FDM 27-10-1 General

December 30, 2002

1.1 Visual Analysis Legal Mandates

Over 20 years ago a cooperative agreement between the Wisconsin Department of Transportation (WisDOT) and the Wisconsin Department of Natural Resources (DNR) was initiated with the goal of minimizing the environmental impacts of WisDOT transportation projects. Protecting Wisconsin's land, water and wildlife while still providing the public with a safe, cost-effective and aesthetically pleasing transportation system is part of the WisDOT mission.

Section 30.455 (2) (b) of the 1989 Wisconsin Act 31 states that "To the extent it is economically and technically feasible, WisDOT shall minimize the visual impact of the activity and any resulting highway or structure."

The term 'activity' in this case refers to highway construction, repair, maintenance, operation or modification. WisDOT is required to prepare an Environmental Impact Statement (EIS) for major projects that will have a significant effect on the environment. The EIS must address the project's effects on visual quality. This discussion may range from a statement of 'no impact' to a detailed study of predicted visual impacts. One method of exploring and documenting predicted visual and environmental effects is to prepare a Visual Impact Assessment (VIA).

1.2 When To Consider Conducting A VIA

A Visual Impact Assessment (VIA) will be conducted when there are potentially significant adverse visual impacts. To anticipate when a VIA should be considered, the following guidance is provided. Conduct a VIA if any one or any combination of the following elements are present on or within view of your project.

The road:

1. affects important cultural features (note: important may be defined by other agencies or the people of that area)
2. affects important natural or physical features (note: important may be defined by other agencies or the people of that area). Natural or physical features may include, but are not limited to
    - landforms (cliffs/bluffs, rock outcrops, steep hills/ ridges, rolling hills, ravines, valleys/ basins, plains/ flatlands, beaches etc.)
    - water (bays/inlets, lakes/ponds, rivers/streams, wetlands, waterfalls/rapids, etc.)
    - vegetation type (plantation, orchard, pasture, cropland, prairie remnant, coniferous forest, deciduous forest, etc.)
3. is a National or State Scenic Byway
4. is part of the Coastal Zone Management areas of Lake Michigan/ Lake Superior
5. is part of a Main Street Program
6. intersects with a Rustic Road
7. is located within the lower Wisconsin River Way
8. is in an area dependent on tourism
9. affects scenic waysides or overlooks
10. travels by a significant historical building
11. is within or crosses a significant historic district.

This is not an all-inclusive list.

The WisDOT landscape architects listed below are available to help determine whether a VIA is needed.

All VIAs will be conducted by consultants who have training and are WisDOT approved. For a copy of the VIA Approved Consultant list contact:

Leif Hubbard 608-267-6884, email leif.Hubbard@dot.state.wi.us

1.3 General

The construction of transportation facilities always has some effect on the visual quality of an area. Effects range from negative to positive, and from major to minor in scale. It is WisDOT's goal to minimize disturbance to the landscape when transportation corridors are selected, and to mitigate any negative effects on the landscape.

The VIA allows designers to anticipate how a proposed project will visually affect the landscape (both favorably and adversely) and guides the design process from inception to completion. The VIA provides:

- Information that can be useful for selecting project alternatives (corridors, alignments, etc.).
- Information that provides direction for more detailed design work.
- A documentation process to ensure that aesthetics are considered during project construction.
- A documentation process to ensure that scheduled maintenance procedures will support aesthetic mitigation efforts and enhancement measures on a long term basis.
- A performance measure for evaluating the long term success of aesthetic components in projects.

Visual factors are important to transportation facility projects in two ways:

1. The view <u>from</u> the facility
2. The view <u>of</u> the facility

The VIA process can improve the view both <u>from</u> the facility and <u>of</u> the facility. Designers use the VIA process to minimize negative effects on the physical landscape and preserve visual resources.

The visual landscape must be assessed early in the Facilities Development Process. The initial steps of the VIA produce recommendations regarding the aesthetic quality of project alternatives.

Once the preferred alternative has been selected, the VIA recommends detailed mitigation measures to minimize negative effects at the project site.

The following is an outline of the Visual Impact Assessment process:

1.4 Inventory

- Identify and briefly describe the landscape.
- Identify and briefly describe existing key views and features.
- Identify and briefly describe the viewer groups and the relative size of each group.

1.5 Evaluation

- Assess the visual quality of the landscape.

1.6 Analysis

- Determine how the project would affect the visual quality of the existing and proposed landscapes.
- Determine how and to what degree the project would affect the viewer groups.

1.7 Identify General Mitigation Methods

- Identify general design solutions for avoiding, minimizing or mitigating adverse effects for each alternative.
- Identify general design solutions for creating, including and enhancing positive effects for each alternative.

1.8 Recommend The Most Effective Aesthetic Treatment For Each Alternative

- Recommend general design options based on the overall visual impacts for each alternative and the degree to which negative effects can be mitigated.

1.9 Recommend Detailed Mitigation Methods For The Selected Alternative

- Provide detailed design solutions for avoiding, minimizing or mitigating adverse visual effects for the selected alternative.
- Provide detailed design solutions for creating, including and enhancing favorable visual effects for the selected alternative.

FDM 27-10-5 Inventory

December 30, 2002

5.1 General

The inventory provides a baseline list of aesthetic components that exist on the site. This baseline is used to

predict project effects on the visual environment, visual resources, and different viewer groups. The Visual Impact Assessment (VIA) provides designers with the tools needed to evaluate the extent of the visual changes arising from proposed design alternatives.

The visual environment is typically determined by the viewshed of the facility, defined as the surface visible from the facility and of the facility from adjacent lands. The viewshed is composed of landscape units and subunits that are homogenous in vegetation, or landform, cultural features or water cover. If the project area is large or diverse in vegetation or landforms, it may be desirable to divide it into smaller landscape units to map the visual character of the site.

The inventory should convey the visual character of the landscape, note visually sensitive resources, catalog key views and key features and list the composition and sizes of viewer groups.

5.2 Visual Character

The visual character of an area is created by its composition of landscape features. Landscape features are divided into four feature types:

1. Landforms: Visual character information should include predominant landforms. Typical landform features in Wisconsin include:
    - Steep hills or ridges
    - Rolling hills
    - Plains or flatland
    - Valleys or basins
    - Cliffs or bluffs
    - Beaches
    - Ravines
    - Rock outcrops
2. Water: Water features located within the project area should be inventoried, along with the type and degree of any recreational uses the water bodies may have. Water features in Wisconsin include:
    - Bays and inlets
    - Rivers and streams
    - Lakes and ponds
    - Wetlands
    - Waterfalls and rapids
3. Vegetation: Record the type and relative magnitude of vegetative cover, noting predominant types. These categorizations (such as ‘heavily forested’) will be relative measures that are specific to the site and not intended to be compared with measures from other sites. Wisconsin vegetation categories include:
    - Coniferous forests
    - Hardwood forests
    - Plantations (such as pine plantations)
    - Orchards
    - Pasture
    - Old field
    - Cropland
    - Prairie remnants or native seeded areas
    - Green space
    - Gardens
4. Cultural features: Catalog the type and magnitude of cultural features. Note the predominant types and data relating to predicted or future uses. Typical cultural features include:
    - Villages/towns/cities
    - Commercial facilities
    - Industrial (factory/plant) facilities
    - Institutional (school/hospital/) facilities

- Residential buildings
- Agricultural buildings
- Local/state/national parks
- Historic/Archeological features
- Billboards
- Signs
- Bridges
- Dams
- Docks/piers
- Salvage yards
- Landfills
- Cemeteries
- Utilities
- Fences
- Walls
- Airports
- Railroads
- Recreational paths
- Roadside sites (such as waysides and rest areas)

5.2.1 Documentation

Use field surveys and map analyses to describe the visual character of the landscape. Documentation methods include:

- Inventories listing the features.
- Text describing the features.
- Maps illustrating feature locations.
- Photographs identifying features and their settings.

5.3 Visually Sensitive Resources

Visual resources (such as views of hills, lakes, forests, etc.) are classified according to predicted viewer sensitivity levels. Viewer sensitivity levels are determined by the interaction between viewers and the landscape they see. Viewer sensitivity is affected by a number of factors, both internal (values related to the viewer) and external (related to the viewed resource).

Internal factors include:

- Activity
- Awareness
- Values

If viewers are experiencing a scenic drive in light traffic (no congestion) versus a heavy traffic jam, they will be more likely to pay attention to the landscape beyond the roadside. Viewer awareness ties in with activity, but it also can be heightened by changes in the landscape. The transition from urban to rural settings or from rocky bluffs to wooded areas heightens viewer awareness since change captures attention more than uniformity. In contrast, a monotonous landscape can be visually ‘tuned out’ after long exposure. Values and preferences also affect viewer sensitivity. Objects or views with cultural significance due to their history are highly regarded by the local public and therefore considered visually sensitive. Projects which diminish those resources are not likely to be well-received by locals. Project designers must identify which viewer groups will be most affected by the new facilities, and tailor their designs accordingly. Sensitivity level classifications should be determined by local management contacts who know the affected population, although non-local users should be considered as well.

External factors affecting viewer sensitivity include:

- Volume of traffic
- Type of use
- Design speed
- Designer’s perception of viewer sensitivity

If the volume of traffic is high, but still uncongested, more users will see the area. Therefore, it may be classified as a highly sensitive visual resource. If the area is classified as a scenic route, it is also considered highly sensitive. If the design speed is low, viewers have more time to observe the landscape, therefore it is considered more sensitive than a landscape with a higher design speed. Finally, the degree to which designers perceive the user population to be sensitive to a particular view may affect the sensitivity level they assign to that view, and the treatment that the area receives.

5.4 Key Views

Key views are important views of panoramic scenes. They encompass pleasing or displeasing views from locations along the facility as well as views of the facility from adjacent lands. Documentation includes:

- Inventories listing key views.
- Text describing key views.
- Maps illustrating the location of key views.
- Photographs identifying key views and their settings.

5.5 Key Features

Key features are landform, water, vegetation or cultural features of visual importance. They may be visually pleasing or displeasing, and can be seen from various locations along the facility as well as from neighboring properties. Documentation methods for key features are the same as for key views above.

5.6 Viewer Groups

To understand and predict the visual effects of a proposed project, the opinions of viewer groups who will see the altered landscape must be ascertained. Viewers consist of two major groups:

- Neighbors: Neighbors may be divided into residential, commercial, industrial, agricultural, recreational, and civic subgroups.
- Travelers: Travelers may be divided into commuting, hauling, touring, and exercising (joggers, bicyclists, etc.) subgroups.

Population and traffic statistics, as well as field surveys, should be used to compile descriptive inventories and maps of these subgroups. This information need not be identified numerically but could be identified by relative, site-specific quantifiers such as low, medium, high, etc. This is the same concept previously addressed in the section on estimating vegetative cover.

As an example, a rural community's subgroups might be described using the following quantifiers:

- Low = 1-100 viewers
- Medium = 100-1000 viewers
- High = Greater than 1000 viewers

Continuing the example, if the population of viewers in the rural community is found to have 50-80 commuters, the VIA inventory could describe the population as having a low proportion of commuters. In a major urban center, the numbers of viewers in the low, medium, and high categories would be much greater.

LIST OF ATTACHMENTS

Attachment 5.1 Sample Inventory

FDM 27-10-10 Evaluation

December 30, 2002

10.1 Visual Quality and Evaluation of Landscapes

Visual quality is measured by the overall impression, either positive or negative, retained during and after viewing an area. The evaluation step determines the visual quality of the landscape that a proposed project may effect. The visual quality of the existing landscape serves as the basis for determining what those impacts will be and how they can be mitigated.

10.2 The Visual Quality Rating System (VQRS)

Visual quality is a subjective issue; there is no exact science for assessing the visual quality of a particular landscape or view. The recommended technique to use for assessing the general landscape is the Visual Quality Rating System (VQRS). The VQRS establishes a visual quality level classification system for a landscape. Persons who use the VQRS will have received WisDOT training in classifying and rating the features of landscapes so that the system will be more objective.

A landscape is composed of some combination of one or more of the four feature types: water, landforms, vegetation and cultural features. Each feature type can be further divided into actual features: bluffs, lakes, agricultural crops, industrial complexes, etc.--see FDM 27-10-5. These are more easily rated for visual quality than an entire landscape.

The VQRS allows trained assessors to systematically rate features based on how visually pleasing or displeasing they are. The assessor makes an educated personal or team decision when assigning a visual value to the features. These values are chosen from a pre-set numerical scale (see Attachment 10.1, the VQRS Rating/Inventory Sheet). The rating assigned by the assessor is multiplied by the frequency of occurrence of the feature in a particular landscape. The more often a feature appears, the more of an impression it makes--whether positive or negative. The ratings for each particular feature type are averaged. Then, these averaged scores are added together, resulting in a Visual Quality Rating (VQR) for the entire landscape. The VQR is used to assign a high, medium, low, or adverse scenic quality classification to the landscape.

This system was developed based on the range of features and scenic quality throughout Wisconsin, and may not be appropriate for locations with landform, water, vegetation and cultural features that vary greatly from this state. The actual applications of this classification will be explained in the analysis and mitigation steps.

LIST OF ATTACHMENTS

Attachment 10.1 Sample Visual Quality Ratings/Inventory Sheet

FDM 27-10-15 Analysis

December 30, 2002

15.1 General

The analysis step brings together information gathered in the Inventory and Evaluation steps and uses it to produce a set of project alternatives. The analysis should determine:

- How the project will affect the existing and proposed landscapes (negative and positive effects)
- How and to what degree viewer groups will be affected

15.2 Effects

Designers should generate a list of predicted negative and positive effects on potential corridor sites and the extent to which existing conditions will be affected. The list is used to create workable site alternatives from which a selection can be made. Designers should address the following site features (and effects upon them):

- Key views
- Vegetation
- Landforms (topography)
- Water bodies
- Cultural features
- Transportation facility use (commuter route, scenic route, etc.)
- Adjacent land uses

If the project is initiated to modify an existing transportation facility, it may be useful to examine the following statistics to help determine the extent of various impacts for each project. Most of these statistics are also examined in producing a new facility.

- Average Daily Traffic volume—existing and future (ADT)
- Design speed (how long users have to experience different views)
- Existing facility usage (scenic route, commuter route, etc.)
- User groups (commuters, tourists, haulers, residents, etc.)
- Peak season usage (spring, summer, autumn or winter)

The analysis should focus on predicted changes in the visual character and visual quality of the site, particularly in reference to views from and views of the transportation facility. Designers should evaluate the existing visual character and visual quality of the site (see FDM 27-10-5 and FDM 27-10-10) as well as the predicted impacts on the visual quality and visual character.

Attachment 15.1, an example from the Visual Impact Assessment (VIA) for State Trunk Highway 57 (WisDOT, 1996, p. 11-12, and 23-24), illustrates this process for Corridor Alternative B.

15.3 Viewer Groups

Viewer groups consist of persons who have views from or of the transportation facility. They are usually classified into two major groups: neighbors and travelers. These groups are further divided into sub-groups, based on their activities. Classifications may overlap when people switch from one activity to another. The number of people affected by the project can be calculated by examining population and traffic statistics. In this way, the relative size of each viewer group can be estimated (see FDM 27-10-5).

15.3.1 Neighbors

Neighbors may be:

1. Residential
2. Rural
3. Retail
4. Commercial
5. Industrial
6. Recreational
7. Civic

Each of these sub-groups perceives transportation facilities as being either compatible or incompatible with the local cultural and natural visual resources. Their perception of visual quality is tied to their values and beliefs, their self-interest and learned preferences. If the new facility is to meet local expectations and gain community support, designers must consider the preferences of the affected community during the design process. The following list of neighbors includes some common preferences which may be helpful in understanding their attitudes and motivations.

1. **Residential** neighbors see the highway from their residences. They tend to favor existing natural and cultural features greatly and are often resistant to the development of new transportation facilities, even if they are greatly needed.
2. **Rural** neighbors are primarily farmers (who are both residential and commercial neighbors) or rural residents. They usually value natural features highly, and cultural features and transportation facilities less.
3. **Retail** neighbors consist of business owners and employees who serve community residents and tourists. Generally, they prefer cultural features and highway facilities more than the natural environment because highway facilities provide access to their businesses.
4. **Commercial** neighbors include people who work in offices, warehouses, factories, farms, etc. who do not retail goods or services directly to the public. They commonly favor cultural features and transportation facilities over than natural features.
5. **Industrial** neighbors consist of people who create and market products to be sold outside the local community. Typically, they have the same preferences as retail and commercial neighbors.
6. **Recreational** neighbors are generally visitors to the area, (such as boaters or hikers) although they may also be members of the local community. They tend to favor natural and cultural features much more than transportation facilities. The roadway may be viewed negatively, as an intrusion on their activities.
7. **Civic** neighbors work in or use public facilities such as schools, libraries, city offices, or other government workplaces. They usually prefer cultural features the most. Buildings they work in or use may be local landmarks that reflect the community's identity. Natural features are valued as a setting for the community's cultural resources. If the highway environment enhances and is well integrated with cultural and natural resources, it is likely to receive the support of civic neighbors.

15.3.2 Travelers

Travelers may be:

1. Commuters
2. Haulers
3. Tourists

4. Exercisers

Travelers' perceptions of the visual and highway environments vary with their travel activities, but all favor a safe, well-designed highway environment. Travelers may be commuters, haulers, tourists or exercisers:

1. **Commuters** prefer the highway over natural and cultural features. Highways should provide safe, clearly marked, rapid routes to their destination and integrate well with cultural resources that commuters use as landmarks to mark progress toward their destination.
2. **Haulers** are comparable to commuters in their use of the highway, and are often placed in the same category as commuters for VIA purposes.
3. **Tourists** travel to experience the unique aspects of different communities and tend to prefer local natural and cultural resources highly. However, they also use the highway for views of interesting landscapes and cultural resources. A particular route may be chosen for travel if it contains scenic overlooks and turnouts. The highway is viewed as part of the journey, and if the facility is well designed and integrated with the local character of the community, it can enhance tourists' experiences.
4. **Exercisers** include joggers, bikers, rollerbladers, and people who are walking dogs or pushing strollers. This group values natural and cultural resources, but also a smooth well-lighted clear pathway. This group generally prefers pathways that do not border heavily traveled roads.

Estimating the composition and size of the different viewer groups can give the designer an idea as to whether the planned transportation facility will be received positively or negatively. Viewer group data is valuable both for design and presentation purposes when working with the local community.

LIST OF ATTACHMENTS

Attachment 15.1 Sample Visual Impact Assessment

FDM 27-10-20 Identify General Mitigation Methods *December 30, 2002*

The fourth step in the Visual Impact Assessment (VIA) process identifies general mitigation techniques for each of the various alternatives. Mitigation is defined as the act of moderating or making less severe. This step addresses the major effects on visual quality that each alternative could cause and identifies any favorable views or features that could be preserved or enhanced. General design solutions should avoid, minimize, or compensate for adverse effects and preserve or enhance existing desirable conditions.

- Avoiding adverse effects or preserving desirable existing conditions is the best solution. For example, an existing stand of trees could be preserved in order to screen an unsightly salvage yard.
- Minimizing adverse effects or undesirable existing conditions involves design methods, which lessen those impacts or conditions. This can be as simple as minimizing the clearing of vegetation in the right-of-way.
- Compensating for adverse effects involves adding items to replace visual resources that were removed as a result of the project. Depending on the result being mitigated, compensation may or may not include the same materials on the same scale. For example, if a planting is removed that screened an unfavorable view; compensation may include replacing the plants with fewer, smaller, more, or larger plants, or changing the alignment of the roadway so the unpleasant view is hidden.
- Creating, including, or enhancing favorable effects or existing conditions improves the project setting. For example, a favorable view may be created as a result of highway re-alignment and selective cutting may improve the degree or duration of that view.

LIST OF ATTACHMENTS

Attachment 20.1 Example of General Mitigation Methods

FDM 27-10-25 Recommend The Most Effective Aesthetic Treatment For Each Alternative *December 30, 2002*

After the inventory, evaluation and analysis of project effects on the landscape and viewer groups have been conducted, a project alternative can be recommended. The following recommendations result from information derived from the inventory, evaluation and analysis steps:

- Avoid landscapes with high visual quality. Ideally, a project in such a landscape would overlook or border the area, but avoid traversing a significant viewshed. Proximity would grant visual access but

avoid excessive impact on the landscape.

- Avoid landscapes with low or adverse visual quality, in order to provide a pleasant driving experience. Monotonous driving experiences tend to be less safe since they may lead to driver fatigue. However, if an area with low visual quality can be enhanced via design methods to create a landscape with moderate visual quality, it would be an acceptable project site.
- Recommend alternatives that are located in areas of moderate visual quality. These sites should provide an aesthetic experience and cause only acceptable effects on the landscape.
- Recommend alternatives that offset negative effects with positive effects. Another option is to recommend alternatives that cause more negative effects, but the effects are more easily mitigated than projects with fewer negative effects.

Although selecting an alternative with the least adverse effects seems to make the most sense, it is often difficult to do in practice, as visual resources and viewer groups can be affected differently by various alternatives. Regardless of the alternative chosen, some viewer groups will be affected negatively and others positively.

FDM 27-10-30 Recommend Detailed Mitigation Methods for the Selected Alternative *December 30, 2002*

The final step of the Visual Impact Assessment (VIA) occurs during the conceptual and preliminary plan portions of the Facilities Development Process.

Mitigation methods consist of design solutions which:

- Avoid adverse effects and adverse existing conditions.
- Minimize adverse effects and existing conditions.
- Compensate for adverse effects.
- Create, include and enhance favorable effects and favorable existing conditions.

Mitigation methods for adverse effects and existing conditions include but are not limited to the following:

- Allow terrain, vegetation, and water bodies to influence the alignment and profile of the project.
- Vary the backslope to avoid impacting the existing topography and vegetation.
- Avoid abrupt changes in alignment.
- Avoid alignments which focus tangents or long curves on adverse features or views.
- Consider bridges and tunnels in lieu of prominent excavation and embankment slopes.
- Minimize rock cuts by varying setbacks and creating irregular benches.
- Minimize the clearing of trees and shrubs along the right-of-way.
- Use forms, materials and finishes that reflect those in the natural and the built environments.
- Provide split level medians, wide medians and independent roadways on multi-lane projects to add interest and relieve the monotony of parallel roadways.
- Flatten slopes and provide vegetation to soften construction lines.
- Grade interchange areas to create graceful, natural-looking contours.
- Avoid traversing a high quality viewshed. If the area must be crossed, look for the least visible route or the route with the least negative impact.
- Mitigate the effects of the project on existing views with plantings, earthforms, color, placement structures (such as retaining walls) and buffer vegetation.
- Screen unpleasant views.
- Select alignments which provide outstanding views of both cultural and natural features.
- Provide vista points or turn-outs for outstanding views.
- Selectively thin out trees or brush to open up scenic vistas or provide a natural-looking boundary between forest and cleared areas.
- Develop planting plans that integrate the project into the environment.
- Manipulate roadside vegetation and planting to create interest by leaving groupings of plants in the median, feathering the edges of clearings, or installing accent plantings.
- Give special attention to bridges, walls, buildings, and other structures to provide visual interest in otherwise nondescript settings.
- Manipulate alignments to focus tangents on favorable views or features.