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Environmental | Engineering | Surveying

Air Permit # 1000-0047

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**CONSTRUCTION PERMIT APPLICATION
LUCK STONE – FAIRFIELD I-77 DEVELOPMENT**

Luck Stone – Fairfield I-77 Development
Fairfield, South Carolina

Prepared by:
GEL Engineering, LLC
Post Office Box 30712
Charleston, South Carolina 29417

April 2021

CONSTRUCTION PERMIT APPLICATION
LUCK STONE – FAIRFIELD I-77 DEVELOPMENT

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LUCK STONE
FAIRFIELD, SOUTH CAROLINA

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2	Process Flow Diagram



Matthew Wike, P.E.
SC State Registration No. 22843



GEL Engineering, LLC
Certificate of Authorization No. C02649

Affixed P.E. Seal only covers information provided in the following sections: Summary, Permit Application Forms, and Emission Assumptions and Calculations.

**CONSTRUCTION PERMIT APPLICATION
LUCK STONE – FAIRFIELD I-77 DEVELOPMENT**

**LUCK STONE
FAIRFIELD, SOUTH CAROLINA**

1.0 OVERVIEW OF PERMIT APPLICATION

Luck Stone – Fairfield I-77 Development (Luck Stone) is submitting this application to obtain a construction permit for an aggregate mine and processing facility to be located near Fairfield, South Carolina. This is a new facility requesting their initial construction permit from the South Carolina Department of Health and Environmental Control (DHEC) Bureau of Air Quality (BAQ).

The facility requests federally enforceable conditions limiting particulate matter (PM) and PM with an aerodynamic diameter of less than or equal to 10 microns (PM₁₀) to below Title V applicable major source levels of 100 tons per year. The facility will utilize wet suppression to achieve emissions below major source levels.

This construction permit application is being submitted for the following emission sources associated with the aggregates mine and processing operations:

- Mining and Material Handling;
- Material Storage;
- Haul Roads; and
- Customer Roads.

The site location and boundary map of the Luck Stone facility is shown as Figure 1. A process flow diagram is provided as Figure 2. A narrative summary of potentially applicable state and federal regulations is provided in Section 3.0.

2.0 DESCRIPTION OF PROCESSES AND EMISSIONS

Luck Stone proposes to operate an aggregate mine and processing facility near Fairfield, South Carolina. The portable facility will be capable of crushing 550 tons per hour from the primary crusher. The process starts inside the pit where the stone will be mined and transported in trucks using plant haul roads. The stone will be dumped into the primary jaw crushing station where stone will be initially crushed and conveyed to the first screening station. At the first screening station, the material will be screened and conveyed to storage piles or conveyed to the cone crusher or secondary screen. At the secondary screening/cone crushing station, the material will be screened and/or crushed and then either conveyed to storage piles, recycled back to the crushers/screens, or conveyed to the wash plant. The wash plant is a totally wet process that is not expected to have emissions. Lastly, the material will be transferred to customer trucks from one of the storage piles and the trucks will exit the site using the customer haul roads.

Emissions from the aggregates mine and processing plant will consist of the criteria pollutants PM, PM₁₀, and PM with an aerodynamic diameter of less than or equal to 2.5 microns (PM_{2.5}). Each crusher, screen, and conveyor will be equipped with wet suppression to reduce emissions. A more detailed description of the above operations is provided in the Emission Assumptions and Calculations (EA&C) section of this permit application.

3.0 SUMMARY OF REGULATORY COMPLIANCE

This section contains a comprehensive regulatory review for the air emissions from the proposed aggregates mine and processing plant at the Luck Stone facility. The regulations that were identified as being potentially applicable are summarized below and discussed in detail in Sections 3.1 through 3.14.

- South Carolina Emissions from Fuel Burning Operations (R.61-62.5, Standard No. 1);
- South Carolina Ambient Air Quality Standards (R.61-62.5, Standard No. 2);
- South Carolina Waste Combustion and Reduction (R.61-62.5, Standard No. 3) and South Carolina Hospital, Medical, Infectious Waste Incinerators (R.61-62.5, Standard No. 3.1);
- South Carolina Emissions From Process Industries Standard (R.61-62.5, Standard No. 4);
- South Carolina Volatile Organic Compounds Standard (R.61-62.5, Standard No. 5);
- South Carolina Control of Oxides of Nitrogen Standard (R.61-62.5, Standard No. 5.2);
- South Carolina Prevention of Significant Deterioration (PSD) Standard (R.61-62.5, Standard No. 7);
- South Carolina Nonattainment New Source Review (NSR) Standard (R.61-62.5, Standard 7.1);
- South Carolina Toxic Air Pollutants Standard (R.61-62.5, Standard No. 8);
- Standards of Performance for New Stationary Sources (40 CFR Part 60);
- National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61);
- National Emission Standards for Hazardous Air Pollutants for Source Categories (40 CFR Part 63);
- Compliance Assurance Monitoring (40 CFR Part 64); and
- Greenhouse Gas Tailoring Rule (June 3, 2010 Federal Register).

3.1 South Carolina Emissions from Fuel Burning Operations (Standard No. 1)

The South Carolina Emissions from Fuel Burning Operations Standard (R.61-62.5, Standard No. 1) establishes standards for fuel burning operations including limitations on visible emissions, PM emissions, and sulfur dioxide (SO₂) emissions (Sections I, II, and III, respectively). There are no fuel burning operations (with the exception of the insignificant activity generator that is exempt from this rule) associated with the proposed aggregates mining and processing operations at Luck Stone. Therefore, Luck Stone is not subject to this standard.

3.2 South Carolina Ambient Air Quality Standards (Standard No. 2)

The South Carolina Ambient Air Quality Standards (SCAAQS - R.61-62.5, Standard No. 2) establish ambient air quality standards for PM₁₀, PM_{2.5}, carbon monoxide (CO), SO₂, nitrogen dioxide (NO₂), ozone, and lead. Emissions from the Luck Stone facility will include PM₁₀ and PM_{2.5}. Compliance with Standard No. 2 is demonstrated using air dispersion modeling.

An air dispersion modeling demonstration was performed for PM₁₀. This air dispersion modeling demonstration was performed because PM₁₀ emissions from the group of mining and material handling emission sources are greater than 1.14 pounds per hour (lb/hr). The 1.14 lb/hr PM₁₀ and PM_{2.5} de minimis levels are established in the DHEC document "Modeling Guidelines for Air Quality Permits" dated October 2018 (revised April 2019). The entire group (as opposed to per source) of PM₁₀ emissions was used to conservatively ensure the aggregate mine and processing facility will comply with Standard No. 2. Therefore, an air dispersion modeling demonstration for PM₁₀ emissions is being submitted for the mining and material handling operations. As shown in the Air Dispersion Modeling Results section of this application, PM₁₀ emissions will comply with Standard No. 2.

The entire group of emissions of PM_{2.5} from the mining and material handling operations are less than 1.14 lb/hr, and therefore, no modeling is required for PM_{2.5} emissions. Additionally, modeling for PM₁₀ or PM_{2.5} emissions from the material storage, haul road process, or customer road process is not required since emissions from those processes (entire group of sources within each process) are less than 1.14 lb/hr. Therefore, no air dispersion modeling is required for PM_{2.5} emissions from this facility.

3.3 South Carolina Waste Combustion and Reduction (Standard No. 3) and South Carolina Hospital, Medical, Infectious Waste Incinerators (Standard No. 3.1)

Both the South Carolina Waste Combustion and Reduction Standard (Standard No. 3) and South Carolina Hospital, Medical, Infectious Waste Incinerators Standard (Standard No. 3.1) establish emission limits and standards for various types of waste combustion sources, hospital, medical, and infectious waste incinerators.

The proposed aggregates mine and processing facility does not include any waste combustion and reduction sources. Additionally, the proposed aggregates mining and processing facility is not classified as a hospital, medical, or infectious waste incinerator. Therefore, Luck Stone is not subject to this standard.

3.4 South Carolina Emissions from Process Industries Standard (Standard No. 4)

The South Carolina Emissions from Process Industries Standard (R.61-62.5, Standard No. 4) establishes emission standards for specific process industries as well as for general process industries. None of the specific process industry categories listed in Sections II through VII apply to Luck Stone. The aggregates mine and processing operations at Luck Stone are subject to Standard No. 4, Section VIII - Other Manufacturing, Section IX - Visible Emissions (where not specified elsewhere), and Section X – Non-Enclosed Operations.

The following section discusses Luck Stone's compliance with the applicable provisions of Standard No. 4.

Particulate Matter Emissions (Standard No. 4, Section VIII)

This standard requires that particulate emissions from general process industries be limited to the value in Table 1 of the Standard No. 4, Section VIII regulation. Interpolation of Table 1 can be obtained by the following equation for process weight rates up to 30 tons per hour:

$$E = F \times 4.10 \times P^{(0.67)}$$

where:

E = allowable particulate emission rate in pounds per hour

F = effect factor (F = 0.25 for acid mists, F = 1.0 for all other pollutants)

P = process weight rate in tons per hour

For process weight rates greater than 30 tons per hour, this standard requires that particulate emissions from general process industries be interpolated by the following equation:

$$E = F \times (55.0 \times P^{(0.11)} - 40)$$

where:

E = allowable particulate emission rate in pounds per hour

F = effect factor (F = 0.25 for acid mists, F = 1.0 for all other pollutants)

P = process weight rate in tons per hour

The proposed aggregates mine and processing operations are subject to and comply with this standard as shown below:

Process	Process Weight Rate (tons/hour)*	Estimated Controlled Hourly PM Emission Rate (lbs/hr)	Allowable Hourly PM Emission Rate (lbs/hr)
Mining and Material Handling	550	6.81	70.1
Material Storage	550	0.61	70.1
Haul Roads	550	0.32	70.1
Plant Roads	550	0.76	70.1

Visible Emissions (Standard No. 4, Section IX)

This standard requires that visible emissions, including fugitive emissions, not exceed 40 percent opacity for existing sources where construction began on or before December 31, 1985, or 20 percent for new sources if constructed after this date (Parts A and B, respectively). All sources are subject to the 20 percent opacity standard.

Non-Enclosed Operations (Standard No. 4, Section X)

This standard requires the following:

- A. All non-enclosed operations shall be conducted in such a manner that a minimum of particulate matter becomes airborne. In no case shall established ambient air quality standards be exceeded at or beyond the property line.
- B. The owner or operator of all such operations shall maintain dust control of the premises and any roadway owned or controlled by the owner or operator by paving or other suitable measures. Oil treatment is prohibited.
- C. All crushing, drying, classification, and like operations shall employ a suitable control device acceptable to the Department, and shall discharge no more particulate matter than that specified in Section VIII of this standard.

The facility will be in compliance with Standard No. 2 and therefore will not exceed the ambient air quality standards at or beyond the property line.

Additionally, the facility will maintain wet suppression for dust control and will maintain a fugitive dust plan to demonstrate compliance with this regulation. Wet suppression on the mine hauling roads and customer access roads will be accomplished by spray from

mobile water trucks. Each crusher, screen, and conveyor will be equipped with wet suppression valves. The wet suppression system will be operated by the control room. Water spray valves will be activated prior to the initiation of operations. Operation of the water spray valves will be controlled to minimize water use such as closing water spray valves on non-operating equipment. The primary source of water for dust suppression systems will be the water that is collected in the sump of the mine pit, which is a combination of stormwater runoff and groundwater infiltration. If necessary, make up water could be supplied by onsite wells or the County water distribution system.

3.5 South Carolina Volatile Organic Compounds Standard (Standard No. 5)

The South Carolina Volatile Organic Compounds Standard (R.61-62.5, Standard No. 5) applies to specific existing industrial sources constructed before July 1, 1979, or July 1, 1980, that have total potential volatile organic compounds (VOC) emissions of more than 550 pounds in any one day or more than 150 pounds in any one hour. This standard applies to existing processes statewide except in the following six counties: Anderson, Bamberg, Barnwell, Fairfield, Darlington, and Hampton (Standard No. 5, Part B.1). Luck Stone's aggregates facility will be in Fairfield County, which is included in the above list of exempt counties.

The Luck Stone facility will be constructed after July 1, 1980 and is not expected to emit VOCs. Furthermore, sources in Fairfield county are exempt from this regulation. Therefore, Luck Stone is not subject to this standard.

3.6 South Carolina Control of Oxides of Nitrogen Standard (Standard No. 5.2)

The South Carolina Control of Oxides of Nitrogen Standard (R.61-62.5, Standard No. 5.2) applies to any stationary source that emits or has the potential to emit NO_x generated from fuel combustion that has not undergone a Best Available Control Technology (BACT) analysis for NO_x in accordance with Regulation 61-62.5, Standard No. 7, and that meets one or more of the three criteria specified in Section I (a)(1) through (a)(3).

The proposed aggregates mine and processing operations are not expected to emit NO_x from any stationary source. Therefore, Luck Stone is not subject to this standard.

3.7 South Carolina PSD Standard (Standard No. 7)

The South Carolina PSD Standard (R.61-62.5, Standard No. 7) applies if the facility is classified as a "major" source as defined under this regulation, or if the facility is classified as a "minor" source and is located in a county for which Minor Source Baseline Dates (MSBDs) for PM₁₀, PM_{2.5}, SO₂, and NO₂ have been established.

Major Source Review

Mining and aggregates plants are not one of the 28 source categories subject to the 100 tpy PSD major source threshold. Total uncontrolled potential emissions of particulates exceed the 250 tpy threshold. However, the facility requests federally enforceable facility-wide emission limits for PM to remain below the PSD major source threshold of 250 tpy and for PM and PM₁₀ Title V threshold of 100 tpy.

The major source applicability under the PSD regulations is determined based on a facility's potential to emit. Potential to emit is defined under Standard No. 7, Part D as:

The maximum capacity of a plant to emit a pollutant under its physical and operational design. Any physical or operational limitations on the capacity of the plant to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.

Luck Stone will operate under the emission limitations described above. Therefore, Luck Stone will not be considered a major source under the PSD regulations.

MSBD Compliance

The facility will be in Fairfield County for which MSBDs have only been established for PM₁₀ and SO₂. Per DHEC BAQ's document "Modeling Guidelines for Air Quality Permits" dated October 2018 (revised April 2019), no air dispersion modeling is required for Standard No. 7 for non-PSD projects unless specifically requested by DHEC BAQ.

3.8 South Carolina Nonattainment NSR Standard (Standard No. 7.1)

The South Carolina Nonattainment NSR Standard (R.61-62.5, Standard No. 7.1) applies to major sources constructed or modified in any nonattainment area designated in 40 CFR Part 81.341 if the emissions from such facility will cause or contribute to concentrations of a regulated NSR pollutant for which the nonattainment area was designated as nonattainment.

Since Fairfield County is not designated as a nonattainment area, Standard No. 7.1 is not applicable at this time. Therefore, Luck Stone is not subject to this standard.

3.9 South Carolina Toxic Air Pollutants Standard (Standard No. 8)

The South Carolina Toxic Air Pollutants (TAPs) Standard (R.61-62.5, Standard No. 8) requires Luck Stone to identify and quantify emissions of South Carolina TAPs to determine compliance with established ambient air quality standards for these TAPs. This regulation establishes standards for approximately 255 TAPs, including most of the 187 hazardous air pollutants (HAPs) established by Title III of the Clean Air Act Amendments.

Luck Stone is not subject to this standard since they do not emit TAPs.

3.10 Standards of Performance for New Stationary Sources (40 CFR Part 60)

The following sections describe New Source Performance Standards (NSPS) promulgated under 40 CFR Part 60 that could potentially apply to the aggregate operations included in this project.

Nonmetallic Mineral Processing Plants (Subpart 000)

This NSPS applies to nonmetallic mineral processing plants that commenced construction, modification, or reconstruction after August 31, 1983.

A nonmetallic mineral processing plant is defined as any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located, including lime plants, power plants, steel mills, aggregates concrete plants, portland cement plants, or any other facility processing nonmetallic minerals except as provided in §60.670 (b) and (c). Luck Stone will handle and crush nonmetallic minerals as defined in Subpart 000 and therefore, the aggregates mine and processing facility is subject to this standard.

Each crusher, screen, and conveyor is subject to the rule. Subpart 000 does not apply to drilling, non-enclosed truck loading, or storage piles as those sources are not listed in §60.670(a). Since the facility is comprised entirely of fugitive emissions, only the fugitive particulate matter emission limits and compliance requirements of Table 3 and §60.672(b) apply. Table 3 of Subpart 000 lists the following requirements that are applicable to a facility that will commence construction after April 22, 2008:

- 7 percent opacity for conveyor transfer points and screens
- 12 percent opacity for crushers
- Initial Performance Test
- Periodic inspections of water sprays per §60.674 (b)
- Reporting and recordkeeping requirements of water sprays under §60.676

Stationary Compression Ignition Internal Combustion Engines (Subpart IIII)

The NSPS for stationary compression ignition internal combustion engines, as outlined in 40 CFR Part 60, Subpart IIII, specifies standards to reduce PM, NO_x, CO, and non-methane hydrocarbons (NMHC) emissions.

The facility will be installing a portable 550-kilowatt diesel-fired generator that will not be subject to Subpart IIII since the generator will be a nonroad engine. 40 CFR Part 1068.30 states "(1) a nonroad engine is any internal combustion engine: (iii) that, by itself or in or on a piece of equipment, is portable or transportable, meaning designed to be and

capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform."

In addition, 40 CFR Part 1068.30 states that which is not a nonroad engine: "(2) an internal combustion engine is not a nonroad engine if: (iii) [t]he engine otherwise included in paragraph (1)(iii) of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engine that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year."

Since the 550-kilowatt diesel-fired generator is portable and it will be moved and will not remain at a location for more than 12 consecutive months, the generator is not subject to this standard because it is not a stationary generator.

Stationary Spark Ignition Internal Combustion Engines (Subpart JJJJ)

The NSPS for stationary spark ignition internal combustion engines (Subpart JJJJ) specifies standards to reduce NO_x, CO, and VOC emissions.

Luck will not maintain any stationary spark ignition internal combustion engines. Therefore, Luck Stone is not subject to this standard.

3.11 National Emission Standards for HAPs (40 CFR Part 61)

40 CFR Part 61 establishes National Emission Standards for Hazardous Air Pollutants (NESHAPs) in Subparts A through FF. None of the NESHAPs found in 40 CFR Part 61 applies to the emission sources at Luck Stone.

3.12 National Emission Standards for HAPs for Source Categories (40 CFR Part 63)

40 CFR Part 63 establishes technology-based regulations for specific source categories emitting any of the 187 compounds designated by the EPA as HAPs. The EPA regulates emissions of HAPs from major and area sources as promulgated under a NESHAP. Facilities that are required to demonstrate compliance with a particular NESHAP must employ Maximum Achievable Control Technology (MACT) as specified in the regulation.

Under 40 CFR Part 63, a major source is defined as any stationary source emitting 10 tpy or more of any individual HAP, or 25 tpy or more of any combination of HAPs. An area

source of HAPs is a facility that is not a major source of HAPs, is not located at a major source, and is not part of a major source of HAP emissions.

Since the facility will not emit any HAPs, none of the 40 CFR Part 63 standards apply to Luck Stone. The generator is not subject to 40 CFR Part 63 Subpart ZZZZ for the same reason as the generator is not subject to 40 CFR Part 60 Subpart IIII. See a more detailed explanation in Section 3.10. Therefore, Luck Stone is not subject to this standard.

3.13 Compliance Assurance Monitoring

The 40 CFR Part 64 Compliance Assurance Monitoring (CAM) regulation was developed to provide reasonable assurance that facilities comply with emissions limitations by monitoring the operation and maintenance of their control devices. CAM applies to an emissions unit if all the following criteria are met:

- the unit is located at a major source for which a Title V permit is required; and
- the unit is subject to an emission limitation or standard; and
- the unit uses a control device to achieve compliance with a federally enforceable limit or standard; and
- the unit has potential pre-control or post-control emissions of at least 100% of the major source amount; and
- The unit is not otherwise exempt from CAM.

The Luck Stone facility will not be a major source and will not need a Title V permit due to federally enforceable emission limitations. Therefore, Luck Stone is not subject to this standard.

3.14 Greenhouse Gas Tailoring Rule

A new industrial source that is major for criteria pollutants and will emit or have the potential to emit 75,000 tpy CO₂ equivalents (CO_{2e}) will be subject to PSD permitting requirements for greenhouse gases (GHGs) as long as the source is subject to PSD for another pollutant.

This application does not contain any permitted emission sources that emit GHGs. Therefore, Luck Stone is not subject to this standard.



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Construction Permit Application
Facility Information
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FACILITY IDENTIFICATION	
SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i> - 1000-0047	Application Date April 2021
Facility Name <i>(This should be the name used to identify the facility at the physical address listed below)</i> Luck Stone – Fairfield I-77 Development	Facility Federal Tax Identification Number <i>(Established by the U.S. Internal Revenue Service to identify a business entity)</i> 54-0630628

FACILITY PHYSICAL ADDRESS		
Physical Address: No address yet.	County: Fairfield County	
City: Fairfield	State: SC	Zip Code: 29180
Facility Coordinates <i>(Facility coordinates should be based at the front door or main entrance of the facility.)</i>		
Latitude: 34° 20' 41"	Longitude 81° 02' 51"	<input type="checkbox"/> NAD27 <i>(North American Datum of 1927)</i> Or <input checked="" type="checkbox"/> NAD83 <i>(North American Datum of 1983)</i>

CO-LOCATION DETERMINATION	
Are there other facilities in close proximity that could be considered co-located?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes*
List potential co-located facilities, including air permit numbers if applicable: NA	
<i>*If yes, please submit co-location applicability determination details in an attachment to this application.</i>	

COMMUNITY OUTREACH
What are the potential air issues and community concerns? Please provide a brief description of potential air issues and community concerns about the entire facility and/or specific project. Include how these issues and concerns are being addressed, if the community has been informed of the proposed construction project, and if so, how they have been informed.
Luck anticipates community concerns similar to other recently permitted quarries. Luck Stone has begun to meet with adjacent neighbors in conjunction with the submittal of our mining permit. Luck Stone intends to monitor dust continuously and will use a water truck to spray road surfaces and storage piles with water. In addition, the plant will be equipped with a wet suppression system that sprays fine streams of water on critical parts of the plant that have the highest potential for dust, such as crushers, screens, and transfer points. Every blast will be monitored for decibel level and air overpressure level. The effects on groundwater will be minimal because of the fine pore sizes found in the rock present. Little infiltration is expected.

FACILITY'S PRODUCTS / SERVICES	
Primary Products / Services <i>(List the primary product and/or service)</i> Granite	
Primary SIC Code <i>(Standard Industrial Classification Codes)</i> 1423	Primary NAICS Code <i>(North American Industry Classification System)</i> 212313
Other Products / Services <i>(List any other products and/or services)</i> NA	
Other SIC Code(s): NA	Other NAICS Code(s): NA

AIR PERMIT FACILITY CONTACT			
<i>(Person at the facility who can answer technical questions about the facility and permit application.)</i>			
Title/Position: Environmental Manager	Salutation: Mr.	First Name: Mark	Last Name: Williams
Mailing Address: P.O. Box 29682			
City: Richmond	State: VA	Zip Code: 23242	
E-mail Address: markdwilliams@luckcompanies.com	Phone No.: 804-476-6404	Cell No.: 804-641-1457	
One hard copy of the signed permit will be mailed to the designated Air Permit Contact.			



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AIR PERMIT FACILITY CONTACT

(Person at the facility who can answer technical questions about the facility and permit application.)

If additional individuals need electronic copies of the permit, please provide their names and e-mail addresses.

Name	E-mail Address
Matthew Wike, P.E.	Matthew.Wike@gel.com

CONFIDENTIAL INFORMATION / DATA

Does this application contain confidential information or data? No Yes*

**If yes, include a sanitized version of the application for public review and ONLY ONE COPY OF CONFIDENTIAL INFORMATION SHOULD BE SUBMITTED*

LIST OF FORMS INCLUDED

(Identify all forms included in the application package)

Form Name	Included (Y/N)
Expedited Review Request (DHEC Form 2212)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Equipment/Processes (DHEC Form 2567)	<input checked="" type="checkbox"/> Yes
Emissions (DHEC Form 2569)	<input checked="" type="checkbox"/> Yes
Regulatory Review (DHEC Form 2570)	<input checked="" type="checkbox"/> Yes
Emissions Point Information (DHEC Form 2573)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If No, Explain)

OWNER OR OPERATOR

Title/Position: Environmental Manager	Salutation: Mr.	First Name: Mark	Last Name: Williams
Mailing Address: PO Box 29682			
City: Richmond	State: VA	Zip Code: 23242	
E-mail Address: markdwilliams@luckcompanies.com	Phone No.: 804-476-6404	Cell No.: 804-641-1457	

OWNER OR OPERATOR SIGNATURE

I certify, to the best of my knowledge and belief, that no applicable standards and/or regulations will be contravened or violated. I certify that any application form, report, or compliance certification submitted in this permit application is true, accurate, and complete based on information and belief formed after reasonable inquiry. I understand that any statements and/or descriptions, which are found to be incorrect, may result in the immediate revocation of any permit issued for this application.

Signature of Owner or Operator: Mark Williams Date: 04/08/2021



**Bureau of Air Quality
Construction Permit Application
Facility Information
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PERSON AND/OR FIRM THAT PREPARED THIS APPLICATION <i>(If not the same person as the Professional Engineer who has reviewed and signed this application.)</i>			
Consulting Firm Name:			
Title/Position:	Salutation:	First Name:	Last Name:
Mailing Address:			
City:	State:	Zip Code:	
E-mail Address:	Phone No.:	Cell No.:	
SC Professional Engineer License/Registration No. (if applicable):			

PROFESSIONAL ENGINEER INFORMATION			
Consulting Firm Name: GEL Engineering, LLC			
Title/Position: Senior Engineer	Salutation: Mr.	First Name: Matthew	Last Name: Wike
Mailing Address: P.O. Box 30712			
City: Charleston	State: SC	Zip Code: 29417	
E-mail Address: matthew.wike@gel.com	Phone No.: 843-300-4252	Cell No.: 843-697-2205	
SC License/Registration No.: 22843			

PROFESSIONAL ENGINEER SIGNATURE

I have placed my signature and seal on the engineering documents submitted, signifying that I have reviewed this construction permit application as it pertains to the requirements of *South Carolina Regulation 61-62, Air Pollution Control Regulations and Standards.*

Matthew Wike

April 8, 2021

Signature of Professional Engineer

Date





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Equipment / Processes
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APPLICATION IDENTIFICATION

(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)

Facility Name <i>(This should be the name used to identify the facility)</i> Luck Stone – Fairfield I-77 Development	SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i> -	Application Date April 2021
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PROJECT DESCRIPTION

Brief Project Description (What, why, how, etc.): Luck Stone proposes to locate the aggregates mine and processing facility near Interstate 77 near Fairfield, South Carolina. The portable facility will be capable of crushing 550 tons per hour from the primary crusher. The process starts inside the pit where the stone will be mined and transported in trucks using plant haul roads. The stone will be dumped into the primary jaw crushing station where stone will be initially crushed and conveyed to the first screening station. At the first screening station, the material will be screened and conveyed to one of two storage piles or conveyed to the cone crusher or secondary screen. At the secondary screening/cone crushing station, the material will be screened and/or crushed and then either conveyed to one additional storage pile, recycled back to the crushers/screens, or conveyed to the wash plant. Lastly, the material will be transferred to customer trucks from one of the storage piles and the trucks will exit the site using the customer haul roads.

ATTACHMENTS

<input checked="" type="checkbox"/> Process Flow Diagram	Location in Application: Figure 2
<input checked="" type="checkbox"/> Detailed Project Description	Location in Application: Summary and Emission Assumptions and Calculations

EQUIPMENT / PROCESS INFORMATION

Equipment ID Process ID	Action	Equipment / Process Description	Maximum Design Capacity (Units)	Control Device ID(s)	Pollutants Controlled (Include CAS#)	Capture System Efficiency and Description	Emission Point ID(s)
See EA&C I	<input checked="" type="checkbox"/> Add <input type="checkbox"/> Remove <input type="checkbox"/> Modify <input type="checkbox"/> Other	Portable 550 tph crushed aggregate mine and processing facility with wet suppression (See Summary and EA&C for details)	550 tph	NA (Wet Suppression will be used)	PM/PM ₁₀ /PM _{2.5}	NA	Fugitive

CONTROL DEVICE INFORMATION

Control Device ID	Action	Control Device Description	Maximum Design Capacity (Units)	Inherent/Required/Voluntary (Explain)	Destruction/Removal Efficiency Determination
NA (Wet Suppression will be used)	<input type="checkbox"/> Add <input type="checkbox"/> Remove <input type="checkbox"/> Modify <input checked="" type="checkbox"/> Other	NA (Wet Suppression will be used)	NA	Required	Efficiency of Wet Suppression Varies by equipment/process. See EA&C I.



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RAW MATERIAL AND PRODUCT INFORMATION			
Equipment ID Process ID Control Device ID	Raw Material(s)	Product(s)	Fuels Combusted
See EA&C I	Stone	Aggregates of various sizes	NA

MONITORING AND REPORTING INFORMATION					
Equipment ID Process ID Control Device ID	Pollutant(s)/Parameter(s) Monitored	Monitoring Frequency	Reporting Frequency	Monitoring/Reporting Basis	Averaging Period(s)
See EA&C I	Opacity	Initial Method 9	As specified in 40 CFR Part 60 Subparts A and 000	As specified in 40 CFR Part 60 Subparts A and 000	As specified in 40 CFR Part 60 Subparts A and 000
See EA&C I	Best Management Practices for Fugitive Dust/Wet Suppression System	As specified in similar quarry air permits and in 40 CFR Part 60 Subparts 000	As specified in similar quarry air permits and in 40 CFR Part 60 Subparts 000	As specified in similar quarry air permits and in 40 CFR Part 60 Subparts 000	As specified in similar quarry air permits and in 40 CFR Part 60 Subparts 000



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APPLICATION IDENTIFICATION

(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)

Facility Name <i>(This should be the name used to identify the facility)</i>	SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i>	Application Date
Luck Stone – Fairfield I-77 Development	-	April 2021

ATTACHMENTS

(Check all the appropriate checkboxes if included as an attachment)

<input checked="" type="checkbox"/> Sample Calculations, Emission Factors Used, etc.	<input checked="" type="checkbox"/> Detailed Explanation of Assumptions, Bottlenecks, etc.
<input checked="" type="checkbox"/> Supporting Information: Manufacturer's Data, etc.	<input type="checkbox"/> Source Test Information
<input checked="" type="checkbox"/> Details on Limits Being Taken for Limited Emissions	<input type="checkbox"/> NSR Analysis

SUMMARY OF PROJECTED CHANGE IN FACILITY WIDE POTENTIAL EMISSIONS

(Calculated at maximum design capacity.)

Pollutants	Emission Rates Prior to Construction / Modification (tons/year)			Emission Rates After Construction / Modification (tons/year)				
	Uncontrolled	Controlled	Limited	Uncontrolled	Controlled	Limited		
Particulate Matter (PM)	Not Applicable	Not Applicable	Not Applicable	401.48	37.14	<250, 100 tpy		
Particulate Matter <10 Microns (PM ₁₀)				142.72	13.33	<100 tpy		
Particulate Matter <2.5 Microns (PM _{2.5})				20.91	1.87	NA		
Sulfur Dioxide (SO ₂)				Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)								
Carbon Monoxide (CO)								
Volatile Organic Compounds (VOC)								
Lead (Pb)								
Highest HAP Prior to Construction (CAS #: NA)								
Highest HAP After Construction (CAS #: NA)								
Total HAP Emissions*								

Include emissions from exempt equipment and emission increases from process changes that were exempt from construction permits.

(*All HAP emitted from the various equipment or processes must be listed in the appropriate "Potential Emission Rates at Maximum Design Capacity" Table)

POTENTIAL EMISSION RATES AT MAXIMUM DESIGN CAPACITY

Equipment ID / Process ID	Emission Point ID	Pollutants (Include CAS #)	Calculation Methods / Limits Taken / Other Comments	Uncontrolled		Controlled		Limited	
				lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
See EA&C									



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APPLICATION IDENTIFICATION

(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)

Facility Name <i>(This should be the name used to identify the facility)</i> Luck Stone – Fairfield I-77 Development	SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i> -	Application Date April 2021
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STATE AND FEDERAL AIR POLLUTION CONTROL REGULATIONS AND STANDARDS

(If not listed below add any additional regulations that are triggered.)

Regulation	Applicable		Include all limits, work practices, monitoring, record keeping, etc.		
	Yes	No	Explain Applicability Determination	List the specific limitations and/or requirements that apply.	How will compliance be demonstrated?
Regulation 61-62.1, Section II(E) Synthetic Minor Construction Permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject as federally enforceable permit conditions are requested to keep the emission below PSD major source levels for PM	See Summary Section	See Summary Section
Regulation 61-62.1, Section II(G) Conditional Major Operating Permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject as federally enforceable permit conditions are requested to keep emissions below Title V major source levels	See Summary Section	See Summary Section
Regulation 61-62.5, Standard No. 1 Emissions from Fuel Burning Operations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 2 Ambient Air Quality Standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject. PM-10 modeling is included with this application	PM-10 (24-hour) = 150 µg/m ³	Air Dispersion Modeling
Regulation 61-62.5, Standard No. 3 Waste Combustion and Reduction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 4 Emissions from Process Industries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject to the PM and Opacity limits in Sections VIII and IX and Non-Enclosed Operations in Section X.	See Summary Section	See Summary Section



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STATE AND FEDERAL AIR POLLUTION CONTROL REGULATIONS AND STANDARDS					
<i>(If not listed below add any additional regulations that are triggered.)</i>					
Regulation	Applicable		Include all limits, work practices, monitoring, record keeping, etc.		
	Yes	No	Explain Applicability Determination	List the specific limitations and/or requirements that apply.	How will compliance be demonstrated?
Regulation 61-62.5, Standard No. 5 Volatile Organic Compounds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 5.2 Control of Oxides of Nitrogen	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 7 Prevention of Significant Deterioration*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	PM < 250 tpy	The facility will utilize wet suppression and other best management practices.
Regulation 61-62.5, Standard No. 7.1 Nonattainment New Source Review*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 8 Toxic Air Pollutants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.6 Control of Fugitive Particulate Matter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject	See Summary Section	The facility will utilize wet suppression and other best management practices.
Regulation 61-62.68 Chemical Accident Prevention Provisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.70 Title V Operating Permit Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
40 CFR Part 64 - Compliance Assurance Monitoring (CAM)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
40 CFR 60 Subpart A - General Provisions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject	See Summary Section	See Summary Section
Subpart OOO	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject	See Summary Section	See Summary Section
40 CFR 61 Subpart A - General Provisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
40 CFR 63 Subpart A - General Provisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA

* Green House Gas emissions must be quantified if these regulations are triggered.



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A. APPLICATION IDENTIFICATION

1. Facility Name: Luck Stone – Fairfield I-77 Development

2. SC Air Permit Number (if known; 8-digits only): - 3. Application Date: April 2021

4. Project Description: Luck Stone proposes to locate the aggregates mine and processing facility near Interstate 77 near Fairfield, South Carolina. The facility will be capable of crushing 550 tons per hour from the primary crusher. The process starts inside the pit where the stone will be mined and transported in trucks using plant haul roads. The stone will be dumped into the primary jaw crushing station where stone will be initially crushed and conveyed to the first screening station. At the first screening station, the material will be screened and conveyed to one of two storage piles or conveyed to the cone crusher or secondary screen. At the secondary screening/cone crushing station, the material will be screened and/or crushed and then either conveyed to one additional storage pile, recycled back to the crushers/screens, or conveyed to the wash plant. Lastly, the material will be transferred to customer trucks from one of the storage piles and the trucks will exit the site using the customer haul roads. The facility will utilize wet suppression to achieve emissions below major source levels.

B. FACILITY INFORMATION

1. Is your company a Small Business? Yes No

2. If a Small Business or small government facility, is Bureau assistance being requested?
 Yes No

3. Are other facilities collocated for air compliance? Yes No

4. If Yes, provide permit numbers of collocated facilities: NA

C. AIR CONTACT

Consulting Firm Name: GEL Engineering, LLC

Title/Position: Senior Engineer	Salutation: Mr.	First Name: Matthew	Last Name: Wike
Mailing Address: P.O. Box 30712			
City: Charleston	State: SC	Zip Code: 29417	
E-mail Address: matthew.wike@gel.com	Phone No.: 843-300-4252	Cell No.: 843-697-2205	

***See Air Dispersion Modeling Results Section of this application for all information required for Sections D through Section L below.**

D. EMISSION POINT DISPERSION PARAMETERS

Source data requirements are based on the appropriate source classification. Each emission point is classified as a point, area, volume, or flare source. Contact the Bureau of Air Quality for clarification of data requirements. Include sources on a scaled site map. Also, a picture of area or volume sources would be helpful but is not required. A user generated document or spreadsheet may be substituted in lieu of this form provided all of the required emission point parameters are submitted in the same order, units, etc. as presented in these tables.

Abbreviations / Units of Measure: UTM = Universal Transverse Mercator; °N = Degrees North; °W = Degrees West; m = meters; AGL = Above Ground Level; ft = feet; ft/s = feet per second; ° = Degrees; °F = Degrees Fahrenheit



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L. EMISSION RATES						
Emission Point ID	Pollutant Name	CAS #	Emission Rate (lb/hr)	Same as Permitted ⁽¹⁾	Controlled or Uncontrolled	Averaging Period
				<input type="checkbox"/> Yes <input type="checkbox"/> No		
				<input type="checkbox"/> Yes <input type="checkbox"/> No		
				<input type="checkbox"/> Yes <input type="checkbox"/> No		

(1) Any difference between the rates used for permitting and the air compliance demonstration must be explained in the application report.

AIR DISPERSION MODELING RESULTS

LUCK STONE – FAIRFIELD I-77 DEVELOPMENT FAIRFIELD, SOUTH CAROLINA

1.0 INTRODUCTION

Luck Stone – Fairfield I-77 Development (Luck Stone) proposes to operate an aggregate mine and processing facility near Fairfield, South Carolina. Luck Stone currently has no permit issued for this facility by the South Carolina Department of Health and Environmental Control (DHEC) Bureau of Air Quality (BAQ).

An air dispersion modeling demonstration is required for particulates with aerodynamic diameter less or equal to 10 microns (PM_{10}). This air dispersion modeling demonstration was performed because PM_{10} emissions from the group of mining and material handling emission sources are greater than 1.14 pounds per hour (lb/hr). The entire group (as opposed to per source) of PM_{10} emissions was used to conservatively ensure the aggregate mine and processing facility complies with South Carolina Ambient Air Quality Standards (R.61-62.5, Standard No. 2).

The entire group of emissions of particulates with aerodynamic diameter less or equal to 2.5 microns ($PM_{2.5}$) from the mining and material handling operations are less than 1.14 lb/hr, and therefore, no modeling is required for $PM_{2.5}$ emissions. Additionally, modeling for PM_{10} or $PM_{2.5}$ emissions from the material storage, the haul road process, or customer road process is not required since emissions from those processes are less than 1.14 lb/hr. The 1.14 lb/hr PM_{10} and $PM_{2.5}$ de minimis levels are established in the DHEC document "Modeling Guidelines for Air Quality Permits" dated October 2018 (revision April 2019).

This modeling analysis was performed to determine compliance with the Standard No. 2. A South Carolina Prevention of Significant Deterioration (PSD) Minor Source Baseline Standard (R.61-62.5, Standard No. 7) modeling demonstration is not required since, per DHEC document "Modeling Guidelines for Air Quality Permits" dated October 2018 (revised April 2019), DHEC BAQ no longer requires a Standard No. 7 modeling demonstration for applications that have not triggered a PSD review.

Lastly, the facility is not expected to emit toxic air pollutants and thus a South Carolina Toxic Air Pollutants Standard (R.61-62.5, Standard No. 8) modeling demonstration is not required.

2.0 AIR DISPERSION MODELING DATA

Modeling was performed using the latest version (version 18081) of the U.S. Environmental Protection Agency (EPA)-approved AERMOD air dispersion model. No urban option was used in this demonstration. The model used Fairfield meteorological

data for years 2012 through 2016 obtained from DHEC BAQ's website. The AERMOD air dispersion model inputs contain the onsite building coordinates, incorporates good engineering practices, and downwash calculations. All model options were chosen in accordance with the DHEC document "Modeling Guidelines for Air Quality Permits" dated October 2018 (revision April 2019) and AERMOD guidance from the DHEC BAQ website.

The analysis used one receptor grid which utilizes the AERMOD distance method. This method places discrete receptors at 50-meter intervals along the facility property boundary. Furthermore, receptors were placed in a grid outside the property boundary at no more than 100-meter spacing extending out 1,500 meters and in such a manner to ensure identification of the highest concentrations. The Fairfield County terrain data, in National Elevation Data 83 (NED83) format, required to run the AERMAP subprogram was obtained from DHEC's BAQ website <http://www.scdhec.gov/environment/air-quality/air-dispersion-modeling-data>. Terrain elevations were calculated within the AERMAP subprogram.

A receptor grid with 100-meter spacing was generated around the facility extending out to 1,500 meters. Discrete receptors were placed every 50 meters along the Luck Stone boundary. The volume sources and receptor coordinates used in the modeling were determined from conversations with Luck Stone and an aerial view of the site using Google Earth. The latest Fairfield NED terrain data was obtained from DHEC BAQ's website and used in this modeling demonstration. Terrain elevations were calculated within the AERMAP subprogram.

A summary of the modeled hourly emission rates and volume source parameters for the Luck Stone facility is included as Table 1. This table summarizes the pertinent modeling inputs and is included in lieu of the DHEC BAQ Emission Point Information form. A site location and boundary map is included as Figure 1.

3.0 AIR DISPERSION MODELING RESULTS

Copies of the AERMOD model input and output files will be submitted to DHEC via disk or electronic mail.

3.1 South Carolina Ambient Air Quality Standards (Standard No. 2)

The South Carolina Ambient Air Quality Standards (SCAAQS - R.61-62.5, Standard No. 2) establish ambient air quality standards for criteria pollutants, including PM₁₀, PM_{2.5}, carbon dioxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone, and lead.

As stated in Section 1.0, PM₁₀ was the only criteria pollutant requiring a modeling demonstration to comply with Standard No. 2. To determine compliance with the SCAAQS, the estimated maximum potential ground-level concentrations of criteria

pollutants resulting from site emissions were added to corresponding background concentrations for the criteria pollutants. The 2017-2019 three-year average background concentration data for PM₁₀ was obtained from the most recent monitoring data provided on the DHEC BAQ website.

The resultant total PM₁₀ concentration was then compared to the SCAAQS, as shown in Table 2. The modeling results demonstrate that PM₁₀ emissions from Luck Stone will comply with the applicable ambient air quality standards.

Table 1
Summary of Modeled Emission Rates and Volume Source Parameters

Luck Stone - Fairfield I-77 Development
Fairfield, South Carolina

Volume Source ID	Equip ID	Source Description	PM ₁₀ ¹ (lbs/hr)	Source Release Height (ft)	Elevated Source Height (ft)	Horizontal Dimension (ft)	Vertical Dimension (ft)	Horizontal Modeling Parameter ² - σ_y (ft)	Vertical Modeling Parameter ³ - σ_z (ft)
V1	P1	Portable 3055 Jaw Plant (P1)	0.297	10.5	3.0	14.7	15.0	3.42	3.49
V2	P1a	Under Jaw Conveyor	0.025	10.0	5.0	2	10.0	0.47	2.33
V3	P1b	52" x 20" VGF Screen	0.407	10.0	5.0	1.7	10.0	0.39	2.33
V4	P2	Under Grizzly Reject Conveyor	0.025	11.5	8.0	2.5	7.0	0.58	1.63
V5	P3	Triple Deck Screen	0.407	11.8	4.0	12.5	15.5	2.91	3.60
V6	P3a	Triple Deck Screen Conveyor	0.025	13.0	11.0	2.0	4.0	0.47	0.93
V7	P3b	Triple Deck Screen Conveyor	0.025	11.0	10.0	2.0	2.0	0.47	0.47
V8	P3c	Triple Deck Screen Conveyor	0.025	10.0	8.0	2.0	4.0	0.47	0.93
V9	P3d	Triple Deck Screen Feed Conveyor	0.025	7.0	6.0	2.0	2.0	0.47	0.47
V10	P3e	Triple Deck Screen Under Conveyor	0.025	7.0	6.0	2.0	2.0	0.47	0.47
V11	P4	Kodiak Cone Crusher	0.297	11.5	3.0	6.0	17.0	1.40	3.95
V12	P4a	Under Cone Conveyor	0.025	5.5	3.0	2.0	5.0	0.47	1.16
V13	P6	Stackable Plus Conveyor	0.025	6.5	5.0	3.0	3.0	0.70	0.70
V14	P7	Stackable Plus Conveyor	0.025	9.5	5.0	3.0	9.0	0.70	2.09
V15	P8	Stackable Plus Conveyor	0.025	6.5	6.0	3.0	1.0	0.70	0.23
V16	P9	Stackable Plus Conveyor	0.025	7.0	6.0	3.0	2.0	0.70	0.47
V17	P10	Stackable Plus Conveyor	0.025	10.0	8.0	3.0	4.0	0.70	0.93
V18	P11	Portable Radial Stacking Conveyor	0.025	5.0	3.0	2.5	4.0	0.58	0.93
V19	P12	Pinnacle Conveyor	0.025	10.0	8.0	3.0	4.0	0.70	0.93
V20	P13	Transfer Conveyor	0.025	9.5	5.0	4.0	9.0	0.93	2.09
V21	P14	Channel Flame Conveyor	0.025	7.0	6.0	3.0	2.0	0.70	0.47
V22	P15	Portable Radial Stacking Conveyor	0.025	4.5	3.0	2.5	3.0	0.58	0.70
V23	P16	Telestacker Conveyor	0.025	9.0	4.0	2.5	10.0	0.58	2.33
V24	P17	Triple Deck Screen	0.407	11.0	4.0	11.5	14.0	2.67	3.26
V25	P17a	Under Screen Conveyor	0.025	11.0	8.0	2.0	6.0	0.47	1.40
V26	Tload	Final Product Truck Loading	0.055	6.0	4.0	5.0	4.0	1.16	0.93
V27	Drill	Drilling inside the Quarry	0.044	22.5	15.0	2.5	15.0	0.58	3.49
V28	HaulLoad	Truck Loading at the Quarry	0.009	8.0	6.0	5.0	4.0	1.16	0.93

Notes:

- 1) Facility is not required to model PM_{2.5} emissions since emissions from each emission grouping (material handling, storage piles, etc.) are below 1.14 lb/hr.
- 2) Horizontal Modeling Parameter - σ_y = Horizontal dimension divided by 4.3 for a single volume source.
- 3) Vertical Modeling Parameter - σ_z = Vertical dimension divided by 4.3 since all sources are elevated at height greater than 0 ft.

Table 2

Comparison of Air Dispersion Modeling Results with
South Carolina Ambient Air Quality Standards No. 2

Luck Stone - Fairfield I-77 Development
Fairfield, South Carolina

Pollutant	Averaging Period	Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$) ¹	Total Concentration ($\mu\text{g}/\text{m}^3$)	Allowable Concentration ($\mu\text{g}/\text{m}^3$)	Site in Compliance
PM ₁₀	24 hour	49.1	34	83.1	150	Yes

Note:

1) Background PM₁₀ concentration taken from DHEC's 2017-2019 average monitoring data gathered from Cayce City Hall.

EMISSION ASSUMPTIONS AND CALCULATIONS I AGGREGATE MINE AND PROCESSING

Luck Stone – Fairfield I-77 Development Fairfield, South Carolina

The following emissions assumptions and calculations are presented for emissions from the mining and material handling, transportation, and material storage operations associated with Luck Stone's proposed aggregate mine and processing facility near Interstate 77 near Fairfield, South Carolina. In addition, fugitive emissions from the wind erosion of storage piles are presented in this emission assumptions and calculations. Despite not being one of the 28 Prevention of Significant Deterioration source categories, fugitive emissions were quantified voluntarily for completeness and consistency with Luck Stone's previously submitted applications for other sites.

Emission calculations are presented for particulate matter (PM), particulates with aerodynamic diameter of less than or equal to 10 microns (PM₁₀) and particulates with aerodynamic diameter of less than or equal to 2.5 microns (PM_{2.5}). While the facility will have a 550-kilowatt diesel-fired generator (P5), the generator is not considered a stationary source as it will be a portable, nonroad, non-stationary engine. Therefore, the diesel-fired generator is not subject to air permitting and is not subject to 40 CFR Part 60 Subpart IIII or 40 CFR Part 63 Subpart ZZZZ.

1.0 Emission Assumptions

- The facility requests federally enforceable permit conditions limiting the potential to emit of PM and PM₁₀ to below 100 tons per year to avoid being a Title V major source.
- Emission sources at the facility can be broken into the following categories:
 - Mining and Material Handling – includes wet drilling and truck loading operations;
 - Material Storage; and
 - Transportation
 - Haul Roads; and
 - Customer Roads.
- The facility will have a wash plant that will be a totally wet process, that is not expected to have emissions. The wash plant will consist of the following equipment:
 - Belt Feeder;
 - Transfer Conveyor;
 - Wash Plant;
 - Chip Conveyor;
 - Course Conveyor;
 - Intermediate Conveyor; and
 - Sand Conveyor.

- The facility does not currently have plans for any non-electric dewatering pumps.

Mining

- PM, PM₁₀, and PM_{2.5} are the only criteria pollutants emitted from the emission sources of wet drilling (Drill) and truck loading (HaulLoad) of materials in the mine.
- Emissions were calculated assuming 8,760 hours per year.
- Uncontrolled and controlled PM, PM₁₀, and PM_{2.5} emissions from wet drilling and truck loading at the mine are calculated based on the U.S. Environmental Protection Agency (EPA) Compilation of Air Pollutant Emission Factors, AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004.
- AP-42, Table 11.19.2-2 only provides truck loading emission factors for PM₁₀ emissions. PM emissions for the truck loading within the quarry were conservatively assumed to be three times PM₁₀ emissions from truck unloading of fragmented stone.
- AP-42 Section 11.19.2 does not provide PM_{2.5} emission factors for wet drilling or truck loading. In cases where PM_{2.5} emission factors were not determined, the PM₁₀ emission factor was used and adjusted based on the particle size multiplier (0.053 - PM_{2.5}/0.35 - PM₁₀) contained in AP-42 Section 13.2.4 for Aggregate Handling and Storage Piles.

Material Handling

- A summary of the portable material handling and storage related equipment to be installed at Luck Stone that will have PM emissions is shown below:

Equip ID	Description	Dimensions
P1	Portable 3055 Jaw Plant (P1)	NA
P1a	Under Jaw Conveyor	54" x 46'
P1b	52" x 20" VGF Screen	52" x 20'
P2	Under Grizzly Reject Conveyor	30" x 13'6"
P3	Triple Deck Screen	7' x 20'
P3a	Triple Deck Screen Conveyor	30" x 13'6"
P3b	Triple Deck Screen Conveyor	30" x 13'6"
P3c	Triple Deck Screen Conveyor	30" x 13'6"
P3d	Triple Deck Screen Feed Conveyor	42" x 50'
P3e	Triple Deck Screen Under Conveyor	60" x 30'
P4	Kodiak Cone Crusher	NA
P4a	Under Cone Conveyor	48" x 20'
P6	Stackable Plus Conveyor	36" x 60'

Equip ID	Description	Dimensions
P7	Stackable Plus Conveyor	36" x 60'
P8	Stackable Plus Conveyor	36" x 60'
P9	Stackable Plus Conveyor	36" x 60'
P10	Stackable Plus Conveyor	36" x 60'
P11	Portable Radial Stacking Conveyor	36" x 95'
P12	Pinnacle Conveyor	36" x 100'
P13	Transfer Conveyor	48" x 65'
P14	Channel Flame Conveyor	36" x 30'
P15	Portable Radial Stacking Conveyor	30" x 80'
P16	Telestacker Conveyor	30" x 120'
P17	Double Deck Screen	6' x 20'
P17a	Under Screen Conveyor	48" x 32'
Tload	Final Product Truck Loading	NA
Drill	Drilling inside the Quarry	NA
HaulLoad	Truck Loading at the Quarry	NA

- PM, PM₁₀, and PM_{2.5} are the only criteria pollutants emitted.
- The hourly production rates were provided by Luck Stone. Annual emissions were calculated assuming 8,760 hours per year.
- Uncontrolled and controlled PM, PM₁₀, and PM_{2.5} emissions from material handling are calculated based on the EPA Compilation of Air Pollutant Emission Factors, AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004. Controlled emissions are based on wet suppression.
- AP-42, Table 11.19.2-2 only provides truck loading emission factors for PM₁₀ emissions. PM emissions for the final product truck loading were conservatively assumed to be three times PM₁₀ emissions.
- AP-42 Section 11.19.2 only provides PM_{2.5} emission factors for some operations. For other operations, PM_{2.5} emission factors were not determined. In cases where PM_{2.5} emission factors were not determined, the PM₁₀ emission factor was used and adjusted based on the particle size multiplier (0.053- PM_{2.5} /0.35- PM₁₀) contained in AP-42 Section 13.2.4 for Aggregate Handling and Storage Piles.
- No PM emissions data was provided in AP-42 for primary or secondary crushing. It was conservatively assumed that primary and secondary crushing emissions were equal to tertiary crushing.

Material Storage

- Part of Luck Stone's operations will include up to eight storage piles for holding various materials that have been mined, crushed, and screened.
- The size of each storage pile in acres was provided by knowledgeable Luck Stone staff.
- Emission factors of 3.2 lbs PM per day per acre, 1.6 lbs PM₁₀ per day per acre, and 0.23 lbs PM_{2.5} per day per acre were used for storage pile wind erosion calculations. The PM emission factor is based on an equation in the EPA Document 450/2-92-004 "Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures," Equation 2-12. Based on the referenced document, the fraction of PM which is PM₁₀ is estimated at 0.5. To obtain the PM_{2.5} emission factors, the PM emission factor was used and adjusted based on the particle size multiplier (0.053 PM_{2.5} / 0.74-PM) contained in AP-42 Section 13.2.4 for Aggregate Handling and Storage Piles.

- The wind erosion equation used to calculate the PM emission factor is shown below:

$$E = 1.7 \times (s/1.5) \times [(365-p)/235] \times (f/15)$$

Where,

E = lbs PM per day per acre

s = 3.9 silt content % (from AP-42 5th Edition Table 13.2.4-1 for various limestone products)

p = 110 number of days with ≥ 0.01 inches of precipitation per year (from AP-42 Figure 13.2.2-1)

f = 10 percentage of time that the unobstructed wind speed exceeds 5.4 m/s at the mean pile height (engineering estimate)

- Annual PM, PM₁₀, and PM_{2.5} emissions are calculated assuming 8,760 hours of operation per year.
- Hourly emissions were calculated using 24 hours per day. Annual emissions were calculated using 365 days per year.

Transportation (Haul and Customer Roads)

- Uncontrolled emissions from the haul roads and customer roads are based on the AP-42, Section 13.2.2 (Unpaved Roads), Equations 1a and 2, for vehicles traveling on unpaved surfaces at industrial sites. The equation is provided below and the variables are defined:

$$E_{\text{ext}} = [k (s/12)^a \times (W/3)^b] (365 - P/365)$$

Where:

E_{ext} = annual or other long-term average emission factor in the same units as k

k, a, and b = Constants (Table 13.2.2-2)

s = Surface material silt content (%) – (Table 13.2.2-1, mean = 8.3 haul roads and 10 for customer roads)

W = average weight of vehicles (tons)

P = number of days with at least 0.01 inches of precipitation during the averaging period. (P = 113 days/yr as taken from <https://www.currentresults.com/Weather/South-Carolina/average-yearly-precipitation.php#c> for Columbia, South Carolina)

Constant	PM _{2.5}	PM ₁₀	PM ₃₀
K (lb/VMT)	0.15	1.5	4.9
a	0.9	0.9	0.7
b	0.45	0.45	0.45

- Controlled emissions from the haul roads and customer roads assume a control efficiency of 90% for keeping the roads wet suppressed during transportation activities.
- VMT for haul road and customer roads provided by knowledgeable Luck Stone staff.

2.0 Emission Calculations

Using the above assumptions and the following equations, PM, PM₁₀, and PM_{2.5} emissions from the mining and material handling equipment are calculated and shown in Tables 1, 2, and 3, respectively. PM, PM₁₀, and PM_{2.5} emissions from wind erosion on the storage piles are calculated and shown in Table 4. PM, PM₁₀, and PM_{2.5} emissions from unpaved roads are calculated and shown in Table 5. The boxed alpha codes in the equations refer to the appropriate columns in the tables.

Tables 1-3 – Material Handling - PM, PM₁₀, and PM_{2.5} Emissions

$$\boxed{\text{A}} \frac{\text{tons material}}{\text{hour}} \times \boxed{\text{B}} \frac{\text{lbs uncontrolled emissions}}{\text{ton material}} = \boxed{\text{C}} \frac{\text{lbs uncontrolled emissions}}{\text{hour}}$$

$$\boxed{\text{C}} \frac{\text{lbs uncontrolled emissions}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \boxed{\text{D}} \frac{\text{tons uncontrolled emissions}}{\text{year}}$$

$$\boxed{\text{A}} \frac{\text{tons material}}{\text{hour}} \times \boxed{\text{E}} \frac{\text{lbs controlled emissions}}{\text{ton material}} = \boxed{\text{F}} \frac{\text{lbs controlled emissions}}{\text{hour}}$$

$$\boxed{\text{F}} \frac{\text{lbs controlled emissions}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \boxed{\text{G}} \frac{\text{tons controlled emissions}}{\text{year}}$$

Table 4 – Storage Piles - PM, PM₁₀, and PM_{2.5} Emissions

$$\boxed{\text{A}} \text{ Pile Size (Acres)} \times \boxed{\text{B}} \frac{\text{lbs emissions}}{\text{day-acre}} \times \frac{\text{day}}{24 \text{ hour}} = \boxed{\text{C}} \frac{\text{lbs emissions}}{\text{hour}}$$

$$\boxed{\text{C}} \frac{\text{lbs emissions}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \boxed{\text{D}} \frac{\text{tons emissions}}{\text{year}}$$

Table 5 – Unpaved Roads - PM, PM₁₀, and PM_{2.5} Emissions

$$E = [k (s/12)^a \times (W/3)^b]$$

$$E_{ext} = E(365 - P/365)$$

Where,

k = constant (lb/Vehicle Mile Traveled (VMT)) **A**

s = Surface Material Silt Loading Content (%) **B**

W = vehicle weight (tons) **C**

P = days with 0.01 inches of rain

E = emission factor (lb/VMT) **D**

E_{ext} = emission factor (lb/VMT) **E**

$$\text{E} \frac{\text{lbs emissions}}{\text{VMT}} \times \text{F} \frac{\text{VMT}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \text{G} \frac{\text{tons uncontrolled emissions}}{\text{year}}$$

$$\text{G} \frac{\text{tons uncontrolled emissions}}{\text{year}} \times \frac{\text{year}}{8760 \text{ hrs}} \times \frac{2000 \text{ lbs}}{\text{ton}} = \text{H} \frac{\text{lbs uncontrolled emissions}}{\text{hour}}$$

$$\text{G} \frac{\text{tons uncontrolled emissions}}{\text{year}} \times \text{I} \text{ 1-Wet Suppression Control Efficiency \%} = \text{J} \frac{\text{tons controlled emissions}}{\text{year}}$$

$$\text{H} \frac{\text{lbs uncontrolled emissions}}{\text{hour}} \times \text{I} \text{ 1-Wet Suppression Control Efficiency \%} = \text{K} \frac{\text{lbs controlled emissions}}{\text{hour}}$$

Table 1
Facility Summary of Emissions
Luck Stone - Fairfield I-77 Development
Fairfield, South Carolina

Emissions Source Description	Uncontrolled PM		Controlled PM ¹		Uncontrolled PM ₁₀		Controlled PM ₁₀ ¹		Uncontrolled PM _{2.5}		Controlled PM _{2.5} ¹	
	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)
Mining and Material Handling	80.51	352.65	6.81	29.84	29.20	127.91	2.43	10.64	4.42	19.37	0.35	1.54
Material Storage	0.61	2.68	0.61	2.68	0.31	1.34	0.31	1.34	0.04	0.19	0.04	0.19
Haul Roads	3.09	13.53	0.31	1.35	0.88	3.85	0.09	0.38	0.09	0.38	0.01	0.04
Customer Roads	7.45	32.63	0.74	3.26	2.20	9.63	0.22	0.96	0.22	0.96	0.02	0.10
Totals	91.66	401.48	8.48	37.14	32.59	142.72	3.04	13.33	4.77	20.91	0.43	1.87

Notes:

1. PM emissions do not require modeling.
2. Controlled PM₁₀ emissions from Mining and Material Storage require modeling due to cumulative PM₁₀ emission rate greater than 1.14 lbs/hr.
3. Cumulative PM_{2.5} emissions are below 1.14 lbs/hr and do not require modeling.

Table 1
Emission Assumptions and Calculations I: PM Emissions from Drilling and Material Handling
Luck Stone - Fairfield I-77 Development
Fairfield, South Carolina

Emission Source ID	Emissions Source Description	A Design Capacity (tons/hr)	B Uncontrolled PM Emission Factor (lbs/ton)	C Uncontrolled PM Hourly Emissions (lbs/hr)	D Uncontrolled PM Annual Emissions (tpy)	E Controlled PM Emission Factor (lbs/ton)	F Controlled PM Hourly Emissions (lbs/hr)	G Controlled PM Annual Emissions (tpy)
P1	Portable 3055 Jaw Plant (P1)	550	0.0054	2.97	13.01	0.0012	0.66	2.89
P1a	Under Jaw Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P1b	52" x 20" VGF Screen	550	0.025	13.75	60.23	0.0022	1.21	5.30
P2	Under Grizzly Reject Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P3	Triple Deck Screen	550	0.025	13.75	60.23	0.0022	1.21	5.30
P3a	Triple Deck Screen Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P3b	Triple Deck Screen Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P3c	Triple Deck Screen Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P3d	Triple Deck Screen Feed Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P3e	Triple Deck Screen Under Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P4	Kodiak Cone Crusher	550	0.0054	2.97	13.01	0.0012	0.66	2.89
P4a	Under Cone Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P6	Stackable Plus Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P7	Stackable Plus Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P8	Stackable Plus Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P9	Stackable Plus Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P10	Stackable Plus Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P11	Portable Radial Stacking Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P12	Pinnacle Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P13	Transfer Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P14	Channel Flame Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P15	Portable Radial Stacking Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P16	Telestacker Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
P17	Double Deck Screen	550	0.025	13.75	60.23	0.0022	1.21	5.30
P17a	Under Screen Conveyor	550	0.003	1.65	7.23	0.00014	0.077	0.34
Tload	Final Product Truck Loading	550	0.0003	0.17	0.72	0.0003	0.165	0.72
Drill	Drilling inside the Quarry	550	0.00024	0.13	0.58	0.00024	0.132	0.58
HaulLoad	Truck Loading at the Quarry	550	0.000048	0.03	0.12	0.000048	0.026	0.12
Total	-	-		80.51	352.65		6.81	29.84

Table 2
Emission Assumptions and Calculations: PM-10 Emissions from Drilling and Material Handling
Luck Stone - Fairfield I-77 Development
Fairfield, South Carolina

Emission Source ID	Emissions Source Description	A Design Capacity (tons/hr)	B Uncontrolled PM ₁₀ Emission Factor (lbs/ton)	C Uncontrolled PM ₁₀ Hourly Emissions (lbs/hr)	D Uncontrolled PM ₁₀ Annual Emissions (tpy)	E Controlled PM ₁₀ Emission Factor (lbs/ton)	F Controlled PM ₁₀ Hourly Emissions (lbs/hr)	G Controlled PM ₁₀ Annual Emissions (tpy)
P1	Portable 3055 Jaw Plant (P1)	550	0.0024	1.32	5.78	0.00054	0.297	1.30
P1a	Under Jaw Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P1b	52" x 20" VGF Screen	550	0.0087	4.79	20.96	0.00074	0.407	1.78
P2	Under Grizzly Reject Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P3	Triple Deck Screen	550	0.0087	4.79	20.96	0.00074	0.407	1.78
P3a	Triple Deck Screen Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P3b	Triple Deck Screen Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P3c	Triple Deck Screen Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P3d	Triple Deck Screen Feed Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P3e	Triple Deck Screen Under Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P4	Kodiak Cone Crusher	550	0.0024	1.32	5.78	0.00054	0.297	1.30
P4a	Under Cone Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P6	Stackable Plus Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P7	Stackable Plus Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P8	Stackable Plus Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P9	Stackable Plus Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P10	Stackable Plus Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P11	Portable Radial Stacking Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P12	Pinnacle Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P13	Transfer Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P14	Channel Flame Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P15	Portable Radial Stacking Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P16	Telestacker Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
P17	Double Deck Screen	550	0.0087	4.79	20.96	0.00074	0.407	1.78
P17a	Under Screen Conveyor	550	0.0011	0.61	2.65	0.000046	0.025	0.11
Tload	Final Product Truck Loading	550	0.0001	0.06	0.24	0.0001	0.055	0.24
Drill	Drilling inside the Quarry	550	0.00008	0.04	0.19	0.00008	0.044	0.19
HaulLoad	Truck Loading at the Quarry	550	0.000016	0.01	0.04	0.000016	0.009	0.04
Total	-	-		29.20	127.91		2.43	10.64

Table 3
Emission Assumptions and Calculations I: PM2.5 Emissions from Drilling and Material Handling
Luck Stone - Fairfield I-77 Development
Fairfield, South Carolina

Emission Source ID	Emissions Source Description	A Design Capacity (tons/hr)	B Uncontrolled PM _{2.5} Emission Factor (lbs/ton)	C Uncontrolled PM _{2.5} Hourly Emissions (lbs/hr)	D Uncontrolled PM _{2.5} Annual Emissions (tpy)	E Controlled PM _{2.5} Emission Factor (lbs/ton)	F Controlled PM _{2.5} Hourly Emissions (lbs/hr)	G Controlled PM _{2.5} Annual Emissions (tpy)
P1	Portable 3055 Jaw Plant (P1)	550	0.00036	0.20	0.88	0.0001	0.055	0.24
P1a	Under Jaw Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P1b	52" x 20" VGF Screen	550	0.0013	0.72	3.17	0.00005	0.028	0.12
P2	Under Grizzly Reject Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P3	Triple Deck Screen	550	0.0013	0.72	3.17	0.00005	0.028	0.12
P3a	Triple Deck Screen Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P3b	Triple Deck Screen Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P3c	Triple Deck Screen Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P3d	Triple Deck Screen Feed Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P3e	Triple Deck Screen Under Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P4	Kodiak Cone Crusher	550	0.00036	0.20	0.88	0.0001	0.055	0.24
P4a	Under Cone Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P6	Stackable Plus Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P7	Stackable Plus Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.031
P8	Stackable Plus Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.031
P9	Stackable Plus Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.031
P10	Stackable Plus Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.031
P11	Portable Radial Stacking Conveyor	550	0.00017	0.09	0.40	0.000013	0.0072	0.0313
P12	Pinnacle Conveyor	550	0.00017	0.09	0.40	0.000013	0.0072	0.0313
P13	Transfer Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P14	Channel Flame Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P15	Portable Radial Stacking Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P16	Telestacker Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.03
P17	Double Deck Screen	550	0.0013	0.72	3.17	0.00005	0.028	0.12
P17a	Under Screen Conveyor	550	0.00017	0.09	0.40	0.000013	0.007	0.031
Tload	Final Product Truck Loading	550	0.000015	0.008	0.04	0.000015	0.008	0.04
Drill	Drilling inside the Quarry	550	0.000012	0.007	0.03	0.000012	0.007	0.03
HaulLoad	Truck Loading at the Quarry	550	0.000002	0.0013	0.006	0.000002	0.001	0.01
Total	-	-		4.42	19.37		0.35	1.54

Note:
1. Since all emissions from each source are below 1 pound per hour, no air dispersion modeling is required.

Table 4
 Emission Assumptions and Calculation: Storage Pile Wind Emissions
 Luck Stone - Fairfield I-77 Development
 Fairfield, South Carolina

Emission Point ID	Emissions Point Description		A Pile Size (acres)	B Emission Factor			C Hourly Emissions			D Annual Emissions		
				(lbs PM/day/acre)	(lbs PM ₁₀ /day/acre)	(lbs PM _{2.5} /day/acre)	(lbs PM/hr)	(lbs PM ₁₀ /hr)	(lbs PM _{2.5} /hr)	(tons PM/yr)	(tons PM ₁₀ /yr)	(tons PM _{2.5} /yr)
STP1	Storage Pile No. 1	#8	0.88	3.2	1.6	0.23	0.117	0.059	0.008	0.51	0.26	0.04
STP2	Storage Pile No. 2	#4	0.19	3.2	1.6	0.23	0.025	0.013	0.002	0.11	0.06	0.01
STP3	Storage Pile No. 3	#21A	1.02	3.2	1.6	0.23	0.136	0.068	0.010	0.60	0.30	0.04
STP4	Storage Pile No. 4	RipRap	0.70	3.2	1.6	0.23	0.093	0.047	0.007	0.41	0.20	0.03
STP5	Storage Pile No. 5	#57	0.71	3.2	1.6	0.23	0.095	0.047	0.007	0.41	0.21	0.03
STP6	Storage Pile No. 6	#5	0.16	3.2	1.6	0.23	0.021	0.011	0.002	0.09	0.05	0.01
STP7	Storage Pile No. 7	Sand	0.78	3.2	1.6	0.23	0.104	0.052	0.007	0.46	0.23	0.03
STP8	Storage Pile No. 8	Driveway Mix	0.15	3.2	1.6	0.23	0.020	0.010	0.001	0.09	0.04	0.006
Total	-		-				0.612	0.306	0.044	2.68	1.34	0.19

Note:

1. Since PM₁₀ and PM_{2.5} emissions from each source are below 1.14 pounds per hour, no air dispersion modeling is required.

Table 5
Emission Assumptions and Calculations I: Unpaved Road Emissions
Luck Stone - Fairfield I-77 Development
Fairfield, South Carolina

		A	B	C	D	E	F	G	H	I	J	K
Emission Source ID	Pollutants	Particle Size Multiplier k (lb/VMT)	Surface Material Silt Loading Content (%)	Avg. Vehicle Weight W (tons)	Emission Factor E (lbs/VMT)	Emission Factor Eext (lbs/VMT)	VMT/yr	Uncontrolled (tons/yr)	Uncontrolled (lbs/hour)	Wet Suppression Control Efficiency (%)	Controlled (tons/yr)	Controlled (lbs/hr)
Haul	PM	4.9	8.3	138	21.20	14.64	1,848	13.53	3.09	90	1.35	0.31
	PM ₁₀	1.5	8.3	138	6.03	4.16	1,848	3.85	0.88	90	0.38	0.09
	PM _{2.5}	0.15	8.3	138	0.60	0.42	1,848	0.38	0.09	90	0.04	0.01
Customer	PM	4.9	10	13.75	8.56	5.91	11,046	32.63	7.45	90	3.26	0.74
	PM ₁₀	1.5	10	13.75	2.53	1.74	11,046	9.63	2.20	90	0.96	0.22
	PM _{2.5}	0.15	10	13.75	0.25	0.17	11,046	0.96	0.22	90	0.10	0.02
Total	PM	-	-	-	-	-	-	46.15	10.54	-	4.62	1.05
	PM ₁₀	-	-	-	-	-	-	13.48	3.08	-	1.35	0.31
	PM _{2.5}	-	-	-	-	-	-	1.35	0.31	-	0.13	0.03

Notes:

1) Emissions based on calculation found in AP-42, Section 13.2.2, Equation 1a: $E = [k (s/12)^a \times (W/3)^b]$ with an extension from Equation 2: $E_{ext} = E \times (365 - P / 365)$

Where: E_{ext} = annual or other long-term average emission factor in the same units as k,

k = particle size multiplier (Table 13.2.2-2)

s = surface material silt content (%) - Table 13.2.2-1, Quarry Haul/Plant (mean)

W = mean weight of vehicles (tons) - obtained from Winnseboro Quarry

a, b = empirical constants from AP-42 Table 13.2.2.2

P = number of days with at least 0.01 inches of precipitation during the averaging period, (P = 113 days/yr as taken from <https://www.currentresults.com/Weather/South-Carolina/average-yearly-precipitation.php#c> for Spartanburg, South Carolina)

Constant	PM _{2.5}	PM ₁₀	PM ₃₀
k (lb/VMT)	0.15	1.5	4.9
a	0.9	0.9	0.7
b	0.45	0.45	0.45

2) Controlled emissions are based on 90% control efficiency from use of wet suppression to keep the haul roads wet at all times.

3) The vehicle miles traveled (VMT) data was provided by Luck Stone.

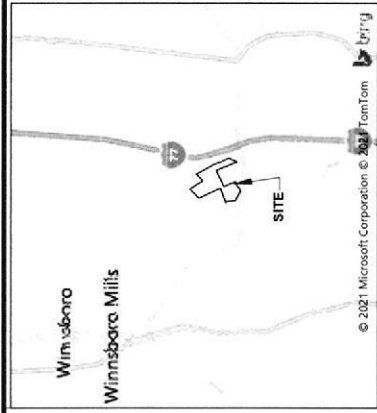
DATE	03/27/2021
DRAWN / APPROVED BY	TJP / MMW
PROJECT NUMBER	IK4100121
FIGURE	1

LUCK STONE
 FAIRFIELD I-77 DEVELOPMENT
 FAIRFIELD, SOUTH CAROLINA

SITE LOCATION AND BOUNDARY MAP

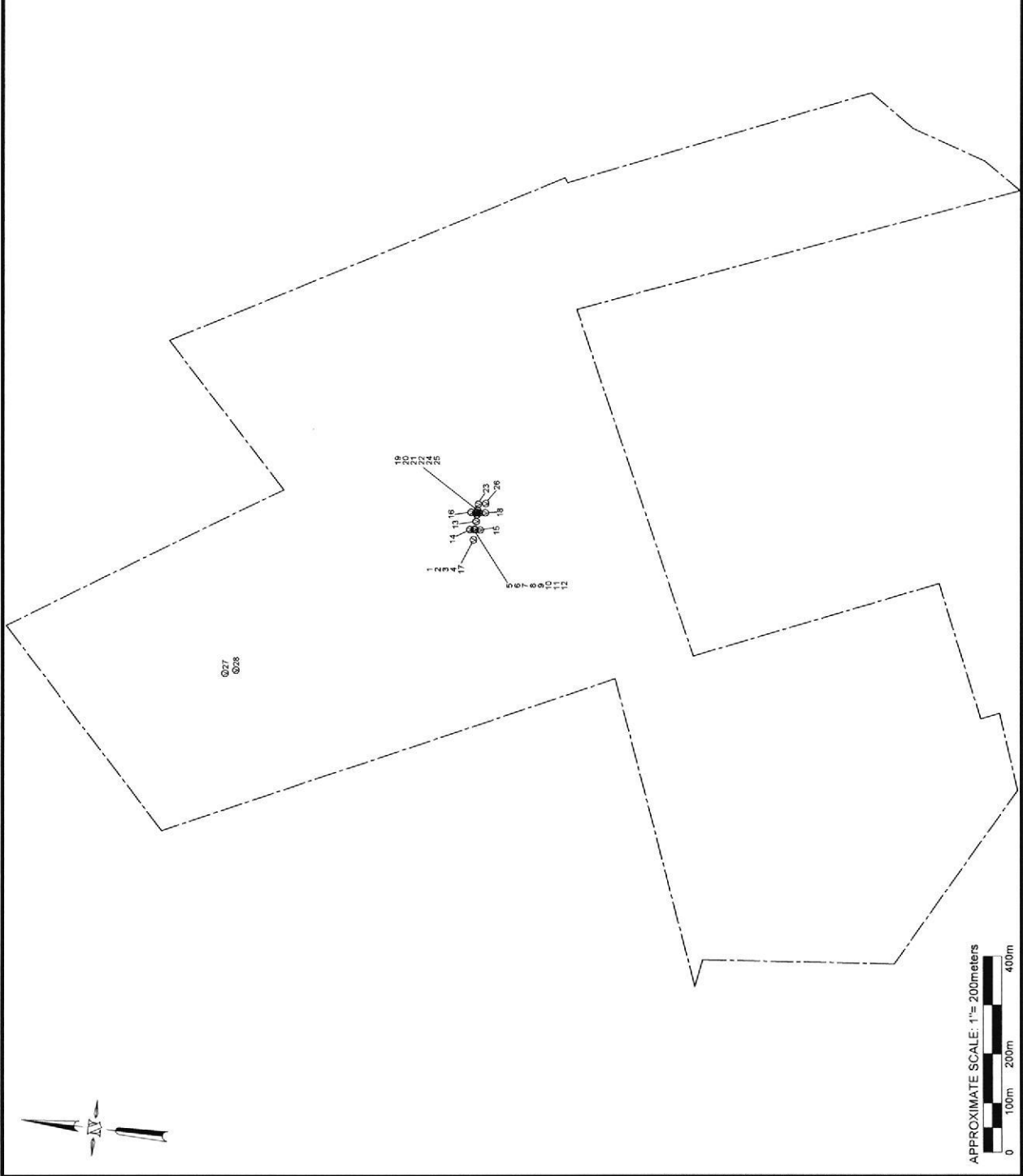
GEL Engineering LLC
 a member of THE GEL GROUP INC
 ENVIRONMENTAL • ENGINEERING • SURVEYING
 2040 Savage Road
 Charleston, SC 29407
 P 843.789.2378
 F 843.789.2397
 www.gel.com

problem solved



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- LEGEND
- PROPERTY BOUNDARY
 - ⊗ VOLUME SOURCE



APPROXIMATE SCALE: 1"= 200meters
 0 100m 200m 400m

FIGURE 2
PROCESS FLOW DIAGRAM
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FAIRFIELD, SOUTH CAROLINA

