Visibility and Visual Impact Assessment

A&C Lines Article VII Project

Towns of Pleasant Valley, LaGrange, Wappinger and East Fishkill
Dutchess County, New York

Prepared for

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GLOSSARY/LIST OF ACRONYMS

BLM	U.S. Department of the Interior Bureau of Land Management
CHG&E	Central Hudson Gas & Electric Corporation
Circuit	A continuous system of conductors providing a path for electricity.
Conductor	A wire, cable, busbar, rod or tube which serves as a path for electric flow. The most common conductor is the overhead wire.
Cross Section	A profile of the terrain that illustrates sources of visual screening along a line-of-sight between the proposed Project and a specific viewer/resource location.
DEM	Digital elevation mapping
DOQQ	Digital ortho quarter quadrangle. Digital Aerial photographs with embedded geo-referencing information.
EDR	EDR Companies
GIS	Geographic information system
GPS	Global positioning system
Insulator	The porcelain support used to insulate the conductors from the pole or tower.
Kilovolt (kV)	1,000 volts
LSZ	Landscape similarity zone. Area of similarlandscape/aesthetic character based on patterns of landform, vegetation, water, land use, and user activity.
NLCD	NationalLand Cover Dataset. Land cover types classified and mapped by U.S. Geological Survey.
ROW	Right-of-way
Substation	A fenced-in yard containing switches, transformers and other equipment and structures. Adjustments of voltage, monitoring of circuits and other service functions take place in this installation.
Transmission Line	An electric line operating at 69,000 or more volts.
Transformer	A device used to transform voltage levels to facilitate the transfer of power from the generating plant to the customer. A step-up transformer increases the voltage while a step-down transformer decreases it.
USGS	U.S. Geological Survey
VIA	Visual impact assessment
Viewshed	Area of potential Project visibility defined by maximum structure height and mapped topography within the study area.

Executive Summary

Central Hudson Gas & Electric Corporation (CHG&E) is proposing to rebuild the existing 115 kilovolt (kV) A and C transmission lines (Project) located between Pleasant Valley and East Fishkill in Dutchess County, New York. The Project is located within an existing 150 foot wide right-of-way (ROW), and spans approximately 11 miles through four towns; Pleasant Valley, LaGrange, Wappinger and East Fishkill. CHG&E retained EDR Companies (EDR) to prepare this Visual Impact Assessment (VIA) for the Project. Based on industry standards, the area within 1-mile of the center line of the proposed transmission line was defined as the visual study area. Within this area EDR described existing landscape character, viewer groups, and visually sensitive resources (historic sites, parks, trails, forests, etc.). Potential Project visibility and visual impact were evaluated through viewshed analysis, field review, preparation of visual simulations, and evaluation of visual contrast by a panel of registered landscape architect.

Topographic viewshed analysis of both the existing and proposed transmission line structures along the A&C Lines route (which does not consider the screening provided by existing vegetation and man-made structures) revealed that the proposed Project will increase potential transmission line visibility by approximately 2.3%. This number reflects the fact that based on topography alone, the vast majority of the study area (82.3%) already has potential views of the existing structures. Factoring the screening effect of mapped forest vegetation into the viewshed analysis reduces potential visibility of the proposed Project from 84.6% (topographic visibility) to 27.6% of the 1-mile radius study area. This significant reduction reflects the abundance of mapped forest vegetation throughout the study area, which limits views to open areas such as open fields, cleared road corridors, the existing cleared ROW, and some areas of higher density development. However, because the potential screening effect of man-made structures, hedgerows, and isolated trees are not considered in the vegetation viewshed analysis, potential Project visibility in these more developed areas is overstated. In addition, because the viewshed analysis does not consider distance from the viewer or physical characteristics of the proposed transmission structures(e.g. color, narrow profile) that may limit or eliminate visibility, being within the vegetation viewshed does not necessarily equate to actual Project visibility.

Field review conducted during October 2012 revealed that Project visibility is likely to be much more limited than suggested by topographic viewshed mapping. This is due to the fact that screening provided by buildings is significant in commercial and residential areas, and trees within rural portions of the study area typically limit long distance views. This field review confirmed that the vegetation viewshed analysis much more accurately predicts locations where Project visibility is likely to occur, and confirmed that the visibility of the existing transmission lines is generally limited to areas at or adjacent to sites where the ROW crosses public roads, and locations where residential development has occurred in proximity to the existing transmission corridor. This is due to the

topographic variation and dense forest vegetation that characterize the majority of the study area. Longer distance views are generally confined to developed open space (including cultivated farmland), portions of the U.S. Route 44, County Route 47 and Plass Road corridors, waterbodies and a few residential developments/neighborhoods with limited vegetative screening. However, landscape trees, hedgerows, and patches of forest vegetation provide at least partial screening of views to the existing lines in many of these areas. Where visible, the existing lines are typically seen at foreground distances (under 0.5 mile) by drivers, local residents, and in some cases, business employees and recreational users. In most instances potential views of the line are restricted to within approximately 100 yards of the transmission corridor due to screening provided by forest vegetation. Where the transmission line crosses public roads, open views are generally restricted to the cleared ROW (i.e., under the lines, looking down the ROW). In these views the existing structures and linear orientation of the lines and cleared ROW can clearly be seen. The transmission structures are close to the viewer, unscreened and often viewed against the sky. However, these road-crossing views are fleeting, and generally completely obscured by existing vegetation once the viewer is outside the limits of the cleared ROW. In some subdivisions, lack of intervening trees provides off-ROW views to the existing lines. These views are typically perpendicular to the line, and include a limited number of Project components (i.e., structures, conductors, and/or cleared ROW).

Field verification also revealed that most of the visually sensitive sites within the study area were well screened from views of the transmission corridor by intervening vegetation and structures. This was found to be the case for the majority of historic sites, local recreational resources and schools visited during field review. The forest vegetation that occurs at many sensitive sites (e.g., parks and natural areas) generally impedes the viewer's perception of the line and/or cleared ROW from these areas. At sensitive sites where such screening is lacking, open views of the existing transmission lines are already available, and therefore additional visual change will be limited. Other than public roads and residential neighborhoods, Project visibility from visually sensitive sites was generally limited by vegetation, built structures, and/or distance.

Simulations from seven representative viewpoints show a slight increase in structure height, visual weight and skyline clutter with the proposed Project in place. However, these changes do not typically result in a significant reduction in the original level of scenic quality. Visual contrast ratings conducted by a registered landscape architect indicate that adverse visual impacts of the proposed Project should be insignificant to minimal. This is largely attributable to the occurrence of the proposed Project within an existing transmission corridor, and hence the lower scenic quality of the existing views and reduced visual contrast presented by the proposed Project. Increased contrast with the sky was noted in the majority of viewpoints but overall Project contrast never exceeded minimal for any of the viewpoints evaluated.

For certain views, especially those in proximity to residences, visibility of the new transmission line structures could be somewhat reduced if vegetative screening was installed and/or if the proposed structures were down-sized or an alternative material was used. Using shorter structures would require a greater number of individual structures, which could actually increase visual impact. Use of alternate materials, such as galvanized steel rather than self-weathering steel, could reduce color contrast and visual weight when the structures are viewed against the sky. However, this material would increase color contrast when the structures are viewed against a vegetated backdrop, which occurs in most instances. Reconstruction of the lines within an existing transmission corridor is considered the best means of reducing perceived visual contrast and change in land use. The feasibility and benefit of vegetative screening would need to be evaluated on a site-specific basis. However, the results of this VIA suggest that mitigation on this sort may not be warranted given the limited visual impact of the proposed Project.

1.0 Introduction

EDR Companies (EDR) was retained by Central Hudson Gas and Electric Corporation (CHG&E) to undertake an analysis of the potential visibility and visual impact of the A&C Lines Article VII Project (the Project). The analysis performed by EDR was designed to address the following questions:

1. What is the visual/aesthetic character of the Project site/study area?

2. What sensitive receptors/resources occur within the Project study area?

3. From what locations could the existing and proposed transmission facilities potentially be seen?

4. What will the proposed facilities look like, as compared to the existing facilities?

5. What is the potential incremental visual impact of the Project?

The study undertaken by EDR addressed these questions through viewshed analysis, field evaluation, computer-assisted visual simulations, and evaluation of visual impact by a registered landscape architect. This approach conforms to the policies, procedures, and guidelines contained in established visual impact assessment methodologies (see Section 7.0, References).

2.0 Project Description

2.1 Project Site

CHG&E is proposing to rebuild the existing 115 kV A and C transmission lines located between Pleasant Valley and East Fishkill in Dutchess County, New York. The A&C Lines Project is located within an existing 150 foot wide right-of-way (ROW), and spans approximately 11 miles through four towns; Pleasant Valley, LaGrange, Wappinger and East Fishkil (Figure 1). The existing ROW has been held by CHG&E and used for transmission purposes since 1948. The existing transmission corridor includes the existing A and C transmission lines, which are currently carried on H-frame wood pole structures with an average height of 51 feet. Significant portions of the corridor also include a CHG&E gas transmission line and two existing Consolidated Edison (ConEd) 345 kV transmission lines. The ConEd lines are carried on steel lattice structures that range in height from 120 to 150 feet. The existing corridor is maintained in early successional vegetation (i.e., old field herbaceous and shrub species), and traverses a variety of landscapes from undeveloped forest land and agricultural fields, to areas of medium density residential development.

2.2 Proposed Project

The 115 kV Pleasant Valley to Todd Hill Road C line and the 115 kV Todd Hill Road to Fishkill Plains A line were built in 1948, and currently, the poles and conductors need replacement. The A&C Lines have been identified as part of CHG&E's ACSR (conductor) Replacement Program. In addition, approximately 60 structures have spar arms instead of traditional crossarms, which have the potential to fail catastrophically without warning. CHG&E is systematically replacing spar arms on the system as part of its High Priority Replacement (HPR) Program. The proposed plan is to replace all structures and conductors along the existing ROW. There are currently 261 existing poles within the Project Site and 172 poles are proposed for the rebuild. Existing structures are primary wood H-frame pole structures with an average height of 51 feet. Replacement poles are anticipated to be primarily single pole self-weathering steel structures with an average above-ground height of 65 feet (Figure 2). Angle structures are currently swing angle suspension, three-pole structures and will be replaced with swing angle suspension, two-pole structures. Existing strain insulator, three-pole deadend structures and will be replaced with strain insulator, two-pole deadend structures. Two static wires (0.461" dia.) associated with the A&C Lines will be replaced with one wire (0.7" dia.). The three existing conductors (0.783" dia.) will be replaced with three new larger conductors on the rebuilt A&C Lines (1.212" dia.). The newly replaced transmission poles will remain entirely within the current ROW and no new ROW or additional tree clearing are required. There will be no changes to the existing 345-kV transmission lines that currently occupy the southern portion the transmission corridor.

3.0 Existing Visual Character

3.1 Visual Setting

Based on established visual assessment methodology and site-specific topographic and land use conditions that limit Project visibility, the study area for this Project was defined as the area within 1.0 mile of the center line of the proposed Project (Figure 3). This study area encompasses approximately 24.5 square miles within the Towns of Pleasant Valley, LaGrange, Wappinger, East Fishkill and a small portion of the Town of Poughkeepsie, New York. Landscape character within this area is defined by the existing pattern of landform (topography), vegetation, land use, and water features, and was evaluated during field visits by EDR staff during the fall of 2012.

The transmission line corridor is located in the Hudson Mohawk Lowlands section of the Valley and Ridge province of the Appalachian Highlands physiographic region (U.S. Geological Survey [USGS], 2002). The Hudson Mohawk lowlands extend 3 to 6 miles east of the Hudson River. The Low Taconics lie just east of the study area with elevations ranging from 500-750 feet, with 200 to 300 feet of relief (USDA, 2001). Specifically within the visual study area, elevations range from approximately 180 feet to 580 feet above sea level, and topography is characterized by small rolling hills and valleys with 100–250 feet of relief.

Land use within the study area is characterized by a mix of undeveloped forest land, successional old field and shrubland, active agricultural land, wetlands and suburban areas characterized by low to medium density residential and light commercial development. U.S. Route 44 and State Routes 55 and 376 are major transportation corridors that run through the visual study area. Mature forest vegetation is the dominant cover type within the southern half of the study area. Forest vegetation is primarily a mixed hardwood (oak-hickory-red maple) community, which provides a strong sense of enclosure and screening around most streets and residential areas. Agricultural lands are also a significant component of the landscape, and occur primarily in the northern half of the study area. Wappinger and Sprout Creeks are the dominant water features within the study area, but the area also includes several streams and ponds located throughout the visual study area. The area also includes residential subdivision, and nodes of commercial development.

3.2 Visually Sensitive Resources

Scenic resources of national significance are not present within the study area. The area includes no national scenic byways (National Scenic Byways Program, 2012a) or national recreational/scenic trails (e.g., Appalachian Trail; NPS, 2012c). None of the waterbodies in the study area are on the national list of wild, scenic or recreational rivers

(National Wild and Scenic Rivers System, 2012), and there are no National Historic Landmarks (NPS, 2011b), National Wildlife Refuges (United States Fish and Wildlife Service, 2012), National Parks (NPS, 2012a), National Seashores (NPS, 2012a), National Forests (NPS, 2012a), or National Natural Landmarks (NPS, 2012b) located within or adjacent to the visual study area. However, as shown on Figure 4, the study area includes several resources/sites that could be considered visually sensitive from a statewide, regional, or local perspective. Aesthetic resources considered to be of statewide significance include structures or districts listed in the State/National Register of Historic Places (NYSHPO, 2011), State Parks (New York State OPRHP, 2012a), State Wildlife Management Areas (NYSDEC, 2012f), State Forests (NYSDEC, 2012b), State-designated Wild, Scenic or Recreational Rivers (NYSDEC, 2012e), State Scenic Byways (NYSDOT, 2012a), State Reservations (New York State OPRHP, 2012b), State Recreational/Scenic Trails (New York State OPRHP, 2012c), State Nature (NYSDEC, 2012g) and Historic Preserve Areas (New York State OPRHP, 2012b), and State-designated Scenic Areas (NYS Department of State, 2004). Resources of regional or local significance would typically include town/county parks and recreational facilities (including trails, bike paths, golf courses and athletic fields), designated open space (e.g., land trust properties, conservation lands), schools/colleges, cemeteries, waterbodies, and areas of intensive land use (e.g., village centers, apartment complexes, and major transportation corridors). Resources of these types that occur within the visual study area are listed in Appendix B, and summarized below.

3.2.1 Historic Sites

According to databases maintained by the U.S. Department of the Interior National Park Service (NPS, 2011b) and the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) (NYSHPO, 2011), there are no historic sites/districts that are listed on the National Register of Historic Places (NRHP) within a 1-mile radius of the proposed Project. However, there are five sites eligible for listing on the National Register. Four of these sites (the Freedom Plain Presbyterian Church and Cemetery, School #3, Dr. Fink House, and Cramer Road south of Overlook Road) occur in the Town of LaGrange, and one site occurs in the Town of Pleasant Valley. The Pleasant Valley Manufacturing Site dates back to 1739. Through the years, the mill at this site was operated under many owners as a wool, grist, filling or cotton mill. Currently, the old mill store serves as the office of the Town Historian for Pleasant Valley (Town of Pleasant Valley, 2013).

3.2.2 Parks and Recreational Areas

According to New York State OPRHP (2012a), the visual study area includes portions of James Baird State Park. No other state lands that could be considered visually sensitive due to the type or level of recreational use they receive occur within the visual study area. James Baird State Park became a state park in 1939 when James Baird donated

his farmland to New York State. The state park includes a golf course, picnic areas, sports complex with basketball, softball, tennis, and volleyball, as well as a playground and a nature center. The state park also has seven miles of wooded trails, used during warmer months for hiking trails and when snow-covered, for cross country skiing and snowshoeing, and a golf course with driving range, pro shop, clubhouse, and restaurant (New York State OPRHP, 2012d).

The study area also includes several local parks and local trails. These areas are used for nature observation and various forms of passive recreation. Local parks include Robinson Lane Park and Martz Field in the Town of Wappinger, Stringham Park in the Town of LaGrange, and Bower Park and Cady Recreation Park in the Town of Pleasant Valley. In addition to the trails in James Baird State Park discussed above, the study area also contains a portion of the Dutchess Rail Trail, which spans the Towns of East Fishkill and Wappinger. The Dutchess Rail Trail will be a twelve mile recreational trail when complete (Dutchess County Government, New York, 2012).

Along with several small streams, Lake Walton, Sprout Creek and Wappinger Creek are located within the study area. These waterbodies are significant aesthetic features in the landscape, and some are important recreational resources that are used for boating, fishing, and passive recreational activities.

3.2.3 Areas of Intensive Land Use

Areas of intensive land use can also be considered visually sensitive due to the number of potential viewers that use these sites. Areas of intensive land use within the study area include the Hamlets of Fishkill Plains, Myers Corner, LaGrange, Freedom Plains, and Pleasant Valley. Commercial development occurs at the northern and southern portions of the study area in the Towns of Pleasant Valley and Wappinger, as well as along Route 55. Suburban residential development occurs throughout the study area, with its greatest concentration in the center and very southern portions of the study area.

The visual study area also includes several highways that could be considered visually sensitive due to the number of drivers that travel these roads on a daily basis. U.S. Route 44 and State Routes 55 and 376 all traverse the study area. According to the New York State Department of Transportation (NYSDOT) web site, average annual 24-hour Average Daily Traffic Counts on these roads between 2009 and 2010 were as follows:

- U.S. Route 44: 12,990 to 14,725 vehicles per day
- State Route 55: 17,246 vehicles per day

- State Route 376: 7,305 to 12,110 vehicles per day

The range in vehicle numbers reflects variation in counts conducted during different years and at different locations along these roads within the study area.

3.3 Landscape Similarity Zones

Within the visual study area, EDR defined five distinct landscape similarity zones (LSZ's). LSZ's are areas of similar landscape/aesthetic character based on patterns of landform, vegetation, water resources, land use, and user activity. These areas were identified within the study area in general accordance with established visual assessment methodologies (Smardon et al., 1988; USDA National Forest Service, 1974 and 1995; USDOT Federal Highway Administration, 1981; USDI Bureau of Land Management, 1980). Preliminary land cover classifications were established through Geographic Information System (GIS) analysis of land cover data (vegetation, structures and water) for the visual study area. They were created using the 2006 USGS National Land Cover Dataset (NLCD). The original NLCD classes were reclassified into four general land cover types: 1) Open Water, 2) Developed, 3) Open/Agriculture, and 4) Forest. The location of these land cover types within the study area is shown in Figure 5. These preliminary groupings were then verified and refined based on aerial photo interpretation and field review. This effort resulted in the definition of five final LSZs within the study area, including the following: 1) Medium/High Density Residential, 2) Commercial/Industrial, 3) Low Density Residential, 4) Agricultural, and 5) Forested. Representative photos of these LSZ's are included in Figure 6 and narrative descriptions are presented below:

3.3.1 Zone 1. Medium/High Density Residential

The Medium/High Density Residential LSZ occurs primarily in the northern, central and southern portions of the visual study area along the Route 44, 55, and 376 corridors. Village centers, such as Pleasant Valley, have older, denser neighborhoods on more rectilinear, tree-lined streets, while newer residential development is concentrated in small subdivisions, generally linear to curvilinear in layout. Structures are typically one- and two-story wood-framed houses with peaked roofs and clapboard or shingle siding. Typical user activities include domestic recreation and maintenance activities, as well as local travel for errands and commuting. These neighborhoods are not typically designed to accommodate much pedestrian traffic. The surrounding forest land, adjacent structures, and gently curving neighborhood roads generally limit available views in this LSZ. However, in a few areas, residential roads run close to the existing transmission line ROW and offer partially screened or clear views toward the proposed Project.

3.3.2 Zone 2. Commercial/Industrial

Like Zone 1, the Commercial/Industrial LSZ occurs primarily along the three major transportation corridors that traverse the study area. The businesses within this LSZ present a range of architectural styles, scale, and set-backs, and some variety in their surrounding land use context. However, buildings are typically large one and two story structures, and automobiles, delivery vehicles, and parking lots are all significant components of the Commercial/Industrial LSZ. Views within the zone are primarily directed along the roadways, and generally limited due to obstruction by adjacent commercial and industrial buildings. Baseline scenic quality in this LSZ is generally not as high as in other zones. Therefore, the Commercial/Industrial LSZ tends to absorb new infrastructure and visual change move readily than other LSZs within the study area.

3.3.3 Zone 3. Low Density Residential

The Low Density Residential LSZ can be found throughout the entire study area, although it occurs with greater frequency in the northern and central portions of the study area. The landscape in this area is characterized by undulating topography with a mix of suburban and rural residences interspersed with agricultural fields and blocks of forest vegetation. Mid-range and longer distance views in this LSZ are available where roads and residences occur along the edges of active or reverting agricultural fields, primarily in the central portion of the study area, between County Road 46 and State Route 55. Typical viewer activity within this zone includes residential activity and automobile travel by local residents and through-travelers.

3.3.4 Zone 4. Agricultural

This LSZ is characterized by gently sloping crop fields and pastures, along with associated farms and rural residences. This zone occurs primarily in the northern and central portion of the study area, and as scattered pockets within the southern portion of the study area. The dominant activity in this area is farming and travel along local roads. Although open farmland provides for long distance views in this zone, adjacent forest and hills typically frame/enclose these views and/or provide significant screening.

3.3.5 Zone 5. Forested

The Forested LSZ is characterized by relatively large tracts of mature forest, typically including both deciduous and coniferous species. Residential development occurs within this zone, but is low density and subservient to the dominant forested landscape. Significant areas of undeveloped forest land are located throughout the study area, but are most abundant in southern portion. Forest vegetation is generally the default cover type, and typically adjoins

and surrounds developed areas as well as waterbodies and wetlands. Most of the forested land within the study area is in private ownership. However, public access is available at several local parks and Dutch County Rail Trail. Long-distance views within this zone are generally either fully or partially screened by woody vegetation. This vegetation generally provides considerable screening from both highways and residences, although some areas of wetlands or low-density residential development provide greater opportunity for outward views. Partially screened views of the line (i.e., through tree branches) are generally limited to sites within 100 yards of the cleared ROW. Open foreground views of the Project in this LSZ are available where the cleared ROW crosses public roads.

3.4 Viewer/User Groups

Specific viewer groups within the study area were identified in order to analyze viewer sensitivity and assure their representation during the viewpoint selection process and the visual impact assessment. Four categories of viewer/user groups were identified within the study area:

3.4.1 Commuters and Through-travelers

Travelers passing through the area view the landscape from motor vehicles on their way to other destinations. Through travelers are typically moving, have a relatively narrow field of view oriented along the axis of the roadway, and are destination-oriented. Drivers on major roads in the area (e.g., U.S. Route 44 and State Routes 55 and 376) will generally be focused on the road and traffic conditions, but do have the opportunity to observe roadside scenery. Passengers in moving vehicles will have greater opportunities for prolonged off-road views than will drivers, and therefore may be more aware of the quality of surrounding scenery. However, this viewer group is used to seeing overhead transmission/utility lines along area roadways, and their sensitivity to visual changes in the landscape is limited.

3.4.2 Local Residents

Local residents include those who live, work, and travel for their daily business within the visual study area. They generally view the landscape from their yards, homes, local roads and places of employment. Residents are concentrated in and around the Towns of Pleasant Valley and Wappinger, but occur throughout the visual study area. Except when involved in local travel, residents are likely to be stationary, and have frequent or prolonged views of the landscape. Local residents may view the landscape from ground level or elevated viewpoints (typically upper floors/stories of homes). Residents' sensitivity to visual quality is variable, and may be tempered by the aesthetic character/setting of their neighborhood or work place. Those living in more densely settled areas with views focused

on their neighborhood street or their downtown centers may be less sensitive to landscape changes than those with a view of undeveloped land. It is generally assumed, however, that all residents are familiar with the surrounding landscape and may be sensitive to changes in their views.

3.4.3 Business Employees

This viewer group is composed of employees of local businesses, primarily in the commercial/industrial portions of the study area. These employees generally experience limited views of the landscape within the study area, except while driving to work. Most work in one- and two-story structures in commercial, industrial, or downtown settings. Their views thus often include existing buildings, paved surfaces, vehicles, and other man-made features. Their attention is also likely to be focused on their activities at work, which typically occur inside buildings. Therefore, this group receives relatively little exposure to the landscape, and is generally not highly sensitive to visual changes in their surroundings.

3.4.4 Recreational Users

This viewer group consists of residents and visitors who come to the area for the purpose of experiencing its scenic and recreational resources. They may view the landscape on their way to a destination (i.e., on a roadway) or from the destination itself. Recreational users in the area are generally involved in outdoor recreational activities at parks, trails, ponds/small lakes, and forests. Typical activities include bicycling, jogging, swimming, recreational boating, fishing, and more passive recreational activities (e.g., picnicking or walking). Visual quality/scenery may or may not be an important part of the recreational experience for these viewers. However, recreational users are generally considered to have relatively high sensitivity to aesthetic quality and landscape character. They will often have continuous views of landscape features over relatively long periods of time, and scenic quality generally enhances the quality of any outdoor recreational activity. Passive recreational activities generally do not require as much concentration as more active recreational activities, and tend to be more focused on the enjoyment of scenery. Those engaged in passive activities therefore may be particularly sensitive to visual change. Recreational users will be concentrated in the public lands (e.g., parks, Dutchess County Rail Trail and waterbodies) and recreational facilities (e.g., playgrounds, ball fields, and golf courses) in the study area.

4.0 Visual Impact Analysis

The Visual Impact Analysis (VIA) procedures used in this study are consistent with methodologies developed by various state and federal agencies, including the U.S. Department of the Interior, Bureau of Land Management (1980 and 1986), the U.S. Department of Agriculture, National Forest Service (1974), the U.S. Department of Transportation, Federal Highway Administration (1981), and the New York State Department of Environmental Conservation (not dated and 2000). The specific techniques used in this study and the results of the VIA are described below.

4.1 Project Visibility

An analysis of potential Project visibility was undertaken to identify those locations within the study area where it may be possible to view the proposed transmission line from ground-level vantage points. The analysis includes identifying potentially visible areas on viewshed maps and verifying line of sight conditions in the field.

4.1.1 Viewshed Analysis

To evaluate potential Project visibility, EDR performed viewshed analyses of the existing and proposed transmission line structures that occur along the proposed route. Information on the location and height of the existing A&C Line structures was provided by CHG&E. These structures are typically H-frame wood poles range in height from 38.5 feet to 100 feet above ground level. Data on the height and location of the new transmission line structures were also provided by CHG&E. These are proposed to be single pole, self-weathering steel structures that range in height from 43 feet to 79 feet.

Topographic viewshed maps for the Project were prepared using USGS digital elevation model (DEM) data (7.5-minute series), the location and height of the existing and proposed A&C Line structures, and ESRI ArcGIS® software with the Spatial Analyst extension. Two 1-mile radius topographic viewsheds were mapped, one to illustrate potential visibility of the existing lines and the other to illustrate potential visibility of the rebuilt lines. The ArcGIS program defines the viewshed (using topography only) by reading every cell of the DEM data and assigning a value based upon visibility from observation points throughout the 1-mile study area. The resulting viewshed maps define the maximum area from which the tallest elements of the existing and proposed lines (i.e., the tops of the transmission line structures) could potentially be seen from ground-level vantage points (existing grade plus 1.7 meters to account for viewer height). Because the topographic viewshed analysis is based on the maximum height of the transmission line components and does not take into account the screening effect of vegetation or built

structures, it provides a very conservative (i.e., "worst case") assessment of potential visibility. It should also be noted that its accuracy is also directly related to the accuracy of the USGS DEM data used in the analysis. The resulting topographic viewshed map for the existing transmission line structures and the topographic viewshed map for the new transmission line structures were compared and overlaid to show the areas of potential increased transmission line visibility resulting from construction of the proposed Project. Because the existing 345 kV lines were not evaluated in this analysis, this comparison overstates the increase in potential transmission line visibility in some areas.

This analysis revealed that both the existing and proposed structures have the potential to be visible from over 80% of the study area based on the screening provided by topography alone (see Table 1). However, it should be kept in mind that, because the screening provided by vegetation and structures is not considered in this analysis, the topographic viewshed represents a "worst case" assessment of potential visibility. Topographic viewshed maps assume that no trees exist, and are therefore very accurate in predicting where visibility will not occur due to topographic interference. However, they are less accurate in identifying areas from which the Project would actually be visible.

As indicated by the topographic viewshed analysis, increased potential visibility could occur along the outside edges of areas currently screened from view of the existing line (Figure 7). The majority of these areas occur beyond 0.5 mile from the transmission line corridor, where intervening vegetation and the effects of distance are likely to mitigate any increase in actual Project visibility or visual impact. A very minor degree of increased potential transmission line visibility is indicated for some sensitive sites, such as James Baird State Park, Lake Walton, and several residential subdivisions west of the southern portion of the line (see Appendix B). However, sensitive sites that occur within the viewshed of the proposed Project are, in almost all cases, already within the viewshed of the existing lines. Consequently, there should be few instances where views of the proposed Project do not already include existing transmission facilities.

A vegetation viewshed analysis was also prepared for the proposed A&C Line structures to more accurately define areas of likely visibility, and better illustrate the potential screening effect of forest vegetation. The vegetation viewshed utilized a forest vegetation layer, which was created by identifying areas mapped as forest by the USGS NLCD, and assigning these areas an assumed height of 40 feet. This layer was added to the digital elevation model to produce a base layer for the viewshed analysis, as described above. Once the viewshed analysis was completed, the areas covered by the forest vegetation layer were set to zero visibility using a Spatial Analyst conditional statement to reflect the fact that views from within forested areas will be generally screened.

Factoring the screening effect of mapped forest vegetation into the viewshed analysis reduces potential visibility of the proposed Project from 84.6% (topographic visibility) to 27.6% of the 1-mile radius study area (see Table 1). This significant reduction reflects the abundance of mapped forest vegetation throughout the study area. As illustrated in Figure 8, the vegetation viewshed is limited primarily to open areas such as open fields, cleared road corridors, larger waterbodies, the existing cleared ROW, and some residential subdivisions. As with the topographic viewshed, areas of increased potential visbility indicated in the vegetation viewshed analysis occur primarily at the edges of areas where potential views of the existing line are already indicated. Totaling these areas indicates that potential visibility of the transmission line within the study area will increase by approximately 3%. However, because a conservative 40 foot tree height was assumed, and the potential screening effect of man-made structures, hedgerows, and isolated trees were not considered in the vegetation viewshed analysis, potential Project visibility within the study area is almost certainly overstated. In addition, the viewshed analysis does not consider distance from the viewer or physical characteristics of the proposed transmission structures (e.g. color, narrow profile) that limit or eliminate visibility in areas indicated as having potential Project visibility in the vegetation viewshed analysis. Consequently, being within the vegetation viewshed does not necessarily equate to actual Project visibility.

Table 1. A and C Line Structure Viewshed Analysis Summary

Type of Viewshed	Visual Study Area		
	Total Acres	Visible Acres	%
Existing Structures - Topography Only	15,723	12,944	82.3
Proposed Structures - Topography Only	15,723	13,305	84.6
Existing Structures – Topography & Vegetation	15,723	3,904	24.8
Proposed Structures - Topography & Vegetation	15,723	4,337	27.6

[1]All acreages rounded to the nearest whole number

4.1.2 Field Verification

As mentioned previously, because the vegetation viewshed analysis and cross sections only consider large blocks of mapped vegetation and assume a 40-foot tree height, they tend to over-estimate potential Project visibility from ground-level vantage points. To more accurately evaluate the potential visibility of the proposed Project, the area within a 1-mile radius of the line was reviewed in the field on October 17, 2012. During field review, views toward the transmission line were documented from 87 representative/sensitive viewpoints with photos and field notes (see Appendix A). All photos were obtained using a Nikon D90 digital SLR camera with the focal length set at approximately 35 mm (equivalent to between 50 and 55 mm on a standard 35 mm film camera). This focal length is

the standard used in visual impact assessment because it most closely approximates human perception of spatial relationships and scale in the landscape. Viewpoint locations were documented using hand-held global positioning system (GPS) units, and the time of each photo was documented on all electronic equipment (cameras, GPS units, etc.) and data sheets (see Appendix A). The existing transmission structures on the ROW were used as locational reference points during field review. Documented viewpoints typically offered the most open, unobstructed views toward the Project site, and/or included areas identified as visually sensitive, or having a high level of public use/visitation. Viewpoint locations within the study area are shown in Figure 4. The photos obtained during this field evaluation were used to determine where the proposed transmission facilities might realistically be visible, and which viewpoints would be appropriate for use in the preparation of visual simulations.

Field verification confirmed that the visibility of the existing transmission lines is generally limited to areas at or adjacent to sites where the ROW crosses public roads, and locations where residential development has occurred in proximity to the existing transmission corridor. This is due to the topographic variation and dense forest vegetation that characterize the majority of the study area. Longer distance views are generally confined to developed open space (including cultivated farmland), several transportation corridors, waterbodies and a few residential developments/neighborhoods with limited vegetative screening. However, landscape trees, hedgerows, and patches of forest vegetation provide at least partial screening of views to the existing lines in many of these areas. Where visible, the existing lines are typically seen at foreground distances (under 0.5 mile) by drivers, local residents, and in some cases, business employees and recreational users. In most instances potential views of the line are restricted to within approximately 100 yards of the transmission corridor due to screening provided by forest vegetation. Where the transmission line crosses public roads, open views are generally restricted to the cleared ROW (i.e., under the lines, looking down the ROW). In these views the existing structures and linear orientation of the lines and cleared ROW can clearly be seen. The transmission structures are close to the viewer, unscreened and often viewed against the sky. However, these road-crossing views are fleeting, and generally completely obscured by existing vegetation once the viewer is outside the limits of the cleared ROW. In some agricultural areas and residential subdivisions, lack of intervening trees provides off-ROW views to the existing lines. In these situations, portions of the lines can be seen in front of, or above, the existing forest vegetation. These views are typically perpendicular to the line, and a limited number of Project components (i.e., structures, conductors, and/or cleared ROW) will therefore be visible.

As far as sensitive resources are concerned, field verification revealed that many sites indicated as having potential visibility by topographic and vegetation viewshed analysis were actually well screened from views of the transmission corridor by intervening vegetation and structures. This was found to be the case for the majority of historic sites, local recreational resources and schools visited during field review. The forest vegetation that occurs at many

sensitive sites (e.g., parks, historic landmarks and schools,) generally impedes the viewer's perception of the line and/or cleared ROW from these areas. At sensitive sites where such screening is lacking (e.g., Cady Recreation Park and the Dutchess County Rail Trail) open views of the existing transmission lines are already available, and therefore additional visual change (either negative or positive) will be limited. Other than public roads and residential neighborhoods, Project visibility from visually sensitive sites was generally limited by vegetation, built structures, and/or distance. Potential Project visibility from sensitive resources inventoried within the visual study area, based on viewshed analysis and field verification, is summarized in Appendix B.

4.2 Project Appearance

4.2.1 Selected Viewpoints

Review of photos obtained from 87 viewpoints within and adjacent to the study area during the October 2012 field verification resulted in the selection of seven viewpoints for use in the development of visual simulations. These seven viewpoints were selected based upon the following criteria:

1. They provide clear, unobstructed views of the Project (as indicated by visibility of the existing lines).
2. They illustrate Project visibility from sensitive resources that have open views of the transmission corridor.
3. They illustrate typical views from LSZs where views of the Project will most typically be available (e.g., Rural Residential).
4. They illustrate views of the proposed Project that will be available to representative viewer/user groups within the visual study area.
5. They illustrate typical views under different lighting conditions, and from different viewer perspectives, to illustrate the range of visual change that will occur with the Project in place.

Because views from identified sensitive resources were typically fully or significantly screened from view by intervening trees, structures, and/or topography, selected viewpoints were limited to public roads and residential neighborhoods. The selected viewpoints show representative views of the transmission line from various distances and directions. However, because distant views of the line are rare (due to screening provided by topography, vegetation, and structures), all of the selected viewpoints are within the foreground (<0.5 mile) distance zone. This resulted in viewpoints that present a "worst case" image of Project visibility and visual impact. Location of the selected viewpoints is indicated in Figure 4. Viewpoint details and selection criteria of each simulation viewpoint are summarized in Table 2, below:

Table 2. Viewpoints Selected for Simulation and Evaluation

Viewpoint Number	Location	Viewer Groups Represented	Landscape Similarity Zone[1]	Viewing Distance[2]	View Orientation
17	Rombout Road, Town of LaGrange	Resident	5	200 ft.	N
40	Vervalen Drive, Town of LaGrange	Resident	1	340 ft.	E
56	Diddell Road, Town of LaGrange	Resident	3	165 ft.	S
61	State Route 376, Town of Wappinger	Traveler	3, 5	50 ft.	N
78	Fort Hill Road, Town of LaGrange	Resident	3	280 ft.	SE
81	Plass Road, Town of Pleasant Valley	Resident	4	150 ft.	W
83	Plass Road, Town of Pleasant Valley	Resident	3, 4	450 ft.	NW

[1]1=Medium/High Density Residential, 3=Low Density Residential, 4=Agricultural, 5= Forested
[2]Distance to nearest proposed transmission structure.

These viewpoints are illustrated as the existing conditions photographs in Figures 9 through 15.

4.2.2 Visual Simulations

To show anticipated visual changes that will result from the proposed Project, computer-generated visual simulations were created to present an accurate photographic representation of the Project from each selected viewpoint location.

The photographic simulations were developed by using Autodesk 3ds Max 2012® to create a simulated perspective (camera view) to match the location, bearing, and focal length of the viewpoint (existing conditions) photograph. Existing elements in the view (e.g., buildings, transmission structures, roads) are then modeled based on aerial photographs and DEM data in AutoCAD Civil 3D 2011®. A three dimensional ("3-D") topographic mesh of the landform (based on DEM data) is then brought into the 3-D model space. At this point minor adjustments are made to camera and target location, focal length, and camera roll to align all modeled elements with the corresponding elements in the photograph. This assures that any elements introduced to the model space (i.e., the proposed transmission structures) will be shown in proportion, perspective, and proper relation to the existing landscape elements in the view. Consequently, the alignment, elevations, dimensions and locations of the proposed Project structures will be accurate and true in their relationship to other landscape elements in the photograph.

Using the camera view as guidance, the visible Project elements are then imported to the model space and set at the proper coordinates. Coordinates for the proposed transmission structures were provided to EDR by CHG&E, along with three dimensional models of the transmission structures. Insulators and conductors were modeled by EDR based plans, elevations, and structure schedules provided by CHG&E. For the purposes of this visual impact assessment, all transmission structures were assumed to be self-weathering steel poles, and the selected viewpoints all feature new single pole tangent or two-pole dead end structures. Models of the structures used for development of the simulations are illustrated in Figure 2.

Once the proposed Project is accurately modeled within the camera view, a lighting system is created based on the actual time, date, and location of the photograph. Using the Mental Ray Rendering System® with Final Gather and Mental Ray Daylight System® within the Autodesk 3ds MAX 2012® software, light reflection, highlights, color casting, and shadows are accurately rendered on the modeled Project based on actual environmental conditions represented in the photograph.

The rendered Project is then superimposed over the photograph in Adobe Photoshop CS3® and portions of the Project that fall behind vegetation, structures or topography are masked out. In views where haze is obviously present in the background, a minimal haze layer is placed over the more distant Project elements to increase realism. Any shadows cast on the ground by the proposed structures were also included by rendering a separate "shadow pass" over the DEM model in Autodesk 3ds Max 2012® and then overlaying the shadows on the simulated view with the proper fall-off and transparency using Adobe Photoshop CS3®.

4.2.3 Analysis of Existing Viewpoints and Potential Visual Change

Viewpoint 17 (Figure 9)

Existing View

This viewpoint is located on Rombout Road in the Town of LaGrange, directly under the existing transmission line. The existing view is oriented to the north, and features a gravel road and an area of mowed lawn on the ROW in the foreground, lined on either side by deciduous trees in autumn color. The ROW transitions from mowed lawn into low brush in the mid-ground of the view. This brush screens the bases of the existing transmission structures, and along with the adjacent forest, blocks long distance views from this location. The existing overhead lines and H-frame transmission structures are centrally located within the cleared ROW and serve as a focal point in this view. The structures' height and color are compatible with the adjacent forest vegetation, and their simple lines and form do not

create significant visual clutter. The overall scenic quality of this view is considered relatively low due to a lack of variety in landscape features and no visible background.

Proposed View

With the proposed Project in place, the existing H-frame transmission structures have been replaced by single pole, self-weathering steel structures. As in the existing view, the structures are centrally located in the cleared ROW, and their color and height are generally compatible with the surrounding vegetation. Because a new foreground structure has been added, and because the new structures are somewhat taller, they extend further into the sky and are now more prominent features of the view. However, the fact that they are replacing existing transmission structures results in little to no additional contrast with vegetation, landform, land use or viewer activity.

Viewpoint 40 (Figure 10)

Existing View

This viewpoint is located on Vervalen Drive in the Town of LaGrange. It is in a residential subdivision, approximately 340 feet from the nearest proposed transmission line structure. The existing view is oriented to the east and includes an asphalt road and maintained yards in the immediate foreground. The mid-ground and background are visible from this viewpoint, and dominated by rolling forested hills. Homes and driveways can be seen among the mature yard trees along the road, as well as two existing transmission structures, which occur in one of the yards. One of these structures is a single wood pole, while the other is a wooden H-frame structure. The structures are backlit in this view, which makes them appear dark against the background hills and sky. They are a focal point in the view because of their height and the contrast in land use they present. However, they are largely compatible with adjacent landscape features in terms of line, color, and scale. The overall scenic quality of this view is relatively high due to the interesting rolling landform, the interspersion of built and natural features, and the multiple layers of forested background hills.

Proposed View

With the proposed Project in place, the existing H-frame transmission structure has been replaced by a single pole structure, that is similar to the remaining structure in line, color and scale. The greater height of the new pole results in a minor increase in contrast with vegetation and landform, and the increased visibility of the conductors against the

sky make it a more prominent feature of the view. However, it is a cleaner, simpler structure than the H-frame, and as a replacement for the existing transmission line structure, the new pole does not substantially increase land use contrast or alter existing scenic quality.

Viewpoint 56 (Figure 11)

Existing View

This viewpoint is located on Diddell Road in the Town of LaGrange, directly under the existing transmission line. The existing view is oriented to the south and includes a residential yard and home in the immediate foreground, backed by forest vegetation in autumn color. Tall trees directly behind the house give way to the cleared ROW on the right hand side of the view, which is dominated by dense shrubby vegetation. This vegetation softens the contrast presented by the cleared ROW, and obscures the lower portions of two existing transmission lines that occupy the ROW. One line consists of single wood poles while the other consists of a mix of wood and self-weathering steel H-frame structures. The height and color of these structures are generally compatible with the surrounding vegetation, both on and off the ROW. Although the lines contrast with the residential character of the view, their modest height and earth tone colors minimize land use contrast. The existing scenic quality of this view is relatively low due to the lack of visual focal points and background landscape features.

Proposed View

With the proposed Project in place, the existing H-frame transmission structures are replaced by single pole, self-weathering steel structures. The increased height of these structures (and associated conductors) increases their visibility and contrast against the sky. However, their color and vertical line actually reduce contrast with the surrounding vegetation. Their line and form are also now consistent with the other line on the ROW. There is no increase in contrast with landform, and due to the presence of the existing transmission lines, the new structures do not increase perceived land use contrast or affect viewer activity. Because of their simpler form and reduced contrast with the surrounding vegetation, the new structures represent a minor improvement in scenic quality.

Viewpoint 61 (Figure 12)

Existing View

This viewpoint is located on State Route 376 in the Town of Wappinger, directly under the existing transmission lines. The view is oriented to the north, directly up the ROW. The view is dominated by the existing transmission line structures and overhead conductors. The existing A&C lines on the left, are carried by wood pole H-frame structures. Two existing ConEd lines are on the right. These lines are carried on double-circuit steel lattice structures. The view includes the sloping cleared ROW in the immediate foreground, which is characterized by low shrubs, herbaceous vegetation and signs indicating the presence of a gas pipeline. Dense trees outside the cleared ROW are visible beyond the A&C lines on the left side of the view. The existing view is dominated by the transmission line structures and the overhead conductors, especially those of the larger ConEd lines. The complex lattice structures and the abundance of overhead conductors on these lines creates substantial visual clutter, and define the land use character of the view. Consequently, existing visual quality is considered low.

Proposed View

With the proposed Project in place, the H-frame transmission structures have been replaced with a line of single, self-weathering steel poles. The color of the new poles is compatible with the surrounding vegetation, and the structures are only slightly taller than the H-frame structures they have replaced. There is no increase in contrast with landform, and although the new strucutres and conductors are more visible against the sky, the vertical arrangement of the new conductors is more compact, and takes up less of the sky overhead. The ConEd structures on the right remain the dominant, character-defining feature of the view, and the new poles do not alter land use, viewer activity or the scenic quality of the view.

Viewpoint 78 (Figure 14)

Existing View

This viewpoint is located on Fort Hill Road in the Town of LaGrange, approximately 280 feet from the nearest proposed transmission structure. The view is oriented to the southeast and is dominated by a centrally-located residential street that descends away from the viewer and turns to the right, out of view. Driveways, planted street trees and areas of mowed lawn also indicate a residential land use, but the lack of visible houses, unmowed herbaceous vegetation, and the forested hills in the mid-ground and background provide a strong rural character. Two existing transmission lines cross the road in a perpendicular manner, with structures visible on either side of the road. Existing scenic quality in this view is relatively high due to the mix of forest and fields in the foreground and extensive forested hills in the background.

Proposed View

With the proposed Project in place, two transmission structures that were partially screened by foreground vegetation have been replaced by taller, less well screened, self-weathering steel poles. The new poles' greater height increases contrast with the background hills and sky. Due to the lack of foreground screening, vegetation contrast also increases, but the increase is limited due to the natural dark brown color of the self-weathering steel. The new poles do not result in a noticeable change in land use, user activity, or scenic quality.

Viewpoint 81 (Figure 14)

Existing View

This viewpoint is located on Plass Road in the Town of Pleasant Valley. It is oriented to the west, approximately 150 feet from the nearest proposed transmission structure. The existing view is characterized by a large mowed hayfield in the foreground that is being crossed by two existing transmission lines, both of which are carried on double pole wood structures. The field is backed by deciduous forest, but existing lattice transmission structures can be seen among the trees and on the crest of the hill that forms the visible horizon in the mid-ground. The view has a strong rural agricultural feel, but the abundance of transmission structures adds a strong utilitarian aspect to the perceived land use. Overall scenic quality is moderate.

Proposed View

With the proposed Project in place, the wood H-frame structures have been replaced by single pole, self-weathering steel structures. Due to their location relative to the viewer, the new poles do not appear appreciably taller than the poles they have replaced. They are also consistent in line, color, scale and form with the two pole wood structures of the other line. The new poles do not increase contrast with vegetation, landform, the sky, land use, or viewer activity, nor do they change the overall character of the view. Because they have a somewhat smaller physical and visual presence within the agricultural field, their presence could result in a minor improvement in the scenic quality of this view.

Viewpoint 83 (Figure 15)

Existing View

This viewpoint is located on Plass Road in the Town of Pleasant Valley. It is approximately 450 feet from the nearest proposed transmission structure and oriented to the northeast. The existing view features a sloping hayfield in the foreground with a line of mature trees and two houses along the back edge of the field. Two transmission lines, both on double pole structures, cut across the field between the viewer and the houses in the mid-ground (presumably parallel to a road that provides access to the houses, but is not visible in this view). A single structure on each line is visible in this view, one built with wood poles, the other with self-weathering steel poles. Both of these structures are subservient to the large white house that serves as the focal point in this view. Despite the presence of the lines, the view has a strong rural residential character and moderate scenic quality.

Proposed View

With the proposed Project in place, the self-weathering steel H-frame structure has been replaced by a single self-weathering steel pole. The structure's added height and thicker pole diameter increase is prominence, and the new conductors are more visible against the sky. However, the scale, line, and form of the new structure are compatible with the remaining wood pole structure, and its color is the same as that of the H-frame structure it replaced. The white house remains the focal point in the view, but the paired transmission structures now become more co-dominant with the house. However, the new structure does not increase contrast with vegetation, landform, or user activity, and the land use character remains rural residential.

4.3 Visual Impact Assessment Rating

To evaluate anticipated visual changes associated with the proposed Project, the photographic simulations of the completed Project (as described above) were compared to photos of existing conditions. These "before" and "after" photographs, identical in every respect except for the Project components shown in the simulated views, were printed in 11 x 17 inch format for each selected viewpoint. A licensed EDR landscape architect who had not otherwise been involved in preparing this VIA was then asked to determine the effect of the proposed Project on the existing visual conditions in terms of its contrast with existing components of the landscape. The methodology utilized in this evaluation is a simplified version of the U.S. Bureau of Land Management (BLM) contrast rating methodology (USDI

BLM, 1980) that was developed by EDR in 1999 for use on wind power projects. It involves using a short evaluation form and a simple numerical rating process. This methodology 1) documents the basis for conclusions regarding visual impact, 2) allows for independent review and replication of the evaluation, and 3) allows a large number of viewpoints to be evaluated in a reasonable amount of time without "burn-out" of the evaluator. Landscape, viewer, and project related factors considered by the landscape architect in his evaluation included the following:

- Variety/Diversity: As a general rule, more diverse landscapes tend to have higher scenic quality. Diversity may result from diverse topography or vegetative types that produce a range of textures and colors, or from the presence of distinct natural features such as water bodies.

- Focal Point: Certain natural or man-made landscape features stand out and are particularly noticeable as a result of their physical characteristics. Focal points often contrast with their surroundings in color, form (shape), scale or texture, and therefore tend to draw a viewer's attention. Examples include prominent trees, mountains and water features. Man-made features, such as a steeple or tall building can also be focal points.

- Intactness/Order: Natural landscapes have an underlying order determined by natural processes. Cultural landscapes exhibit order by displaying traditional or logical patterns or land use/development. Elements in the landscape that are inconsistent with this natural order may detract from scenic quality. When a new project is introduced to the landscape, intactness and order are maintained through the repetition of the forms, lines, colors, and textures existing in the surrounding built or natural environment.

- Distance: Foreground views (within 0.5 mile) are considered to be most sensitive due to viewer proximity, and the ability to perceive detail. Mid-ground views extend from 0.5 mile to 3.5 miles from the viewer; distances where one can perceive individual structures and trees, but not great detail. Background is beyond 3.5 miles and generally defines the distance where only broad landforms are discernable and where atmospheric conditions may render the landscape an overall bluish color. Views in which all three distance zones are visible are often considered to have the highest scenic quality. In general, the scale and impact of a project is reduced the further it is located from a viewer. Due to the modest height of the proposed structures and the limited availability of views to the line from points beyond 0.5 mile, only foreground and near mid-ground views of the project are evaluated in this study.

- Duration of View: Some views are seen as quick glimpses (e.g., while driving along a roadway) while others are seen for a more prolonged period of time. Longer duration views of a project, especially from significant aesthetic resources, have the greatest potential for adverse visual impact.

- Scenic or Recreational Value: When a site receives designation as a scenic or recreational resource, it is an indication that there is broad public consensus on the value of that particular resource. The particular characteristics of the resource that contribute to its scenic or recreational designation provide guidance in evaluating a project's visual impact on that resource.

- Project Scale: The apparent size of a proposed project in relation to its surroundings define the compatibility of its scale with the existing landscape. Perception of project scale is likely to vary depending on the distance from which it is seen and other contextual factors.

- Visual Clutter: Numerous unrelated built elements occurring within a view can adversely impact scenic quality by creating visual clutter.

- Form, Line, Color, and Texture: These are the basic compositional elements that define the visual characteristics of a landscape, as well as a project. The extent to which form, line, color, and texture of a project are similar to, or contrast with these same elements in the existing landscape is a primary determinant of visual impact.

A summary of the results of the visual impact assessment rating are presented in Table 3. Completed rating forms are included in Appendix C.

Table 3. Visual Impact Assessment Summary

Viewpoint	Contrast Score[1]					
	Landform	Vegetation	Land Use	Sky	Viewer Activity	Average
17	0	0	0	1	0	0.2
40	1	1	0	2	0	0.8
56	0	-0.2[2]	0	1	0	-0.2
61	0	0	0	1	0	0.2
78	1	1	0	1	0	0.6
81	0	0	0	0	0	0
83	0	0	0	0	0	0

Average	0.3	0	0	0.9	0	0.2

[1]On a scale of 0 (insignificant) to 4 (strong)
[2]Indicates a moderate decrease in contrast

As this table shows, for all viewpoints the rater found an insignificant to minimal increase (i.e., score of less than 1.0 on the scale of 0 to 4) in visual contrast with the proposed Project in place, when compared with the existing view. This typically related to the presence of the existing transmission lines which minimized the proposed Project's contrast with all components of the landscape, especially land use. The new structures' simpler form and dark brown color are consistent with adjacent forest vegetation, and actually reduced contrast and resulted in minor improvement in scenic quality in some viewpoints. Contrast with the sky was increased in most viewpoints with the new structures in place, due to their taller height, larger diameter conductors, and bolder visual presence. However, this contrast was never rated as greater than moderate (score of 2) in any of the viewpoints. Viewpoint 40, located in a Moderate Density Residential zone, exhibited the greatest visual contrast. At this viewpoint, contrast was increased primarily due to the increased height of the proposed structures, and their proximity to a nearby residence. However, even in this viewpoint the average contrast rating of 0.8 is minimal on the scale of 0 to 4.

When considering the selected viewpoints as a whole (i.e., the composite average rating of all seven viewpoints), the Project's overall visual impact was rated as insignificant to minimal (i.e., 0.2 on a scale of 0 to 4). This is largely attributable to the presence of existing transmission lines, which compromises baseline scenic quality and tends to reduce the perception of additional visual contrast presented by the proposed Project. Utilizing an existing transmission corridor is a pre-emptive mitigation strategy that 1) eliminates the need for additional ROW clearing, 2) reduces line, form and land use contrast due to the presence of existing transmission structures, and 3) takes advantage of lower viewer expectations regarding scenic quality.

5.0 Mitigation

Practical mitigation options for a transmission line are limited, given the nature of the Project and its siting, structural and electrical requirements. However, in accordance with NYSDEC Program Policy (NYSDEC, 2000), various visual mitigation measures should be considered. These include the following:

A. Professional Design and Siting. A properly designed and sited project is the best way to mitigate potential impacts. The Project's occurrence on an existing transmission line ROW that is generally well screened from significant visual resources minimizes its visual impact.

B. Screening. In selected locations where lack of existing foreground vegetation increases the visibility of the proposed and/or existing lines, screen plantings could reduce Project visibility. Screen plantings have the greatest mitigation value in off-ROW situations, where the line is proximate to residential or recreational viewers, opportunities for plantings exist, and these plantings have the potential to grow tall enough to fully screen the transmission line or enclose the viewer's area of spatial reference (e.g., Viewpoint 56). Plantings on the ROW, in situations such as the road crossing shown in Viewpoint 61, would have to be evaluated in terms of their compatibility with ROW maintenance/line clearance requirements. The screening value of any on-ROW plantings would likely be limited, as they would have to utilize relatively low growing species.

C. Relocation. The Project has been sited within an existing transmission corridor, which serves to minimize the contrast presented by the rebuilt lines and concentrates visual impacts in an area already affected by the existing A&C Lines and ConEd 345 kV lines.

D. Camouflage. The dark brown color of the self-weathering steel proposed for the new structures generally minimizes contrast with surrounding vegetation under most conditions. Use of alternate materials, such as galvanized steel rather than wood could reduce color contrast and visual weight when the structures are viewed against the sky. However, this material would increase color contrast when the structures are viewed against a vegetated backdrop. Because self-weathering steel poles minimize color contrast with existing background vegetation, they are considered the best material for reducing visual impact in most situations.

E. Low Profile. A significant reduction in structure height is not feasible given the line clearance/safety requirements of the Project. The only way to accommodate lower structures would be to shorten span

length and install additional structures. Given the relatively modest height of the proposed structures, this alternative (i.e., more numerous shorter structures) could actually increase visual impact.

F. Downsizing. See previous discussion regarding reduced structure height. Reducing the length of the line is not feasible given the need to maintain the existing electrical connections these lines provide. The existing ROW is also the shortest, most direct route from the beginning to the end points of the line.

G. Alternate Technologies. Alternate technologies for electrical transmission such as the use of direct current (DC) would not be compatible with the existing transmission system and would require the construction of large transition stations at each end of the lines. These would significantly increase the Project's visual impact. Underground installation of the line would reduce the Project's visual impact, but the roughly ten-fold increase in construction cost does not seem warranted given the limited visual impact of the Project as currently proposed.

H. Nonspecular Materials. Non-specular conductors will be used on the rebuilt lines to minimize reflected glare.

I. Lighting. Lighting along the rebuilt transmission lines will not be required. Lighting at the substations at either end of the lines will not be affected by the proposed Project.

J. Maintenance. Use of self-weathering steel prevents the need for repainting of towers as part of transmisison line maintenance. Maintenance of the ROW will be conducted on a regular basis to assure the electrical security of the line and remove any debris that is illegally disposed in the area.

K. Offsets. Correction of an existing aesthetic problem within the viewshed is a viable mitigation strategy for projects that result in significant adverse visual impact. For instance, historic structure restoration/maintenance activities could be undertaken to off-set a Project's potential visual impacts on cultural resources. However, results of this VIA and Project cultural resource studies do not suggest that impacts will be substantial enough to warrant this type of mitigation.

6.0 Conclusions

The visual analysis performed by EDR indicates that the A&C Line Article VII Project will result in a limited increase in visibility and visual contrast when compared to the existing transmission lines. However, the Project is likely to have an effect on the visual/aesthetic character of some near foreground views within the study area. Specific conclusions include the following:

- Based on topographic viewshed analysis (i.e., analysis that considers only the screening provided by landform) approximately 84.6% of the study area (the area within 1-mile of the Project center line) is within the topographic viewshed of the Project. However, almost all of this area is already included within the viewshed of the existing transmission lines. When the screening effect of mapped forest vegetation is factored into the viewshed analysis, only 27.6% of the study area is indicated as having potential views of the proposed Project. This is roughly 3% increase over the area indicated as having potential views of the existing lines.

- Field review confirmed the results of the vegetation viewshed analysis and revealed that direct lines of sight to the existing line are largely restricted to road crossings (e.g. Routes 44 and 376), open fields, and some residential areas adjacent to the existing transmission corridor. In most areas, visibility of the existing line is limited to the area within 100 yards of the transmission corridor due to the screening provided by forest vegetation. Open views from visually sensitive resources are extremely rare.

- Simulations from seven representative viewpoints generally show a slight increase in structure height, visual weight and skyline clutter with the proposed Project in place. However, these changes do not typically result in a significant increase in visual contrast or reduction in the original level of scenic quality. This is largely due to the presence of the existing transmission lines in the views. The largest impact occurs in those instances where the height of the proposed structures increase visibility of poles and conductors against the sky.

- The visual contrast ratings conducted by a registered landscape architect indicated that adverse visual impacts of the proposed Project should be insignificant to minimal. This is largely attributable to the occurrence of the proposed Project within an existing transmission corridor, and hence the lower scenic quality of the existing views and reduced visual contrast presented by the proposed Project. Increased

contrast with the sky was noted in the majority of viewpoints, but overall Project contrast never exceeded a score of 1 (minimal) for any of the viewpoints evaluated.

- For certain views, especially those in proximity to residences, visibility of the new transmission line structures could be somewhat reduced if vegetative screening was installed. The feasibility and need for this type of mitigation would need to be evaluated on a site-specific basis. However, the results of this VIA suggest that mitigation of this sort may not be warranted given the limited visual impact of the proposed Project. Location of the new line within an existing transmission corridor is considered the best means of reducing perceived visual contrast and change in land use.

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FIGURES

Appendix A

Photo Log and Field Notes

Appendix B

Project Visibility from Visually Sensitive Resources

Appendix C

Completed Contrast Rating Forms and Resume of Involved Landscape Architect