM 6.00 – FUGITIVE EMISSION SOURCES

[illegible]

Facility Name: Aspen Aerogels, Inc.Date of Application: 11/15/2022**FORM 7.00 – AIR MODELING INFORMATION: Stack Data**

Stack ID	Emission Unit ID(s)	Stack Information			Dimensions of largest Structure Near Stack		Exit Gas Conditions at Maximum Emission Rate			
		Height Above Grade (ft)	Inside Diameter (ft)	Exhaust Direction	Height (ft)	Longest Side (ft)	Velocity (ft/sec)	Temperature (°F)	Flow Rate (acfm)	
									Average	Maximum
S001	RTO/NOx Scrubber Control system	48	3	Vertical	38	1100	TBD	TBD	21,000	TBD
BL01-BL04	BL01-04	58	1.5	Vertical	48	283	TBD	350	33,000 each	33,000 each
Fugitive	IA01	45	3	Vertical	38	1100	TBD	ambient	30,000 Building Vent	TBD

NOTE: If emissions are not vented through a stack, describe point of discharge below and, if necessary, include an attachment. List the attachment in Form 1.00 General Information, Item 16.


Date of Application: 11/15/2022

[illegible]

Attachment D

**Calculations
and
Georgia Air Toxics Impact Assessment**

Redacted Copy

	Project	Aspen Aerogels, Inc. - Plant 2					
	Item Name	Potential-to-Emit Calculations					
	Document No.						
	Project No.	REV	DATE		PAGE		
	21TCI02-31000	A	15-Nov-22		1	OF 6	
		Aspen Aerogels, Inc. Plant 2 Register, GA,					



Calculation

Potential-to-Emit Calculations

Prepared by

WSP USA Environment & Infrastructure, Inc.

Aspen Aerogels, Inc. - Plant 2



Emissions Summary (Data for form 100 Item 12)

Criteria Pollutant	Uncontrolled	Controlled	Actual/Controlled
	Potential (tpy)	Potential (tpy)	Potential (lb/hr)
Carbon monoxide (CO)	41.2	41.2	9.41
Nitrogen oxides (NOx)	1413	53.0	12.1
Particulate Matter (PM) (filterable only)	306	15.6	3.55
PM <10 microns (PM10)	306	15.6	3.55
PM <2.5 microns (PM2.5)	306	15.6	3.55
Sulfur dioxide (SO ₂)	0.280	0.280	0.064
Volatile Organic Compounds (VOC)	1280.7	87.8	20.0
Greenhouse Gases (GHGs) (in CO ₂ e)	57,418	57,418	13,109
Hydrochloric Acid (HCl)	nil	nil	nil
Total Hazardous Air Pollutants (HAPs)	nil, see below	nil, see below	nil, see below
Individual HAPs and Georgia TAPs			Fugitive + Controlled lb/yr
Ethanol (process, including fugitives)	Less than MER (219,000 lb/yr)		175,512
Arsenic (combustion byproduct only)	>MER and Passed Risk Analysis; See BL01 - BL04 Evaluation		
Chromium +6 (combustion byproduct only)	>MER and Passed Risk Analysis; See BL01 - BL04 Evaluation		
All other HAPs and Georgia TAPs < MER	Less than MER		

Ga Air Toxics Emissions Impact Assessment - Sitewide Ethanol from All Sources - See Emission Summary

	Sitewide - All Sources - Uncontrolled Emission Rate (lb/hr)	Sitewide Controlled Emission Rate (lb/hr)	Controlled Emission Rate with 97% DRE		MER (lb/yr)	< MER?
			lb/yr	ton/yr		
Ethanol	328.0	20.0	175,512	87.8	219,000	Yes

Process Simulation - VOC Emission Mass Balance
Aspen Aerogels, Inc. - Plant 2



LEL EtOH 3.30 % vol 25.0 77.0 C - F
327.52 Kcal/mol

VOC Abatement Mass Balance		EtOH flow						Volumetric flow				EtOH flow + volumetric flow -> LEL									
September 08 2022		lb/h	kg/h	lb/day	ton/day	lb/year	ton/year	acfm	m3/h TOTAL	kg/h	gal processed & vented per day	T [°C]	T [F]	P [atm]	LEL [%]	m3/h EtOH	m3/h air	kg/h air	% EtOH	% LEL	gr EtOH/m3
A1	Oven 1	55.48	25.19		0.67		233.03	5,000.00	8,495.05	5,107.32		316	600	1	2.63	26.44	8,468.61	5,082.13	0.31	11.81	2.97
A1T5	Ovens	277.42	125.95		3.33		1,165.16	25,000.00	42,475.23	25,536.58		316	600	1	2.63	132.18	42,343.05	25,410.63	0.31	11.81	2.97
A2	Oven 1 - After Cooler	55.48	25.19		0.67		233.03	3,348.51	5,689.15	5,107.32		121	250	1	3.08	17.70	5,671.44	5,082.13	0.31	10.10	4.43
A2T5	Ovens - After Cooler	277.42	125.95		3.33		1,165.16	16,742.54	28,445.73	25,536.58		121	250	1	3.08	88.52	28,357.21	25,410.63	0.31	10.10	4.43
A3	Oven 1 - Air Inlet pre filter	0.00	0.00		0.00		-	651.49	1,106.89	1,304.30		27	80	1		0.00	1,106.89	1,304.30	-		-
A3T5	Ovens - Air Inlet pre filter	0.00	0.00		0.00		-	3,257.46	5,534.46	6,521.52		27	80	1		0.00	5,534.46	6,521.52	-		-
A4	Oven 1 - After Dust Collector	55.48	25.19		0.67		233.03	4,000.30	6,796.54	6,411.62		102	215	1	3.12	16.84	6,779.70	6,386.43	0.25	7.93	3.71
A4T5	Ovens - After Dust Collector	277.42	125.95		3.33		1,165.16	20,001.49	33,982.72	32,058.10		102	215	1	3.12	84.20	33,898.51	31,932.15	0.25	7.93	3.71
B	Mezzanine in process Tanks	3.96	1.80	95.08		33,279.63	16.64	5.85	9.94	12.09	63,047.52	25	77	1	3.30	0.96	8.99	10.29	9.61	291.31	180.88
C	Aging Ethanol Tanks	0.48	0.22	11.43		4,002.12	2.00	0.70	1.20	1.45	7,581.93	25	77	1	3.30	0.11	1.08	1.24	9.61	291.31	180.88
D	ANU N2 total 3 tanks	45.79	20.79	1,098.90		384,615.0	192.31	45.00	76.46	95.70		25	77	1	3.30	11.05	65.41	74.91	14.45	437.90	271.89
E	Process Vent Header	50.23	22.80	1,205.42		421,896.7	210.95	51.56	87.60	109.24		25	77	1	3.30	12.12	75.48	86.44	13.84	419.25	260.32
F	Process Vent Header - Air Inlet	0.00	0.00		0.00		-	384.82	653.82	770.42		26.67	80	1		0.00	653.82	770.42	-		-
G	Process Vent Header - After KOP	50.23	22.80		0.60		210.95	434.87	738.85	879.67		26.46	80	1	3.30	12.18	726.67	856.86	1.65	50.00	30.86
H	Process Vent Header Transfer Can	11.75	5.33	281.92		98,673.28	49.34	17.36	29.49	35.87	187,000.00	25	77	1	3.30	2.83	26.66	30.53	9.61	291.21	180.81
I	Process Vent Header TC - Air Inlet	0.00	0.00		0.00		-	84.84	144.15	169.86		26.67	80	1		0.00	144.15	169.86	-		-
J	Process Vent Header TC - After Air In	11.75	5.33		0.14		49.34	101.67	172.74	205.72		26.38	79	1	3.30	2.85	169.90	200.39	1.65	50.00	30.87
V	Rotary Valves	0.045	0.02	1.09		380.00	0.19	0.07	0.12		731.97	31	88	1	3.29	0.01	0.10	0.12	9.65	293.50	177.90
K	RTO - Inlet pre Air Inlet	327.65	148.75		3.93		1,376.11	20,560.10	34,931.80	32,937.77		99.88	211.79	1	3.13	98.92	34,832.88	32,989.53	0.28	9.05	4.26
L	RTO - Air Inlet	0.00	0.00					0.01	0.02	0.02		26.67	80	1		0.00	0.02	0.02	-		-
M	RTO - Inlet	327.65	148.75		3.93		1,376.11	20,560.11	34,931.81	32,937.79		99.88	212	1	3.13	98.92	34,832.90	32,989.55	0.28	9.05	4.26

U	Tank Farm	2.65	1.20	63.49		22220.00	11.11	12.03	20.44		129,604.35	26.5	80	1	3.30	0.64	19.80	23.35	3.14	95.19	58.75
W	Extractor Blankets	0.052	0.02	1.26		440.00	0.22	500	849.50			24	75	1	3.30	0.01	849.49	1,009.99	0.001	0.04	0.03
X	Casting Lines	3.431	1.56	82.34		28820.00	14.41	5000	8,495.05			24	75	1	3.30	0.83	8,494.22	10,099.10	0.010	0.29	0.18
Y	4 x Bag Dumping Stations	-	0.000	-		-	-	15000	25,485.14			24	75	1	3.30	0.00	25,485.14	30,300.23	-	-	0
Z	Converting dust collectors (each)	-	0.00	-		-	-	13000	22,087.12			24	75	1	3.30	0.00	22,087.12	26,260.20	-	-	-
AA	Liquefaction CO2 emissions	-	0.00	-		-	-	444	754.13	912.50		24	75	1	-	0.00	754.13	896.62	-	#DIV/0!	-
BB	Boilers (CUP)	-	0.00	-		-	-	0	-			24	75	1	-	0.00	-	-	#DIV/0!	#DIV/0!	#DIV/0!

Not going to the RTO

Mezz. and Tank Farm



Gensler

Project	Aspen Aerogels, Inc. - Plant 2		
Item Name	Potential-to-Emit Calculations		
Page Name	Mezzanine and Tank Farm		
Project No.	REV	Date	Page
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Vapor Composition:	Value:	Units:
Average Temp (Normal):	86.48	F
Vapor Pressure Avg T:	9910	Pa (abs)
Headspace Pressure	344737.9	Pa (abs)
Partial Pressure of N2	334827.9	Pa (abs)
Vapor Comp. EtOH	0.0287	mol frac
Vapor Comp. N2	0.9713	mol frac
EtOH Vapor Percent	2.87	% mol
N2 Vapor Percent	97.13	% mol

(50 psia venting pressure)

Tank Farm & Sol Mix and Ethanol Day Tanks

Vapor Composition:	Value:	Units:
Average Temp (Normal):	86.48	F
Vapor Pressure Avg T:	9910	Pa (abs)
Headspace Pressure	108292.52	Pa (abs)
Partial Pressure of N2	98382.52	Pa (abs)
Vapor Comp. EtOH	0.0915	mol frac
Vapor Comp. N2	0.9085	mol frac
EtOH Vapor Percent	9.15	% mol
N2 Vapor Percent	90.85	% mol

atm P 28" WC venting Pressure

Vapor Composition:	Value:	Units:
Average Temp (Normal):	125	F
Vapor Pressure Avg T:	31970	Pa (abs)
Headspace Pressure	344737.9	Pa (abs)
Partial Pressure of N2	312767.9	Pa (abs)
Vapor Comp. EtOH	0.0922	mol frac
Vapor Comp. N2	0.9073	mol frac
EtOH Vapor Percent	9.27	% mol
N2 Vapor Percent	90.73	% mol

(50 psia venting pressure)

Aging Ethanol

Vapor Composition:	Value:	Units:
Average Temp (Normal):	260	F
Vapor Pressure Avg T:	315174	Pa (abs)
Headspace Pressure	344737.9	Pa (abs)
Partial Pressure of N2	29563.9	Pa (abs)
Vapor Comp. EtOH	0.9142	mol frac
Vapor Comp. N2	0.0858	mol frac
EtOH Vapor Percent	91.42	% mol
N2 Vapor Percent	8.58	% mol

(50 psia venting pressure)

Constants:	
EtOH MW (g/mol)	46
lbs/lug	2.21E-09
min/hr	60
ft ² /m ²	10.764
EtOH ER Constant	1181
min/day	1440
Atm pressure in "WC	407.189
g/lb	453.592
N2 Gas Density (lb/ft ³)	0.0725
ft ³ in a gal	0.133681
\$/ft ³ N2	0.005
Hours of In-Breathing	5
EtOH Vapor Density (lb/ft ³)	19.6
Atm Pressure (Pa)	101325
28" W.C in units of (Pa)	6967.52
Price of N2 Gen. (Euro/m ³)	0.07
\$/Euro	1.17
m ³ /ft ³	0.0283168
R gas const (L*Pa/(K*mol))	8314.463
L/U S gal	3.7854

Mezz. and Tank Farm

Emissions Estimate based on tank throughput:

Equipment	Qty.	Batches per Day	Liq. Vol. (gal)	Time of Process	Temperature Location	Material and Bulk N2 Picked up into Tank per Batch (gal)	Material and Bulk N2 Picked up into Tank per Day (gal)	N2 for EIOH Process Use per Day (gal)	Total Volume for In-Breathing - Thermal Cooling (SCF)	
Aging Tanks	2	-	12000	-	EIOH 260F	12000	67,900	0	0	Note 1
	3	2	6000	480	Temp 125F	6000	36,000	0	0	Note 2
	3	2	12000	480	Temp 115F	12000	72,000	0	0	Note 2
	3	2	12000	60	Mixing Temp 55F	12000	72,000	0	0	Note 2,3
EIOH Day Tanks	3	1	5000	1440	Air Cond. 75F	0	56,592	0	0	Note 4
	6	1	10000	1440	Air Cond. 75F	0	60,000	0	0	
Outside Tank - Ethanol Grades	8	1	60000	1440	Outside	0	0	1728000	57143	Note 5,6
Outside Tank -	2	1	60000	1440	Outside	0	0	80640	14286	Note 6,7
							364492	1908640	71429	SCF EIOH N2
									534321	gal EIOH N2

	EIOH Potential to Emit				
Ethanol Aging Tanks	4966.15 gal EIOH vapor per day	Note 9			
Mezz. Tanks	12706.87 gal EIOH vapor per day	Note 9			
Tank Farm Transfer	165511.18 gal EIOH vapor per day				
Tank Farm Breathing	48896.45 gal EIOH vapor per day				
Aging Tanks	7.49 lbs EIOH vapor per day				
Mezz. Tanks	19.16 lbs EIOH vapor per day				
Tank Farm Transfer	249.61 lbs EIOH vapor per day				
Tank Farm Breathing	73.74 lbs EIOH vapor per day				
Aging Tanks	2733.73 lbs EIOH per year				
Mezz. Tanks	6994.77 lbs EIOH per year				
Tank Farm Transfer	1248.07 lbs EIOH per year (Note 8)	Note 8			
Tank Farm Breathing	26916.13 lbs EIOH per year				
			Max. Hourly PTE (lb/hr)	Controlled Emissions (by RTO@97%) (lb/yr)	Vent to flare?
Aging Tanks	1.4 Tons EIOH per year		0.31	0.041	Vent to PWRTO
Mezz. Tanks	3.5 Tons EIOH per year		0.80	0.105	Vent to PWRTO
Tank Farm Transfer	0.62 Tons EIOH per year		0.14	NA	Atmospheric vent
Tank Farm Breathing	13.5 Tons EIOH per year		3.073	NA	Atmospheric vent
Tank Farm Total	14.1 Tons EIOH per year		3.215	NA	Atmospheric vent
Tank Farm Total Adjusted	14.1 Tons EIOH per year	Note 10		NA	Atmospheric vent
PURM mPWRTO					
(mPWRTO) (PWRTO) density					
density of EIOH vapor at 86F (g/L)	1.81E-01				
density of EIOH vapor at 86F (lb/gal)	1.51E-03				
Temp of EIOH vap (K)	303.39				

APPENDIX A—BASIS OF THE NORMAL VENTING FOR TABLES 1 AND 2

For liquids with a flash point below 100°F (37.8°C), this standard recommends a venting capacity of 12 SCFH of air for each barrel (2.02 Nm³/h per cubic meter) per hour of filling rate. Of this quantity, one half, or 6 SCFH (1.01 Nm³/h per cubic meter), of air, represents the vapor displacement caused by liquid movement. The additional 6 SCFH (1.01 Nm³/h per cubic meter) of air was established on the basis of an evaporation rate of approximately 0.5 percent and to account for the conversion of dense vapors being vented to an air equivalent.

The evaporation rate of approximately 0.5 percent was selected on the basis of gasoline being pumped into an essentially empty tank. During this period, heat pickup is the greatest. Also, any vapor flashing as a result of hot line products (for example, the pipeline being exposed to the sun) is the most critical at this time, since there is no large heat sink such as exists in a full tank. In addition, vaporization is increased since there is essentially no tank pressure to suppress vaporization. For conversion of hydrocarbon vapor to air, a specific gravity of 1.5, compared with 1 for air, was arbitrarily selected.

In addition to the venting capacity for product movement indicated above, a thermal evaporation rate based on tank size

(see Table 2) was established. This is additive to the venting for liquid movement.

It was established that in the southwestern United States, tanks could be cooled rapidly, as happens when a sudden rainstorm occurs on a hot, sunny day. For vacuum conditions, it was found that roof plates could be cooled as much as 60°F (33°C) and that shell plates could be cooled about 30°F (17°C). This can be converted to a heat loss from the tank vapor space of about 20 BTU per hour per square foot (63 Watts per square meter) of shell and roof surface. From this, vacuum (inbreathing) requirements were set. Since records were not available on how fast tank vapor spaces can be heated (outbreathing), a figure of 60 percent of the inbreathing requirements was arbitrarily selected as the basis for thermal outbreathing.

In establishing the basis above, it was recognized that the requirements for outbreathing are somewhat conservative; however, some conservatism was believed to be desirable to take into account both unusual climatic conditions and products that might generate more vapor than gasoline generates. Also, the cost involved for a larger venting device is very small, considering the overall cost of a tank. This conservatism also provides some margin of safety should pumping rates be increased slightly above design rates.

Mezz. and Tank Farm

6

API STANDARD 2000

Table 2A—Requirements for Thermal Venting Capacity
A. English Units

Tank Capacity		Inbreathing (Vacuum)	Outbreathing	
Column 1 ^a		Column 2 ^a	Column 3 ^b	Column 4 ^c
			Flash Point $\geq 100^{\circ}\text{F}$ or Normal Boiling Point $\geq 300^{\circ}\text{F}$	Flash Point $< 100^{\circ}\text{F}$ or Normal Boiling Point $< 300^{\circ}\text{F}$
Barrels	Gallons	SCFH Air	SCFH Air	SCFH Air
60	2,500	60	40	60
100	4,200	100	60	100
500	21,000	500	300	500
1,000	42,000	1,000	500	1,000
2,000	84,000	2,000	1,200	2,000
3,000	125,000	3,000	1,800	3,000
4,000	168,000	4,000	2,400	4,000
5,000	210,000	5,000	3,000	5,000
10,000	420,000	10,000	6,000	10,000
15,000	630,000	15,000	9,000	15,000
20,000	840,000	20,000	12,000	20,000
25,000	1,050,000	24,000	15,000	24,000
30,000	1,260,000	28,000	17,000	28,000
35,000	1,470,000	31,000	19,000	31,000
40,000	1,680,000	34,000	21,000	34,000
45,000	1,890,000	37,000	23,000	37,000
50,000	2,100,000	40,000	24,000	40,000
60,000	2,520,000	44,000	27,000	44,000
70,000	2,940,000	48,000	29,000	48,000
80,000	3,360,000	52,000	31,000	52,000
90,000	3,780,000	56,000	34,000	56,000
100,000	4,200,000	60,000	36,000	60,000
120,000	5,040,000	68,000	41,000	68,000
140,000	5,880,000	75,000	45,000	75,000
160,000	6,720,000	82,000	50,000	82,000
180,000	7,560,000	90,000	54,000	90,000

Notes:

^a For tanks with a capacity of 20,000 barrels (3,180 cubic meters) or more, the requirements for the vacuum condition are very close to the theoretically computed value of 2 SCFH of air per square foot (0.577 Nm³/h per square meter) of total shell and roof area. For tanks with a capacity of less than 20,000 barrels (3,180 cubic meters), the requirements for the vacuum condition have been based on 1 SCFH of air for each barrel of tank capacity (0.169 Nm³/h per cubic meter). This is substantially equivalent to a mean rate of temperature change of 100°F (37.8°C) per hour in the vapor space (see Appendix A). An engineering review should be conducted for uninsulated tanks where the vapor space temperature is maintained above 120°F (48.9°C) (see 4.2.5.14).

^b For stocks with a flash point of 100°F (37.8°C) or above, the outbreathing requirement has been assumed to be 60 percent of the inbreathing requirement. The roof and shell temperatures of a tank cannot rise as rapidly under any condition as they fall, for example, during a sudden cold rain.

^c For stocks with a flash point below 100°F (37.8°C), the outbreathing requirement has been assumed to be equal to the inbreathing requirement to allow for vaporization at the liquid surface and for the higher specific gravity of the tank vapors.

^d Interpolate for intermediate tank sizes. Tanks with a capacity of more than 180,000 barrels (30,000 cubic meters) require individual study. Refer to Appendix A for additional information about the basis of this table.

Nitrogen and Ethanol Venting Assumptions (inside this thick bordered box)

Calculations use vapor pressure of EtOH and thermal in-breathing SCF values.

EtOH fraction in headspace determined above.

Notes

1. Bulk N2 Pulled into Tank per Day (gal) - 350 gal to an extractor every 7.5 minutes
2. Assumed to be 100% Ethanol
3. Sol mix Tank low pressure nitrogen blanket
4. Bulk N2 Pulled into Tank per Day (gal) - 39.3 gpm, 7.5 to Sol, 1.6 to Catalyst, 1.6 Catalyst, 28.9 Casting Line.
5. N2 for EtOH Process Use per Day (gal) - Ethanol 150 GPM to process for each of the 8 grades
6. Total Volume for In-Breathing - From API 2000 Table 2A
7. N2 for EtOH Process Use per Day (gal) - 28 GPM per MTES and S40
8. Tanks on the Tank Farm and Truck unloading tanker to be headspace connected. Emissions only will be during shutdown.
9. PRV only open at 2-3 psia but BPV valve only open at 50 psia. So, the nitrogen will be compressed during loading and unloading and no emissions will be expected. Except for the Sol mix and EtOH Day tanks, where foaming can be an issue so a low blanket pressure is established. Therefore, there will be emission only when cleaning the tanks, once a month (8% of the year).
10. Only during during 9 month of the year

**Gensler**

Project	Aspen Aerogels, Inc. - Plant 2		
Item Name	Potential-to-Emit Calculations		
Page Name	Casting Line VOC (CLO1-CLO9)		
Project No.	REV	DATE	PAGE
21TCI02-31000	A	17-Oct-22	2 OF 6

Assumptions

1. Total Pressure Ethanol @ 25C	0.85	atm
2. Casting width:	10	ft
3. Casting length:	150	ft
4. Pool Depth	1	mm
5. Casting Area	1500	ft²
6. Partial conc. of Ethanol reaches 0 in the air (Ca,L):	3	m
7. Number of Casting Tables:	9	

Input Data

1. Saturation Pressure Ethanol @ 25C (Psa)	0.08	atm
2. Gas Constant (R):	0.08	L*atm/mol*K
3. Temperature (T)	298	K
4. Diffusion Coefficient of ethanol vapour in air (Dab)	0.13	cm²/s
5. Molar Mass of Ethanol:	46.1	g/mol

Magin Lapuerta, Juan Pabb Hernández, John R. Agudelo,

An equation for the estimation of alcohol-air diffusion coefficients for modelling evaporation losses in fuel systems,

Applied Thermal Engineering,
Volume 73, Issue 1,

2014,

Pages 539-548,

ISSN 1359-4311,

<https://doi.org/10.1016/j.applthermaleng.2014.08.009>.

(<https://www.sciencedirect.com/science/article/pii/S1359431114006711>)

Advection Equation (Eq. 1)

$$N_a = CD_{ab} \nabla X_A + X_A * (N_a + N_b)$$

$$(1 - X_a) * N_a = -CD_{ab} \frac{dX_A}{dz}$$

$$N_a = -D_{ab} * \frac{C_A}{(1 - X_A)} \frac{dX_A}{dz}$$

$$N_a = -D_{ab} * \frac{1}{(1 - X_A)} \frac{dC_A}{dz}$$

$$N_a = -D_{ab} * \frac{C}{(C - C_A)} \frac{dC_A}{dz}$$

$$N_a = \frac{C * D_{ab}}{L} * \ln\left(\frac{C - C_{A,L}}{C - C_{A,0}}\right)$$

Results

1. Partial concentration of Ethanol at the blanket (Ca,o):	0.00316105	mol/L
2. Total Concentration of Ethanol-air vapour (C):	0.03475931	mol/L
3. Molar Flux of Ethanol per second (Na):	1.40E-05	mol/m²*s
4. Molar Flux of Ethanol per second (Na):	0.0896	g/s
5. Amount of EtOH lost per year per casting table [Note 1]:	2.96	ton/year
6. Amount of EtOH lost per year per all casting tables:	26.6	ton/year

Note 1: 5% pressure adjustment considered.

Project	Aspen Aerogels, Inc. - Plant 2		
Item Name	VOC Abatement Calculations (cont'd)		
Page Name	Casting Line VOC (CL01-CL09)		
Project No.	REV	DATE	PAGE
21TCI02-31000	A	17-Oct-22	2.5 OF 6

EtOH pool vapor release evap calc

1 mm EtOH
rectang
150 ft long
10 ft wide
1mm deep
atm P
ambient Temp

Research: Article Name

"An equation for the estimation of alcohol-air diffusion coefficients for modelling evaporation losses in fuel systems"

Ethanol @ 25°C, 0.85 atm

$D_{\text{EtOH-air}} = 0.1264 \text{ cm}^2/\text{s}$

$P_{\text{sat}} @ 25^\circ\text{C} = 0.0773 \text{ atm}$

$R = 0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$

$T = 298\text{K}$

$C_{\text{EtOH, surf}} = \frac{P_{\text{sat}}}{RT} = 0.003161 \frac{\text{mol}}{\text{L}}$

$\times 1000 \rightarrow \text{mol}/\text{m}^3$

Advection:

$$\bar{N}_A'' = -CD_{AB}\nabla x_A + x_A(\bar{N}_A'' + \bar{N}_B'')$$

$$C = \frac{P}{RT} = 0.034759 \frac{\text{mol}}{\text{L}}$$

$$\times 1000 \rightarrow \text{mol}/\text{m}^3$$

$$(1-x_A)\bar{N}_A'' = -CD_{AB}\frac{dx_A}{dz}$$

$$\bar{N}_A'' = -D_{AB} \cdot \frac{C}{1-x_A} \frac{dx_A}{dz}$$

$$\bar{N}_A'' = -D_{AB} \cdot \frac{1}{1-x_A} \frac{dC_A}{dz}$$

$$\bar{N}_A'' = -D_{AB} \cdot \frac{C}{C-C_A} \frac{dC_A}{dz}$$

$$L \cdot \bar{N}_A'' = -D_{AB} \cdot C \cdot (-\ln(C-C_A)) \Big|_{C_{A0}}^{C_{AL}}$$

$$\bar{N}_A'' = \frac{CD_{AB}}{L} \cdot \ln\left(\frac{C-C_{A,L}}{C-C_{A0}}\right)$$

$$C_{A,L} = 0; L = 3\text{m}$$

$$D_{AB} = 0.1264 \frac{\text{cm}^2}{\text{s}} \cdot \frac{(1\text{m})^2}{(100\text{cm})^2} = 1.264 \times 10^{-5}$$

$$\bar{N}_A'' = \frac{CD_{AB}}{L} \cdot \ln\left(\frac{C-C_{A,L}}{C-C_{A0}}\right) \cdot 1.1004$$

$$A = 1500\text{ft}^2 = 139.3546\text{m}^2$$

$$\bar{N}_A'' = 1.396 \times 10^{-5} \frac{\text{mol}}{\text{m}^2 \cdot \text{s}}$$

most likely an overestimate ~ decrease by 15%

$$MM_{\text{EtOH}} = 46.07 \frac{\text{g}}{\text{mol}}$$

$$A \cdot MM_{\text{EtOH}} \cdot \bar{N}_A'' = \left[\frac{\text{g}}{\text{s}} \right] = 0.08965 \frac{\text{g}}{\text{s}} \text{ EtOH Evaporating}$$

Aspen Aerogels Inc. - Plant 2

REC1 - Recycle System - Blanket Ethanol Extraction and CO₂ Recovery / Liquefaction Emissions

Aging, Extraction and Blanket Removal

Aging is a closed process and occurs while blanket is inside the extractor. Liquid circulates in the extractors the required amount of time. Aging fluid is drained from the extractors to the aging ethanol tanks.

Extraction using [REDACTED] CO₂ to remove bound or [REDACTED] ethanol [REDACTED] (occurs inside closed extractor vessels).

During the extraction cycle, extraction [REDACTED] is vented to REC1 where vapors are vented to a water scrubber for ethanol recovery, then CO₂ is compressed in the 2 CO₂ scrubber/liquefaction plants.

Note: REC1 Water scrubber and CO₂ Liquefaction plants are inherent to process step for reclaim of ethanol and CO₂, and hence are not control devices.

Ethanol Recycle Emissions:

CO ₂ /ethanol from extraction process	20,000 lb/hr	(10,000 lb/hr per CO ₂ scrubber)
Ethanol from extraction *	420 lb/hr	Ethanol vapor to recovery water scrubber
Ethanol recovery scrubber efficiency	99.00%	Water scrubber efficiency
Ethanol emission rate from scrubber/CO ₂ recovery	4.2 lb/hr	Ethanol emissions from water scrubber to CO ₂ recovery plants
Uncontrolled ethanol emission rate from CO ₂ scrubbers	18.4 ton/yr	PTE, emission from 2 CO ₂ Scrubber plants vent to RTO
Controlled ethanol emission rate from CO ₂ scrubbers	0.552 ton/yr	PTE Controlled ethanol @97% Efficiency RTO

* 2% /v or 2.1% /w ethanol based on testing of similar process at Plant 1.

CO₂ Emissions:

Carbon Dioxide Recycle:

The CO₂ liquefaction trains process up to 10,000 lb/hr each.

Scrubber Waste (per scrubber; Ref: mfr) =	95 lb/hr	416.1 tons/year CO ₂ per plant	832.2 tons/year CO₂ total PTE (2 plants)
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Note: CO₂ scrubbers are vented to RTO





Project	Aspen Aerogels, Inc. - Plant 2		
Item Name	Potential-to-Emit Calculations		
Page Name	Oven Emissions (OV01-OV05)		
Project No.	REV	DATE	PAGE
21TCI02-31000	A	17-Oct-22	4 OF 6

Assumptions

1. All ovens running at high temperature to dry and cure blankets.
2. 3% of Ethanol bonded and 0.9% of Ethanol unbonded.
3. Thermal oxidizer EtOH destruction efficiency is >97%
4. Ovens are electric

Parameter:	Value:	Units:
Diameter:	█	inches
Radius:	█	inches
Height:	█	inches
Blanket Volume:	█	in^3
Blanket Weight	█	lb
Blankets Production	█	blankets/day
Blankets to Ovens	█	blankets/day
% by weight of VOC (EtOH) in blanket	█	
Mass evaporated per day	6658.08	lb EtOH/day
Mass evaporated per hour	277.42	lb EtOH/hr
Mass evaporated per year	1215.10	tn EtOH/year
EtOH removed by VOC Abatement (RTO) @ 97%	1178.65	tn EtOH/year
Net VOC Emissions, PTE Controlled	36.45	tn EtOH/year
Oven (OV01-OV05) Dust Emissions Estimate		
Oven dust emission factor (lb PM per blanket) ¹	█	lb PM/ blanket
Ovens PM PTE, Uncontrolled	512.78	lb PM/day
Ovens PM PTE, Uncontrolled	187,163	lb PM/yr
Ovens PM PTE, Uncontrolled	94	ton PM/yr PTE
Ovens PM PTE, controlled at 95% eff.	4.68	ton PM/yr PTE
Ovens PM PTE, controlled at 95% eff.	1.07	lb PM/hr PTE

8.3 lb/hr, PTE controlled

total for 5 ovens

total for 5 ovens, controlled by DC01-DC05

total for 5 ovens

1. Aspen Aerogels █ - 2022 dust study results on a per blanket basis for similar product.
Oven emissions █ lb PM/blanket



Aspen Aerogels Plant 2

NOx Scrubber (SC01) Emissions from Thermal Oxidizer (TO01) Process Gas Combustion

Note: Volatile organic compound from tanks and other PVH sources and oven exhaust consists of ethanol and other organics evolved from aerogel blanket materials at cure temperature.

Note: Thermal oxidizer inlet VOC mass rate is estimated by process simulation and mass balance to be 278 lb/hr, and NOx outlet mass rate is estimated to be 320 lb/hr, by process simulation

NOx PTE (Emitted from OV1-OV5 and other PVH sources) 320.0 lb/hr, Est. from mass balance

NOx PTE (Emitted from TO01) 1,402 tons per year

SC01 NOx Scrubber Eff. 97%

NOx PTE, Controlled 42.0 tons Nox / yr Controlled

9.6 lbs NOx/hour, Controlled

Thermal Oxidizer Natural Gas Combustion Emissions

Thermal Oxidizer (TO) NG Combustion PTE is based on EPA's AP-42 Chapter 1.4 emission factors, allowable fuels, and boiler capacities except as noted.

TO (10.0 MMBtu/hr rated burner @50%)

5.00 MMBtu/hr average firing rate

21,900 MMBtu/yr

21 MMR3/yr gas

	PM**	PM10**	PM2.5**	SOx*	NOx*	VOC*	CO*	Pb*	CO2*	CH4	N2O	CO2e
gas emission factor (lb/MMSCF)	0.2	0.2	0.11	0.6	100	5.5	84	5.00E-04	120000	2.3	0.22	120123
gas PTE (tpy)	0.0021	0.0021	0.0012	0.006	1.07	0.06	0.90	5.37E-06	1,288	0.02	0.002	1,289.6
gas PTE (lb/hr)	4.90E-04	4.90E-04	2.70E-04	1.47E-03	0.25	1.35E-02	0.21	1.23E-06	294.12	0.0056	0.0005	294.42
	9.80E-05 lb/hr PM PTE compared to rule limit			0.60 lb/MMBtu								

* AP42 Emission Factors - Chapter 1.4 Natural Gas Combustion

** PM/ PM10 / PM2.5 Emission Factors revised per US EPA Region 5, Ron Myers, NEIS document 2007

Natural Gas CO2e factor	CO2	Methane	N2O	Total CO2e Factor
Emission Factor	120,000	2.3	0.22	
GWP	1	25	298	
Weighted Em. Factors	120,000	57.5	65.56	120,123 lb/mmscf

GWP from EPA's Emission Factors for Greenhouse Gas Inventories (modified 4/4/2014)

HAP PTEs for Natural Gas

Maximum Rated TO Capacity:

5.00 million Btu/hr

Heat Value of Gas:

1020 Btu/cf

Fuel Consumption Rate

4,901.96 cf/hr

HAP Name	CAS	Emission Factor lbs/MMscf	Emission Rate (lb/hr)	PTE (tpy)
POM*	NA	8.63E-05	4.23E-07	1.85E-06
Benzene	71-43-2	2.10E-03	1.03E-05	4.51E-05
Formaldehyde	50-00-0	7.50E-02	3.68E-04	1.61E-03
Hexane	110-54-3	1.80E+00	8.82E-03	3.86E-02
Naphthalene	91-20-3	6.10E-04	2.99E-06	1.31E-05
Toluene	108-88-3	3.40E-03	1.67E-05	7.30E-05
Arsenic	7440-38-2	2.00E-04	9.80E-07	4.29E-06
Beryllium	7440-41-7	1.20E-05	5.88E-08	2.58E-07
Cadmium	7440-43-9	1.10E-03	5.39E-06	2.36E-05
Chromium	7440-47-3	1.40E-03	6.86E-06	3.01E-05
Cobalt	7440-48-4	8.40E-05	4.12E-07	1.80E-06
Lead	7439-92-1	5.00E-04	2.45E-06	1.07E-05
Manganese	7439-96-5	3.80E-04	1.86E-06	8.16E-06
Mercury	7439-97-6	2.60E-04	1.27E-06	5.58E-06
Nickel	7440-02-0	2.10E-03	1.03E-05	4.51E-05
Selenium	7782-49-2	2.40E-05	1.18E-07	5.15E-07

Source of Data - AP-42, table 1.4-3, dated 7/98

Total	0.009	0.041	total HAPs, tpy
Max Individual HAP		0.039	hexane, tpy

Note: Thermal oxidizer natural gas combustion emissions are modeled with boiler modeling.



Gensler

Project	Aspen Aerogels, Inc. - Plant 2		
Item Name	Potential-to-Emit Calculations		
Page Name	ANU - N2 Sparging - Ethanol Recovery		
Project No.	REV	DATE	PAGE
21TCI02-31000	A	17-Oct-22	5 OF 6

Ethanol is transferred from the casting tables and the CO2 recovery system to the ANU sparging tanks
Sparging removes dissolved CO2 from the solution

Input Data and assumptions:

- 1 mole = 0.79 cubic feet in Standard conditions
- Molar Mass EtOH 46 g/mol
- Density Nitrogen @ 1 atm 70F: 0.0755 lb/ft³
- Nitrogen Sweep Flowrate:
 - 7 SCFM A
 - 20 SCFM B
 - 50 SCFM C
- Real Sparging flowrate: 15 SCFM
- Active ANU Sparging tanks at any time: 3

Parameter:	Value:	Units:
Temperature:	90	F
Ethanol Saturation Pressure:	88.4	mmHg
EtOH vapor Mole Fraction at headspace at T and 1 atm (760 mmHg) total pressure:	0.12	
EtOH Emissions Sparg N2 Flow A	1.17	moles/min
EtOH Emissions Sparg N2 Flow B	3.35	moles/min
EtOH Emissions Sparg N2 Flow C	8.37	moles/min
EtOH Emissions Sparg N2 Flow A	7.12	lb/hr
EtOH Emissions Sparg N2 Flow B	20.35	lb/hr
EtOH Emissions Sparg N2 Flow C	50.87	lb/hr
Average lb of EtOH emitted per SCFM of N2	1.02	Average lb/hr per SCFM of N2

From Eq. 1

Note: Assumes 97% DRE for RTO

Total AN01-AN09 Emissions	EtOH emitted from Sparging:	200.54	tons/year
	EtOH removed by RTO	194.53	tons/year
	EtOH Controlled Emissions	6.02	tons/year, PTE
	EtOH Controlled Emissions	1.37	lb/hr

Per Each AN01-AN09 Tank Emissions	EtOH emitted from Sparging:	22.28	tons/year
	EtOH removed by RTO	21.61	tons/year
	EtOH Controlled Emissions	0.67	tons/year, PTE
	EtOH Controlled Emissions	0.15	lb/hr

WSP

Project	Aspen Aerogels, Inc. - Plant 2	
Item Name	Potential-to-Emit Calculations	
Page Name	Finishing - Blanket Cutting/Trimming	
Project No.	REV	DATE
21TCI02-31000	A	17-Oct-22

Assumptions

- 4 Trimming Machines
- PM/PM10/PM2.5 collector efficiency 95%
- Emission factor based on data from Aspen Aerogels [REDACTED] Finishing = [REDACTED]

Parameter:	Value:	Units:			
Diameter:	[REDACTED]	inches			
Radius:	[REDACTED]	inches			
Height:	[REDACTED]	inches			
Blanket Volume:	[REDACTED]	in ³			
Blanket Weight	[REDACTED]	lb			
Blankets Production	[REDACTED]	blankets/day			
Blankets to Trimmers	[REDACTED]	blankets/day			
Trimming / Finishing emission factor (lb PM per blanket) ¹	[REDACTED]	lb PM/ blanket			
Finishing PM PTE mass emitted to indoor air	1,164.00	lb PM/day			
Finishing PM PTE mass emitted to indoor air	424860	lb PM/yr	ton/yr per	lb/hr per	lb/hr all
Finishing PM PTE mass emitted to indoor air	212.4	ton PM/yr PTE	Trimmer	Trimmer	Trimmers
Total PM PTE	212.4	ton PM/year	53.1	12.125	48.5 PTE, uncontrolled
Control Efficiency (min)	95%				
Controlled PM/PM10/PM2.5 PTE	10.62		2.66	0.61	2.425 PTE, controlled

1. Aspen [REDACTED] dust collector study results:

Trimming/Finishing of blankets [REDACTED] lb PM/blanket

Aspen Aerogels Inc. - Plant 2 - Proposed Four (4) Cleaver Brooks Steam Boilers CBEX-2D 800 HP - Potential-to-Emit

Boiler PTE is based on EPA's AP-42 Chapter 1.4 emission factors, allowable fuels, and boiler capacities, and Ultra Low-Nox burners (9 ppm guaranteed) except as noted.

Natural Gas Combustion Emissions												
Boilers - Total Heat Rating	107.20	MMBtu/hr total		939,072	MMBtu/yr		921	MMft3/yr gas				
	26.8	MMBtu/hr per boiler										
	PM**	PM10**	PM2.5**	SOx*	NOx*	VOC*	CO*	Pb*	CO2*	CH4	N2O	CO2e
gas emission factor (lb/MMSCF)	0.2	0.2	0.11	0.6	15.0	5.5	84	5.00E-04	120,000	2.3	0.22	120,123
	(Ultra low NOx burners 9 ppm)											
PTE (tpy)	0.0921	0.0921	0.0506	0.276	6.90	2.53	38.67	2.30E-04	55,240	1.06	0.101	55,296.1
PTE (lb/hr)	2.10E-02	2.10E-02	1.16E-02	6.31E-02	1.58	0.58	8.83	5.25E-05	12,612	0.24	0.02	12,625
* AP42 Emission Factors - Chapter 1.4 Natural Gas Combustion												
** PM/ PM10 / PM2.5 Emission Factors revised per US EPA Region 5, Ron Myers, NEIS document 2007												

Natural Gas CO2e factor	CO2	Methane	N2O	Total Factor
Emission Factor	120,000	2.3	0.22	
GWP	1	25	298	
Weighted Em. Factors	120,000	57.5	65.56	120,123 lb/10E6 scf
GWP from EPA's Emission Factors for Greenhouse Gas Inventories (modified 4/4/2014)				

Aspen Aerogels Inc. - Plant 2 - Proposed Four (4) Cleaver Brooks Steam Boilers CBEX-2D 800 HP - Potential-to-Emit

Boiler PTE is based on EPA's AP-42 Chapter 1.4 emission factors, allowable fuels, and boiler capacities, and Ultra Low-Nox burners (9 ppm guaranteed) except as noted.

Natural Gas Combustion Emissions												
Boilers - Total Heat Rating	107.20	MMBtu/hr total		939,072	MMBtu/yr		921	MMBtu/yr gas				
	26.8	MMBtu/hr per boiler										
	PM	PM10	PM2.5	SOx	NOx	VOC	CO	Pb	CO2	CH4	N2O	CO2e
gas emission factor (lb/MMSCF)	0.2	0.2	0.11	0.6	15.0	5.5	84	5.00E-04	120000	2.3	0.22	120123
	(Ultra low NOx burners 9 ppm)											
PTE (tpy)	0.0921	0.0921	0.0506	0.276	6.90	2.53	38.67	2.30E-04	55,240	1.06	0.101	55,296.1
PTE (lb/hr)	2.10E-02	2.10E-02	1.16E-02	6.31E-02	1.58	0.58	8.83	5.25E-05	12,612	0.24	0.02	12,625

* AP42 Emission Factors - Chapter 1.4 Natural Gas Combustion

** PM/ PM10 / PM2.5 Emission Factors revised per US EPA Region 5, Ron Myers, NEIS document 2007

* AP42 Emission Factors - Chapter 1.4 Natural Gas Combustion

** PM/ PM10 / PM2.5 Emission Factors revised per US EPA Region 5, Ron Myers, NEIS document 2007

Natural Gas CO2e factor	CO2	Methane	N2O	Total Factor
Emission Factor	120,000	2.3	0.22	
GWP	1	25	298	
Weighted Em. Factors	120,000	57.5	65.56	120,123 lb/10E6 scf

GWP from EPA's Emission Factors for Greenhouse Gas Inventories (modified 4/4/2014)

Boilers - Georgia Air Toxics Evaluation - Ambient Impact Assessment

Include four (4) x 26.8 mmBTU/hr boilers + Thermal Oxidizer burner 10 mmBTU

Stack temp (°F)	350	Stack temp (°K)	450	Distance to P/L	159.7	meters
Operating Schedule =	8760	hours per year		Distance to P/L	524	feet
Combined Burner Rating =	117.2	MMBtu/hr (four 26.8 mmBTU/hr boilers and 10 mmBTU/hr burner on RTO)				
Stack Height	55.0	ft	16.8	Meters		
Exhaust Flowrate	32,659	acfm		Nearest Bldg Ht.	48	feet
Stack Diameter	0.4572	meters (24" OD, 18" ID)		Nearest Bldg Lgth	283	feet
				Nearest Bldg Lgth	165	feet

Table 1. Emission Rates Compared to MER from Boilers

										SCREEN3 Results	Ambient Impact Assessment						
Pollutant	CAS No.	Emission Factor *	Emissions	Emissions	MER	% of MER	< MER?	Emission Rate (g/s)	SCREEN3 Max. Hourly Ground Level Conc. (ug/m3) for 1.0 g/s emission	Adjusted MGLC for emission rate in col I (ug/m3)	Averaging Period	Adjusted Avg. Period MGLC x 0.08 ann factor (ug/m3)	Long Term AAC (ug/m3)	Meets Long-term Risk Goal?	Adjusted Short Term MGLC x 1.32 ST factor (ug/m3)	Short Term 15-min Term AAC (ug/m3)	Meets Short-term Risk Goal?
Arsenic	7440-38-2	1.96E-07	2.30E-05	2.01E-01	5.67E-02	355.04%	NO	2.90E-06	47.71	1.38E-04	Annual	1.11E-05	2.33E-04	YES	1.82E-04	2.00E-01	YES
Benzene	71-43-2	2.06E-06	2.41E-04	2.11E+00	3.16E+01	6.69%	YES		(at 160 meters)								
Beryllium	7440-41-7	1.18E-08	1.38E-06	1.21E-02	9.73E-01	1.24%	YES										
Cadmium	7440-43-9	1.08E-06	1.26E-04	1.11E+00	1.35E+00	82.01%	YES										
Chromium (total, II and III)	7440-47-3	1.37E-06	1.54E-04	1.35E+00	5.64E+01	2.32%	YES										
Chromium VI	7440-47-3	1.37E-06	6.43E-06	5.64E-02	2.02E-02	279.04%	NO	8.11E-07	47.71	3.87E-05	Annual	3.09E-06	8.30E-05	YES	5.11E-05	10	YES
Cobalt	7440-48-4	8.24E-08	9.65E-06	8.45E-02	1.17E+01	0.72%	YES		(at 160 meters)								
Copper	7440-50-8	8.33E-07	9.77E-05	8.56E-01	1.17E+02	0.73%	YES										
Formaldehyde	50-00-0	7.35E-05	8.62E-03	7.55E+01	2.67E+02	28.27%	YES										
Hexane	110-54-3	1.76E-03	2.07E-01	1.81E+03	1.70E+05	1.07%	YES										
Lead	7439-92-1	4.90E-07	5.75E-05	5.03E-01	5.84E+00	8.62%	YES										
Manganese	7439-96-5	3.73E-07	4.37E-05	3.82E-01	1.22E+01	3.14%	YES										
Mercury	7439-97-6	2.55E-07	2.99E-05	2.62E-01	7.30E+01	0.36%	YES										
Molybdenum	7439-98-7	1.08E-06	1.26E-04	1.11E+00	1.74E+03	0.06%	YES										
Naphthalene	91-20-3	5.98E-07	7.01E-05	6.14E-01	7.30E+02	0.08%	YES										
Nickel	7440-02-0	2.06E-06	2.41E-04	2.11E+00	3.86E+01	5.48%	YES										
Pentane	109-66-0	2.55E-03	2.99E-01	2.62E+03	3.42E+05	0.77%	YES										
Propane	74-98-6	1.57E-03	1.84E-01	1.61E+03	2.09E+05	0.77%	YES										
Selenium	7782-49-2	2.35E-08	2.76E-06	2.42E-02	2.34E+01	0.10%	YES										
Toluene	108-88-3	3.33E-06	3.91E-04	3.42E+00	1.22E+06	0.00%	YES										

* Source: EF from AP 42 Tables 1.4-1 through 1.4-4.

Note: Cr(II/III) are 96% of total chromium for natural gas emissions per Ga EPD

Note: Cr+6 is 4% of total chromium for natural gas emissions per Ga EPD

10/17/22

10:13:49

*** SCREEN3 MODEL RUN ***

*** VERSION DATED 13043 ***

Aspen P2 Boilers Ga TAPs 10.17.22

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT
EMISSION RATE (G/S) = 1.000000
STACK HEIGHT (M) = 16.8000
STK INSIDE DIAM (M) = 0.4572
STK EXIT VELOCITY (M/S)= 93.8846
STK GAS EXIT TEMP (K) = 450.0000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = 14.6000
MIN HORIZ BLDG DIM (M) = 50.0000
MAX HORIZ BLDG DIM (M) = 86.3000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 32659.000 (ACFM)

BUOY. FLUX = 16.785 M**4/S**3; MOM. FLUX = 299.913 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)		U10M STAB (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	SIGMA DASH
160.	47.71	4	15.0	16.2	4800.0	17.29	12.67	12.53	SS
200.	40.70	4	15.0	16.2	4800.0	17.56	15.56	13.81	SS
300.	28.81	4	10.0	10.8	3200.0	22.28	22.61	15.00	SS
400.	25.85	4	10.0	10.8	3200.0	22.28	29.45	18.04	SS
500.	22.09	4	10.0	10.8	3200.0	22.28	36.15	20.97	SS
600.	18.98	4	8.0	8.6	2560.0	26.74	42.72	22.75	SS
700.	16.93	4	8.0	8.6	2560.0	26.74	49.19	25.53	SS
800.	14.98	4	8.0	8.6	2560.0	26.74	55.57	28.25	SS
900.	13.24	4	8.0	8.6	2560.0	26.74	61.88	30.90	SS
1000.	11.90	4	8.0	8.6	2560.0	26.74	68.13	32.09	SS
1100.	10.68	4	8.0	8.6	2560.0	26.74	74.31	34.12	SS
1200.	10.11	4	5.0	5.4	1600.0	42.61	80.44	36.09	SS
1300.	9.555	4	5.0	5.4	1600.0	42.61	86.52	38.00	SS

1400.	9.017	4	5.0	5.4	1600.0	42.61	92.55	39.86	SS
1500.	8.504	4	5.0	5.4	1600.0	42.61	98.54	41.67	SS
1600.	8.021	4	5.0	5.4	1600.0	42.61	104.49	43.44	SS
1700.	7.569	4	5.0	5.4	1600.0	42.61	110.41	45.17	SS
1800.	7.191	4	4.5	4.9	1440.0	47.46	116.28	46.86	SS
1900.	6.871	4	4.0	4.3	1280.0	52.81	122.13	48.52	SS
2000.	6.609	4	3.5	3.8	1120.0	58.71	127.94	50.15	SS
2100.	6.389	4	3.5	3.8	1120.0	58.71	133.73	51.75	SS
2200.	6.171	4	3.5	3.8	1120.0	58.71	139.48	53.33	SS
2300.	6.052	5	1.0	1.2	10000.0	88.43	110.53	41.65	NO
2400.	6.213	5	1.0	1.2	10000.0	88.43	114.73	42.43	NO
2500.	6.358	5	1.0	1.2	10000.0	88.43	118.91	43.20	NO
2600.	6.486	5	1.0	1.2	10000.0	88.43	123.08	43.96	NO
2700.	6.600	5	1.0	1.2	10000.0	88.43	127.24	44.71	NO
2800.	6.699	5	1.0	1.2	10000.0	88.43	131.39	45.46	NO
2900.	6.785	5	1.0	1.2	10000.0	88.43	135.52	46.19	NO
3000.	6.859	5	1.0	1.2	10000.0	88.43	139.64	46.92	NO
3500.	7.073	5	1.0	1.2	10000.0	88.43	160.07	50.45	NO
4000.	7.093	5	1.0	1.2	10000.0	88.43	180.22	53.81	NO
4500.	6.923	5	1.0	1.2	10000.0	88.43	200.13	56.65	NO
5000.	6.705	5	1.0	1.2	10000.0	88.43	219.82	59.35	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 160. M:

160.	47.71	4	15.0	16.2	4800.0	17.29	12.67	12.53	SS
------	-------	---	------	------	--------	-------	-------	-------	----

DWASH= MEANS NO CALC MADE (CONC = 0.0)

DWASH=NO MEANS NO BUILDING DOWNWASH USED

DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED

DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED

DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

* SUMMARY OF TERRAIN HEIGHTS ENTERED FOR *

* SIMPLE ELEVATED TERRAIN PROCEDURE *

TERRAIN	DISTANCE RANGE (M)	
HT (M)	MINIMUM	MAXIMUM
-----	-----	-----
0.	160.	5000.

*** REGULATORY (Default) ***

PERFORMING CAVITY CALCULATIONS
WITH ORIGINAL SCREEN CAVITY MODEL
(BRODE, 1988)

*** CAVITY CALCULATION - 1 *** *** CAVITY CALCULATION - 2 ***

CONC (UG/M**3) = 0.000	CONC (UG/M**3) = 0.000
CRIT WS @10M (M/S) = 99.99	CRIT WS @10M (M/S) = 99.99
CRIT WS @ HS (M/S) = 99.99	CRIT WS @ HS (M/S) = 99.99
DILUTION WS (M/S) = 99.99	DILUTION WS (M/S) = 99.99

CAVITY HT (M) = 14.87 CAVITY HT (M) = 14.60
CAVITY LENGTH (M) = 60.95 CAVITY LENGTH (M) = 47.14
ALONGWIND DIM (M) = 50.00 ALONGWIND DIM (M) = 86.30

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S. CONC SET = 0.0

END OF CAVITY CALCULATIONS

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	47.71	160.	0.

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

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WSP

Aspen Aerogels Plant 2

Proposed Emerg Gen & Fire Pump Engines - Potential-to-Emit

#2 Fuel Oil (BTU/gal) 136,600 Btu/gal, average Sulfur Content of Fuel 15 ppm Operation: 500 hours/year emergency & maintenance

Capacity Data						
Source ID No.	Full Standby Fuel Rate (gph)	Max Fuel Through put (gpy)	Fuel Through put (ft3/hr)	Fuel Through put (MMft3/yr)	BHP Rating @ full standby	BSFC (Btu/bhp hr)
GEN1- Emergency Generator (1750 kw)	60	30,000	8.0	0.0040	2333	3513
FP01 Fire Pump (150 hp)	5	2,500	0.7	0.0003	150	4553

Criteria Pollutant Potential Emissions

Sample Calculation: AP-42 Emission Factor (lb/MMBtu) X 136,600 Btu/gal diesel fuel x fuel consumption rate (gal/hr) ÷ 1,000,000 Btu/MMBtu = Emission Rate (lb / hr)

Sample Calculation: Mfr. Emission Factor (gram/HP-hr) X HP Rating at full standby load ÷ 453.593 grams / LB = Emission Rate (lb / hr)

Source ID No./Reference	1. Emission Factor (lbs/MMBtu)					Potential Emissions (lbs/hr)					Potential Emissions at 500 operating hours (tons/yr)				
	NO _x	CO	VOC	SO ₂ <small>[500 ppm Sulfur]</small>	PM ₁₀ -PM _{2.5}	NO _x	CO	VOC	SO ₂	PM ₁₀	NO _x	CO	VOC	SO ₂	PM ₁₀ -2.5
GEN1 - 40 CFR 60 Subpart IIII, 2007+ standards.	1.28	0.71	0.035	0.0015	0.041	10.49	5.81	0.29	0.01	0.34	2.62	1.45	0.072	0.003	0.084
FP01-40 CFR 60 Subpart IIII, 2007+ standards.	1.98	1.01	0.155	0.0016	0.16	1.35	0.69	0.11	0.00	0.11	0.338	0.172	0.02647	0.00026	0.0280
						11.84	6.50	0.40	0.01	0.45	2.96	1.63	0.10	0.003	0.11

Hazardous Air Pollutant (HAP) Emissions

Sample Calculation: AP-42 Emission Factor (lb/MMBtu) X 136,600 Btu/gal diesel fuel x fuel consumption rate (gal/hr) ÷ 1,000,000 Btu/MMBtu = Emission Rate (lb / hr)

Source ID No.	Emission Factors (lb/MMBtu) <small>AP- 2, c03a0 , Tbl 3. -3] [Ref 2: AP- 2, c03s03, Tbl. 3.3-2]</small>						Potential Emissions (lbs/hr)						Potential Emissions at 500 operating hours (tons/yr)					
	Benzene	Ethyl benzene	Toluene	Xylenes	n-hexane	Form-aldehyde	Benzene	Ethyl benzene	Toluene	Xylenes	n-hexane	Form-aldehyde	Benzene	Ethyl benzene	Toluene	Xylenes	n-hexane	Form-aldehyde
GEN1	7.76E-04	Not Available	2.81E-04	1.93E-04	Not Available	7.89E-05	6.36E-03	Not Available	2.30E-03	1.58E-03	Not Available	6.47E-04	1.59E-03	Not Available	5.76E-04	3.95E-04	Not Available	1.62E-04
FP01	7.76E-04	Not Available	2.81E-04	1.93E-04	Not Available	7.89E-05	5.30E-04	Not Available	1.92E-04	1.32E-04	Not Available	5.39E-05	1.33E-04	Not Available	4.80E-05	3.30E-05	Not Available	1.35E-05
Total		Not Available			Not Available		6.89E-03	Not Available	2.49E-03	1.71E-03	Not Available	7.01E-04	1.72E-03	Not Available	6.24E-04	4.28E-04	Not Available	1.75E-04

TOTAL HAP	1.18E 02 lb/hr
-----------	----------------

TOTAL HAP	2.95E 03 TPY
-----------	--------------

Emergency Engines - Ga Air Toxics Evaluation - Ambient Impact Assessment								
Operating Schedule =		8760						
Combined Heat Rating =		8.8790 MMBtu/hr						
Stack Height		12.0000 ft						
Exhaust Flowrate		5000.0 acfm						
Stack Diameter		1.0000 ft						
Table 1. Emission Rates Compared to MER from Boilers								
		Emission Factor	Emissions	Emissions	Emissions	MER	% of	<
Pollutant	CAS No.	(lb/MMBtu)	(lb/hr)	lb/yr	tpy	(lb/yr)	MER	MER?
Benzene	71-43-2	7.76E-04	6.89E-03	3.45E+00	1.72E-03	3.16E+01	10.90%	YES
Formaldehyde	50-00-0	7.89E-05	9.47E-04	4.73E-01	2.37E-04	2.67E+02	0.18%	YES
Toluene	108-88-3	2.81E-04	1.41E+00	7.03E+02	3.51E-01	1.22E+06	0.06%	YES
Xylenes	133-02-07	1.93E-04	1.93E-04	9.65E-02	4.83E-05	2.40E+03	0.004%	YES



Aspen Aerogels LLC - Plant 2

IA01 - Catalyst and Opacifier Rotary Airlock Loading/Mixing Potential-to-Emit (PTE) Calculations

Material		Emission	Throughput (lbs/d)	Throughput (lbs/hr)	Throughput (tons/hr)	Uncontrolled Hourly Emissions from Rotary Lock Loading (lbs/hr)	Uncontrolled Annual Emissions from Rotary Lock Loading (tons/yr)	Controlled Annual Emissions from Rotary Lock Loading (lbs/yr)
Catalyst	[REDACTED]	PM	2,269	94.6	0.0473	0.0288	0.13	0.0063
		PM 10 / PM 2.5				0.0288	0.13	0.0063
	[REDACTED]	PM	5,360	223	0.112	0.0029	0.013	0.0006
		PM 10 / PM 2.5				0.0021	0.009	0.0005
[REDACTED]	[REDACTED]	PM	8,216	342	0.171	0.104	0.46	0.0229
		PM 10 / PM 2.5				0.104	0.46	0.0229

Notes:

VOC emissions are included in Tank Farm emissions.

Daily throughput data taken from Q4 2025 daily material usage data from Daily Usage for Air Permit Rev 3 spreadsheet

Dust Collector filtration efficiency 95%

AP-42 Emission Factors

[REDACTED] Emission factors are from AP-42 11.17 Lime Manufacturing Pg 11.17-11

Product Loading, closed truck Filterable PM 0.61 lbs/ton

An emission factor for [REDACTED] could not be located; emission factor for sodium carbonate (AP-42 8.12 page 8.12-4) was used in lieu.

Soda Ash Screening, Total PM 0.026 lbs/ton

Soda Ash Screening, PM 10/PM 2.5 PM 0.019 lbs/ton

AP-42 11.31.1 contains emission factors for [REDACTED] production (provided below), but not for transfer/handling activities.

Rotary dryer, sand blasting grit, with fabric filter 0.015 lbs/ton

Because no emission factor for transfer and handling of [REDACTED] was available, the above-referenced and more conservative emission factor for [REDACTED] was used.

Conclusion: These activities are proposed as insignificant activity IA01.

Assumptions

- Fugitive ethanol - VOC emissions occur when blankets are removed from the transfer cans after extraction, and transferred to ovens OV01-OV05.
- ████ by weight of Ethanol remains bonded and █████ of Ethanol unbonded. Bonded ethanol is removed in heat curing, see OV01-OV05)
- Transfer cans are ventilated to PVH system when opened
- It is assumed 50% of the unbonded Ethanol evaporates under the PVH hood, and 50% fugitive to the room air, as the blanket is transferred to the cure ovens.

Parameter:	Value:	Units:
Diameter:	████	inches
Radius:	████	inches
Height:	████	inches
Surface Area:	████	in^2
Surface Area:	████	m^2
Blankets Production	████	blankets/day
Blanket Transfer Process	████	min
Molar Mass EtOH:	46.07	g/mol
Molar Evaporation Flux:	1.40E-05	mol/(m^2*s)
Seconds per Year:	59480400	sec/year
Total EtOH Lost from Evaporation:	217,773	g/year
Total EtOH Lost from Evaporation:	0.24	tons/year, uncontrolled
EtOH Emitted to Room Air:	0.12	tons/year
EtOH Emitted to PVH:	0.12	tons/year
Controlled EtOH Emissions:	0.1235	tons/year, controlled

Conclusion: This activity is proposed as insignificant activity IA02.

ASPEN AEROGELS PLANT II



IA04: FUGITIVE FLANGE & VALVE POTENTIAL-TO-EMIT (PTE) CALCULATIONS

Equipment	Units	VOC Emissions Uncontrolled (lb/hr- part)	VOC Emissions Uncontrolled (lb/hr)	VOC Emissions Uncontrolled (tons/yr)	Total VOC Emissions from Flanges & Valves (tons/yr)
PHASE I					1.2
Flange	24	3.9E-05	9.3E-04	4.1E-03	
Valve	79	1.8E-03	0.14	0.62	
PHASE II					
Flange	22	3.9E-05	8.5E-04	3.7E-03	
Valve	73	1.8E-03	0.13	0.57	
Notes:					
Flange and valve counts are from Aspen Process Piping MTO - Phase 1 and Phase 2 documents					
Emission Factors from AP-42, Ch. 5.1-4, Table 5.1-4 for petroleum refinery of 330,000 barrels/day crude capacity					
VOC Emissions from 46,500 Flanges (lb/d)			600		
VOC Emissions from 11,500 Valves (lb/d)			6,800		
Assume ethanol emissions equivalent to petroleum refinery emissions, proportional to daily throughput and number of valves/flanges					
Estimated Max. Daily Ethanol Transfers in Plant II (MGD)			1	(sum of all process daily throughputs)	
Estimated Max. Daily Ethanol Transfers in Plant II (barrel/day)			23,810		

Conclusion: *These activities are proposed as insignificant activity IA04.*

Attachment E

Safety Data Sheets

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APPENDIX E NOISE ANALYSIS

March 8, 2022

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Re: **Acoustical Consulting Services – Ambient Sound Level Survey**
Aspen Aerogels
Statesboro, Georgia

Gensler Project Number 002.8918.100

TECHNICAL MEMORANDUM - DRAFT

At the request of Gensler Architects, SLR International Corporation (SLR) has conducted an ambient sound level survey at the Aspen Aerogels site in Bulloch County, Georgia. The site is currently under construction. The results of the ambient sound level survey are presented in this report and compared to project noise goals and regulatory limits.

AMBIENT SOUND LEVEL SURVEY

General

Overnight sound levels were measured starting on September 7th, 2020 and concluding on September 8th, 2022. The purpose of the measurement was to determine the ambient sound levels prior to the completion and occupation of the Aspen Aerogels office building and lab.

Measurement Locations

Sound levels were monitored at two locations. Measurement Location 1 (ML1) was on the southeast property line and Measurement Location (ML2) was at the southwest property line. **Map 1** at the end of this report shows the two measurement locations.

Measurement Instrumentation

Two Larson Davis Model 824 Type 1 sound level meters were used (serial numbers A0917 and A0975). The meters recorded 1/3-octave band and full-octave band sound levels as well as statistical parameters. The meters collected sound levels in terms of ten-second sound level averages, and the statistical parameters were logged on a fifteen-minute basis. The meters hold factory calibration certification traceable to NIST standards, and were field calibrated before and after the measurement period using a Larson Davis CAL200 pure tone calibrator, serial number 15673. Microphone windscreens were used for all measurements.

Weather

The temperature ranged from approximately 77 to 84°F during the measurement survey. The skies were overcast to partly cloudy. Wind speed ranged from 0 to 5 mph from the various directions. The relative humidity ranged from approximately 65 to 76%. The ground conditions at the site were dry.

MEASUREMENT RESULTS

Measurement Locations

Graph 1 and **Graph 2**, attached, show the sound level measurement results for the two measurement locations. Each graph is the result of a single set of measurements at a single position. The upper graph shows the 10-second L_{eq} , represented by a solid blue line, the 15-minute L_{eq} , a stepped red line, and the 15-minute L_{90} , a stepped green line. The L_{90} is the sound level exceeded 90 percent of the time. This parameter is useful for characterizing background levels and contributions from sources that are constant.

The lower portion of each graph shows frequency-based data. Sound frequency is plotted on the vertical axis and time is plotted on the horizontal axis. The color indicates the A-weighted sound pressure level at each frequency. The frequency data is useful for determining the presence of any tonal components in the overall sound and helps to characterize the presence of specific noise emissions.

The logged sound level values at each position were used to calculate overall the daytime average levels (L_d), the nighttime average levels (L_n), and the overall average sound levels, L_{eq} for the full measurement period. The results of the survey are summarized in **Table A**.

Table A – Summary of Ambient Sound Survey Results, A-Weighted Decibels, dBA

Measurement Location	Description	Daytime Average (L_d)	Nighttime Average (L_n)	Period Overall (L_{eq})
ML1	Southeast PL	54.2	53.3	53.9
ML2	Southwest PL	59.8	53.8	58.4

¹ Daytime average sound level (0700 – 2200 hours)

² Nighttime average sound level (2200 – 0700 hours)

³ Average sound level for the entire measurement period

At Measurement Location 1 the dominant source was traffic on Highway 16. Insects and birds were also audible. Noise from construction activity at the Aspen Aerogels site was minimal at this location. The sources at Location 2 included traffic on Highway 16 as well as traffic on Highway 31, and on

Rocky Road when present. During the daytime noise from the concrete plant and traffic entering the site was also audible at this location.

Local Zoning Requirement

The Bulloch County, Georgia Industrial Performance Standard (applies to Light Industrial and Heavy Industrial districts) states, “Noise as measured at the street or property line may not exceed 60 decibels and must comply with requirements of the County’s Code of Ordinances.” This limit is presumed to in terms of standard-practice A-weighted (dBA) decibels.

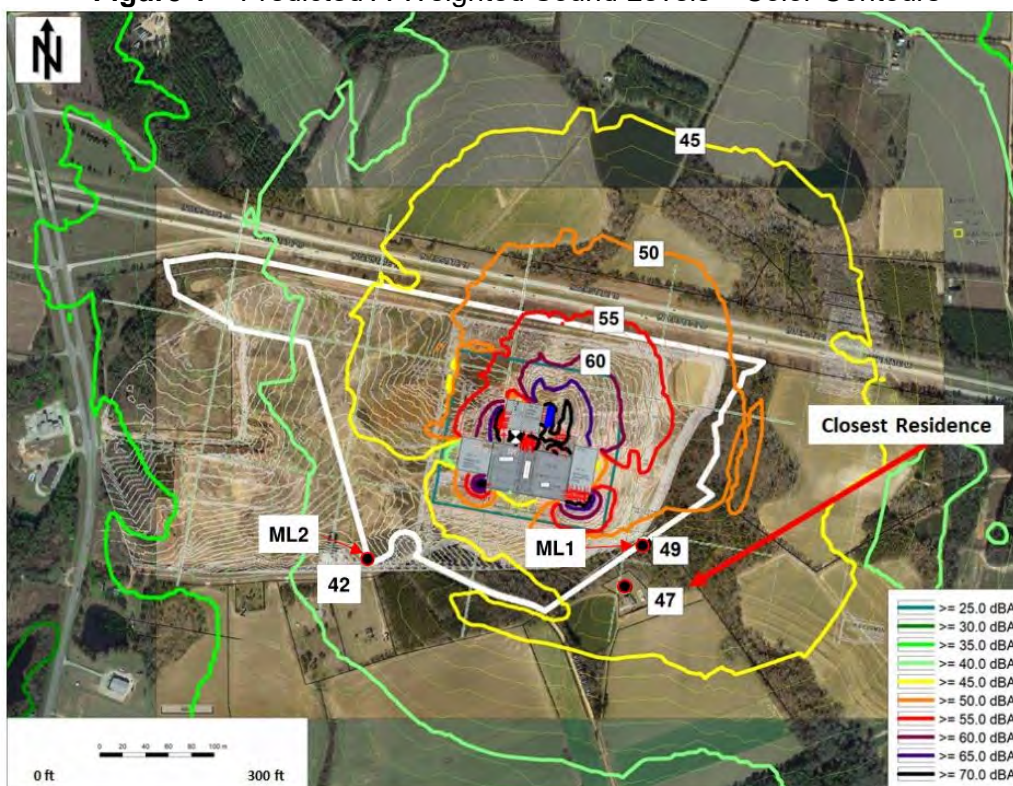
Outdoor Noise Model Development

During the Schematic Design Phase, SLR developed a sound propagation model (“noise model”) for the Project. This report, dated December 14, 2021, is attached for reference. The three-dimensional model was developed using CadnaA, an internationally accepted sound modeling package developed by DataKustik GmbH. Sound level sources anticipated from the Aspen Aerogels facility operation were used as input for the model. Distance, air absorption, reflections, and other site factors were used in the model to calculate the resulting sound levels expected at the two Measurement Locations. The propagation model was also used to create the color sound level contours shown in **Figure 1**.

Noise Model Results

Figure 1 shows the modeling results in the form of calculated A-Weighted sound level contours. The predicted sound levels at Measurement **Location 1** (ML1) is 49 dBA, and 42 dBA at **Measurement Location 2**. The predicted sound level contributions from the future Aspen Aerogels operations are below the levels measured during the ambient survey.

Figure 1 – Predicted A-Weighted Sound Levels – Color Contours



CONCLUSION

At Measurement Locations 1 and 2, the predicted sound levels from the Aspen Aerogels facility are 49 dBA and 42 dBA, respectively. The predicted level at the closest residence is 47 dBA. The property-line contribution predictions are below the ambient levels measured during the survey, (**Table A**), and are well below the 60 dBA limit in the Bulloch County, Georgia Industrial Performance Standard.

This concludes this Technical Memorandum. Please call if you have any questions or comments.

Sincerely,

SLR INTERNATIONAL CORPORATION

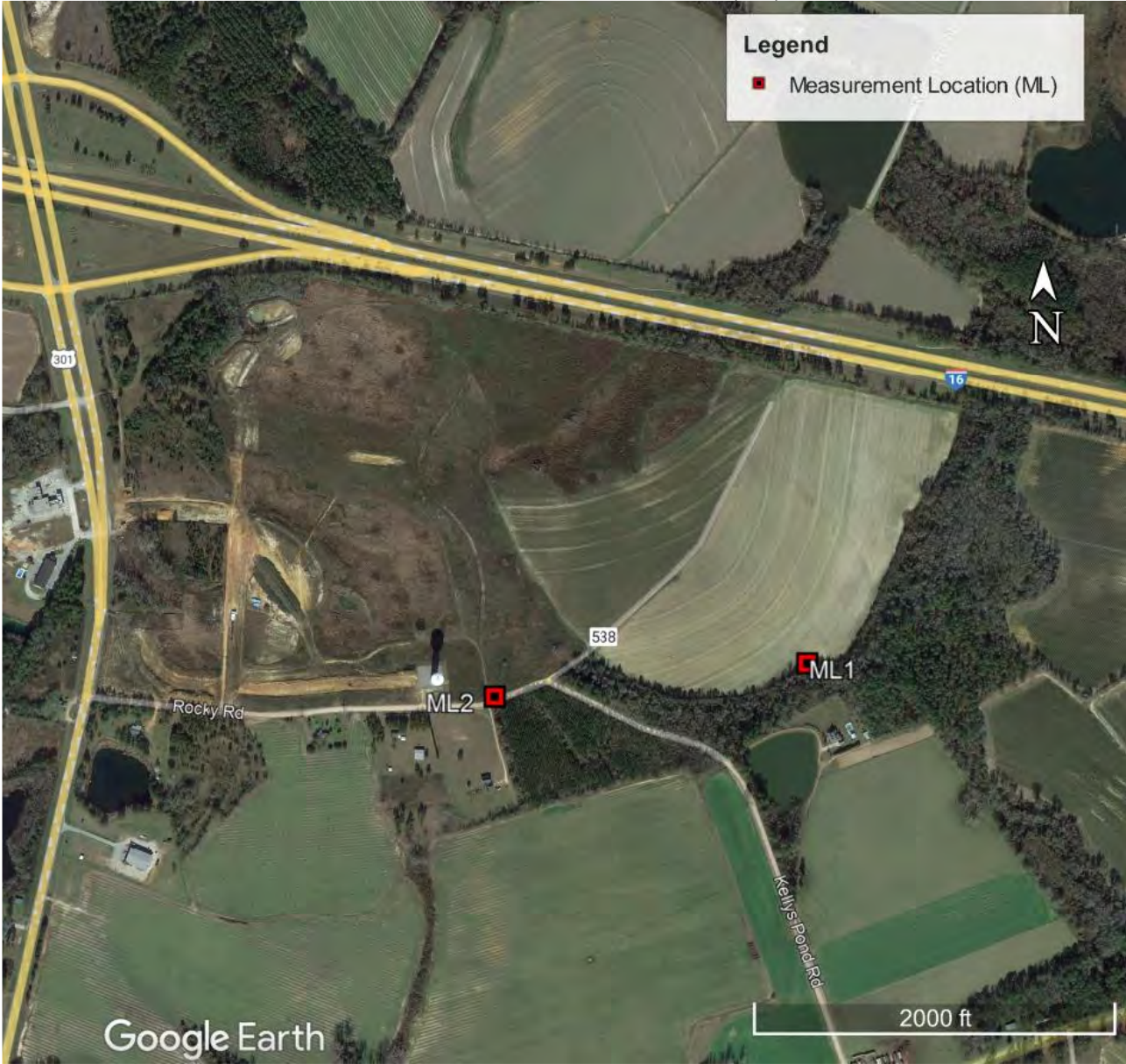


Juan Cerda
Senior Consultant

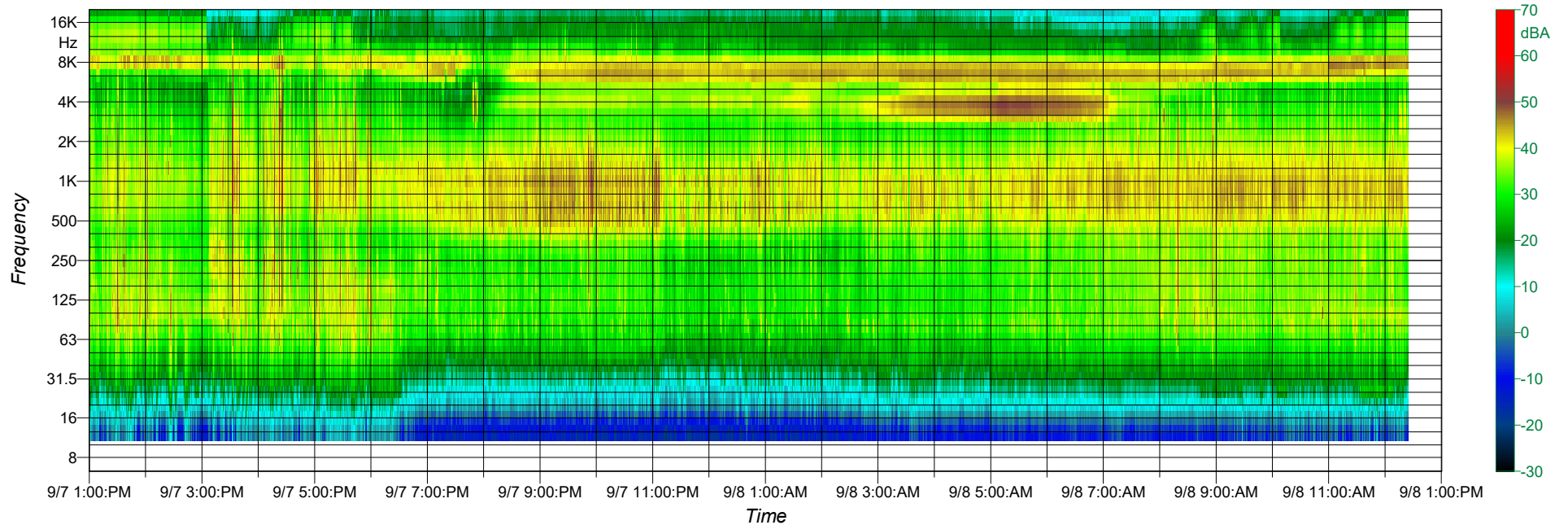
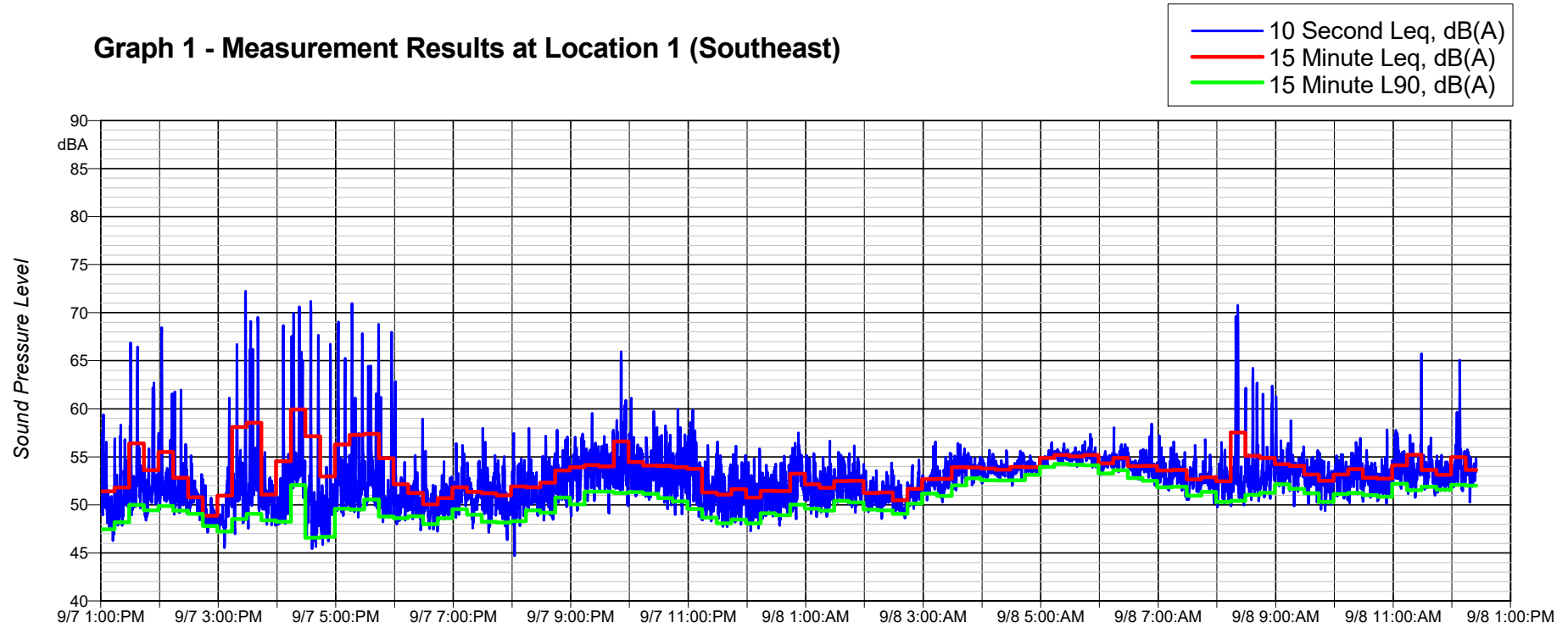
JMC/jc SLR - Aspen Aerogels Ambient Survey_09-2022 v1.0.docx

Enc: Map 1
Graphs 1 & 2
December 14, 2021 - Aspen Aerogels Schematic Design Phase Noise Model Report

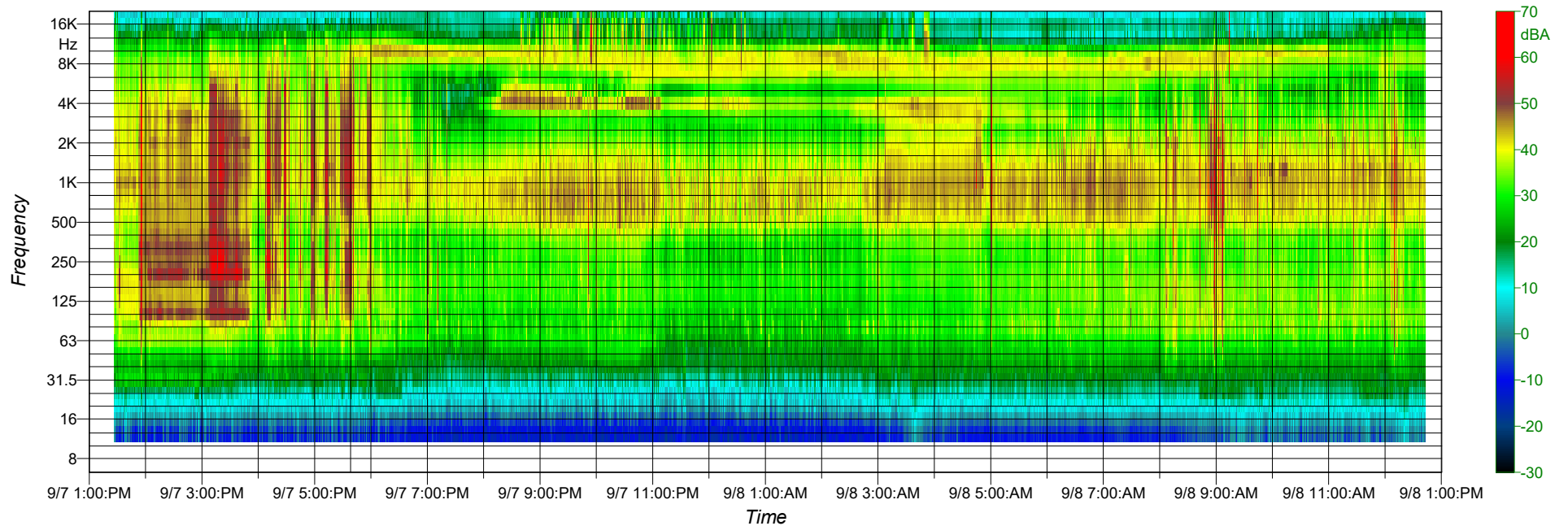
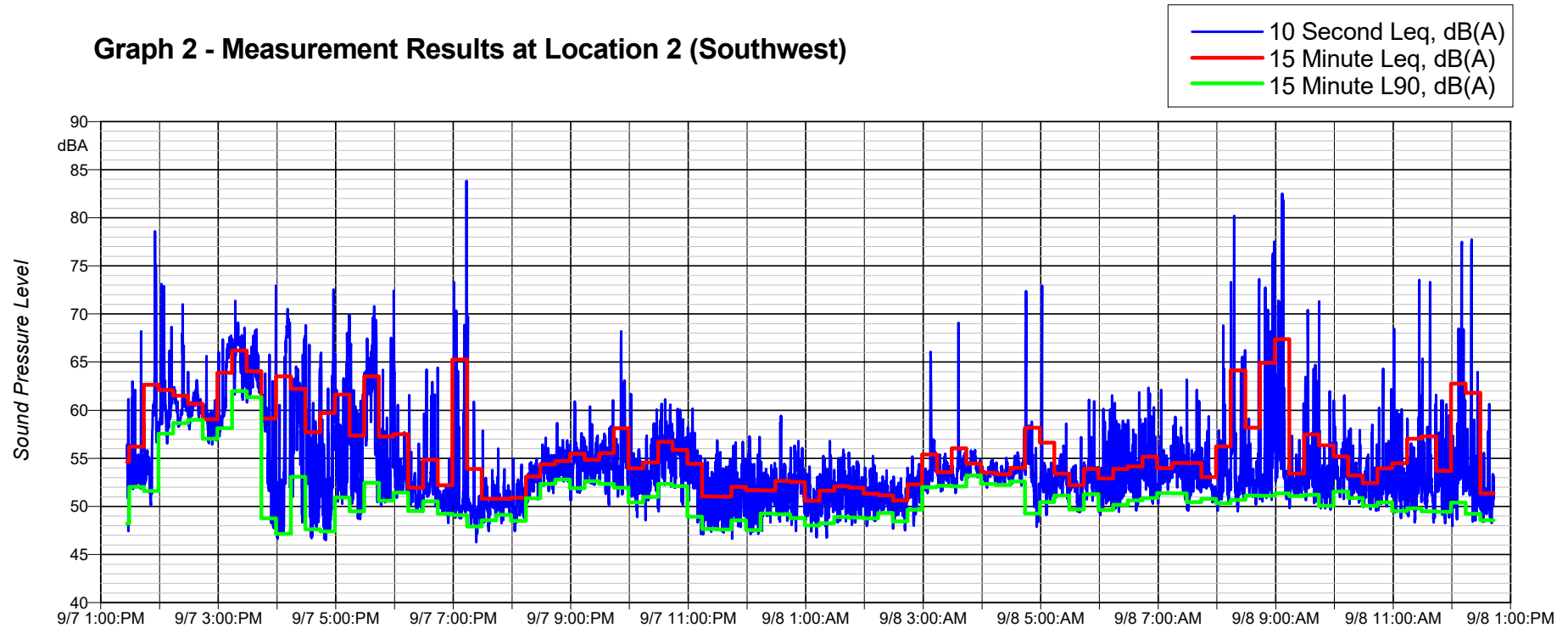
Map 1 – Measurement Locations (ML)



Graph 1 - Measurement Results at Location 1 (Southeast)



Graph 2 - Measurement Results at Location 2 (Southwest)



December 14, 2021

Suzanne Schreider

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Gensler

2 Houston Center
909 Fannin Street
Suite 200
Houston, Texas 77010

Re: Aspen Aerogels Schematic Design Phase Noise Model

1. INTRODUCTION

At the request of Gensler Architects, SLR International Corporation (SLR) has prepared a schematic design phase noise study for the Aspen Aerogels project (Project). The noise model predicts that sound levels from the Project equipment will be below 60 dBA at the property line.

The acoustic analysis for the Schematic Design phase of this project considered the following acoustic elements:

- Environmental sound levels (outdoor)
- Occupational sound levels (indoor)

2. REGULATORY BACKGROUND

Local Zoning Requirement

The Bulloch County, Georgia Industrial Performance Standard (applies to Light Industrial and Heavy Industrial districts) states, "Noise as measured at the street or property line may not exceed 60 decibels and must comply with requirements of the County's Code of Ordinances." This is understood to be A-weighted (dBA) decibels.

Occupational

Per the Occupational Safety and Health Administration (OSHA), occupational noise exposure limits are described in the Code of Federal Regulations (CFR). The 29 CFR 1910.95 "Hearing Conservation Amendment" states,

The employer shall administer a continuing, effective hearing conservation program, as described in paragraphs (c) through (o) of this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with appendix A and Table G-16a, and without regard to any attenuation provided by the use of personal protective equipment.

From a Technical Monograph created by 3M corporation¹, the following describes the Time Weighted Average (TWA):

The 8-hour time-weighted average sound level (TWA) is the sound level that would produce a given noise dose if an employee were exposed to that sound level continuously over an 8-hour workday. This is true regardless of the length of the actual workshift. For example, workday exposures of 4 hours at 90 dB, 8 hours at 85 dB, or 12 hours at 82 dB, all correspond to a TWA of 85 dBA or a noise dose of 50%. If a noise level is constant for an entire 8-hour workshift the TWA is simply equal to the measured sound level.

For the purposes of having a simple, single-number design goal for interior noise levels, it is typical to design for a steady sound level of no more than 85 dBA in areas where staff may frequently walk.

3. OUTDOOR NOISE MODEL DEVELOPMENT

SLR developed a sound propagation model (“noise model”) of the Project. The three-dimensional model was developed using CadnaA, a commercial sound modeling package developed by DataKustik GmbH. The software considers sound decay due to distance, ground, and atmospheric effects, shielding from barriers and buildings, reflections from surfaces and other sound propagation properties. The software is based on published engineering standards. The ISO 9613 standard was used for air absorption and other sound propagation calculations.

The outdoor model was built using the site layout and elevation view drawings provided. The outdoor mechanical equipment that was included in the noise model is summarized in Table 3-1. The table also provides the sound power level used for each source. All air handling units and exhaust fans were assumed to be in the mechanical equipment yards, per locations provided by the MEP engineer.

The sound power levels for the fans represent the casing radiated sound, not the sound attributable to an un-ducted fan inlet or outlet. Any un-ducted/open fan exhausts or inlets should be run through a filter or silencer with acoustical attenuation that will limit the sound power of the inlet or outlet to equal to or less than the sound power listed for the fan casing in Table 3-1.

¹ E-A-R LOG 11, “The Hearing Conservation Amendment”, 3M Hearing Conservation Archives

Table 3-1: Modeled Equipment and Reference A-Weighted Sound Levels, dBA

Item	Sound Power Level (PWL, dBA)				
Cooling Tower (All 6 Fans)	115				
Dust Collector Fan	102				
Regenerative Thermal Oxidizer (RTO)	92				
<u>Exhaust Fans</u>	Sound Power Level (PWL, dBA)	Cubic Feet Per Minute, per Fan	Static Pressure (inches wg)	Location/Service	Quantity
EF-4A	96	26667	6.2	CASTING	3
EF-4B	96	26667	6.2	CASTING	3
EF-4C	91	9333	6.2	TANK MEZZ.	3
EF-4D	94	16667	6.2	EXTRACTOR PIT	3
EF-4E	92	11333	6.2	CONVERTING	3
<u>Air Handling Units</u>	Sound Power Level (PWL, dBA)	Cubic Feet Per Minute, per Fan	Static Pressure (in. wg)	Location/Service	Quantity
AHU-2A (Supply Fans)	82	5000	3	OFFICE	4
AHU-2A (Return Fans)	86	20000	2.4	OFFICE	2
AHU-2B (Supply Fans)	84	8000	3	OFFICE/LAB	4
AHU-2B (Return Fans)	88	32000	2.4	OFFICE/LAB	2
AHU-4A	87	13333	3	CASTING	6
AHU-4B	87	13333	3	CASTING	6
AHU-4C	84	7000	3	TANK MEZANNINE	4
AHU-4D	84	7000	3	TANK MEZANNINE	4
AHU-4E	84	8333	3	EXTRACTOR PIT	6
AHU-4F	84	8333	3	EXTRACTOR PIT	6
AHU-4G (Supply)	84	8000	3	OVEN	4
AHU-4H (Supply)	84	8000	3	OVEN	4
AHU-4G (Return)	82	8000	2.4	OVEN	4
AHU-4H (Return)	82	8000	2.4	OVEN	4
AHU-4I	69	8.5	3	CONVERTING	4
AHU-4J	69	8.5	3	CONVERTING	4
AHU-6A (Supply)	87	13333	3	CUP	6
AHU-6A (Return)	85	13333	2.4	CUP	6
AHU-6B	87	13333	3	CUP	6
AHU-6A (Return)	85	13333	2.4	CUP	6
AHU-6C (Supply)	85	10000	3	CUP	4
AHU-6C (Return)	85	10000	3	CUP	4
AHU-6D (Supply)	84	7500	3	CUP	2
AHU-6D (Return)	85	10000	3	CUP	2

4. MODELING RESULTS

Figure 1 shows the modeling results in the form of calculated A-Weighted sound level contours. Each color contour line indicates the Project sound level contribution as distance from the Project increases. Levels are highest near the cooling tower and the mechanical equipment yards. It is understood that the mechanical equipment yards on the south side (nearest the office and raw material warehouse) will be shielded with metal panel screens. The screens were not assumed to provide any significant sound attenuation, so the modeling results are somewhat conservative.

The thick white line indicates the Project property boundary. The highest sound level contour that crosses a property boundary is 55-56 dBA to the north. The calculated sound level near the closest residential property boundary to the southeast is 49 dBA, and the calculated sound level at the actual residence is 47 dBA.

5. TRUCK ACTIVITY

Truck traffic sound levels will be based on project traffic volume projections provided by others, which were not available when this memo was prepared. Presumably traffic into and out of the Project complex will occur primarily during daytime hours, and trucks will enter/exit mostly along the western side of the Finished Good Warehouse. The access road on the western side of the building is approximately 1,400 feet from the closest residence to the southeast, which would provide close to a 50-dBA noise reduction from the road to the home. A large truck would be expected to emit 75-80 dBA at 50 feet (Federal Highway Administration), which would result in an instantaneous sound level of approximately 50 dBA at 1400 feet away. Though very approximate, a single large truck passing into or out of the facility would likely not generate sound levels above 60 dBA at that residential property line.

Given that truck activity will not be constant, it is questionable as to whether the 60-dBA Industrial Performance Standard would necessarily apply. Once better information is available regarding truck volumes and entry/exit patterns, computer modeling can be used to calculate more accurate long-term and instantaneous sound levels due to truck traffic.

6. OCCUPATIONAL NOISE EVALUATION

Our understanding is that the manufacturing process used in the Project is relatively quiet, and that hearing protection is not required at the existing Aspen Aerogels manufacturing facility. The manufacturing areas have not been considered in this occupational evaluation.

The Central Utility Plant contains the bulk of noisy equipment associated with the Project and the average sound levels may approach 90 dBA in some areas, notably the Chilled/Cold Water Plant and the Boiler Room. SLR was provided information indicating that chiller sound levels could approach 85.5 dBA at 3 feet. A review of the building layouts indicates six chillers and six pumps in the large room. The room will have hard, reflective surfaces throughout. Though not excessively “loud”, multiple chiller units in simultaneous operation, coupled with the highly reverberant room conditions, will likely result in areas where sound levels exceed 85 dBA or even 90 dBA.

These predicted sound levels would be an occupational noise concern if individuals are expected to spend more than four hours in the space over the course of a typical work shift. If individuals will typically spend only brief periods of time in the space, then personnel protective equipment such as ear plugs or muffs would be sufficient.

Adding acoustical absorption to the space will reduce sound levels in the reverberant field, far from any specific pieces of equipment, along the walls and walkways of the space. With sufficient absorption, sound levels in areas removed from equipment would be reduced by 6 to 8 decibels, and would generally be below 85 dBA except in areas in close proximity to equipment. This would make the space much more pleasant for occupancy and would remove the need for hearing protection except close to equipment. Typically, acoustical absorption is added to these types of spaces using spray-on cellulose insulation on the underside of the roof deck and/or in patches on the walls, above eight feet or so. To achieve the listed reductions, approximately 60% of the ceiling and 20% of the walls should be treated with 1 to 2 inches of K-13 spray on insulation or other products having similar acoustical performance.

Overall, it is not expected that noise levels will exceed 90 dBA in most areas of the Chilled Water Plant. However, during more detailed design phases, more robust calculations could be developed to model noise levels in that room.

The steam and hot water boilers will also emit approximately 85 dBA at 3 feet (high fire). Though it is not known how often all boilers may run simultaneously, the boiler room is smaller than the chiller room. Sound levels approaching 90 dBA are likely, even if sound treatments are installed in the room. That room will likely require signage directing any entering staff to use hearing protection (ear plugs, etc.).

High sound levels are expected in the emergency generator room. The generators are predicted to emit 110 dBA at one meter. With both generators in operation, sound levels in this reverberant room would likely exceed 115 dBA. Signage will be needed to alert staff to use double hearing protection while inside the generator room, and personnel should only be present in the generator room during operation of the generators if absolutely necessary. Adding acoustical absorption to this space will reduce the sound levels in the reverberant field by about three decibels. Due to the small relative size of the generator room there are few spaces in the room that are distant from both generators, so absorption will have limited effect in this space.

7. SUMMARY AND CONCLUSIONS

A sound propagation model was developed to calculate sound levels at the Project property-line due to outdoor mechanical equipment at the proposed Aspen Aerogels Project. Given the information available at this time, the highest calculated sound level at the Project property line shared with the closest residence to the southeast is 49 dBA, which is below the Bulloch County Industrial Performance Standard of 60 dBA. The highest overall Project sound level is 56 dBA along the northern boundary shared with Interstate 16.

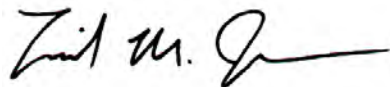
Noise from truck traffic is not expected to exceed 60 dBA at the closest residential property line. However, additional calculations should be performed once more truck volume information becomes available.

It is not expected that interior sound levels will exceed 90 dBA within frequently accessed rooms in the Central Utility Plant. However, there could be some “hot spots” that approach 90 dBA, such as when standing between two chillers or two boilers that are in simultaneous operation at high output. Hearing protection signage will likely be necessary for these utility plant rooms. To reduce the sound levels in the reverberant field, in areas remote from specific equipment, acoustical absorption could be added to these spaces as outlined in this memo.

Please contact us if you have any questions or comments.

Sincerely,

SLR INTERNATIONAL CORPORATION



David M. Jones, P.E., INCE Bd. Cert.
US Acoustical Services Manager



Damien Bell
Sr. Acoustical Engineer

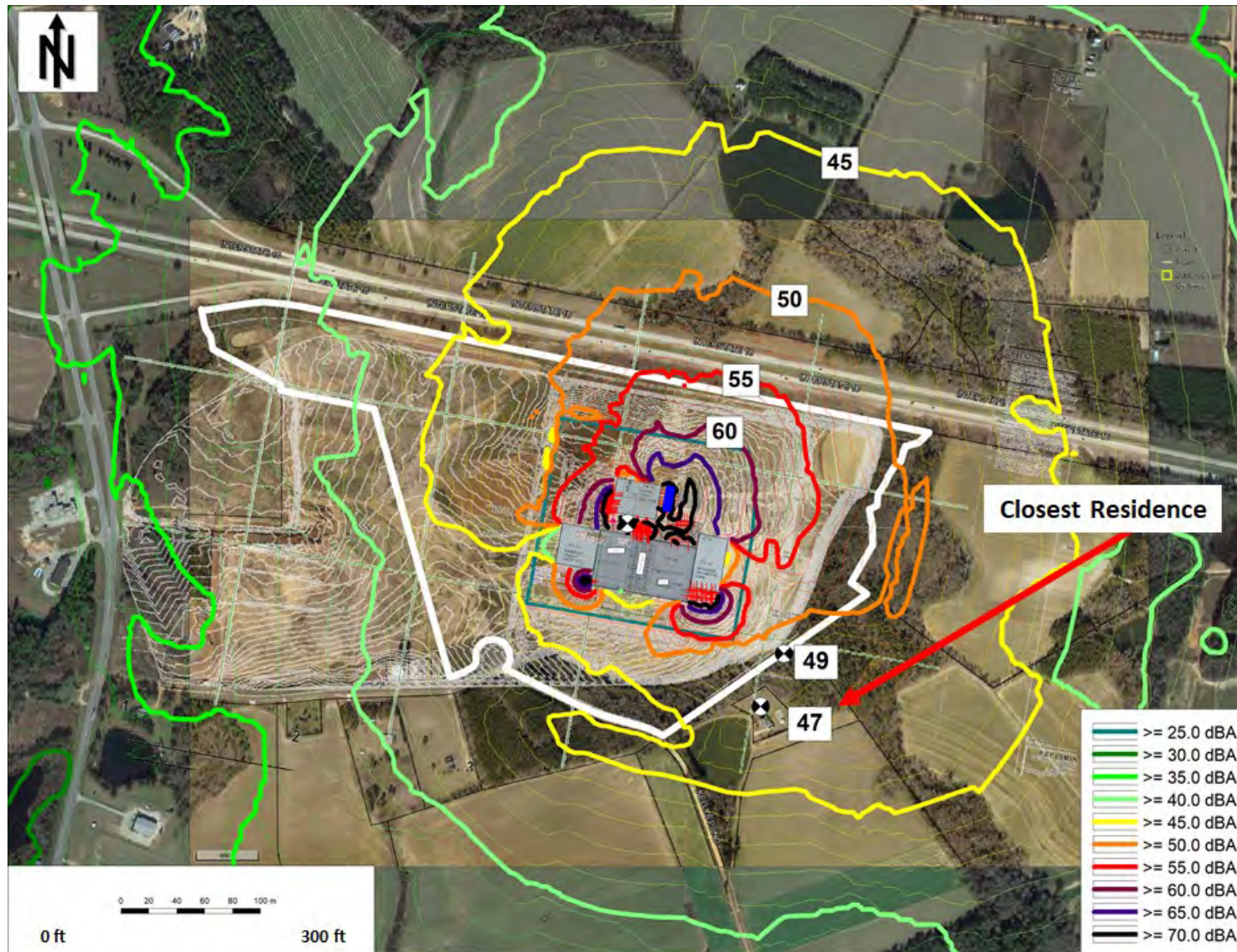


Figure 1: Predicted A-weighted Sound Levels due to Project Outdoor Equipment, dBA

APPENDIX F TRAFFIC ANALYSIS



Traffic Impact Study

Aspen Aerogels DRI

Bulloch County, Georgia

Report Prepared:

April 2022

Prepared for:

Gensler

Prepared by:

Kimley»Horn

Kimley-Horn and Associates, Inc.
100 Bull Street, Suite 200
Savannah, Georgia 31401
015464013

Traffic Impact Study

Aspen Aerogels DRI

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Report Prepared:

April 2022

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Prepared by:

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Kimley-Horn and Associates, Inc.
100 Bull Street, Suite 200
Savannah, Georgia 31401
015464013



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Appendix B: Traffic Count Data

Appendix C: Trip Generation Worksheet

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1.0 INTRODUCTION

This report presents the analysis of the anticipated traffic impacts associated with the *Aspen Aerogels DRI* development, which is expected to be completed in 2024 (referred to herein as “build-out year”). This study evaluates the impact of constructing 533,527 SF of manufacturing space. The approximate 90-acre site is located along Rocky Road in Bulloch County, Georgia. The proposed project site was included within Phase 1 of the planned Interstate Gateway Tax Allocation District master plan. A traffic impact study for the 1,781-acre two phase master plan was completed in 2014.

Figure 1 provides a location map of the project site. **Figure 2** provides an aerial image of the project site and study network. A site plan is also included in **Appendix A**.

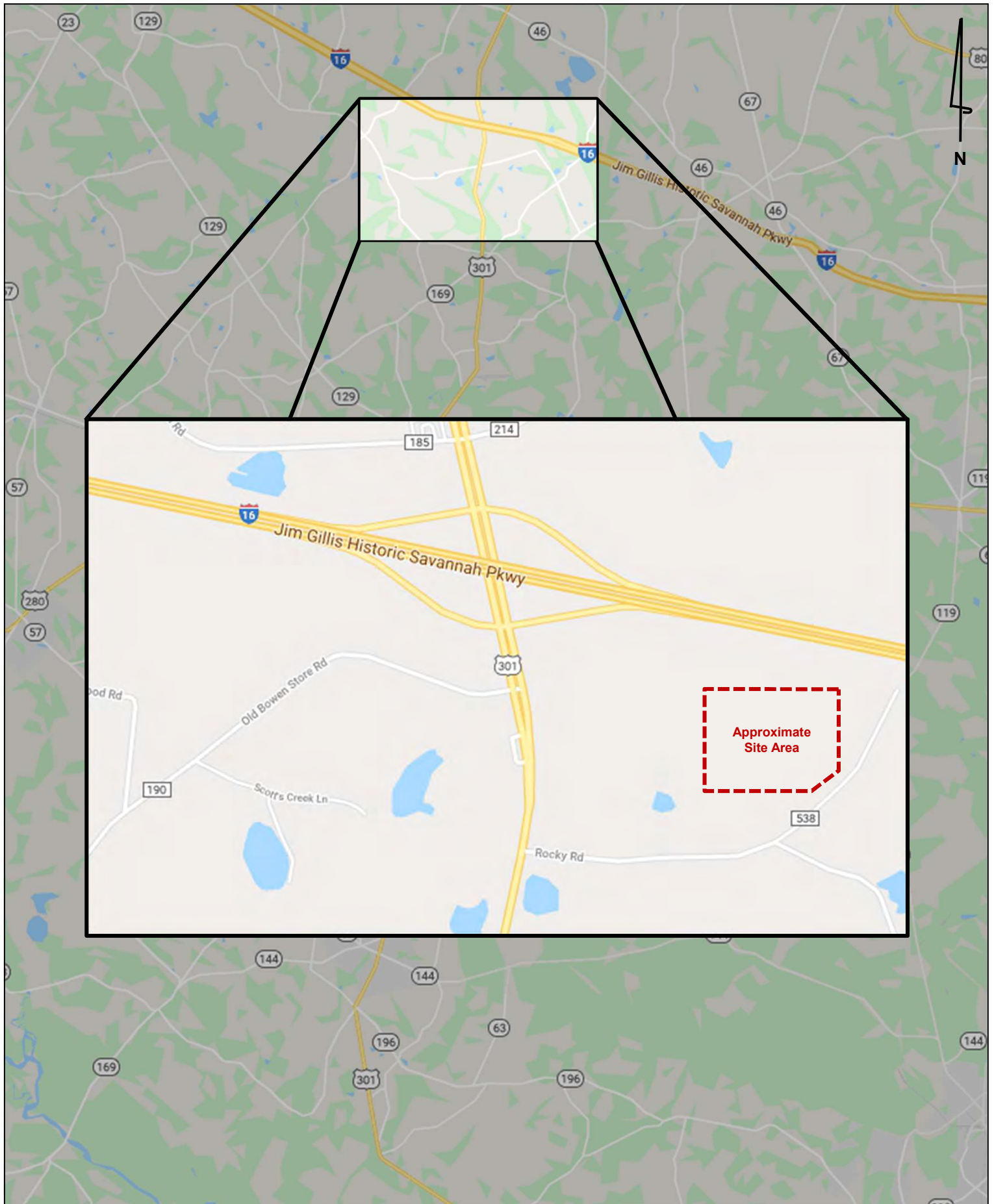
2.0 STUDY AREA DETERMINATION

The study area consists of the following intersections:

1. SR 73 / US 301 at Rocky Road
2. SR 73 / US 301 at Private Driveway / Travel America Roadway
3. SR 73 / US 301 at I-16 Eastbound Ramps
4. SR 73 / US 301 at I-16 Westbound Ramps

Rocky Road will be extended (Rocky Road Extension) to provide external access to the site. Additionally, there are four (4) proposed internal accesses to serve the development along Rocky Road Extension. A site plan depicting Rocky Road Extension and the proposed internal site accesses is provided in **Appendix A**.

Note: The extension of Rocky Road is referred to as “Rocky Road Extension” throughout this report. However, it should be noted that the extension is intended to be private and controlled/maintained by the tenant.





3.0 EXISTING TRAFFIC CONDITIONS

The existing roadways within the study network have the following characteristics:

SR 73 / US 301 is a divided, four-lane, minor arterial south of the I-16 Eastbound Ramps and a divided, four-lane principal arterial north of the I-16 Eastbound Ramps with a posted speed limit of 55 MPH. Historical GDOT traffic counts taken south of Rocky Road indicated an AADT of 8,820 vehicles per day in 2019. At its unsignalized T-intersection with Rocky Road, SR 73 / US 301 provides two (2) through lanes and a dedicated left-turn/u-turn lane on both the northbound and southbound approaches with an additional northbound right-turn lane on the southern leg. At its unsignalized intersection with Private Driveway / Travel America Roadway, SR 73 / US 301 provides a dedicated left-turn lane, two (2) through lanes, and a dedicated right-turn lane on both the northbound and southbound approaches. At its unsignalized intersection with the I-16 Eastbound Ramps, SR 73 / US 301 provides two (2) through lanes and a dedicated right-turn lane on the northbound approach and two through lanes and a dedicated left-turn lane on the southbound approach. At its unsignalized intersection with the I-16 Westbound Ramps, SR 73 / US 301 provides two (2) through lanes and a dedicated left-turn lane on the northbound approach and two through lanes and a dedicated right-turn lane on the southbound approach.

Rocky Road is a divided, four-lane local roadway with an unmarked speed limit. For the purposes of this analysis, a speed limit of 25 MPH was assumed. At its T-intersection with SR 73 / US 301, Rocky Road provides one left-turn lane and one right-turn lane.

Private Driveway / Travel America Roadway provides access to existing developments to the west of SR 73 / US 301 and to the future Travel America development to the east of SR 73 / US 301. For the purposes of this analysis, a speed limit of 25 MPH was assumed for both legs. At its unsignalized intersection with SR 73 / US 301, Private Driveway and Travel America Roadway each provide one shared left-turn/through lane and one right-turn lane.

I-16 Eastbound Ramps provide access to/from Interstate 16. Historical GDOT traffic counts taken on the off-ramp east of SR 73 / US 301 indicated an AADT of 1,560 vehicles per day in 2019. At its intersection with SR 73 / US 301, the I-16 Westbound Ramps provides one shared left-turn/through lane and one dedicated right-turn lane on the westbound approach and one receiving-only lane on the western leg (on-ramp).

I-16 Westbound Ramps provide access to/from Interstate 16. Historical GDOT traffic counts taken on the off-ramp west of SR 73 / US 301 indicated an AADT of 1,900 vehicles per day in 2019. At its intersection with SR 73 / US 301, the I-16 Eastbound Ramps provides one shared left/through/right-turn lane on the eastbound approach and one receiving-only lane on the eastern leg (on-ramp).

For the purposes of this transportation analysis, SR 73 / US 301 is considered to have a north-south orientation. Rocky Road, Private Driveway / Travel America Roadway, I-16 Eastbound Ramps, and I-16 Westbound Ramps are considered to have an east-west orientation.

Vehicle peak hour turning movement counts were performed at the following study intersections:

- SR 73 / US 301 at Rocky Road
- SR 73 / US 301 at I-16 Eastbound Ramps
- SR 73 / US 301 at I-16 Westbound Ramps

The turning movement counts were collected during the AM period (7:00 AM – 9:00 AM) and the PM period (4:00 PM – 6:00 PM) on Tuesday, December 7, 2021.

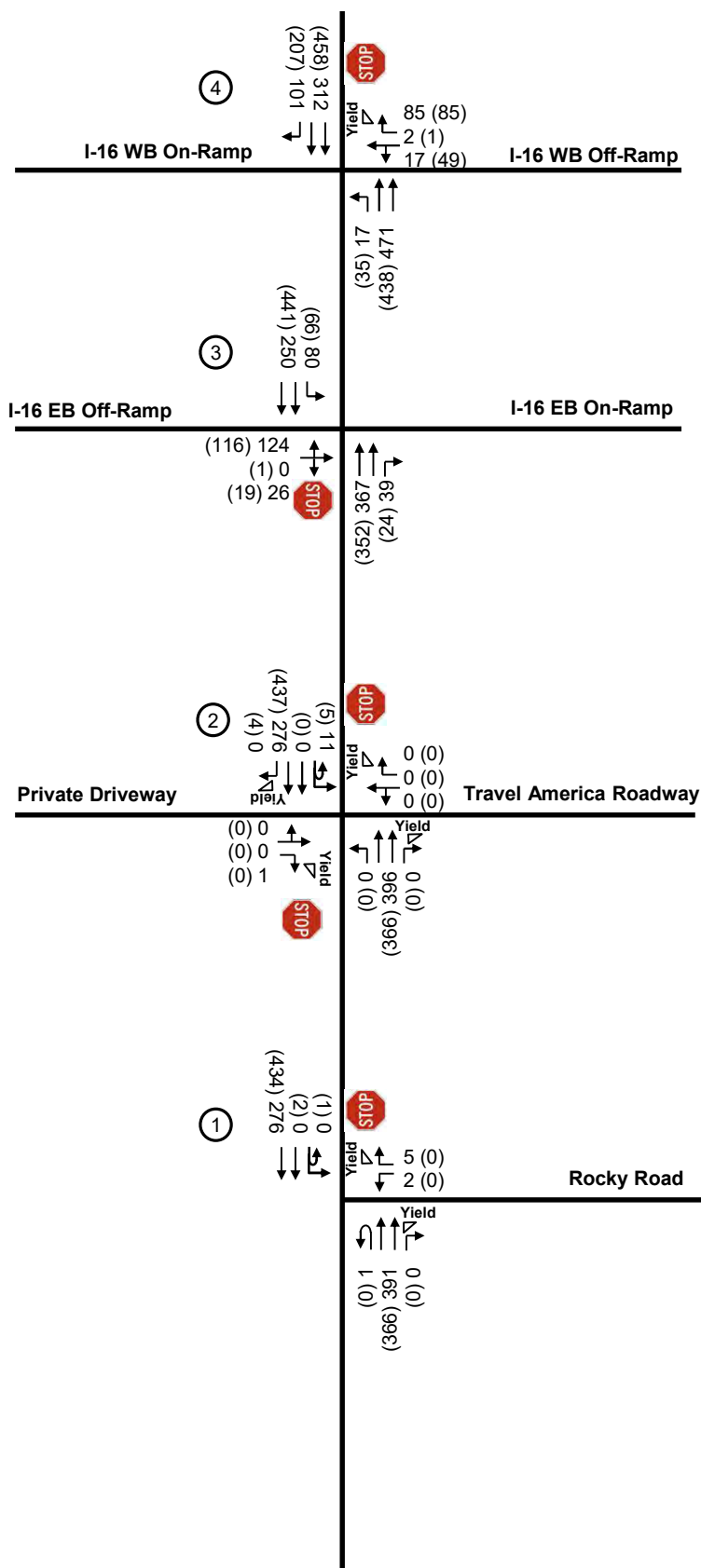
For the intersection of SR 73 / US 301 at Private Driveway / Travel America Roadway, existing (July 9, 2019) turning movement counts were used from *the Travel America Express Development Traffic Impact Study* dated August 8, 2019 to supplement the new (2021) traffic count data. In the Existing 2021 traffic conditions at this study intersection, the appropriate turning movements at the adjacent study intersection (Intersection 1) represent the mainline through movements, and data from the Travel America study was grown at 2% for 2 years to account for the turning movements to/from the side-streets. The utilized Travel America traffic counts are provided in **Appendix B**.

Peak hours for the study intersections are shown in **Table 1**.

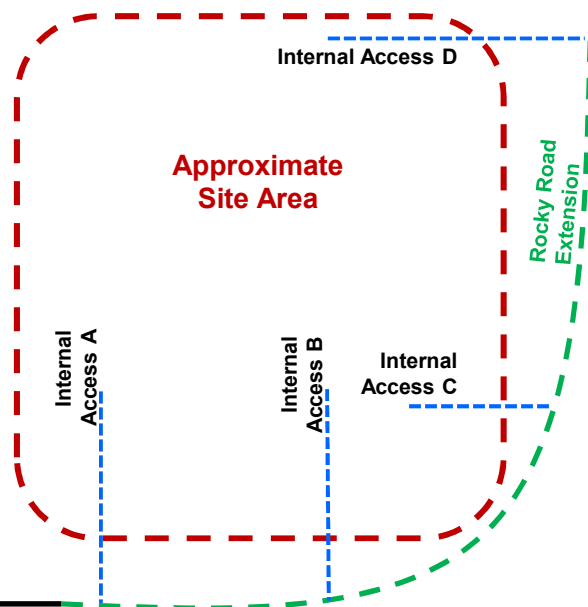
Table 1: Peak Hour Summary		
Intersection	AM Peak Hour	PM Peak Hour
1. SR 73 / US 301 at Rocky Road	7:15 AM – 8:15 AM	4:45 PM – 5:45 PM
2. SR 73 / US 301 at Private Driveway / Travel America Roadway	7:00 AM – 8:00 AM	4:45 PM – 5:45 PM
3. SR 73 / US 301 at I-16 Eastbound Ramps	7:30 AM – 8:30 AM	4:45 PM – 5:45 PM
4. SR 73 / US 301 at I-16 Westbound Ramps	7:30 AM – 8:30 AM	4:45 PM – 5:45 PM

The complete traffic count data is provided in **Appendix B**.

Figure 3 illustrates the Existing 2021 peak hour traffic volumes at the study intersections as well as the existing roadway geometry (intersection layout).



NOT TO SCALE



AM Peak Hour: 7:30 AM – 8:30 AM
PM Peak Hour: 4:45 PM – 5:45 PM

LEGEND	
	Existing Roadway Laneage
	Proposed Roadway Extension
	Proposed Internal Project Access
	Intersection Reference Number
	Existing STOP Control
XX	AM Peak Hour Traffic Volumes
(XX)	PM Peak Hour Traffic Volumes

4.0 PROJECTED BACKGROUND (NON-PROJECT) TRAFFIC

Projected background (non-project) traffic is defined as the expected traffic on the roadway network in the future year(s) absent the *Aspen Aerogels DRI* development. The existing 2021 peak hour traffic volumes were increased by 2.0% per year for three (3) years to account for the expected background growth in traffic through year 2024, the build-out of the project. Additionally, the project trips associated with the *Travel America Express Development Traffic Impact Study* dated August 8, 2019 were added to the projected background traffic volumes at the study intersections to represent the Projected 2024 No-Build conditions in the study network. The utilized Travel America project trips are provided in **Appendix B**.

Figure 4 illustrates the Projected 2024 No-Build traffic conditions.

4.1 FUTURE ROADWAY / INTERSECTION PROJECTS

The GDOT GeoPI system and the Bulloch County SPLOST project list were researched to identify any currently programmed transportation projects that may impact the study network during the analysis period. No programmed projects were identified in the vicinity of the study network.

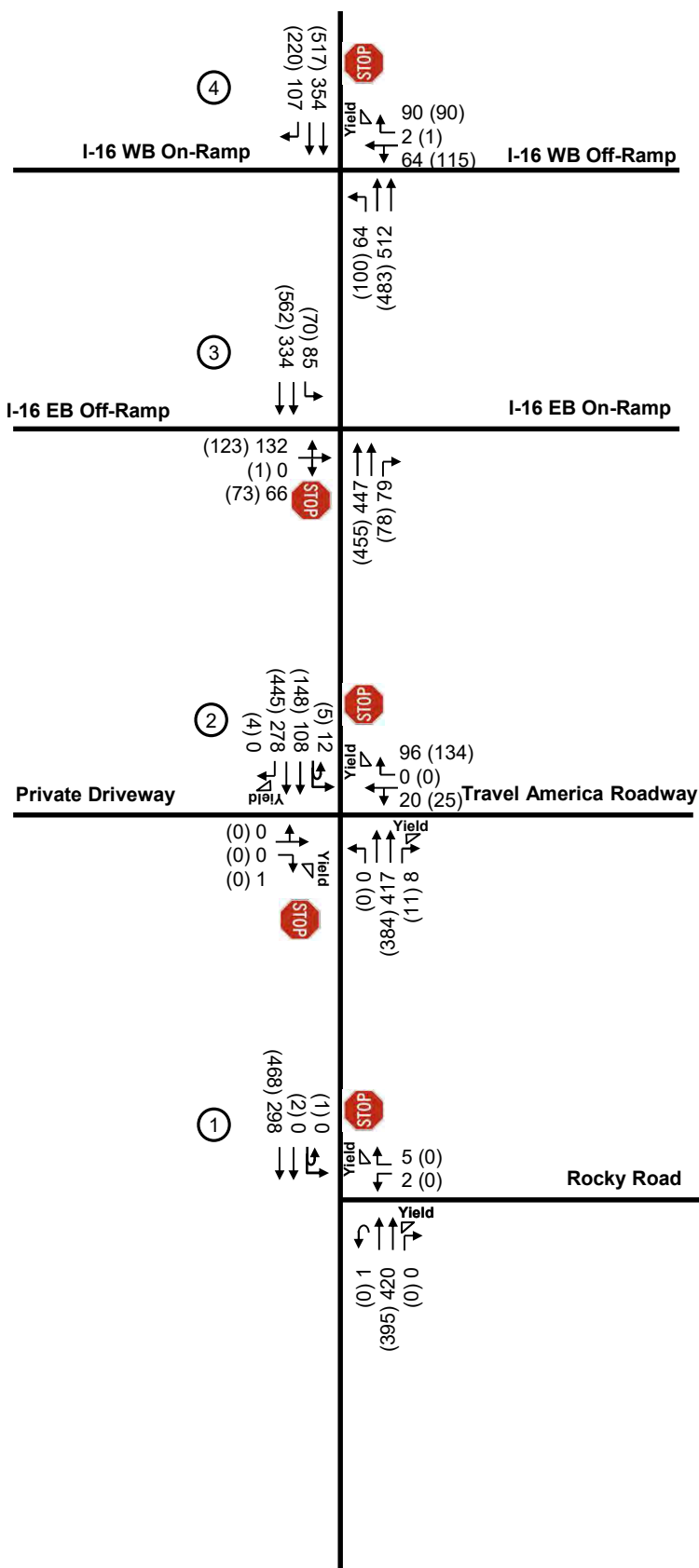
As part of the development of the Aspen Aerogels site, Rocky Road will be extended east past the existing terminus to provide multiple access points (passenger vehicles and heavy trucks) to the proposed project site.

5.0 PROJECT TRAFFIC

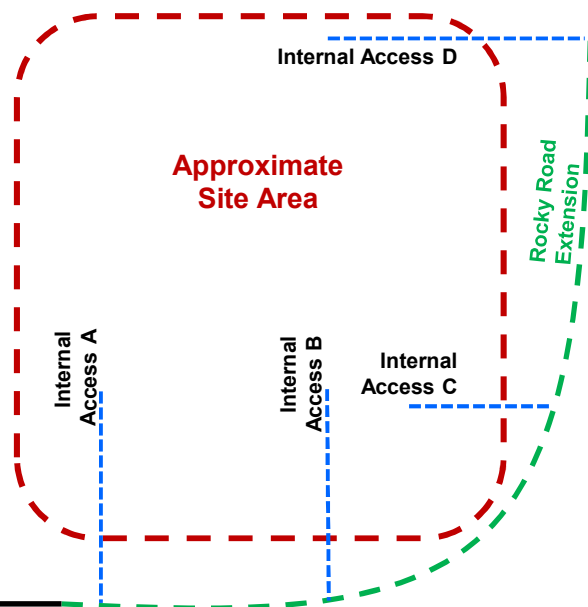
Project traffic used in this analysis is defined as the vehicle trips expected to be generated by the proposed development, and the distribution and assignment of that traffic through the study roadway network. This traffic impact study evaluated the impacts of adding the new trips generated by the proposed *Aspen Aerogels DRI* development.

5.1 PROJECT SITE ACCESS

Access to the site will be provided externally via Rocky Road Extension and by four (4) proposed internal site accesses, which are shown on the proposed site plan in **Appendix A**. All proposed internal site accesses will provide one inbound and one outbound lane.



NOT TO SCALE



LEGEND	
	Existing Roadway Laneage
	Proposed Roadway Extension
	Proposed Internal Project Access
	Intersection Reference Number
	Existing STOP Control
XX	AM Peak Hour Traffic Volumes
(XX)	PM Peak Hour Traffic Volumes

A description of Rocky Road Extension and the proposed site accesses is as follows:

- West of Internal Access A, Rocky Road Extension will be a four-lane, divided segment. At Internal Access A, Rocky Road Extension will drop one westbound through lane to provide one shared eastbound left-turn/through lane, one eastbound through lane, and one shared westbound through/right-turn lane.
 - Internal Access A is proposed along Rocky Road Extension approximately 100 feet to the east of the existing Rocky Road terminus. Internal Access A will be a full-movement access point and provide one inbound lane and one outbound lane under conventional side-street stop control.
- Between Internal Access A and Internal Access B, Rocky Road Extension will be a three-lane (two eastbound lanes and one westbound lane), divided section. At Internal Access B, Rocky Road Extension will provide one dedicated eastbound left-turn lane, one eastbound through lane, and one shared westbound through/right-turn lane.
 - Internal Access B is proposed along Rocky Road Extension approximately 600 feet to the east of the existing Rocky Road terminus. Internal Access B will be a full-movement access point and provide one inbound lane and one outbound lane under conventional side-street stop control.
- East of Internal Access B, Rocky Road Extension will drop one eastbound lane to transition to a two-lane, undivided roadway. At Internal Access B, Rocky Road Extension will provide one dedicated eastbound left-turn lane, one eastbound through lane, and one shared westbound through/right-turn lane.
 - Internal Access C is proposed along Rocky Road Extension approximately 1,400 feet to the east of the existing Rocky Road terminus. Internal Access C will be a full-movement access point and provide one inbound lane and one outbound lane under conventional side-street stop control.
- Rocky Road Extension is proposed to terminate directly into the site approximately 2,400 feet to the east of the existing Rocky Road terminus.
 - At the proposed terminus, Internal Access D would provide direct access to the site via a secured gate.

The proposed site accesses provide vehicular access to the entire development. Internal, private roadways throughout the site provide access to all buildings and parking facilities. Refer to the site plan in **Appendix A** for a visual representation of vehicular access and circulation throughout the proposed development and Rocky Road Extension.

5.2 TRIP GENERATION

Gross trips associated with the proposed development were estimated using the *Institute of Transportation Engineers' (ITE) Trip Generation Manual, Eleventh Edition, 2021*, using equations where available. Heavy Vehicle trips were estimated using percentages from the *ITE Trip Generation Manual, 10th Edition Supplement, 2019*. Trip generation for the proposed development was calculated based upon the following land uses:

- Land Use Code 140: Manufacturing
 - Per ITE, LUC 140 is utilized for facilities “where the primary activity is the conversion of raw materials/parts into finished products... a manufacturing facility typically has an office and may provide space for warehouse, research, and associated functions.”

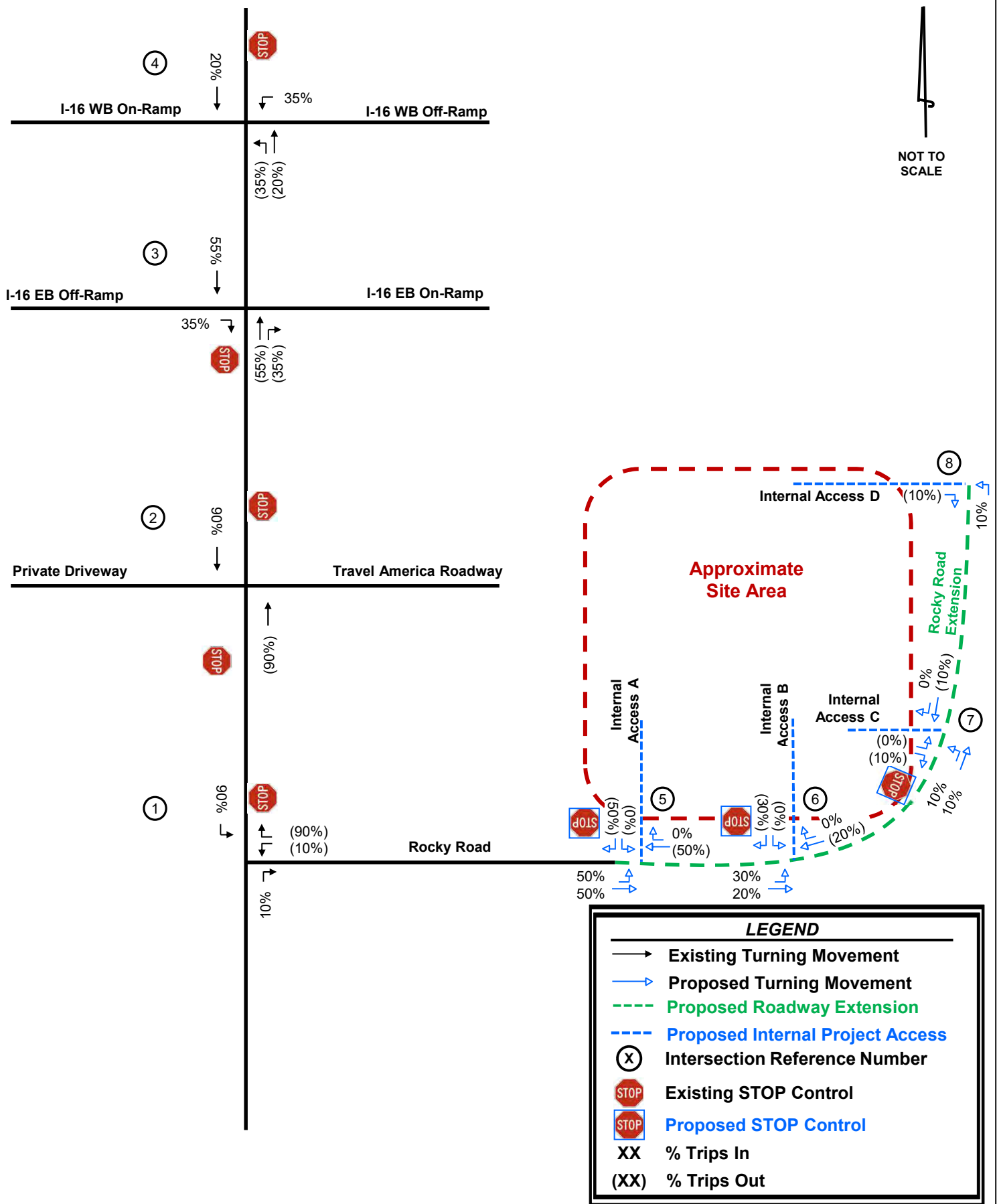
Table 2 summarizes the net trip generation for the proposed development upon full build-out (2024). **Appendix C** provides the detailed trip generation worksheet for the proposed development. Reductions to gross trips were not considered in the analysis.

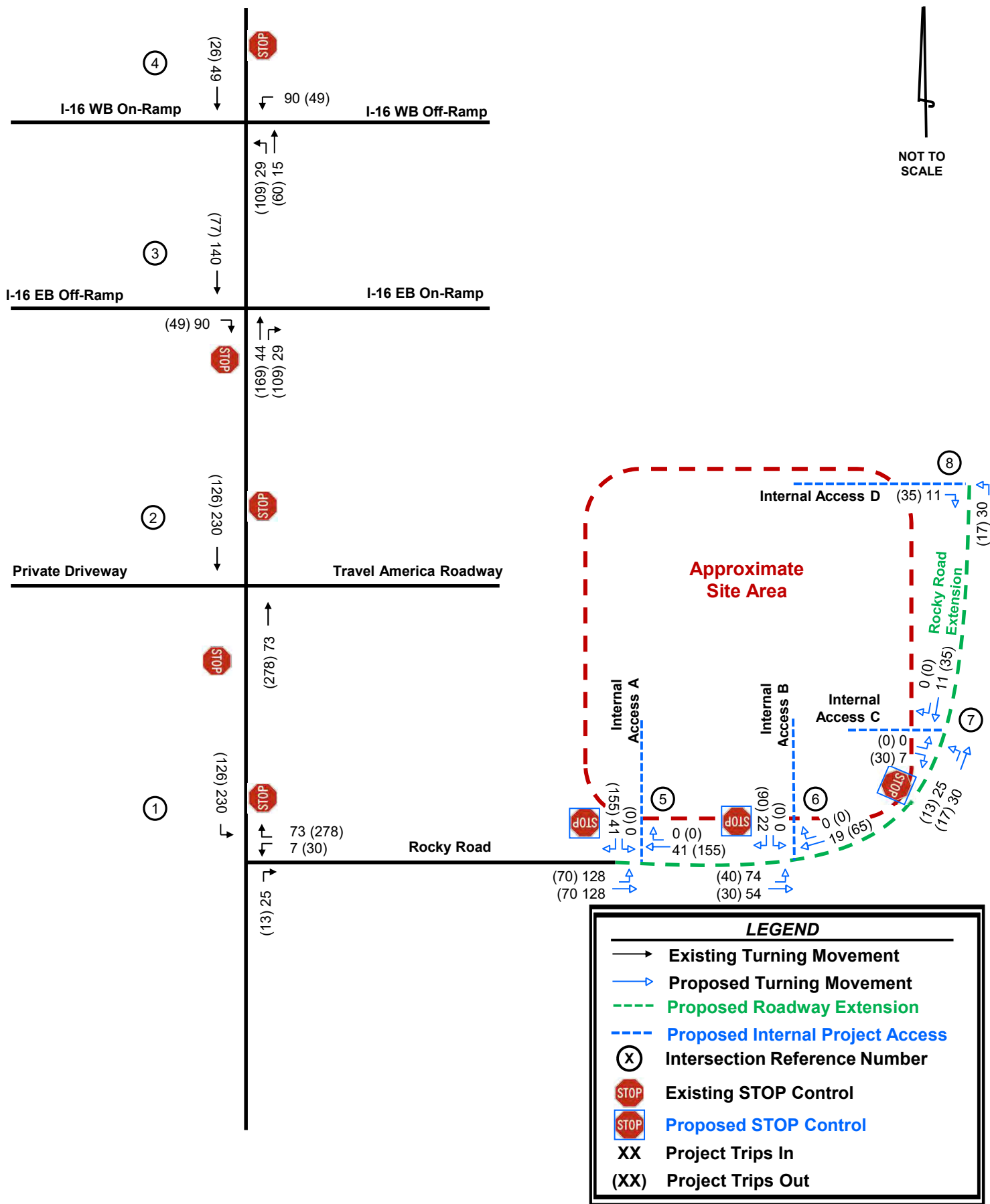
Table 2: Project Trip Generation Summary								
Land Use	Intensity	ITE Code	Daily Traffic		AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit	Enter	Exit
Manufacturing*	533,527 SF	140	1,107	1,107	255	80	139	308
Total Project Trips			1,107	1,107	255	80	139	308
Total Heavy Vehicle Trips			125	125	9	7	7	9
Total Passenger Vehicle Trips			982	982	246	73	132	299

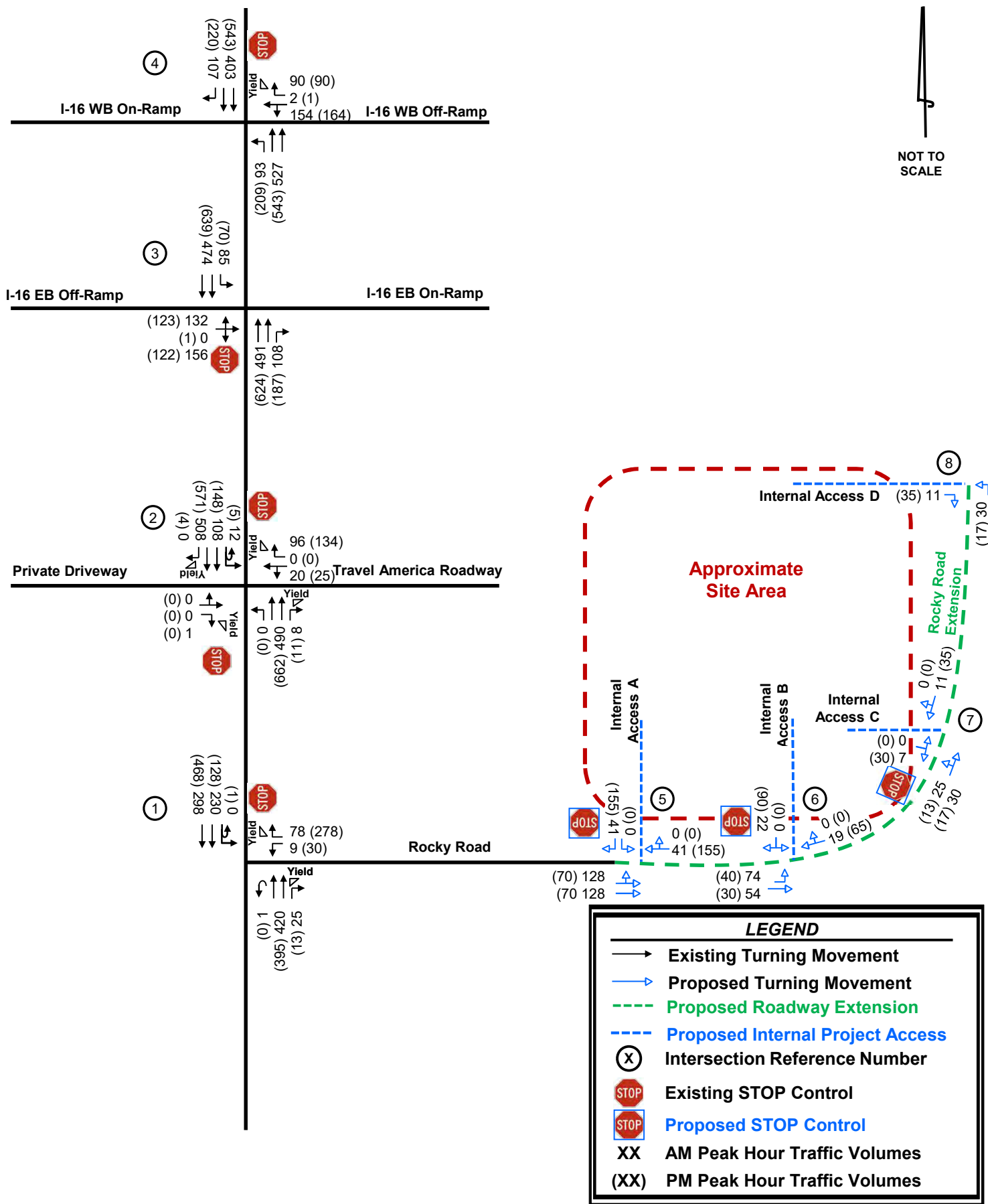
*Heavy Vehicle percentage based on ITE 10th Edition Supplement.

5.3 TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution and assignment of adding new trips (project trips) related to the proposed development was based on a review of land uses and population densities in the area, and a review of the existing travel patterns in the area. A detailed trip distribution and assignment for the project is shown for passenger vehicles and heavy vehicles respectively in **Figure 5** and **Figure 6**. Heavy vehicles and passenger cars were determined to have the same trip distribution and assignment. Based on the trip generation from **Table 2** and the anticipated trip distribution, new project trips were assigned to the study roadway network. **Figure 7** illustrates the new project trips distributed throughout the study network for the Projected 2024 Build conditions. **Figure 8** illustrates the Projected 2024 Build traffic conditions for the AM and PM peak hours. **Appendix D** provides intersection volume worksheets for all study intersections.







6.0 LEVEL-OF-SERVICE ANALYSIS

Level-of-service determinations were made for the weekday AM and PM peak hours for the study network intersections using *Synchro*, Version 11.0. *Synchro* software uses methodologies contained in the *Highway Capacity Manual*, 6th Edition to determine the operating characteristics of an intersection. Capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a specified period under prevailing roadway, traffic, and control conditions.

LOS is used to describe the operating characteristics of a road segment or intersection in relation to its capacity. LOS is defined as a qualitative measure that describes operational conditions and motorists' perceptions of a traffic stream. The *Highway Capacity Manual* defines six levels of service, LOS A through LOS F, with A being the best and F the worst.

LOS for unsignalized intersections, with stop control on the minor street only, are reported for the side-street approaches and major street left-turns. Low levels-of-service for side street approaches are not uncommon, as vehicles may experience significant delay turning onto a major roadway.

In addition to the Existing 2021 conditions, an analysis was performed for the AM and PM peak hours under Projected 2024 No-Build and Build traffic conditions. The results of the LOS analysis are summarized for the AM and PM peak hours in **Table 3**. The *Synchro* analysis reports are included in **Appendix E**.

Table 3: Level-of-Service Summary LOS (Delay in Seconds)							
Intersection	Approach	Existing 2021		Projected 2024 No-Build		Projected 2024 Build	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
1. SR 73 / US 301 at Rocky Road	NBU	A (9.1)	A (0)	A (9.2)	A (0)	A (9.2)	A (0)
	SBL	A (0)	A (8.6)	A (0)	A (8.7)	A (9.7)	A (8.8)
	WB Stop	B (10.9)	A (0)	B (11.1)	A (0)	B (13.4)	B (13.7)
2. SR 73 / US 301 at Private Driveway / Travel America Roadway	NBL	A (0)	(0)	A (0)	A (0)	A (0)	A (0)
	SBL	B (10.1)	A (9.5)	A (9.7)	A (9.3)	B (10.3)	B (11.3)
	EB Stop	B (10.9)	A (0)	B (10.9)	A (0)	B (12.6)	A (0)
	WB Stop	A (0)	A (0)	B (14.3)	B (14.4)	C (17.3)	C (22.9)
3. SR 73 / US 301 at I-16 Eastbound Ramps	SBL	B (10.1)	A (9.1)	B (11.2)	A (9.9)	B (11.9)	B (12.0)
	EB Stop	C (19.1)	C (19.9)	D (25.6)	D (27.8)	E (49.3)	E (42.1)
4. SR 73 / US 301 at I-16 Westbound Ramps	NBL	A (8.6)	A (9.6)	A (9.2)	B (10.6)	A (9.6)	B (11.5)
	WB Stop	B (12.4)	B (12.5)	C (16.0)	C (19.7)	D (31.4)	F (81.1)
5. Rocky Road Extension at Internal Access A	EBL					A (7.6)	A (7.8)
	SB Stop					A (8.8)	B (10.1)
6. Rocky Road Extension at Internal Access B	EBL					A (7.4)	A (7.4)
	SB Stop					A (8.5)	A (9.0)
7. Rocky Road Extension at Internal Access C	EBL					A (7.3)	A (7.3)
	SB Stop					A (8.4)	A (8.6)

As shown in **Table 3**, the analysis indicates that under Existing 2021 conditions, all intersections currently operate at an acceptable overall LOS during the AM and PM peak hours.

Under Projected 2024 No-Build conditions, all intersections are projected to continue to operate at an acceptable LOS in the AM and PM peak hours.

The eastbound approach at Intersection 3 is anticipated to operate at LOS E during the AM and PM peak hours under the Projected 2024 Build conditions. Low levels-of-service for side street approaches are not uncommon, as vehicles may experience significant delay turning onto a major roadway. The 95th percentile estimated queue lengths for the eastbound approach is 8.4 vehicles (approximately 235 feet) in the AM peak hour and 6.2 vehicles (approximately 175 feet) in the PM peak hour, which can be accommodated by the existing storage length (2,000+ feet) along the ramp. Therefore, the 95th percentile estimated queues will not extend to the interstate.

The westbound approach at Intersection 4 is projected to operate at LOS F during the PM peak hour under the Projected 2024 Build conditions. Low levels-of-service for side street approaches are not uncommon,

as vehicles may experience significant delay turning onto a major roadway. The 95th percentile estimated queue lengths for the eastbound approach is 7.9 vehicles (approximately 215 feet) in the PM peak hour, which can be accommodated by the existing storage length (2,000+ feet) along the ramp. Therefore, the 95th percentile estimated queues will not extend to the interstate.

Based on preliminary results for peak hour warrants (Warrant 3), the projected traffic volumes at Intersection 3 (SR 73 / US 301 at I-16 Eastbound Ramps) and Intersection 4 (SR 73 / US 301 at I-16 Westbound Ramps) are not satisfied. Conditions at these intersections should continue to be monitored considering the anticipated future development traffic associated with the remaining Interstate Gateway Tax Allocation District Industrial Park master plan.

7.0 CONCLUSION

This traffic study evaluates the anticipated traffic impacts associated with the *Aspen Aerogels DRI* development. The project will include approximately 533,527 SF of manufacturing space. The project is expected to be complete in 2024. The approximate 90-acre project site is located along Rocky Road in Bulloch County, Georgia. The proposed project site was included within Phase 1 of the planned Interstate Gateway Tax Allocation District master plan. A traffic impact study for the 1,781-acre two phase master plan was completed in 2014.

The study network, which consists of four (4) unsignalized off-site intersections, was analyzed for the weekday AM and PM peak hours under Existing 2021 conditions, Projected 2024 No-Build conditions (three years of background traffic growth plus the Travel America project trips), and Projected 2024 Build conditions (Projected 2024 No-Build conditions plus traffic generated by the proposed *Aspen Aerogels DRI* development).

All study intersections currently operate at an acceptable LOS overall and are projected to operate at an acceptable LOS overall during the AM and PM peak hours under Projected 2024 No-Build conditions.

Under the Projected 2024 Build conditions, the eastbound approach at Intersection 3 (SR 73 / US 301 at I-16 Eastbound Ramps) is anticipated to operate at LOS E in the AM and PM peak hours. Low levels-of-service for side street approaches are not uncommon, as vehicles may experience significant delay turning onto a major roadway. The Projected 2024 Build 95th percentile estimated queue lengths for the eastbound approach can be accommodated by the existing storage length along the ramp and are not anticipated to extend to the interstate.

The westbound approach at Intersection 4 (SR 73 / US 301 at I-16 Westbound Ramps) is anticipated to operate at LOS F in the PM peak hour under the Projected 2024 Build traffic conditions. Low levels-of-service for side street approaches are not uncommon, as vehicles may experience significant delay turning onto a major roadway. The Projected 2024 Build 95th percentile estimated queue lengths for the westbound

approach can be accommodated by the existing storage length along the ramp and are not anticipated to extend to the interstate.

Based on preliminary results for peak hour warrants (Warrant 3), the projected traffic volumes at Intersection 3 (SR 73 / US 301 at I-16 Eastbound Ramps) and Intersection 4 (SR 73 / US 301 at I-16 Westbound Ramps) are not satisfied. Conditions at these intersections should continue to be monitored considering the anticipated future development traffic associated with the remaining Interstate Gateway Tax Allocation District Industrial Park master plan.

7.1 SITE ACCESS IMPROVEMENT RECOMMENDATIONS

Based on the results of this study, Kimley-Horn and Associates, Inc. recommends the following site-access improvements to serve the Projected 2024 Build traffic conditions (note: this would be the improvements needed to serve the traffic associated with the *Aspen Aerogels DRI* development).

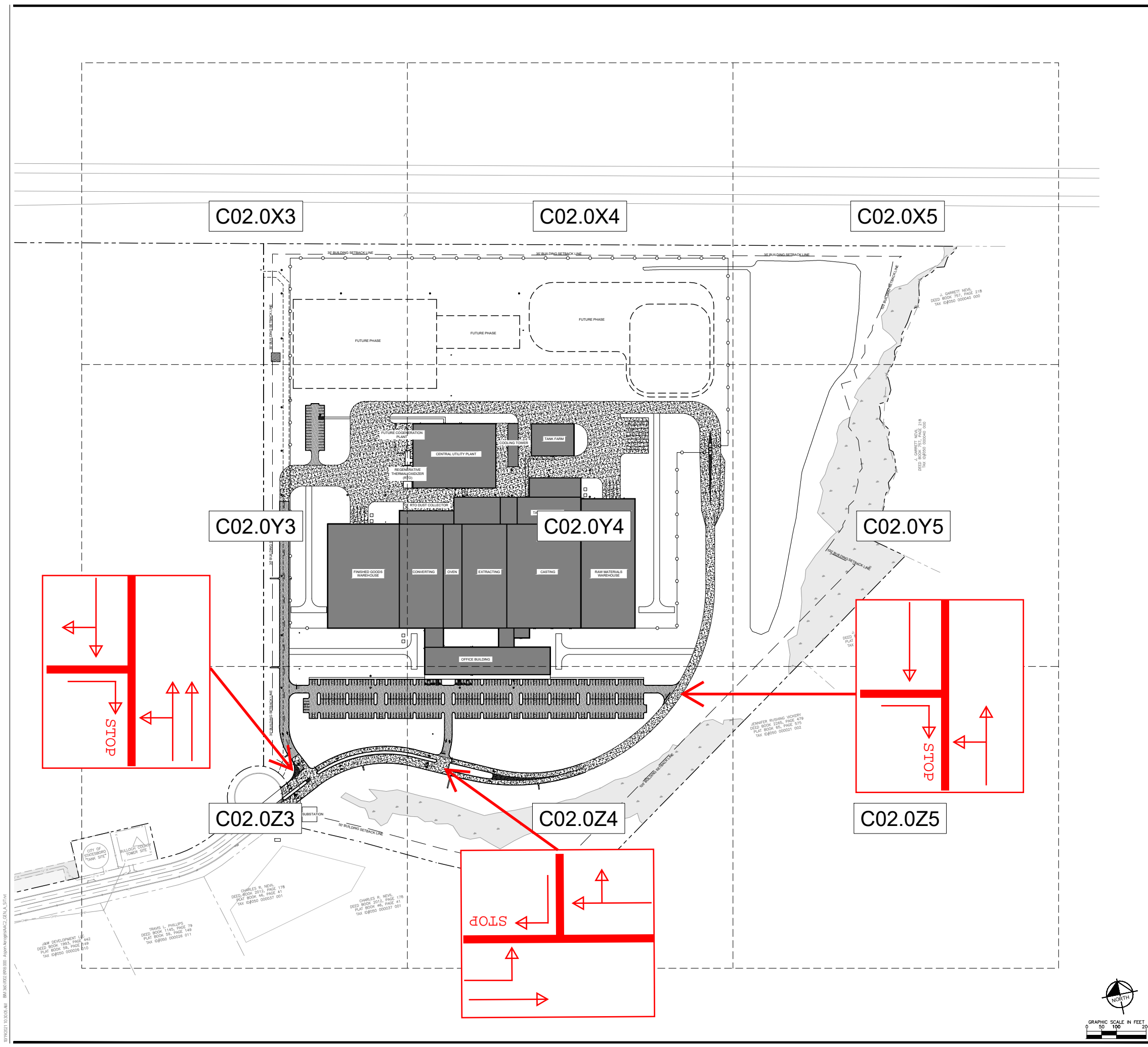
Access to the site will be provided externally via Rocky Road Extension and by four (4) proposed internal site accesses, which are shown on the proposed site plan in **Appendix A**. A description of Rocky Road Extension and the proposed site accesses is as follows:

- West of Internal Access A, Rocky Road Extension will be a four-lane, divided segment. At Internal Access A, Rocky Road Extension will drop one westbound through lane to provide one shared eastbound left-turn/through lane, one eastbound through lane, and one shared westbound through/right-turn lane.
 - Internal Access A is proposed along Rocky Road Extension approximately 100 feet to the east of the existing Rocky Road terminus. Internal Access A will be a full-movement access point and provide one inbound lane and one outbound lane under conventional side-street stop control.
- Between Internal Access A and Internal Access B, Rocky Road Extension will be a three-lane (two eastbound lanes and one westbound lane), divided section. At Internal Access B, Rocky Road Extension will provide one dedicated eastbound left-turn lane, one eastbound through lane, and one shared westbound through/right-turn lane.
 - Internal Access B is proposed along Rocky Road Extension approximately 600 feet to the east of the existing Rocky Road terminus. Internal Access B will be a full-movement access point and provide one inbound lane and one outbound lane under conventional side-street stop control.
- East of Internal Access B, Rocky Road Extension will drop one eastbound lane to transition to a two-lane, undivided roadway. At Internal Access B, Rocky Road Extension will provide one dedicated eastbound left-turn lane, one eastbound through lane, and one shared westbound through/right-turn lane.

- Internal Access C is proposed along Rocky Road Extension approximately 1,400 feet to the east of the existing Rocky Road terminus. Internal Access C will be a full-movement access point and provide one inbound lane and one outbound lane under conventional side-street stop control.
- Rocky Road Extension is proposed to terminate directly into the site approximately 2,400 feet to the east of the existing Rocky Road terminus.
 - At the proposed terminus, Internal Access D would provide direct access to the site via a secured gate.

The proposed site accesses provide vehicular access to the entire development. Internal, private roadways throughout the site provide access to all buildings and parking facilities. Refer to the site plan in **Appendix A** for a visual representation of vehicular access and circulation throughout the proposed development and Rocky Road Extension.

Site Plan



SHEET NOTES

SITE SUMMARY:

CURRENT ZONING:	HI (HEAVY INDUSTRIAL)
SITE AREA:	89.9 ACRES
ROW DEDICATION:	X.XX ACRES
ADJUSTED SITE AREA:	X.XX ACRES
IMPERVIOUS AREA:	63.1 ACRES (70.2%)
PERVIOUS AREA:	26.80 ACRES (29.8%)
GREEN SPACE:	20.97 ACRES (23.3%)
TOTAL DISTURBED AREA:	89.9 ACRES
BUILDING SETBACK:	FRONT (PUBLIC ROW): 35 FT
	SIDE (ADJON HI): 30 FT
	SIDE (ADJON OTHER): 100 FT

PROPOSED LAND USES & DENSITIES:

HEAVY INDUSTRIAL:	232 EMPLOYEES
-------------------	---------------

PARKING SUMMARY:

PER BASE CODE:

REQUIRED PARKING: 155 SPACES (TOTAL)

HEAVY INDUSTRIAL: 155 SPACES (0.6/EEMPL)

ADA: 6 SPACES

PER COVENANT:

REQUIRED PARKING: 195 SPACES (TOTAL)

HEAVY INDUSTRIAL: 195 SPACES (0.8/EEMPL)

ADMIN: 60 SPACES (1.1/EEMPL)

PRODUCTION: 135 SPACES (0.6/EEMPL)

ADA: 6 SPACES

PROPOSED PARKING: 389 SPACES (TOTAL)

HEAVY INDUSTRIAL: 389 SPACES (1.6/EEMPL)

STANDARD: XXX SPACES

COMPACT: XXX SPACES

ADA: 8 SPACES

GENERAL NOTES

SITE NOTES:

- THE PROPOSED BUILDING INFORMATION SHOWN HEREON IS FROM AN ELECTRONIC FILE PROVIDED BY GENSLER DATED 11/15/2021 AND IS FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL REFERENCE ARCHITECTURAL PLANS FOR EXACT BUILDING INFORMATION.
- EXISTING CONDITIONS SHOWN HEREON ARE FROM A SURVEY FILE PROVIDED BY MARVELL REDDICK AND ASSOCIATES, DATED 10/01/2021.
- ALL DIMENSIONS ARE FROM FACE OF CURB TO FACE OF CURB UNLESS OTHERWISE NOTED.
- SIDEWALK INSTALLED AGAINST BACK OF CURB SHALL BE INSTALLED PER THE PLAN AS MEASURED FROM THE BACK OF CURB.
- ALL SIGNAGE AND STRIPING MUST MEET THE LATEST REQUIREMENTS SET FORTH BY MUTCD, GDOT, AND GEORGIA STATE CODE.
- REFERENCE LANDSCAPE PLANS FOR ALL HARDSCAPE AND LANDSCAPE DETAILS AND SPECIFICATIONS.

SITE PLAN LEGEND:

PROPERTY LINE

BUILDING SETBACK LINE

HEAVY DUTY CONCRETE PAVEMENT

HEAVY DUTY ASPHALT PAVEMENT

10 PARKING COUNT

Scale / Signature

Project Name

Project Number

Description

Scale

VOL

BLDG

SHEET

KEY PLAN

X1 X2 X3 X4 X5

Y1 Y2 Y3 Y4 Y5

Z1 Z2 Z3 Z4 Z5

0 50 100 200

GRAPHIC SCALE IN FEET

NORTH

aspen aerogels

Slatesboro, GA 30458

TCI

TCI Consultants
125 Mill Street
Marion, MA 02738
Tel: 508.748.2620

Gensler

2 Houston Center
909 Fannin St, Ste. 200
Houston, TX 77010

2021.12.15

Issue for Schematic Design

Seal / Signature

Project Name

Project Number

Description

Scale

VOL

BLDG

SHEET

Traffic Count Data



[Click here for Map](#)

Peak Hour Turning Movement Count

Register, GA



www.marrtraffic.com

Tuesday, December 7, 2021	
Period	0630 - 0830
Peak Hour	0715 - 0815





[Click here for Map](#)

Peak Hour Turning Movement Count

Register, GA



www.marrtraffic.com

Tuesday, December 7, 2021	
Period	1600 - 1800
Peak Hour	1645 - 1745

Session Parameters

(Drop Down Menu)

Peak Hour

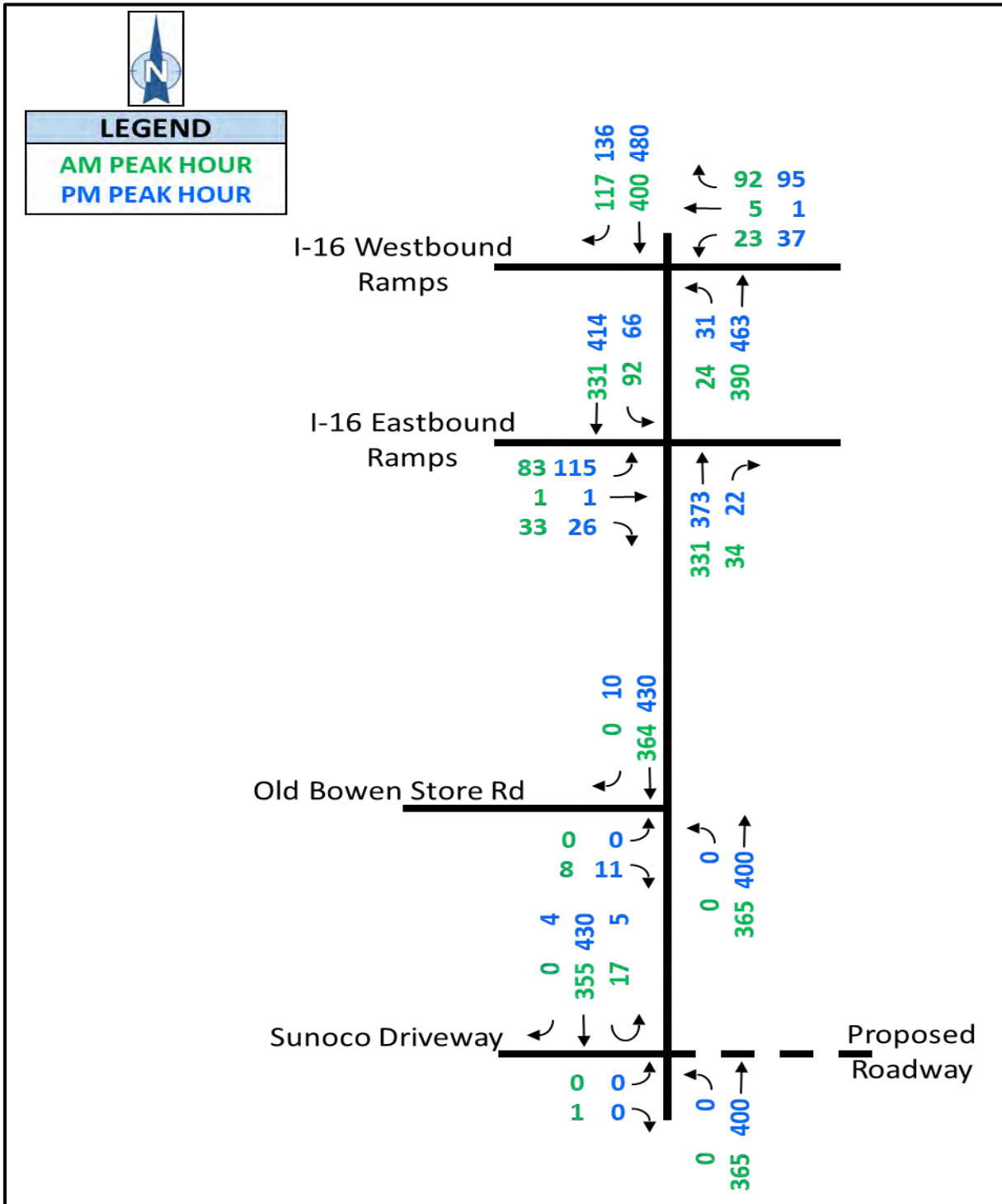
Volume



TURNING MOVEMENT VOLUMES

Turning Movement Counts (TMCs) were conducted at the study intersections on Tuesday, July 9, 2019 from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM. Existing peak hour turning movement volumes are shown in Figure 5 below. The Turning movement volumes were balanced between intersections. The raw data is provided in Appendix B.

Figure 5: EXISTING TRAFFIC VOLUMES





[Click here for Map](#)

Peak Hour Turning Movement Count

Register, GA



www.marrtraffic.com

Tuesday, December 7, 2021	
Period	0630 - 0830
Peak Hour	0730 - 0830

Session Parameters

(Drop Down Menu)

Peak Hour

Volume





[Click here for Map](#)

Peak Hour Turning Movement Count

Register, GA



www.marrtraffic.com

Tuesday, December 7, 2021	
Period	1600 - 1800
Peak Hour	1645 - 1745

Session Parameters

(Drop Down Menu)

Peak Hour

Volume





[Click here for Map](#)

Peak Hour Turning Movement Count

Register, GA



www.marrtraffic.com

Tuesday, December 7, 2021	
Period	0630 - 0830
Peak Hour	0730 - 0830

Session Parameters

(Drop Down Menu)

Peak Hour

Volume





[Click here for Map](#)

Peak Hour Turning Movement Count

Register, GA



www.marrtraffic.com

Tuesday, December 7, 2021	
Period	1600 - 1800
Peak Hour	1645 - 1745

Session Parameters

(Drop Down Menu)

Peak Hour

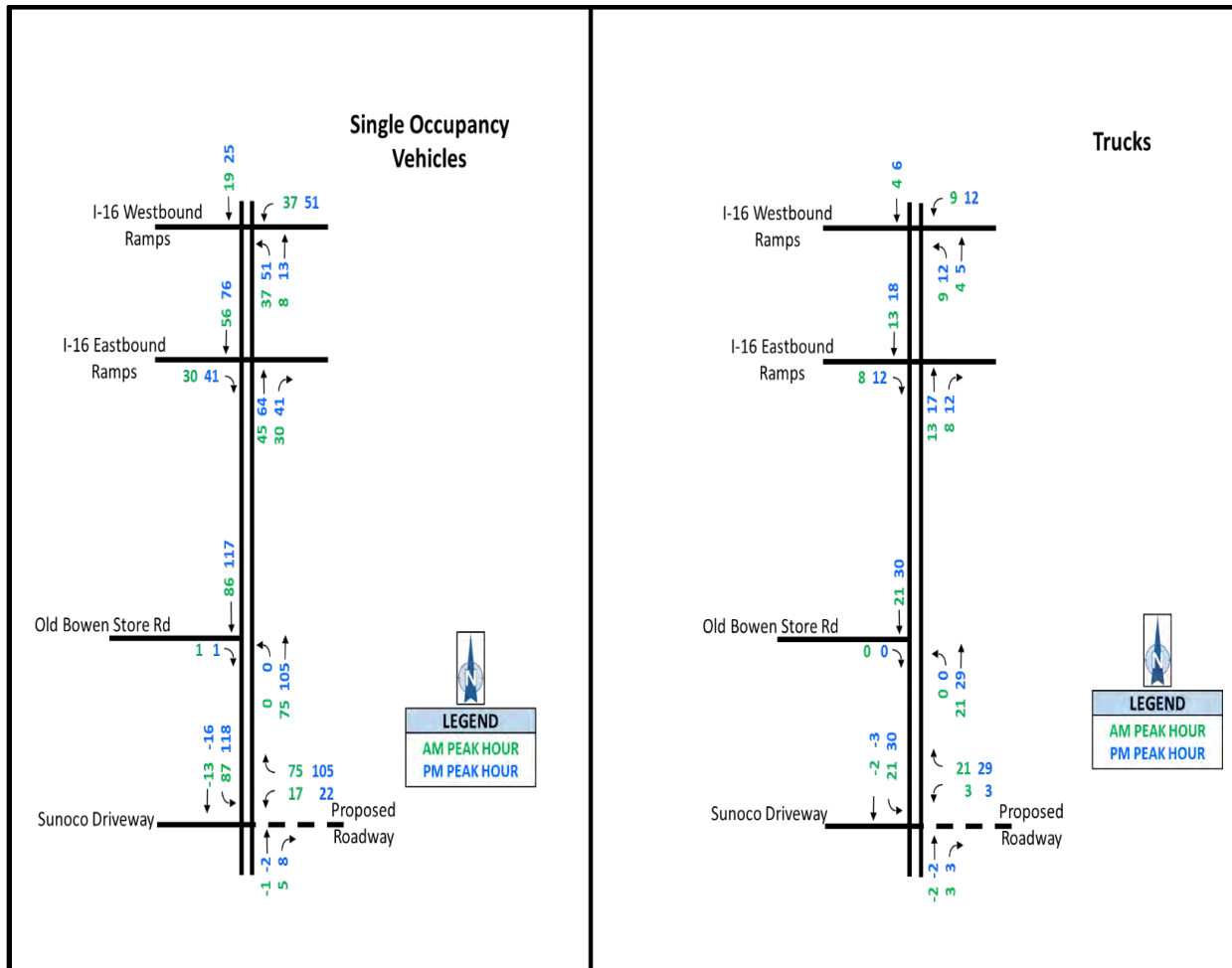
Volume



Total New Trips

The Total New Trips are derived by combining the new trips (Figure 8), pass-by trips (Figure 9), and the diverted link trips (Figure 10). The Total New Trip volumes are shown in Figure 11.

Figure 11: TOTAL TRIPS, SINGLE OCCUPANCY VEHICLES VS TRUCKS



Trip Generation Worksheet

Trip Generation Analysis (11th Ed. With 2nd Edition Handbook Daily IC & 3rd Edition AM/PM IC) Aspen Aerogels DRI Statesboro, GA													
Land Use			Density		Daily Trips			AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out	Total	In	Out
Proposed Project Trips													
LUC	Land Use		Density	Units									
140	Manufacturing		533,527	Sq. Ft. GFA	2,214	1,107	1,107	335	255	80	447	139	308
Total Proposed Trips					2,214	1,107	1,107	335	255	80	447	139	308
Total Proposed Project Trips					2,214	1,107	1,107	335	255	80	447	139	308
Total Existing Site Trips (To Be Removed)					0	0	0	0	0	0	0	0	0
Gross Project Trips					2,214	1,107	1,107	335	255	80	447	139	308
Warehouse Trips					2,214	1,107	1,107	335	255	80	447	139	308
Truck Trips (of Warehousing Trips)					250	125	125	16	9	7	16	7	9
Car Trips (of Warehousing Trips)					1,964	982	982	319	246	73	431	132	299
Alternative Mode Reductions					0	0	0	0	0	0	0	0	0
Adjusted Car Trips					1,964	982	982	319	246	73	431	132	299
Mixed-Use Reductions - TOTAL					0	0	0	0	0	0	0	0	0
Alternative Mode Reductions - TOTAL					0	0	0	0	0	0	0	0	0
Pass-By Reductions - TOTAL					0	0	0	0	0	0	0	0	0
New Trips					2,214	1,107	1,107	335	255	80	447	139	308
Driveway Volumes													

Intersection Volume Worksheets

INTERSECTION #1
GA-73 (South)/GA-73 (North) at Rocky Rd

AM PEAK HOUR

[illegible]

INTERSECTION #1
GA-73 (South)/GA-73 (North) at Rocky Rd

[illegible]

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #2
SR 73 / US 301 at Private Dwy/Travel America

AM PEAK HOUR																
	SR 73 / US 301 Northbound				SR 73 / US 301 Southbound				Private Dwy Eastbound				Travel America Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	396	0	11	0	276	0	0	0	0	1	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	27	0	0	0	29	0	0	0	0	1	0	0	0	0
Heavy Vehicle %	2%	2%	7%	2%	2%	2%	11%	2%	2%	2%	2%	100%	2%	2%	2%	2%
Peak Hour Factor	0.84				0.84				0.84				0.84			
Adjustment Factor	1.04	1.04	1	1.04	1.04	1.04	1	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Adjusted 2021 Volumes	0	0	396	0	11	0	276	0	0	0	0	1	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips			-1	5		87	-13							17		75
Travel America Truck Trips			-2	3		21	-2							3		21
Total Approved Development Trips	0	0	-3	8	0	108	-15	0	0	0	0	0	0	20	0	96
2024 No-Build Traffic	0	0	417	8	12	108	278	0	0	0	0	1	0	20	0	96
Trip Distribution IN							95%									
Trip Distribution OUT			(95%)													
Warehouse Truck Trips	0	0	7	0	0	0	9	0	0	0	0	0	0	0	0	0
Trip Distribution IN							90%									
Trip Distribution OUT			(90%)													
Warehouse Car Trips	0	0	66	0	0	0	221	0	0	0	0	0	0	0	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	73	0	0	0	230	0	0	0	0	0	0	0	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	73	0	0	0	230	0	0	0	0	0	0	0	0	0
2024 Build Traffic	0	0	490	8	12	108	508	0	0	0	0	1	0	20	0	96
2024 Build Heavy Vehicle %	2%	2%	7%	38%	2%	19%	7%	2%	2%	2%	2%	110%	2%	15%	2%	22%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #2
SR 73 / US 301 at Private Dwy/Travel America

PM PEAK HOUR																
	SR 73 / US 301 Northbound				SR 73 / US 301 Southbound				Private Dwy Eastbound				Travel America Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	366	0	5	0	437	4	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	21	0	0	0	12	4	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	6%	2%	2%	2%	3%	100%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor	0.91				0.91				0.91				0.91			
Adjustment Factor	1.04	1.04	1	1.04	1.04	1.04	1	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Adjusted 2021 Volumes	0	0	366	0	5	0	437	4	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips			-2	8			118	-16						22		105
Travel America Truck Trips			-2	3			30	-3						3		29
Total Approved Development Trips	0	0	-4	11	0		148	-19	0	0	0	0	0	25	0	134
2024 No-Build Traffic	0	0	384	11	5		148	445	4	0	0	0	0	25	0	134
Trip Distribution IN							95%									
Trip Distribution OUT			(95%)													
Warehouse Truck Trips	0	0	9	0	0	0	7	0	0	0	0	0	0	0	0	0
Trip Distribution IN							90%									
Trip Distribution OUT			(90%)													
Warehouse Car Trips	0	0	269	0	0	0	119	0	0	0	0	0	0	0	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	278	0	0	0	126	0	0	0	0	0	0	0	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	278	0	0	0	126	0	0	0	0	0	0	0	0	0
2024 Build Traffic	0	0	662	11	5		148	571	4	0	0	0	0	25	0	134
2024 Build Heavy Vehicle %	2%	2%	4%	27%	2%		20%	3%	110%	2%	2%	2%	2%	12%	2%	22%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #3
GA-73 (South)/GA-73 (North) at GA-404 Jim Gillis Historic Savannah Pkwy E/Bound Off-Ramp/GA-404 Jim Gillis Historic Savannah Pkwy E/Bound On-Ramp

AM PEAK HOUR																
	GA-73 (South) Northbound				GA-73 (North) Southbound				GA-404 Jim Gillis Historic Savannah Pkwy E/Bound Eastbound				GA-404 Jim Gillis Historic Savannah Pkwy E/Bound On Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	1	0	367	39	0	80	250	0	0	124	0	26	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	26	5	0	39	21	0	0	15	0	6	0	0	0	0
Heavy Vehicle %	2%	2%	7%	13%	2%	49%	8%	2%	2%	12%	2%	23%	2%	2%	2%	2%
Peak Hour Factor	0.83				0.83				0.83				0.83			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	1	0	367	39	0	80	250	0	0	124	0	26	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips			45	30			56					30				
Travel America Truck Trips			13	8			13					8				
Total Approved Development Trips	0	0	58	38	0	0	69	0	0	0	0	38	0	0	0	0
2024 No-Build Traffic	1	0	447	79	0	85	334	0	0	132	0	66	0	0	0	0
Trip Distribution IN							50%					45%				
Trip Distribution OUT			(50%)	(45%)												
Warehouse Truck Trips	0	0	4	3	0	0	5	0	0	0	0	4	0	0	0	0
Trip Distribution IN							55%					35%				
Trip Distribution OUT			(55%)	(35%)												
Warehouse Car Trips	0	0	40	26	0	0	135	0	0	0	0	86	0	0	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	44	29	0	0	140	0	0	0	0	90	0	0	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	44	29	0	0	140	0	0	0	0	90	0	0	0	0
2024 Build Traffic	1	0	491	108	0	85	474	0	0	132	0	156	0	0	0	0
2024 Build Heavy Vehicle %	2%	2%	9%	15%	2%	49%	11%	2%	2%	12%	2%	12%	2%	2%	2%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #3
GA-73 (South)/GA-73 (North) at GA-404 Jim Gillis Historic Savannah Pkwy E/Bound Off-Ramp/GA-404 Jim Gillis Historic Savannah Pkwy E/Bound On-Ramp

PM PEAK HOUR																
	GA-73 (South) Northbound				GA-73 (North) Southbound				GA-404 Jim Gillis Historic Savannah Pkwy E/Bound Eastbound				GA-404 Jim Gillis Historic Savannah Pkwy E/Bound On Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	1	0	352	24	4	62	441	0	0	116	1	19	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	12	2	0	20	17	0	0	15	0	5	0	0	0	0
Heavy Vehicle %	2%	2%	3%	8%	2%	32%	4%	2%	2%	13%	2%	26%	2%	2%	2%	2%
Peak Hour Factor	0.914				0.91				0.91				0.91			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	1	0	352	24	4	62	441	0	0	116	1	19	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips			64	41			76					41				
Travel America Truck Trips			17	12			18					12				
Total Approved Development Trips	0	0	81	53	0	0	94	0	0	0	0	53	0	0	0	0
2024 No-Build Traffic	1	0	455	78	4	66	562	0	0	123	1	73	0	0	0	0
Trip Distribution IN							50%					45%				
Trip Distribution OUT			(50%)	(45%)												
Warehouse Truck Trips	0	0	5	4	0	0	4	0	0	0	0	3	0	0	0	0
Trip Distribution IN							55%					35%				
Trip Distribution OUT			(55%)	(35%)												
Warehouse Car Trips	0	0	164	105	0	0	73	0	0	0	0	46	0	0	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	169	109	0	0	77	0	0	0	0	49	0	0	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	169	109	0	0	77	0	0	0	0	49	0	0	0	0
2024 Build Traffic	1	0	624	187	4	66	639	0	0	123	1	122	0	0	0	0
2024 Build Heavy Vehicle %	2%	2%	6%	10%	2%	32%	6%	2%	2%	13%	2%	17%	2%	2%	2%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #4
GA-73 (South)/GA-73 (North) at GA-404 Jim Gillis Historic Savannah Pkwy W/Bound On-Ramp/GA-404 Jim Gillis Historic Savannah Pkwy W/Bound Off-Ramp

AM PEAK HOUR																
	GA-73 (South) Northbound				GA-73 (North) Southbound				GA-404 Jim Gillis Historic Savannah Pkwy W/Bound Eastbound				GA-404 Jim Gillis Historic Savannah Pkwy W/Bound Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	17	471	0	0	0	312	101	0	0	0	0	0	17	2	85
Count Balancing																
Heavy Vehicles	0	2	39	0	0	0	60	21	0	0	0	0	0	0	2	37
Heavy Vehicle %	2%	12%	8%	2%	2%	2%	19%	21%	2%	2%	2%	2%	2%	2%	100%	44%
Peak Hour Factor	0.86				0.86				0.86				0.86			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	17	471	0	0	0	312	101	0	0	0	0	0	17	2	85
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips		37	8				19							37		
Travel America Truck Trips		9	4				4							9		
Total Approved Development Trips	0	46	12	0	0	0	23	0	0	0	0	0	0	46	0	0
2024 No-Build Traffic	0	64	512	0	0	0	354	107	0	0	0	0	0	64	2	90
Trip Distribution IN							5%							45%		
Trip Distribution OUT		(45%)	(5%)													
Warehouse Truck Trips	0	3	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Trip Distribution IN							20%							35%		
Trip Distribution OUT		(35%)	(20%)													
Warehouse Car Trips	0	26	15	0	0	0	49	0	0	0	0	0	0	86	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	29	15	0	0	0	49	0	0	0	0	0	0	90	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	29	15	0	0	0	49	0	0	0	0	0	0	90	0	0
2024 Build Traffic	0	93	527	0	0	0	403	107	0	0	0	0	0	154	2	90
2024 Build Heavy Vehicle %	2%	15%	9%	2%	2%	2%	18%	21%	2%	2%	2%	2%	2%	8%	106%	44%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #4

GA-73 (South)/GA-73 (North) at GA-404 Jim Gillis Historic Savannah Pkwy W/Bound On-Ramp/GA-404 Jim Gillis Historic Savannah Pkwy W/Bound Off-Ramp

PM PEAK HOUR																
	GA-73 (South) Northbound				GA-73 (North) Southbound				GA-404 Jim Gillis Historic Savannah Pkwy W/Bound Eastbound				GA-404 Jim Gillis Historic Savannah Pkwy W/Bound Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	35	438	0	0	0	458	207	0	0	0	0	0	49	1	85
Count Balancing																
Heavy Vehicles	0	5	26	0	0	0	36	14	0	0	0	0	0	2	0	30
Heavy Vehicle %	2%	14%	6%	2%	2%	2%	8%	7%	2%	2%	2%	2%	2%	4%	2%	35%
Peak Hour Factor	0.959				0.96				0.96				0.96			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	35	438	0	0	0	458	207	0	0	0	0	0	49	1	85
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips		51	13				25							51		
Travel America Truck Trips		12	5				6							12		
Total Approved Development Trips	0	63	18	0	0	0	31	0	0	0	0	0	0	63	0	0
2024 No-Build Traffic	0	100	483	0	0	0	517	220	0	0	0	0	0	115	1	90
Trip Distribution IN							5%							45%		
Trip Distribution OUT		(45%)	(5%)													
Warehouse Truck Trips	0	4	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Trip Distribution IN							20%							35%		
Trip Distribution OUT		(35%)	(20%)													
Warehouse Car Trips	0	105	60	0	0	0	26	0	0	0	0	0	0	46	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	109	60	0	0	0	26	0	0	0	0	0	0	49	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	109	60	0	0	0	26	0	0	0	0	0	0	49	0	0
2024 Build Traffic	0	209	543	0	0	0	543	220	0	0	0	0	0	164	1	90
2024 Build Heavy Vehicle %	2%	10%	6%	2%	2%	2%	8%	7%	2%	2%	2%	2%	2%	10%	2%	35%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #5
at

AM PEAK HOUR

	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN										50%	50%					
Trip Distribution OUT								(50%)							(50%)	
Warehouse Truck Trips	0	0	0	0	0	0	0	4	0	5	5	0	0	0	4	0
Trip Distribution IN										50%	50%					
Trip Distribution OUT								(50%)							(50%)	
Warehouse Car Trips	0	0	0	0	0	0	0	37	0	123	123	0	0	0	37	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	41	0	128	128	0	0	0	41	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	41	0	128	128	0	0	0	41	0
2024 Build Traffic	0	0	0	0	0	0	0	41	0	128	128	0	0	0	41	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	10%	2%	4%	4%	2%	2%	2%	10%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #5
at

PM PEAK HOUR																
	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN										50%	50%					
Trip Distribution OUT								(50%)							(50%)	
Warehouse Truck Trips	0	0	0	0	0	0	0	5	0	4	4	0	0	0	5	0
Trip Distribution IN										50%	50%					
Trip Distribution OUT								(50%)							(50%)	
Warehouse Car Trips	0	0	0	0	0	0	0	150	0	66	66	0	0	0	150	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	155	0	70	70	0	0	0	155	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	155	0	70	70	0	0	0	155	0
2024 Build Traffic	0	0	0	0	0	0	0	155	0	70	70	0	0	0	155	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	3%	2%	6%	6%	2%	2%	2%	3%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #6
at

AM PEAK HOUR																
	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN											50%					
Trip Distribution OUT															(50%)	
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0
Trip Distribution IN										30%	20%					
Trip Distribution OUT								(30%)							(20%)	
Warehouse Car Trips	0	0	0	0	0	0	0	22	0	74	49	0	0	0	15	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	22	0	74	54	0	0	0	19	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	22	0	74	54	0	0	0	19	0
2024 Build Traffic	0	0	0	0	0	0	0	22	0	74	54	0	0	0	19	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	21%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #6
at

PM PEAK HOUR																
	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN											50%					
Trip Distribution OUT															(50%)	
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0
Trip Distribution IN										30%	20%					
Trip Distribution OUT								(30%)							(20%)	
Warehouse Car Trips	0	0	0	0	0	0	0	90	0	40	26	0	0	0	60	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	90	0	40	30	0	0	0	65	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	90	0	40	30	0	0	0	65	0
2024 Build Traffic	0	0	0	0	0	0	0	90	0	40	30	0	0	0	65	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	13%	2%	2%	2%	8%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #7
at

AM PEAK HOUR

	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN											50%					
Trip Distribution OUT															(50%)	
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0
Trip Distribution IN										10%	10%					
Trip Distribution OUT								(10%)							(10%)	
Warehouse Car Trips	0	0	0	0	0	0	0	7	0	25	25	0	0	0	7	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	7	0	25	30	0	0	0	11	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	7	0	25	30	0	0	0	11	0
2024 Build Traffic	0	0	0	0	0	0	0	7	0	25	30	0	0	0	11	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	17%	2%	2%	2%	36%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #7
at

PM PEAK HOUR																
	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN											50%					
Trip Distribution OUT															(50%)	
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0
Trip Distribution IN										10%	10%					
Trip Distribution OUT								(10%)							(10%)	
Warehouse Car Trips	0	0	0	0	0	0	0	30	0	13	13	0	0	0	30	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	30	0	13	17	0	0	0	35	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	30	0	13	17	0	0	0	35	0
2024 Build Traffic	0	0	0	0	0	0	0	30	0	13	17	0	0	0	35	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	24%	2%	2%	2%	14%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #8
at

AM PEAK HOUR																
	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN										50%						
Trip Distribution OUT								(50%)								
Warehouse Truck Trips	0	0	0	0	0	0	0	4	0	5	0	0	0	0	0	0
Trip Distribution IN										10%						
Trip Distribution OUT								(10%)								
Warehouse Car Trips	0	0	0	0	0	0	0	7	0	25	0	0	0	0	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	11	0	30	0	0	0	0	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	11	0	30	0	0	0	0	0	0
Pedestrian Distribution IN																
Pedestrian Distribution OUT																
Pedestrian Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle Distribution IN																
Bicycle Distribution OUT																
Bicycle Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 Build Traffic	0	0	0	0	0	0	0	11	0	30	0	0	0	0	0	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	36%	2%	17%	2%	2%	2%	2%	2%	2%

INTERSECTION VOLUME DEVELOPMENT








INTERSECTION #8
at

PM PEAK HOUR																
	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing																
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor																
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Growth Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Travel America Car Trips																
Travel America Truck Trips																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN										50%						
Trip Distribution OUT								(50%)								
Warehouse Truck Trips	0	0	0	0	0	0	0	5	0	4	0	0	0	0	0	0
Trip Distribution IN										10%						
Trip Distribution OUT								(10%)								
Warehouse Car Trips	0	0	0	0	0	0	0	30	0	13	0	0	0	0	0	0
Pass-By Distribution IN																
Pass-By Distribution OUT																
Pass-By Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	35	0	17	0	0	0	0	0	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	35	0	17	0	0	0	0	0	0
2024 Build Traffic	0	0	0	0	0	0	0	35	0	17	0	0	0	0	0	0
2024 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	14%	2%	24%	2%	2%	2%	2%	2%	2%

Synchro Analysis Reports











HCM 6th TWSC
1: SR 73/US 301 & Rocky Road

02/01/2022

Intersection							
Int Delay, s/veh	0.1						
Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	2	5	1	391	0	0	276
Future Vol, veh/h	2	5	1	391	0	0	276
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	Yield	-	-	Yield	-	None
Storage Length	0	0	300	-	350	215	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	7	2	2	11
Mvmt Flow	2	6	1	465	0	0	329
Major/Minor	Minor1	Major1			Major2		
Conflicting Flow All	632	233	329	0	0	465	0
Stage 1	467	-	-	-	-	-	-
Stage 2	165	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	-	-	2.22	-
Pot Cap-1 Maneuver	413	769	888	-	-	1093	-
Stage 1	597	-	-	-	-	-	-
Stage 2	847	-	-	-	-	-	-
Platoon blocked, %				-	-		-
Mov Cap-1 Maneuver	413	769	888	-	-	1093	-
Mov Cap-2 Maneuver	413	-	-	-	-	-	-
Stage 1	596	-	-	-	-	-	-
Stage 2	847	-	-	-	-	-	-
Approach	WB	NB			SB		
HCM Control Delay, s	10.9	0			0		
HCM LOS	B						
Minor Lane/Major Mvmt	NBU	NBT	NBRWBLn1WBLn2		SBL	SBT	
Capacity (veh/h)	888	-	-	413	769	1093	-
HCM Lane V/C Ratio	0.001	-	-	0.006	0.008	-	-
HCM Control Delay (s)	9.1	-	-	13.8	9.7	0	-
HCM Lane LOS	A	-	-	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-

HCM 6th TWSC
2: SR 73/US 301 & Private Dwy/Travel America

02/01/2022









Intersection													
Int Delay, s/veh	0.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	0	0	1	0	0	0	0	396	0	11	0	276	0
Future Vol, veh/h	0	0	1	0	0	0	0	396	0	11	0	276	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	Yield	-	-	-	Yield
Storage Length	-	-	100	-	-	75	525	-	300	-	0	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	100	2	2	2	2	7	2	2	2	11	2
Mvmt Flow	0	0	1	0	0	0	0	471	0	13	0	329	0
Major/Minor	Minor2		Minor1		Major1		Major2						
Conflicting Flow All	591	826	165	662	826	236	329	0	0	471	471	0	0
Stage 1	355	355	-	471	471	-	-	-	-	-	-	-	-
Stage 2	236	471	-	191	355	-	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	8.9	7.54	6.54	6.94	4.14	-	-	6.44	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	4.3	3.52	4.02	3.32	2.22	-	-	2.52	2.22	-	-
Pot Cap-1 Maneuver	391	306	613	347	306	766	1227	-	-	722	1087	-	-
Stage 1	635	628	-	542	558	-	-	-	-	-	-	-	-
Stage 2	746	558	-	792	628	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-			-	-
Mov Cap-1 Maneuver	386	300	613	341	300	766	1227	-	-	722	722	-	-
Mov Cap-2 Maneuver	386	300	-	341	300	-	-	-	-	-	-	-	-
Stage 1	635	617	-	542	558	-	-	-	-	-	-	-	-
Stage 2	746	558	-	776	617	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB						
HCM Control Delay, s	10.9		0		0		0.4						
HCM LOS	B		A										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1227	-	-	-	613	-	-	722	-	-			
HCM Lane V/C Ratio	-	-	-	-	0.002	-	-	0.018	-	-			
HCM Control Delay (s)	0	-	-	0	10.9	0	0	10.1	-	-			
HCM Lane LOS	A	-	-	A	B	A	A	B	-	-			
HCM 95th %tile Q(veh)	0	-	-	-	0	-	-	0.1	-	-			

Intersection													
Int Delay, s/veh	4.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕						↑↑	↗	↖	↑↑		
Traffic Vol, veh/h	124	0	26	0	0	0	0	367	39	80	250	0	
Future Vol, veh/h	124	0	26	0	0	0	0	367	39	80	250	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	-	-	275	260	-	-	
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	
Heavy Vehicles, %	12	2	23	2	2	2	2	7	13	49	8	2	
Mvmt Flow	149	0	31	0	0	0	0	442	47	96	301	0	
Major/Minor	Minor2						Major1			Major2			
Conflicting Flow All	714	982	151				-	0	0	489	0	0	
Stage 1	493	493	-				-	-	-	-	-	-	
Stage 2	221	489	-				-	-	-	-	-	-	
Critical Hdwy	7.04	6.54	7.36				-	-	-	5.08	-	-	
Critical Hdwy Stg 1	6.04	5.54	-				-	-	-	-	-	-	
Critical Hdwy Stg 2	6.04	5.54	-				-	-	-	-	-	-	
Follow-up Hdwy	3.62	4.02	3.53				-	-	-	2.69	-	-	
Pot Cap-1 Maneuver	345	248	806				0	-	-	801	-	0	
Stage 1	552	545	-				0	-	-	-	-	0	
Stage 2	765	548	-				0	-	-	-	-	0	
Platoon blocked, %								-	-				-
Mov Cap-1 Maneuver	304	0	806				-	-	-	801	-	-	
Mov Cap-2 Maneuver	396	0	-				-	-	-	-	-	-	
Stage 1	552	0	-				-	-	-	-	-	-	
Stage 2	673	0	-				-	-	-	-	-	-	
Approach	EB						NB			SB			
HCM Control Delay, s	19.1						0			2.5			
HCM LOS	C												
Minor Lane/Major Mvmt		NBT	NBR	EBLn1	SBL	SBT							
Capacity (veh/h)		-	-	434	801	-							
HCM Lane V/C Ratio		-	-	0.416	0.12	-							
HCM Control Delay (s)		-	-	19.1	10.1	-							
HCM Lane LOS		-	-	C	B	-							
HCM 95th %tile Q(veh)		-	-	2	0.4	-							

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	17	2	85	17	471	0	0	312	101
Future Vol, veh/h	0	0	0	17	2	85	17	471	0	0	312	101
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	260	220	-	-	-	-	285
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	100	44	12	8	2	2	19	21
Mvmt Flow	0	0	0	20	2	99	20	548	0	0	363	117
Major/Minor												
Minor1				Major1				Major2				
Conflicting Flow All	770	1068	274	480	0	-	-	-	-	-	0	-
Stage 1	588	588	-	-	-	-	-	-	-	-	-	-
Stage 2	182	480	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.84	8.5	7.78	4.34	-	-	-	-	-	-	-	-
Critical Hdwy Stg 1	5.84	7.5	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	7.5	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	5	3.74	2.32	-	-	-	-	-	-	-	-
Pot Cap-1 Maneuver	337	111	612	1011	-	0	0	-	0	-	-	-
Stage 1	518	309	-	-	-	0	0	-	0	-	-	-
Stage 2	831	363	-	-	-	0	0	-	0	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	330	0	612	1011	-	-	-	-	-	-	-	-
Mov Cap-2 Maneuver	420	0	-	-	-	-	-	-	-	-	-	-
Stage 1	508	0	-	-	-	-	-	-	-	-	-	-
Stage 2	831	0	-	-	-	-	-	-	-	-	-	-
Approach												
WB				NB				SB				
HCM Control Delay, s	12.4			0.3				0				
HCM LOS	B											
Minor Lane/Major Mvmt												
NBL				NBTWBLn1WBLn2				SBT SBR				
Capacity (veh/h)	1011	-	420	612	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.02	-	0.053	0.161	-	-	-	-	-	-	-	-
HCM Control Delay (s)	8.6	-	14	12	-	-	-	-	-	-	-	-
HCM Lane LOS	A	-	B	B	-	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.6	-	-	-	-	-	-	-	-

HCM 6th TWSC
1: SR 73/US 301 & Rocky Road

02/01/2022

Intersection								
Int Delay, s/veh	0.1							
Movement	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations								
Traffic Vol, veh/h	0	0	0	366	0	1	2	434
Future Vol, veh/h	0	0	0	366	0	1	2	434
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	Yield	-	-	Yield	-	-	None
Storage Length	0	0	300	-	350	-	215	-
Veh in Median Storage, #	0	-	-	0	-	-	-	0
Grade, %	0	-	-	0	-	-	-	0
Peak Hour Factor	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	6	2	2	2	3
Mvmt Flow	0	0	0	402	0	1	2	477
Major/Minor	Minor1	Major1		Major2				
Conflicting Flow All	647	201	477	0	0	402	402	0
Stage 1	402	-	-	-	-	-	-	-
Stage 2	245	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	-	-	6.44	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	-	-	2.52	2.22	-
Pot Cap-1 Maneuver	404	806	716	-	-	798	1153	-
Stage 1	644	-	-	-	-	-	-	-
Stage 2	773	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	403	806	716	-	-	1004	1004	-
Mov Cap-2 Maneuver	403	-	-	-	-	-	-	-
Stage 1	644	-	-	-	-	-	-	-
Stage 2	771	-	-	-	-	-	-	-
Approach	WB	NB		SB				
HCM Control Delay, s	0	0		0.1				
HCM LOS	A							
Minor Lane/Major Mvmt	NBU	NBT	NBRWBLn1WBLn2		SBL	SBT		
Capacity (veh/h)	716	-	-	-	-	1004	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.003	-	-
HCM Control Delay (s)	0	-	-	0	0	8.6	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

HCM 6th TWSC
2: SR 73/US 301 & Private Dwy/Travel America

02/01/2022

Intersection													
Int Delay, s/veh	0.1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱	↰		↰	↱	↰
Traffic Vol, veh/h	0	0	0	0	0	0	0	366	0	5	0	437	4
Future Vol, veh/h	0	0	0	0	0	0	0	366	0	5	0	437	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	Yield	-	-	-	Yield
Storage Length	-	-	100	-	-	75	525	-	300	-	0	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	84	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	6	2	2	2	3	100
Mvmt Flow	0	0	0	0	0	0	0	402	0	5	0	480	4

Major/Minor	Minor2		Minor1		Major1		Major2							
Conflicting Flow All	691	892	240	652	892	201	480	0	0	402	402	0	0	
Stage 1	490	490	-	402	402	-	-	-	-	-	-	-	-	
Stage 2	201	402	-	250	490	-	-	-	-	-	-	-	-	
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	6.44	4.14	-	-	
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-	-	
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.52	2.22	-	-	
Pot Cap-1 Maneuver	331	280	761	353	280	806	1079	-	-	798	1153	-	-	
Stage 1	529	547	-	596	599	-	-	-	-	-	-	-	-	
Stage 2	782	599	-	732	547	-	-	-	-	-	-	-	-	
Platoon blocked, %								-	-			-	-	
Mov Cap-1 Maneuver	329	278	761	351	278	806	1079	-	-	798	798	-	-	
Mov Cap-2 Maneuver	329	278	-	351	278	-	-	-	-	-	-	-	-	
Stage 1	529	544	-	596	599	-	-	-	-	-	-	-	-	
Stage 2	782	599	-	727	544	-	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1079	-	-	-	-	-	-	798	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.007	-	-
HCM Control Delay (s)	0	-	-	0	0	0	0	9.5	-	-
HCM Lane LOS	A	-	-	A	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-	-	0	-	-

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↑↑	↑	↑	↑↑	
Traffic Vol, veh/h	116	1	19	0	0	0	0	352	24	66	441	0
Future Vol, veh/h	116	1	19	0	0	0	0	352	24	66	441	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	275	260	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	13	2	26	2	2	2	2	3	8	32	4	2
Mvmt Flow	127	1	21	0	0	0	0	387	26	73	485	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	825	1044	243	-	0	0	413	0	0
Stage 1	631	631	-	-	-	-	-	-	-
Stage 2	194	413	-	-	-	-	-	-	-
Critical Hdwy	7.06	6.54	7.42	-	-	-	4.74	-	-
Critical Hdwy Stg 1	6.06	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.06	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.63	4.02	3.56	-	-	-	2.52	-	-
Pot Cap-1 Maneuver	290	228	689	0	-	-	955	-	0
Stage 1	463	473	-	0	-	-	-	-	0
Stage 2	788	592	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	268	0	689	-	-	-	955	-	-
Mov Cap-2 Maneuver	363	0	-	-	-	-	-	-	-
Stage 1	463	0	-	-	-	-	-	-	-
Stage 2	728	0	-	-	-	-	-	-	-








Approach	EB	NB	SB
HCM Control Delay, s	19.9	0	1.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	389	955	-
HCM Lane V/C Ratio	-	-	0.384	0.076	-
HCM Control Delay (s)	-	-	19.9	9.1	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	1.8	0.2	-

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	49	1	85	35	438	0	0	458	207
Future Vol, veh/h	0	0	0	49	1	85	35	438	0	0	458	207
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	260	220	-	-	-	-	285
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	4	2	35	14	6	2	2	8	7
Mvmt Flow	0	0	0	51	1	89	36	456	0	0	477	216
Major/Minor												
Minor1				Major1				Major2				
Conflicting Flow All	767	1221	228	693	0	-	-	-	-	-	0	-
Stage 1	528	528	-	-	-	-	-	-	-	-	-	-
Stage 2	239	693	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.88	6.54	7.6	4.38	-	-	-	-	-	-	-	-
Critical Hdwy Stg 1	5.88	5.54	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.88	5.54	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.54	4.02	3.65	2.34	-	-	-	-	-	-	-	-
Pot Cap-1 Maneuver	334	179	683	822	-	0	0	-	-	-	-	-
Stage 1	550	526	-	-	-	0	0	-	-	-	-	-
Stage 2	772	443	-	-	-	0	0	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	319	0	683	822	-	-	-	-	-	-	-	-
Mov Cap-2 Maneuver	417	0	-	-	-	-	-	-	-	-	-	-
Stage 1	526	0	-	-	-	-	-	-	-	-	-	-
Stage 2	772	0	-	-	-	-	-	-	-	-	-	-
Approach												
WB				NB				SB				
HCM Control Delay, s	12.5			0.7				0				
HCM LOS	B											
Minor Lane/Major Mvmt												
NBL				NBTWBLn1WBLn2				SBT SBR				
Capacity (veh/h)	822	-	417	683	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.044	-	0.125	0.13	-	-	-	-	-	-	-	-
HCM Control Delay (s)	9.6	-	14.9	11.1	-	-	-	-	-	-	-	-
HCM Lane LOS	A	-	B	B	-	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.4	-	-	-	-	-	-	-	-











HCM 6th TWSC
1: SR 73/US 301 & Rocky Road

02/01/2022

Intersection							
Int Delay, s/veh	0.1						
Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	2	5	1	420	0	0	298
Future Vol, veh/h	2	5	1	420	0	0	298
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	Yield	-	-	Yield	-	None
Storage Length	0	0	300	-	350	215	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	7	2	2	11
Mvmt Flow	2	6	1	500	0	0	355
Major/Minor	Minor1		Major1		Major2		
Conflicting Flow All	680	250	355	0	0	500	0
Stage 1	502	-	-	-	-	-	-
Stage 2	178	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	-	-	2.22	-
Pot Cap-1 Maneuver	385	750	855	-	-	1060	-
Stage 1	573	-	-	-	-	-	-
Stage 2	835	-	-	-	-	-	-
Platoon blocked, %				-	-		-
Mov Cap-1 Maneuver	385	750	855	-	-	1060	-
Mov Cap-2 Maneuver	385	-	-	-	-	-	-
Stage 1	572	-	-	-	-	-	-
Stage 2	835	-	-	-	-	-	-
Approach	WB		NB		SB		
HCM Control Delay, s	11.1		0		0		
HCM LOS	B						
Minor Lane/Major Mvmt		NBU	NBT	NBR	WBLn1	WBLn2	SBL SBT
Capacity (veh/h)		855	-	-	385	750	1060 -
HCM Lane V/C Ratio		0.001	-	-	0.006	0.008	- -
HCM Control Delay (s)		9.2	-	-	14.4	9.8	0 -
HCM Lane LOS		A	-	-	B	A	A -
HCM 95th %tile Q(veh)		0	-	-	0	0	0 -

HCM 6th TWSC
2: SR 73/US 301 & Private Dwy/Travel America

02/01/2022

Intersection													
Int Delay, s/veh	3												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	0	0	1	20	0	96	0	417	8	12	108	278	0
Future Vol, veh/h	0	0	1	20	0	96	0	417	8	12	108	278	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	Yield	-	-	-	Yield
Storage Length	-	-	100	-	-	75	525	-	300	-	0	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	100	15	2	22	2	6	38	2	19	10	2
Mvmt Flow	0	0	1	24	0	114	0	496	10	14	129	331	0
Major/Minor	Minor2		Minor1		Major1		Major2						
Conflicting Flow All	865	1113	166	948	1113	248	331	0	0	496	496	0	0
Stage 1	617	617	-	496	496	-	-	-	-	-	-	-	-
Stage 2	248	496	-	452	617	-	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	8.9	7.8	6.54	7.34	4.14	-	-	6.44	4.48	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.8	5.54	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.8	5.54	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	4.3	3.65	4.02	3.52	2.22	-	-	2.52	2.39	-	-
Pot Cap-1 Maneuver	248	207	612	197	207	695	1225	-	-	696	954	-	-
Stage 1	444	479	-	492	544	-	-	-	-	-	-	-	-
Stage 2	734	544	-	524	479	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-			-	-
Mov Cap-1 Maneuver	182	174	612	173	174	695	1225	-	-	901	901	-	-
Mov Cap-2 Maneuver	182	174	-	173	174	-	-	-	-	-	-	-	-
Stage 1	444	403	-	492	544	-	-	-	-	-	-	-	-
Stage 2	613	544	-	440	403	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB						
HCM Control Delay, s	10.9		14.3		0		2.9						
HCM LOS	B		B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1225	-	-	-	612	173	695	901	-	-			
HCM Lane V/C Ratio	-	-	-	-	0.002	0.138	0.164	0.159	-	-			
HCM Control Delay (s)	0	-	-	0	10.9	29.1	11.2	9.7	-	-			
HCM Lane LOS	A	-	-	A	B	D	B	A	-	-			
HCM 95th %tile Q(veh)	0	-	-	-	0	0.5	0.6	0.6	-	-			

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↑↑	↑	↑	↑↑	
Traffic Vol, veh/h	132	0	66	0	0	0	0	447	79	85	334	0
Future Vol, veh/h	132	0	66	0	0	0	0	447	79	85	334	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	275	260	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	12	2	22	2	2	2	2	9	17	49	14	2
Mvmt Flow	159	0	80	0	0	0	0	539	95	102	402	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	876	1240	201	-	0	0	634	0	0
Stage 1	606	606	-	-	-	-	-	-	-
Stage 2	270	634	-	-	-	-	-	-	-
Critical Hdwy	7.04	6.54	7.34	-	-	-	5.08	-	-
Critical Hdwy Stg 1	6.04	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.04	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4.02	3.52	-	-	-	2.69	-	-
Pot Cap-1 Maneuver	270	174	748	0	-	-	687	-	0
Stage 1	480	485	-	0	-	-	-	-	0
Stage 2	722	471	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	230	0	748	-	-	-	687	-	-
Mov Cap-2 Maneuver	331	0	-	-	-	-	-	-	-
Stage 1	480	0	-	-	-	-	-	-	-
Stage 2	615	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.6	0	2.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	407	687	-
HCM Lane V/C Ratio	-	-	0.586	0.149	-
HCM Control Delay (s)	-	-	25.6	11.2	-
HCM Lane LOS	-	-	D	B	-
HCM 95th %tile Q(veh)	-	-	3.6	0.5	-

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↕	↕	↕			↕	↕
Traffic Vol, veh/h	0	0	0	64	2	90	64	512	0	0	354	107
Future Vol, veh/h	0	0	0	64	2	90	64	512	0	0	354	107
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	260	220	-	-	-	-	285
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	14	100	44	17	9	2	2	20	21
Mvmt Flow	0	0	0	74	2	105	74	595	0	0	412	124









Major/Minor	Minor1		Major1		Major2		
Conflicting Flow All	949	1279	298	536	0	-	0
Stage 1	743	743	-	-	-	-	-
Stage 2	206	536	-	-	-	-	-
Critical Hdwy	7.08	8.5	7.78	4.44	-	-	-
Critical Hdwy Stg 1	6.08	7.5	-	-	-	-	-
Critical Hdwy Stg 2	6.08	7.5	-	-	-	-	-
Follow-up Hdwy	3.64	5	3.74	2.37	-	-	-
Pot Cap-1 Maneuver	238	75	588	931	-	0	-
Stage 1	401	246	-	-	-	0	-
Stage 2	774	334	-	-	-	0	-
Platoon blocked, %					-	-	-
Mov Cap-1 Maneuver	219	0	588	931	-	-	-
Mov Cap-2 Maneuver	304	0	-	-	-	-	-
Stage 1	369	0	-	-	-	-	-
Stage 2	774	0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBTWBLn1WBLn2	SBT	SBR
Capacity (veh/h)	931	- 304 588	-	-
HCM Lane V/C Ratio	0.08	- 0.252 0.178	-	-
HCM Control Delay (s)	9.2	- 20.8 12.4	-	-
HCM Lane LOS	A	- C B	-	-
HCM 95th %tile Q(veh)	0.3	- 1 0.6	-	-

HCM 6th TWSC
1: SR 73/US 301 & Rocky Road

02/01/2022

Intersection								
Int Delay, s/veh	0.1							
Movement	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations								
Traffic Vol, veh/h	0	0	0	395	0	1	2	468
Future Vol, veh/h	0	0	0	395	0	1	2	468
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	Yield	-	-	Yield	-	-	None
Storage Length	0	0	300	-	350	-	215	-
Veh in Median Storage, #	0	-	-	0	-	-	-	0
Grade, %	0	-	-	0	-	-	-	0
Peak Hour Factor	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	6	2	2	2	3
Mvmt Flow	0	0	0	434	0	1	2	514
Major/Minor	Minor1	Major1		Major2				
Conflicting Flow All	697	217	514	0	0	434	434	0
Stage 1	434	-	-	-	-	-	-	-
Stage 2	263	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	-	-	6.44	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	-	-	2.52	2.22	-
Pot Cap-1 Maneuver	375	787	678	-	-	762	1122	-
Stage 1	621	-	-	-	-	-	-	-
Stage 2	757	-	-	-	-	-	-	-
Platoon blocked, %				-	-			-
Mov Cap-1 Maneuver	374	787	678	-	-	969	969	-
Mov Cap-2 Maneuver	374	-	-	-	-	-	-	-
Stage 1	621	-	-	-	-	-	-	-
Stage 2	755	-	-	-	-	-	-	-
Approach	WB	NB		SB				
HCM Control Delay, s	0	0		0.1				
HCM LOS	A							
Minor Lane/Major Mvmt	NBU	NBT	NBRWBLn1WBLn2		SBL	SBT		
Capacity (veh/h)	678	-	-	-	-	969	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.003	-	-
HCM Control Delay (s)	0	-	-	0	0	8.7	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

HCM 6th TWSC
2: SR 73/US 301 & Private Dwy/Travel America

02/01/2022

Intersection													
Int Delay, s/veh	3.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱	↰		↰	↱	↱
Traffic Vol, veh/h	0	0	0	25	0	134	0	384	11	5	148	445	4
Future Vol, veh/h	0	0	0	25	0	134	0	384	11	5	148	445	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	Yield	-	-	-	Yield
Storage Length	-	-	100	-	-	75	525	-	300	-	0	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	84	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	12	2	22	2	5	27	2	20	2	100
Mvmt Flow	0	0	0	27	0	147	0	422	12	5	163	489	4

Major/Minor	Minor2		Minor1		Major1		Major2							
Conflicting Flow All	1036	1247	245	1003	1247	211	489	0	0	422	422	0	0	0
Stage 1	825	825	-	422	422	-	-	-	-	-	-	-	-	-
Stage 2	211	422	-	581	825	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.74	6.54	7.34	4.14	-	-	6.44	4.5	-	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.62	4.02	3.52	2.22	-	-	2.52	2.4	-	-	-
Pot Cap-1 Maneuver	186	172	755	183	172	736	1070	-	-	776	1015	-	-	-
Stage 1	333	385	-	554	587	-	-	-	-	-	-	-	-	-
Stage 2	771	587	-	442	385	-	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-			-	-	-
Mov Cap-1 Maneuver	129	143	755	159	143	736	1070	-	-	996	996	-	-	-
Mov Cap-2 Maneuver	129	143	-	159	143	-	-	-	-	-	-	-	-	-
Stage 1	333	320	-	554	587	-	-	-	-	-	-	-	-	-
Stage 2	617	587	-	367	320	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	14.4	0	2.4
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1070	-	-	-	-	159	736	996	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.173	0.2	0.169	-	-
HCM Control Delay (s)	0	-	-	0	0	32.3	11.1	9.3	-	-
HCM Lane LOS	A	-	-	A	A	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0.6	0.7	0.6	-	-

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↑↑	↑	↑	↑↑	
Traffic Vol, veh/h	123	1	73	0	0	0	0	455	78	70	562	0
Future Vol, veh/h	123	1	73	0	0	0	0	455	78	70	562	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	275	260	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	13	2	24	2	2	2	2	7	18	32	6	2
Mvmt Flow	135	1	80	0	0	0	0	500	86	77	618	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1022	1358	309	-	0	0	586	0	0
Stage 1	772	772	-	-	-	-	-	-	-
Stage 2	250	586	-	-	-	-	-	-	-
Critical Hdwy	7.06	6.54	7.38	-	-	-	4.74	-	-
Critical Hdwy Stg 1	6.06	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.06	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.63	4.02	3.54	-	-	-	2.52	-	-
Pot Cap-1 Maneuver	214	148	626	0	-	-	805	-	0
Stage 1	389	407	-	0	-	-	-	-	0
Stage 2	737	495	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	193	0	626	-	-	-	805	-	-
Mov Cap-2 Maneuver	296	0	-	-	-	-	-	-	-
Stage 1	389	0	-	-	-	-	-	-	-
Stage 2	666	0	-	-	-	-	-	-	-








Approach	EB	NB	SB
HCM Control Delay, s	27.8	0	1.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	368	805	-
HCM Lane V/C Ratio	-	-	0.588	0.096	-
HCM Control Delay (s)	-	-	27.8	9.9	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	3.6	0.3	-

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	115	1	90	100	483	0	0	517	220
Future Vol, veh/h	0	0	0	115	1	90	100	483	0	0	517	220
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	260	220	-	-	-	-	285
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	12	2	35	17	7	2	2	9	7
Mvmt Flow	0	0	0	120	1	94	104	503	0	0	539	229
Major/Minor												
Minor1				Major1				Major2				
Conflicting Flow All	981	1479	252	768	0	-	-	-	-	-	0	-
Stage 1	711	711	-	-	-	-	-	-	-	-	-	-
Stage 2	270	768	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.04	6.54	7.6	4.44	-	-	-	-	-	-	-	-
Critical Hdwy Stg 1	6.04	5.54	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.04	5.54	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4.02	3.65	2.37	-	-	-	-	-	-	-	-
Pot Cap-1 Maneuver	230	125	657	751	-	0	0	-	-	-	-	-
Stage 1	422	434	-	-	-	0	0	-	-	-	-	-
Stage 2	722	409	-	-	-	0	0	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	198	0	657	751	-	-	-	-	-	-	-	-
Mov Cap-2 Maneuver	289	0	-	-	-	-	-	-	-	-	-	-
Stage 1	364	0	-	-	-	-	-	-	-	-	-	-
Stage 2	722	0	-	-	-	-	-	-	-	-	-	-
Approach												
WB				NB				SB				
HCM Control Delay, s	19.7			1.8				0				
HCM LOS	C											
Minor Lane/Major Mvmt												
NBL				NBTWBLn1WBLn2				SBT SBR				
Capacity (veh/h)	751	-	289	657	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.139	-	0.418	0.143	-	-	-	-	-	-	-	-
HCM Control Delay (s)	10.6	-	26.1	11.4	-	-	-	-	-	-	-	-
HCM Lane LOS	B	-	D	B	-	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0.5	-	2	0.5	-	-	-	-	-	-	-	-

HCM 6th TWSC
1: SR 73/US 301 & Rocky Road

02/01/2022

Intersection							
Int Delay, s/veh	3.2						
Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Vol, veh/h	9	78	1	420	25	230	298
Future Vol, veh/h	9	78	1	420	25	230	298
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	Yield	-	-	Yield	-	None
Storage Length	0	0	300	-	350	215	-
Veh in Median Storage, #	0	-	-	0	-	-	0
Grade, %	0	-	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84	84
Heavy Vehicles, %	2	9	2	7	2	4	11
Mvmt Flow	11	93	1	500	30	274	355
Major/Minor	Minor1	Major1			Major2		
Conflicting Flow All	1228	250	355	0	0	500	0
Stage 1	502	-	-	-	-	-	-
Stage 2	726	-	-	-	-	-	-
Critical Hdwy	6.84	7.08	6.44	-	-	4.18	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.39	2.52	-	-	2.24	-
Pot Cap-1 Maneuver	170	729	855	-	-	1046	-
Stage 1	573	-	-	-	-	-	-
Stage 2	440	-	-	-	-	-	-
Platoon blocked, %				-	-		-
Mov Cap-1 Maneuver	125	729	855	-	-	1046	-
Mov Cap-2 Maneuver	125	-	-	-	-	-	-
Stage 1	572	-	-	-	-	-	-
Stage 2	325	-	-	-	-	-	-
Approach	WB	NB			SB		
HCM Control Delay, s	13.4	0			4.2		
HCM LOS	B						
Minor Lane/Major Mvmt	NBU	NBT	NBRWBLn1WBLn2		SBL	SBT	
Capacity (veh/h)	855	-	-	125	729	1046	-
HCM Lane V/C Ratio	0.001	-	-	0.086	0.127	0.262	-
HCM Control Delay (s)	9.2	-	-	36.5	10.7	9.7	-
HCM Lane LOS	A	-	-	E	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	1.1	-

HCM 6th TWSC
2: SR 73/US 301 & Private Dwy/Travel America

02/01/2022

Intersection													
Int Delay, s/veh	2.6												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱	↰		↰	↱	↰
Traffic Vol, veh/h	0	0	1	20	0	96	0	490	8	12	108	508	0
Future Vol, veh/h	0	0	1	20	0	96	0	490	8	12	108	508	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	Yield	-	-	-	Yield
Storage Length	-	-	100	-	-	75	525	-	300	-	0	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	100	15	2	22	2	7	38	2	19	7	2
Mvmt Flow	0	0	1	24	0	114	0	583	10	14	129	605	0

Major/Minor	Minor2		Minor1		Major1		Major2		Major2		Major2		Major2	
Conflicting Flow All	1183	1474	303	1172	1474	292	605	0	0	583	583	0	0	0
Stage 1	891	891	-	583	583	-	-	-	-	-	-	-	-	-
Stage 2	292	583	-	589	891	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	8.9	7.8	6.54	7.34	4.14	-	-	6.44	4.48	-	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.8	5.54	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.8	5.54	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	4.3	3.65	4.02	3.52	2.22	-	-	2.52	2.39	-	-	-
Pot Cap-1 Maneuver	145	125	472	133	125	648	969	-	-	613	879	-	-	-
Stage 1	304	359	-	434	497	-	-	-	-	-	-	-	-	-
Stage 2	692	497	-	431	359	-	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-			-	-	-
Mov Cap-1 Maneuver	104	103	472	115	103	648	969	-	-	823	823	-	-	-
Mov Cap-2 Maneuver	104	103	-	115	103	-	-	-	-	-	-	-	-	-
Stage 1	304	297	-	434	497	-	-	-	-	-	-	-	-	-
Stage 2	570	497	-	355	297	-	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.6		17.3		0		2	
HCM LOS	B		C					




Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	969	-	-	-	472	115	648	823	-	-
HCM Lane V/C Ratio	-	-	-	-	0.003	0.207	0.176	0.174	-	-
HCM Control Delay (s)	0	-	-	0	12.6	44.3	11.7	10.3	-	-
HCM Lane LOS	A	-	-	A	B	E	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0.7	0.6	0.6	-	-

Intersection													
Int Delay, s/veh	10.5												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↔						↕↕	↗	↖	↕↕		
Traffic Vol, veh/h	132	0	156	0	0	0	0	491	108	85	474	0	
Future Vol, veh/h	132	0	156	0	0	0	0	491	108	85	474	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	-	-	275	260	-	-	
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	
Heavy Vehicles, %	12	2	12	2	2	2	2	9	15	49	14	2	
Mvmt Flow	159	0	188	0	0	0	0	592	130	102	571	0	
Major/Minor	Minor2						Major1			Major2			
Conflicting Flow All	1071	1497	286				-	0	0	722	0	0	
Stage 1	775	775	-				-	-	-	-	-	-	
Stage 2	296	722	-				-	-	-	-	-	-	
Critical Hdwy	7.04	6.54	7.14				-	-	-	5.08	-	-	
Critical Hdwy Stg 1	6.04	5.54	-				-	-	-	-	-	-	
Critical Hdwy Stg 2	6.04	5.54	-				-	-	-	-	-	-	
Follow-up Hdwy	3.62	4.02	3.42				-	-	-	2.69	-	-	
Pot Cap-1 Maneuver	200	121	682				0	-	-	625	-	0	
Stage 1	390	406	-				0	-	-	-	-	0	
Stage 2	700	429	-				0	-	-	-	-	0	
Platoon blocked, %								-	-				-
Mov Cap-1 Maneuver	167	0	682				-	-	-	625	-	-	
Mov Cap-2 Maneuver	272	0	-				-	-	-	-	-	-	
Stage 1	390	0	-				-	-	-	-	-	-	
Stage 2	586	0	-				-	-	-	-	-	-	
Approach	EB						NB			SB			
HCM Control Delay, s	49.3						0			1.8			
HCM LOS	E												
Minor Lane/Major Mvmt		NBT	NBR	EBLn1	SBL	SBT							
Capacity (veh/h)		-	-	403	625	-							
HCM Lane V/C Ratio		-	-	0.861	0.164	-							
HCM Control Delay (s)		-	-	49.3	11.9	-							
HCM Lane LOS		-	-	E	B	-							
HCM 95th %tile Q(veh)		-	-	8.4	0.6	-							

Intersection												
Int Delay, s/veh	6.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↕	↕	↕			↕	↕
Traffic Vol, veh/h	0	0	0	154	2	90	93	527	0	0	403	107
Future Vol, veh/h	0	0	0	154	2	90	93	527	0	0	403	107
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	260	220	-	-	-	-	285
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	8	100	44	15	9	2	2	18	21
Mvmt Flow	0	0	0	179	2	105	108	613	0	0	469	124
Major/Minor												
Minor1				Major1				Major2				
Conflicting Flow All	1064	1422	307	593	0	-	-	-	-	-	0	-
Stage 1	829	829	-	-	-	-	-	-	-	-	-	-
Stage 2	235	593	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.96	8.5	7.78	4.4	-	-	-	-	-	-	-	-
Critical Hdwy Stg 1	5.96	7.5	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.96	7.5	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.58	5	3.74	2.35	-	-	-	-	-	-	-	-
Pot Cap-1 Maneuver	208	57	579	895	-	0	0	-	-	-	-	-
Stage 1	374	216	-	-	-	0	0	-	-	-	-	-
Stage 2	764	307	-	-	-	0	0	-	-	-	-	-
Platoon blocked, %					-			-		-		-
Mov Cap-1 Maneuver	183	0	579	895	-	-	-	-	-	-	-	-
Mov Cap-2 Maneuver	269	0	-	-	-	-	-	-	-	-	-	-
Stage 1	329	0	-	-	-	-	-	-	-	-	-	-
Stage 2	764	0	-	-	-	-	-	-	-	-	-	-
Approach												
WB				NB				SB				
HCM Control Delay, s	31.4			1.4				0				
HCM LOS	D											
Minor Lane/Major Mvmt												
NBL				NBTWBLn1WBLn2				SBT SBR				
Capacity (veh/h)	895	-	269	579	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.121	-	0.674	0.181	-	-	-	-	-	-	-	-
HCM Control Delay (s)	9.6	-	42.2	12.6	-	-	-	-	-	-	-	-
HCM Lane LOS	A	-	E	B	-	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	0.4	-	4.4	0.7	-	-	-	-	-	-	-	-





HCM 6th TWSC
5: Rocky Road & Internal Access A

02/01/2022

Intersection						
Int Delay, s/veh	3.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	128	128	41	0	0	41
Future Vol, veh/h	128	128	41	0	0	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	10	2	2	10
Mvmt Flow	139	139	45	0	0	45
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	45	0	-	0	-	45
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.16	-	-	-	-	6.35
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.238	-	-	-	-	3.395
Pot Cap-1 Maneuver	1549	-	-	-	0	1000
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1549	-	-	-	-	1000
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.8	0		8.8		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1549	-	-	-	1000	
HCM Lane V/C Ratio	0.09	-	-	-	0.045	
HCM Control Delay (s)	7.6	0.1	-	-	8.8	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	

HCM 6th TWSC
6: Rocky Road & Internal Access B

02/01/2022

Intersection						
Int Delay, s/veh	4.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	74	54	19	0	0	22
Future Vol, veh/h	74	54	19	0	0	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	9	21	2	2	2
Mvmt Flow	80	59	21	0	0	24




Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	21	0	0 240 21
Stage 1	-	-	- 21 -
Stage 2	-	-	- 219 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1595	-	- 748 1056
Stage 1	-	-	- 1002 -
Stage 2	-	-	- 817 -
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1595	-	- 711 1056
Mov Cap-2 Maneuver	-	-	- 711 -
Stage 1	-	-	- 952 -
Stage 2	-	-	- 817 -

Approach	EB	WB	SB
HCM Control Delay, s	4.3	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1595	-	-	-	1056
HCM Lane V/C Ratio	0.05	-	-	-	0.023
HCM Control Delay (s)	7.4	-	-	-	8.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1









HCM 6th TWSC
7: Rocky Road & Internal Access C

02/01/2022

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	30	11	0	0	7
Future Vol, veh/h	25	30	11	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	17	36	2	2	2
Mvmt Flow	27	33	12	0	0	8
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	12	0	-	0	99	12
Stage 1	-	-	-	-	12	-
Stage 2	-	-	-	-	87	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1607	-	-	-	900	1069
Stage 1	-	-	-	-	1011	-
Stage 2	-	-	-	-	936	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1607	-	-	-	885	1069
Mov Cap-2 Maneuver	-	-	-	-	885	-
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	936	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.3	0		8.4		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1607	-	-	-	1069	
HCM Lane V/C Ratio	0.017	-	-	-	0.007	
HCM Control Delay (s)	7.3	0	-	-	8.4	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0	

HCM 6th TWSC
1: SR 73/US 301 & Rocky Road

02/01/2022

Intersection								
Int Delay, s/veh	4.1							
Movement	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations								
Traffic Vol, veh/h	30	278	0	395	13	1	128	468
Future Vol, veh/h	30	278	0	395	13	1	128	468
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	Yield	-	-	Yield	-	-	None
Storage Length	0	0	300	-	350	-	215	-
Veh in Median Storage, #	0	-	-	0	-	-	-	0
Grade, %	0	-	-	0	-	-	-	0
Peak Hour Factor	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	3	2	6	2	2	5	3
Mvmt Flow	33	305	0	434	14	1	141	514
Major/Minor	Minor1	Major1		Major2				
Conflicting Flow All	975	217	514	0	0	434	434	0
Stage 1	434	-	-	-	-	-	-	-
Stage 2	541	-	-	-	-	-	-	-
Critical Hdwy	6.84	6.96	6.44	-	-	6.44	4.2	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.33	2.52	-	-	2.52	2.25	-
Pot Cap-1 Maneuver	249	784	678	-	-	762	1101	-
Stage 1	621	-	-	-	-	-	-	-
Stage 2	548	-	-	-	-	-	-	-
Platoon blocked, %				-	-			-
Mov Cap-1 Maneuver	217	784	678	-	-	1091	1091	-
Mov Cap-2 Maneuver	217	-	-	-	-	-	-	-
Stage 1	621	-	-	-	-	-	-	-
Stage 2	477	-	-	-	-	-	-	-
Approach	WB	NB		SB				
HCM Control Delay, s	13.7	0		1.9				
HCM LOS	B							
Minor Lane/Major Mvmt	NBU	NBT	NBRWBLn1WBLn2		SBL	SBT		
Capacity (veh/h)	678	-	-	217	784	1091	-	
HCM Lane V/C Ratio	-	-	-	0.152	0.39	0.13	-	
HCM Control Delay (s)	0	-	-	24.5	12.5	8.8	-	
HCM Lane LOS	A	-	-	C	B	A	-	
HCM 95th %tile Q(veh)	0	-	-	0.5	1.9	0.4	-	

HCM 6th TWSC
2: SR 73/US 301 & Private Dwy/Travel America

02/01/2022

Intersection													
Int Delay, s/veh	3.5												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱	↰		↰	↱	↱
Traffic Vol, veh/h	0	0	0	25	0	134	0	662	11	5	148	571	4
Future Vol, veh/h	0	0	0	25	0	134	0	662	11	5	148	571	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	Yield	-	-	-	Yield
Storage Length	-	-	100	-	-	75	525	-	300	-	0	-	300
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	84	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	12	2	22	2	4	27	2	20	3	100
Mvmt Flow	0	0	0	27	0	147	0	727	12	5	163	627	4

Major/Minor	Minor2		Minor1		Major1		Major2		Major2		Major2		Major2	
Conflicting Flow All	1327	1690	314	1377	1690	364	627	0	0	727	727	0	0	0
Stage 1	963	963	-	727	727	-	-	-	-	-	-	-	-	-
Stage 2	364	727	-	650	963	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.74	6.54	7.34	4.14	-	-	6.44	4.5	-	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.74	5.54	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.62	4.02	3.52	2.22	-	-	2.52	2.4	-	-	-
Pot Cap-1 Maneuver	113	92	682	95	92	579	951	-	-	497	763	-	-	-
Stage 1	274	332	-	359	427	-	-	-	-	-	-	-	-	-
Stage 2	627	427	-	401	332	-	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-			-	-	-
Mov Cap-1 Maneuver	69	71	682	78	71	579	951	-	-	739	739	-	-	-
Mov Cap-2 Maneuver	69	71	-	78	71	-	-	-	-	-	-	-	-	-
Stage 1	274	257	-	359	427	-	-	-	-	-	-	-	-	-
Stage 2	468	427	-	310	257	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	22.9	0	2.4
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	951	-	-	-	-	78	579	739	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.352	0.254	0.228	-	-
HCM Control Delay (s)	0	-	-	0	0	74.4	13.3	11.3	-	-
HCM Lane LOS	A	-	-	A	A	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	1.3	1	0.9	-	-

Intersection												
Int Delay, s/veh	6.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↑↑	↑	↑	↑↑	
Traffic Vol, veh/h	123	1	122	0	0	0	0	624	187	70	639	0
Future Vol, veh/h	123	1	122	0	0	0	0	624	187	70	639	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	275	260	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	13	2	17	2	2	2	2	6	10	32	6	2
Mvmt Flow	135	1	134	0	0	0	0	686	205	77	702	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1199	1747	351	-	0	0	891	0	0
Stage 1	856	856	-	-	-	-	-	-	-
Stage 2	343	891	-	-	-	-	-	-	-
Critical Hdwy	7.06	6.54	7.24	-	-	-	4.74	-	-
Critical Hdwy Stg 1	6.06	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.06	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.63	4.02	3.47	-	-	-	2.52	-	-
Pot Cap-1 Maneuver	163	85	604	0	-	-	594	-	0
Stage 1	350	373	-	0	-	-	-	-	0
Stage 2	659	359	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	142	0	604	-	-	-	594	-	-
Mov Cap-2 Maneuver	249	0	-	-	-	-	-	-	-
Stage 1	350	0	-	-	-	-	-	-	-
Stage 2	573	0	-	-	-	-	-	-	-




Approach	EB	NB	SB
HCM Control Delay, s	42.1	0	1.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	352	594	-
HCM Lane V/C Ratio	-	-	0.768	0.13	-
HCM Control Delay (s)	-	-	42.1	12	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	6.2	0.4	-

Intersection												
Int Delay, s/veh	13											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	164	1	90	209	543	0	0	543	220
Future Vol, veh/h	0	0	0	164	1	90	209	543	0	0	543	220
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	-	-	260	220	-	-	-	-	285
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	10	2	35	10	6	2	2	8	7
Mvmt Flow	0	0	0	171	1	94	218	566	0	0	566	229
Major/Minor												
Minor1				Major1				Major2				
Conflicting Flow All	1285	1797	283	795	0	-	-	-	-	-	0	-
Stage 1	1002	1002	-	-	-	-	-	-	-	-	-	-
Stage 2	283	795	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7	6.54	7.6	4.3	-	-	-	-	-	-	-	-
Critical Hdwy Stg 1	6	5.54	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6	5.54	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.6	4.02	3.65	2.3	-	-	-	-	-	-	-	-
Pot Cap-1 Maneuver	~ 146	79	624	772	-	0	0	-	-	-	-	-
Stage 1	298	318	-	-	-	0	0	-	-	-	-	-
Stage 2	716	398	-	-	-	0	0	-	-	-	-	-
Platoon blocked, %					-			-		-		-
Mov Cap-1 Maneuver	~ 105	0	624	772	-	-	-	-	-	-	-	-
Mov Cap-2 Maneuver	174	0	-	-	-	-	-	-	-	-	-	-
Stage 1	214	0	-	-	-	-	-	-	-	-	-	-
Stage 2	716	0	-	-	-	-	-	-	-	-	-	-
Approach												
WB				NB				SB				
HCM Control Delay, s	81.1			3.2				0				
HCM LOS	F											
Minor Lane/Major Mvmt												
NBL				NBTWBLn1WBLn2				SBT SBR				
Capacity (veh/h)	772	-	174	624	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	0.282	-	0.988	0.15	-	-	-	-	-	-	-	-
HCM Control Delay (s)	11.5	-	118.9	11.8	-	-	-	-	-	-	-	-
HCM Lane LOS	B	-	F	B	-	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	1.2	-	7.9	0.5	-	-	-	-	-	-	-	-
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												





HCM 6th TWSC
5: Rocky Road & Internal Access A

02/01/2022

Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	70	155	0	0	155
Future Vol, veh/h	70	70	155	0	0	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	3	2	2	3
Mvmt Flow	76	76	168	0	0	168
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	168	0	-	0	-	168
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.19	-	-	-	-	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.257	-	-	-	-	3.3285
Pot Cap-1 Maneuver	1382	-	-	-	0	873
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1382	-	-	-	-	873
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.9	0		10.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1382	-	-	-	-	873
HCM Lane V/C Ratio	0.055	-	-	-	-	0.193
HCM Control Delay (s)	7.8	0.1	-	-	-	10.1
HCM Lane LOS	A	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.7




HCM 6th TWSC
6: Rocky Road & Internal Access B

02/01/2022

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	30	65	0	0	90
Future Vol, veh/h	40	30	65	0	0	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	13	8	2	2	2
Mvmt Flow	43	33	71	0	0	98
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	71	0	-	0	190	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	119	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1529	-	-	-	799	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1529	-	-	-	777	991
Mov Cap-2 Maneuver	-	-	-	-	777	-
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	906	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.2	0		9		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1529	-	-	-	991	
HCM Lane V/C Ratio	0.028	-	-	-	0.099	
HCM Control Delay (s)	7.4	-	-	-	9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	

HCM 6th TWSC
7: Rocky Road & Internal Access C

02/01/2022

Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	17	35	0	0	30
Future Vol, veh/h	13	17	35	0	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	24	14	2	2	2
Mvmt Flow	14	18	38	0	0	33
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	38	0	-	0	84	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	46	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1572	-	-	-	918	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	976	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1572	-	-	-	910	1034
Mov Cap-2 Maneuver	-	-	-	-	910	-
Stage 1	-	-	-	-	975	-
Stage 2	-	-	-	-	976	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.2	0		8.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1572	-	-	-	-	1034
HCM Lane V/C Ratio	0.009	-	-	-	-	0.032
HCM Control Delay (s)	7.3	0	-	-	-	8.6
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-	0.1