The decision of whether or not to build the proposed Rail Line Quarry in the South Draw tributary to Eldorado is a decision that involves Jefferson County’s government, citizens, and industry. A locally owned mining business, the Asphalt Paving Company, owns a tract of land surrounding the South Draw. The tract is positioned in an area zoned as Agricultural-1, which allows agriculture and low density residential development. The current decision facing Jefferson County exists because the Asphalt Paving Company has submitted a proposal to rezone the area to allow mining. The potential impacts of the Rail Line Quarry have drawn many interested parties into the decision process and resulted in a myriad of approaches, arguments, and assertions. Numerous citizens groups, the planning commission, and the Asphalt Paving Company have all based their arguments on “fairness,” or equity—often defined by government regulations. However, in addition to this aspect, the decision of whether or not to build the Rail Line Quarry in the South Draw is a question of economics. The absence of economic data relating to the mine not only excludes considerations of efficiency, but also make a full and accurate discussion of “fairness” impossible. Economics can provides a more rational and methodological base from which to approach the decision facing Jefferson County.

The decision should be approached from two different avenues of thought: efficiency and equity. However, the question of equity cannot be addressed without information on cost and efficiency. Thus, efficiency must be addressed first; it is what economics is designed to explore. In question form, the efficiency issue would be addressed as follows: If resources are reallocated—that is, if rezoning allows the land to change from a tract of woodlands to a quarry—will efficiency be improved? Efficiency is defined in terms of a potential pareto improvement: Would it be possible for the gainers from the reallocation of resources to compensate the losers from the reallocation
of resources to create a situation where some members of society are better off while no members are worse off? Thus, in final form, the basic question of efficiency would be: Will the benefits of constructing the quarry outweigh the costs?

Having determined a standard and created a specific, quantifiable question, a method for addressing the question must be chosen; the nature of the decision must be determined. Is the question marginal or discrete? The quarry decision has a marginal quality because the proposal can be and is modified during negotiation between Jefferson County and the APC. However, because the process is a negotiation between two parties, neither of which are primarily interested in society’s welfare, and is not subject to market forces, it is not likely that marginal benefits will ever be brought into equilibrium with marginal costs or that marginal social cost and marginal private cost will ever be reconciled. Further, at the latter stages of the decision process, a formal and final proposal will be submitted, at which point the decision will transform into a yes or no question with no marginal qualities. Thus, the equation of marginal costs and marginal benefits that normally signals efficiency cannot have a place in an economic approach to this issue. Due to the above reasons, the decision under consideration will be assumed a discrete decision for the purposes of this analysis. A cost-benefit analysis will be assumed the applicable economic tool.

With the proper question and methodology ascertained, the collection and analysis of data must be begun, with the final result being a policy recommendation. This process is lengthy, complex, and beyond the scope of this paper. However, the framework outlined above can be used to evaluate the work already done by involved parties. The decision process to the present has not included a cost-benefit analysis or any significant amount of economic methodology. It has been based upon compliance with policies and procedures adopted in 1977 and sporadically revised since that time. The process undergone to arrive at these regulations did not rely on economic data; thus, it is assumed that these regulations on water pollution, noise levels, air quality, etc. are based on the idea of equity. (Commercial Quality 3) Further, the regulations are command and control policies, which are not optimal in this situation. The use command and control policy is problematic precisely because it often undermines efficiency. On a societal level, such policies are generally undesirable, but in the case of the Rail Line Quarry,
command and control policies require further discussion. Policies that regulate pollution at a specific level could be useful in creating a potential pareto improvement. If pollution costs (including damage and abatement) equaled \(a\), opportunity costs of the resource equaled \(b\), and benefits equaled \(c\), then specific command and control policies could cap pollution such that \(c > a + b\) and a potential pareto improvement existed. However, while this may possess some appeal in isolation, it does not achieve maximum efficiency. In the case of the quarry, such measures could only be justified if the monitoring costs were extremely high. Because the Rail Line Quarry would be located in a small area, the pollution should be localized and not prohibitively expensive to monitor. Due to this characteristic, targeted levels of pollution would be better reached by considering all polluters and instituting alternative policies that contain pollution below a desired level while equating marginal abatement costs across all producers of pollution.

A component of pollution that has become central in the rezoning debate, noise and blast vibrations, illustrates the criticism outlined above. The discussion of this issue begins from a fact recognized by both the APC and the residents: noise will increase in residential areas surrounding the canyon. There exist some debate on the exact amount of the increase, but it is generally estimated to be between 20dB to 30dB. If the tract is rezoned, the county will place no limits on noise, leaving state regulations to govern the quarry. Under these regulations, a 20dB to 30dB is legal. (Noise 2-5) Thus, the APC has focused its efforts on producing scientific proof that the noise increase will indeed fall within the above range. The concerned citizens and surrounding residences have focused more attention on the expected effects of the increase and their “incompatibility” with residential living. The residential groups cite “negative health impacts” and provide a graded system for qualifying the actual vibrations from blasting. (Rebuttal 95) The system of qualification assigns the labels of “perceptible, noticeable, unpleasant, disturbing, and objectionable” to different ground velocities of vibration. (Rebuttal 94) The residents’ rebuttal concludes “The potential noise and ground motion impacts on the Crescent Park community allowed by the ODP are extreme even by the standards presented in the application, are incompatible with current and envisioned land uses (per NMCP), and suggest that the proposed quarry is highly unsuitable for this residential area.” (Rebuttal 95) To an economist attempting a rational and systematic approach, the
flaws in this analysis are obvious. The residents have collected no quantifiable or even
detailed qualitative data on the effects of the noise and vibration increase. In order to
make a rational and informed decision this information is necessary. A better approach
could be outlined as follows. First, all possible impacts should be determined. These
would include depreciation of property value, quality of life, health problems, resulting
medical expenses, and structural damage from the vibrations. Further, impacts that
would affect citizens other than near residences, such as noise impacts in Eldorado
Canyon and Open Space, should be considered. All of these issues should be considered
and quantified. An expensive, lengthy study, however, is not required. Any estimation
would allow a more knowledgeable discussion than that which has occurred thus far.
The residents cite health problems, but do so in such a vague manner that it unclear
whether a small percentage of residences will experience minor fatigue or insomnia, or
whether many residences will experience depression and violent tendencies. The
residents’ rebuttal also leaves the decrease in property values unestimated. Is it between
$300,000 and $500,000 or over $2,000,000? Though such general data could be obtained
inexpensively by examining similar situations, it would provide a base for an informed
discussion and facilitate a rational, economically sound decision by allowing a cost-
benefit comparison to occur.

However, more erroneous than the lack of data in the cost discussion, is the
absolute absence of benefit discussion. The blame for this error again lies with the
command and control policies the decision process has focused upon. The APC has
narrowed its efforts to proving the quarry’s compliance while community members have
argued this compliance and focused upon the quarry’s negative impacts and resulting
“incompatibility.” Only weak and vague efforts by APC have been directed at benefit
estimation. The benefits asserted by the APC are 1) creation of jobs, 2) increased tax
revenue and, 3) satisfaction of demand/avoidance of a shortage.

The APC makes the standard corporate claim of job creation. (Commercial
Quality 4) This assertion, however, is economically false. Economic theory cites two
criteria under which jobs are created. First is the existence of structural unemployment in
Golden. Golden, being a city void of a significant poverty, does not have a population
segment unable to migrate to job opportunities. Second is the creation of a comparative
advantage or increase in factor productivity. The Rail Line Quarry will not introduce or
develop new technology to increase efficiency; and, thus will not create new jobs. The
Rail Line Quarry will merely transfer jobs within the economy.

In the area of tax revenue, or more specifically, benefit to the county government,
some effort has been made towards quantitative analysis, though it is incomplete. The
APC has presented a study that examines three possible uses of the tract and produces
revenue figures for each using the formula of tax revenues minus the costs of government
services. First, if the property is left undeveloped, the APC estimates the costs of
services as negligible and gives a total figure equal to tax revenue, $500. This seems
fairly accurate. Second, the land may be developed under current residential zoning.
This would produce 75 homes and approximately $112,500 in tax revenue. The costs,
however, are unquantified; not even an interval estimate is provided. The APC merely
lists possible costs as schools, road construction and maintenance, and sheriff services.
They then conclude that these costs will exceed the $112,500 of tax revenue, creating an
unestimated net loss for the county. Third, the rezoning may be approved and the quarry
constructed. The APC proposal calculates a $49,500 increase in revenue ($50,000 tax
revenue from the quarry - $500 current revenue). The proposal then dismisses the costs
to the county as negligible and offers a final figure of a $49,000 net increase in tax
revenue. (Fiscal Impact Analysis 2-4) This is obviously irrational and incomplete.
Among many mistakes, the dismissal of service costs as negligible ignores government
responses to complaints concerning air, water, noise, etc., monitoring and enforcement
costs, losses in tax revenue from a decrease in residential property values, and the
obvious costs to the county of the proposal process, which would already take several
years of tax revenue to recoup. Citizens’ groups point out many of these shortcomings,
but do not attempt to quantify any of the cost data ignored by the APC. (Rebuttal 52-53)
As a result, this issue is especially demonstrative of the exclusion of methodological cost-
benefit analysis by both the residents and the APC. The benefits accruing to the county
are quantified, and the simultaneous costs do not require extensive, costly studies, but
merely research, analysis, and application of existing data. Yet, no efforts have been
made to produce a cost-benefit analysis despite it being so easily within reach.
Finally, the APC claims the benefit of demand fulfillment or the prevention of resource depletion. This benefit is the most thoroughly explored by the APC and also allows the most discussion of economic theory. First, the APC claims a danger of resource exhaustion. The study estimates, with current reserves, resource depletion by 2002 “based upon growth projections and upon accepted figures for annual consumption on a per capita basis” (Commercial Quality 6). This Malthusian argument is directly opposed to economic theory and contains two major flaws.

First, the study bases its findings on a fixed per capita consumption rate of 11.0 tons. (Commercial Quality 6) This extrapolation ignores the rationality of economic agents. It assumes that as supply decreases and price increase, agents will not respond to market signal in any form; they will not curtail consumption or seek out alternatives. Economics assumes the opposite: agents are believed to be rational beings who respond to market signals. As the price increases due to decreased supply, economics assumes the agents will respond by lowering consumption.

Second, in a related point, economics defines the resource base with respect to technology. In its study, the APC does not, assuming the base to be fixed. This assumption is incorrect. As price increases stimulate technological advances, conservation and the pursuance of alternatives will occur. Efficiency will increase, alternative materials will be developed, new resources will be discovered, and recycling will occur. The shift from wood to coal and from whale oil to kerosene provides empirical evidence. More recently, the increased supply and decreased price of petroleum demonstrates the effectiveness of rational responses for a resource for which similar predictions of depletion have been made.

Third, the APC’s study extrapolates upon “the growth rates we have been experiencing in the 1990’s” (Commercial Quality 9). Again, this is an uniformed, Malthusian assumption that stands opposed to economic thought and evidence. The extrapolation of growth rates again ignores the rationality of economic agents. The concept of an ever-increasing population whose demand will overcome resource supply is disproved by the economic theory of fertility, which assumes that agents act rationally. Addressing growth rates, the model assumes two sources of demand for children: demand for producers’ durables and demand for consumers’ durables. As producers’ durables,
children contribute to the family income and provide a form of security for the parents in their retirement. As consumers’ durables, children provide utility to the parents in the form of altruistic satisfaction, sense of meaning, love, etc. The household consumer model also addresses costs and contraception. Parents do not abstain from an additional child unless the cost of having that child is greater than the cost of contraception. Recent data displays two important trends: 1) the cost of a child is increasing (due to opportunity costs for working mothers and increased direct costs, such as education, etc.) and 2) the decreasing financial and psychological costs of contraception. This two factors alone combine to explain a decrease in growth rates. Demand, however, completes the explanation for declining growth rates. As the need for children as producer’s durables declines the demand for children as consumers’ durables increases; thus, the demand for quality, because it increases the utility of children, increases. Because quality entails a higher expenditure per child and the household operates under the constraint of limited resources, the number of children demanded decreases. Data supports this theory and predicts population stabilization and a zero population growth rate occurring in approximately 2020. Predictions of consumption and demand based on the extrapolation of current growth rates, including APC’s predictions, are incorrect.

In addition to its Malthusian errors, the APC report contains additional assertions that are economically incorrect and deserve attention. In concert with its claims of resource depletion, the APC makes a series of statements concerning imports: “Because of the lack of long term resources, we have long ago surpassed the situation where each county can supply its own needs” and “These types of import operations are significant in that they would never have been financially possible when closer reserves were available to meet market demand” (Commercial Quality 8). In the context of the report, these statements imply that the importation of quarry materials into Jefferson County is a negative occurrence; they, in some sense, advocate a closed market. The report then goes further to claim that the local Rail Line Quarry will “help insure a longer term supply for the metro area,” implying that local supply will be the only source available to meet long term demand. (Commercial Quality 9) Obviously, these assertions oppose virtually all economic thought since Adam Smith uttered the words, “free market.” The firm with a comparative advantage, which can produce the product at the lowest comparative cost,
should always produce the product. This issue is null with respect to the decision process, which should still be based on a cost-benefit analysis.

Finally, it should be noted that the APC has ignored what should be at the center of the benefits component, the value of the extracted resources. Nowhere in the APC’s proposal is the expected value of the extracted resources estimated.

An issue that is separate from the cost-benefit analysis but has extensive indirect affects is the definition of society. This is perhaps the only area of discussion where two opposing cost and benefit categories are acknowledged and compared. The residential groups involved recognize that themselves and visitors to Eldorado Canyon and Boulder Parks will absorb the costs and externalities resulting from the quarry. They also recognize that the benefits from the quarry, defined as the extracted minerals, will most likely accrue to residents of other counties and states. (Rebuttal 52) This argument, however, is problematic from an economic standpoint. If society were defined as all residents within a 5 square mile radius, the costs would obviously be greater than the benefits. If society were defined as the citizens of Golden, it would seem intuitive that, if minerals were utilized out of the county, then the costs to the residents of Golden would be greater than the benefits. However, it is important to recognize that for a potential pareto improvement to occur, the distribution of benefits and costs does not need to be equitable. If the benefits, defined to include tax revenues and profits captured by the APC, were found to be greater than the costs incurred by the residents and recreators, then a potential pareto improvement would exist. All arguments against such a scenario would be equity based.

The most fundamental problem with the present proposal process is the focus upon aging command and control regulations based on equity, which has led the involved parties to ignore such economic tools as cost-benefit analysis. This exclusion may or may not by the result ignorance—either party could focus upon equity as a tactic. But, from an economic view, a focus upon equity to the exclusion of efficiency is undesirable whether or not it is tactical. The current discussion does not direct the process towards a maximization of efficiency; thus, economics rejects this current process and suggest a cost-benefit analysis. Though a site specific, complete cost-benefit analysis would be lengthy and expensive, such a study is not necessary. Much of the work on costs such as
air and water pollution has already been completed, but has not been transferred into quantitative estimates. Further, much of the uncompleted work, such as costs for property value declines, structural damage, and government monitoring can be estimated based upon data from similar quarry-residential interactions. The main criticism of this paper is not the absence of an exhaustive cost-benefit analysis, but the absence of effort to approach the decision process in a rational, methodological manner aimed at maximizing social welfare.
Works Cited

“Citizens’ Rebuttal.” On file at Jefferson County Administrative Center.


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