
MELLOTT QUARRY EXPANSION ISSUES ANALYSIS

Prepared By Richard D. Klein
COMMUNITY & ENVIRONMENTAL DEFENSE SERVICES
811 Crystal Palace Court
Owings Mills, Maryland 21117
410-654-3021
800-773-4571
Fax: 410-654-3028
E-mail: info@ceds.org
Web Page: www.ceds.org

At The Request Of
FRIENDS OF MOUNT AETNA CREEK
Hagerstown, Maryland

January 14, 2005

CONTENTS

INTRODUCTION	1
OVERALL SUMMARY	1
BLASTING EFFECTS	5
GROUNDWATER EFFECTS	9
VIEWSHED EFFECTS	12

INTRODUCTION

Community & Environmental Defense Services (CEDS) was retained by the Friends of Beaver Creek to assist in resolving their concerns about the proposed expansion of an existing limestone quarry. Our research focused on issues relevant to the rezoning the applicant needed to expand the quarry. CEDS identified potential issues, verified the validity of each issue, compiled the information needed to support the issue, then lined up lay and expert witnesses to testify regarding each issue. Following are the results of our research and the testimony presented before the Washington County Planning Commission. This testimony prompted the Commission to recommend denial of the expansion, although the Board of County Commissioners subsequently approved the project, which is now on appeal.

OVERALL SUMMARY

The facts presented before the Washington County Planning Commission and the Board of County Commissioners on November 15th and December 13, 2004 show that rezoning the northern extension site to the Industrial, Mineral District will allow uses which are incompatible with adjacent land uses. In fact, the site has two characteristics which causes incompatibility to be substantially more severe on this site when compared to all other existing quarry sites in Washington County. First, the site is on a ridge which makes it impossible to screen area homes from the visual and blasting impacts of the proposed quarry. All other existing quarries, except the East Pit, are at an elevation below homes on adjacent lands. Second, the number of homes adjacent to the northern extension site is far greater than at any other existing quarry site in the County. Many of those residing in these homes already suffer due to blasting at the existing quarry. The northern extension would move blasting much, much closer causing the severity of impact and the number of households impacted to increase substantially. Blasting along with lowering of groundwater levels increases the likelihood of more sinkholes forming in an area which already has an abundance of sinkhole. At least one homesite is on a depression which is a potential sinkhole. This homesite is a mere 250 feet from the northern extension site boundary. Blasting also poses a threat to residential well water quality, the Mount Aetna Cave, and the archaeological and historic resources on the site.

Following is a summary of the testimony supporting the incompatibility issues summarized above.

The protestant's witness Mr. Tony Redman, an expert in the field of land use planning, testified that the Comprehensive Plan for the County 2002 and Article 15 of the Washington County Zoning Ordinance set forth criteria relevant to a request to rezone property to the Industrial, Mineral (IM) District:

Text on page 142 of the Comprehensive Plan for the County 2002 calls locating industrially zoned areas so that activities with higher noise levels can be directed away from residential areas. Mr. Redman also testified that Mount Aetna is one of the rural villages identified in the plan and the plans calls for special protection of rural villages.

Mr. Redman testified that the Article 15 purpose statement requires that new or expanded "IM" Districts be compatible with existing adjacent land uses.

Mr. Redman testified about a survey he made of each of the existing quarries depicted on a map contained in the Comprehensive Plan for the County 2002. Mr. Redman stated that after visiting the existing Beaver Creek quarries and the proposed northern extension, he found them to be fundamentally different in a way exacerbating incompatibility with adjacent land uses. Specifically, except for Beaver Creek, all the other quarries are situated at a lower elevation than the surrounding homes and roads. Mr. Redman testified that this makes it very easy to screen the existing quarries from the view of those living in homes in the vicinity and traveling nearby roads. In contrast, there are few homes on lands adjacent to the existing Beaver Creek quarry (East and West Pit) and the southern extension. Like other quarries in the County, the West Pit is located at an elevation lower than the few nearby homes and area roads. However, the East Pit and southern extension are situated on a ridge where it is highly visible. In fact, during his testimony Mr. Redman introduced an exhibit consisting of two photos of the ridge on which the East Pit and proposed northern extension is located. The East Pit was clearly visible at the right (south) side of these photos despite being one mile distant from the home where the photo was taken. The upper photo showed the existing scenic, wooded ridge north of the East Pit. The lower photo illustrated how the northern extension would degrade the viewshed from the many homes located to the west of this ridge. Mr. Redman also presented a second finding which makes the northern extension uniquely different from all the other existing quarries, including Beaver Creek - there are a far greater number of homes in the immediate vicinity of the northern extension. In summary, Mr. Redman testified that two factors will cause the northern extension to be far more incompatible with adjacent land uses when compared to all other quarry sites in Washington County.

1. The northern extension will be located on a ridgeline which will make it impossible to mitigate the visual and noise impact.
2. There are many more homes on lands adjacent to the northern extension when compared to all other existing quarry sites in Washington County.

Mr. Carl Boyer testified on behalf of the applicant in rebuttal to Mr. Redman's testimony. Mr. Boyer claimed that the visual impact of the quarry will be resolved with berms and other measures to screen views of the quarry from homes located within 500 of the northern extension, as required by Washington County zoning regulation 15.4(c). In support of this claim Mr. Boyer submitted an exhibit consisting of a plan labeled "East Pit - North Extension Washington County Rezoning Cross Sections Sheet 6 of 6," dated December 13, 2004. However, close examination of this exhibit shows that the view from the northernmost home, which is intersected by cross-section C2-C3 and the 500-foot demarcation line, will not be protected by proposed screening. Instead, the residents of this home will have an unobstructed view of the quarry.

From Mr. Redman's testimony it is clear that a fundamental requirement must be met to rezone a property to Industrial, Mineral District: Will the IM activities be compatible with adjacent land uses. Mr. Redman testified that all other existing quarry sites in the County are compatible because they are: a) situated below the elevation of existing nearby homes, and/or b) there are very few homes on adjacent lands. The northern extension site has many homes on the adjacent

lands and the site is at a higher elevation than many of these homes. Combined, these factors make the site uniquely incompatible with adjacent land uses.

Four area residents testified about how the vibration caused by blasting at the existing quarry shakes their entire home and greatly disturbs their quality of life. Two other witnesses testified as to how blasting at the existing quarry disrupts classes at Highland View Academy and disturbs those attending the Mount Aetna Camp & Retreat Center. The retreat center director and several homeowners testified about damage to buildings and other structures they attribute to blasting at the existing quarry. The affected homes and structures are located 0.75- to 1.5-miles from the existing quarry where the blasting is occurring. The proposed northern extension would move the site of blasting much closer to these and many other homes as well as the retreat center and Academy.

Dr. Robert Kondner, an expert witness, testified on blasting effects on behalf of the protestants. He explained that the northern extension site is in an area prone to sinkhole formation and how blasting could cause new sinkholes to form. He pointed to one proposed homesite located just 250 feet from the northern extension which sits on a depression which could become a sinkhole. Dr. Kondner also testified that blasting can cause groundwater to become muddy which could degrade the quality of the numerous residential wells located on lands adjacent to the northern extension site. Dr. Kondner also explained how blasting could damage Mount Aetna Cave by causing breakage of stalagmites and stalactites. Finally, Dr. Kondner testified that these impacts could occur with blasting both above and below the water table. In other words, the quarry need not penetrate groundwater to accelerate sinkhole formation, degrade well water, and damage Mount Aetna Cave.

During testimony on archaeological and historic resources, Dr. Charles Hulse, one of the protestant's expert witnesses, testified as to the presence of numerous resources on and adjacent to the northern extension site. Dr. Hulse submitted an exhibit consisting of a map showing the location of these resources, two of which occur within the area of proposed blasting and are labeled as "Fout Collecting Area" and "WAI-149" on Dr. Hulse's exhibit.

The applicant's blasting expert, Mr. Steve Carter, stated that blasting would not damage Mount Aetna Cave. Mr. Carter failed to address specific issues raised by Dr. Kondner such as breakage of stalagmites and stalactites.

Mr. Carter was also asked if he thought blasting would adversely affect archaeological and historic resources depicted on Dr. Hulse's exhibit at the northeast corner of the extension site. He testified that these resources would not be adversely affected by blasting. Mr. Carter was not asked about impacts to the resources located within the area of proposed blasting which were labeled as Fout Collecting Area and WAI-149 on Dr. Hulse's exhibit.

Finally, Mr. Carter was asked whether blasting at the existing or proposed quarry would damage area homes. He said he did not believe damage would occur, but provided little basis for this belief. He did not address the numerous disturbances described by those who live, learn, and

work in the area. Nor did he address how moving blasting much closer to a large number of homes on adjacent lands would exacerbate these impacts.

Hydrogeology professor Dr. Grant Garven testified on behalf of the protestants regarding groundwater effects. Professor Garven echoed much of Dr. Kondner's testimony by describing how sinkholes form. While Dr. Kondner focused on the effects of blasting on sinkholes, Professor Garven described how lowering groundwater levels can also exacerbate sinkholes by removing the support groundwater provides for overlying rock and soil.

Professor Garven testified that applicant data presented in a State of Maryland year 2000 report showed that the proposed quarry would lower groundwater levels by up to 50 feet. He found this magnitude of groundwater depletion more than sufficient to cause concern about accelerated sinkhole formation and impacts to residential wells on adjacent lands. However, Professor Garven also testified that the data provided by the applicant thus far was not sufficient to make an accurate assessment of impacts. Professor Garven stated that, at a minimum, one would need water levels measurements gathered monthly for at least twelve months from a monitoring well network and the results of pump tests conducted on the site. This data could then be input to a groundwater computer model, the output of which would allow Professor Garven to make an accurate assessment of how the northern extension would affect sinkhole formation and wells on adjacent lands.

Mr. Craig Robertson testified on behalf of the applicant in rebuttal to Professor Garven's testimony. Mr. Robertson stated that the State of Maryland report Professor Garven relied upon used data from a flawed monitoring well. This well (E2) had been drilled on the existing East Pit quarry by Mr. Robertson client - the applicant - at a point adjacent to the proposed northern extension. Mr. Robertson testified that after a number of other wells had been drilled on the site they discovered that well E2 was not reflecting true groundwater levels. Redrilling of this well caused the water level to drop by 32 feet.

Mr. Robertson testified that water level measurements had been made in the northern extension monitoring wells for six months, with a seventh measurement to be made in December 2004. He claimed that these measurements showed that the proposed quarry would not extend down to the water table. In support of this claim Mr. Robertson submitted an exhibit labeled as "East Pit Northern Extension - Cross Section T-U." However, this exhibit shows that the water table at well N2 occurs at an elevation 2.5 feet above the quarry floor as depicted on another applicant exhibit labeled as "Sheet 4 of 5 East Pit - Northern Extension Washington County Rezoning Reclamation Plan." Additionally, the Cross Section T-U exhibit shows that the water level in well N3 will be at an elevation 70 feet higher than at well N2. Portions of the proposed quarry between these two adjacent wells will be much more than just 2.5 feet below the water table.

Mr. Robertson claimed that the data they had gathered fulfilled the minimum requirements specified by Professor Garven. Yet, Mr. Robertson testified that only six months of water level measurements were available; not the minimum twelve monthly measurements specified by Professor Garven. Mr. Robertson did not present the results of individual measurements made

each month at each well. Instead just a single value was presented and Mr. Robertson never specified whether the single water level values were an average, maximum, or minimum for each well. Mr. Robertson also claimed that pumping from the East Pit quarry provided the pump test data specified by Professor Garven. This is somewhat ironic in that Mr. Robertson began his testimony by criticizing Professor Garven for using data from one well (E2) located adjacent to, but off of, the northern extension site. The location of pumping on the East Pit is even further removed than well E2. Furthermore, Mr. Robertson also failed to present the results of the so-called East Pit pumping test. Finally, Mr. Robertson did not present the results of computer modeling utilizing the water level measurements and pumping test data. Clearly, Mr. Robertson failed to meet the applicant's burden of proof that the proposed quarry would not be incompatible with adjacent land uses due to a lowering of groundwater and the resulting sinkhole and residential well impacts. Instead, the data presented by Mr. Robertson shows the proposed quarry will penetrate the water table and lower groundwater elevations.

BLASTING EFFECTS

Six witnesses who either live or work in the area testified as to their experience of vibration effects they attribute to blasting at the existing quarry. Two expert witnesses addressed blasting effects from the proposed northern extension: Dr. Robert L. Kondner testified on behalf of the protestants and Steve Carter testified on behalf of the applicant.

John Barron

Mr. Barron lives at 21266 Mount Aetna Road which is 0.8 miles from the existing quarry. He presented records made by his neighbor showing that 18 of the blasts which occurred at the existing quarry from June 18th to October 13, 2004 rattled the windows in his neighbor's house.

David Andrews Burrows

Mr. Burrows resides at 21917 Academy Lane which is one mile from the East Pit quarry. He said that he experiences blast-caused vibrations at his home and is concerned about how the northern extension would exacerbate impacts.

Woodrow Barron

Mr. Barron resides at 21110 Mount Aetna Road which is 0.8 miles from the East Pit quarry. He said his whole house shakes when blasts occur at the existing quarry. The proposed quarry would only be a half-mile from his home, making the blast effects much worse.

Alden Howell

Mr. Howell testified that he is the president of the student association at Highland View Academy, which is located 0.75 miles from the existing quarry. He stated that the Academy administration building presently shakes when blasts occur at the existing quarry. The vibration and noise creates a sensation of dwindling liquid beneath students desks which is very disrupting to classes and is frightening to Academy students.

Glen Milam

Mr. Milam stated that he was the director of the Mount Aetna Camp & Retreat Center which is located 1.3 miles from the existing quarry. Mr. Milam testified that the inner city youth who attend the camp find blasting from the existing quarry quite disturbing. Mr. Milam also testified that he believes quarry blasting has played a role in the need to replace the camp swimming pool three times over the past 40 years.

Clifford W. Shramm

Mr. Shramm lives at 10327 Highpoint Drive which is 0.9 miles from the existing quarry. Mr. Shramm testified that for the 21 years he's lived in his home there has been blasting at the quarry weekend and weekout. He said his house literally shakes. He described the first time he was off work and the whole house shuttered. Mr. Shramm said he had a mason look at his home to estimate some work. The mason noticed numerous cracks in the west wall of Mr. Shramm's home, which is the side facing the quarry. Cracks were found in other walls too. Mr. Shramm stated he had submitted an insurance claim. The insurance company adjustor found more cracks upon inspection of the claim.

Dr. Robert L. Kondner

Dr. Kondner began his testimony by describing how sinkhole form. He explained that sinkholes result from the dissolution of carbonate in rocks by water. The dissolution removes support from overlying material. The overlying material collapses forming a sinkhole. Sinkholes may also formed when soil and rock is dewatered and overlying material loses the support provided by water.

Dr. Kondner then testified that his review of the applicant's geologic map (Sheets 5 & 12 - Geology and Zone of Influence) showed numerous sinkholes in the vicinity of the quarry. These sinkholes form a curve surrounding the [northern extension] site which shows there is a very active karst phenomenon taking place around the site, meaning that formation of additional sinkholes is likely. Dr. Kondner also testified that a famous cave, the Mount Aetna Cave, is near the site. The cave was formed through the dissolution process he described earlier.

Dr. Kondner stated that the numerous sinkholes depicted on the applicant's geologic map plus the presence of the cave shows that the area is a "Swiss-cheese" of solution channels - subsurface chambers and channels formed by the dissolution process. He said some of these channels contained water. Dr. Kondner described how blasting proposed by the applicant would send shock waves through rock and the channels. He said the shock would cause an effect like water-hammer which would disturb and flush sediments from the surrounding material.

Dr. Kondner stated that the sediment disturbance could cause area wells to become muddy, degrading the quality of well water. He said the blast-caused shock waves will also produce a stress field which can fracture the cave and solution channels causing these features to collapse. The shock waves could also cause the collapse of material retaining water within solution channels. The draining of water from these channels would increase the likelihood of sinkhole formation at the land surface above these points of drainage.

Dr. Kondner testified that when he viewed the Easterday subdivision and northern extension ridge from the east he saw a depression on the slope below the proposed quarry which looked like a sinkhole. In fact one of the homes proposed for construction just below the northern extension will be located on this depression. He expressed concern that quarry induced stress will jeopardize this homesite due to sinkhole formation.

In his written submission, which was entered as an exhibit, Dr. Kondner wrote that there are 13 buildings [homes] located within 1,150 feet of the northern extension and a sinkhole within 1,400 feet. Dr. Kondner wrote that

“Any underground void - groundwater network between the quarry and the large number of sinkholes surrounding the quarry, could impact on the adjacent properties during blast thru stress wave propagation within the rock as well as thru shock wave surge action within the groundwater contained within the voids, fissures, fractures, solution channels, etc.”

In other words, Dr. Kondner wrote that blast need not be below the water table to exacerbate sinkhole formation in the area. Blasts occurring in the portion of the quarry above the water table could also accelerate sinkhole formation and pose a threat to nearby homes.

Dr. Kondner cited a U.S. Geological Survey report which described how blasts at quarries in karst areas, such as the Beaver Creek area, can damage caves by causing stalagmites and stalactites to break off and cause cave roofs to collapse with the propagation of collapse to the ground surface.

Steve Carter

Mr. Carter stated that he reviewed the blasting plan for the northern extension. He said he did not believe there would be any impact to the Mount Aetna Cave due to blasting. However, no specifics supporting this belief were provided by Mr. Carter. He did not address the cave damage Dr. Kondner described in his testimony, specifically breakage of stalagmites and stalactites and cave roof collapse caused by blasting at other quarries in karst areas.

Mr. Carter was asked if he thought blasting would adversely affect the resources shown on the archaeological and historic sites exhibit - presumably that submitted by Dr. Hulse. This question focused on the resources located in the northeast corner of the northern extension site and the northwest corner of the Easterday property. Mr. Carter stated that he did not believe that proposed blasting would adversely affect resources in this area. He was not asked about blasting impacts to any of the other resources depicted on Dr. Hulse's archaeological and historic sites exhibit, including the Fout Collecting Area and the WAI-149 site, both of which are located within the area of proposed blasting.

Mr. Carter was asked whether he saw anything in the blasting plans for the existing or proposed quarries which would cause the disturbing level of rattling and shaking of homes attributed by numerous area residents and workers to blasting at the existing quarry. Mr. Carter stated that the

vibrations caused by blasting would not be in the range that would cause any damage. He did not address the annoying and disturbing effects of blasting described by area residents.

Mr. Carter was asked by a Commission member if he had placed any shock and vibration transducers out to a half-mile or mile. Mr. Carter said they make measurements at 1,200 (0.22 miles) and 1,600 feet (0.30 miles) for every blast and others are done in random upon request. He said that the majority are within the 100- to 109-decibel range. The Commission also asked why measurements were not being made at homes where residents complained of vibration damage. Mr. Carter responded by stating that the blast-caused vibration at the homes was no greater than the vibration caused by someone walking across a floor.

Mr. Carter was not asked any questions regarding the specific points raised by Dr. Kondner with respect to the effect of blasting on increased sinkhole formation and the threat this posed to the numerous homes in close proximity to the northern extension site.

Summary

Six people who live or work 0.75- to 1.5-miles from the existing quarry described the impact blasting has on their lives. This testimony showed that students at the Highland View Academy find the blasting very disruptive of their classes. The director of the Mount Aetna Camp & Retreat Center described the disturbing impact blasting has on inner city youth attending the camp and believes blasting is part of the reason why their pool has been replaced three times. Residents described how blasts rattles windows and causes their entire home to shake. Several residents believe blasting has damaged their homes. All of these people expressed concern about how the proposed quarry will exacerbate the blasting impacts they suffer. In Mr. Tony Redman testimony, he stated that the northern extension is located within 250 feet of the nearest home.

Dr. Kondner testified that there is abundance of homes in the immediate vicinity of the northern extension and the area is prone to sinkhole formation due to blasting proposed by the applicant. Dr. Kondner cited a U.S. Geological Survey study which showed that blasting at other quarries in limestone (karst) areas caused collapse of solution channels and formation of sinkholes. Dr. Kondner testified that blasting at the proposed quarry could degrade the quality of area wells and could jeopardize homes through the formation of new sinkholes. In fact, Dr. Kondner pointed out one proposed home which is located on a sinkhole depression on the slope immediately below the proposed northern extension. The applicant's blasting expert, Mr. Steve Carter, offered no testimony in rebuttal to these concerns expressed by Dr. Kondner.

Mr. Carter did not address impacts to the archaeological and historic resources located within the area of proposed blasting on the northern extension site. He only addressed potential effects to the area at the northeast corner of the site, which is outside the blasting area.

Mr. Carter did not address the blasting impacts described by the six people who live or work in the area. Nor did Mr. Carter address how locating a new quarry close to a far greater number of homes (when compared to the existing Beaver Creek quarries) would exacerbate the blast impact.

In summary, the blasting which is an integral part of the proposed northern extension will create impacts which render the project incompatible with the residential land use adjoining the site. These impacts will occur from blasting shock transmitted through both saturated and unsaturated material - material above and below the water table.

GROUNDWATER EFFECTS

Two witnesses addressed the effect of the proposed northern extension on groundwater elevations at the proposed northern extension: Dr. Grant Garven testified on behalf of the protestants and Craig G. Robertson testified on behalf of the applicant.

Dr. Grant Garven

Professor Garven testified that to accurately determine groundwater levels its prudent to measure hydraulic head or water level elevations in observation wells over a period of several months to a year. Professor Garven stated that a long measurement period is particularly important for groundwater contained in unconfined aquifers, such as that in the Beaver Creek quarry area. Groundwater elevations will be lowest in the fall and winter when its drier and highest in the wetter months.

Professor Garven testified regarding various documents he reviewed which are relevant to groundwater conditions in the area. The first document referenced by Professor Garven was a Maryland Department of the Environment year 2000 study and a groundwater contour map included in the study as Plate 2.

Professor Garven testified that Plate 2 showed that groundwater flowed generally from east to west which means that groundwater elevations are highest on the east and lowest to the west of the quarry operations. He stated that there is a rather steep gradient to groundwater flow from east to west ending at Beaver Creek.

Professor Garven then referred to the applicant's plans for the northern extension and testified that these plans showed that the base of the quarry would be at an elevation of 510- to 520-feet above sea level. Referring back to Plate 2, Professor Garven testified that groundwater elevations in this area would be at 540- to 600-feet above sea level. Professor Garven stated that this data shows that the quarry pit would extend 40 to 50 feet into the water table on the east side of the proposed northern extension. When asked about the west side of the proposed quarry Professor Garven stated that mining would either be just slightly above or penetrate the water table by up to five feet.

Professor Garven was then asked about a 2004 plan [applicant's plan titled Beaver Creek Quarry Water Level Monitoring Data - September 23, 2004]. Professor Garven testified that there was one monitoring well, labeled E-2, which appeared on Plate 2, from the year 2000 report, and on the 2004 plan. Well E-2 is located at the southern edge of the northern extension. Professor Garven testified that the 2000 groundwater contour plan showed the water level in well E-2 at 546 feet above sea level and the 2004 plan showed the water level in this well at an elevation of 514 feet above sea level. Professor Garven testified that the 2004 plan showed that the water

level of 514 feet above sea level was measured on September 23, 2004 or 32 feet lower than the year 2000 level. When asked whether he would expect groundwater levels to be relatively low or high in September, Professor Garven testified that the level would be low. He also testified that measurements made in September would not be adequate to estimate how much higher groundwater levels would be in wetter months since September is the driest time of the year.

Professor Garven was then asked whether climatic variations might account for the 32-foot difference in year 2000 and 2004 water levels. Professor Garven said he analyzed data from two nearby wells operated by the U.S. Geological Survey. He stated that these wells showed that groundwater levels were generally lower in the year 2000 compared to 2004. Professor Garven testified that this is the opposite of what measurements in well E-2 showed. He elaborated by stating that since 2004 is a much wetter year than 2000 you would expect groundwater levels in well E-2 to be higher now than in 2000. Professor Garven reiterated that this is the opposite of what the year 2000 and 2004 E-2 well data shows.

Professor Garven testified that the single measurement presented on the September 23, 2004 plan did not provide sufficient groundwater level data to determine the impact of the proposed northern extension quarry. Professor Garven stated that measurements should be made in all monitoring wells on the northern extension site for at least twelve months to accurately determine groundwater levels. Additionally, Professor Garven testified that other tests, such as a pumping test, should be performed to characterize groundwater activity in the area. He stated that all this data could then be entered into a state-of-the-art model to accurately predict groundwater elevations on the site.

Professor Garven testified that without the twelve-months of water level monitoring, pump test results, and the modeling based upon this input data one ran the risk of quarrying below the water table elevation which could lead to sinkhole formation. Professor Garven explained that carbonate rocks [such as those in the Beaver Creek area] are supported by both solid rock and the water contained in pores between soil and rock particles. He said that when the water table is lowered the support is withdrawn which can cause collapse of overlying material and the formation of a sinkhole.

Finally, Professor Garven was asked what effect the northern extension quarry might have on area wells. He responded that without the twelve months of monitoring well measurements, the pump test results, and modeling analysis it was impossible to determine how nearby residential wells might be affected.

Craig G. Robertson

In his December 13, 2004 verbal and written testimony, Mr. Robertson responded to Professor Garven's testimony.

Mr. Robertson stated his belief that one could not extrapolate groundwater elevations on the northern extension site based upon data from just well E2 as Professor Garven had done. Mr. Robertson then described how twelve additional monitoring wells had been drilled on the

northern extension site. He said groundwater level measurements were initiated in these twelve wells in June 2004. Mr. Robertson stated that these measurements showed that well E2 was producing anomalous readings. He testified that well E2 was redrilled to a greater depth and after redrilling the water level dropped considerably in well E2.

During his verbal testimony Mr. Robertson introduced an exhibit labeled East Pit Northern Extension - Cross Section T-U. This exhibit depicted four monitoring wells labeled N1, N2, N3, and N4. A water level elevation is shown for each well. But neither this exhibit nor Mr. Robertson testimony explains what these water levels represent. In other words, we do not know if these are average water level elevations for the six-month monitoring period, maximum elevations, or even minimum water levels.

Mr. Robertson testified that the proposed quarry will not penetrate the water table. However, the data presented by the applicant clearly demonstrates that the quarry will penetrate the water table. The Cross Section T-U exhibit shows that the water level in well N3 is at elevation 600.03 feet. A dark blue line in this exhibit connects the water level in wells N1, N2, and N4 but ignores the water level in well N3. Mr. Robertson offered no explanation for this gross discrepancy during his verbal testimony nor in his written submittal. Additionally, the Cross Section T-U exhibit shows that the water level in well N2 is at elevation 529.46. The applicant's plan labeled Sheet 4 of 5 East Pit - Northern Extension Washington County Rezoning Reclamation Plan shows that the elevation of the quarry floor at well N2 will be 527 feet or 2.5 feet lower than the water level shown for well N2 in the applicant's Cross Section T-U exhibit. If a line is drawn on Mr. Robertson's Cross Section T-U exhibit from the 600.03-foot water level in well N3 to the 529.46-foot water level in well N2 then the penetration into groundwater is much greater than the 2.5-foot penetration at well N2.

Mr. Robertson presented his belief that the pumping conducted in the active East Pit quarry constitutes the type of pumping test recommended by Professor Garven. However, he presented no results from this "pumping test" nor the output from any modeling performed using pump test results and twelve months of water level monitoring which Professor Garven stated was the minimum necessary to accurately determine groundwater impacts.

Summary

Professor Garven testified that if quarrying at the proposed northern extension penetrated the water table then this could lead to the formation of more sinkholes in the vicinity and adversely affect nearby residential wells. He also testified that available information indicated that the quarry would penetrate the water table by up to 50 feet. But to accurately assess just what impact the quarry would have on groundwater, sinkholes, and area wells one would need at least twelve months of water level measurements from monitoring wells and the results of pump tests conducted in the wells. This data would then serve as input for a groundwater model, the output of which would provide an accurate picture of the probable effects of the quarry on sinkhole formation and nearby residential wells.

Mr. Robertson stated that six months of water level measurements had been made and contended that pumping at the East Pit constitutes the pump test recommended by Professor Garven. However, Mr. Robertson did not provide the results of the so-called “pump test” nor the output from a model using this data. But even if he had provided such output it would be based upon a mere six-months of water level monitoring data, not the twelve-month minimum recommended by Professor Garven.

The data presented in exhibits introduced by Mr. Robertson and the applicant contradict their claim that the quarry will not penetrate the water table. The proposed quarry floor will be 2.5 feet below the water table elevation in well N2. The water level in well N3 is much higher showing even greater groundwater penetration elsewhere in the proposed northern extension quarry.

VIEWSHED EFFECTS

Two witnesses addressed the effect of the proposed northern extension on views from homes and roads located in the vicinity of the proposed northern extension: Tony Redman on behalf of the protestants and Carl Boyer on behalf of the applicant.

Tony Redman

After describing his qualifications in the field of land use planning, Mr. Redman testified that he visited the other existing quarries identified in the Washington County comprehensive plan: Security limestone quarry, Rockdale limestone quarry, Pinesburg limestone quarry, Pinesburg slate quarry, Williamsport clay quarry, and the Benevola limestone quarry. Mr. Redman stated that he also toured the vicinity of the existing Beaver Creek quarries along with the vicinity of the proposed northern extension.

Mr. Redman stated that the northern extension site is unique in two ways. First, when visiting the vicinity of the other quarries one finds that most of the activity is below existing homesites and most are well bermed, screening the quarries from view from nearby homes and there are very few homes in the vicinity of the other quarries. Second, the northern extension is unique in that there is a great deal of residential development nearby. To illustrate this point Mr. Redman pointed to an exhibit consisting of a mosaic of Washington County topographic maps covering the vicinity of the northern extension. Mr. Redman explained that the topographic maps obtained from Washington County did not show all houses in the vicinity because a number of homes have been built nearby since the maps were prepared. Mr. Redman stated that there are over 40 to 50 homes either in the rural village of Mount Aetna or in the surrounding residential subdivisions which he believed created conditions where the proposed quarry expansion could not be found compatible with the surrounding land uses. Mr. Redman cited Article 15, of the Washington County Zoning Ordinance, which specifically requires in the purpose clause that a finding of compatibility with surrounding land uses be made. He contrasted the land uses surrounding the northern extension with the previously approved southern extension. Mr. Redman stated that land uses were totally different; night and day; a horse of a different color: “There is much more residential development here [around the northern extension..]” He stated that land uses surrounding the southern extension was much more akin to that at the other seven

existing quarries in the county; very little nearby residential development. Mr. Redman stated this created a very unique condition and made the northern extension site the wrong location for a quarry. He also stated that the site is located within the Beaver Creek Special Planning Area.

Mr. Redman cited text on page 142 of the County's comprehensive plan, within the environmental resources management chapter, calling for locating industrially zoned areas so that activities and environmental noise levels can be directed away from residential areas. He also pointed out that Mount Aetna was one of several rural villages identified in the comprehensive plan and that the plan calls for providing special protection of rural villages from incompatible uses.

Mr. Redman then pointed to an exhibit showing two views of the wooded ridgeline where the proposed northern extension would take place. Both views are from new homes located on Avonlea Hills Court, at a very high elevation, looking down at and southeast towards the ridgeline. The upper photo shows the ridgeline as it presently exists. The lower photo depicts the ridgeline as it would appear with the proposed quarry, including proposed berms to screen quarrying activity from view. Mr. Redman stated that given the change in view form that will occur their [owners of Avonlea Hills Court homes] views will be very much impacted by the proposed quarry.

In summary, Mr. Redman testified that there are a number of other locations in the County which are appropriate for this form of activity [quarrying] because homes are located much farther from possible quarry sites when compared to the northern extension site. There are existing homes within 500 feet of the quarry site and two are proposed to be within 250 feet.

Carl Boyer

At the November 15th Mr. Carl Boyer, H.B. Mellott Estate Vice President for Environmental Matters, described the five-sheet set of plans submitted as part of the rezoning application. Mr. Boyer claimed that the plans showed that there would be no real visibility of the quarry from the east, north or west because the trees and ridges that border each side of the quarry will not be affected.

On December 13th Mr. Boyer presented testimony in rebuttal to Mr. Redman concerns regarding the visual impact of the proposed quarry expansion. Mr. Boyer began his testimony on visual effects by stating that despite testimony by others there is very little visibility of the quarry from surrounding areas. He then read the following text which appears in the Washington County Zoning Ordinance at Section 15.4(c):

“Screen planting shall be required where mineral extraction and related activities are visible from adjacent residential, commercial or industrial structures or any public road located within five hundred (500) feet of the property line. Plant materials used in the screen planting shall be of such species, size, and number as to minimize objectionable views, dust, and noise. Whenever topography, existing vegetation, berm, or other natural barrier makes

screen planting either unnecessary or impractical, this requirement may be waived by the Commission.”

Mr. Boyer testified that the location of roads and all other structures within at least 500 feet of the property line were shown on Sheet 3 of the rezoning application for submittal. He then introduced a smaller version of Sheet 3 which is identified in the lower left-hand corner as “East Pit - North Extension Washington County Rezoning Cross Sections Sheet No. 6 of 6.” After describing what Sheet 6 showed Mr. Boyer then stated that

“the required screening of the site from adjacent residential structures is accomplished by the plan as it is proposed. The cross sections shown on the sheet, which you now have a copy of, is presented here clearly demonstrates that existing, unaffected slopes and vegetation on the east, west, and north will provide more than adequate screening of the quarry operations from adjacent and nearby residences and roads including locations within and beyond the 500-foot property line offset area required by the ordinance. What we’re looking at here, this site is a ridge. It is bounded on the west, north, and east by a ridgeline which is going to be quarried. The quarrying is going to take place within this ridgeline leaving the outer boundary essentially standing where they are. The top of the ridge will be taken off and inside the ridge will be lowered.”

Mr. Boyer then pointed to cross sections shown on Sheet 6. He explained that these cross sections depicted line of sight from areas outside the quarry site. Mr. Boyer stated that the cross sections depicted line of sight within the affected area and demonstrated that:

“you could not see quarry operations within the affected area; it is completely screened from the outside view and there’s no visibility available from Route 66 or Mount Aetna Road as well.”

A Commission member asked Mr. Boyer if he had presented a similar view analysis during the rezoning hearing on the Schneider Property (southern extension). Mr. Boyer answered that a similar view analysis was presented using a different method.

Summary

Section 15.0, of the Washington County Zoning Ordinance sets forth the purpose of the Industrial Mineral (IM) zoning classification the applicant has requested for the subject site, which reads:

The purpose of the Industrial, Mineral District is to provide for high volume mineral extraction in rural areas of the County. It is the intent of this Ordinance that Industrial, Mineral Districts be protected from encroachment by incompatible land uses and that new or expanded "IM" Districts be compatible with existing adjacent land uses.

This purpose statement sets forth a fundamental test for determining whether a site is appropriate for the IM classification. This test is:

...that new or expanded "IM" Districts be compatible with existing adjacent land uses.

Mr. Redman testified that the subject site is not compatible with the adjacent land uses because of two fundamental differences with other existing quarries in Washington County. First, the number of homes in the vicinity of the existing quarries is much lower when compared to the applicant's site. Second, the other quarries are excavated below the elevation of the few homes located in the vicinity, which makes it very easy to screen the other quarries from view. The applicant's site is situated on a ridge where screening is very difficult.

During his testimony Mr. Redman presented two photos of the ridge taken from existing homes to the west. The two photos were mounted one above the other on the same board. The upper photo shows the ridge as it presently exists. The lower photo showed the area of the ridge altered by proposed quarrying and visible to the west. This exhibit clearly demonstrated a profound impact to the viewshed of homes situated west of the proposed northern extension site.

The proposed northern extension fails the fundamental compatibility test because of the unusually high number of residences located in the vicinity of the site and because site topography makes it impossible to screen the proposed quarry from view.

The applicant's testimony on viewshed effects was restricted to Section 15.4(c) of the Zoning Ordinance requiring that a quarry be screened from view from homes and roads located within 500 feet of a quarry site. However, implicit in the construction of Section 15 of the Zoning Ordinance is that if a quarry is screened from view from homes and roads within 500 feet then it will also be screened from more distant homes and roads. As stated during Mr. Redman's testimony, this is true for the other quarries in Washington County because these other mining sites are at a lower elevation than nearby homes and roads. This is not the case for the applicant's site. Because the proposed quarry is situated on a ridgeline, screening it from homes within 500 feet does not screen it from view from residences located at a greater distance.

The two photos introduced by Mr. Redman show the site of the proposed quarry and a portion of the existing East Pit of the applicant's quarry. Visible at the far right-hand (south) side of the photos is the blacktop plant at the existing quarry. The blacktop plant is clearly the tallest and most visible feature at the existing quarry and causes the greatest viewshed impact. Sheet 3 of the applicant's "East Pit - Northern Extension Washington County Rezoning Mining Plan" shows that a "Ready Mix Concrete and/or Blacktop Plant" will be located at two points within the proposed northern extension. None of the cross sections presented on Sheet 6, submitted during Mr. Boyer's testimony, reference the blacktop plant. By failing to include the concrete or blacktop plant in the cross sections the applicant has failed to demonstrate that the quarry will be screened from view from homes and roads within 500 feet. Clearly the blacktop plant would be visible at both locations west of the ridge.

While Mr. Boyer testified that Sheet 6 showed that all homes within 500 feet from the property line would be screened from view, this is not what Sheet 6 actually shows. The home of Michael & Martha Blake is located at 10501 Trotter Drive, which is the house shown on Sheet 6 at the

point where the red-dashed “500 Ft. Property Line Offset” line passes through the C2-C3 cross-section line. Sheet 6 shows that the Blake home is located at elevation 598 feet. The second floor of the Blake home would be located at elevation 612 feet. A line extended from elevation 612 at the Blake home south along cross-section C3 through C1 intersects the proposed quarry area and passes over top the 20' trees depicted on Sheet 6. In other words, quarry operations will be visible from the Blake home which, again, is within 500 feet of the property line.