

Appendix M

Blasting Plan

**PAR Western – Horizon West Transmission
Ironwood Transmission Line
Draft Blasting Plan**

The final Blasting Plan will be completed after geotechnical analysis and final engineering design.

1. Purpose

- 1.1. Drill and blast methods will be used to fracture rock to promote excavation for the construction of building transmission structure pads.

2. Scope of Blasting

- 2.1. Blasting operations will be conducted for structure pads, access roads, and other work areas where traditional methods of excavation are ineffective. More detail of location and type of blasting is outlined in Attachment X [Placeholder pending final Blasting Plan].

3. Definitions

- 3.1. (PWLC) – PAR Western Line Contractors
3.2. (HWT) – Horizon West Transmission
3.3. (JSA) – Job Safety Analysis

4. Responsibilities

- 4.1. A qualified subcontractor will be responsible for maintaining proper state and federal permits and licenses to conduct blasting operations.
4.2. A qualified subcontractor and its employees are responsible for compliance with federal, state, and local law pertaining to storage, transportation, and use of explosives to conduct blasting operations.
4.3. A list of qualified personnel is in the Qualifications of Supervisory Personnel section in Qualified Subcontractor's General Blasting Plan.



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5. Location of Blasting Area

The Ironwood Transmission line consists of approximately 86 miles of single circuit 500 kV towers going from North Gila Substation (near Yuma, AZ) Heading West to Imperial Substation.

The geology and topography of the proposed route presents several locations in the eastern portion of the alignment with the potential need for blasting operations. The areas with the highest likelihood for blasting include the following locations (both the structure locations and the nearby access roads):

- Structure 1- 20
- Structures 26-47
- Structures 76- 90

An overview of anticipated blasting activities across the entire alignment, as well as detailed graphics of the focus areas described above, are presented in Figure 1 through Figure 5.

A more detailed description of Bedrock and Geological Problems will be provided once geotech borings are received. However, exact subsurface conditions will be unknown until construction begins and blasting may be necessary in locations outside of the structure locations described above.

Figure 1 Blasting Plan Structures Overview



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25-17237 PEA ETS Figure 1
 Fig X Blasting Plan Structures OVERVIEW

Figure 2 Blasting Plan Structures – Page 1 of 4

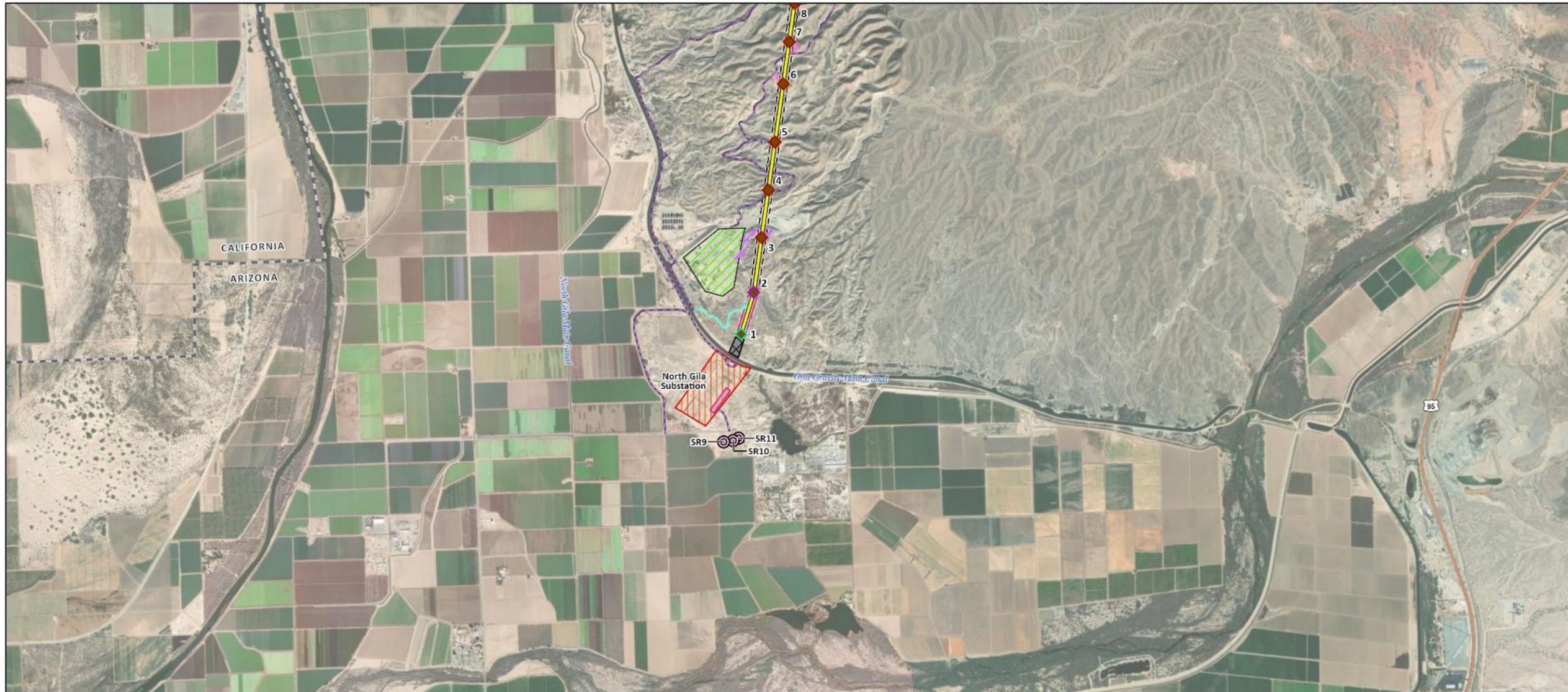


Figure 3 Blasting Plan Structures – Page 2 of 4

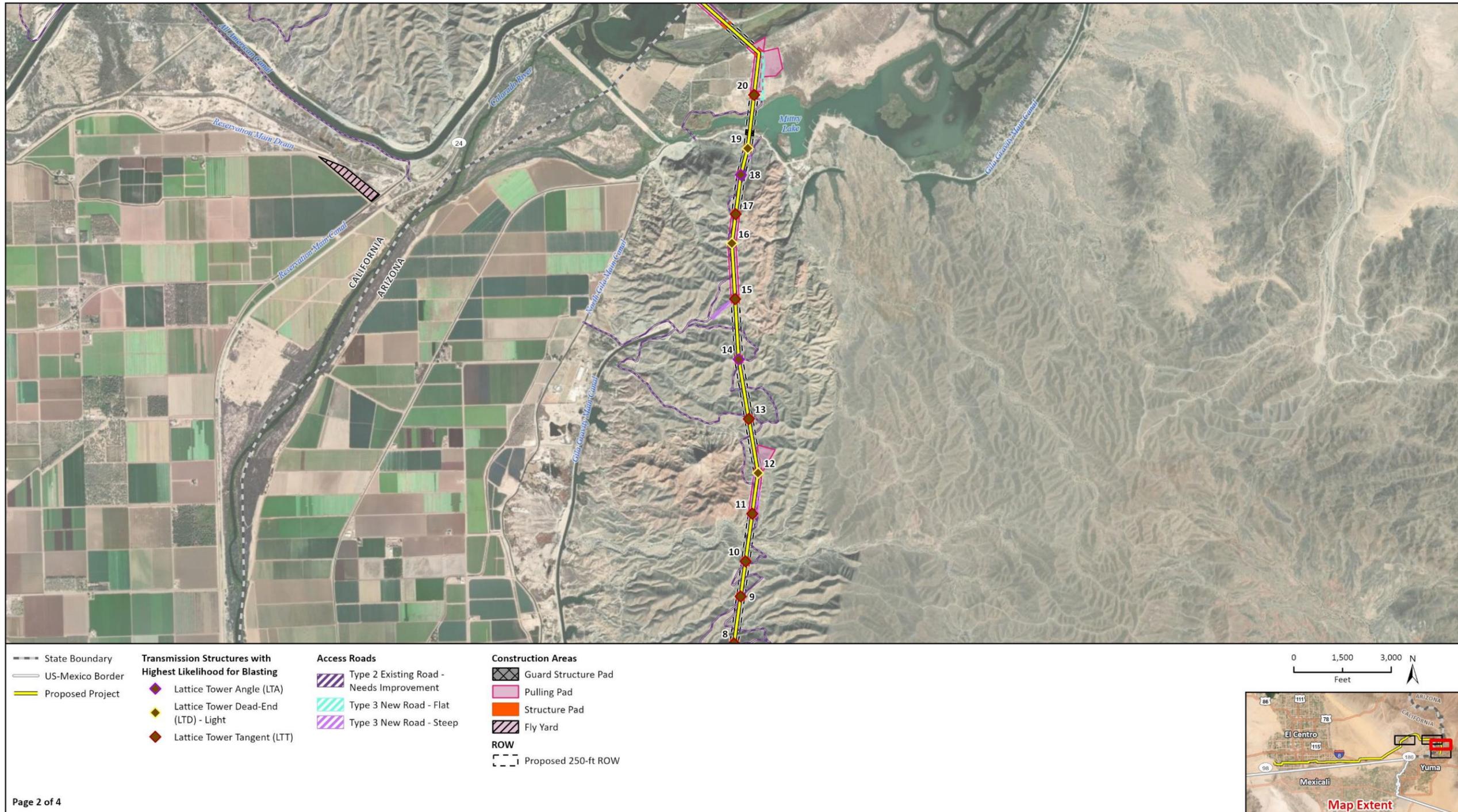


Figure 4 Blasting Plan Structures – Page 3 of 4

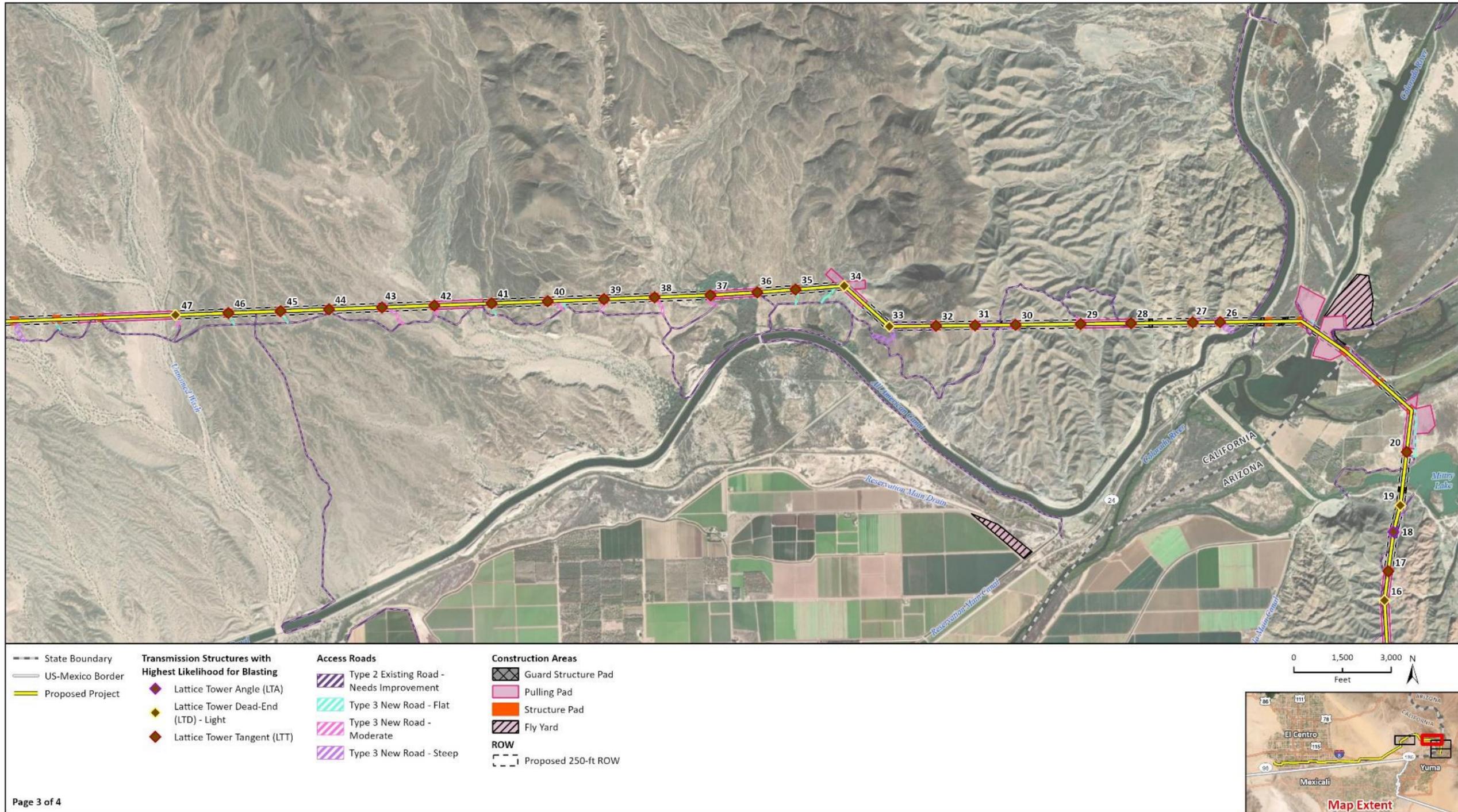
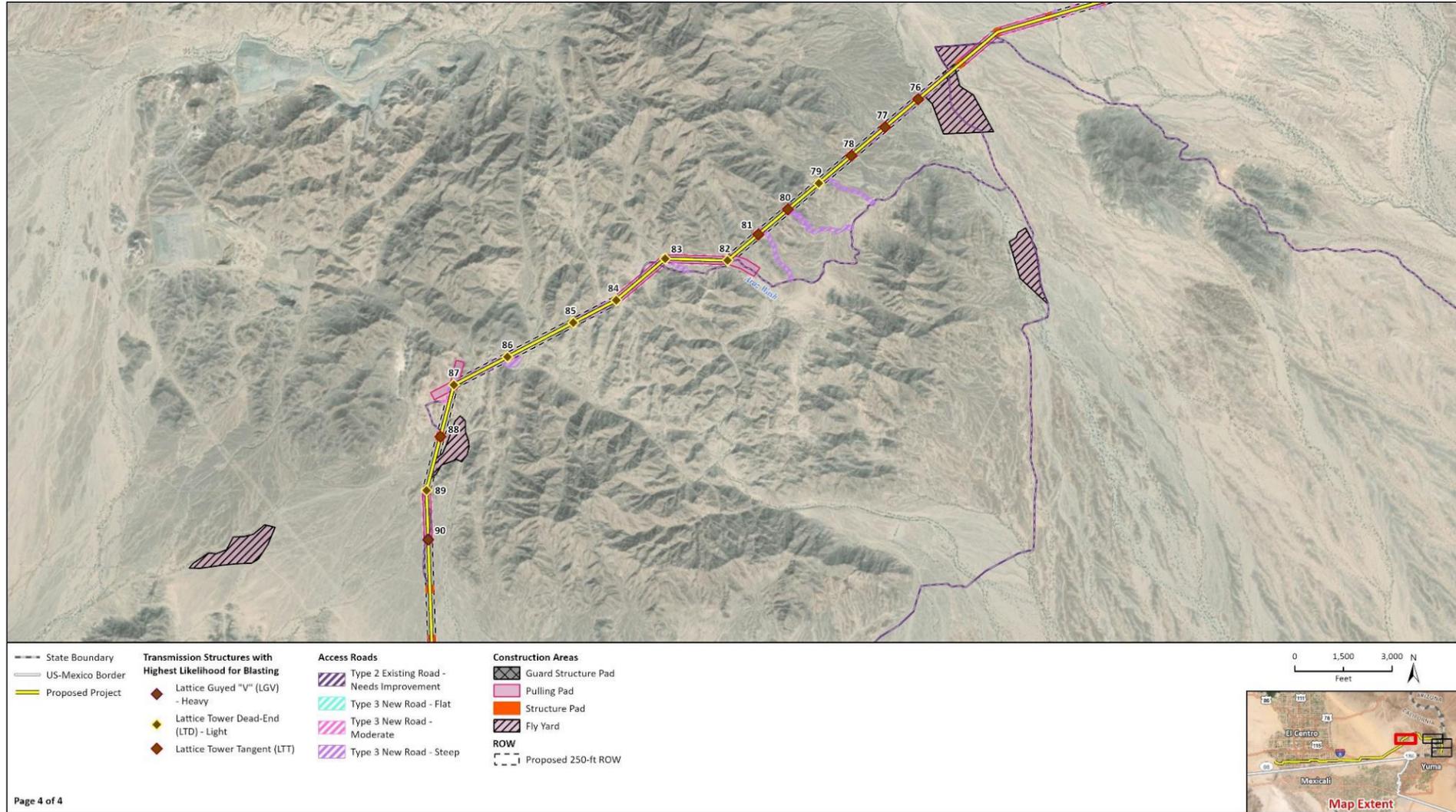


Figure 5 Blasting Plan Structures – Page 4 of 4



6. Environmental Considerations

- 6.1. Exposures to potential sensitive wildlife areas will be reviewed by PWLC and the BLM liaison to decide the best option for drilling and blasting.
- 6.2. All necessary measures will be taken to exclude livestock from the blasting area. During the normal safety check prior to blasting, the area will be checked for both livestock and wildlife. The blast will not be initiated until the area is clear.
- 6.3. The native rock (granite, volcanic, other) would be fragmented by the blast and then be able to be excavated as needed to level the work area.

7. Safety Considerations

- 7.1. General Regulations:
 - 7.1.1. Only authorized and qualified personnel shall handle explosives and shall always be under the direct supervision of a licensed blaster.
 - 7.1.2. All blasting will be performed with a non-electric initiation system and shall follow standard industry guidelines regarding use and safety.
 - 7.1.3. No flame, heat, radio transmitter or spark-producing device shall be permitted in or near explosives during handling, transport, or use.
 - 7.1.4. No person shall be allowed to handle, use, or work in the area while under the influence of liquor, narcotic, or other dangerous drugs.
 - 7.1.5. Explosives shall be always accounted for. Personnel shall be notified of any loss or theft of any explosives.
 - 7.1.6. No explosives shall be abandoned.
 - 7.1.7. Magazines shall be kept locked except for removal of material for use. In addition, explosives will be loaded directly to each shot point from the magazines on approved ground transportation equipment.
 - 7.1.8. Empty packing material shall not be used again for any purpose. Packing materials will be removed from the work area and properly disposed.
 - 7.1.9. Damaged or deteriorated blasting supplies shall not be used.
 - 7.1.10. Delivery and issue of explosives shall only be processed by and to authorized persons and into authorized magazine or temporary storage handling areas.
 - 7.1.11. All loading and firing shall be directed and supervised by the Blaster in Charge.
 - 7.1.12. No loaded holes shall be left unattended or unprotected. No explosives or blasting agents shall be abandoned on the right-of-way. Explosives shall not be primed until immediately before use and shall not be allowed to lay overnight in drilled holes.
 - 7.1.13. All personnel not involved with the current blasting operation must check in with the Blaster in Charge before entering the blasting zone.

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- 7.1.14. Contractors will follow all Federal and State regulations.
 - 7.1.15. Bureau of Alcohol, Tobacco and Firearms – 27CFR 181 (Commerce in Explosives).
 - 7.1.16. Occupational Safety and Health Administration – 29CFR 1926.90 (Safety and Health Regulations for Construction Blasting and Use of Explosives).
 - 7.1.17. Carriage by Public Highway – 49CFR 177 (self-explanatory).
 - 7.1.18. Explosives and Blasting Agents – OSHA, 29CFR 1910.109 (Safety in the Workplace When Using Explosives)
 - 7.1.19. Dig Alerts will be called in by PWLC for individual sites requiring blasting.
 - 7.2. Individual blast sites will be marked with signs, traffic cones, vehicles, and/or machinery owned by PWLC or qualified subcontractor, and access will be blocked to the sites by said equipment during active drilling and blasting operations.
 - 7.3. Individual blast sites will be marked with signs, traffic cones, vehicles, and/or machinery owned by PWLC or qualified subcontractor, and access will be blocked to the sites by said equipment during active drilling and blasting operations.
 - 7.4. Traffic control for public roadways will not be needed on the Ironwood project as the blasting sites are not near any public roadways. Traffic control near blast sites will be followed as stated in Attachment X [Placeholder pending final Blasting Plan]
 - 7.5. Emergency Blast Initiation will be covered in subcontractor’s Blast Site Standard Operating Procedures, Attachment X [Placeholder pending final Blasting Plan]
 - 7.6. Blasting operations shall not be carried out in the proximity of .25 miles of other utilities or property owners without prior approval. Notices will be sent 72 hours before any blasting occurs. Publications will not be needed due to the location where the blasting will occur and what type of blasting will be needed.
 - 7.7. Fire Prevention
 - 7.7.1. Various pickups and drill equipment will be equipped with fire extinguishers and applicable kits.
 - 7.7.2. Following the “All Clear” after each shot, the blast area will be inspected for any indication of fire or fire hazard. Particular attention will be paid to vegetated areas. Generally, the explosives cartridges are vaporized at the instant of explosion and there is no fiber or other material left to smolder or be a source of concern.
 - 7.8. Safety Hazards will be addressed in the daily JSA meeting.
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7.9. Emergency Response

7.9.1. In the event of an accident involving PWLC or subcontractors' personnel, a standard "911" call should be made with the description of the accident and notice given to any responding personnel of potential explosives on-site.

7.10. Minor or Nonemergency Medical Care

7.10.1. The team on site will have more than one person who is paramedic trained to provide minor or nonemergency medical care if needed.

7.11. First Aid

7.11.1. Various pickups and explosive trucks will be equipped with first aid kits.

8. Risk Management

8.1. The qualified blasting contractor will implement all required safety protocols to establish the appropriate work area and buffer zones.

8.2. There will be no risk of damage to nearby utilities or property owners' buildings due to technical Blasting performed at sites provided in Attachment X [Placeholder pending final Blasting Plan].

8.3. During electrical storms all blasting operations shall be suspended and all persons shall be removed from the blasting areas during the approach of an electrical storm. The Non-Electric products we use are less susceptible to stray electrical current than electric blasting caps, however for the safety of all personnel the following rules must be followed:

8.3.1. Blasting must be completed before the storm's distance is 1 mile from site. A lightning detector on a smart device and blasters observations will be used to monitor the proximity of lightning.

8.3.2. If the blast cannot be initiated before the storm is within 1 mile the blaster in charge shall guard the site from a safe distance.

8.3.3. Personnel may return to worksite when the storm has passed and is 5 miles distant or after the completion of blast allowing for the inspection of site and/or misfire.

8.4. Fly Rock protection is in more detail under the "Fly Rock Protection & Dust Control" section in subcontractor's General Blasting Plan. Additionally, timing and charge weights will be selected to produce a controlled blast with effective results. The stemming and delay sequence will be designed to minimize or eliminate any fly rock. Blast mats will not be needed due to open terrain and type of blasting performed.

8.5. Blasting areas on HWT will be in an open-air area, so after a blast has occurred, the crew shall wait 5 minutes before entering station limit to eliminate risk of carbon monoxide exposure.

8.6. For vibration control and monitoring, all shots will be monitored using instancel

seismographs. All shots will be designed not to exceed all peak particle velocities from client, city, state, and federally set thresholds.

- 8.7. Noise levels are expected to be extreme close to the blast site (130 dB+) and would dissipate greatly as distance increases as estimated below.

Distance Effects

Blasting noise decreases rapidly with distance:

Distance from Blast	Typical Peak Sound
0–100 ft	130–140 dB
500 ft	115–125 dB
0.5 mile	95–110 dB (still very noticeable)
1–2 miles	70–90 dB (like thunder)

- 8.8. Pre-blast survey and inspection is outlined in subcontractor's Blast Site Standard Operating Procedures.
- 8.9. If applicable, blast damage complaints will be addressed and resolved by PWLC. Due to the layout of the blast site and the technical blasting being performed, there is no risk to blast damage to any nearby utilities or buildings.
- 8.10. All holes will be stemmed for a length of a minimum 20 times the hole diameter to prevent blast hole venting and excessive air blast.

9. Blast Design Concept *(see attached for diagrams of pattern layout and loaded borehole profile)*

- 9.1. Station limits of proposed shot are established by the blasting team. This is further outlined in the Blast Site Standard Operating Procedures.
- 9.1.1. The subcontractor will use controlled drilling and blasting techniques.
- 9.2. Plan and section views of proposed drill pattern, including free face, burden, blasthole spacing, blasthole diameter, blasthole angles, lift height, and sub-drill depth are included within the Attachment X [Placeholder pending final Blasting Plan]
- 9.3. Loading diagram showing type and amount of explosives, primers, initiators, and location, and depth of stemming are included within the Attachment X [Placeholder pending final Blasting Plan]
- 9.4. Approximately 91 holes would be drilled per site with one blasting cap detonator per hole.
- 9.4.1. The Blasting Agent would likely be ammonium nitrate–fuel oil (ANFO) or another commercial emulsion.
- 9.5. The blast area will be accessed with a self-contained hydraulic track drill to

drill a consistent pattern of holes for explosives placement.

- 9.5.1. The drill holes will be 3-inch diameter.
- 9.5.2. A 6 ft x 6 ft pattern will be used for initial blast design. The pattern may be adjusted to achieve optimal results.
- 9.5.3. Each hole will be loaded with a 1/3rd lb. cast booster high explosive or an emulsion high explosive primer, a non-electric detonator and ANFO blasting agent. Additionally, an emulsion packaged blasting agent may be used in some holes that are wet.
- 9.5.4. The blast design and products used may be modified in the field if the blaster determines it necessary.
- 9.5.5. The work is proposed to be done in one individual blast at each site but may require several blasts to break the rock.
- 9.5.6. The manufacturers data sheets for all explosives, primers, and initiators to be employed are included within Attachment X [Placeholder pending final Blasting Plan]

10. All procedures are covered in subcontractor's Blast Site Standard Operating Procedures.

11. Records

- 11.1. *PWLC and subcontractor will ensure accurate records are kept as required by regulation. This is expanded upon in XVII. Record Keeping within the Blast Site Standard Operating Procedures.*

12. Attachments

[Placeholder pending final Blasting Plan]