

BOONE COUNTY PLANNING & ZONING COMMISSION
BOONE COUNTY GOVERNMENT CENTER
COMMISSION CHAMBERS, 801 E. WALNUT ST, COLUMBIA, MISSOURI
(573) 886-4330

Minutes

7:00 P.M.

Thursday, June 20, 2024

I. CALL TO ORDER

Chairperson Harris called the meeting to order at 7:00 p.m. with a quorum present.

II. ROLL CALL:

a. Members Present:

Boyd Harris, Chairperson	Centralia Township
Eric Kurzejeski, Vice Chairperson	Missouri Township
Gregory Martin, Secretary	Katy Township
Steve Koirtyohann	Rocky Fork Township
Randall Trecha	Cedar Township
Kevin Harvey	Rock Bridge Township
Robert Schrieber	Three Creeks Township
Christy Schnarre	Bourbon Township
Jeff McCann	County Engineer

b. Absent

Rhonda Proctor	Perche Township
Vacant Seat	Columbia Township

c. Staff Present:

Bill Florea, Director	Thad Yonke, Senior Planner
Uriah Mach, Planner	Andrew Devereux, Planner
Paula Evans, Staff	

III. APPROVAL OF MINUTES

Minutes from the May 16, 2024 meeting were approved as presented by acclamation.

IV. CHAIRPERSON STATEMENT

Chairperson Harris read the following statement:

The June 20, 2024 meeting of the Planning and Zoning Commission is now called to order.

Notice of this meeting has been posted in accordance with State and local laws.

The Boone County Planning and Zoning Commission is an advisory commission to the County Commission and makes recommendations on matters dealing with land use. The commission is made up of individuals representing each township of the county and the county engineer.

The Planning and Zoning Commission may follow Robert's Rules of Order or its own by-laws. The by-laws provide that all members of the commission, including the chairperson, enjoy full privileges of the floor and may debate, vote upon, or make any motion.

The following procedure will be followed:

Announcement of each agenda item will be followed by a report from the planning department staff. After the staff report, the applicant or their representative may make a presentation to the Commission. Then, the floor will be opened for a public hearing. Those wishing to speak in support of the request will be allowed to speak, then the floor will be given over to those opposed to the request. Individuals that neither support nor oppose a request may address the commission at any time during the public hearing.

Please direct all comments or questions to the commission. Be concise and restrict your comments to the matter under discussion. We ask that you please not be repetitious with your remarks. The Chairperson may implement time limits per speaker at any time during the meeting. Some issues can be quite emotional but please be considerate of everyone hereby refraining from applause, cheers, or other signs of support or displeasure.

Please give your name and mailing address when you address the commission and sign the sheet on the table after you testify. We ask that you turn off or silence your cell phones.

Any materials that are presented to the commission, such as photographs, written statements or other materials will become a part of the record for these proceedings. If you would like to recover original material, please see the staff during regular business hours.

After the public hearing is closed no further comments will be permitted from the audience unless requested by the Commission. The applicant will have an opportunity to respond to any concerns expressed during the public hearing. Next the staff will be given an opportunity for any additional comments. The commission will then discuss the matter and a motion will be made for a recommendation to the County Commission.

All recommendations for approval are forwarded to the County Commission. They will conduct another public hearing on Tuesday, July 2, 2024 at 7:00 PM. Interested parties will be able to comment on the requests at that time. The vote on discretionary items, such as rezonings and conditional use permits will not be taken at that hearing; those items will be scheduled for a second reading at a future hearing, likely on Tuesday, July 9, 2024, however, the date of the second reading will be announced at the meeting on the 2nd. The County Commission generally follows the recommendations of the Planning and Zoning Commission; however, they are not obligated to do so.

Requests that are denied will not proceed to the County Commission unless the applicant files an appeal form within 3 working days. Please contact the planning office to see if a request that has been denied has filed an appeal. There will be no further public notification due to the short time between the hearing tonight and the County Commission hearing.

The Boone County Zoning and Subdivision Regulations are hereby made a part of the record of these proceedings.

V. ORDER OF BUSINESS

Chairperson Harris made, and Commissioner Koirtyohann seconded a motion to conduct business in the following order for tonight's meeting: Rezoning Requests, Planned Developments, Plats, Conditional Use Permit Requests, Old Business then New Business.

All members voted in favor. None opposed.

VI. REZONING REQUESTS

- 1. Request by T-Vine Development Group to rezone from Single-Family Residential (R-S) and Agriculture 2 (A-2) to Two-Family Residential (R-D) on 4.21 acres located at 8155 N North Browns Station Rd, Columbia. (open public hearing)**

Planner, Uriah Mach gave the following staff report:

The subject property is located at the southwestern corner of Ketterer Road and Brown Station Road, approximately 1 1/3 miles to the north of the City of Columbia. The property is currently undeveloped. The subject property is composed of a 3.03-acre lot and four lots that are each roughly 1/4 acre in size. The properties have three zonings among them, the 3.03-acre lot is zoned Agriculture 2, the three northernmost small lots are zoned Two-Family Residential (R-D), and the southernmost small lot is zoned Single-Family Residential (R-S).

Zoning around the subject properties is as follows:

North – Agriculture 2 (A-2)

South – Single-Family Residential (R-S)

East – A-2

West – Planned Two-Family Residential (R-DP)

This proposal intends to rezone a small portion (1053 square feet) of the A-2 lot and a small portion (2147 square feet) of the R-S lot to Two Family Residential (R-D). These rezonings will allow for reconfiguration of the existing R-D lots from three lots to four lots.

The Boone County Master Plan has designated this area as being suitable for rural residential & agricultural land uses. The Boone County Master Plan designates a sufficiency of resources test for the evaluation of zoning changes where each proposal is evaluated to see if sufficient utility, transportation, and public safety infrastructure is in place to support the change in zoning. The sufficiency of resources test provides a “gatekeeping” function. Failure to pass the test should result in denial of a request. Success in passing the test should result in further analysis.

Utilities – The subject property is located in Public Water Service District #4, the Boone Electric Cooperative service and the Boone County Fire Protection District. Utility services to meet the needs of this rezoning have been constructed as parts of earlier phases of the Settlers Ridge development plan.

Transportation – The properties that are part of this rezoning request have frontage on Ketterer Road and North Brown Station Road. Both Ketterer and North Brown Station have been improved during earlier phases of the Settlers Ridge development plan to support the overall development.

Public Safety – The nearest Boone County Fire Protection District Station is located approximately 2 1/4 miles away, on State Route HH, east of the subject property.

Zoning Analysis – This request is a minor modification of the existing development to accommodate the creation of an additional lot with the correct zoning. While it does trim a small amount of property from a

common lot, the use of that lot is unimpaired. Similarly, trimming a small portion of property from the R-S-zoned lot to the south does not restrict its ability to be developed. It does require that R-S lot to take access from Brookhill Drive rather than having the option to take access off of Brookhill or North Brown Station. This is a simple request, with limited impact on the surrounding properties.

The property scored 71 points on the rating system

Staff recommends approval of the request.

Present representing the request:

Jay Gebhardt, A Civil Group, 3401 W Broadway Business Park, Columbia

Jay Gebhardt: I am just here to answer any questions.

Chairperson Harris: This is just a cleanup? I heard the applicants were going to gain a lot by doing this?

Jay Gebhardt: Each duplex lot requires 10,000 square feet and currently the area of the R-D is less than 40,000 square feet so we can't have four lots. The applicants always intended for it to be four lots and they didn't realize that it wasn't zoned properly to do that. This would allow the applicants to build an additional duplex on the property.

Open to public hearing.

No one spoke in favor or opposition to the request.

Closed to public hearing.

Commissioner Koirtyohann made, and Commissioner Harvey seconded a motion to approve the request by T-Vine Development Group to rezone from Single-Family Residential (R-S) and Agriculture 2 (A-2) to Two-Family Residential (R-D) on 4.21 acres located at 8155 N North Browns Station Rd, Columbia:

Boyd Harris – Yes	Eric Kurzejeski – Yes
Greg Martin – Yes	Steve Koirtyohann – Yes
Randal Trecha – Yes	Kevin Harvey – Yes
Robert Schreiber – Yes	Christy Schnarre – Yes
Jeff McCann – Yes	

Motion to approve the rezoning request passes unanimously

Chairperson Harris stated that this request would go before the County Commission on Tuesday, July 2, 2024 at 7:00 PM.

VII. PLANNED DEVELOPMENTS

- 1. Request by RML Investments to approve a Final Development Plan for Concorde South Plat 1-B in the pending Planned Light-Industrial (M-LP) zoning district on 11.36 acres located at 5101 E Meyer Industrial Dr, Columbia.**

The following staff report was entered into the record:

The subject property is located at the immediate northwestern corner of the intersection of Meyer Industrial Drive and Tom Bass Road. The applicant is seeking to finalize the rezoning of 11.36-acres from General Commercial (C-G) & Planned Industrial (M-LP) to a new continuous M-LP plan. The approval of this Final Plan will finalize the rezoning. The Review Plan and rezoning was approved by the County Commission on June 04th, 2024, by Commission Order 262-2024 with the same conditions as recommended by the Planning & Zoning Commission. The conditions are as follows:

1. All agreements and documentation related to the provision of sewer service be completed to the satisfaction of the BCRSD and the Director of Resource Management prior to submission of the Final Development Plan.
2. That it is recognized that additional hydrant/water improvements may be required and must be worked out to the satisfaction of the Water District and the Director of Resource Management.

The Boone County Zoning Ordinance, Section 6.2.14, Standards for Approval of the Final Development Plan identify 3 criteria for approval and state that the Commission shall approve a Final Development Plan when it is satisfied that:

- All required information is accurately portrayed on the plan.
- The Final Plan conforms to the approved review plan.
- The Final Plan demonstrates compliance with all conditions which the County Commission may have imposed on the Review Plan.

Staff has reviewed the plan. All required information is accurately portrayed, and the plan conforms to the revised review plan.

We have correspondence from both the BCRSD and from Consolidated Public Water District #1 that the developer is working with the districts to resolve any remaining issues, so the two conditions of approval are substantially satisfied. At this point, the Final Development Plan is in compliance with the conditions established by Commission Order 262-2024.

Staff recommends approval.

Commissioner Harvey made, and Commissioner Schrieber seconded a motion to approve RML Investments to approve a Final Development Plan for Concorde South Plat 1-B in the pending Planned Light-Industrial (M-LP) zoning district on 11.36 acres located at 5101 E Meyer Industrial Dr, Columbia:

Boyd Harris – Yes	Eric Kurzejeski – Yes
Greg Martin – Yes	Steve Koirtyohann – Yes
Randal Trecha – Yes	Kevin Harvey – Yes
Robert Schreiber – Yes	Christy Schnarre – Yes
Jeff McCann – Yes	

Motion to approve the Final Development Plan passes unanimously

Chairperson Harris stated that this request would go before the County Commission on Tuesday, July 2, 2024 at 7:00 PM.

VIII. PLATS

Plats 1 – 5 were placed on consent agenda

1. **Concorde South Plat 1-B. Pending M-LP. S3-T47N-R12W. RML Investment Properties LLC, owner. Andrew Greene, surveyor**

The following staff report was entered into the record:

The subject property is located at the immediate northwestern corner of the intersection of Meyer Industrial Drive and Tom Bass Road. The overall property is 11.36-acres in size, with the eastern half zoned General Commercial (C-G) and the western half zoned Planned Industrial (M-LP). All the surrounding property is zoned as follows:

- North – Agriculture 1 (A-1) & General Industrial (M-G)
- Northeast – City Residential Mobile Home (R-MH)
- East – City R-MH
- Southeast – Planned Industrial (M-LP)
- South – Planned General Industrial (M-GP) & M-LP
- Southwest – M-GP
- West – M-GP
- Northwest – M-LP & M-GP

Many of these zonings are the result of rezoning as the area has had a dynamic history with respect to zoning since the original 1973 zoning.

A revised review plan and rezoning request to change the zoning to a continuous M-LP zoning was approved by the County Commission earlier this month and will go into effect with the approval of a Final Development Plan that is also on this P&Z agenda.

The proposal is to reconfigure the existing 4 lots into 3 lots. The current parent parcel is vacant.

There is some central sewer infrastructure that needs to be installed in conjunction with the development of this property, however, each lot is already served by central sewer so the plat will be allowed to go forward prior to full installation of the sewer re-construction. This will be coordinated with the BCRSD.

The property scored 78 points on the rating system.

Staff recommends approval of the plat subject to the following conditions:

1. It is recognized that coordination with the BCRSD is somewhat more complicated with this plat than most, so prior to scheduling this item for County Commission BCRSD will need to confirm they are ready for the plat to be recorded.

2. **KM Farms Plat 1. A-R. S25-T51N-R13W. KM Farms LLC, owner. David Butcher, surveyor.**

The following staff report was entered into the record:

The subject property is located between N Old Highway 63 and N Highway 63, less than ½ mile south of the intersection of W Highway NN and N Highway 63. The subject property is zoned Agriculture-Residential (A-R). The surrounding zoning is as follows:

- North – A-R
- West – Agriculture 2 (A-2)
- South – A-R
- East across N Highway 63 – A-2

The proposed subdivision plat is to divide the northern portion of the property into two five plus acres lots. The 11.89-acre remainder to the south is shown on an accompanying administrative survey. Proposed lot 1 of the subdivision contains an existing single-family dwelling and onsite wastewater lagoon. Proposed lot 2 is undeveloped.

Both lots have direct front along N Old Highway 63, a publicly maintained roadway. An existing driveway serves the dwelling on the proposed northern lot. The applicants have not submitted a request for a waiver from the traffic study requirement. However, only one additional traffic source will be generated from this subdivision plat. Granting of a waiver to the traffic study is appropriate in this case.

Public Water Supply District 10 provides water service. Boone Electric Cooperative provides power service. The Boone County Fire Protection District provides fire protection. The nearest station, station 6, is approximately 5.7 miles away.

The applicant proposes the use of onsite sewage lagoons to handle wastewater. The applicants have not submitted a request for a waiver to the sewer cost benefit analysis. However, no publicly operated central sewer is located nearby. Granting of a waiver to the sewer cost benefit analysis is appropriate in this case.

A sinkhole recognized by the Missouri Department of Natural Resources (DNR) is shown on the property by the County's GIS. After notifying the surveyor of the karst feature, staff have received a letter from a DNR geologist that states that the sinkhole designation was made in error. The letter indicates that the sinkhole will be removed from the state's official sinkhole map.

The property scored 28 points on the rating system

Staff recommends approval of the plat and granting of waivers.

3. McGee Estates. A-R. S12-T50N-R12W. Andrew L. McGee Jr, owner. Kevin Schweikert, surveyor.

The following staff report was entered into the record:

The subject property is located approximately ½ mile north of the City of Hallsville, located off Highway 124. The property is 31.50 acres and is zoned Agriculture-Residential (A-R). The property is surrounded by A-R zoning on all sides. The proposal is to subdivide the property into three lots with the 10-acre remainder tract by administrative survey. All the proposed lots created by the subdivision plat will be over five acres.

The proposed subdivision plat will utilize a private access easement for the three platted lots to have access to Highway 124, a publicly maintained roadway. The administrative survey tract will utilize a separate access easement to Highway 124. The applicant has submitted a request for a waiver to the traffic study. The addition of three traffic sources along MoDOT maintained right of way is likely to have minimal impact on existing transportation resources. Granting a waiver is appropriate in this case.

Public Water Supply District #4 provides water service. Ameren Electric provides power service in this area. The Boone County Fire Protection District provides fire protection. The nearest station, station 3, is approximately 1.2 miles away.

The subdivision plat proposes the use of onsite wastewater lagoons. The applicant has submitted an onsite wastewater plan showing compliant lagoon locations. The applicant has submitted a request for a waiver from the sewer cost benefit analysis. Nearby Hallsville utilizes a privately operated sewer system with very limited capacity for additional sewer customers. The cost of connecting to such a sewer system would likely be impractical for development. Granting a waiver is appropriate in this case.

The property scored 58 points on the rating system

Staff recommends approval of the plat and granting of waivers.

4. Porter Bend Plat 2. A-2. S19-T46N-R12W. Martin & Tanya Porter, owners. David Butcher, surveyor.

The following staff report was entered into the record:

The subject property is located off E Route M, just over ½ mile west of the intersection of Route M and E Cedar Tree Lane. The property is zoned Agriculture 2 (A-2) and is surrounded by A-2 zoning on all sides. The proposal is to subdivide the 13.68 parent parcel into three platted lots. The subject property is undeveloped.

All three proposed lots have direct access onto E Route M, a publicly maintained roadway. Review comments from MoDOT indicate that proposed lots 1 and 2 have access from an existing shared driveway. The applicants have not submitted a request for a waiver from the traffic study requirement. However, the creation of two additional traffic sources along MoDOT maintained right of way is likely to have minimal impact to the existing transportation infrastructure. Granting of a waiver is appropriate in this case.

Consolidated Water Supply District #1 provides water. Boone Electric Cooperative provides power service. The Southern Boone County Fire Protection District provides fire protection. The nearest station, station #17, is approximately 4.6 miles away.

The applicant proposes the use of onsite sewage lagoons for wastewater. A lagoon plan was submitted showing compliant locations for onsite wastewater lagoons. The applicant did not submit a waiver from the sewer cost benefit analysis. However, no public sanitary sewer system is nearby. Granting of a waiver to the sewer cost benefit analysis is appropriate in this case.

The property scored 38 points on the rating system

Staff recommends approval of the plat and granting of waivers.

5. B & B Subdivision Plat 2-A. A-2. S36-T47N-R13W. Black Dog Consulting & Development & NBG and JJG Revocable Trust, owners. Kevin Schweikert, surveyor.

The following staff report was entered into the record:

The subject property is located along S Andrew Sapp Road, approximately one mile north of the intersection of S Andrew Sapp Road and E Highway MM. The property is zoned Agriculture 2 (A-2) and is surrounded

by A-2 zoning on all sides. The proposal is to replat the existing lot 2 of B&B Subdivision Plat 2 from a 6.35-acre lot to a 15.35-acre lot, utilizing acreage from 26.40 survey tract to the north. The remainder of the survey tract will be incorporated into a 37.39-acre boundary survey to the north. The subject property is fully developed with a single-family dwelling, accessory structure, and onsite wastewater lagoon.

The subject property has direct frontage along S Andrew Sapp Rd, a publicly maintained roadway. An existing driveway provides access for the single-family dwelling. The applicant has submitted a written request for a waiver for the traffic study requirement. The replat of the property will not generate any additional traffic sources. Granting of a waiver is appropriate in this case.

Consolidated Water Supply District #1 provides water. Boone Electric Cooperative provides power service. The Southern Boone County Fire Protection District provides fire protection. The nearest station, station 17, is approximately 6.4 miles away.

An existing onsite wastewater lagoon serves the single-family dwelling. The applicant has provided an onsite wastewater plan showing a compliant location for a replacement lagoon. The applicant has submitted a written request for a waiver from the sewer cost benefit analysis. No nearby public sewer is available to service the area. Granting of a waiver from the sewer cost benefit analysis is appropriate in this case.

The property scored 32 points on the rating system

Staff recommends approval of the plat and granting of waivers.

Commissioner Trecha made, and Commissioner Kurzejeski seconded a motion to approve the items on consent agenda as recommended:

Boyd Harris – Yes	Eric Kurzejeski – Yes
Greg Martin – Yes	Steve Koirtyohann – Yes
Randal Trecha – Yes	Kevin Harvey – Yes
Robert Schreiber – Yes	Christy Schnarre – Yes
Jeff McCann – Yes	

Motion to approve the plats passes unanimously

Chairperson Harris stated that plats eligible to go before the County Commission will do so on Tuesday, July 2, 2024 at 7:00 PM.

IX. CONDITIONAL USE PERMITS

- 1. Request by Land Investments LLC and Stadium West Properties for a conditional use permit for a quarry in the Agriculture 2 (A-2) zoning district on 57.27 acres located at 24000 S Hwy 63, Hartsburg. (open public hearing)**

Planner, Uriah Mach gave the following staff report:

The subject properties are a combined area of approximately 57.27 acres adjacent to the eastern boundary of Boone County. The zoning is Agriculture (A-2). Adjacent zoning is A-2 to the north, south, east and west. This is all original 1973 zoning. There is an existing rock quarry north of the subject properties. The quarry use was originally expanded by a conditional use permit in 1974, under Commission order 74-02. The

quarry to the north has also received conditional use permits for the temporary placement of asphalt plants in 2005 and 2014.

The proposal is to expand the existing quarry site for extracting limestone. This activity will be focused on the 42-acre Land Investments LLC parcel and the 13-acre Stadium West parcel. The 2.7-acre Stadium West parcel will be used for fill and overburden storage.

The following criteria are the standards for approval of a conditional use permit, followed by staff analysis of how this application may meet those standards. Staff analysis of the request is based upon the application and public comments received following notification of the surrounding property owners.

(a) The establishment, maintenance or operation of a conditional use permit will not be detrimental to or endanger the public health, safety, comfort or general welfare.

The applicant has submitted approved copies of their state permits for quarry operations and maintenance of the site. The activity associated with a quarry can create negative off-site impacts, specifically the noise and dust raised by blasting. This, combined with equipment noise generated by heavy equipment in regular use on the site, can be problematic for nearby property owners. The applicants have submitted several proposed conditions to the conditional use permit to help mitigate negative impacts. If operated in a manner consistent with existing state and county regulations, and with appropriate conditions, this conditional use permit request should meet this criterion.

(b) The conditional use permit will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted by these regulations.

The quarry to the north is longstanding and pre-dates a substantial number of the surrounding residences, as is visible in the 1956 aerial photos of the county. The first subdivision plat for Lake Champetra was recorded in 1971. Aerial photos from 1956 show four houses in this area along what would become Westbrook Drive. Any development in the vicinity of the quarry must consider its presence as a major factor in the character of the area.

The establishment of this new property as a quarry site is essentially an expansion of this existing quarry. Quarry operations can be injurious to the use and enjoyment of the surrounding properties. As an established, preexisting land use there is an expectation that some level of externalities caused by quarrying are a component of the neighborhood characteristics. The quarry operation was present prior to the establishment of the residential area around Champetra Lake to the north. This residential development was established in proximity to an existing quarry operation.

In response to the proposed intensity of the quarry activity, conditions are suggested to limit activity for the most intrusive aspects of the quarry use to times that are generally considered working hours.

The applicant has also provided a blasting study and a hydrogeologic study to evaluate the impact of the quarry operations on Champetra Lake and its dam. These studies were prepared by experts in their respective fields and reviewed by county staff, including the county hydrologist. The assessment of these studies is that the quarry activities will not present significant risk to the lake or the dam.

The blasting study contradicts the application regarding the frequency of blasting. The study states that "The anticipated shot size is 20,000 tons of rock, which is an average shot size for a quarry. This translates to only 20 full sized blasts a year". The application submitted by Capital Quarries states there will be up to 3 blasts per week, a total of 156 blasts. The number of blasts will have a direct impact on the use and enjoyment of the nearby residents. The discrepancy regarding the number of blasts should be clarified before approval of the CUP. The number of blasts should be limited to minimize the impact to the neighboring residents.

The proposed conditions should allow the use contemplated by the conditional use permit to not raise the level of injury to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted by these regulations. Such conditions have been proposed by the applicant and reviewed by staff for consideration with this request. Other conditions are proposed in response to public input received during the review process.

(c) The conditional use permit will not substantially diminish or impair property values of existing properties in the neighborhood.

The existing quarry to the north has been a significant physical feature of the area prior to most of the residential development to the north and west of the site. Its presence and activity should be baseline assumptions in the value of existing properties in the vicinity. The proposed expansion is shifting predominantly away from residentially developed areas. Testimony from the public and the applicant may help to verify compliance with this criterion.

(d) All necessary facilities will be available, including, but not limited to, utilities, roads, road access, and drainage.

The adjacent site has developed adequate internal utility, road, road access, and drainage infrastructure to meet the needs of the use that is contemplated by this conditional use permit.

(e) The establishment of a conditional use permit will not impede the normal and orderly development and improvement of surrounding property for uses permitted in the zoning district.

Examining the historic aerial photography shows that the existing quarry operation was in existence prior to the development of the Lake Champetra subdivision. Therefore, the quarry in general has not impeded normal and orderly development. The availability of infrastructure is a stronger limitation on increased development than the establishment of this conditional use permit.

The establishment of this conditional use permit will not impede the normal and orderly development of the surrounding property for uses permitted in the zoning ordinance.

(f) The establishment of a conditional use permit will not hinder the flow of traffic or result in traffic congestion on the public streets. This will include the provision of points of access to the subject property.

This site shares access to Highway 63 with the quarry property to the north. There is a posted 70 MPH speed limit on 63. Large, heavily loaded vehicles entering the road present a hazard to the traveling public. The Missouri Department of Transportation conceptually identified the need for a climbing lane towards Westbrook as part of a larger plan to improve traffic on this part of Highway 63. This proposal was not taken up for development but was considered. Installation of an acceleration lane by Capital Quarry, under permit with MoDOT, may allow the establishment of this conditional use permit to avoid hindering the flow of traffic or result in traffic congestion on public streets

(g) The conditional use permit shall in all other respects conform to the applicable regulations of the zoning district in which it is located. The County Commission shall find that there is a public necessity for the conditional use permit.

This proposal can, in all other respects, conform to the applicable regulations of the zoning district in which it is located.

Zoning Analysis: This application may meet the criteria for approval of a conditional use permit with appropriate conditions. The presence of residential development is a factor in consideration of criteria (a), (b) & (c). Access to US 63 is a key factor in consideration of criteria (f). The proposed addition of new quarry property to the area brings the issues presented by criteria (a), (b), (c), and (f) to the forefront.

Comments and discussion with the public and the applicant have presented a number of issues for consideration with this request. The effects of expansion of the quarry and the potential for increased blasting have raised concerns about their impact on the lake to the north. The applicant has provided two studies on this issue.

The blasting study discusses the impact of explosives on the dam creating the lake and indicates that the blasts used by the quarry are unlikely to create significant risk to the dam. This study describes the overall difficulty in damaging the dam through an indirect event, such as the blasts at the quarry, and utilizes several increasingly intensive explosive scenarios to describe this difficulty.

The hydrogeological study describes the impacts of quarry operations on the quarry's water supply well and their impacts on the water level at the lake and the surrounding private domestic wells. This study indicates that the expansion of quarry operations and the pumping of groundwater at the quarry is unlikely to have an impact on water level elevations at the lake or the water supply capacity of the surrounding private wells. This is due to the direction of quarry expansion, location of watershed boundaries, and the low and intermittent pumping rates. Additionally, there are no reported water level or well pumping impacts from current quarry operations.

The standards for approval of this conditional use permit can be met with conditions limiting the impacts of quarry operations on surrounding properties.

These facts allow for the conditional use permit to be considered for approval.

The property scored 35 points on the rating system.

Staff recommends approval of the conditional use permit with the following conditions:

1. If the Missouri Department of Natural Resources Land Reclamation Permit is terminated for the area covered by the conditional use permit, the conditional use permit will also terminate.
2. Capital Quarries (CQC) shall limit blasting to a number as determined by the County Commission after recommendation from the Planning and Zoning Commission.
3. CQC would limit blasting to Monday through Friday between 7am-5pm and no blasts would be permitted on New Year's Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day.
4. Neighbors will have the option to sign up for blasting notifications, so they will be alerted prior to the blast event on the day of the blast.
5. All CQC equipment will use white noise backup alarms, as long as CQC is still in compliance with the requirements of the Mine Safety & Health Administration's Code of Federal Regulations 30.
6. All materials excavated from the quarry covered under this CUP request will be crushed and processed within the same site boundaries of this CUP. Crushing/processing hours will be limited from 7am to 7pm, Monday through Friday.
7.
 - a. That CQC will design and construct an acceleration lane, or other constructed traffic mitigation improvement, on Highway 63, as permitted by the Missouri Department of Transportation, to allow for safer interactions between the quarry trucks/equipment and present traffic on Highway 63.

-Or-

- b. That the Planning & Zoning Commission table the Conditional Use Permit until such time as a traffic study is completed to evaluate the traffic impacts and propose proportional mitigation measures as shown by the study.
8. That the CQC will hold quarterly public meetings with nearby property owners to discuss the blasts and their details as described in the individual shot reports. Information provided at each meeting shall include date, location, and seismic data for each blast, and a site map showing the location for each shot in the previous quarter.
9. That CQC document water use and water elevations and provide a yearly report to the Director of Resource Management. This report should include, but not be limited to, records of pumping rate, pumping times, volume of water stored in the subsurface area, and water elevations in the well during pumping and non-pumping conditions.
10. That the conditional use permit be returned to the Planning & Zoning Commission for review at the five-year anniversary of its approval to confirm compliance with the approved conditions.

Present representing the request:

Kurt Oakes, Director of Technical Services, Eleven Point Engineering, St. Louis

Tony Schrorer, Senior Hydrogeologist, Barr Engineering, Jefferson City

Jamie Jones, COO, Capital Quarries,

Chris Thiltgen, Capital Quarries,

Chris Williams, Capital Quarries

The applicant gave four power point presentations, all of which are attached to the end of these minutes.

The applicant also presented a list of definitions, also attached to the end of these minutes.

Presentation # 1 Pages 1-8 – Overview of the Highway 63 North Quarry

Kurt Oakes gave an overview and history of the existing quarry and stated the 2.7-acre parcel in this request is to be used only for stockpiling.

Presentation # 2 – Hydrogeological Assessment

Tony Schrorer stated that Capital Quarries requested that Barr Engineering perform a Hydrogeological Assessment for the proposed quarry expansion to assess the impact of water levels at Lake Champetra and private wells surrounding Lake Champetra. Mr. Schrorer stated that a desktop analysis was completed. Mr. Schrorer stated that the quarry and Lake Champetra are located in different watersheds, and in summary concluded that there is nothing in the data to show that the operation of the quarry will impact the lake or the residential wells.

Presentation #3 – Blasting Operations

Kurt Oakes provided an overview of blasting operations and historical data with what has been done at the quarry. Mr. Oakes stated if you are an operator you have to follow the Missouri Blasting Safety Act and comply with licensing and ensure proper training and experience; Mr. Oakes explained licensing requirements and seismograph limits. The Missouri Blasting limit is 133 decibels (dB), a seismograph, which is required to be calibrated on an annual basis, was placed at 7900 North Shore Drive south of the dam and none of the blasts that took place at the quarry exceeded the decibel limit.

Presentation #4 – Dr. Paul N. Worsley Report

Kurt Oakes: Dr. Worsley was contracted to do a report on the potential effects of blasting on the Lake Champetra dam; the report was prepared in March 2024.

Mr. Oakes stated that the report contains an overview of the Lake Champetra dam, the dam is registered with the US Army Corps of Engineers and is on the National Inventory of Dams. There are emergency action plans in place in the event that one of the dams fail. Mr. Oakes summarized that Dr. Worsley's professional opinion is that the proposed permitting of additional land for mining south of the quarry does not present a risk to the Lake Champetra Dam. Blast vibration levels at the south dam abutment will be at very low levels due to the large/great distances from the blast to the dam.

The permitting of the new land acquisition adjoining the quarry on the south side of its current operations does not present a technical impediment from a blasting perspective. There are homes closer to the quarry than Lake Champetra. The State of Missouri Blasting Regulations limits vibration and sound from blasting. Vibration and sound diminish over distance, therefore the homes in Lake Champetra will experience less vibration and sound than those homes that are closer to the quarry.

Continuation of Presentation #1 page 8-17.

Kurt Oakes continued Power Point Presentation # 1 beginning with page 8.

Mr. Oakes presented information regarding seismograph results from blasting that has occurred at the existing quarry. Mr. Oakes stated he agreed with Dr. Worsley's conclusions.

Commissioner Trecha asked about the ratio of explosive to tonnage of rock.

Kurt Oakes: When those calculated assumptions were made that was based on a taller face versus what the current face height is. When you have a shorter face you can't get as many pounds of explosives in the hole. When you time out the blast we don't shoot the whole shot on the same delay, we time it out in a given sequence in order to manage the vibrations, improve the breakage and fragmentation, and improve the dig-ability of it. We shoot each of those holes in a given designed sequence.

Mr. Worsley was making assumptions because he was unable to do a site visit prior to this report, but he has been on site many times previously. At one point the face was 80-feet tall; they have mined through the ridge top and the face is getting shorter. You can equate power factors two ways, in tons of rock per pound of explosive or in pounds of explosive per cubic yard. In the Worsley report, he used both of those values when he denoted the power factors. A cubic yard of limestone rock is equivalent to about 2.15 tons of rock.

Commissioner Trecha: Was the existing data reviewed or did Vibra-Tech take their own data?

Kurt Oakes: They can do it a couple of ways, they have a remote seismograph and it will have a solar panel on it, the panel has a cell phone and it communicates with the server so that every time the seismograph is triggered it records it. There is also a portable seismograph which is what I was working with the days I was out there. That is an in-hand seismograph that you physically dig a hole and install the instrument. The permanent seismographs are automated and they provide very good, consistent numbers; they are planted in the ground at the same place every time so the factor of human error is much less with a permanent seismograph.

Commissioner Trecha: My question was are the independent monitors hands-on with the equipment or are they just reading data that you provide them?

Kurt Oakes: The permanent units, Vibra-Tech takes that number and analyzes it. Before Vibra-Tech will send a permanent record to Buckley Powder, they do what is referred to as confirming it. If it is a portable unit, Vibra-Tech ensures that the seismograph is calibrated properly and Buckley is responsible for analyzing the seismic data.

Commissioner Trecha: Is Capital Quarries making the data available to the residents in the area?

Kurt Oakes: We have discussed that; that is something we need to assess. We didn't get the staff recommendations until 5:00 pm this evening. I have worked with quarry and mining operations where they will share some of the seismic data with the neighbors.

Chairperson Harris: The applicant had a chart in their presentation that showed some of the highest seismic readings in 2020. Have recent seismic readings been lower?

Kurt Oakes: Correct.

Chairperson Harris: Was this due to a change in the process, monitoring, or blasting approach? Why the differential?

Kurt Oakes: It is due to a reduction in the face height. The face height in the quarry is less now than it was at that point in time because they have worked their way through that taller 80-foot face; they have mined through that already. When Paul made his calculations he was using the worst-case scenario. Currently, the Cedar Valley ledge is a little less than 50-feet.

Chairperson Harris: As the operation moves south, do the applicants anticipate the wall will get higher?

Kurt Oakes: It will be pretty static; if you look at the topographic map for that point it goes off to the south, that will stay pretty consistent and then underlying the Cedar Valley is the Cotter/Jefferson City Dolomite and that is a pretty consistent thickness as well.

Chairperson Harris: In one of the slides you indicated that the drainage area for Lake Champetra is only about 0.9 acre.

Kurt Oakes: 0.93 square miles. There are ridges on each side of the lake and the low side is the side that the dam was constructed on and the surface water won't drain in that direction. It has a relatively small area of influence for surface water to feed the lake.

Chairperson Harris: Looking at the topographic map, with that explanation, is it geographically possible for surface water to come out of the quarry and get to the lake?

Kurt Oakes: No. The Hydrogeological presentation showed the highest peak which was located north of the quarry and south of the dam; there is a divide.

Chairperson Harris: The inch per second (ips) measurement is how fast the vibration moves in any one direction?

Kurt Oakes: Correct.

Chairperson Harris: One of the slides showed some impoundments on the quarry and at that point you were talking about the effect of any vibrations on impoundments on surrounding property, are those impoundments on the quarry dam structures or old pits?

Kurt Oakes: They are dam structures that the State of Missouri assesses on an annual basis through the stormwater permit. They do an inspection to make sure that any stormwater or water onsite is controlled before discharging from the quarry. The slide with the view to the north, that was an area that had been blasted out.

Chairperson Harris: The presentation indicated an average of 14,000 pound charge and a later slide there were examples of 3,000 and 7,000 pound charges; is one of those more typical than the other?

Kurt Oakes: The 14,000 lb charge was Paul doing a worst-case scenario of what it would take in order to achieve a scale distance factor of 55 or lower. Even then, given the ground factors of 160 and a negative slope of 1.6 you would still only get a peak particle velocity of 0.4 ips.

Chairperson Harris: My question was in those three charges one was 11,000 lbs and one 4,000; is there such a thing as a typical?

Kurt Oakes: The 11,000 lb was the total pounds in the entire blast of 53 holes. The 13,000 lbs that Paul made reference to in order to get the 55 scale distance, that is in one individual hole.

Chairperson Harris: How far back are the holes from the high wall?

Kurt Oakes: The typical pattern is a 10 x 11. The 10-foot is the burden; the burden distance is the distance from the blast hole to the free face. The 11 is the distance between holes down a row.

Chairperson Harris: 11-feet?

Kurt Oakes: Yes.

Chairperson Harris: If there are 20 of them down the face of the wall, number 1 will go, then number 2, etc, or 1-20 will go?

Kurt Oakes: We like to time it out. You get better breakage, fragmentation, and vibration results in the event that you shoot them in a single charge; that is where the per 8 millisecond delay comes in. Typically, they are shooting 25 milliseconds per hole down the face. Hole 1 may go at zero, number 2 shoots at 25, number 3 shoots at 50, then 75, 100; they go up in increments of 25 milliseconds. When there are multiple rows, you put enough time between those rows to ensure that the front row moves forward so when the second row starts going off it has void space to move in to; when it has void space you get less vibration and you also get improved breakage because as the second row is moving along with the first row, the second row can be hitting the rock in the first row allowing it to turn over and break even further to make it good digging and good feed through the crusher.

Chairperson Harris: Throughout a big part of the report there is reference to 20 blasting events per year. At one point there is reference to three blasting events per week.

Kurt Oakes: In my experience, rural quarries in the event of a flood are an amazing resource to community safety because if a levy fails or a road gets flooded it is very common place for the road departments to call on the local quarry to get shot rock to build everything up.

Jamie Jones: I would like to add that we can get some smaller shots in there too, they aren't all the 20,000 ton shots as you've seen. There are times when the rock is a little dirtier on top, we will shoot smaller strip shots to get all the dirt and rock that is on top so we can peel that off; those are smaller shots so you aren't doing three, 20,000 ton shots in a week.

Chairperson Harris: But you could.

Jamie Jones: Yes, in theory we would.

Chairperson Harris: The I-70 widening project will end; what is the future for what the intensity and use will be after that project, will it taper off a little?

Jamie Jones: We don't have any material for the I-70 project coming out of this location.

Commissioner Koirtyohann: When this gets going how many trucks per day do you anticipate are coming out of this quarry?

Jamie Jones: We don't anticipate anything different than what we currently have. To our knowledge we don't have anything for the I-70 project. We don't anticipate any influx of material coming from this location to the I-70 project. Right now it is business as usual.

Chairperson Harris: I misunderstood because there has been some discussion that the I-70 project was the reason for this expansion.

Jamie Jones: We would have liked to have that project but I am not saying that something happens and their supply chain falls through but as of right now we have no purchase orders.

Commissioner Koirtyohann: How many trucks come out of there per day now?

Jamie Jones: I don't have that number but we can try to figure it out.

Commissioner Schreiber: According to your DNR permits, what is the permitted number of tons you are capable of producing?

Chris Thilgten: Around 700,000 lbs per year.

Commissioner Schreiber: That is your permit limit, right? What are the hours of operation that are in your air permit?

Chris Thilgten: We put normal operation hours 7:00 am – 5:00 pm.

Commissioner Schreiber: That is what is in the air permit?

Chris Thilgten: They don't hold us to that; they just want to know on average what the operating time is and that is our average operating time.

Commissioner Schreiber: You aren't anticipating an increase in production from this expansion?

Jamie Jones: No. The extra acreage is a supply and demand thing; it just shifts where we take the rock.

Commissioner Schreiber: What is the production capacity of the crusher operation?

Jamie Jones: Our goal is 400 tons an hour.

Chairperson Harris: Is the water that you are using for dust control or to clean before you stockpile and deliver?

Jamie Jones: The majority of it we use to water the roads to be in compliance with our permit. We wash rock there also; that water is recycled.

Kurt Oakes: You have to wash out the fines in order to make the rock neat. If it is base rock it doesn't matter.

Commissioner Trecha: The Hydrogeological study estimates the lake depth at 25-feet and I know it is about 65-feet.

Tony Schrorer: We used the topographic map from the 1960's that show the lower bottom range of elevation for the lake to be around 600-feet above sea level so that is what we based it on.

Commissioner Trecha: A measurement by another resident was up to 90-feet in one area. That gets it close to the potentiometric line.

Tony Schrorer: Where is it 90-feet?

Commissioner Trecha: I don't know, but I know where it is 65-feet. Does that affect the analysis of it being connected because it gets pretty close to that line.

Tony Schrorer: If it was 90-feet, and I believe we already had it listed at 25-feet, that would put another 65-feet down which is still 35-feet less than the 100-foot distance we calculated, so no. It has to be in contact, I am not talking about 2 or 3-feet, it has to be in contact.

Commissioner Trecha: Is the use of the deep well seasonal or year-round?

Jamie Jones: It is not year-round, it is seasonal and typically we are pumping and recycling what we have. I can't tell you right now how much we are using it but it is not even every day.

Commissioner Trecha: But you use it during warm weather?

Jamie Jones: This time of year you would probably use it more.

Commissioner Trecha: When you have 15 or 18 variations in depth by the end of the summer and you said there were no complaints of level changes in the water but there are seasonal changes; I can't say that it is due to the quarry.

Jamie Jones: This well was just done last year; prior to that the water we were using was for circulating water.

Kurt Oakes: Are you talking about 18-inch difference in water levels of the lake or the wells?

Commissioner Trecha: The lake. I don't know if the water levels are due to the quarry or evaporation.

Tony Schrorer: There is less runoff; if you get less supply going into the lake you will see water levels drop. It has nothing to do with pumping from the well.

Commissioner Trecha: Do you plan on mining the dolomite and dropping the floor?

Jamie Jones: Yes.

Commissioner Trecha: How far down?

Jamie Jones: I am not exactly sure what the overall height would be, typically it is around 100-feet total depth so take out the 30-feet we are already down.

Chairperson Harris: Are rock quarries subject to reclamation guidelines and standards like what came into the mining industry? Can you somewhat reclaim portions of the quarry?

Kurt Oakes: You can reclaim portions of a quarry but it is not the same reclamation standards as for coal. With coal you are only going after 18-inches. It is different reclamation standards because in an aggregate quarry, everything that you are shooting you are processing.

Chairperson Harris: The staff report indicated that the quarry was visible in 1956 aerial imagery and the lake was built sometime in the late 1960's to early 1970's. When the lake was built was the quarry active at that time?

Bill Florea: We don't know.

Kurt Oakes: There was a period of time when operations were underground so it is hard to pick it up on a surface image if it is underground.

Chairperson Harris: The standards for blasting today compared to the standards in 1971 I am assuming are more stringent than they were when the lake was built.

Kurt Oakes: They are more stringent but at that point in time the US Bureau of Mines was regulating everything at a given distance away from a structure. If you were greater than 2000-feet away you had 2-inches per second; if you were anywhere from 2000-301 you were limited to 1-inch per second. Anything less than 300-feet or lower you were limited to a lower number. The frequency relationship had not come in at that point.

Chairperson Harris: I assume there is some reason for rock quality that the effort is made to go south of the existing operations. Is there minable material to the north?

Jamie Jones: As you go south you get more of the Jefferson City Dolomite which is more desirable for commercial base rock, road rock, driveways. The Cedar Valley rock is used to make concrete and asphalt rock but it makes terrible base and road rock because it is more sticky and we have to go through a process to clean it up.

Chairperson Harris: Whether it is today or five years from now the desirability of going north is not that good.

Jamie Jones: There is underground to the north as well.

Chairperson Harris: So, there are caverns.

In preparation of the public comment portion of the hearing, Chairperson Harris reminded the audience not to be repetitious with their remarks, time limits may be implemented, and to be considerate and refrain from any personal attacks. If a speaker begins to be unkind their testimony will be stopped. We want to hear everyone out but be considerate.

Open to public hearing.

No one spoke in favor of the request.

Present, speaking in opposition: (No speakers signed in)

Nick Boshard, 7054 E North Shore Drive, Hartsburg

Chairperson Harris: I believe you submitted not one, but two emails?

Nick Boshard: I sent one and my wife sent one.

Nick Boshard: In August 2023, I along with other members of Lake Champetra attended a meeting that was called by Capital Quarries concerning their request for a conditional use permit. The minutes produced of that meeting included with the statement we believe there was quality information given, good discussion and some concerns were alleviated. Nothing could be further from the truth.

Capital Quarries basically told us they were going to blast the rock they needed, that they were a business solely driven by economic demand, and that yes there could be collateral damage to lake assets such as our dam. If we were concerned about that impact our alternative was to bring litigation. In their initial proposal, Capital Quarries also suggested that only the quality of rock would be adequate to meet the needs of the I-70 project. As I learned tonight other quarries were more successful in their bid for that project so obviously that statement was also lacking in truth.

Chairperson Harris reminded the audience to remain considerate.

Nick Boshard: What was not discussed by Capital Quarries at the August meeting were any reasonable conditions that might be placed on their request for a permit. I was pleased that staff has recommended certain conditions. I agree with the suggestion that seismic data provided to residents of Lake Champetra should be one of the conditions. I also suggest that an environmental impact study for expanded operations be conducted by an impartial third-party that is not employed by Capital Quarries. I would also suggest that the Commission consider setbacks to establish a clear buffer zone, although I did note that the revised proposal suggests the blasting operations be pushed further south. It seems to be different than what was proposed in August 2023.

Blasting limits such as the number and size of blasts as well as limits on the number of rock crushing should be considered. Monitoring the air quality related to an increase in debris in and around the lake should be required because in the most recent report it looks like they are proposing to increase production of blasting by almost four times which is different than some of the data presented today which was historical data. Methods should be looked at to reduce noise pollution.

We are concerned as an association about excavating deeper than the lake level because the cavities may be open which could degraded the lake. That was partially addressed by the presentation tonight, but we are still concerned about the blasting going so deep that it creates cavities for the water that would seek a lower level. There is also, in some situations, a transition where for every acre that is added to a quarry an acre is removed from further blasting; that seems to be a reasonable proposal given what has happened to this site over the past 50-years.

We would also think that it would be in order to consider some kind of sunset provision for this permit. If they don't win projects like I-70 what is the purpose in increasing blasting operations at this site? As they said, their operations are based on economic demand and the number of contracts that are awarded. What is the reason to expand the area of blasting if they don't win additional contracts for more rock? I would ask that the Commission review the photos of the Highway 63 site. Obviously you would expect some kind of environmental impact after 60 or 70 years of blasting. Parts of the site can be reclaimed, there are things that can be done to negate the impact of the blasting. I would also ask the Commission to ask themselves what they would do in their neighborhoods if they were by a quarry or similar operation that came to them and said we are proposing to increase our operations by four times and increase the area we blast in and we know how to place blasts, how to remove rock from the earth and basically we are going to do that with impunity. That is

basically what we were told at the August meeting. I don't think I am out of order in saying that because that is what was said.

Rhylee Wynn, Assistant Attorney General for Osage Nation (by phone)

Chairperson Harris: We received an email from Drew Bunton, Director of Missouri Department of Natural Resources, are you familiar with or connected with them?

Rhylee Wynn: I am not associated or affiliated with them, however I know the Nation has been in contact with MoDNR.

Rhylee Wynn: The quarry expansion is set to expand south and in the southernmost quadrant of the proposed location for expansion is an Osage Nation registered burial mound. As you are aware, Missouri State Law requires that any known or reasonably known unmarked burial ground is protected. The mound at the site, listed as 23BO53 is described as partially plowed and located on the edge of the slope of a land form as per all the recordings that have been filed by the Nation. The Nation would ask that either this expansion be curbed to mitigate the disruption of the known burial ground or that there be safeguards put in place so the quarry cannot destroy the existing mound. The application that was submitted for the conditional use permits does not list any type of statement or notification that there is a known burial mound; this is concerning to the Nation and we ask the Commission that there either be safeguards put in place or that the permit be denied.

Paul Collins, 7242 E North Shore Dr, Hartsburg

Paul Collins: I am waiting for meaningful discussion about conditions to be placed on the permit. Staff recommended some good conditions, if those conditions are added there could be some agreement between the Lake Champetra residents and the quarry.

I would like everyone to think about the inequity of risk because if something happens catastrophic in Lake Champetra such as a sinkhole opens and drains the lake, what happens? All the property owners lose their property values but what happens to Capital Quarries? Nothing. There is an inequity of risk and unintended consequences. The residents have an extreme amount of risk and Capital Quarries have very little risk. Litigation takes a lot of money and takes several years to litigate.

Regarding the Hydrogeological study, I am not a geologist but in reading that I was a little more scared reading the report than I was before I read the report. Missouri has a karst terrain where the dissolving of the bedrock has created sinkholes, sinking streams, caves, and springs. Karst is also associated with soluble rock types such as limestone, marble and gypsum. They have been blasting and we have been at risk already, I am glad nothing has happened. There are already 16,000 sinkholes in Missouri at a depth of about 100-feet; our lake is a high as 65-feet, if you do a 100-foot sinkhole there we are already down into the aquifer.

In 2004 there was a 50-foot wide sinkhole that drained 23-acre Lake Chesterfield lake within a few days. It mentioned in the report that we are in that type of area. You just don't know the unintended consequences. They are going to increase excavation by four times where before they said in a 10-year period they did 1,045,000 tons and now they want to up it to 400,000 tons a week which equals 4 million tons over the next 10-year period. By increasing four times they aren't going to use any more water and they won't cause any more problems.

Is the rock crushing going to stay where it is which already causes noise and dust or is it going to move further south? In the Hydrological study submitted with the application, everything that was in the report tonight there is a disclaimer sentence on almost everything that was mentioned. The report includes the words, approximate, estimated, unlikely, appears and assumed. It says conditions may change seasonally. Talking about groundwater flow they said it is likely disconnected from groundwater it doesn't say it is absolutely

disconnected. It says values can vary. If you go to the limitation of the desktop there is no measurement of Lake Champetra from the water side. In their limitations of desktop review, read the last three bullet points. The conclusions and opinions expressed in this report are based on a review based on the documents listed in Section 2.1 as well as the education, training and expertise of the licensed professional engineers and geologists. I have no problem with their qualifications. These conclusions and opinions are based on the information that has been provided to Barr at this time and may be modified or supplemented if new information becomes available. They are already saying they have incomplete information and they say that throughout the report, they say there is a lack of site-specific information multiple times throughout the report. There are a lot of things presented as absolute fact and if you read the report and look to those ambiguous words you'll find out that they are not absolute fact, there are disclaimers on almost all of them.

Carl Steinhaus, 7900 North Shore, Hartsburg

Carl Steinhaus: When the quarry is blasting the house shakes and the windows rattle. I made several complaints, so I wonder why that didn't get registered. I have cracks in my drywall. We get noise at night. Well water is a concern, there are about nine of us on well systems. Who is going to test it? What happens if the well goes bad?

Veronica Marian, 7332 North Shore Dr, Hartsburg

Veronica Marian: I am the President of the Homeowners Association. I appreciate the staff conditions but we are opposed to the expansion because we need protection for our neighborhood. We hear and feel the blasts and there is constant noise from the crushing of rock and the backup vehicles; the noise travels up the hill and across the water and it seems like it increases. We feel that an expanded quarry is going to increase what we have to live with which is reduced quality outdoor time.

We are glad there are hours of operation because right now there are no limits to curtail the rock crushing, the screening of equipment, the backup noises you hear from the equipment and dump trucks. There is no current limits on the number of times they can blast, the frequency, the time of day or the size of the blast. They work 24-hours a day and on the weekends and holidays. We've heard the activities before 6:00 AM and after 11:00 PM. We oppose this request and feel there needs to be more reasonable protections on our property because as you've heard, the risk is ours.

Commissioner Harvey asked staff to read the recommended conditions.

Uriah Mach read the conditions.

Brian Treece, 6950 North Shore Dr, Hartsburg

Mr. Treece presented an aerial photo of the quarry and Lake Champetra.

Brian Treece: I am a past president of the Homeowners Association and a member of the Missouri Highway and Transportation Commission. I think we have gotten in the weeds with academic studies and blasting data; I think where the divide exists is on the size and frequency of the data. Dr. Trecha did a good job pointing out that their own experts says they need to have about 20 blasts per year. Their historic data has been around 89 blasts since 2019, or 17.8 per year. I don't know why they would want as much as three blasts per week.

I live the furthest away from the quarry and just last Tuesday I was mowing the grass with a three year old Briggs and Stratton engine and I could hear the blast over the sound of my lawnmower and could feel the pound in my chest and the reverberation when the energy bounced off the hill beside my house and came back, hit me again and rippled the lake. Having that three times a week becomes a nuisance and a detraction.

When I was President of Lake Champetra in 2014, APAC requested a conditional use permit to set up a temporary asphalt plant to resurface Highway 63. As president, the association, and Joe Pool at APAC and Shawn Riley were able to negotiate a mutual accommodation when it came to noise buffers, nuisance, odor attenuation, sound attenuation and other offsets commensurate to the impact on our neighborhood. That conditional use permit also expired when the project was substantially completed.

A conditional use permit without any conditions is just an unlimited permit and that is not what the county ordinance envisions. Lake Champetra was established about 50-years ago, the first houses were built in 1971 or 1972 and the lake reached full pool in 1973. The first conditional use permit was granted to the quarry in 1974. Our neighborhood has grown and matured since then, there are about 48 houses there that are valued from \$350,000 up to \$2,000,000. There are scores of outdoor activity, we live outside; we hike, waterski, float, boat and recreate outside. Most of our houses, if you've ever lived on a lake, the backdoor is our front door and we all face our neighbors and it is a great neighborhood. The approval of this permit without any conditions for a 24-hour day/7-day a week operation would be detrimental to the public health and safety of the neighborhood, it would be injurious to the use and enjoyment of our property that is already permitted and existing during the life of the quarry. It will also diminish the property values of existing properties.

This should be considered a separate and new condition of approval, not an expansion of the existing quarry. These conditional use permits run with the land; this is new land. I think the neighbors existing use has to take priority over the applicants proposed use. For the most part, these two entities have peacefully coexisted for the last 50-years. Up until the last couple of years there has been an uptick of activity there, my experience with APAC was very positive.

I agree with the subject and content of staff's recommendations; I think there are some tweaks and a couple of additions I would make. The first condition regarding the land reclamation permit, it is unclear if it is talking about the existing permit or the proposed one tonight. I would suggest an acre for acre; if you grant them a 57-acre conditional use permit they should retire 57-acres closest to the neighborhood and make that a clearly defined buffer zone. There are no fencing requirements or perimeter requirements; that is a matter of safety between our neighborhood and our adjoining neighbor to make sure they can't mine right up to Mr. Steinhaus's property line.

There was an accident on Highway 63 this morning and a second one this afternoon at the Westbrook exit; there are trucks pulling out of there and they are loaded down, there is no acceleration lane or climbing lane, they are in the driving lane of traffic. Before you move forward I think a traffic study and improvements in place are necessary to protect the traveling public.

I don't understand the sense of urgency, their own mining permit contemplates a time of 7:00 to 5:00 or 8:00 to 5:00; it seems to me having some consistent standard over not just blasting but their operations, crushing and screening within normal business hours Monday through Friday, excluding holidays gives neighbors the reasonable expectation that they can have periods of no blasting and relative tranquility during the evening hours. It is not unusual to see boats on the water promptly at 6:00 when people come home from work. As late as 7, 10, 11 last night people were complaining about hearing the rock crushers.

Having a phone number of someone to call would be nice, we've never met these people and as far as I know they have never been at the lake to hear our concerns and have any type of authentic engagement over our concerns. Transparency would go a long way. Having an independent seismologist report that data in real time to the neighborhood to those who want to opt in for it; let us get it the same time the quarry is getting it from whoever it may be is going to keep everyone honest as to the size, frequency and impact of the blasts. That is going to be the best way to ameliorate the concern.

I was surprised to hear the testimony from the Osage Nation, I am not surprised by what she said; there is significant Native American archeology in this area; the former Director of DNR owned 80-acres across the

street from me and has documented a Sac and Fox Indian burial ground. If you read far enough into the Lewis and Clark journals they sent a team of three men up the Little Cedar Creek bordering this area. With my time on MoDOT and historic preservation reminds me that anything that is paid for in whole or in part by Federal funds requires a Section 106 review (*see staff note below); that is probably the letter you received from DNR to that effect.

You have to avoid segmentation, back in August the applicants submitted a plan for a 499-acre mega-quarry; we are glad that didn't go through but if that is their intent then I think county planning staff needs to know that so that they can plan accordingly to plan for those potential impacts but you can't break up a system that would have otherwise triggered a 106 review into smaller pieces in order to avoid that review.

When I was in the Commission's position, I would defeat this application and give the neighbors the ability to negotiate with the applicant and come back with a plan that is better than the one than this one. We aren't being unreasonable, we just want basic neighborhood protections to mitigate the noise, light, blasting and the impact to our neighborhood. I ask that the Commission table this request for the maximum number of days to get the clarification on the blasting and hydrogeological studies and clarification on the 106 review and have further conversations with DNR.

**Staff Note: Section 106 Review – Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to take into account the effects of their undertakings on historic properties, and give the Advisory Council on Historic Preservation a reasonable opportunity to comment – per USDA Rural Development, US Department of Agriculture website: <https://www.rd.usda.gov/programs-services/all-programs/water-environmental-programs/section-106-review-basics>*

Closed to public hearing.

Commissioner Koirtyohann: Are the applicants working 24-hours a day?

Jamie Jones: Not right now, no.

Commissioner Koirtyohann: What are your hours of operation?

Jamie Jones: It is supply and demand. There was a time last year that we ran 24-hours a day for a few months.

Commissioner Kurzejeski: I am under the impression of a four-fold increase in the number of trucks leaving the place every day; listening now, I hear there won't be an increase?

Jamie Jones: I am not going to say that it will never increase. I am just saying that right now there isn't a change.

Commissioner Kurzejeski: You don't have a contract that you have to fill that you have to require that now?

Jamie Jones: No. We have the normal everyday stuff; there is concrete rock that we supply into the market and other things. As of right now there is no expected increase but I don't want to say there won't be a MoDOT project sometime in the future.

Commissioner Kurzejeski: The expansion is the expansion of the area that could be quarried but not necessarily an increase in expansion of the operations?

Jamie Jones: Correct.

Commissioner Kurzejeski: We were pretty much told it was for the I-70 project.

Jamie Jones: When we met with the neighbors we brought that up but that was a long way out and as of right now we don't have any of that material. We don't currently have any of it, but nothing is to say that two years into the project if there is an issue with their current supplier they may need us to provide it.

Commissioner Kurzejeski: I understand that; I am just trying to get my head around exactly what this request might entail in terms of increased production, traffic, and blasting.

Commissioner Schreiber: Do you have an annual limit in your air permit and if so, what is it?

Chris Thilgten: 700,000 tons.

Chairperson Harris: Realistically speaking, what is the possibility to reclaim any of the existing area to make it look better and let it grow back? What is the likelihood that the northern end where the underground mining took place would ever come back as surface mining?

Jamie Jones: We honestly don't know. We don't know enough about that area to even be able to go into it. We've tried to map some of it out but right now it is too dangerous an area for anyone to be on top of or inside of. I noticed on staff condition #9 it mentioned volume of water stored in the subsurface area; in the area we are talking about for this conditional use permit there is no subsurface water so there are some things that don't pertain to the area in question.

Chairperson Harris: Is it possible to reclaim anything there?

Jamie Jones: We have to permit everything though DNR but everything is permitted and there is a land usage setback; we have to post a bond to do it and we don't get our bond back until that area is reclaimed. There was one area by Mr. Steinhaus's property, that is not anything that we ever disturbed or have any intention of going into; he was asking about reclaiming or something, we don't even have that area permitted. If we permit an area then we have to reclaim it back but right now we don't have any intentions of being in that area.

Chairperson Harris: One of the most concerning things is the burial grounds and the impact; the applicants will have to deal with it.

Jamie Jones: That is the first we have heard of this. We went through the DNR process and this area in question is already in our DNR permit and DNR has not raised this question.

Kurt Oakes: She made reference to the site being on a hillside. I don't know where that might be located.

Commissioner Kurzejeski: I wondered that as well.

Kurt Oakes: Those sites are not public record.

Chairperson Harris: How does DNR go through the permitting process with any credibility on their part and fire off a letter two days before this meeting to inform the applicants of this issue? How did they give you a permit?

Commissioner Schreiber: Because someone notified them of it.

Chairperson Harris: Someone from DNR didn't do their homework. Those sites are to remain unknown but that is something the applicants will have to work around.

Jamie Jones: Absolutely, we will have to do some research and find out more details.

Chairperson Harris: To have this sprung on the applicants tonight, no one better hold your feet to the fire timewise on that.

Commissioner Harvey: Should we table this until next month and get a more concise list of conditions?

Jamie Jones: Can we work through as much as we can tonight? We received these conditions at 5:00 PM so we haven't had a chance to formulate a response to them.

Chairperson Harris: The crusher operation and white noise versus the beepers on the equipment. If you were to expand to the southern area is the crusher going to stay where it is or will it move?

Jamie Jones: It would stay there, it is a fixed structure. You have all the infrastructure, concrete, three-phase electric and wash plant there.

Chairperson Harris: There is still a lot of confusion and inconsistency on the number of blasts that you might need. The 20-blasts per year are the big blasts, how often are the overburden blasts, are they even noticeable and can people hear and feel them?

Kurt Oakes: Whenever you blast there will always be some level of vibration and air overpressure just from the displacement of the material but when it is a smaller blast for shooting overburden in some instances you could get a higher level of air overpressure because it is weathered material and that energy vents out between the bedding. We do everything we can to minimize the air overpressure; it can be managed. I have been involved in the Moberly area with an old underground limestone operation where about 12 years ago we took out the pillars in order to get the rock in that area to supply the concrete market up there. It can be done as long as it's done safely.

Commissioner Trecha: I have seen that underground area and there are sinkholes and it is flooded. I don't know how you would address that problem. I thought it was a natural barrier for expansion to the north. I would like the applicants to consider some sort of assurance or buffer zone.

Kurt Oakes: There is a lot of confusion related to the expansion of the quarry meaning expansion of production and from my understanding of things that is not the case. It is supply and demand and this additional plot of land is reserves to supply the market in this area.

Commissioner Kurzejeski: Was any outreach made to neighbors outside of Lake Champetra? I see houses closer to the east and west.

Jamie Jones: We have not; I know the neighbor to the south had blasting concerns. Keith Henderson with Buckley Power, who is not here tonight went out and met with him to discuss issues he was raising.

Commissioner Kurzejeski: Relative to that, in my opinion, if buffer zones are good for one it is good for all.

Chairperson Harris: Is there any point of comparison to say that one blast would register what on a Richter scale?

Kurt Oakes: It is a very different correlation because there have been some analysis made between traditional TNT and an earthquake like a magnitude 1 point Richter scale on a magnitude of 1.0 and for that equivalency it is a matter of well over 3 million pounds and even then it is on a logarithmic scale as that number gets higher in the 8507 curve, that is on a logarithmic scale of 10. Sound travels at a logarithmic scale of six so that actual number is mindboggling. It is similar to when Dr. Worsley did the analysis on the earthen dam and he was

equating it to a small nuclear blast, it could go off in this parcel of property and it still would not affect the integrity of the dam. It would destroy all the homes around the dam but the dam would still be there.

Chairperson Harris: Not much focus has been made on the 2.7 acre tract; what is the proposed use for that tract?

Jamie Jones: It is more to get the whole property in the permit.

Chairperson Harris: There won't be an entrance from the highway to that?

Jamie Jones: No.

Kurt Oakes: It is just to tie everything in because that tract is not permitted.

Commissioner Martin: Do the applicants understand the conditions?

Kurt Oakes: Uriah was able to get those to us late this afternoon.

Commissioner Martin: Are the applicants okay with the conditions?

Jamie Jones: We haven't had time to fully go through all of these but #6 stating that all materials excavated from the quarry covered under this request will be crushed and processed within the same site boundaries of the permit. We intend to keep our plant where it is; you couldn't sit your plant on top of what you are trying to take out and it wouldn't be feasible to move the plant there, we would have to excavate material before we could even move the plant there so we would be in violation of our conditional use permit before we ever started. Our intention would be to mine this property and bring the material back to the plant.

Commissioner Koirtyohann: What is the noise level of the crusher? How many decibels?

Jamie Jones: I am not sure. Typically, the loudest thing we run into is the backup alarms, that has been our issue in the past which is a requirement. That was one of the things about going to white noise backup alarms.

Kurt Oakes: MSHA (Mine Safety & Health Administration) requires a certain level of decibels a distance away from the equipment; it is required.

Commissioner Kurzejeski: The condition indicates that white noise backup alarms are required as long as they are in compliance with MSHA. Do we know if white noise is in compliance?

Jamie Jones: We have used them in the past and been able to get them to work but there is some gray area with some inspectors. Our goal is to try to use something with white noise or else minimize the effects of a backup alarm.

Commissioner Koirtyohann: Can the Commission grant a conditional use permit after hearing about the Indian burial ground? If we issue it what are the consequences to the Commission?

Bill Florea: That is not the Commission's responsibility.

Chairperson Harris: No, they will have to comply with any regulations.

Bill Florea: The owner is aware of it and it could be stipulated as notice in the Conditions of Approval.

Chairperson Harris: When did Capital Quarries put the quarry into full operation?

Jamie Jones: We have been there in the past, left and came back; over the last 3-4 years we have ramped up production.

Chairperson Harris: There was a comment made earlier that it had been dormant for a while.

Jamie Jones: There was a time period sometime years ago.

Commissioner Kurzejeski: Do the recommended conditions apply to the entire operation or just to the extension.

Jamie Jones: It only applies to the 57-acres in question tonight. If we are going to install white noise backup alarms we will put it on all the equipment that is operating on the site.

Commissioner Kurzejeski: But you can keep blasting on the other site outside the hours of operation?

Jamie Jones: Typically, you aren't going to have any blasting outside of those hours anyway.

Chairperson Harris: The crushing hours wouldn't apply.

Jamie Jones: That is my understanding.

Bill Florea: That is why staff recommended that the material would have to be crushed on this site because we were aware that there might be a work-around to avoid the restricted hours of operation on the crusher by just moving the rock to a different site and crushing it there where the restriction didn't apply.

Chairperson Harris: That might not be feasible to stay in compliance with the land disturbance permit.

Jamie Jones: It goes back to the size of that property, even if you had it leveled off to sit the crusher on it is not big enough how that wedge shape is there to go mine it and plus with the DNR permits and you also have proximity to your property lines that you have to meet to be in compliance with the permits and adjust your tonnage on what you are allowed to do.

Commissioner Kurzejeski: If neighbors sign up for blasting notifications, does that only apply on the 57-acres or on the whole operation?

Bill Florea: Only on the 57-acre.

Kurt Oakes: I would agree with the whole operation; that is a good level of trust building.

Commissioner Kurzejeski: Do the hours of operation apply to only the 57-acres or the whole operation?

Bill Florea: You have a permit that is defined by a geographic area.

Commissioner Kurzejeski: Part of the conditions could be that the remaining operations also fall in compliance with these conditions.

Bill Florea: I don't think the Commission can do that; the existing operation is not part of tonight's proceeding.

Commissioner Harvey: The applicants could agree to it.

Bill Florea: Yes they can but it doesn't mean the county can enforce it.

Commissioner Schreiber: I reviewed all the permits that have been issued, those permits are a result of an application; we don't know all the information. There are also existing permits for the area that is not subject to tonight's activity that has limits for all the existing operations. I think we need to take a holistic approach to this and look at the conditions of both the old and new permits and make sure we understand what we are permitting but I have a feeling they have existing limitations that would concur with what we are proposing to do.

Chairperson Harris: For tonight our focus has to be on the 57-acre request; anything else that is going on is under existing permits and can go on until they run out of rock in that existing area with no change at all. If the Commission were to approve this and the applicants wanted to do something out of courtesy in general operation perspectives but in fairness we can't cross anything that exists with anything that doesn't exist.

Chairperson Harris asked the applicants if they wanted the Commission to take action tonight or if they wanted to table the request until they had time to review the conditions.

Kurt Oakes: It would be nice to review the turning lanes; the Indian burial grounds caught all of us by surprise. Dealing with Indian burial grounds is a rather arduous process, however it is a respectable process and we want to respect and ensure that we are doing the right thing because this operation is an investment and it is a long term investment that Capital Quarries wants to continue use of because it is a critical location. That unknown warrants the ability to digest.

Chairperson Harris: At this point the Commission can take action and move that we table the request until next month's meeting and we can take it up then.

Bill Florea: The Planning & Zoning Commission will not hold another public hearing; it will take place in a public meeting but there will be no opportunity for public comment.

Commissioner Harvey made, and Commissioner Koirtyohann seconded a motion to table the request by Land Investments LLC and Stadium West Properties for a conditional use permit for a quarry in the Agriculture 2 (A-2) zoning district on 57.27 acres located at 24000 S Hwy 63, Hartsburg until the July 18, 2024 meeting:

Boyd Harris – Yes	Eric Kurzejeski – Yes
Greg Martin – Yes	Steve Koirtyohann – Yes
Randal Trecha – Yes	Kevin Harvey – Yes
Robert Schreiber – Yes	Christy Schnarre – Yes
Jeff McCann – Yes	

Motion to table the request passes unanimously

Chairperson Harris stated that this request would return to the Planning & Zoning Commission at the Thursday, July 18, 2024 meeting.

Chairperson Harris informed the audience that the public hearing before the Planning & Zoning Commission has been completed and that there would be no public hearing for this request at the July 18th meeting.

X. OLD BUSINESS

1. Update on Commission action

The Conditional Use Permit by Missouri Soybean Association was approved as recommended.

The Rezoning Request by RML Investment Properties and Review Plan for Concorde South Plat 1B was approved as recommended.

The Rezoning Requests and Review Plan by IUVO Constructum for lots 201 & 243 Oak Hill Estates was recommended denial by the Planning & Zoning Commission in April 2024. The applicants appealed the decision to the County Commission who approved the requests.

The Plats for Jacobs Ridge Subdivision Plat 2 was approved and accepted.

XI. NEW BUSINESS

None.

XII. ADJOURN

Being no further business, the meeting was adjourned at 10:20 p.m.

Respectfully submitted,

Secretary
Greg Martin, Secretary

Minutes approved on this 16th day of May 2024



Presentation Definitions

Subject: Capital Quarries HWY 63 North Hydrogeological Assessment
Date: June 20, 2024

Alluvium: A deposit of clay, silt, sand, or gravel left by flowing streams in a river valley or delta.

Aquifer: A body of rock that is sufficiently permeable to readily transmit ground water to wells and springs.

Cone of Depression: A low point or depression in the potentiometric surface of a body of groundwater, which has the shape of an inverted cone and develops around a well from which water is being withdrawn.

Drawdown: The lowering of the water table or potentiometric surface caused by the extraction of groundwater by pumping from a well.

Evaporation: The process of turning liquid into gas or vapor.

Hydraulic Conductivity: A measure of how easily water can pass through soil or rock.

Hydrologic Balance: An accounting of the inflow to, outflow from, and storage in a hydrologic unit such as a drainage basin, aquifer, soil zone, lake, or reservoir; the relationship between evaporation, precipitation, runoff, and the change in water storage.

Porosity: The quality or degree of having minute spaces or voids through which liquid or air may pass.

Potentiometric Surface: An imaginary surface representing the total head of groundwater and defined by level to which water will rise in a well.

Precipitation: Any liquid or frozen water that forms in the atmosphere and falls back to the earth.

Recharge: The primary method through which water enters an aquifer.

Residuum: Weathered rock that is not transported by erosion, contributing in time to the formation of soil.

Steady State: A flow condition under which the pressure at any point in the reservoir remains constant over time. Inflows and outflows are perfectly balanced.

Watershed: An area of land that drains all of its water to a specific lake or river.

Water Table: Upper level of an underground surface in which the soil or rocks are permanently saturated with water.

Unconsolidated: Soil material that is in a loosely aggregated form.

Unsaturated Zone: The portion of the subsurface above the water table.

Boone County Planning & Zoning Commission

Conditional Use Permit Application Hearing

Land Investments, LLC and Stadium West Properties

dba, Capital Quarries - Hwy 63 North Quarry, Hartsburg, MO



**CAPITAL
QUARRIES**

Quality Aggregates for the Construction Industry

Date: 20 June, 2024

**Boone County Government Center
Boone County Resource Management
801 E. Walnut
Columbia, MO**

Items for Presentation and Discussion

- “Hydrogeological Assessment of the Hwy 63 North Quarry”

Mr. Tony Schrorer, PG – Senior Hydrogeologist
Barr Engineering – Jefferson City, MO



- “Blasting Operations at the Hwy 63 North Quarry”

Mr. Keith Henderson – Technical Manager
Buckley Powder Company – Hermann, MO



- “Report on the Potential Effects of Blasting from the Hwy 63 North Quarry on the Lake Champetra Dam”

Dr. Paul N. Worsey, PhD (Professor Emeritus)
Missouri S&T – Dept of Mining & Explosives Engineering
Worsey & Associates – Principal/Partner



- “An Overview of the Highway 63 North Quarry”

Mr. Kurt B. Oakes – Director of Technical Services / Partner
Eleven Point Engineering & Consulting – St. Louis, MO



Overview – Highway 63 North Quarry

- Quarry began operation in the 1960's – Adrian Brothers
 - Both Surface and Underground
 - Underground inactive for many decades prior to Capital ownership
- Capital Quarries purchased the Rights to the quarry from the Adrian Family in 1993
- Capital Quarries has purchased the 55 acres adjacent to the south property line of the quarry for the extraction of limestone reserves
 - ~42 Ac titled under Land Investments, LLC
 - ~13 Ac titled under Stadium West Properties
- An ~ 2.7 acre parcel adjoining the operation to the west-northwest for stockpiling
- Distance from the south end of the Lake Champetra Dam to the northern boundary of the 55 acre parcel is ~ 6,500 feet
- Distance from the southern boundary of the 55 acre parcel to the nearest neighbor is approximately 800 feet.



**Existing
Highway 63 North
Quarry Operations**

**~55 Acres purchased for the
extraction of limestone reserves
for aggregate production
agricultural use**

**Land Investments, LLC
42 Acres
Stadium West Properties
~13 Ac and ~2.7 Ac**

~2.7 Ac for stockpile usage



**View looking south - southwest
from the east highwall of the
Highway 63 North Quarry
UAV image**

**Picture of the quarry floor,
after extracting the
Cedar Valley Limestone ledge**



**View looking north
from the east highwall of the
Highway 63 North Quarry
UAV image**

**Picture of the quarry floor,
after extracting the
Cedar Valley Limestone ledge
As well as an area of underlying
Cotter / Jefferson City Dolomite**

Overview – Highway 63 North Quarry

Introduce; Geology and Hydrogeology

Tony Schroer – Sr. Hydrogeologist, Barr Engineering for Hydrogeological Presentation

Blast Management and Vibration

Keith Henderson – Technical Manager, Buckley Powder Co. for D&B and Vibrations

Assessment of Blast Effects on the Lake Champetra Dam

Kurt Oakes to present Dr. Paul N. Worsley, Worsley & Assoc. for Lake Champetra Dam

Independent Assessment of Blast Effects in the Surrounding Community

Kurt Oakes – Technical Services Director, Eleven Point E&C for Overview and Close



**View of blasted Cedar Valley Ls
muck pile from the south end
of the east highwall of the
Highway 63 North Quarry**

Date; 15 April, 2024 @ 10:46am

**This blast of ~15,833 tons,
utilizing 11,134 lbs of explosive
did not trigger the seismograph
which was set-up on
the south end of the
Lake Champetra Dam**



**Seismograph Set-Up
South end of Lake Champetra Dam
For two blast events at
Highway 63 North Quarry**

**Date; 15 April, 2024
Blast #1 @ 10:46am
Blast #2 @ 1:32pm**

No Trigger for either event

**Trigger Level Setting:
0.030 in/sec PPV
112dB Airblast**



Seismograph set-up in accordance with ISEE Seismograph Set-Up Guidelines



**Blast #2 @ 1:23pm on 4/15
of ~6,372 tons
Utilizing 4,102 lbs of explosive
did not trigger the seismograph
which was set-up on
the south end of the
Lake Champetra Dam**



**Blast #3 @ 10:58am on 4/23
of ~11,278 tons
Utilizing 7,519 lbs of explosive
did not trigger the seismograph
which was set-up on
the south end of the
Lake Champetra Dam**



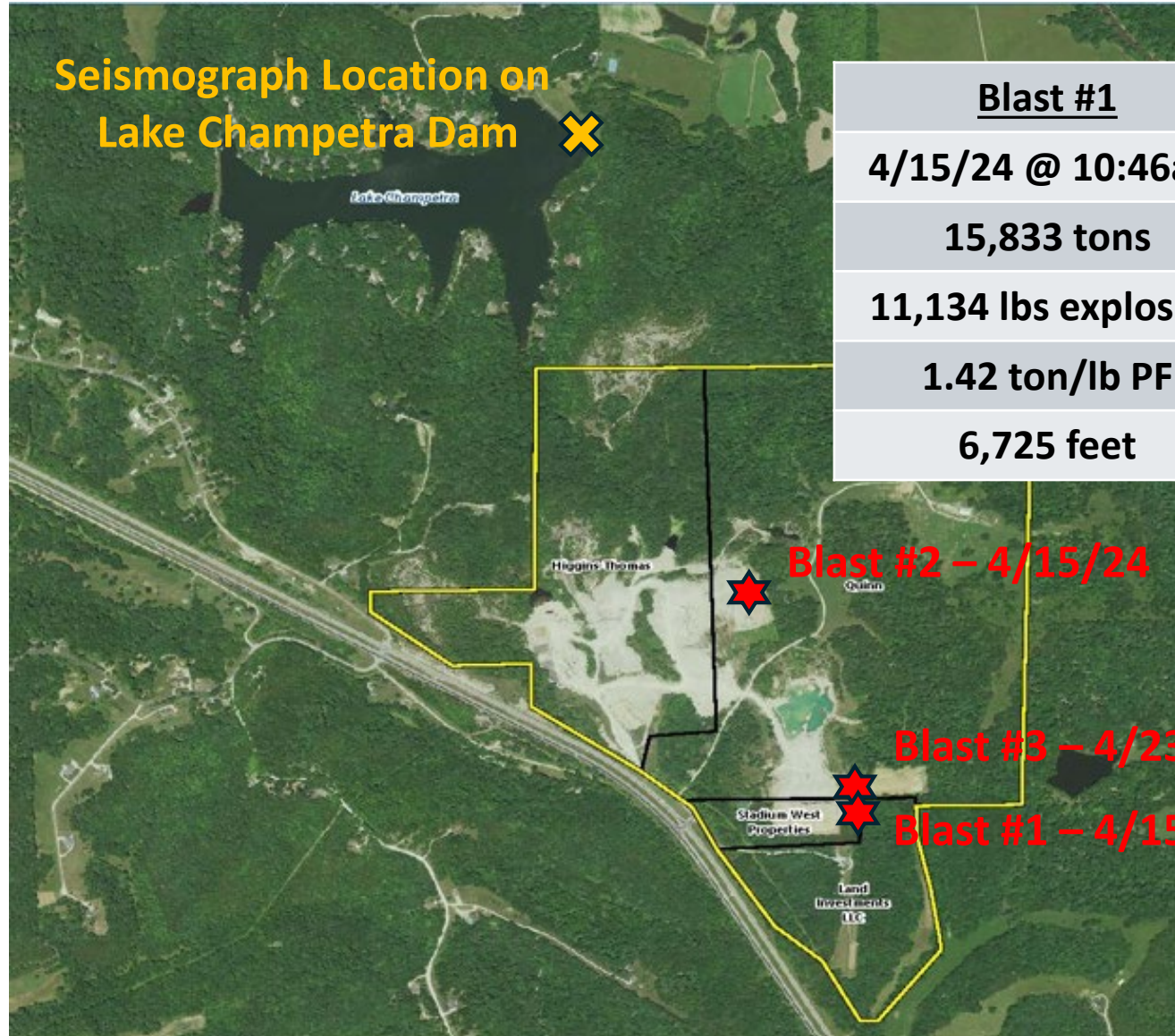
**Trigger Level Setting:
0.010 in/sec PPV
110dB Airblast**

**No Trigger Screen
on seismograph**

Blast Data @ Lake Champetra Dam

Seismograph Location on Lake Champetra Dam ✕

<u>Blast #1</u>	<u>Blast #2</u>	<u>Blast #3</u>
4/15/24 @ 10:46am	4/15/24 @ 1:32pm	4/23/24 @ 10:58am
15,833 tons	6,373 tons	11,278 tons
11,134 lbs explosive	4,102 lbs explosive	7,519 lbs explosive
1.42 ton/lb PF	1.55 ton/lb PF	1.50 ton/lb PF
6,725 feet	4,445 feet	6,567 feet



Blast #2 – 4/15/24

Blast #3 – 4/23/24

Blast #1 – 4/15/24

Stop Event Report – 4/15/24 @ Lake Champetra Dam

GeoSonics Inc. Seismic Analysis Stop Event Report

Serial No:	28120 v5.29	Begin Date:	04/15/2024 09:08:43
Client:	CAPITAL QUARRIES	End Date:	04/15/2024 13:39:53
Operation:	63 North	Events over Trigger:	2 (6-7)
Location:	Lake Champetra	Record Time:	10.0 s
Distance:		Seismic Trigger:	0.030 in/s
Operator:		Sound Trigger:	112 db
Comment:		Battery Level:	8.5

Additional Info:

Shaketable Calibrated: 05/15/2023
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40299 U.S.A.
TEL: 502.240.9900 FAX: 502.240.9902

Dynamic Calibration Graph:



Cal Test Results:

Longitudinal:	Pass
Transverse:	Pass
Vertical:	Pass
Sound:	Pass

Stop Event Report documents that the seismograph had been set-up and functioning at the time of a given blast in the event the vibration or air overpressure was not sufficient to trigger the seismograph

Stop Event Report – 4/23/24 @ Lake Champetra Dam

GeoSonics Inc. Seismic Analysis Stop Event Report

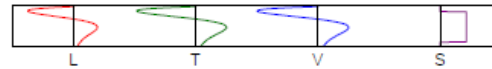
Serial No: 28093 v5.25
Client: 2
Operation: 63 North
Location: Lake Champetra
Distance:
Operator: KURT OAKES
Comment:

Begin Date: 04/23/2024 10:25:12
End Date: 04/23/2024 11:06:38
Events over Trigger: 0 (40-39)
Record Time: 10.0 s
Seismic Trigger: 0.010 in/s
Sound Trigger: 110 db
Battery Level: 8.3

Additional Info:

Shaketable Calibrated: 12/06/2023
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40299 U.S.A.
TEL: 502.240.9900 FAX: 502.240.9902

Dynamic Calibration Graph:






Cal Test Results:

Longitudinal: Pass
Transverse: Pass
Vertical: Pass
Sound: Pass

Notes;

Start Date and Time
Stop Date and Time
Trigger Levels for ppv & airblast
Length of Record Time
Performs a Calibration Test to ensure functionality
Notes required Annual Calibration Date

Professional Thought on Dr. Worsley Conclusions

-  The proposed permitting of additional land for mining south of the Capital Quarries Highway 63 North Quarry does not present a risk to the Lake Champetra Dam.
 - **AGREED**
-  Blast vibration levels at the south dam abutment will be at very low levels due to the large / great distances involved, as a result only a small fraction of the permitted levels by the US Army Corps of Engineers on their blasting contracts near dams.
 - **AGREED**
-  The permitting of the new land acquisition adjoining Capital Quarries on the south side of its operations at the Highway 63 North Quarry do not present a technical impediment from a blasting perspective. The current State of Missouri Blasting Regulations protect nearby structures located a fraction of the distance away from that of the dam to the new permit area. These structures act as an additional buffer for Lake Champetra from any blasting vibrations.
 - **AGREED**

About Kurt B. Oakes

- Kurt B. Oakes, BS in Mining Engineering, Univ. of Missouri – Rolla (MO S&T) Graduated 1985
- First eleven years were in mine operations and engineering, both surface and underground, prior to professional emphasis on explosives engineering and drilling & blasting discipline
- He has held blast licensure in the states of: AR (DoL & DEQ), CO, IA, IL, KS (Unlimited), MN, MO, NC, NV, OK, WI (Unlimited), & WY
- Assisted with the development of and initial legislative passage for Blaster's Licensure in the states of Arkansas and Iowa
- Approved for Instructing Blaster's Training Certification in AR, IA, KS, MO, & NV
- USDoL - MSHA Part 48 Certified Trainer – Surface & Underground ("Blue Card" holder)
- Served seven years on the Board of Directors for the International Society of Explosive Engineers (ISEE), Elected by an international membership to three terms, 2015 – 2022
 - Chair of the ISEE Blaster's Training Committee 2018 – 2022
 - Board Liaison to the Seismic Section, and Standards Committee
 - Current Chairman of the ISEE Drilling Section (2-year term)
- 1999 Recipient Young Scientist of the Year Award by the Society of Mining Engineers
- 2016 Elected to the Missouri S&T – Academy of Mines & Metallurgy

Thank You for your time and Attention

Any Questions...?



Take Care, Be Safe!



Capital Quarries - Highway 63 North Quarry Hydrogeological Assessment



Tony Schroer, PG
Jefferson City, MO

Boone County Planning &
Zoning Commission Meeting

June 20, 2024



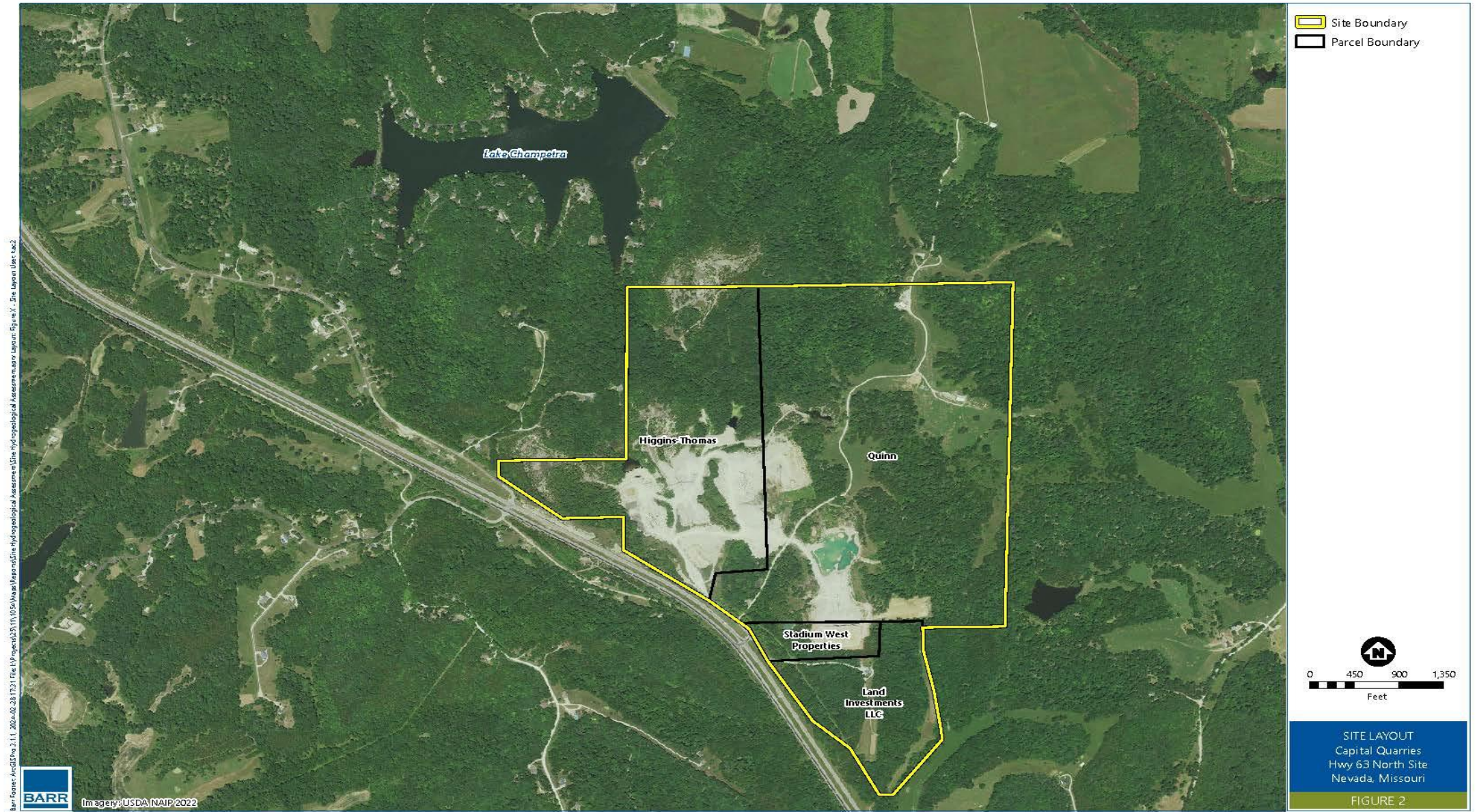
Hydrogeological Assessment Objectives

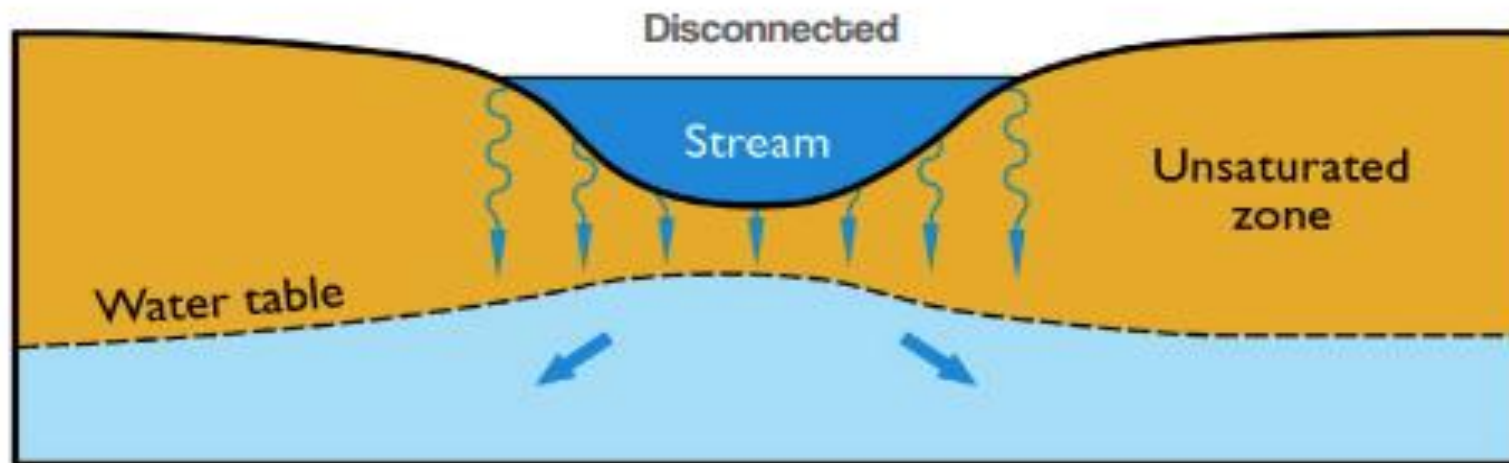
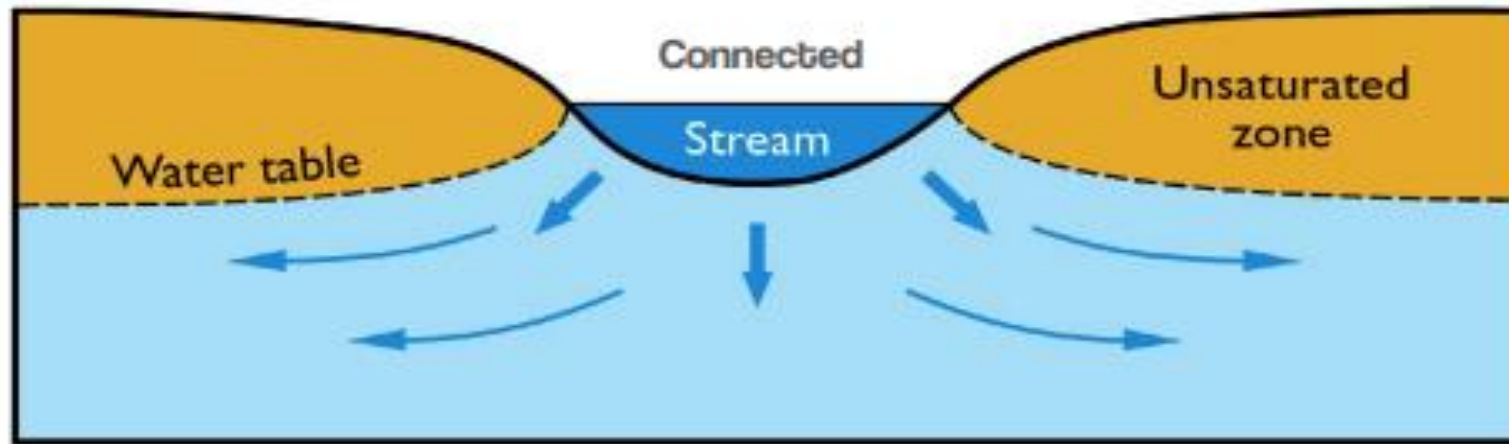


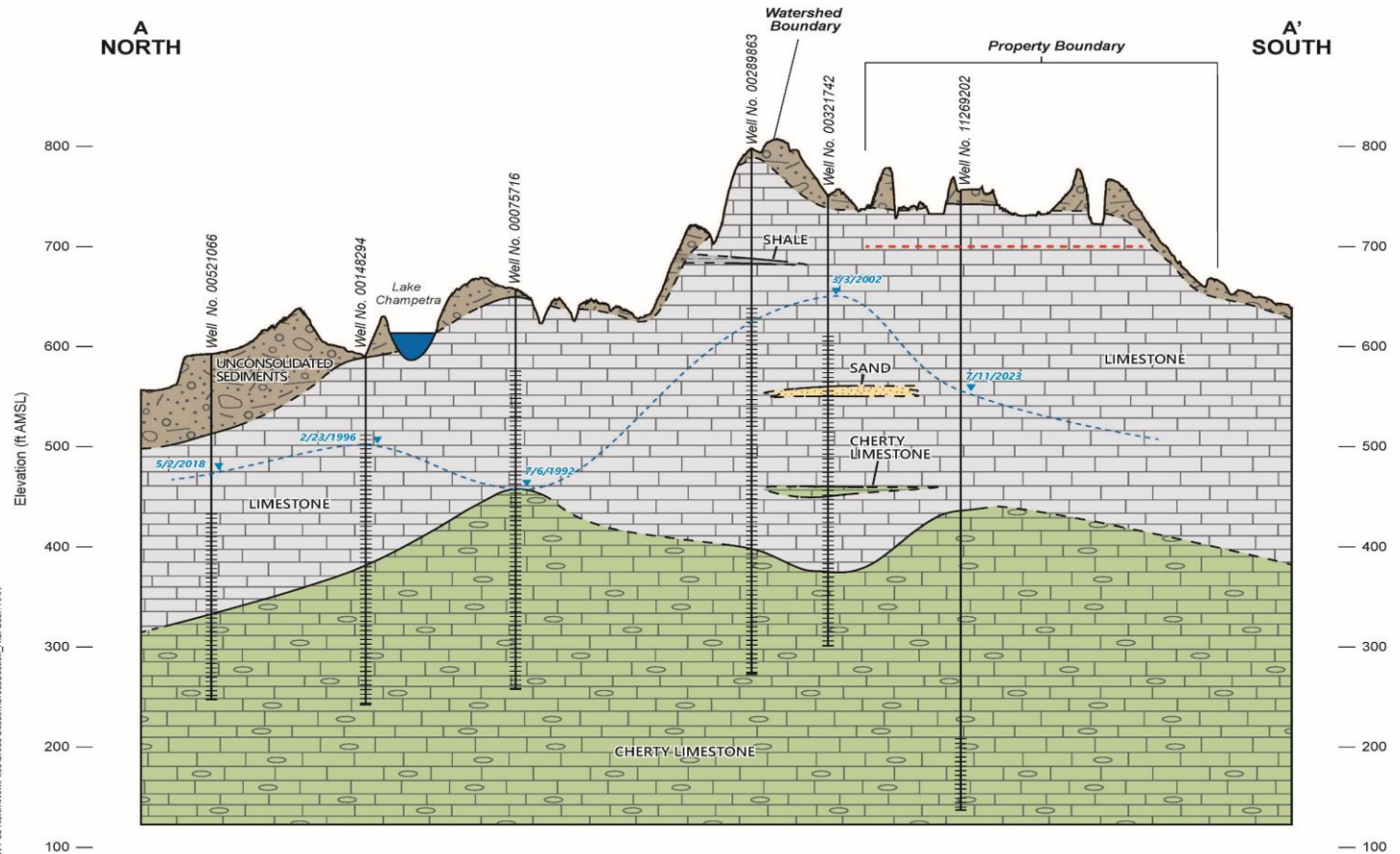
Barr completed a desktop hydrogeologic assessment to determine the potential for expansion of quarry operations and pumping of groundwater from an on-site well to impact water level elevations at Lake Champetra and within residential private wells surrounding Lake Champetra.

The goal of the assessment is to :

1. evaluate potential hydraulic connections between the Quarry water supply well and the Lake Champetra
2. evaluate potential hydraulic connections between the Quarry water supply well and the Lake Champetra Community residential wells







P:\Well\025_MO111351111054_Capital Quarries HWY 63 North\WorkFiles\Cross Section\CrossSection_A.mxd User: BAK

LEGEND

	Geologic Contact		2/23/1996 Date of Water Level Elevation Measurement		Unconsolidated Sediments		Shale
	Inferred Geologic Contact		Open Borehole (no casing)		Limestone		Cherty Limestone
	Approximate Potentiometric Surface		Soil Boring		Sand		
	Approximate Lowest Point of Elevation of the Quarry Floor						

0 1000
Approximate Horizontal Scale in Feet
10X Vertical Exaggeration

**Groundwater elevations are associated with the date the well was drilled or the date the pump was installed. Due to variations in monitoring intervals and date of groundwater elevation measurements, the potentiometric surface is an approximation.*



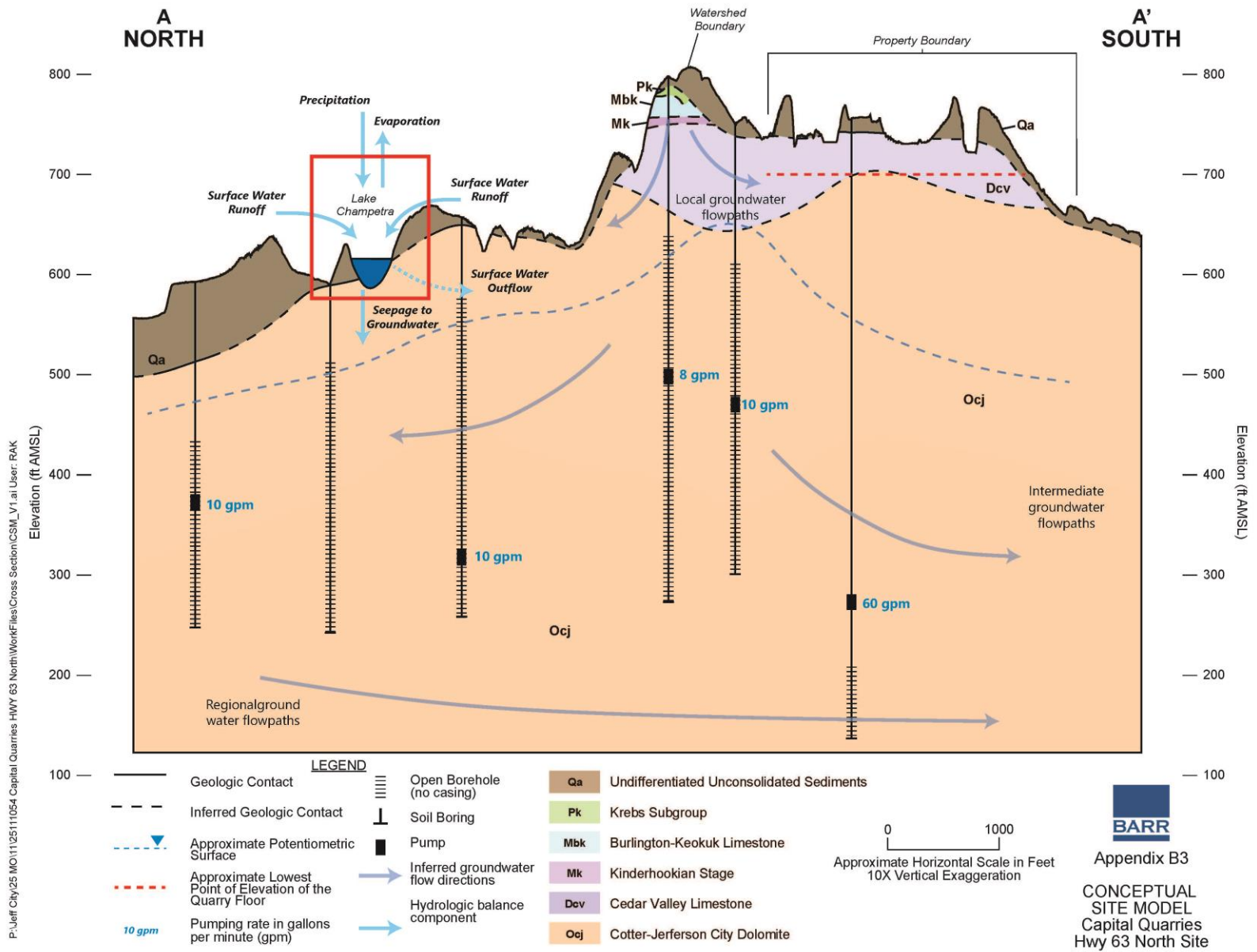
LEGEND

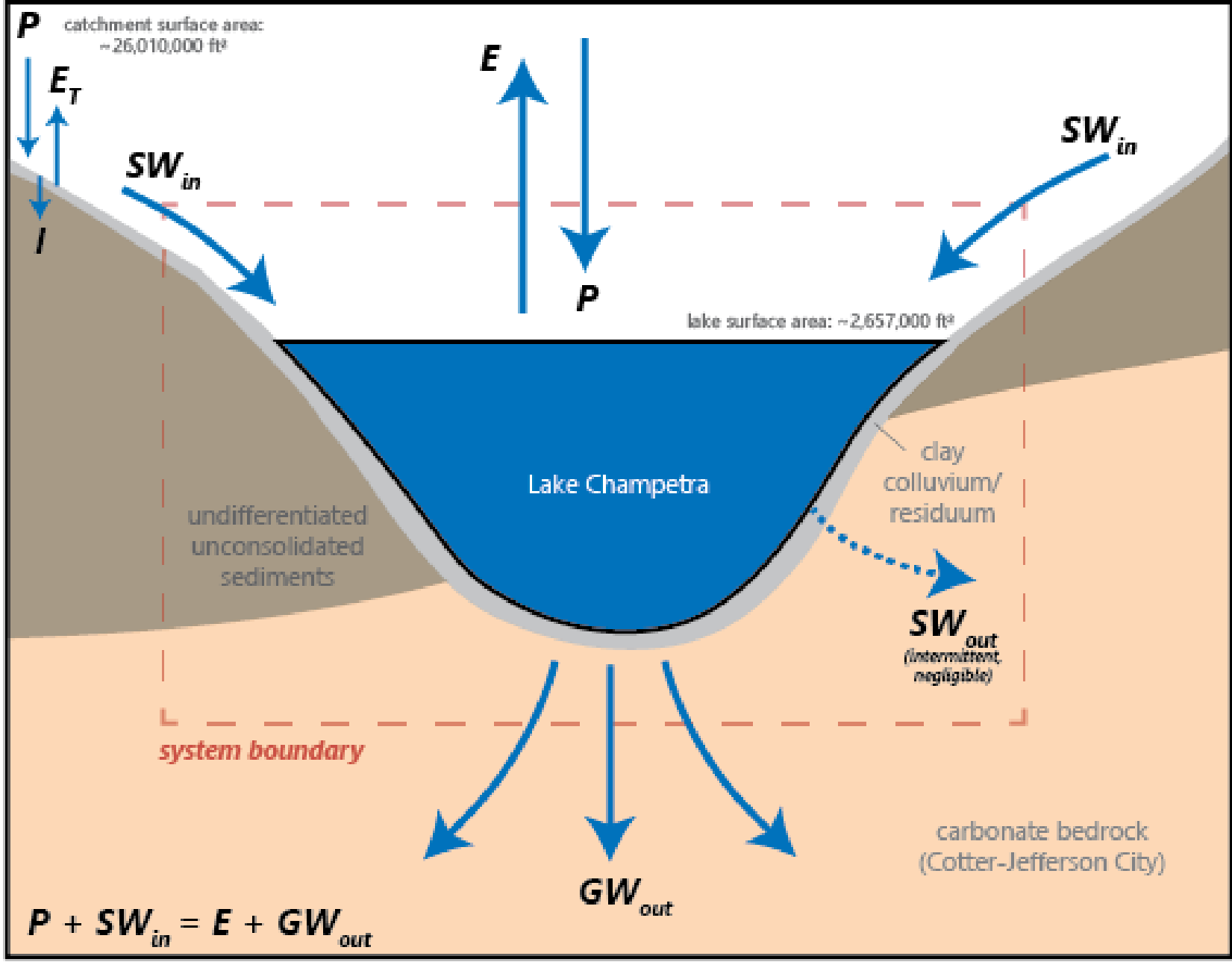
	Missouri DNR Well Reference Number (Well No.)
	Cross Section A - A'
	HUC 12 Watershed Boundary
	Stream
	Quarry Property Boundary
	Lake Champetra

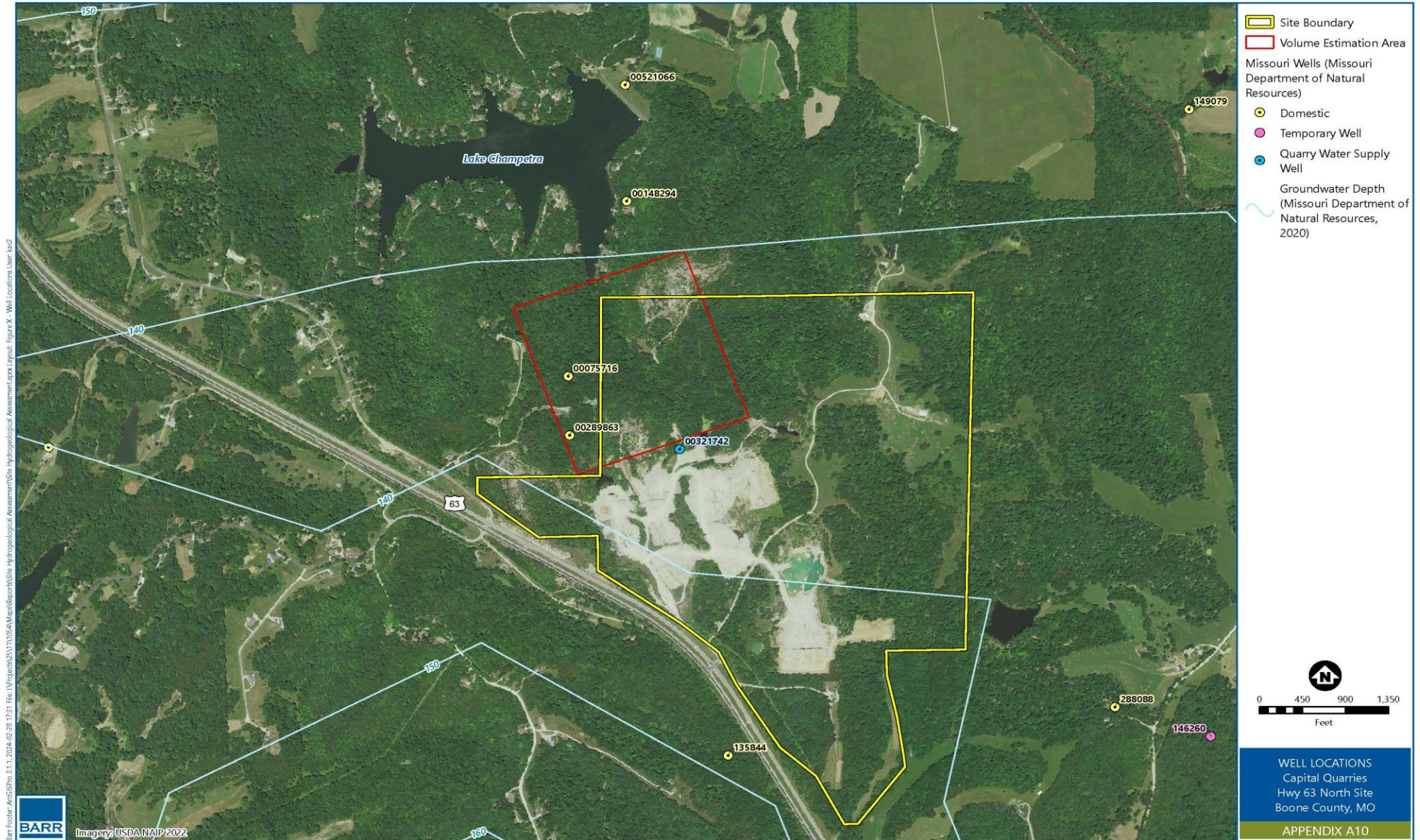


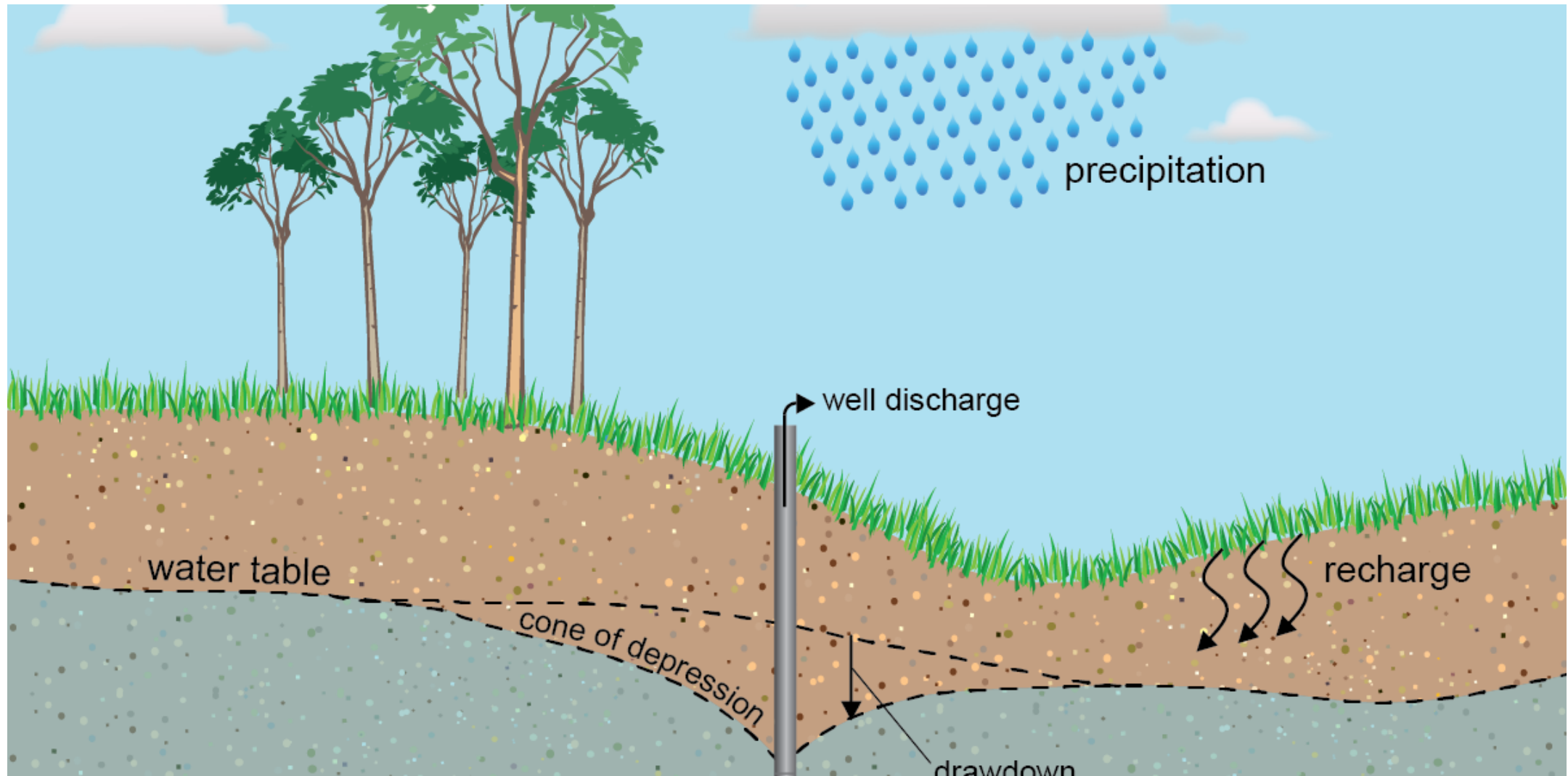
Appendix B2

**GEOLOGIC CROSS
SECTION A-A'**
Capital Quarries
Hwy 63 North Site









[Cone of depression: Pumping a well can cause water level lowering | U.S. Geological Survey \(usgs.gov\)](https://www.usgs.gov)



Thank You.



Tony Schroer
Senior Hydrogeologist
Tschroer@Barr.com
1001 Diamond Ridge, Ste. 1100
Jefferson City, MO 65109
Phone: 573.201.7032



Blasting Operations Capital Quarries

Highway 63 North Quarry



Hartsburg, MO

June 3, 2024

Blasting Governing Code

 Missouri Blasting Safety Act.

 The purpose of the Missouri Blasting Safety Act:

-  for licensing of blasters and users of explosives, insuring proper training and experience.
-  is to foster the safe use of explosives in mining and construction by establishing and enforcing consistent statewide industry standards.

Licensing



Accumulated 1000 hours experience directly related to explosives use within 2 years prior to license.



Completed training course (20 Hours) and passed the licensing examination.



To Continue: To qualify for renewal, an individual must provide documentation of completing eight hours of approved explosives-related training, at least half of which shall have been completed within the year prior to renewal.

Our Blasters



We have 5 Licensed Blasters at Hermann, MO



All Blasters have completed an intensive 32-hour in-depth course on blasting.



All blasters are appraised for compliance with proper procedures.




There are monthly refreshers regarding the training.



There are additional refresher trainings and technology update trainings each year.

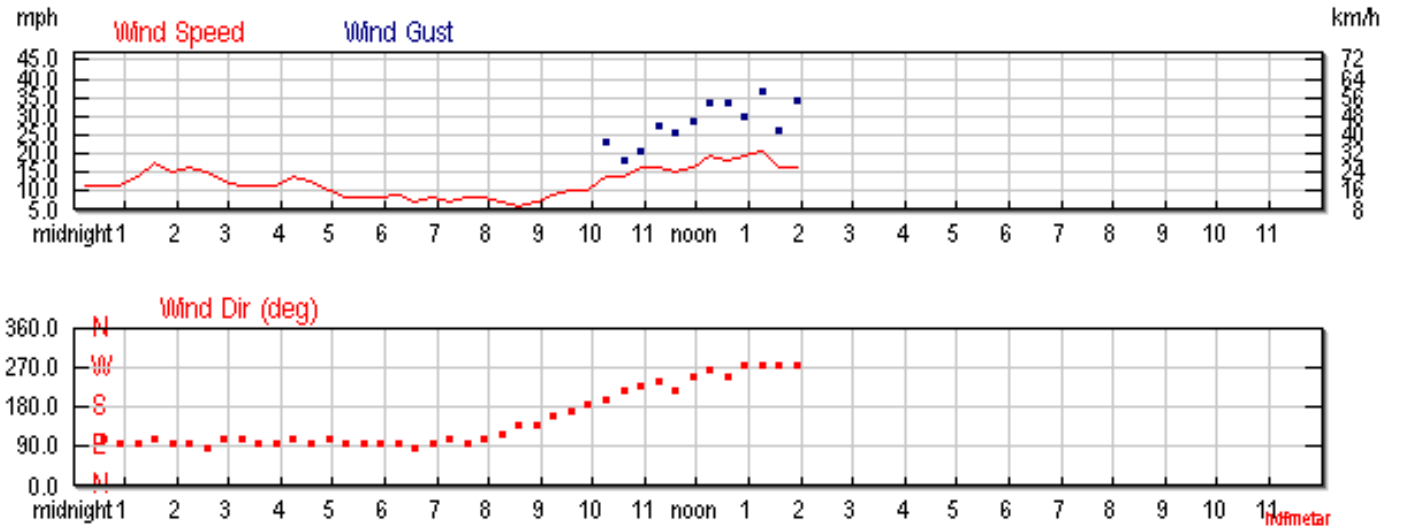
Blast Monitoring Requirements

 Scaled Distance of 55 or greater is required if no seismograph is used.

 Acoustic values shall be limited to 133 dB using a 2 Hz flat response system. (Equivalent pressure of 27mph wind.)

 The pressure scale measures more than just sound.

Wind Triggers Seismograph.



Hourly Weather History & Observations

Time (CST)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	
11:55 AM	74.5 °F	-	56.5 °F	53%	29.65 in	10.0 mi	WSW	16.1 mph	28.8 mph
12:15 PM	76.6 °F	-	54.1 °F	46%	29.66 in	10.0 mi	West	19.6 mph	33.4 mph
12:35 PM	75.6 °F	-	47.1 °F	36%	29.67 in	10.0 mi	WSW	18.4 mph	33.4 mph
12:55 PM	75.4 °F	-	48.7 °F	39%	29.68 in	10.0 mi	West	19.6 mph	29.9 mph
1:15 PM	73.2 °F	-	45.7 °F	37%	29.70 in	10.0 mi	West	20.7 mph	36.8 mph
1:35 PM	73.0 °F	-	46.8 °F	39%	29.71 in	10.0 mi	West	16.1 mph	26.5 mph

Seis. Trigger Time 1:24PM

Wind Triggers Seismograph & Exceeds State Limits.

Serial Number: 7546
 Firmware Version: 0C-06.05
 Event Date: 04/18/2018 13:24:50 (UTC -05:00)
 Event number: 65
 Recording Time: 5 s
 Client:
 Operation:
 Location:
 Distance:
 Operator: Vibra-Tech Verizon
 Comment:
 Seismic Trigger: 0.02 in/s
 Sound Trigger: 127 dB

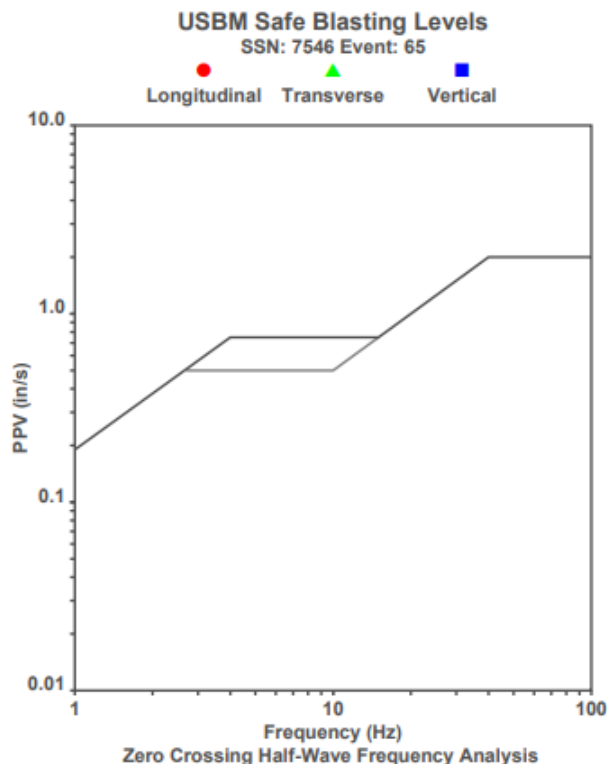
Additional Info:
 j-GEO-19076
 N37 47 30.3,W89 55 58.3

Summary Data

	L	T	V
PPV (in/s):	0.003	0.003	0.01
FREQ (HZ):	500	15.2	15.6
PD (.001"):	0.09	0.05	0.14
PPA (g):	0.013	0.013	0.013

Peak Vector Sum: 0.01 in/s
 Peak Air Pressure: 134 dB
 0.0151 psi @ 5.9 HZ

Shaketable Calibrated
 On: 01/15/2018 (UTC -05:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

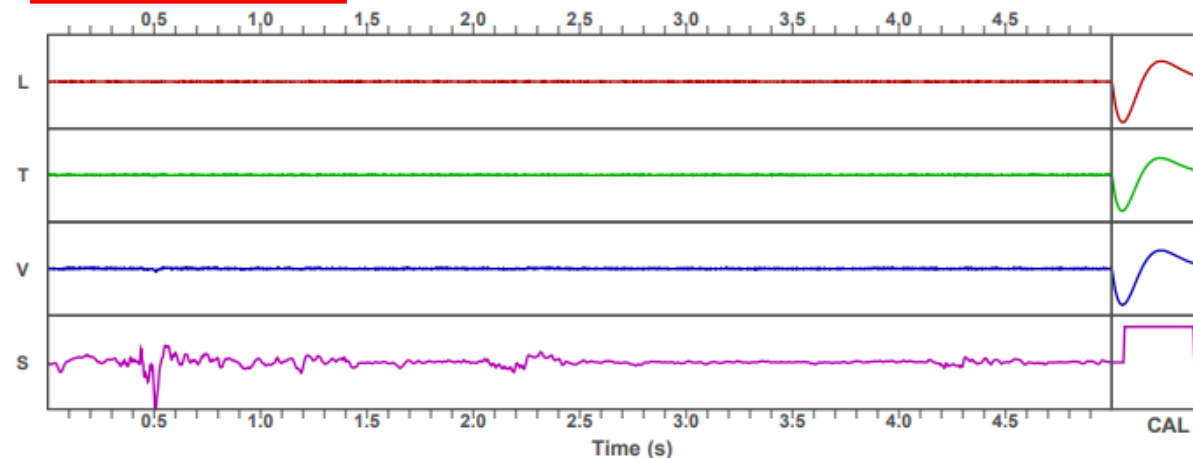


Waveform Graph Scale

Time Scale: 0.1 s
 Seismic Scale: +/- 0.16 in/s
 Sound Scale: +/- 0.015 psi

Velocity Waveform

SSN: 7546 Event: 65



Ground Vibration Limits Base on USBM 8507



Missouri Limits Based on USBM RI-8507

- ✿ Any person using explosives in the state of Missouri in which monitoring with a seismograph is required, as provided in section 319.309, shall comply with ground vibration limits based on the U.S. Bureau of Mines Report of Investigations 8507, Appendix B.



USBM RI 8507 – 1980

- ✿ Study involved USBM measurement and inspections from 240 blasts at 76 homes in 10 states.
- ✿ Combined with results from 9 previous studies at ~150 structures, 718 blasts
- ✿ Structure Response and Damage Produced by Ground Vibration From Surface Mine Blasting
 - ✿ Vibration levels of 0.50 ips from blasting become indistinguishable from environmental effects
 - ✿ There is no documented case of observed damage at vibration levels of 0.50 ips or lower
 - ✿ Many studies have been performed to find exceptions to this criteria but uphold the findings of the study.

United States Bureau of Mines (USBM) Report of Investigation (RI) 8507

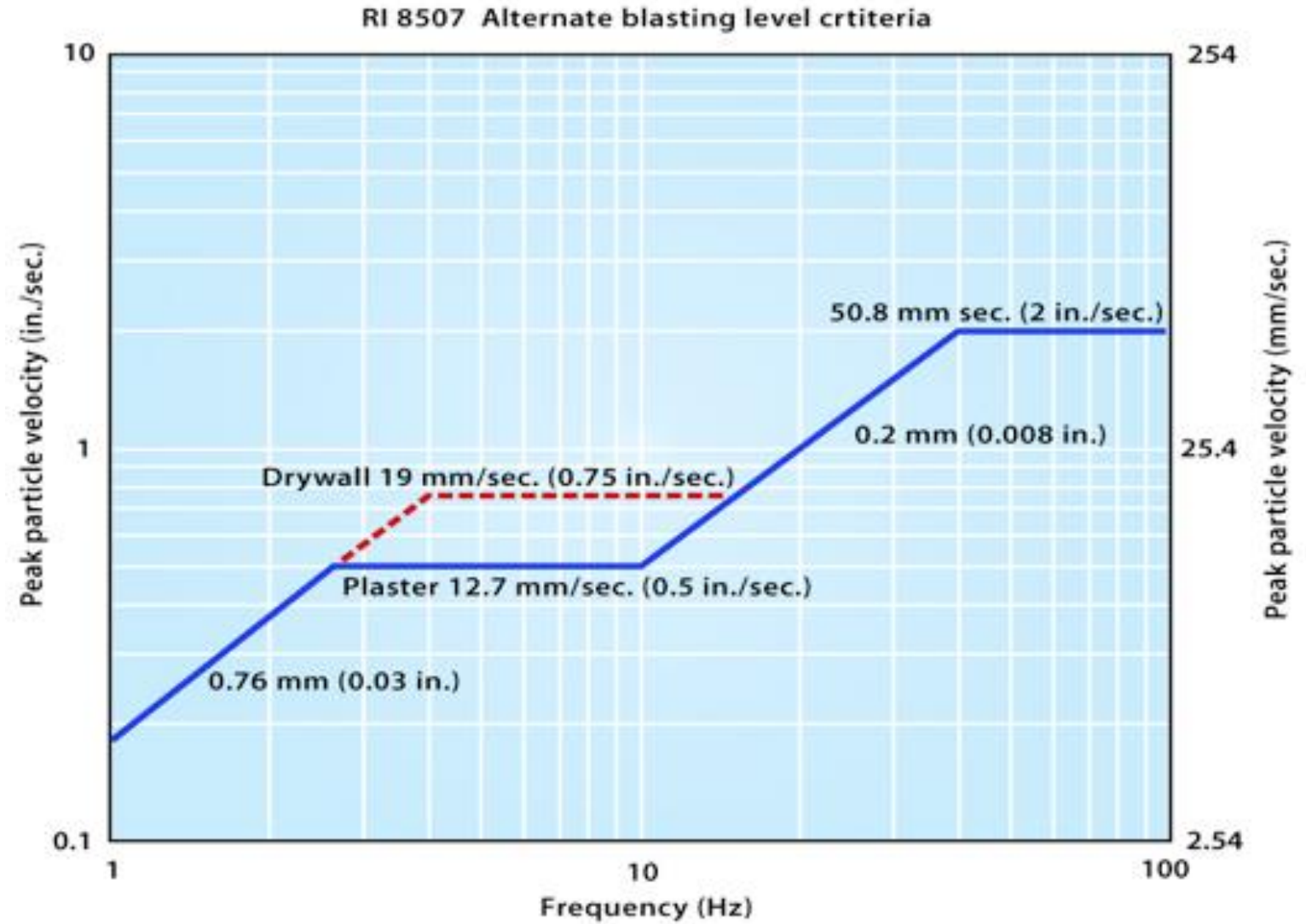


Appendix B Curve established safe blasting criteria.



“Threshold damage is defined as the most superficial interior cracking of the type that develops in all homes independent of blasting.”

Structure Response USBM Appendix B Curve



Blasting Operations Hwy 63 Since 2019



Since 2019 there have been 89 shots at the quarry.



Of those 52 shots triggered the seismograph deployed at 7900 North Shore Dr.



The highest recorded reading was November 6, 2020

0.138 ins/sec. at 27.8 Hz.

9.93% The level of compliance of the Missouri Blasting Safety Act.

Or more than 10 x's below the legal limit.

Blasting Operations – 4 Highest Readings Since 2019

Shot Report Date	Distance	Scaled Distance	Ppv V	Freq V	Ppv T	Freq T	Ppv L	Freq L	Air
11/6/2020 10:22	3759.81	175.8765	0.098	31.30	0.098	31.30	0.138	27.80	93
			6.26%		6.26%		9.93%		
3/25/2020 12:41	3799.07	173.7654	0.058	26.30	0.108	23.80	0.063	31.30	93
			4.41%		9.08%		4.03%		
12/15/2020 12:52	3801.55	209.9055	0.030	15.20	0.098	22.70	0.063	23.80	91
			3.95%		8.63%		5.29%		
3/16/2020 9:55	3785.89	173.8917	0.043	27.80	0.103	29.40	0.058	27.80	93
			3.09%		7.01%		4.17%		

Blasting Operations 2024 At 7900 North Shore Dr.

Percent of Compliance

Multiple of SD 55

Shot Report Date	Distance	Max Charge/ Delay	Scaled Distance	Ppv V	Freq V	Ppv T	Freq T	Ppv L	Freq L	Air
2/21/2024 10:56	4956.347	247.51	315.0397 5.73							
2/8/2024 11:24	4402.051	280.43	262.8711 4.78	0.025 1.50%	33.3	0.045 3.24%	27.8	0.065 4.15%	31.3	103
2/6/2024 11:14	5027.887	244.73	321.3971 5.84	0.015 1.56%	19.2	0.043 9.25%	9.3	0.035 8.43%	8.3	107
1/5/2024 12:03	4960.339	481.49	226.0569 4.11							

Blasting Operations 2023 At 7900 North Shore Dr.

Percent of Compliance

Multiple of SD 55

Structure Longitude	Shot Report Date	Distance	Scaled Distance	Ppv V	Freq V	Ppv T	Freq T	Ppv L	Freq L	Air
-92.23231	7/25/2023 13:20	4218.314	246.9004 4.49	0.018 1.22%	29.4	0.043 2.93%	29.4	0.053 4.67%	22.7	103
-92.23231	7/3/2023 13:13	3001.477	227.2347 4.13	0.015 1.97%	15.2	0.035 8.24%	8.5	0.04 2.56%	31.3	90
-92.23231	7/3/2023 10:36	4219.181	249.5116 4.54	0.023 3.13%	14.7	0.053 3.61%	29.4	0.045 3.06%	29.4	103
-92.23231	6/9/2023 9:11	4886.198	373.9303 6.80	0.018 1.37%	26.3	0.03 2.88%	20.8	0.035 2.80%	25	103
-92.23231	6/2/2023 10:23	4873.688	362.5088 6.59	0.018 2.24%	16.1	0.028 2.58%	21.7	0.043 3.79%	22.7	99
-92.23231	5/25/2023 11:03	4877.493	333.0919 6.06	0.015 0.88%	34.1	0.035 2.46%	28.4	0.045 3.35%	26.9	106

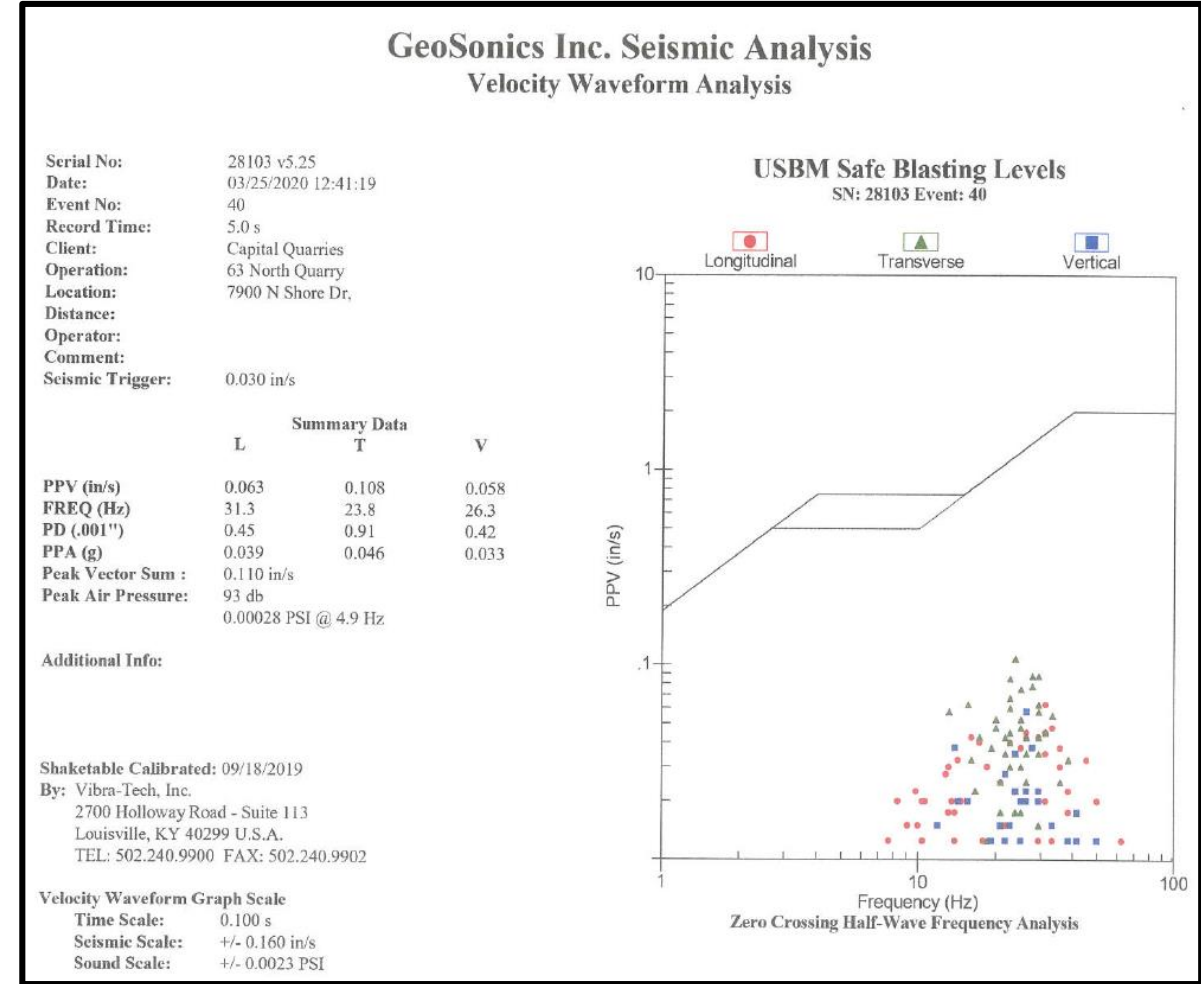
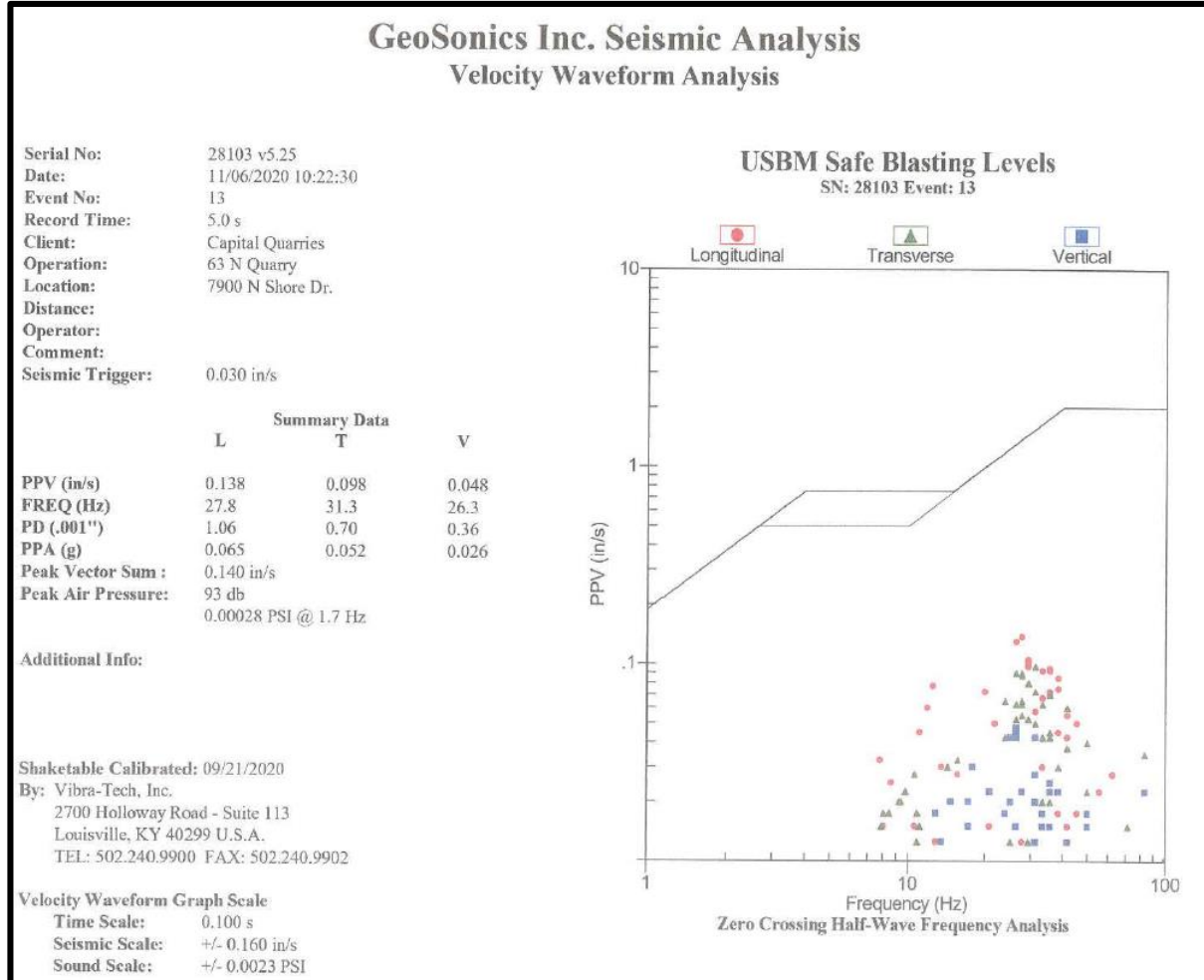
Blasting Operations 2023 At 7900 North Shore Dr.

Percent of Compliance

Multiple of SD 55

Shot Report Date	Distance	Max Charge/ Delay	Scaled Distance	Ppv V	Freq V	Ppv T	Freq T	Ppv L	Freq L	Air
12/15/2023 12:33	4957.208	298.1	287.1152 5.22							
12/1/2023 13:03	4944.585	609.06	200.3548 3.64							
11/2/2023 11:23	4896.708	281.5	291.8536 5.31							
10/13/2023 11:11	4891.196	82.5	538.503 9.79							
10/3/2023 10:55	4862.69	133.75	420.4648 7.64							
9/29/2023 8:43	4842.622	145.04	402.1024 7.31							
9/20/2023 11:30	3001.475	287.88	176.9005 3.22	0.025 2.50%	20	0.04 5.13%	15.6	0.035 2.66%	26.3	101
9/20/2023 11:28	4348.998	287.72	256.3918 4.66	0.02 1.84%	21.7	0.023 1.38%	33.3	0.033 2.24%	29.4	108
9/7/2023 10:00	4270.463	246.83	271.8166 4.94	0.013 1.04%	25	0.23 19.33%	23.8	0.035 1.96%	35.7	87
8/28/2023 10:57	4897.269	150.75	398.8644 7.25	0.013 1.04%	25	0.038 2.28%	33.3	0.025 1.70%	29.4	99
8/11/2023 9:57	4850.508	117.32	447.8176 8.14							
8/8/2023 11:58	4268.115	292	249.7725 4.54	0.023 1.47%	31.3	0.038 2.59%	29.4	0.038 3.35%	22.7	91

Seismograms For 4 – Highest Readings



Seismograms For 4 – Highest Readings

GeoSonics Inc. Seismic Analysis Velocity Waveform Analysis

Serial No: 28105 v5.29
 Date: 12/15/2020 12:52:24
 Event No: 8
 Record Time: 5.0 s
 Client: Capital Quarries
 Operation: 63 North quarry
 Location: 7900 N Shore Dr.
 Distance:
 Operator:
 Comment:
 Seismic Trigger: 0.030 in/s

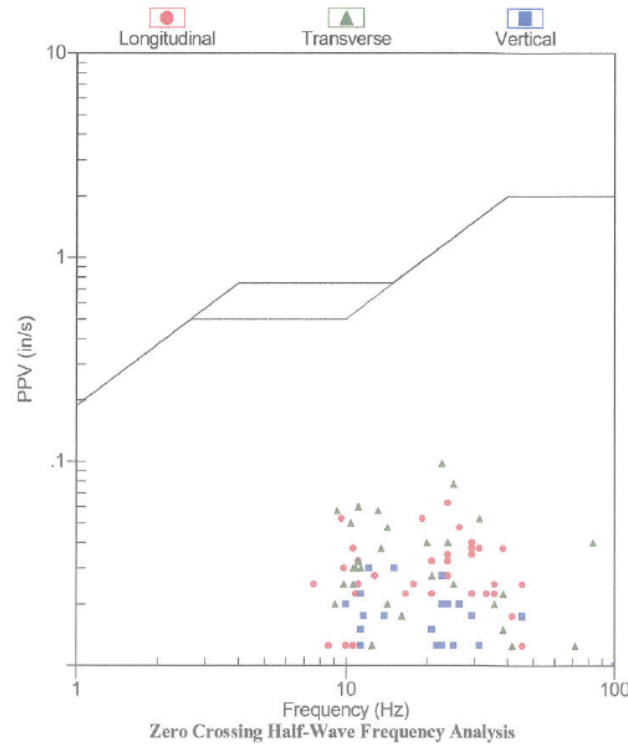
USBM Safe Blasting Levels SN: 28105 Event: 8

	Summary Data		
	L	T	V
PPV (in/s)	0.063	0.098	0.030
FREQ (Hz)	23.8	22.7	15.2
PD (.001")	0.53	0.92	0.35
PPA (g)	0.033	0.033	0.020
Peak Vector Sum :	0.100 in/s		
Peak Air Pressure:	91 db		
	0.00025 PSI @ 3.1 Hz		

Additional Info:

Shaketable Calibrated: 11/04/2020
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40299 U.S.A.
 TEL: 502.240.9900 FAX: 502.240.9902

Velocity Waveform Graph Scale
 Time Scale: 0.100 s
 Seismic Scale: +/- 0.160 in/s
 Sound Scale: +/- 0.0023 PSI



GeoSonics Inc. Seismic Analysis Velocity Waveform Analysis

Serial No: 28105 v5.29
 Date: 03/16/2020 09:55:35
 Event No: 21
 Record Time: 5.0 s
 Client: Capital Quarries
 Operation: 63 North Quarry
 Location: 7900 N Shore Dr.
 Distance:
 Operator:
 Comment:
 Seismic Trigger: 0.030 in/s

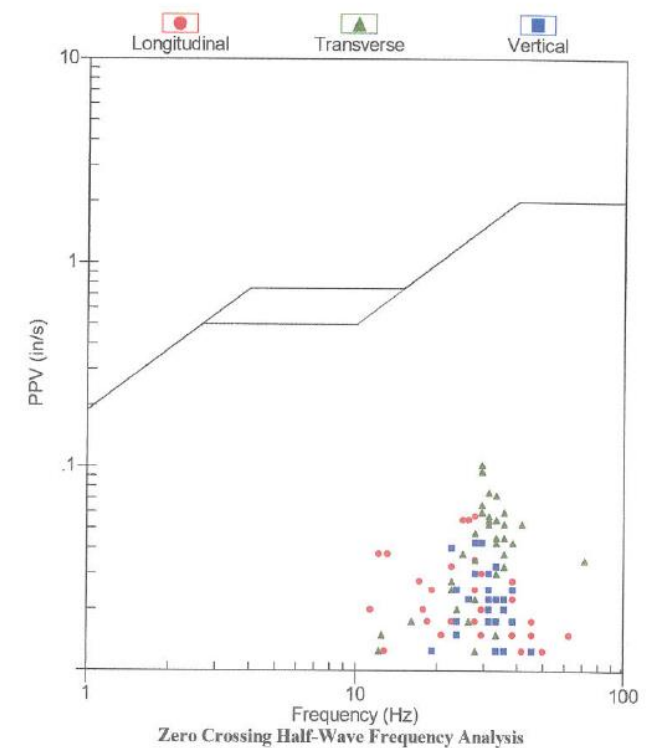
USBM Safe Blasting Levels SN: 28105 Event: 21

	Summary Data		
	L	T	V
PPV (in/s)	0.058	0.103	0.043
FREQ (Hz)	27.8	29.4	27.8
PD (.001")	0.39	0.59	0.26
PPA (g)	0.033	0.059	0.026
Peak Vector Sum :	0.108 in/s		
Peak Air Pressure:	93 db		
	0.00028 PSI @ 1.8 Hz		

Additional Info:

Shaketable Calibrated: 10/02/2019
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40299 U.S.A.
 TEL: 502.240.9900 FAX: 502.240.9902

Velocity Waveform Graph Scale
 Time Scale: 0.100 s
 Seismic Scale: +/- 0.160 in/s
 Sound Scale: +/- 0.0023 PSI



Blasting Questions?

explosives.org

Further Vibration Studies

- Confirmation of 8507 studies.

 This work, published as RI 8896 by Stagg et al. (1984), included the vibration effects on a single structure's construction and components combined with a variety of laboratory tests.

David E. Siskind, Ph.D. "Vibrations From Blasting", ", International Society of Explosives Engineers, Cleveland, OH
2000 pp. 38 – 39

Structure Response To Induced Vibrations

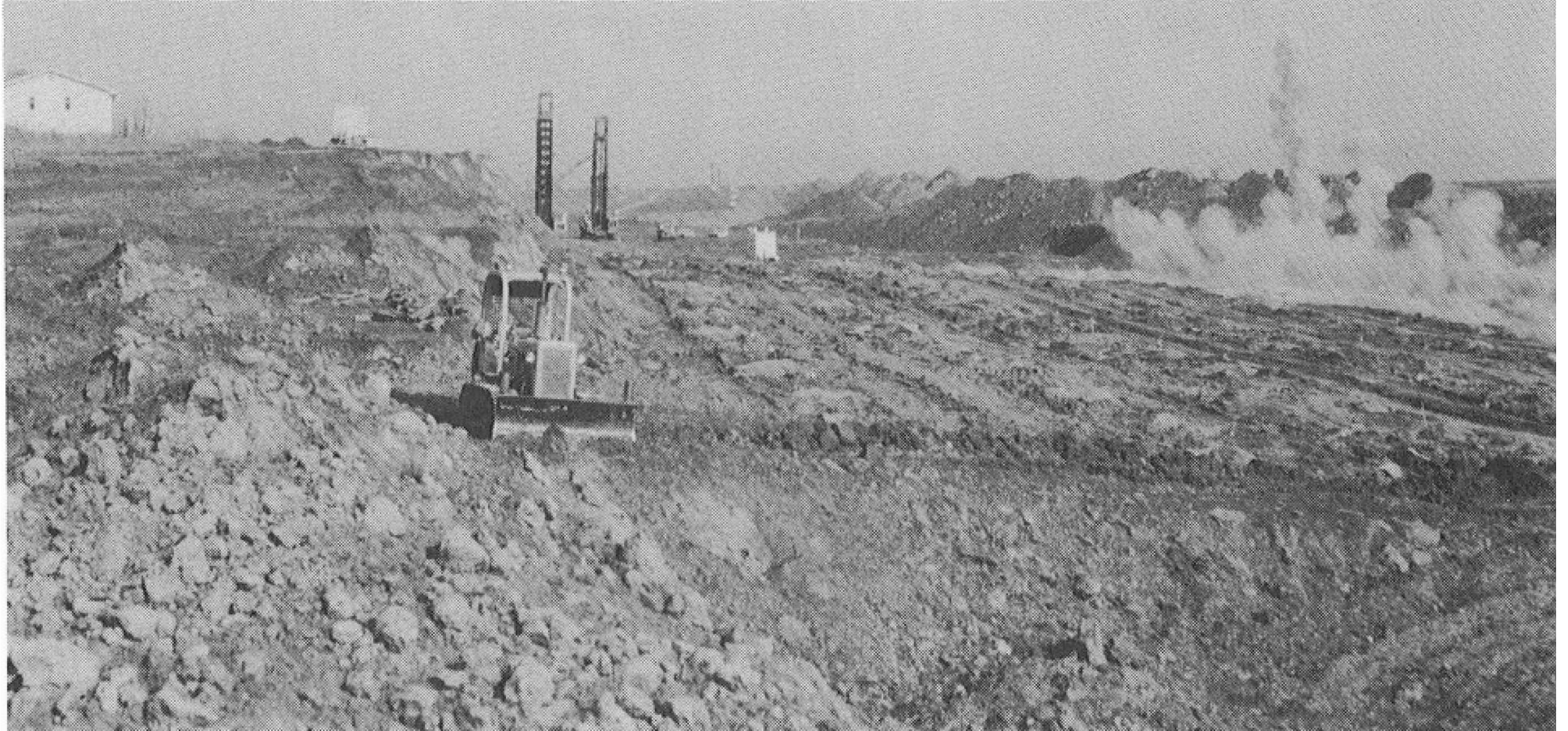


Studies with induced vibrations USBM Test on a wood frame house RI 8896


Mining Close to Test House



Mining Close to Test House



Structure Response To Induced Vibrations

- House was subjected to 645 total blasts.
 - 587 blasts were >0.1 in/sec.
 - 134 blasts were >0.5 in/sec.
 - 28 blasts were >2.0 in/sec.
 - House was then subjected to mechanical shaking
 - 🌸 First crack appeared after 56,000 cycles which is equivalent to 28 years of blasting two times per day at a vibration level of .5 ips
 - 🌸 First crack was a wall-board tape joint
 - 🌸 No apparent cumulative effect
-  This study is important because most homeowners believe damage from blasting is different from the natural shaking of their homes due to the number of blast


Further Vibration Studies


- Confirmation of 8507 studies.

 Additional Confirmation

 Crum and Siskind, 1993;






 Crum and Pierce, 1995a;

 Pierce et al., 1996; Crum 1997

 “It is worth noting that all the additional USBM findings, as well as the additional work by others, were consistent with and supported those in RI 8507.”

David E. Siskind, Ph.D. “Vibrations From Blasting”, , International Society of Explosives Engineers, Cleveland, OH
2000 pp. 38 – 39

Ground Vibration Criteria For Concrete

-  “Driveways and similar masonry structures on or in the ground are restrained by the ground on which they sit and thus not able to vibrate freely.
-  This means they move with the ground and do not undergo dynamic response amplification regardless of vibration frequency.
-  Foundation walls below ground or in contact with the soil are also in this category.
-  Cracks in mass concrete generally require vibration amplitudes measured in three digits (>100 in/s).
-  There were no instances of cracks formed in concrete pads, driveways, or walkways in any of the mining blast studies by the USBM, including the follow-up fatigue study, or in any of the work reported by others.”

 David E. Siskind, Ph.D. “Vibrations From Blasting”, , International Society of Explosives Engineers, Cleveland, OH 2000 p.64


Ground Vibration Criteria For Concrete

Structure Response Concrete


- Massive concrete is understandably very resistant to vibration-induced cracking. Work by Oriard, 1980 specified some historical guidelines for new (green) concrete that has not yet fully cured of 2 to 4 in/sec and estimating a more realistic safe level of 10 to 20 in/s after 7 to 10 days. The American Concrete Institute recommends similar criteria for peak vibrations: 2 to 7 in/s.

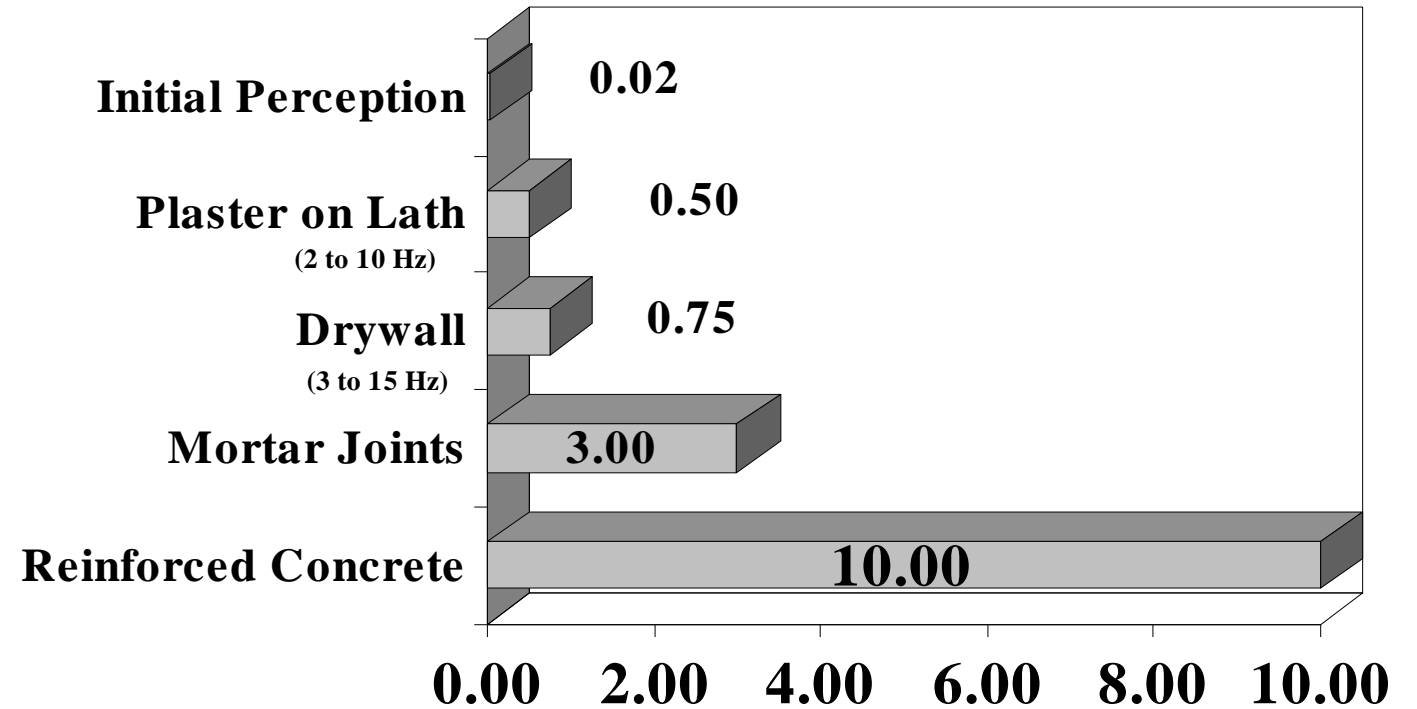
Oriard, Cracking of Concrete From Vibrations

Human Perception - Vibration Levels

 Perception is not by itself indicative of damage

 Average human can detect vibration levels of 0.02 ips

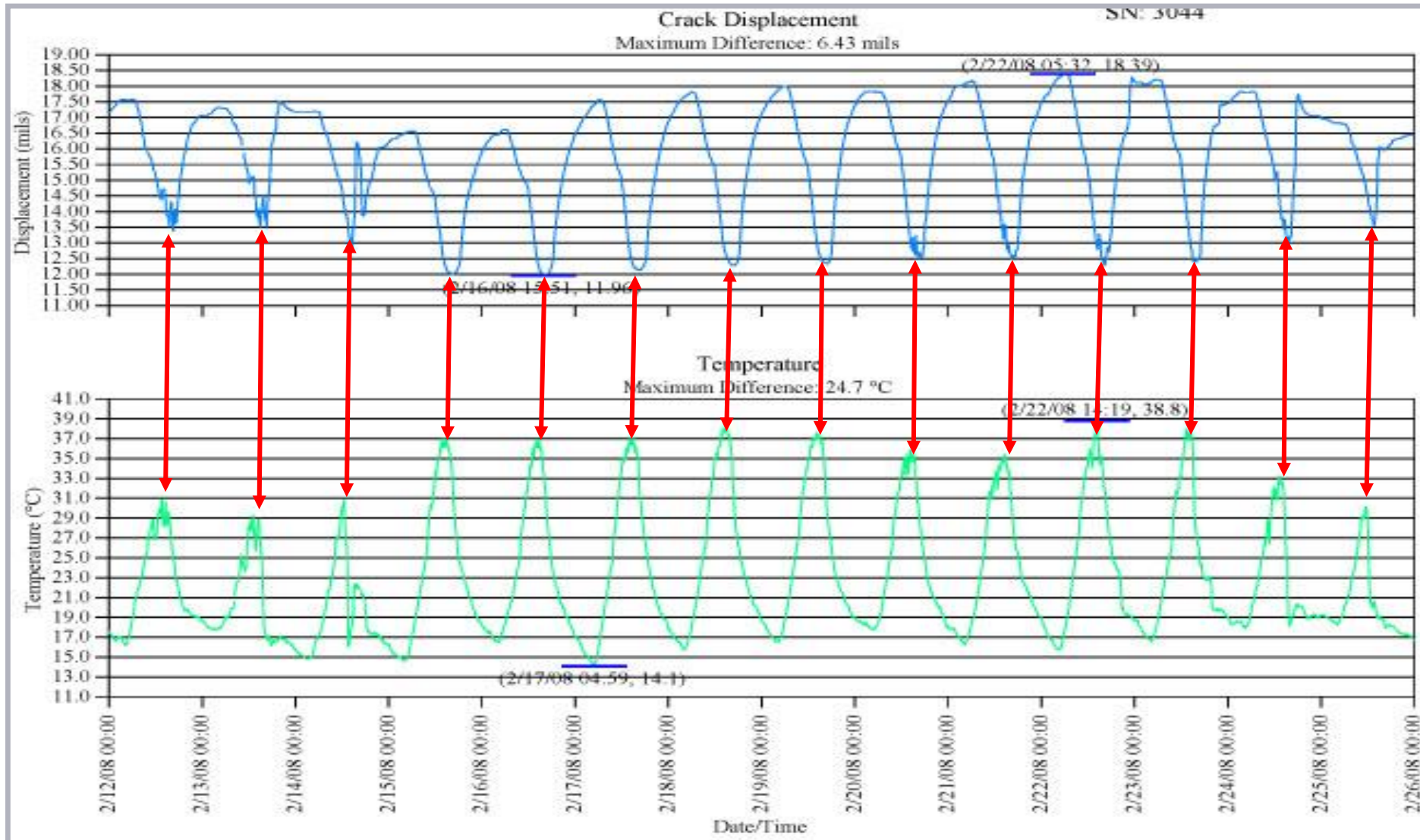
 This is many times less than the vibration levels that could possibly cause damage.



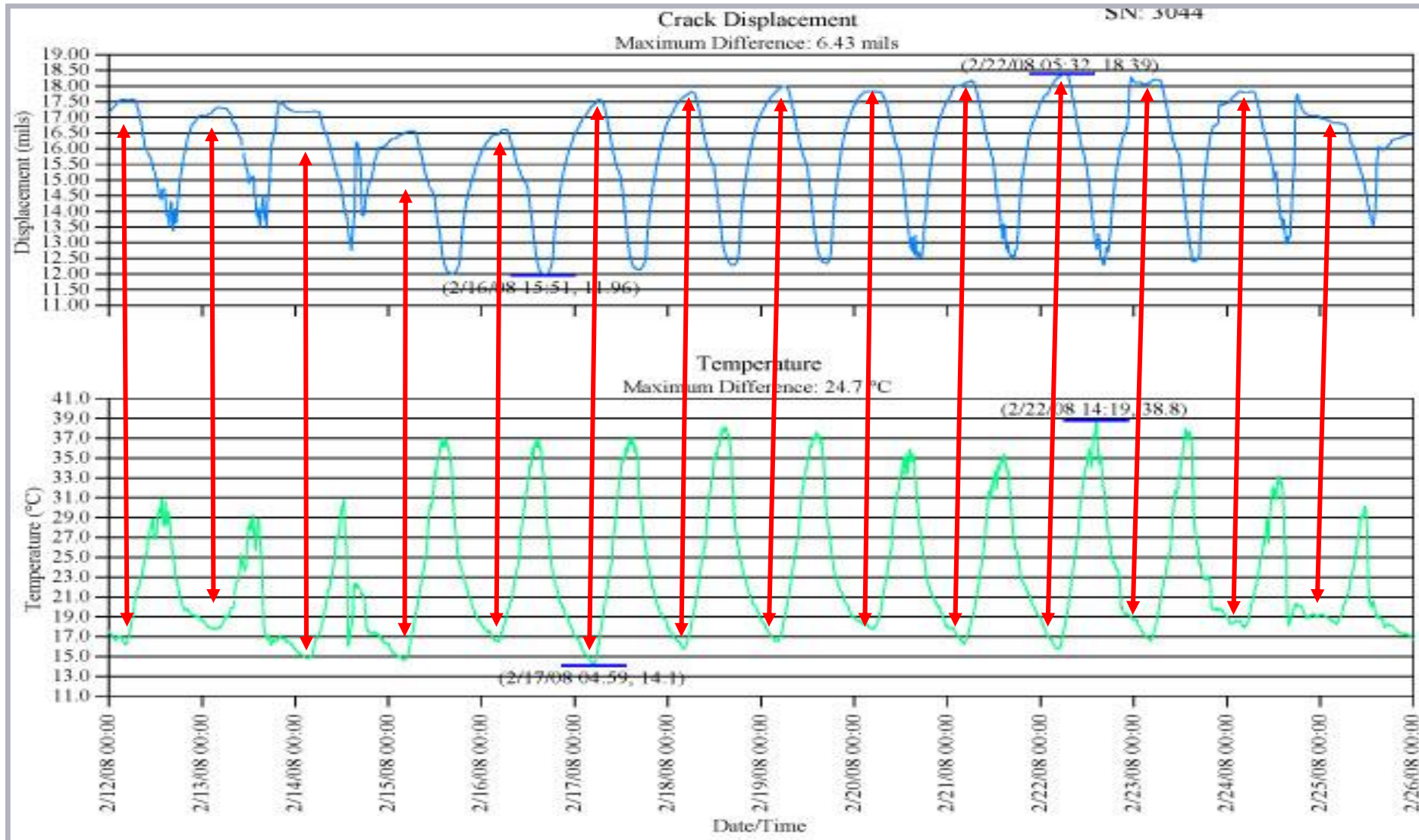
Comparison of Crack Movement to Environmental Effects

A **mil** is a thousandth of an inch — .001 inch.

As temperature increases, the opening in the crack decreases.



Comparison of Crack Movement to Environmental Effects



A **mil** is a thousandth of an inch — .001 inch.

As temperature decreases, the opening in the crack increases.

Crack Response

Blast-Induced versus Weather-Induced

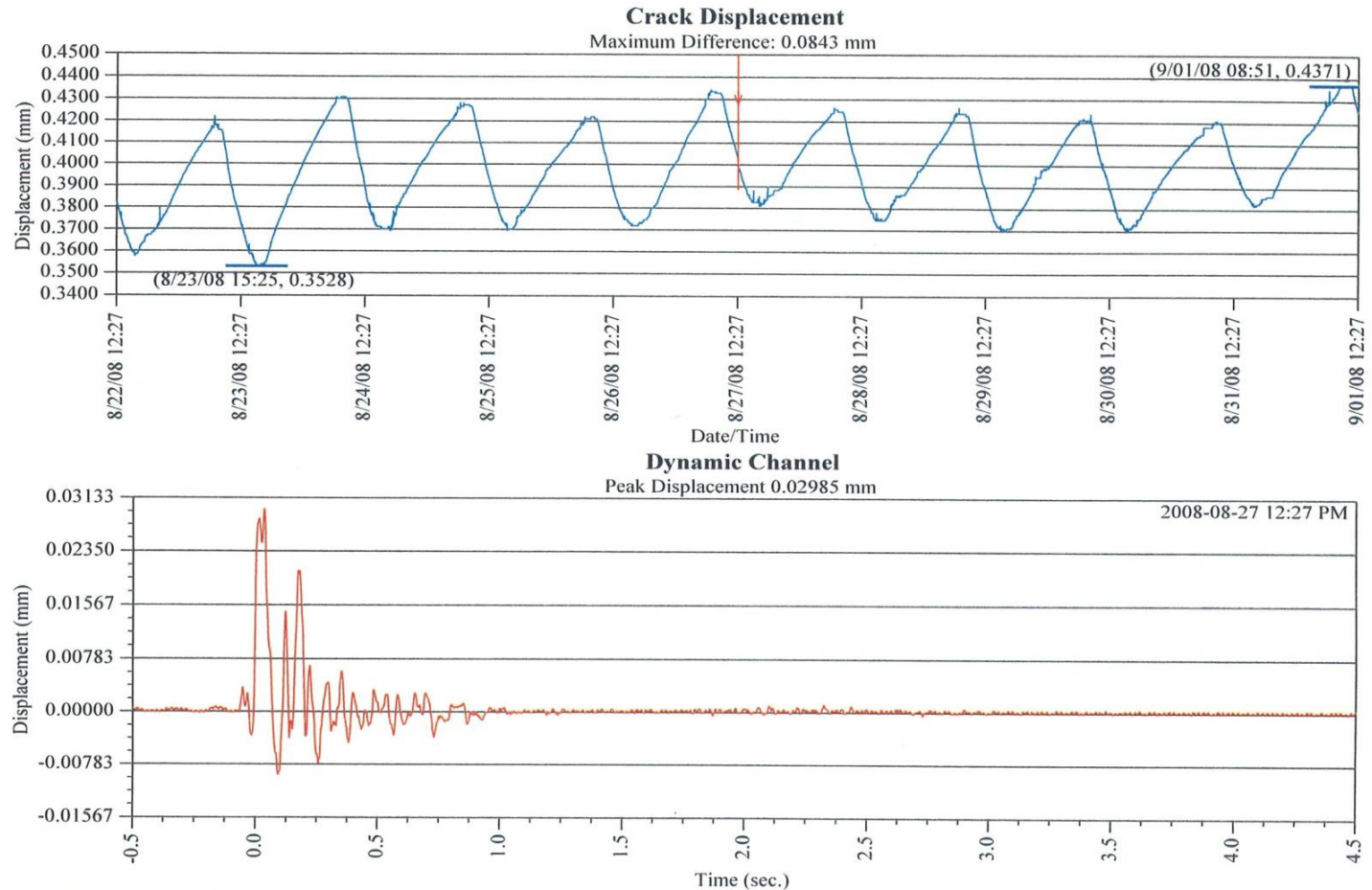
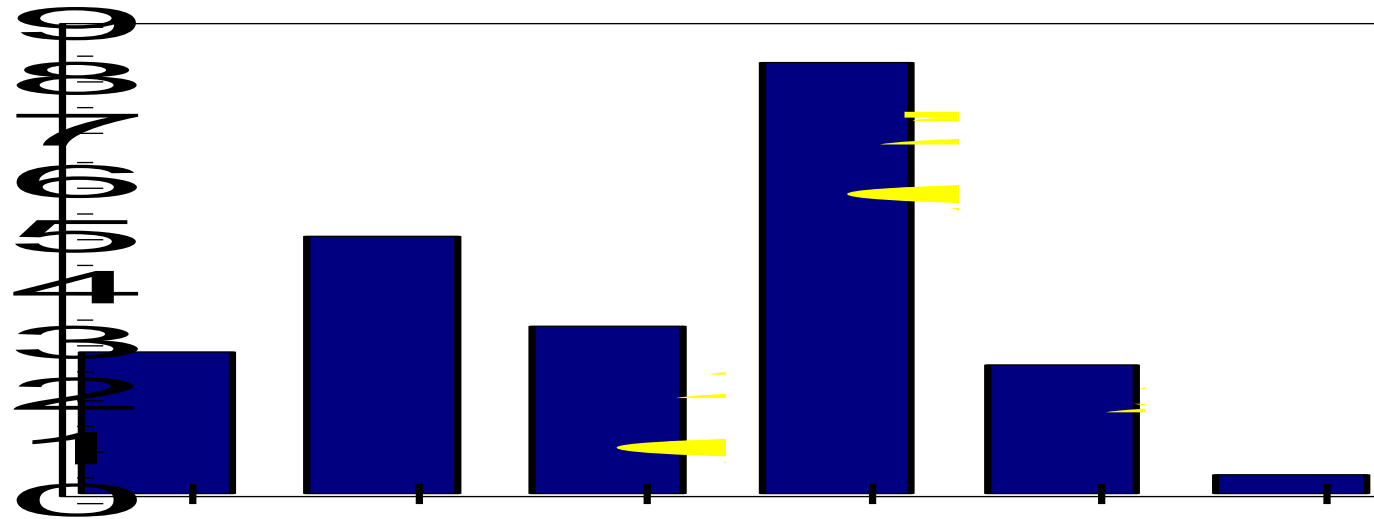


Figure 11

Environmental Impact on Wood Frame House

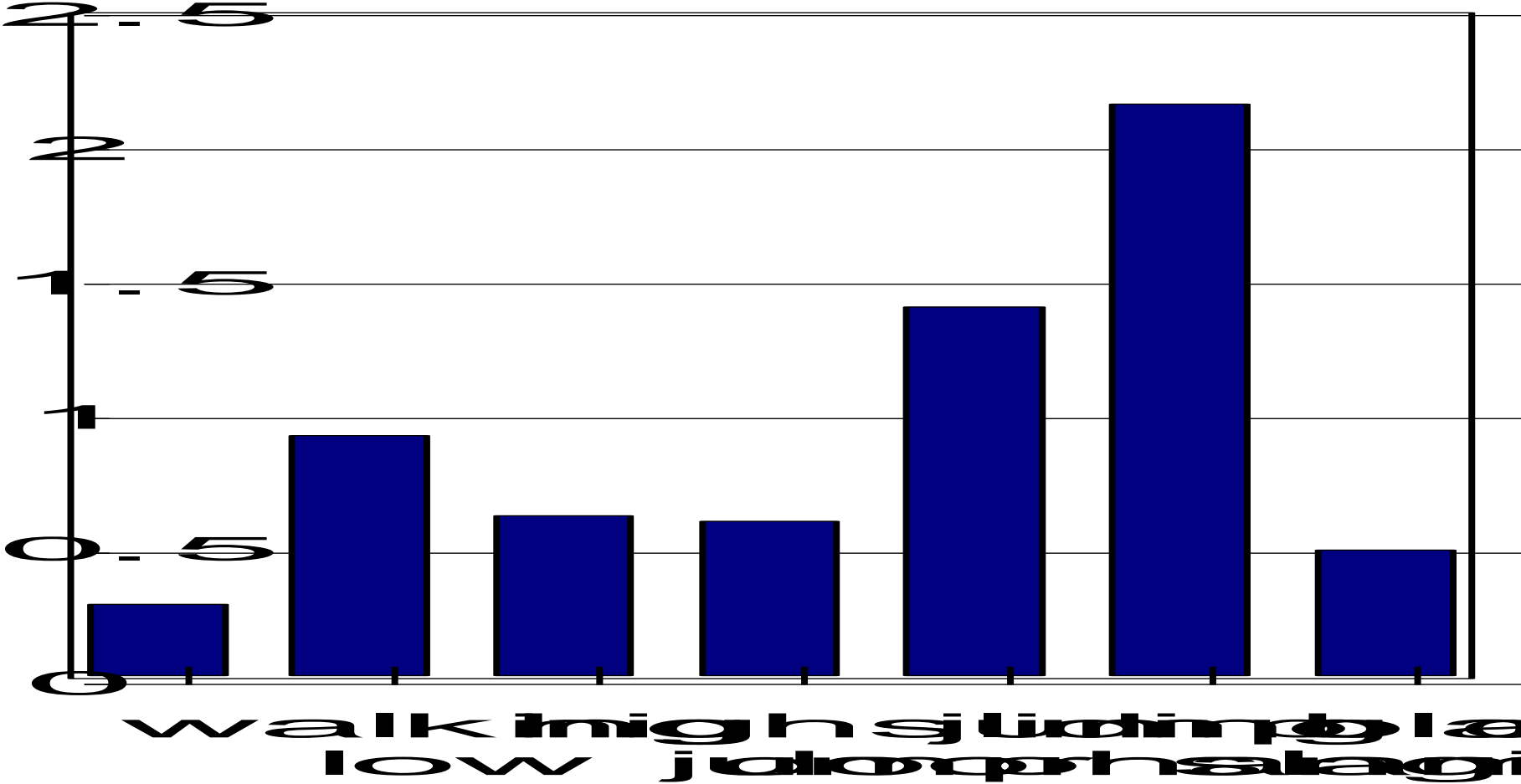
Vibration Environment Equivalent Bl



Inside and Outside
Equivalent Bl
Type of E

Data from Stagg, et al, 1985

Causes of Complaints - Household Activities



Structure Response (Restricted Structures)



Can only move with the surrounding ground



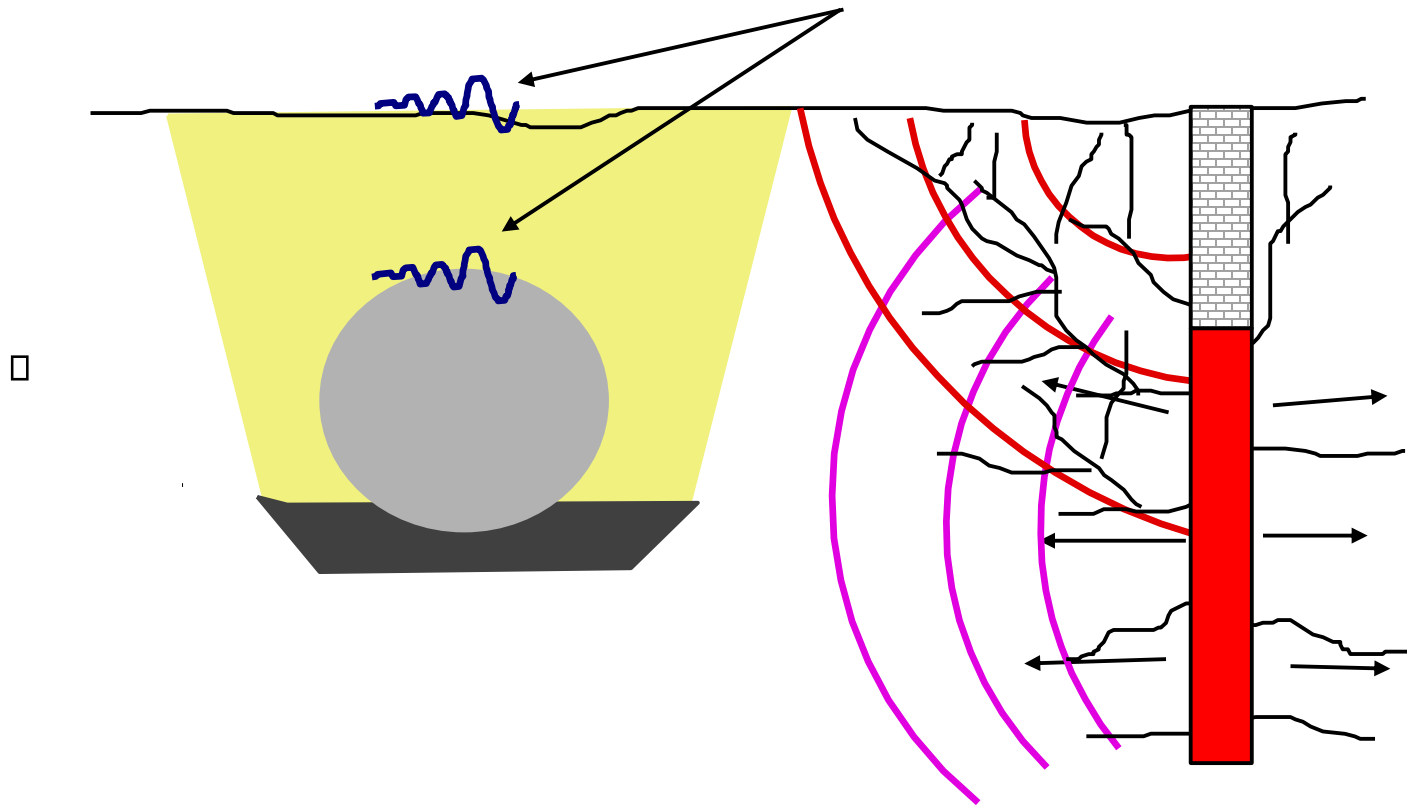
Representative of buried pipelines, utilities, etc.



Very resistant to vibration damage i.e., typical buried structures can withstand vibration values of 20 i.p.s. or higher

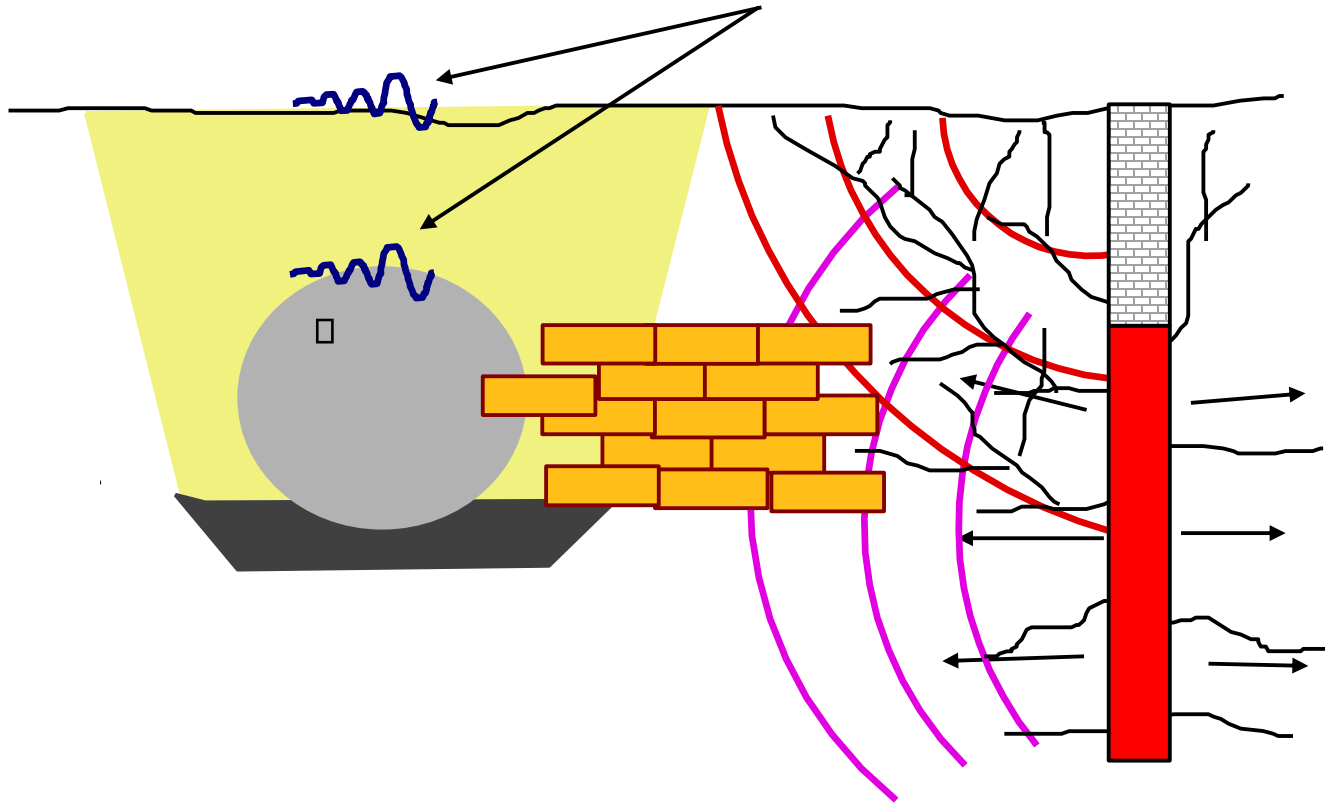
Structure Response (Restricted)

As vibration passes pipe, it can only move in phase with surrounding rock and soil






Structure Response (Restricted)


Pipe damage is possible if the ground were shifted and pushed into the pipe.




Response Of Pressurized Pipelines To Production-size Mine Blasting.

-  Study by David E. Siskand, mark S. Stagg U.S. Bureau of mines twin cities research center, Minneapolis, MN.
-  Four welded steel pipelines ranging from 6" – 20" diameter and one 8" PVC Water supply line.
-  Overburden blasts of up to 2100 lbs. per delay in a 12¼" diameter hole.

Analysis

 “The last mining cycle brought the production blasting within 48 ft of the closest pipeline. There was little back-break and no apparent permanent ground displacement at this minimum distance of 44 hole diameters. Vibration levels were 25 in/s for this blast on the ground surface and 9.2 to 10.8 on the two instrumented pipelines with no loss of pipe integrity”.

 This study was monitoring 12 $\frac{1}{4}$ ” hole. That’s nearly 10 x’s the hole size used at the Capital Quarries - 63N Quarry.

 Microfractures would not extend beyond 15’ with the hole diameters used at the Capital Quarries - 63N Quarry.

*RI 9523 Study at a coal mine in IN "Response of Pressurized Pipelines to Production-Size Mine Blasting"
by David E. Siskind, Mark S. Stagg for the U. S. Bureau of Mines - Twin Cities Research Center,
Minneapolis, MN*

USBM RI 9523





Within the follow up study (RI 9523) to the USBM paper mentioned, Siskand et al noted previous work by Lewis L. Oriard.




“His involvement with many large pipeline projects as well as roughly 350 urban pipeline and utility projects has led him to conclude that the blasting risk to pipelines is from block motion (permanent strain) or from having the pipeline in the actual blast crater zone. He suspects that no elastic wave (vibration velocity) criterion is needed, nor is it meaningful.”

USBM RI 9523(cont.)

 Jack L. Kiker had reported to Siskind et al of blasting within 3-6m (10' – 20') of a pipeline. In one case “a parallel ditch within 4m (13.12') of the blast had ground rupture cracks extending to the existing pipeline and in which peak velocities were 64 mm/s (2.52 in/s), without damage.

 Another case “involved blasting within 1.2m (3.93') of a 30 cm (11.81”) PVC Sewer pipe. Vibration Amplitudes up to 1450 mm/s (57.09 in/s) produced no damage.”

 Burial depth was 1m (3.2808') to 1.2 m (3.94').


 Kiker like Oriard “believes that risk to pipelines comes from ground rupture and movement...not from vibrations per se.”

USBM RI 9523 Conclusions



“Although particle velocities of over 600 mm/s (23.62 in/s) were sustained without loss of pipe integrity, it is recommended that 125 mm/s (4.92 in/s) measured at the surface is a safe-level criterion for large surface mine blasts for Grade B or better steel pipelines. The same criterion is recommended for SDR 26 or better PVC pipe.”

Pipeline Response

 It combined a limit of 12 in/s with criteria for ground fracture control. There was an unexpected "proof-test" when 7000 ft of trench was blasted instantaneously (with no delays) at a distance of 25 ft. No damage was done. Tests were conducted prior to the beginning of the project. Welded steel pipelines are very resistant to high-frequency ground vibrations, but they are relatively sensitive to ground shifting. Ground control is essential to the prevention of damage when blasting in very close proximity. I always insist on that control, but do not insist on vibration limits.

•Lewis L.Oriard Explosives Engineering, Construction Vibrations and Geotechnology pp.371-372

Air Overpressure – Decibels, PSI, & Millibars

Most states allow 133 dB
No damage will occur at 133, and for a
long time 140 dB was the regulated limit.

dB	PSI	mBar	dB	PSI	mBar	dB	PSI	mBar
100	0.00029	0.020	117	0.00208	0.141	134	0.01485	1.010
101	0.00033	0.220	118	0.00234	0.159	135	0.01663	1.131
102	0.00037	0.250	119	0.00262	0.178	136	0.01871	1.273
103	0.00041	0.280	120	0.00290	0.197	137	0.02094	1.424
104	0.00046	0.310	121	0.00330	0.224	138	0.02353	1.601
105	0.00052	0.350	122	0.00371	0.252	139	0.26430	1.798
106	0.00058	0.390	123	0.00416	0.283	140	0.02900	1.973
107	0.00065	0.440	124	0.00468	0.318	141	0.03326	2.263
108	0.00074	0.500	125	0.00523	0.356	142	0.03742	2.546
109	0.00083	0.560	126	0.00580	0.395	143	0.04187	2.848
110	0.00093	0.630	127	0.00661	0.450	144	0.04707	3.202
111	0.00104	0.071	128	0.00742	0.505	145	0.05286	3.596
112	0.00117	0.080	129	0.00832	0.566	146	0.05939	4.040
113	0.00131	0.089	130	0.00935	0.636	147	0.06652	4.525
114	0.00147	0.100	131	0.01047	0.712	148	0.07483	5.090
115	0.00165	0.112	132	0.01180	0.803	149	0.08374	5.697
116	0.00186	0.127	133	0.01321	0.899			

Structure Response to Air Overpressure

 Structures are frequency dependent (more prevalent on upper levels)

 Air Blast rarely causes damage

 140 -150 dB = break window glass


 145 dB = cracked window breaks


ANSI S2.20 -1983 gives a structural damage criterion of about 0.25 Lb/in² (158 dB). The standard also states that "claims for damages such as cracked concrete foundations or broken pipes [from airblasts] are invalid." American National Standard Institute


Air Pressure is Greatly Affected by the Wind

 27 mph wind is equivalent to 133 dB

 40 mph wind is equivalent to 140 dB

 U.S. Weather Service (NOAA) data show all regions of the U.S. have the potential to experience winds up to 60 mph

 Anything moving through the air at a high speed creates pressure

 Average blast moves at 53'/sec. , or 36 mph

**Report on the Potential Effects of Blasting by
Capital Quarries 63 North Quarry
on the Lake Champetra Dam**



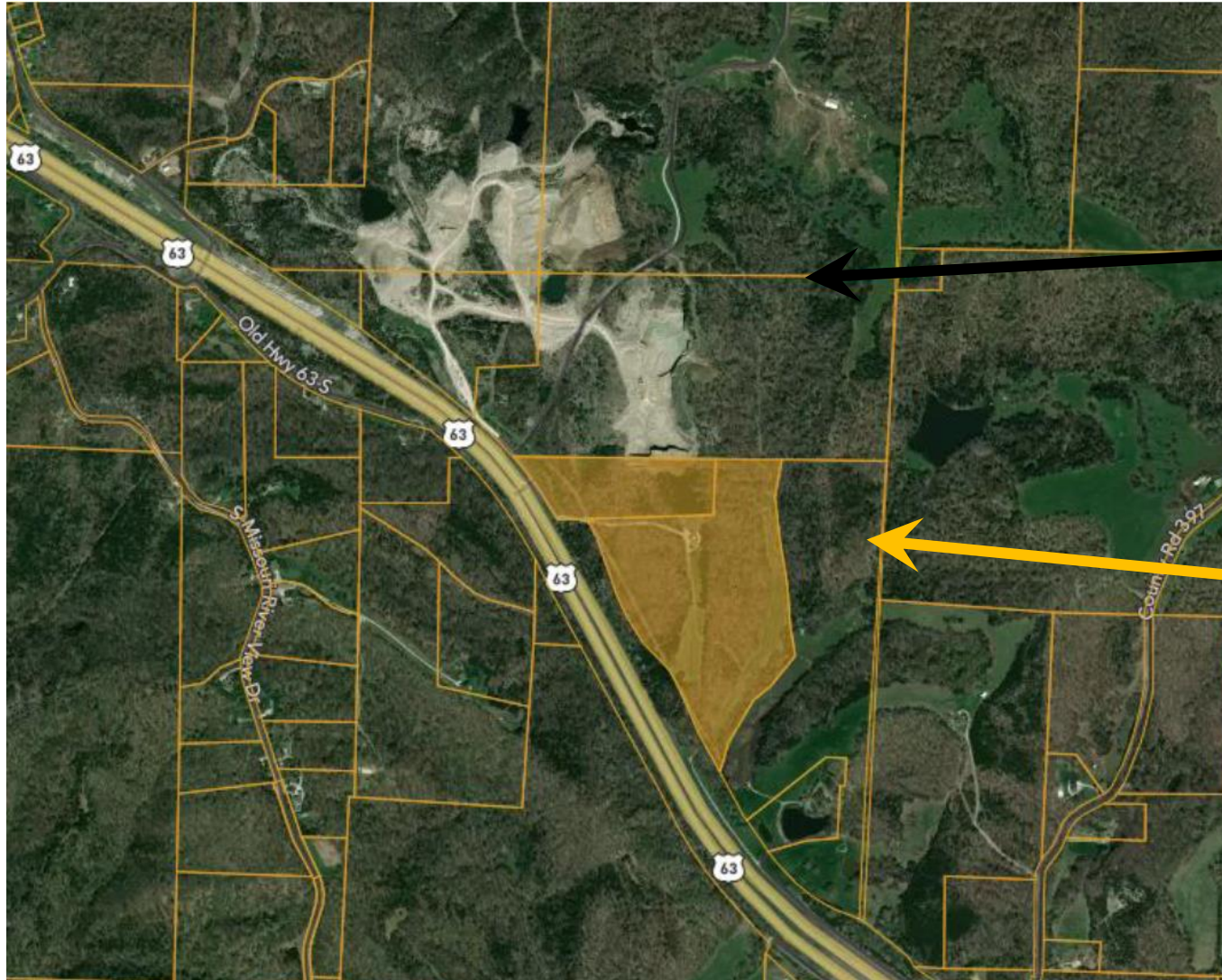
Date Prepared: 8 March, 2024

Dr. Paul N. Worsey - Emeritus Professor of Explosives Engineering

Department of Mining Engineering - Missouri S&T

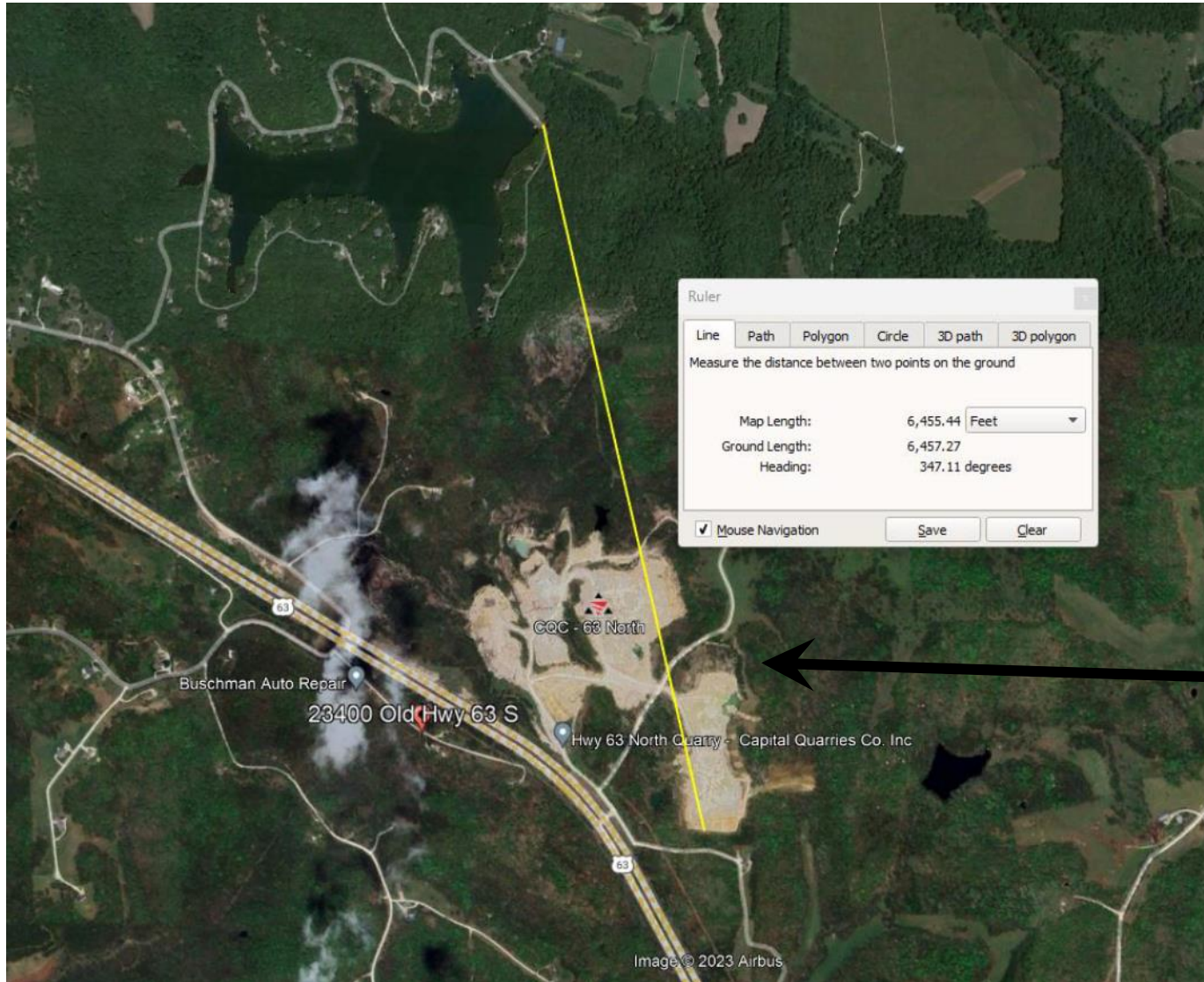
President of Worsey and Associates, Inc.





**Existing
Highway 63 North
Quarry Operations**

**55 Acre Parcel
purchased for Extraction of
limestone reserves
for aggregate and
agricultural production**



**Approximate 6,500 ft distance
from south end of the
Lake Champetra Dam to the
Northern boundary of the
55-acre parcel purchased**

**Existing
Highway 63 North
Quarry Operations**

Overview – Highway 63 North Quarry

- Quarry began operation in the 1960's – Adrian Brothers
 - Both Surface and Underground
 - Underground inactive for many decades prior to Capital ownership
- Capital Quarries purchased the Rights to the quarry from the Adrian Family in 1993
- Capital Quarries has purchased the 55 acres adjacent to the south property line of the quarry for the extraction of limestone reserves
- Distance from the south end of the Lake Champetra Dam to the northern boundary of the 55-acre parcel is ~ 6,500 feet



Overview – Lake Champetra Dam

Registered with the US Army Corps of Engineers (USACoE)

National Inventory of Dams (NID)

Lake Champetra Dam ID – NID – MO30880

- Owner – Lake Champetra HoA
- Year Completed – 1970
- Dam Type – Earth
- NID Height – 60 feet
- Last Inspection – 5/22/2022 (Every 2 years)
- Last Emergency Action Plan Submitted – 12/5/2011
- Dam Length – 600 ft
- Structural Height – 60 feet
- Volume of Material to Construct Dam – 240,000 cu-yds
- NID Storage – 1,530 acre-feet
- Surface Area – 47 acres
- Drainage Area – 0.93 square miles



Lake Champetra – USACoE Dam Classifications

- 2020 National Inventory of Dams (NID)
 - 39 of the privately owned dams in Boone County, MO are classified as “High Hazard”
 - Lake Champetra Dam is included in the 39 noted dams in Boone County
 - There are currently over 1,000 privately owned dams in the State of Missouri classified as “High Hazard”
 - “High Hazard” refers to the potential for downstream damage if the dam were to fail
 - The “Hazard Classification” does not reflect to the “Condition” of the dam
 - The “Condition Classification” for the Lake Champetra Dam is rated “Satisfactory”
 - NID has four (4) Condition ratings;
 - Satisfactory
 - Fair
 - Poor
 - Unsatisfactory



Lake Champetra – USACoE Dam Classifications

- 2020 National Inventory of Dams (NID)
 - The “Condition Classification” for the Lake Champetra Dam is rated “Satisfactory”
 - “Satisfactory” is the top rating in the Condition Classification
 - By USCoE NID definition:
 - “No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions, (static, hydrologic, seismic) in accordance with the minimum applicable state or federal regulatory criteria or tolerable risk guidelines.”
 - Seismic reference includes both the effects from earthquakes and blasting

Lake Champetra – USACoE Dam Classifications

- The prevalent causes to dam failure are overtopping, and poor maintenance of spillways and slopes leading to erosion and ultimate failure
- In a review of technical papers and published research, no blast related dam failures or dams having been compromised due to blasting have taken place
- Examination through aerial photography shows the dam to be substantial and in good condition with respect to the spillway and slopes
- The Lake Champetra Dam was completed over 50 years ago, as a result the materials used in the construction of the dam are fully compacted

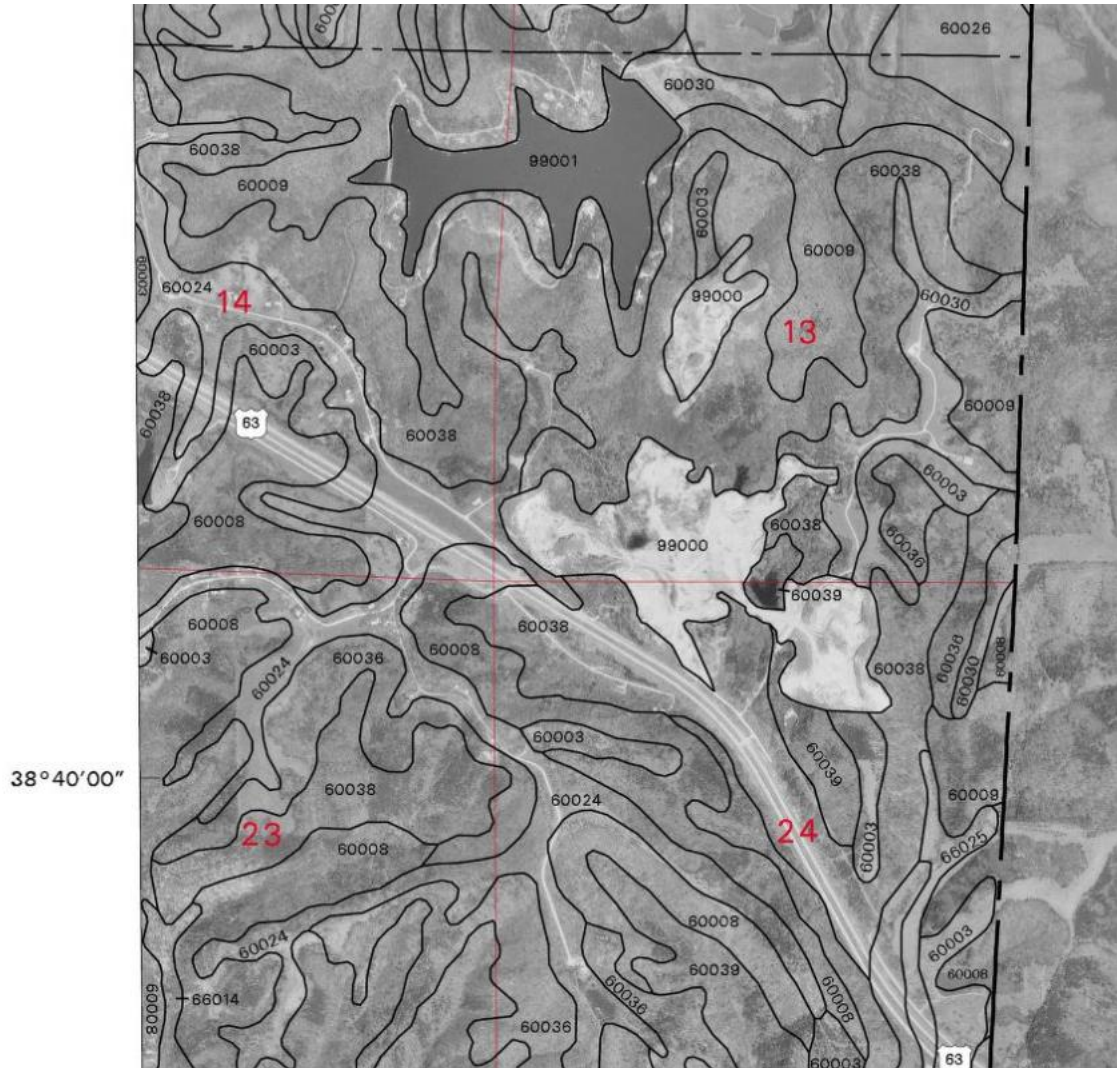
Lake Champetra – Blasting and Dams

- Blasting near, at, or even on dams is a common occurrence
- USACoE establishes site specific blast related vibration limits on an individual project basis taking into consideration construction type and condition of the dam
 - Vibration Limits observed range from 10.0 in/sec ppv down to 1.0 in/sec ppv
 - The USACoE is a very conservative entity when establishing vibration limits
- Earthen dams are constructed with suitable materials, compacted in layers which are very resistant to vibrations
- It is important to note that the large separation distance, approximately 6,500ft, between the new area that Capital Quarries has purchased, and the Lake Champetra dam means that blast induced vibrations and their resulting effects would be a “tiny fraction” of that of an earthquake



Lake Champetra – Blasting and Dams

- Vibrations from earthquakes are the “most serious”, due to the duration of the event and low dominant frequencies of the vibration waveforms
- Some earthen materials when subjected to significant vibration energy over a suitable duration in saturated conditions can be subject to liquefaction
- The most noted materials subject to liquefaction are uniformly graded sands, due to the open pore (void) space between the grains of sand allowing for fluids to move
- Minor clay content (~10%) in the soils will minimize the ability for liquefaction
- The soils around Lake Champetra have high clay contents
 - USDA NRCS soils maps depict soil units
 - 60009 – Clinkenbrand – Gasconade Rock – rocky soil remnants
 - 60030 – Wingfield Silt - loamy silt 2-5% slopes
 - 60038 - Rochport-Bonnefemme - loamy clay, 14 – 25% slopes
 - 60039 – Rochport-Bonnefemme – loamy clay, 25 – 45% slopes



USDA NRCS Soils Map

- **60009 – Clinkenbrand – Gasconade Rock – rocky soil remnants – outcrops & steep slopes**
- **60030 – Wingfield Silt - loamy silt 2-5% slopes**
- **60038 - Rochport-Bonnefemme - loamy clay, 14 – 25% slopes**
(Majority of dozed material utilized in the Lake Champetra Dam)
- **60039 – Rochport-Bonnefemme – loamy clay, 25 – 45% slopes**



Lake Champetra – Blasting and Dams

- Have been multiple studies on the effects of blasting impacts, from various types and forms, by a variety of organizations & agencies, and their effects on dams, including:
 - Nuclear Testing
 - Terrorist Bombs
 - Historical Attacks on Dams during WW II
 - Commercial and Construction blasting applications
- There are additional earthen impoundments nearer to the quarry than the Lake Champetra Dam , none of which have exhibited any signs of compromise:
 - A 4.3 Acre lake with a 300 ft long dam, due east 1,600 ft of the current highwall, and 200 ft from the property boundary (Boone County / Callaway County Line)
 - There are three (3) impoundments on the quarry property itself, the nearest being approx. 250 ft north of the current highwall
 - These four (4) impoundments are a small fraction of the distance to Lake Champetra

Capital Quarries – Hwy 63 N Quarry - Overview

- Formations present at the Capital Quarries – Highway 63 North Quarry are:
 - Cedar Valley Limestone
 - Cotter / Jefferson City Dolomite
- The materials from the operation are used for various purposes:
 - Construction and Road Base material
 - Asphalt aggregate
 - Concrete aggregate
 - Agricultural lime
 - Run of Quarry shot rock for flood control
- The main market areas served are:
 - Ashland
 - Hartsburg
 - Jefferson City
- Average Production over the past 10 years is ~ 400,000 tons per year



Capital Quarries – Hwy 63 N Quarry Drill & Blast

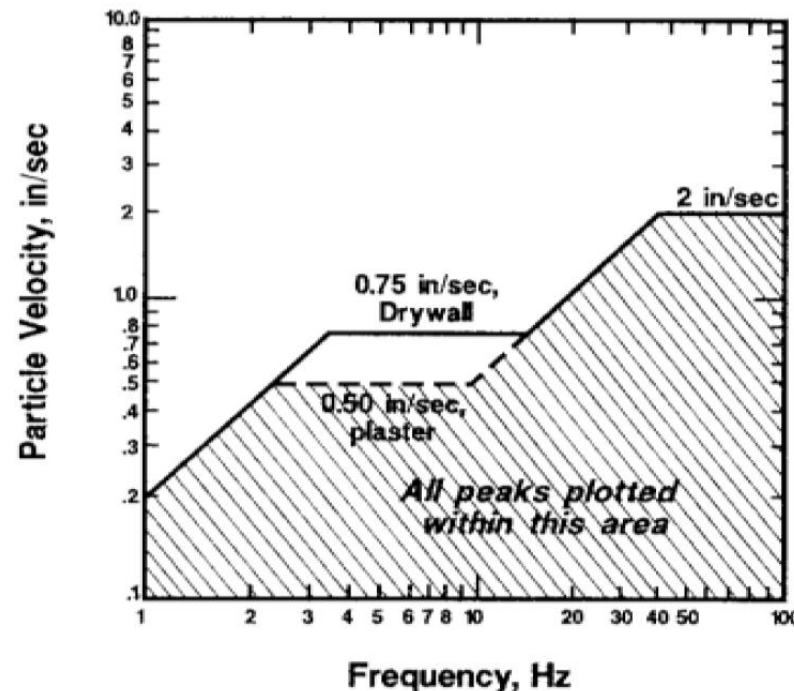
- **Blasting Services**
 - **Buckley Powder Company – Hermann, MO Magazine Site**
 - **Founded in 1921**
 - **Joint Venture Company with Dyno Nobel**
 - **Service mines and quarries across 13 states.**
 - **Buckley Powder manages the blasting services for the Hwy 63 North Quarry**
 - **VibraTech Engineers supports the blast vibration and air overpressure monitoring**
 - **Capital Quarries manages the blasthole drilling services to Buckley’s specifications**
 - **Capital Quarries manages the planning, preparation, stripping and coordination**
- **On Average the Highway 63 N Quarry blasts 20 times per year with an average size of approximately 20,000 tons per blast**
- **Regulatory compliance for commercial blasting activities in the State of Missouri are provided through the State Fire Marshal’s Office, enacted through the “Safe Blasting Act”**



Capital Quarries – Hwy 63 N Quarry Drill & Blast

- Regulatory compliance for commercial blasting activities in the State of Missouri are provided through the State Fire Marshal's Office, enacted through the "Safe Blasting Act"
 - The "Safe Blasting Act" was enacted in 2008
 - Protects homes and other structures from excessive vibration levels
 - Blast vibration levels are measured to the potential for damage threshold criteria noted in the Report of Investigation of the USBM RI-8507 Appendix B

The State of Missouri "Safe Blasting Act" regulates to the 8507 curve, also known as the "Z-curve"



The solid line depicts a potential for cosmetic damage to occur, and is the regulated limit for The State of Missouri

Capital Quarries – Hwy 63 N Quarry Drill & Blast

- Scaled Distance
 - The Scaled Distance Factor is a value used to compare blasts of different sizes with the purpose of assessing ground vibration levels
 - The higher a scaled distance factor is, the lower a vibration level will be
 - Conversely, the lower a scaled distance factor is, the higher a vibration level will be
 - In the State of Missouri if the calculated scaled distance factor, at a structure, is 55 or below, then a seismograph must be used to measure the ground vibrations and air overpressure (air blast)
 - In “General”, a Scaled Distance of 55 will result in a blast vibration of ~ 0.40 in/sec
 - The Scaled Distance Formula is:
$$SD = D / (W^{1/2})$$

Where: D = Distance, ft
W = Weight of explosives per 8 ms delay

Capital Quarries – Hwy 63 N Quarry Drill & Blast

- Scaled Distance (Cont.)
 - The Scaled Distance Factor, like any equation can be used to equate the value of an “unknown”, if you know the other two variables
 - How many pounds of explosives, detonated within an 8 ms delay, would be required to achieve a scaled distance of 55 at the Lake Champetra Dam if the charge were in the 55-acre parcel at the south end of the existing quarry?
 - We know that $SD = D / (W^{1/2})$
 $55 = 6,500 \text{ ft} / (W^{1/2})$
So, $W = (6,500/55)^2$
 $W = (118.18)^2$
 $W = 13,966.5$ pounds to detonate within an 8 ms delay period
 - At this point a seismograph would be required at the Lake Champetra Dam, with an associated expected vibration amplitude of 0.40 in/sec

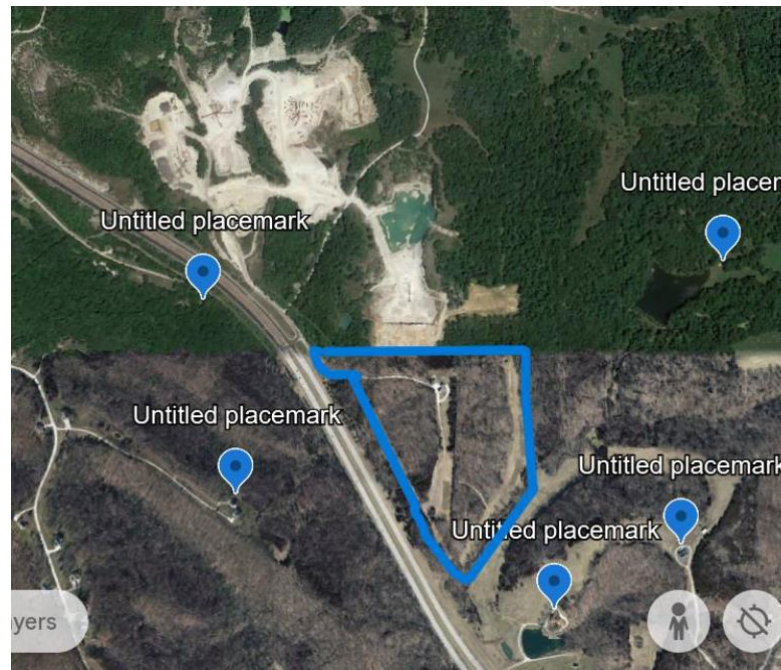
Capital Quarries – Hwy 63 N Quarry Drill & Blast

- Scaled Distance (Cont.)
 - Note; 0.40 in/sec is still below the potential damage threshold limits for damage to a given structure
 - Let's look at what parameters are typically carried out at the Hwy 63 N Quarry...
 - Typical hole diameter = 4" Φ
 - Face Height = 80 ft tall (For the sake of discussion... Current face height is ~50 ft)
 - Blasting Agent Density = 1.15 g/cc
 - Calculates to ~ 450 lbs of explosive/hole, when holding 8.5 ft of stemming
 - The Predicted Vibration Peak Particle Velocity (ppv) would be...
 - Vibration = $160 (SD)^{-1.6}$
 - $V = 160 (6,500/(450)^{1/2})^{-1.6}$
 - $V = 160 (306.6)^{-1.6}$
 - $V = 0.017$ in/sec ppv
 - A vibration of 0.017 in/sec is below any damage potential, can be perceived / felt

Capital Quarries – Hwy 63 N Quarry Drill & Blast

- Buckley Powder Company – Hermann Magazine Site
 - Safety is the #1 Priority on each and every blast
 - Incorporates the use of the “Best Available Technologies”
 - Mandates Annual Training in Best Practices for their Lead Blasters and Blast Crews
 - Company policy to utilize a seismograph at the nearest non-owned structure on each blast.

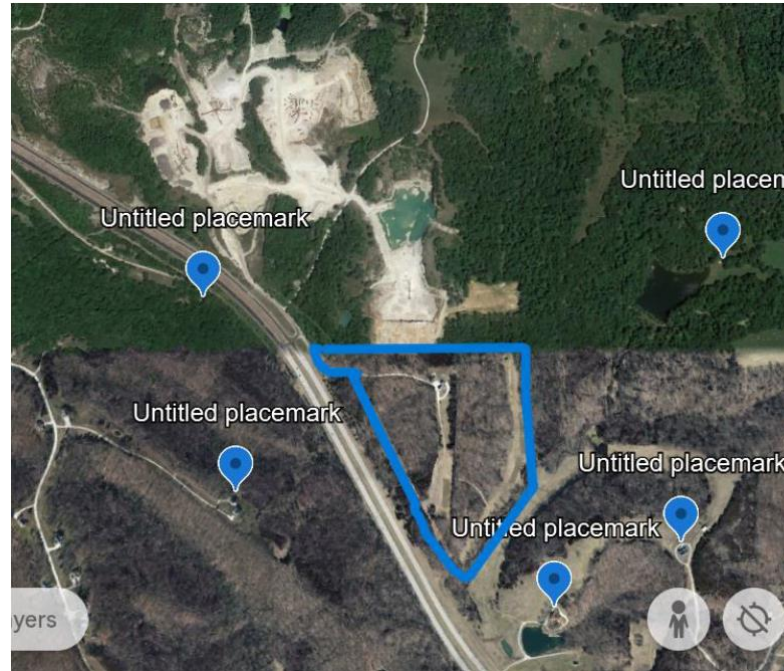
Nearest Neighbor Locations
to the parcel of property for
This CUP Application



Depending upon the location
of the blast, a seismograph
will be set-up at the nearest
of these homes

Capital Quarries – Hwy 63 N Quarry Drill & Blast

Nearest Neighbor Locations
to the parcel of property for
This CUP Application



Depending upon the location
of the blast, a seismograph
will be set-up at the nearest
of these homes

Nearest House	Edge of property	North edge	measurement
NE	1,750	1,750	ft
NW	1,200	1,200	ft
South	800	2350	ft
SE	1,200	2,550	ft
SW	1,300	1,600	ft
Champetra Dam, N	6,450	7,360	ft

Table 1. Nearest distances from the new permit area application to the closest residential structures and Champetra Dam. (Distances to the nearest 50ft)

Professional Opinions

1. **Blasting at the proposed permit area at the Capital Quarries – Highway 63 North operation will not affect the stability of the Lake Champetra Dam**
 - **This is due to:**
 - **Proposed permit area is too distant from the dam to have the slightest affect**
 - **Earthen dams are very resilient to blasting, even more than residential structures**
 - **The Missouri blasting regulations protect the dam, due to the houses around it**
 - **There are many houses a fraction of the distance away, which are protected by state law. These limits will further reduce the blast vibration levels at the dam**
 - **Blasting within the current permit area are not affecting the dam**
 - **Recent blast vibration results at the nearest residential structures calculate to approximately 2% of the lowest permitted vibration limits by the USCoE for dams**
 - **The soils around Lake Champetra contain clays to avoid liquefaction**
 - **The Lake Champetra Dam is a stout dam, in good condition and has the highest USCoE “Condition Rating”**



Professional Opinions

2. **Blasting at the proposed permit area at the Capital Quarries – Highway 63 North operation will not adversely affect the residents of the Lake Champetra Community**
 - **This is due to:**
 - A. **The large / great physical distance involved**
 - B. **State of Missouri blasting regulations more than adequately protect residential structures**
 - C. **There are many houses a fraction of the distance away from the proposed permit area, all of which are protected by state law. This will further reduce the vibration levels for the Lake Champetra residences**
 - D. **The new proposed permit area is further away from the currently permitted area**
 - E. **Blasting in the proposed permit area will be of the same approximate size as what is currently taking place in the existing permit area**
 - F. **To my knowledge, and that of Capital Quarries management, no complaints concerning ground vibrations have been made by Lake Champetra residents**

Conclusions

- The proposed permitting of additional land for mining south of the Capital Quarries Highway 63 North Quarry does not present a risk to the Lake Champetra Dam.
- Blast vibration levels at the south dam abutment will be at very low levels due to the large / great distances involved, as a result only a small fraction of the permitted levels by the US Army Corps of Engineers on their blasting contracts near dams.
- The permitting of the new land acquisition adjoining Capital Quarries on the south side of its operations at the Highway 63 North Quarry do not present a technical impediment from a blasting perspective. The current State of Missouri Blasting Regulations protect nearby structures located a fraction of the distance away from that of the dam to the new permit area. These structures act as an additional buffer for Lake Champetra from any blasting vibrations.

About Professor Worsey

- **Dr. Paul N. Worsey has a PhD in Mining Engineering, and an MS in Rock Mechanics and Excavation Engineering from the University of New Castle-upon-Tyne, he also has a BS in Applied Geology from Bristol University, in the United Kingdom.**
- **During his PhD studies he was employed by the UK Transport and Road Research Laboratory to troubleshoot blasting on highway contracts in the Scottish Highlands and assess the stability of road cuts.**
- **He is also a Top-Grade European Engineer, and Chartered Engineer in the UK.**
- **In 1981 he was recruited by the Univ. of Missouri – Rolla (MO S&T) to perform research at the Rock Mechanics and Explosives Research Center, and to teach courses in the Mining Engineering Department.**
- **He has worked on over 50 research contracts and has over 300 publications.**
- **Co-Host of the Discovery Channel’s “The Detonators”**
- **In 1990 was approached by the Missouri Limestone Producers Association to develop a Blasters Certification program for the State of Missouri. Holds Missouri License #2.**



Thank You for your time and Attention

Any Questions...?



Take Care, Be Safe!



Presented by Brian Treece
Capital Quarries Club 6/20/24

