



## Blasting Plan

### INTRODUCTION

This Blasting Plan describes the blasting operations that will occur during operation of the Star Excavation, LLC Land Reclamation Project ("Project"). The purpose of this Blasting Plan is to provide Project-specific information concerning blasting procedures, including the safe use of explosives, and the measures that will be implemented to prevent potential adverse impacts to public health, safety, and the environment from the use of explosives during blasting activities. The Blasting Contractor shall comply with all conditions within this plan as well as all specifications detailed in the Missouri Blasting Safety Act (the "Act"), and 11 Code of State Regulations 40-7.010, and related federal and local laws.

### DEFINITIONS

The following definitions, which are also set forth in 11 CSR 40-7.010, shall be used in interpreting this blasting plan:

Blaster:	A person qualified to be in charge of and responsible for the loading and firing of an explosive or explosive material.
Blast:	Detonation of explosives.
Blasting:	The use of explosives in mining or construction.
Blast Site:	The area where explosives are handled during loading of a bore hole, including fifty feet (50') in all directions from the perimeter formed by loaded holes. A minimum of thirty feet (30') may replace the fifty (50)-foot requirement if the perimeter of loaded holes is marked and separated from non-blast site areas by a barrier. The fifty (50)-foot or thirty (30)-foot distance requirements, as applicable, shall apply in all directions along the full depth of the bore hole.
Bore Hole:	A hole made with a drill, auger, or other tool in which explosives are placed in preparation for detonation.
Scaled distance:	A value determined by dividing the linear distance, in feet, from the blast to a specified location, by the square root of the maximum weight of explosives, in pounds, to be detonated in any eight (8) millisecond period.
Seismograph:	An instrument that measures ground vibrations and acoustic effects.
Uncontrolled Structure:	Any dwelling, public building, school, church, commercial building, or institutional building that is not owned or leased by the person using explosives, or otherwise under the direct contractual responsibility of the person using explosives.



## **OVERVIEW OF BLASTING OPERATIONS**

### **Locations**

Blasting will be limited to land located within the Missouri Department of Natural Resources, Land Reclamation Program, permitted (Permit No. 1105) and bonded mine plan area, wherein an abandoned underground mine is being removed, and where traditional excavation and earth moving equipment are not adequate to meet Project specifications. Blasting may consist of either implosion or explosion.

### **Procedures**

Star Excavation, LLC will contract with, or employ a qualified, experienced, and licensed blasting contractor that will perform blasting using current and professionally accepted methods, products, and procedures to maximize safety during blasting operations. Blasting procedures will be carried out according to and in compliance with applicable laws and will be closely monitored by Star Excavation, LLC personnel.

Blasting procedures will be conducted according to the following four basic principles:

- The blast will produce fractured rock of appropriate dimensions.
- The blast will prevent/minimize production of flyrock and air blast hazards.
- The blast will minimize peak particle velocities.
- The blast will be scaled/sized to minimize overblasting that can result in excessive excavation and handling of excavated material, and increased drilling, excavation, and backfill costs.

### **Personal Safety, Protection of Property, and Notification**

#### **Blast Site Personnel Safety**

All personnel responsible for handling explosives and present in and around blasting sites will be fully informed and trained in applicable safety precautions/procedures. Star Excavation, LLC will ensure Project personnel's safety by requiring the Blasting Contractor to provide safety training to its personnel, provide experienced supervisors, use safety equipment, practice good communication, and adhere to notification procedures (including pre-blast notification). If an electrical storm approaches during blasting preparation, the Blasting Contractor will follow the appropriate regulatory procedures and delay or reschedule the blast, as necessary.

The Blasting Contractor will use a signaling system to alert workers of an impending blast. The signaling system will be comprised of the following components:

- **Warning Signal:** 5 minutes prior to the blasting signal, an approximately 15-second-long, audible signal will be sounded at the blast site.

- **Blasting Signal:** 1 minute prior to a blast, a series of three (3) short, approximately 15 seconds each, audible signals will be sounded at the blast site.
- **All-Clear Signal:** Following inspection of the blast area, a prolonged, audible signal will be sounded at the blast site.

The Blasting Contractor will post signs explaining the signaling protocol at construction staging areas and other appropriate locations. All active blast sites will have clear warning signs located at key access points to ensure the public does not accidentally enter a blast site of the Project. Following detonation, the blasting area will be inspected for undetonated or misfired explosives. The blasting area will also be inspected for hazards such as falling rock and rock slides. Once the area has been inspected and these issues have been addressed, the "all-clear" signal will sound, and personnel will be able to safely re-enter the blast zone.

Additional safety precautions will be developed to address site-specific conditions at the time of the blast. Special attention will be given to preventing potential hazards in the blasting area resulting from flying rock, destabilized walls, and structures.

### **Adjacent Property**

Star Excavation shall notify the owner or occupant of any residence or business located within a scaled distance of fifty-five (55) from the Blast Site twenty-four (24) hours prior to the day blasting will occur. The notification in the form, attached, shall be delivered in person to any such owner or occupant, or by posting prominently on the premises or the property of the owner or occupant of the residence or business.

For an owner or occupant of any residence or business located along the portion of Quarry Park Road and Clifford Drive, adjacent to the Project, and located outside the required scaled distance of fifty-five (55) from the Blast Site notice area, a courtesy notification in the form and manner described above shall be made.

The Blasting Contractor shall offer to conduct pre-blast surveys of each uncontrolled structure located within a scaled distance of 35 from the Blast Site, as required by the Act, when authorized by the property owner to conduct such survey. A request for a pre-blast survey by any property owner outside the requirements of the Act shall be evaluated and may or may not be granted.

Pre-blasting inspections will be conducted by a qualified, third party and will include written, photographic or video documentation of the physical conditions of each structure and facility. The owner may be asked to sign and date any written log that would accompany the photo or video record.

### **Seismograph**

The Star Excavation, City Special Use Permit for Rock Reclamation, requires the following process in the event of blasting at the Project. Star Excavation shall take seismographic measurements during blasting activities on the north and south sides of I-470 and the results shall be made available to the public. Star Excavation shall coordinate with the City to determine appropriate locations for the placement of seismographic measuring equipment south of I-470.

The Blasting Contractor shall assure that the following requirements are also met.

- The Blasting Contractor shall calculate the scaled distance to the nearest uncontrolled structure. If more than one (1) uncontrolled structure is the same approximate distance from the blast site, then the person using explosives may select one (1) representative structure for calculation of scaled distance.
- In any instance when the calculated scaled distance value is fifty-five (55) or less, the Blasting Contractor shall use at least one (1) seismograph calibrated to the manufacturer's standard for use to record the ground vibration and acoustic levels that occur from the use of such explosives or explosive materials.
- When measuring ground vibration and acoustic levels, the seismograph shall be placed in the proximity of the nearest uncontrolled structure or, at the option of the person using explosives, closer to the blast site. If more than one (1) uncontrolled structure is the same approximate distance from the blast site, then the person using explosives may select one (1) representative structure for placement of the seismograph.
- Star Excavation may also direct the Blasting Contractor to voluntarily use a seismograph calibrated to the manufacturer's standard for use for all blasting, regardless of the scaled distance.

#### **Fire Safety – No Storage of Explosives**

All blasting work will be conducted in compliance with the Project Fire Prevention Plan and all applicable fire prevention laws and regulations. The explosive material to be used for the Project will not be stored at the Project site.

#### **REGULATORY OVERVIEW**

The Mine Safety Administration (MSHA) and numerous state and local jurisdictions regulate the land reclamation mining operations at Star Excavation's Project. The Federal Bureau of Alcohol, Tobacco, and Firearms (ATF) regulates explosives storage and commerce. The Missouri Blasting Safety Act enforced by the Missouri Fire Marshall, and local laws govern how the use of explosives are to be conducted. Star Excavation, LLC and its sub-contractors will comply with the most stringent provisions of applicable federal, state and local laws that pertain to the use of explosives.



## Notification of Blasting Operations

Date of Notification:
Firm Conducting Blasting Operations:
Address:
City, State & Zip:

Blasting Operations being conducted for:
Blasting Location:
Address:
City, State & Zip:
Blasting Dates:
Blasting Supervisor:

Received By

Date

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Owner or Occupant of any residence or business

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Posted By

Date

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Location Posted

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## Blasting Plan Checklist

Blasting Date: \_\_\_\_\_

Blasting Time: \_\_\_\_\_

### 1. Property Owner Notification

Blasting Contractor notified the owner or occupant of any residence or business located within a scaled distance of fifty-five (55) feet from the Blast Site, twenty-four (24) hours prior to the day blasting will occur.

Notification Form was delivered in person to any such owner or occupant, or by posting prominently on the premises or the property of the owner or occupant of the residence or business within the scaled distance.

<u>Name</u>	<u>Hand Delivery</u>	<u>Posted</u>	<u>Photo of Posting</u>
_____	□	□	□
_____	□	□	□
_____	□	□	□

Courtesy Notification by Star Excavation, Inc. delivered to residence or business located along the portion of Quarry Park Rd and Clifford Drive, adjacent to the Project, and located outside the required scaled distance of fifty-five (55) feet from the Blast Site notice area, was made in the form and manner described above.

<u>Name</u>	<u>Hand Delivery</u>	<u>Posted</u>	<u>Photo of Posting</u>
_____	□	□	□
_____	□	□	□
_____	□	□	□

Blasting Contractor offered to conduct pre-blast surveys of each uncontrolled structure located within a scaled distance of thirty-five (35) feet from the Blast Site, as required by the Act, when authorized by the property owner to conduct such survey.

Not Applicable

<u>Name</u>	<u>Offered</u>	<u>Accepted</u>	<u>Rejected</u>
_____	□	□	□
_____	□	□	□
_____	□	□	□



Request for a pre-blast survey by any property owner outside the requirements of the Act shall be evaluated and may or may not be granted

Not Applicable

<u>Name</u>	<u>Date Requested</u>	<u>Accepted</u>	<u>Rejected</u>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>

2. **Seismograph**

The Blasting Contractor shall assure that the following requirements are met:

Calculate the scaled distance to the nearest uncontrolled structure. If more than one (1) uncontrolled structure is the same approximate distance from the blast site, then Blasting Contractor may select one (1) representative structure for calculation of scaled distance.

In any instance when the calculated scaled distance value is fifty-five (55) feet or less, the Blasting Contractor shall use at least one (1) seismograph calibrated to the manufacturer's standard for use to record the ground vibration and acoustic levels that occur from the use of such explosives or explosive materials.

When measuring ground vibrations and acoustic levels, the seismograph shall be placed in the proximity of the nearest uncontrolled structure, or at the option of the Blasting Contractor, closer to the blast site. If more than one (1) uncontrolled structure is the same approximate distance from the blast site, then Blasting Contractor may select one (1) representative structure for calculation of scaled distance.

Star Excavation, Inc. communicate and coordinate with the City to determine appropriate locations for the placement of seismographic measuring equipment south of I-470.

Seismograph set for blasting activities on north and south sides of I-470

Seismographic results ready to be made available to the public

3. **Blasting Site Personnel Safety**

Star Excavation, LLC contracted with experienced, and licensed blasting contractor.

Name of Contractor: \_\_\_\_\_

All Personnel responsible for handling explosives, and present in and around blasting sites has been



— fully informed and trained in applicable safety precautions / procedures.

Blasting Contractor has provided safety training to its personnel.

Contractor Adhere to Notification Procedures (including pre-blast notification)

If an electrical storm approaches during blasting preparation, the Blasting Contractor will follow the appropriate regulatory procedure and delay or reschedule the blast, as necessary. (if applicable)

Date of Delay: \_\_\_\_\_ Time: \_\_\_\_\_ Signature: \_\_\_\_\_

Signaling system to alert workers of an impending blast. The signaling system will be comprised of the following components:

**Warning Signal:** 5 minutes prior to the blasting signal, an approximately, 15 seconds-long, audible signal will be sounded at the blast site.

**Blasting Signal:** 1 minute prior to a blast, a series of three (3) short, approximately 15 seconds each, audible signals will be sounded at the blast site.

**All-Clear Signal:** Following inspection of the blast area, a prolonged, audible signal will be sounded at the blast site.

**4. Fire Safety – No Storage of Explosives**

Blasting work conducted in compliance with the Project Fire Prevention Plan and all applicable fire Prevention laws and regulations.



