

VISUAL LANDSCAPE ANALYSIS OF RURAL

IOWA LIMESTONE QUARRIES¹

by

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Abstract. One of the most common and significant environmental impacts of rock quarries is the visual intrusion of the mining operations, facilities and associated activities of what is an industrial activity in a rural landscape. Four operating limestone quarries in Iowa were analyzed in terms of their visual impact on the rural landscape. The analysis was based on field observations and photographs of significant or typical views seen by the general public from adjacent roads. The photographs were used to determine the type and degree of visual landscape intrusion. Using the photographs as bases, sketches were developed to analyze the existing conditions and the potential of alternative landscape treatments in mitigating adverse visual impacts. Some landscape treatments were found to be not only ineffective, but to be counterproductive in mitigating the visual impacts. Some of the alternatives analyzed were: single plants and planting patterns, exotic or non-indigenous plant forms versus indigenous plant forms, and indigenous plant species versus non-indigenous plant species. Some of the recommended alternatives are: Provide a landscape setback along public roads and property boundaries where appropriate, use more visually compatible plant species and landscape planting plans, determine where and to what extent visual screening is an appropriate goal, and develop and implement an appropriate long-term landscape and maintenance plan consistent with the operator's visual and landscape goals. It was found that to determine the appropriateness and effectiveness of landscape treatments used to mitigate the visual impacts of limestone quarries a clear statement of the intent is necessary. A visual analysis of the mining operations can be more useful in determining the most appropriate, effective and economical landscape treatment to mitigate perceived visual impacts of the limestone quarries.

Introduction

The construction aggregate mining industries produce 43% of all U.S. mineral commodities (largest of any mined commodity). These operations are located in every state and have the highest public visibility in the mineral industry. They also can be characterized as occupying a relatively small area for a long time

(20 to 50+ years is not uncommon) which can lead to conflicts with surrounding land uses (NAS 1980).

Much of the land disturbed by stone quarries is not reclaimed until the mining operations are complete. Significant and real conflicts can exist between quarry operators and their neighbors. Of the most difficult conflicts to resolve are: 1) truck traffic, 2) quarry blasting and ground vibrations, and 3) unsightliness. Unsightliness can be lessened or mitigated if the operators "Landscape" or screen their operations. (NAS 1980)

Limestone quarries can visually intrude on the rural landscape by the introduction of contrasting scale, forms, colors and textures into the landscape along with removing vegetation. The purpose of this study was to determine the effect of some commonly used landscape elements in

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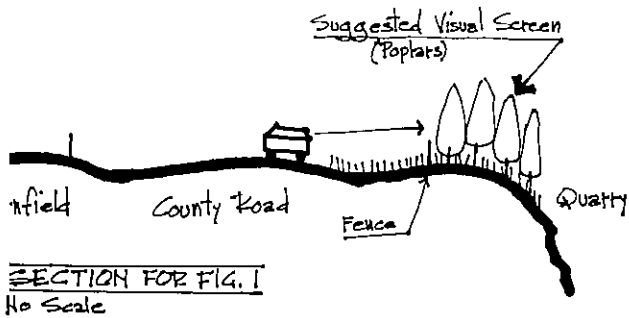


Figure 4 illustrates an approach to visually screening the spoil piles from the road. Figures 5 and 6 show approximately the same view in the winter as Figures 1 and 2 respectively. These figures show the necessity for making visual surveys at different times of the year under various conditions. The white snow cover on the ground eliminates the visual impact caused by the white spoils creating a very significant color contrast. Figure 5 also illustrates that deciduous vegetation still can provide some visual screening when the plants are dormant and without leaves in the winter.

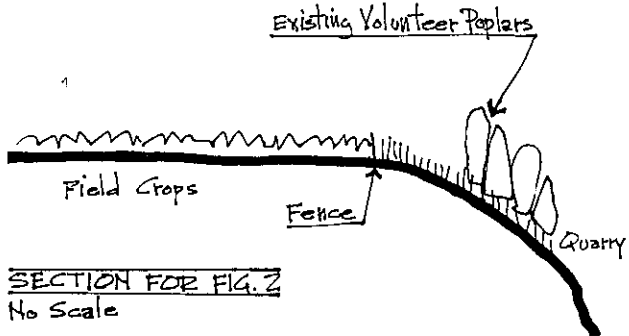
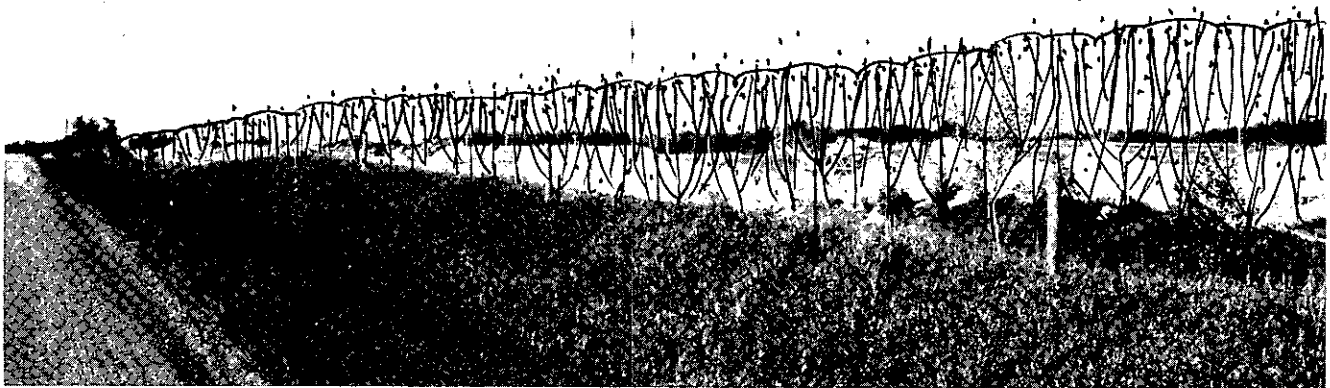


Figure 3. Sections for Figures 1 and 2 respectively.

Figure 4. Sketch of alternative for Figure 1. Alternative includes deciduous trees similar to volunteer trees in Figure 2.



Quarry No. 2

This quarry is set in a landscape of farm fields, with a small wooded stream and related drainage way on one end of it. Beyond the stream is a single family subdivision with large lots. Most of the lots are vacant.

Figures 7 and 8 indicate the view of the quarry site from an adjacent county road. Note the mown grass, split rail fence, and white pine trees (20' o.c.). The quarry, spoil piles, yard areas, and stock piles are clearly visible through the split rail fence and between the pine trees. Figure 8 illustrates the existing cross-section and a proposed cross-section. The alternative cross-section would require 1) the moving of the stockpiles away from the fence/property line area, 2) introduction of an earth berm along the property line, and 3) use of deciduous indigenous poplars

for a visual screen. For more visual compatibility with the roadside landscape in the area it is recommended that the roadside areas would be mowed only twice a year. This also should decrease the energy and management input for maintaining this grass lawn area.

Figure 10 illustrates again the effectiveness of deciduous trees in visually screening quarry operations. Figure 11 is a winter photograph at the same approximate location of Figure 12 and illustrates that even when the leaves are off deciduous trees, they can still be an effective visual screen. The effectiveness in winter of a mass planting of deciduous plant species is dependent to a great deal on the thickness of the plantings.



Figure 13. Looking north in winter same general location as Figure 10. Note that even without leaves their is effective visual screening.



Figure 14. Hedge of Tartarian Honeysuckle planted as visual screen along county road (between ditch and quarry). Note quarry and operations are visible over sheared hedge.

Quarry No. 3

This quarry site is bisected by a paved county road. The limestone quarry on the south side of the road is active. The quarry on the north side is inactive. The processing plant is portable and is located on the bottom of the quarry when in operation on this site. Limestone stockpiles are located on the south side of the road adjacent to and west of the quarry proper.

The landscape development and screening on the south side are:

Quarry

Mown grass between road and quarry. A hedge of Tartarian Honeysuckle (4' + high) between the ditch and the top of the quarry high wall. See Figure 20. Black Hills Spruce (20' + 0.6 and 15"-18" high) are planted at the base of the hedge on the south side.

Stockpile/Yard Area

Mown grass between road and quarry. A split rail wood fence at the edge of the limestone base stockpile yard area. See Figure 21.

The Honeysuckle hedge does not visually screen much of the quarry because the hedge is sheared so low that the quarry is easily viewed over the top. The split-rail fence also does not screen the stockpile area. It is not clear as to what the primary purpose of these landscape elements (Honeysuckle hedge, Black Hill Spruce and split-rail fence) is: ornamental, visual screening, etc. The hedge is sheared too low to be an effective screen, the spruce are planted too far apart to provide a screen when mature, and the fence appears to be primarily for ornamental purposes and for demarcation of the property or right-of-way line.

The scale and form of these landscape elements is not in keeping with the rural agricultural landscape of unmanicured right-or-way, wire fences and farm fields with scattered deciduous trees along fence lines or related topographic features and drainage ways.



Figure 15. View of quarry entrance and stockpile. Note landscape elements of stone columns and entrance gate and split rail fence. No visual screening of stockpile and yard area.

Alternatives

Some of the possible alternatives are:

1. Allow the honeysuckle to grow to its mature height of 10+ feet.
2. Use deciduous trees/shrubs for visual screening. See Figure 22.
3. Use an earth berm to reinforce the visual screening and physical separation. See Figure 22.
4. Mow the right-of-way on the same schedule as the county or twice a year.
5. Use the Tartarian Honeysuckle but allow it to grow its natural form, (do not overtrim or shear), use a more naturalistic planting scheme (not in a single file or line) and incorporate the plantings with a earth berm.



Figure 19. Development of visual screening alternatives using a photograph and acetate overlays.

Additional consideration and study should be given to the following areas.

1. Plant species other than indigenous natives, including shrubs and groundcovers.
2. Plantings composed of a mixture of plant species to provide:
 - a. Naturalistic plantings that are visually compatible with the surrounding rural landscape.
 - b. Visual interest.
 - c. Varied wildlife habitats.
3. Plant species particularly suited for design and engineering functions such as visual screens, wind breaks, and acoustical screens, erosion control.
4. Site safety and security relationship to plant security.

Summary

The visual landscape survey of the selected limestone quarries indicate that there have been efforts by the operators to improve the public image of the operations by the use of landscape design elements such ornamental plantings, wood fences, etc. The effectiveness of the landscape elements in reducing the visual impacts of the mining operations is mixed. Too many of the plantings appear to be primarily of an ornamental or decorative nature. Landscape elements with the appropriate functional characteristics should be utilized to mitigate negative visual impacts.

The selection of the most appropriate landscape elements is best done through a rational methodology that leads to developing a program for mitigating the defined negative visual impacts. A suggested outline for this methodology is:

1. The operator should identify, define and clearly state the visual and other problems to be addressed.
2. Alternative solutions using various landscape elements should be developed and be reviewed for appropriateness, cost, effectiveness, and compatibility with the existing landscape.
3. The operator should select the solution that deals best with the identified visual problem.

There is seldom a clear statement as to the specific visual problem to be addressed. This in turn means that there is very little with which to make a judgement as to the appropriateness of alternative landscape solutions and the landscape elements and plant species used.