MANITOBA – MINNESOTA TRANSMISSION PROJECT
Environmental Impact Statement

ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS ON VISUAL QUALITY

CHAPTER 17
SEPTEMBER 2015

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ABBREVIATIONS AND ACRONYMS

ATK	Aboriginal Traditional Knowledge
CEAA	*Canadian Environmental Assessment Act, 2012*
EIS	environmental impact statement
GIS	Geographic Information System
LAA	local assessment area
LCC	landscape character class
MMTP	Manitoba–Minnesota Transmission Project
NEB	National Energy Board
PDA	Project development area
RAA	regional assessment area
RM	rural municipality
ROW	right-of-way
RVTC	Riel–Vivian Transmission Corridor
SLTC	Southern Loop Transmission Corridor
VC	valued component
VSC	visual sensitivity class

GLOSSARY OF TECHNICAL TERMS

Biogeoclimatic	A geographic area having similar patterns of energy flow, vegetation and soils as a result of a macroclimate.
Biophysical rating	A measure of the degree to which biophysical characteristics of a view create visual interest and draw people's attention.
Built interventions	Human-constructed structures, roadways, buildings and infrastructure.
Candidate viewpoint	A viewpoint that is identified as important for community use, residential use, First Nation use, Metis use, recreation use or tourism use.
Community sense of place	Those characteristics that make a location special or unique, as well as foster a sense of authentic human attachment and belonging.
Interventions	Landscape alterations caused by activities such as forestry, industrial development, mining, road construction, utility corridors and agriculture.
Landscape character class	A qualitative description and classification of the landscape according to its topographic variety, vegetation pattern and the extent and type of land use interventions.
Local assessment area	All lands with a potential view of the Project that is visible in the foreground (0 km to 1 km) and mid-ground (1 km to 8 km) as alterations will be most apparent at these distances. This area considers direct visual effects of the Project.
Priority viewpoint	A candidate viewpoint that is located in the Project viewshed, is within 8 km of the Project and its view is not represented by other identified viewpoints.
Prominence	The degree to which an object occupies a person's central field of vision.
Regional assessment area	The area of the LAA plus the land beyond where the Project is visible in the background (greater than 8 km, to a maximum extent of 15 km). This area considers the contribution to cumulative effects by the Project and other major projects nearby.

Rural/pastoral character	An area characterized by undeveloped lands, agricultural fields or grazing lands, and may include some low-density residential development.
View	A viewscape as seen within an approximate 60° view, consistent with a human's central field of vision, including some near peripheral vision. This is generally representative of two 50 mm frames stitched into a mini-panorama, which are chosen to represent the area of greatest visual disturbance anticipated from each viewpoint.
Viewer rating	A measure of the number of people likely to experience the view and the preferences, expectations or concerns they have about how they would like the view to look.
Viewing condition	A measure of the condition under which the view is most commonly viewed.
Viewpoint	An on-the-ground or water-based location from which the surrounding landscape can be viewed or observed.
Viewshed	A viewshed includes the area that can potentially be seen from single or multiple viewpoints of the Project. A direct sight line potentially exists between the viewpoint and the area being viewed.
Visual absorption capacity	The relative capacity of a landscape to absorb visual alterations and still maintain its visual integrity.
Visual quality	The potential for a landscape to produce varying degrees of satisfaction among viewers. It is a human response to a landscape, which arises from the relationship between the landscape character and its effects on viewers.
Visual sensitivity class	The sensitivity of the landscape to alteration based on biophysical characteristics and viewing and viewer-related factors.

17 Assessment of Potential Environmental Effects on Visual Quality

17.1 Introduction

Manitoba Hydro is proposing construction of the Manitoba–Minnesota Transmission Project (MMTP, or the Project), which involves the construction of a 500 kilovolt (kV) AC transmission line in southeastern Manitoba. The transmission line would originate at the Dorsey Converter Station northwest of Winnipeg, continue south around Winnipeg and within the Existing Transmission Corridor (Existing Corridor), the Southern Loop Transmission Corridor (SLTC) and the Riel–Vivian Transmission Corridor (RVTC), to just east of Provincial Trunk Highway (PTH) 12. The transmission line then continues southward on a New Right-of-way (New ROW) across the rural municipalities of Springfield, Tache, Ste. Anne, La Broquerie, Stuartburn and Piney to the Manitoba–Minnesota border crossing south of the community of Piney. The Project also includes the construction of terminal equipment at the Dorsey Converter Station, electrical upgrades within the Dorsey and Riel converter stations, and modifications at the Glenboro South Station requiring realignment of transmission lines entering the station.

Based on the above description, the assessment of the Project is divided into three components:

- transmission line construction in Existing Corridor, extending from Dorsey Converter Station to just east of PTH 12;
- transmission line construction in a New ROW, extending south from the Anola area to the border by Piney; and
- station upgrades—at Glenboro South Station, Dorsey Converter Station and Riel Converter Station—and transmission line realignment work at Glenboro South Station.

This chapter assesses potential effects on visual quality. Visual quality is a valued component (VC) because the transmission line and its associated infrastructure and vegetation clearing have the potential to change the visual quality of the landscape from viewpoints important to local residents, First Nations and Metis, recreationalists, tourists and other stakeholders. An adverse change in visual landscape can contribute to stress and annoyance; for example, due to the perception that aesthetic quality, recreation values, or property values will be affected. Visual quality is related to several socio-economic conditions, such as: community identity, property values, quality of life, and recreation and tourism. The Dorsey and Riel converter stations and the Glenboro South Station were not assessed for visual quality because the stations already exist and upgrades are not anticipated to further affect the aesthetics from surrounding viewpoints.

Routing considered visual effects such as proximity of the Project to residences, communities, parks, cultural sites and other such locations whenever possible.

For further discussions linked to visual quality, see:

- Chapter 16 – Land and Resource Use: visual quality is linked to land values, which are discussed in this chapter.
- Chapter 19 – Community Health and Well-being: potential changes in visual quality can contribute to stress and annoyance, which is addressed in this chapter.

17.1.1 First Nation and Metis Engagement

During the First Nation and Metis Engagement Process (Chapter 4), which included open houses, meetings and one-on-one discussions, participants expressed their concern about the Project's potential effects on visual quality and stress and annoyance related to the Project.

17.1.2 Regulatory and Policy Setting

17.1.2.1 Primary Regulatory Guidance

A list of the various regulatory requirements that were considered in developing this environmental impact statement (EIS) can be found in the Project description (Chapter 2, Section 2.3). Particular consideration was given to the following federal and provincial legislation and guidelines in the preparation of this environmental assessment:

- the Project Final Scoping Document, issued on June 24, 2015 by Manitoba Conservation and Water Stewardship's Environmental Approvals Branch, which represents the Guidelines for this EIS;
- the relevant filing requirements under the *National Energy Board Act* (R.S.C., 1985, c. N-7), and guidance for environmental and socio-economic elements contained in the National Energy Board (NEB) Electricity Filing Manual, Chapter 6; and
- the *Canadian Environmental Assessment Act, 2012* (S.C. 2012, c. 19, s. 52) and its applicable regulations and guidelines.

17.1.2.2 Additional Federal Guidance

The NEB Filing Manual (NEB 2015) provides guidance regarding identification of any predicted visual or other aesthetic effects of the Project on existing land uses in the study area. Similarly, aesthetics is considered if the project could change the existing environmental setting related to visual aesthetics and requires a description of any aesthetic effects of the project on residents or other potentially affected persons or users in the study area.

17.1.2.3 Additional Provincial Guidance

The identification of visual quality effects is not currently regulated or legislated within the Manitoba EIA process. However, provincial requirements following *The Environment Act* (Government of Manitoba 2015) and the provincial guidelines for proposals under *The*

Environment Act (Manitoba) include the need to sustain a high quality of life, including social and economic development, recreation and leisure, and the need to describe socio-economic implications resulting from environmental impacts.

17.1.2.4 Additional Municipal Guidance

Policy direction or statements related to the management of the visual landscape and its effect on local residents' quality of life and recreation and tourism opportunities is included in the municipal development plans (adopted under *The Planning Act)* for seven of the RMs and communities that cross the Project.

The development plans for the RM of Headingley (2006), RM of La Broquerie (2011), Macdonald-Ritchot Planning District (2013), South Interlake Planning District (2010), and the RM of Piney (2013) outline a number of common general goals related to visual quality. These include the protection and improvement of the quality of the physical environment and visual amenities of the communities, ensuring adequate recreational opportunities for the health and enjoyment of residents and maintaining a semi-rural atmosphere throughout the municipalities. Two development plans (Piney and South Interlake) note the importance of applying mitigation measures such as visual buffering to mitigate the effects of wind generation turbines, which result in similar visual effects on the landscape by virtue of the tall, linear tower features.

Manitoba Hydro is cognizant that neither *The Planning Act*, nor its Regulations, apply to the Crown or Crown agencies. However, it does seek to work cooperatively with the municipalities when planning, designing, constructing, operating and maintaining its projects to limit the extent of possible interactions with their developments and plans.

17.1.3 Engagement and Key Issues

As part of Manitoba Hydro's Public Engagement and First Nation and Métis Engagement Process, input was sought from First Nations, Metis, local municipalities, stakeholder groups, government departments, local landowners, and the general public concerning the Project. No key person interviews were conducted for the assessment of visual quality.

Key issues regarding visual quality identified through this process and the sections in the EIS where they are addressed are summarized in Table 17-1.

Table 17-1 Issues and Concerns Addressed in the EIS

Comment/Concern	EIS Reference
Visual Quality and Aesthetic Value	
Effects on property values, tourism, recreation, quality of life and cultural identity	Chapter 16 – Land and Resource Use (Sections 16.5.2, 16.5.3, 16.5.4 and 16.5.6) Chapter 19 – Community Health and Well-being (Sections 19.4.1 and 19.5.2)

Consideration of these issues and feedback from the engagement process was considered in transmission line routing (Chapter 5) and was also considered during the development of mitigation measures for potential effects and the importance ratings that were assigned to each viewpoint (as described in Section 17.3.1.3.3).

17.2 Scope of Assessment

17.2.1 Spatial Boundaries

The following spatial boundaries are used to assess Project effects on visual quality:

- **Local assessment area (LAA):** corresponds to lands with a potential foreground or mid-ground view of the transmission line[1] within a 16 km corridor (8 km on either side of the final preferred route). Construction and operation of the Project is expected to be most apparent at this distance (BC MOFR 1997, 2001).
- **Regional assessment area (RAA):** corresponds to the LAA plus the areas beyond with a potential view of the line, to the maximum extent of visibility, which includes areas within a 30 km corridor (15 km on either side of the final preferred route) – the anticipated limit of visibility due to topography and the earth's curvature).

17.2.2 Temporal Boundaries

Subject to the timing of regulatory approval, the following temporal boundaries are used to assess residual and cumulative environmental effects of the Project on visual quality.

- **Construction:** Construction of the transmission lines will span from Q3 2017 to Q1 2020, and modifications to the Dorsey Converter Station, Riel Converter Station and Glenboro South Station will span from Q4 2017 to Q4 2019.
- **Operation and Maintenance:** The Project is expected to be in-service in 2020 and have a service life of about 100 years.

Effects on visual quality are relevant during construction, operation and maintenance of the Project. However, the visual quality assessment focuses on the operation and maintenance phase portion because that phase has the potential for permanent visual effects and aesthetic changes, while the construction phase has the potential for temporary visual disturbances only.

[1] For visual quality, the Dorsey and Riel converter stations and the Glenboro South Station were not assessed because the stations already exist and upgrades are not anticipated to further impact the aesthetics from surrounding viewpoints.

17.2.3 Learnings from Past Assessments

To make sure the assessment of visual quality was both comprehensive and addressed the appropriate effects related to this VC, a regulatory review of Manitoba Hydro's past EISs (Bipole III Transmission Project [Bipole III] and the Keeyask Generation Project) was considered in the scoping of Project effects. Additionally, a review of relevant large transmission lines and linear development was undertaken to identify related issues and concerns, as well as residual effects and conclusions. The review of these environmental assessments informed the application of mitigation measures needed to manage similar effects.

Visual quality concerns related to Bipole III included changes in views from residences and areas of recreational use, loss of unique terrain or a reduction in landscape integrity, and overall changes in landscape character (Manitoba Clean Environment Commission 2013). Visual impact of the proposed transmission lines was frequently mentioned as a concern during engagement processes in agricultural Manitoba. Many rural landowners and residents spoke of not wanting to see the towers through their front window every day, or of the transmission line affecting their quality of life. These concerns were used to help identify and prioritize viewpoints for analysis for MMTP. These viewpoints included a sample of recreational, residential, agricultural and forested areas, representative of similar areas within the LAA, where it was likely that the public and stakeholders would be concerned if views were altered.

Outside of these Manitoba Hydro examples, the study of visual aesthetics is becoming more commonplace and is often expected by individuals, communities, and proponents of transmission line development projects elsewhere across Canada (Golder Associates Ltd. 2008; BCTC 2010). A broad review of visual preference studies undertaken in Canada, Spain and the United States indicates that:

- natural landscapes are preferred over human-modified landscapes (Arriaza *et al.* 2004).
- human intervention tends to have a negative effect on visual quality. Some interventions such as open pit mines, oil and gas wells and major transmission lines have a greater negative effect on visual quality than other land uses such as agricultural land use, forestry and tourism. Studies also demonstrate that increased levels of intervention are correlated with decreased levels of public acceptance (MFLNRO 2011; ATPR 2013; ACT 2015).
- disturbance to visual quality can negatively affect property values (Chapter 16, Section 16.5.2).
- disturbances designed to reduce vegetation clearing and to more closely reflect natural disturbance patterns and openings have higher public acceptance ratings (BC MFLNRO 2011).
- landscape alterations can negatively affect economic potential of tourism operations that rely in part on viewscapes as part of the product or experience they are marketing (Wilderness Tourism Association, n.d.; Minnesota DNR Forestry 1994; Santos, Ferreira and Costa n.d.).

- agricultural land, while largely homogenous in nature, provides views of open spaces and visually appealing rural landscapes characteristic of open prairie landscapes (Benson 2008; Fleischer and Tsur 2000) and can therefore improve scenic quality.

Manitoba Hydro recognizes the importance of visual quality to individuals and communities in Manitoba and is building on accepted practices for assessing the baseline and predicted visual quality. Manitoba Hydro has reviewed mitigation from other jurisdictions in the development and application of options to reduce visual contrast and prominence, where possible.

17.3 Methods

17.3.1 Existing Conditions Methods

At this time, there are no Manitoba-specific methods for assessing visual quality. Therefore established and accepted visual quality methods and beneficial practices from elsewhere in Canada, the United States, and the United Kingdom guide the visual quality assessment. These methods address concerns related to visual quality and the potential effects on landscape character, community identity, property values, and tourism and recreation through the creation of photo-simulations that allow the public, stakeholders and First Nations and Metis to accurately visualize the potential visual change. The resulting photo-simulations can then be considered relative to known visual preference research and public acceptance thresholds, as well as used to characterize and calculate the extent of new visual disturbance from the perspective of each viewpoint.

Individuals and communities can have strong opinions about the visual quality from viewpoints of particular importance to them. Therefore, viewpoints are assessed individually to determine the predicted change to visual quality. However, the overall assessment conclusions result from considering the changes in visual quality throughout the LAA, as represented by all assessed individual viewpoints. This allows a stakeholder to understand the anticipated view from a particular viewpoint as well as consider the anticipated changes in visual quality within the LAA overall.

17.3.1.1 Overview of Methods

Methods for the desktop review included a literature review, viewshed analysis and viewpoint identification and prioritization. Methods for fieldwork included photo-documentation of baseline views, in accordance with beneficial practices, and determination of the area of greatest visual sensitivity for each viewpoint. Subsequent analysis included assessment of the visual sensitivity, landscape character and anticipated prominence of the Project from each viewpoint.

The literature review helped identify viewpoints of concern within the LAA and to review visual preferences within similar landscapes. The viewshed analysis determined which portions of the LAA might have a view to the Project based on local terrain and the Earth’s curvature. Viewpoints were identified through a review of engagement records, literature review, and professional judgement, in accordance with beneficial practices. As the initial viewpoint identification resulted

in a large number of candidate viewpoints, these were refined as the final preferred route was determined as well as through a screening procedure to reduce viewpoints with duplicate views, and to prioritize viewpoints that are within the viewshed and anticipated to have views of the Project.

The remaining viewpoints were deemed priority viewpoints and assigned a relative importance rating based on the type of activity occurring at the viewpoint, the estimated frequency of use, and the anticipated viewing distance to the nearest tower. Viewpoints that are frequently accessed, with views expected to align with a rural landscape or 'naturalized' view, and anticipated to have prominent views of the Project would be deemed to be of greater importance than viewpoints with less use, more anticipated acceptance of disturbed views, or less prominent views of the Project. Priority viewpoints are considered representative of views that would be experienced throughout the LAA, across a range of different view types (*e.g.*, residences, recreation areas) and different settings (forested, non-forested) from a range of distances.

Fieldwork included visiting each priority viewpoint to capture panoramic photos of baseline views, as views of the Project are anticipated to differ based on varying lines of sight due to topography and existing structures and vegetation, two side-by-side frames/shots were chosen to represent the area of greatest visual sensitivity expected from each viewpoint. The area captured within the two photographs is consistent with most people's central field of vision (60°). These two photographs were used for each viewpoint to assess the sensitivity of the view to alteration, the landscape character class based on landscape characteristics and the visibility and degree of built interventions, and the anticipated prominence of the Project, once built.

17.3.1.2 Sources of Information

The following sources of information were used to characterize the baseline conditions for visual quality:

- engagement records – to identify concerns related to visual quality as well as to identify viewpoints of potential concern identified during the Public Engagement and First Nation and Metis Engagement Processes;
- previous Manitoba environmental assessments related to transmission lines – to identify concerns related to visual quality;
- online and hardcopy maps – to identify viewpoints of potential concern;
- existing legislation, regulation, land use management and policy direction–to understand these in relation to visual quality;
- relevant visual quality and visual preference literature – to present accepted procedures for assessing visual quality and to revise accepted methods to suit the type and context of this particular Project; and
- fieldwork – spatial and visual primary data were collected at priority viewpoints to photo-document and assess the existing visual condition.

17.3.1.3 Desktop Analysis

17.3.1.3.1 Literature Review

A literature review was completed to identify both general and site-specific concerns related to visual quality and to identify viewpoints of potential concern. This included a review of:

- existing engagement records;
- traditional knowledge studies (*e.g.*, Roseau River Anishinabe First Nation Aboriginal Traditional Knowledge Report n.d.; Manitoba Hydro 2015);
- previous reports on public hearings associated with Manitoba environmental assessments related to transmission lines (Manitoba Clean Environment Commission 2013);
- visual preference research (USDA Forest Service 1994; Arriaza 2004; Benson 2008; ATPR 2013; ACT 2015; Fleischer and Tsur 2000);
- local and regional tourism and marketing literature and associated studies (Travel Manitoba 2015; Red River North Tourism n.d.; Interlake Tourism Association n.d.); and
- online and hardcopy recreation and tourism maps.

Photographs, satellite imagery and topographical maps were reviewed to gain an understanding of the degree of topography, vegetation, water bodies and the extent and type of landscape disturbances already present within the LAA and RAA.

17.3.1.3.2 Viewshed Delineation

Viewshed analysis was used to delineate the LAA and RAA and to calculate the proportion of the LAA and RAA that has a potential view of the Project. Geographic Information System (GIS) software was used to identify areas, up to 15 km from the Project, which have a direct sight line, taking into account topography and the earth's curvature.

This analysis was undertaken for the transmission line but not for the proposed upgrades at the Dorsey and Riel converter stations and the Glenboro South Station. In those cases, upgrades are not anticipated to further affect the aesthetics from surrounding viewpoints.

17.3.1.3.3 Viewpoint Identification and Prioritization

Methods for prioritizing viewpoints and assigning importance ratings have been adapted from beneficial practices and existing guidelines in Canada and elsewhere (BC MOFR 1995; BC MOFR 1997; BC MOFR 2001; Urbis 2013). Candidate viewpoints were identified through a combination of reviewing engagement records, literature review, and professional judgment, according to beneficial practices. Initially, viewpoints were identified along the alternative routes; however as the route was refined into the final preferred route, a number of viewpoints were removed from further consideration as they were not anticipated to have views of the Project.

Remaining candidate viewpoints were evaluated for inclusion or exclusion in the field assessment, using the following criteria:

- candidate viewpoint must be located within the viewshed of the Project;
- candidate viewpoint must be within 8 km from the Project (as foreground and mid-ground views would result in more prominent views of the Project); and
- candidate viewpoint must not be duplicated by other viewpoints. In cases where viewpoints duplicated the view to the Project, the viewpoint with the potential for the most prominent view was identified as the priority viewpoint and was used to provide a conservative representative view.

Viewpoints that remained after the three criteria were applied were deemed priority viewpoints. A number of viewpoints remained at this stage, and had to be further refined to determine which could reasonably be field assessed to document baseline conditions. Therefore, the list of priority viewpoints was classified into first or second tier priority viewpoints, with the first tier slated to receive field assessment and verification and the second tier viewpoints relegated to the status of candidate viewpoints. The candidate and priority viewpoint locations for this assessment are shown in Map Series 17-100 – Candidate and Priority Viewpoints.

The priority viewpoints were assigned an importance rating based on GIS analysis and the knowledge gained about each viewpoint through the background review. Viewpoint importance ratings were assigned based on three factors:

- access to the viewpoint
- type of activity and estimated frequency of visitation
- viewing distance (to nearest tower)

The Socio-economic and Land Use TDR, Table 4-85 provides data regarding access to viewpoints, types of activity, viewing distance and other variables for each of the viewpoints. Ease of access and frequency of visitation were rated relative to the type of activity being pursued. Viewing distance was based on the distance from each viewpoint to the Project. Only viewpoints ranked as high and moderate were included in the effects assessment because these were determined to be the viewpoints of greatest concern to local residents, First Nation and Metis, and stakeholders. Viewpoints considered in this assessment are considered representative of views that would be experienced throughout the LAA, across a range of different view types (*e.g.*, residences, recreation areas) and different settings (forested, non-forested) from a range of distances.

17.3.1.3.4 Field Studies

Field studies were conducted at each of the priority viewpoints to collect baseline visual quality data and to photo-document current conditions, in accordance with established beneficial practices (BC MOFR 1997, 2001). The field program was conducted in October and November 2014.

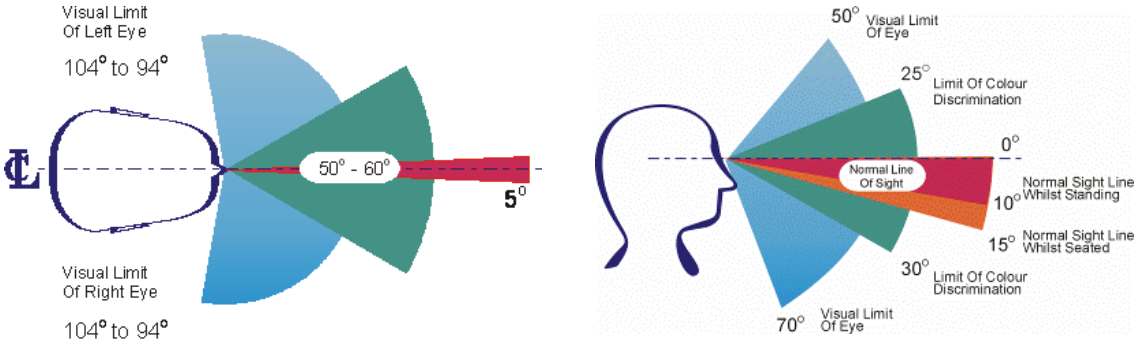
Researchers travelled to each priority viewpoint to confirm that an unobstructed view of the Project would occur. Locations for the viewpoints were based on information identified in the literature review and engagement records.

Photographs were taken from each viewpoint while photo numbers and corresponding compass bearings were documented, and a geographic location for each photo was recorded. To the extent possible, photos were taken under optimal conditions; however, local weather conditions varied during field research, and optimal conditions were not always possible.

17.3.1.3.5 Central Field of View Determination

Due to the linear nature of the Project and the extended range of visibility from most viewpoints, panorama photographs were taken from each viewpoint. Two side-by-side frames/shots equaling approximately a 60° central field of vision were chosen to represent the area of greatest visual sensitivity expected from each viewpoint (looking toward the proposed line that runs closest to the viewpoint).

A 60° view is consistent with most people's central field of vision. At this angle, both eyes perceive an object simultaneously which allows for image sharpness, depth perception, colour discrimination and, ultimately, the most in-focus view of an object (Figure 17-1). The 60° central field of vision does include some peripheral vision, most notably within the near peripheral range, which is adjacent to the center of gaze (Panero and Zelnik 1979; Urbis 2013).



SOURCE: Panero and Zelnik 1979

Figure 17-1 Central Field of Vision – Horizontal and Vertical

While the 60° central field of vision was used to assess baseline and post-development conditions, several more photos on either side of the central view were stitched together into a wider view panorama using Adobe Photoshop® to provide more context for the view from each viewpoint.

17.3.1.3.6 Visual Sensitivity, Landscape Character and Prominence

The effect of the Project on visual quality is assessed through consideration of:

- visual sensitivity class (VSC) – a relative expression of how sensitive a view is to alteration and the likelihood that the public and stakeholders would be concerned if it were altered (Sheppard 2004) (Table 17-2);
- landscape character class (LCC) – based on landscape characteristics and the visibility and degree of built interventions (roadways, buildings and infrastructure); and
- prominence – measures the degree to which an object occupies a person's central field of vision, and is affected by viewing distance, as viewers can detect landscape alterations to varying degrees whether they are in the foreground (0 to 1 km), midground (1 to 8 km), or background (greater than 8 km).

The central field of view from each viewpoint was classified according to its visual sensitivity and landscape character. Together, the views from each viewpoint are used to describe the nature of the LAA in general. Visual sensitivity, landscape character and prominence are determined based on the central field of view experienced by an observer when looking toward the proposed transmission line where it runs closest to the viewpoint.

VISUAL SENSITIVITY

Established visual landscape inventory procedures (BC MOFR 1997) were used as a guide for determining the VSC of each viewpoint, ranging from very high to very low sensitivity (Table 17-2).

Table 17-2 Visual Sensitivity Class Definitions

VSC	Description
1	**Very high** sensitivity to visual alteration. The area is extremely important to viewers. There is a very high probability that the public would be concerned if the view is altered in any way or to any scale.
2	**High** sensitivity to visual alteration. The area is very important to viewers. There is a high probability that the public would be concerned if the view is altered.
3	**Moderate** sensitivity to visual alteration. The area is important to viewers. There is a probability that the public would be concerned if the view is altered.
4	**Low** sensitivity to visual alteration. The area is moderately important to viewers. There is a risk that the public would be concerned if the view is altered.
5	**Very low** sensitivity to visual alteration. The area may be somewhat important to viewers. There is a small risk that the public would be concerned if the view is altered.

SOURCE: BC MOFR 1997

Determining the VSC is calculated as such:

VSC = (Biophysical Rating + Viewing Condition + Viewer Rating) - Visual Absorption Capability

using the following parameters:

- biophysical rating – an evaluation of biophysical elements of the viewshed including slope, aspect, topographic variety, vegetation variety, visibility of water and the influence of adjacent scenery;
- viewing condition – degree of existing visible interventions within the viewshed, viewing distance, duration of the view, frequency of viewing and angle of the view;
- viewer rating – relative number of viewers and viewer expectations; and
- visual absorption capacity – ability of the landscape to absorb visual alterations and still maintain its visual integrity, given its slope, aspect and topographic variety.

LANDSCAPE CHARACTER

The baseline landscape character class of each viewpoint's central field of view was described based on the terrain and vegetation that make up the landscape characteristics, along with the visibility and degree of built interventions evident from the viewpoint (resulting in classes ranging from a rural/pastoral landscape to an urban/industrial landscape, described in Table 17-3). Existing human disturbances were delineated on the photos of each view using Adobe PhotoShop® software to help understand the extent of current modifications. While landscape character is considered for each viewpoint, the assessment considers landscape character across the LAA as a whole.

Table 17-3 Landscape Character Class Description

Landscape Character Class	Description
Rural/Pastoral	The central field of view toward the Project has a rural/pastoral character. Built interventions, when assessed from a viewpoint, are (1) not visible or (2) very small in scale, and not easily distinguished from the pre-development conditions.
Rural/Pastoral with minimal development	The central field of view toward the Project has a rural/pastoral character. Built interventions, when assessed from a viewpoint, are (1) difficult to see and (2) low in prominence.
Rural/pastoral with distinguishable development	The central field of view toward the Project has a rural/pastoral character. Built interventions, when assessed from a viewpoint, are (1) easy to see and (2) low to moderate in prominence.
Semi-urban/industrial	The central field of view toward the Project is dominated by a semi-urban or industrial character. Built interventions, when assessed from a viewpoint, are (1) easy to see and (2) high in prominence.
Urban/industrial	The central field of view toward the Project has an urban or industrial character. Built interventions when assessed from a viewpoint, begin to dominate the view as they are (1) very easy to see and (2) very high in prominence.

PROMINENCE

Prominence is not assessed for the existing condition portion of the assessment because the Project does not yet exist and can therefore not be measured. Prominence is instead discussed in Section 17.3.2.1.2.

17.3.1.4 Addressing Uncertainty

Viewpoint selection was based upon available information and patterns of use, and general expectations around visual quality based on the type of viewpoint. Multiple viewpoints were included in the assessment covering different view types (*e.g.*, residences, recreation areas) and different settings (forested, non-forested) from a range of distances to provide a representative sample. An established analytical and quantitative approach was applied in assessing the viewpoints, which reduces uncertainty in the assessment results.

The viewshed analysis does not account for vegetation screening due to the presence of vegetation located between the viewer and the Project; therefore, it is a conservative estimate of visibility.

The Project is anticipated to use guyed structures along much of the route, which have less visual effect than self-supporting structures; however, the model included self-supporting towers to show the maximum/more conservative visual effect. Similarly, the most prominent tower placement (located directly in front of the viewpoint) was shown in the photo-simulations to present the “worst-case” visual scenario.

In cases where candidate viewpoints duplicated the view to the Project, the viewpoint with the potential for the most prominent view was identified as the priority viewpoint and was used to provide a conservative view that represents adjacent or similar viewpoints in terms of viewpoint type, distance to and viewing direction toward the Project.

17.3.2 Assessment Methods

The overall socio-economic effects assessment methods are presented in Chapter 7. The specific techniques used to carry out the assessment for the visual quality VC are presented in this section. These include:

- assessment approach
- potential effects, effects pathways and measureable parameters
- effects description criteria for the VC
- significance thresholds for residual effects

17.3.2.1 Assessment Approach

17.3.2.1.1 Modelling and Photo simulations

A 3D computer simulation model was used to prepare photo simulations that illustrate the potential post-construction conditions from each of the priority viewpoints. Project effects on visual quality were simulated using 3ds Max® and Adobe Photoshop® and were based on the current Project design details, resulting in a spatially accurate and scaled computer model of the transmission line and towers. However, the built transmission line may not be exactly as modeled due to variations required to accommodate site conditions and final design.

Virtual cameras were then assigned within the site model using the geographic coordinates of the viewpoints analyzed in the baseline field program. To provide accuracy of the photo simulation, the virtual cameras were placed at a height of 1.75 m above the ground (typical height of a human observer), then matched in focal length and exposure settings to the settings used to capture the baseline photos. The synthesized images were rendered from the model and then overlaid on the respective baseline condition photograph for each analyzed viewpoint.

17.3.2.1.2 Prominence

Prominence measures the degree to which an object occupies a person's central field of vision, and is affected by viewing distance, as viewers can detect landscape alterations to varying degrees whether they are in the foreground (0 to 1 km), midground (1 to 8 km) or background (greater than 8 km). The potential visual effect from the transmission line will primarily depend on how much of the central field of vision it occupies.

The visual prominence of a feature is measured in degrees (both vertical and horizontal) and assigned a score (Table 17-4). Because the size of the towers and the distance the towers are from a priority viewpoint are known, the following calculation for determining tangent is used to determine prominence:

tangent (angle or degrees of prominence) = opposite side of viewing angle/ adjacent side of viewing angle

The respective horizontal and vertical degrees of view for each of the closest one to three towers are determined (in recognition that these towers have the most potential to effect visual quality) and then averaged to get a total prominence per view.

The human eye is accustomed to a strong horizontal line when viewing the landscape, and as a result vertical structures are more prominent and noticeable than horizontal ones (Urbis 2013). Therefore, in the calculation of overall prominence scores (Table 17-5), the vertical prominence scores are weighted double those of the horizontal prominence scores and the two scores are summed.

Photo simulations do not account for atmospheric conditions such as glare, fog and haze; therefore, modelling may overestimate the visibility of the Project.

Table 17-4 Horizontal and Vertical Prominence

Field of View	Degrees of Field of View Occupied	Potential Visual Prominence	Associated Score
Horizontal	Less than 5° (*Low*)	Low visual prominence; may not be highly visible unless it contrasts strongly with background.	1
	5° to 30° (*Moderate*)	Moderate visual prominence; may be noticeable. The degree it intrudes on the view depends on how well it integrates with the landscape character.	2
	Greater than 30° (*High*)	High visual prominence; will be highly noticeable and will dominate view.	3
Vertical	Less than 0.5° (*Low*)	Low visual prominence; will appear as a small thin line on the landscape.	2
	0.5° to 2.5° (*Moderate*)	Moderate visual prominence; may be noticeable. The degree it intrudes on the view depends on how well it integrates with the landscape character.	4
	Greater than 2.5° (*High*)	High visual prominence; will be highly noticeable. The degree of visual intrusion will depend on the landscape character and the width/thickness of the object.	6

SOURCE: Adapted from Urbis 2013

Table 17-5 Potential Visual Prominence

	High Vertical Angle (6)	Moderate Vertical Angle (4)	Low Vertical Angle (2)
High Horizontal Angle (3)	High (9)	High (7)	Moderate (5)
Moderate Horizontal Angle (2)	High (8)	Moderate (6)	Low (4)
Low Horizontal Angle (1)	High (7)	Moderate (5)	Low (3)

NOTE: Sample Calculation:

A low horizontal angle (1) + A moderate vertical angel (4) = An overall moderate visual prominence (5)

A high total prominence is achieved if the calculated score is 7 to 9; a moderate total prominence is achieved if the calculated score is 5 to 6; and a low total prominence is achieved if the calculated score is 3 to 4.

17.3.2.2 Potential Social Effects, Effects Pathways and Measurable Parameters

Project effects on visual quality were identified based on anticipated Project activities and physical works, regulatory and policy setting, issues identified through the Public Engagement and First Nation and Metis Engagement Processes (Section 17.1.1), and learnings from past assessments (Section 17.2.3). Measureable parameters were selected to facilitate qualitative or quantitative measurement of potential effects (Table 17-6). Effects pathways are illustrated in Figure 17-2.

Measureable parameters were selected to facilitate qualitative and quantitative measurement of potential effects (Table 17-6). The measurable parameters for the assessment of visual quality describe the area within which Project components will be visible (visibility), qualitative and quantitative changes in the existing visual conditions, and degree of prominence of Project infrastructure.

Table 17-6 Potential Social Effects, Effect Pathways and Measurable Parameters for Visual Quality

Potential Social Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement	Notes or Rationale for Selection of the Measureable Parameter
Change in visual quality	Removal of vegetation, addition of built infrastructure (transmission line and towers)	Visibility	Determines how visible the transmission line would be in the LAA.
		Change in existing visual condition (%)	Assesses biophysical characteristics of the landscape as well as the degree of visual landscape intactness.
		Prominence	Considers the degree to which the transmission line occupies a viewer's central field of view.

17.3.2.3 Residual Environmental Effects Description Criteria

Residual effects are those that remain after mitigation measures have been applied, and are described in terms of direction, magnitude, geographic extent, frequency, duration, reversibility, and socio-economic context. The characterization of residual effects on visual quality is based on the criteria defined in Table 17-7.

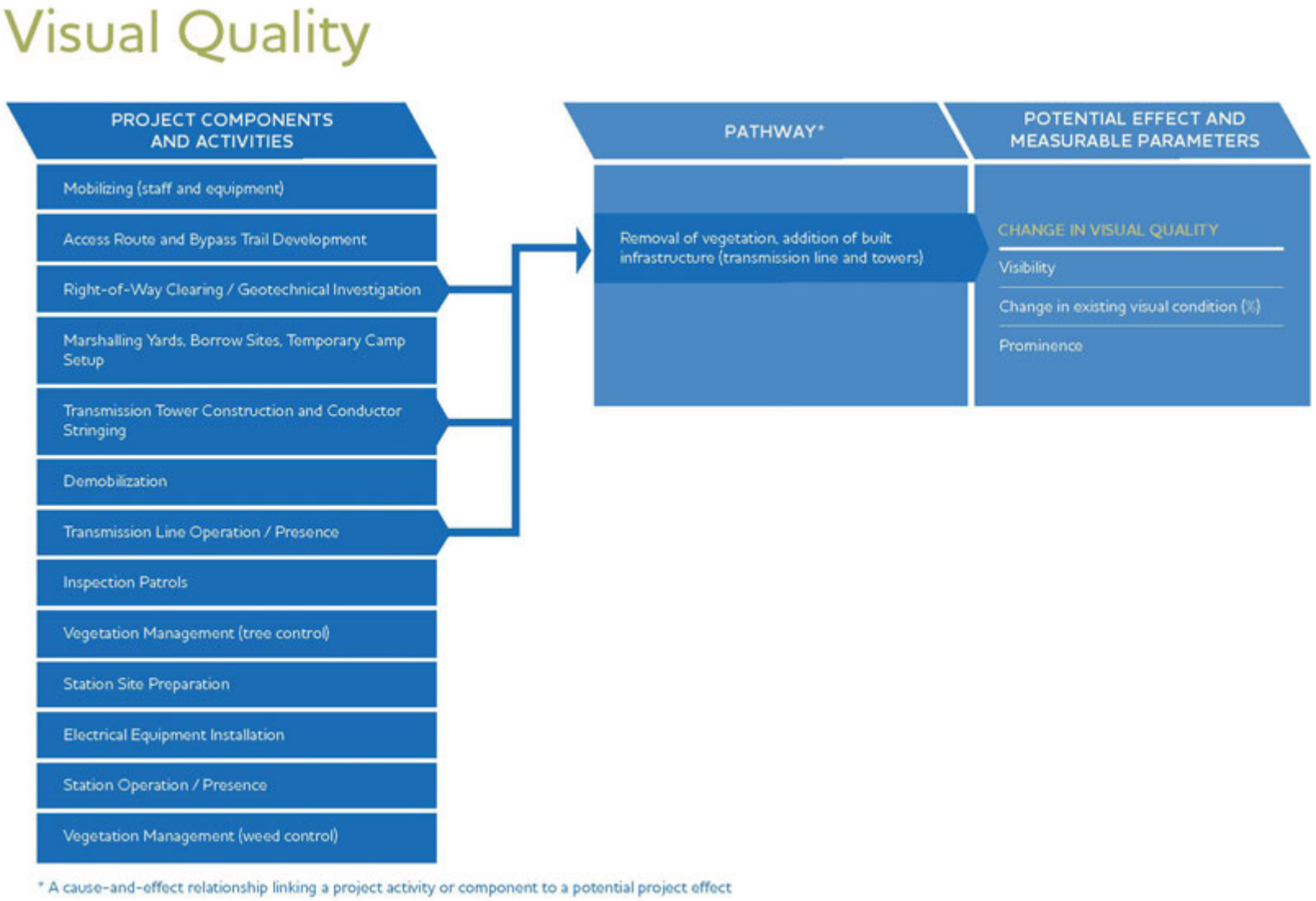


Figure 17-2 Effect Pathways

Table 17-7 Characterization of Residual Environmental Effects on Visual Quality

Characterization	Description	Definition
Direction	The trend of the residual effect	**Positive** – not applicable to visual quality **Adverse** – changes that may decrease visual quality **Neutral** – no change in visual quality
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**Negligible** – Views of the Project are generally not obvious; and there is no evident change in the LAA's landscape character, as viewed from moderate and high importance viewpoints **Low** – Views of the Project are, on average, of a low prominence. While there may be a measurable change in the LAA's landscape character as viewed from moderate and high importance viewpoints, on average, the change remains within the baseline landscape character class **Moderate** – Views of the Project are, on average, of a moderate prominence. A noticeable change in the LAA's landscape character from a notable number of moderate and high importance viewpoints may result in a change in baseline landscape character class **High** – Views of the Project are, on average, highly prominent. A fundamental change in the LAA's landscape character from moderate and high importance viewpoints may result in a change in the baseline landscape character class to semi-urban/industrial
Geographic Extent	The geographic area in which an environmental, effect occurs	**PDA** – Residual effects are restricted to the PDA **LAA** – Residual effects extend into the LAA **RAA** – Residual effects interact with those of other projects in the RAA
Frequency	How often during the Project or in a specific phase	**Single event** – residual effect occurs once **Multiple irregular event (no set schedule)** – residual effect occurs multiple times at irregular intervals **Multiple regular event** – residual effect occurs multiple times at regular intervals **Continuous** – residual effect occurs continuously

Characterization	Description	Definition
Duration	The period of time required until the measurable parameter or the VC returns to its existing condition, or the effect can no longer be measured or otherwise perceived	**Short-term** – Residual effect is restricted to construction phase **Medium-term** – Residual effect extends more than the construction phase **Permanent** – Residual effect extends for the lifetime of the Project or more
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the Project activity ceases	**Reversible** – The visual effect is able to be reversed after activity completion and reclamation **Irreversible** – The visual effect is unable to be reversed
Socio-economic context	Refers primarily to the sensitivity and resilience of the VC. Consideration of context draws heavily on the description of existing conditions of the VC, Project interactions may have a more pronounced effect if they occur in areas or regions that have already been affected by human activities	**Low resilience** – landscape character is unable to accommodate change, with consideration of the baseline visual condition, visual sensitivity class and anticipated prominence **Moderate resilience** – landscape character is able to accommodate some change, with consideration of the baseline visual condition, visual sensitivity class and anticipated prominence **High resilience** – landscape character is able to accommodate a high degree of change, with consideration of the baseline visual condition, visual sensitivity class and anticipated prominence

17.3.2.4 Significance Thresholds for Residual Social Effects

The thresholds for assessing the significance of the Project effects defined below consider the effect of the Project within the planning context and intended management vision for the area, as well as the degree of change from current baseline conditions.

The significance of visual effects depends primarily on the anticipated magnitude of the visual alteration created by the Project and the visual sensitivity of the landscape, including the anticipated viewer response to the visual alteration.

A residual effect is considered significant if the following three conditions occur:

- the average visual landscape character changes from relatively undisturbed to disturbed[2]
- the closest towers at high value viewpoints are moderately to highly prominent[3]
- visual quality is an important planning objective in the LAA by government authorities

Additional details on methods for determining importance, prominence, and defining landscape character classes are provided in Sections 17.3.1.3.5 and 17.3.1.3.6.

17.4 Existing Conditions

17.4.1 Overview

The character of the visual quality assessment area is a product of its biogeoclimatic setting, terrain and the type and extent of human interventions present within the LAA and RAA. Biophysical characteristics such as topography, vegetation and views of water can create visual interest and draw people's attention. Similarly, the extent and type of landscape disturbances already present can influence the scenic integrity and visual enjoyment of the landscape.

17.4.1.1 Biophysical Landscape Characteristics

The Existing Corridor and areas around the Dorsey and Riel converter stations have low to gently rolling terrain, with views of water as the route crosses the Red, Assiniboine and La Salle rivers and their tributaries. Areas along the New ROW begin to gently undulate with slopes up to 5%. Land cover moves from cultivated land to pastureland and hayland, and much of the forested landscapes along the route are located along the southeast portion of the route near the RMs of

[2] A "relatively undisturbed" visual landscape is as one that is either rural/pastoral in character, or rural/pastoral with minimum development (see Table 17-3 for landscape character class definitions). A disturbed visual landscape exceeds the rural pastoral with distinguishable development class, becoming more semi-urban/industrial in character.

[3] Table 17-4 provides criteria for horizontal and vertical prominence based on the degrees of visual field occupied. Table 17-5 provides composite prominence scores in consideration of both horizontal and vertical prominence of a structure.

La Broquerie, Stuartburn and Piney. Views include forested lands consisting of mixedwood forest and peatlands. Continuing to move south and southeastward along into the RMs of La Broquerie, Stuartburn and Piney the terrain undulates more than elsewhere along the route and transects a number of bogs and large intact areas of forest.

Overall, the LAA is characterized by its low to gently sloping topographic variation, varied vegetation patterns, common views of agricultural landscapes, and views of water along the Red, La Salle and Assiniboine rivers. Supported by the findings from visual preference literature (Benson 2008; Fleischer and Tsur 2000; USDA Forest Service 1994; Sheppard 2004; MLFNRO 2011; ATPR 2013), it can be concluded that these characteristics form a visually appealing landscape. Section 6.2 of the Socio-economic and Land Use TDR provides more detail on climate, landforms, terrain, vegetation, wetlands, waterbodies and enduring features, as they relate to visual quality.

17.4.1.2 Human-Caused Landscape Characteristics

Land use within the LAA is predominantly agricultural and pastureland, but other visible land uses include recent and historical forest harvesting, major industrial developments, commercial developments, residential developments, road construction and utility corridors. Depending on the degree of human modification, this can reduce the quality and enjoyment of the visual landscape. However, the degree of disturbance varies depending on the view shed being observed.

Agricultural land, while largely homogenous in nature, provides views of open spaces and visually appealing rural landscapes characteristic of open prairie landscapes (Benson 2008; Fleischer and Tsur 2000) and can therefore in fact improve scenic quality.

The most northerly extent of the Existing Corridor, near the Dorsey Converter Station, is characterized largely by agricultural pasture lands, despite the proximity to the urban and suburban areas of Winnipeg. However, traveling south, this portion of the route passes close to a Hutterite community, transects the TransCanada Highway, and runs just west of the residential area of South Headingley and to the west and south of Oak Bluff. Traveling along this northwest portion of the route from the Dorsey Converter Station to where it crosses the Red River just south of Winnipeg, the visual landscape is mostly semi-rural and agricultural in nature, although it includes a patchwork of residential communities and associated commercial development.

South of Winnipeg, views consist of residential development to the north, greenspace along the Red River Floodway, and agricultural lands to the south as well as the communities of Grande Pointe, Prairie Grove, and Deacon’s Corner.

Travelling along the RVTC, the new ROW transects agricultural lands, and then heading south-southeast, the viewscape is dominated by rural residential and smaller agricultural parcels near the communities of Ste. Genevieve and Richer. Travelling south of Richer and the TransCanada Highway, the landscape is predominantly larger agricultural lands and rural residential development in the vicinity of La Broquerie and Zhoda. From Zhoda to Piney the route runs through both small and large patches of treed areas, with the larger patches occurring mostly near the Sandilands Provincial Forest, wildlife management areas, and the communities of

Menisino and Sundown. Near Piney, agricultural lands and rural residential is the predominant landscape.

More detail on traditional land and resource use, heritage resources, population bases, roadways, transportation and utility infrastructure, land and resource use, and agricultural land use is provided in Sections 6.3.1 to 6.3.7 of the Socio-economic and Land Use TDR, as they relate to visual quality.

Photographs typical of these various land uses and biophysical characteristics are shown in the compilation below (Photo 17-1).

Rural/Semi-Urban Interface

Forested Areas

Rural Residences

Community Sites of Interest

Agricultural Fields

Parks

SOURCE: LaBroquerie.com; visual quality field staff photos

Photo 17-1 Sample Views of the Landscape and Development within the RAA

17.4.2 Desktop Review

The desktop review included a literature review, viewshed delineation to determine areas with a direct sightline to the Project, and viewpoint identification and prioritization. Each of these tasks are discussed in the sub-sections below.

17.4.2.1 Literature Review

A review of Aboriginal traditional use and knowledge studies shows that traditional use areas such as berry picking, camping and archaeological sites are located within the LAA. For example, a grouping of several archaeological discoveries are located in close proximity to Duff Roblin Provincial Park, as well as within the Saint Norbert Provincial Heritage Park near Winnipeg and could be affected by new visual disturbances. The Saint Norbert Heritage Park is an important cultural and heritage feature along the famed Crow Wing Trail and located less than one kilometer north of the final preferred route (Roseau River Anishinabe First Nation ATK Report n.d.; Manitoba Hydro 2015).

A number of recreational and tourism values exist within the LAA, which could be affected by visual disturbances from the Project. A number of provincial forests, parks, ecological reserves and Wildlife Management Areas exist where recreation and eco-tourism activities take place. Common activities include horseback riding, hiking, cross-country skiing, all-terrain vehicle driving, snowmobiling, hunting, fishing, camping, guided walks, bird and wildlife watching, and canoeing. Visual quality is an important attractor to these parks, as noted by Interlake Tourism Association (“I am the heart of Manitoba Canada, a place of natural beauty!”), Travel Manitoba (2015) and Red River North Tourism (n.d.) marketing materials. There are also a number of golf courses, campgrounds and other recreational amenities located outside of parks and protected areas, but within the LAA. Within their promotional materials, many of the RMs along the final preferred route emphasize the importance of visual quality to community sense of place, outdoor recreation and the competitiveness of the tourism industry within the RAA.

17.4.2.2 Viewshed Delineation

Assuming no vegetation screening, the transmission line would be visible from a number of rural or semi-rural residential areas covering approximately 95% of the LAA (Map 17-1 – Visual Quality Assessment Area). However, because of vegetation screening, the actual extent of visibility is expected to be lower. The transmission line is expected to be visible to residents from local Hutterite Colonies, visitors to the Ridgeland Cemetery, residences near Macdonald Road and 58N Road, Courchaine Bridge, and Prairie Grove Road. Recreation users accessing the Red River Floodway, Sundown Lake, La Verendrye Golf Club, Oakwood Golf Course and campground are also likely to see the Project.

17.4.2.3 Viewpoint Identification and Prioritization

A total of 89 candidate viewpoints were identified within the LAA, including viewpoints in: communities; residences, rural roadways; lodges, outfitters, resorts, campgrounds and country clubs; golf courses, parks; key visitation sites; trails; and hunting areas. Seventy-five of the 89 candidate viewpoints were determined to be outside of the viewshed, beyond the LAA (8 km maximum distance), or the view toward the Project was duplicated by another viewpoint. The remaining 14 viewpoints (the "priority" viewpoints) along the final preferred route were deemed to represent viewpoints of potential high importance, and were selected for field visits and further evaluation in the visual quality assessment.

Table 17-8 describes the priority viewpoints and their associated viewpoint ratings, determined by the methods outlined in Section 17.3.1.3.3. Map Series 17-100 – Candidate and Priority Viewpoints shows the location of all candidate and priority viewpoints, and further details on the candidate viewpoints can be found in Appendix I of the Socio-economic and Land Use TDR.

Table 17-8 Viewpoints and Viewpoint Importance in the LAA

Priority Viewpoint[1]	Description	Importance[2]	Anticipated Distance to Closest Tower
1 – Hutterite Colony I	Rural community	Moderate	Midground
2 – Access to Sundown Lake and Grave Site	Recreation resource and cultural site	Moderate	Foreground
3 – Ridgeland Cemetery	Community resource and cultural site	High	Foreground
4 – La Verendrye Golf Club	Tourism and recreation resource; community resource	High	Foreground
5 – Oakwood Golf Course and Campground	Tourism and recreation resource; community resource	High	Midground
6 – Ste. Genevieve	Semi-rural community	Moderate	Midground
7 – Hutterite Colony II	Rural community	High	Foreground
8 – Hutterite Colony III	Rural community	High	Foreground
9 – Macdonald Road Residence	Semi-rural residential area	Moderate	Foreground
10 – TransCanada Trail Courchaine Bridge	Tourism and recreation resource; community resource	High	Foreground
11 – Red River Floodway at Chrypko Dr and Two Mile Rd	Tourism and recreation resource; community resource	High	Foreground

Priority Viewpoint[1]	Description	Importance[2]	Anticipated Distance to Closest Tower
12 – Prairie Grove Rd 54N Near Van Dekeere Rd	Semi-rural residential area	Moderate	Foreground
13 – Road 58N Residence	Semi-rural residential area	Moderate	Foreground
14 – Residences on Road 58N	Semi-rural residential area	Moderate	Foreground

NOTES:
Foreground – Project components 0 km to 1 km from a viewpoint
Midground – Project components 1 km to 8 km from a viewpoint
[1] Viewpoint numbers are not sequential
[2] The Socio-economic and Land Use TDR, Table 4-85 provides data regarding how the level of importance was assigned, and is based on access to viewpoints, types of activity, viewing distance and other variables for each of the viewpoints.

17.4.3 Field Studies

17.4.3.1 Visual Sensitivity and Landscape Character

Baseline results of the visual quality assessment of each priority viewpoint are summarized in Table 17-9, Table 17-10 and Table 17-12. See Section 17.4.1.2 for photos of the baseline conditions from two of the viewpoints. More information on the other 75 candidate viewpoints is provided in Appendix I of the Socio-economic and Land Use TDR.

VISUAL SENSITIVITY CLASS DETERMINATIONS

Observations from the field determined that views within the LAA ranged from low to moderate visual sensitivity, with one view assessed as “low” (VSC of 4), 11 assessed as “moderate” (VSC of 3), and two views to the Project were obstructed. With 11 of 14 classified as having views with moderate visual sensitivity, it is likely that visual quality in the LAA is important to the public and stakeholders and that visual alterations are of concern.

Table 17-9 describes the priority viewpoints and their associated VSC ratings, determined as per the methods and definitions outlined in Section 17.3.1.3.6.

Scenic views are an important attraction for a number of viewpoints in the assessment area including the golf courses (viewpoints 4 and 5), Red River Floodway (viewpoint 11) as well as the Ridgeland cemetery (viewpoint 3), and a number of residences (viewpoints 7, 8 and 9). Viewers at these locations will likely expect that visual quality from those viewpoints be maintained because of biophysical elements (slope/terrain/vegetation), or due to a combination of frequency of viewing, duration of viewing, and viewer expectations.

Table 17-9 Visual Sensitivity Class Determinations

Viewpoint	Biophysical Rating	Viewing Condition	Viewer Rating	Visual Absorption Capacity	VSC
1 – Hutterite Colony I	L	H	L	M	Moderate (3)
2 – Access to Sundown Lake and Grave Site	L	M	M	H	Low (4)
3 – Ridgeland Cemetery	L	M	M	M	Moderate (3)
4 – La Verendrye Golf Club	L	M	M	M	Moderate (3)
5 – Oakwood Golf Course and Campground	N/A, View Obstructed	N/A, View Obstructed	N/A, View Obstructed	N/A, View Obstructed	N/A, View Obstructed
6 – Ste. Genevieve	N/A, View Obstructed	N/A, View Obstructed	N/A, View Obstructed	N/A, View Obstructed	N/A, View Obstructed
7 – Hutterite Colony II	L	M	L	L	Moderate (3)
8 – Hutterite Colony III	M	M	M	M	Moderate (3)
9 – Macdonald Road Residence	L	M	M	M	Moderate (3)
10 – TransCanada Trail Courchaine Bridge	L	H	M	M	Moderate (3)
11 – Red River Floodway at Chrypko Dr and Two Mile Rd	L	H	M	M	Moderate (3)
12 – Prairie Grove Rd 54N Near Van Dekeere Rd	L	H	L	M	Moderate (3)
13 – Roade 58N Residence	L	H	M	M	Moderate (3)
14 – Residences on Road 58N	L	H	M	M	Moderate (3)

NOTES:
H – high; M – moderate; L – low; N/A – not applicable

17.4.3.2 Landscape Character Class Determinations

The views from each of the priority viewpoints is mainly rural, characterized by open, sprawling fields, low topographic variation, and little vegetative variety. Seven of the 14 viewpoints have a view toward the Project that is Rural/Pastoral with minimal levels of built interventions and development; 6 of the 14 have a view toward the Project that is Rural/Pastoral with distinguishable levels of built interventions and development. One viewpoint has a view that is considered Rural/Pastoral. No viewpoints are considered Urban/Industrial in landscape character (Table 17-10). Views are characterized largely by dirt-road networks, minimal forest cover and sprawling farmland. Transmission line towers or telephone lines are visible from many of the viewpoints assessed, though at a low to moderate prominence. The extent of baseline human interventions/alteration visible in the central field of view from each priority viewpoint ranges from none to nearly a quarter of the view, with an average of 7% of the view including human interventions, when considered across all viewpoints.

Table 17-10 Landscape Character Class Determinations

Viewpoint	Primary Visual Characteristics	Baseline Landscape Character Class	Baseline Alteration (%)
1 – Hutterite Colony I	Farmland, residences/outbuildings, shelter belts	Rural/pastoral with distinguishable development	18.5
2 – Access to Sundown Lake and Grave Site	Forest, farmland, dirt road, telephone lines	Rural/pastoral with minimal development	23.6
3 – Ridgeland Cemetery	Small cemetery, road, some vegetative screening	Rural/pastoral with distinguishable development	8.9
4 – La Verendrye Golf Club	Grassy open spaces, some mixed coniferous and deciduous vegetative screening	Rural/pastoral with minimal development	0.0
5 – Oakwood Golf Course and Campground	Grassy open spaces, some mixed coniferous and deciduous vegetative screening, few visible structures	Rural/pastoral with minimal development	1.9
6 – Ste. Genevieve	Residences, road networks, coniferous and deciduous vegetative screening, telephone lines	Rural/pastoral with distinguishable development	13.1
7 – Hutterite Colony II	Grassy fields, mixed deciduous and coniferous forest cover, hydroelectric towers	Rural/pastoral with minimal development	0.3

Viewpoint	Primary Visual Characteristics	Baseline Landscape Character Class	Baseline Alteration (%)
8 – Hutterite Colony III	Farmlands, coniferous trees, hydroelectric towers	Rural/pastoral with minimal development	10.7
9 – Macdonald Road Residence	Farmlands, residences and road networks, some mixed deciduous and coniferous forest cover, telephone lines	Rural/pastoral with distinguishable development	14.3
10 – TransCanada Trail Courchaine Bridge	Grasslands, some mixed deciduous and coniferous forest cover, river, single small residence screened by vegetation, small radio tower	Rural/pastoral with minimal development	0.2
11 – Red River Floodway at Chrypko Dr and Two Mile Rd	Grasslands, some forest cover, no visible infrastructural disturbances	Rural/pastoral	0.0
12 – Prairie Grove Rd 54N Near Van Dekeere Rd	Farmland, dirt road network, small signage, no forest cover	Rural/pastoral with minimal development	1.9
13 – Road 58N Residence	Farmland, residences, some mixed deciduous and coniferous forest cover, hydroelectric towers,	Rural/pastoral with distinguishable development	0.4
14 – Residences on Road 58N	Farmland, residences, hydroelectric towers some coniferous forest cover	Rural/pastoral with distinguishable development	0.8

NOTES:
H – high; M – moderate; L – low; N/A – not applicable

17.5 Assessment of Environmental Effects on Visual Quality

The assessment of visual quality examines potential effects related to visual quality and associated stress and annoyance. Potential effects related to visual quality, and stress and annoyance (including perceived effects of EMF) were frequently cited during public engagement.

17.5.1 Project Interactions with Visual Quality

Table 17-11 identifies physical activities and components that might interact with visual quality.

Table 17-11 Potential Project-Social Interactions and Effects on Visual Quality

Project Components and Physical Activities	Potential Environmental Effects and Change in Visual Quality
Transmission Line Construction Activities	
Mobilizing (staff and equipment)	–
Access Route and Bypass Trail Development	–
Right-of-way Clearing/Geotechnical Investigation	✓
Marshalling Yards, Borrow Sites, Temporary Camp Setup	–
Transmission Tower Construction and Conductor Stringing	✓
Demobilization	–
Transmission Line Operation/Maintenance	
Transmission Line Operation/Presence	✓
Inspection Patrols	–
Vegetation Management (tree control)	–
Station Construction	
Station Site Preparation	–
Electrical Equipment Installation	–
Station Operation/Maintenance	
Station Operation/Presence	–
Vegetation Management (weed control)	–

NOTES:
"✓" = Potential interactions that might cause an effect.
"–" = Interactions between the project and the VC are not expected.

Effects on visual quality are relevant during construction, operation and maintenance of the Project. For visual quality, the Dorsey and Riel converter stations and the Glenboro South Station were not assessed because the stations already exist and upgrades are not anticipated to further affect the aesthetics from surrounding viewpoints.

Five of the above Project activities are anticipated to result in an effect on visual quality: access route and bypass trail development, ROW clearing/geotechnical investigation, marshalling yards/borrow sites/temporary camp setup, transmission tower construction and conductor stringing, and transmission line operation/presence. Construction of the Project will result in altered vegetation patterns within the New ROW and the transmission line will often be clearly visible on the landscape because of the height of the towers (45 to 55 m).

The remaining Project activities are not expected to interact with visual quality because they do not involve the disturbance of vegetation or topography, or because alterations made to the converter stations or the Glenboro South Station will be minimal and will not affect visual quality.

17.5.2 Assessment of Change in Visual Quality

17.5.2.1 Pathways for Change in Visual Quality

Vegetation clearing and the construction of Project infrastructure, including transmission line towers and conductor wires will create or add to human-caused disturbance at identified viewpoints.

17.5.2.2 Construction and Operation and Maintenance

Photo simulations present post-development visual representation of the Project on the landscape. The photo simulations for viewpoints 1 and 3 are shown in Photo 17-2 and can be located as per the viewpoint numbers shown on Map series 17-100 – Candidate and Priority Viewpoints. Appendix 17A provides baseline and post-development photos as well as calculations of visual disturbance from all priority viewpoints.

Viewpoint 1: Hutterite Colony I (near Piney) (see Map 17-100-04 – Candidate and Priority Viewpoints)

Photo 17-2 Post-Development Renderings of the Project

Viewpoint 3: Ridgeland Cemetery (near Sundown) (see Map 17-100-04 – Candidate and Priority Viewpoints)

Photo 17-2 Post-Development Renderings of the Project (continued)

17.5.3 Mitigation for Change in Visual Quality

Visual quality considerations were factored into route selection, and the final preferred route passes through less populated areas, where possible; parallels existing transmission lines, where possible; and is generally located away from residences, parks, communities, and other locations that are likely to have concerns related to views of the transmission line. In addition to routing considerations, it is recognized that decisions around tower siting/placement could substantially mitigate the visual changes from a particular viewpoint.

Manitoba Hydro has or will use the following mitigation measures to enhance visual screening and reduce visual contrast of the Project:

- The transmission line has been routed to consider populated areas, paralleling opportunities with existing transmission lines, proximity of residences, parks, and communities.
- With the exception of reflective bird diverters at areas of high bird-wire collision potential, non-reflective galvanized tower materials are which reduces the visual contrast with background.
- Where practical, towers will be sited as far from viewpoints of concern as possible to reduce the visible prominence.
- Approved clearing boundaries will be clearly delineated by flagging prior to clearing or equipment will be guided through the use of Global Positioning Systems to keep clearing activities within the project.
- Efforts will be made during the design process to locate transmission towers to reduce visual interference in areas identified during public engagement (i.e., Ridgeland Cemetery).

17.5.4 Characterization of Residual Effect for Change in Visual Quality

17.5.4.1 Construction, Operation and Maintenance

If there were no vegetation screening, the transmission line would be visible from residences and other viewpoints throughout about 95% of the LAA (336,899 ha). However, because of vegetation screening, the extent of visibility is expected to be lower.

Viewpoints were chosen to provide representative views within the LAA (Section 17.3.1.3.3). The visual sensitivity and visual absorption capability of the viewpoints is largely moderate, meaning that the visual landscape viewed from ten of the viewpoints has the ability to absorb visual alterations and still generally maintain its visual integrity. This ability is due to its slope, aspect and topographic variety.

Post-development renderings and analysis predict that 10 of the views are anticipated to experience very limited measurable change and remain within their baseline landscape character class (Table 17-12). The remaining one-third of viewpoints are likely to experience a noticeable

change from baseline conditions. These five viewpoints are anticipated to experience a change in landscape character as follows:

- Views from viewpoints 2, 4, 10 and 12 will change from a landscape character class of "rural/pastoral with minimal development" to "rural/pastoral with distinguishable development," though remaining relatively undisturbed).
- The view from viewpoint 11 will change from a landscape character class of "rural/pastoral" to "rural/pastoral with minimal development," though remaining relatively undisturbed.

On average, the Project is anticipated to add less than 1% of additional visual disturbance to the assessed views. These results indicate that, on average landscape character effects will be noticeable but not substantial.

Project infrastructure is predicted to be highly prominent at 10 of the viewpoints and moderately prominent at two of the viewpoints (Table 17-13). Two of the viewpoints (viewpoints 17 and 25) are anticipated to have obstructed views of the Project due to vegetation screening.

17.5.4.2 Prominence—Post-Development Determinations

As some viewpoints are likely to see more than one tower within their central field of view, the prominence of each of the three nearest towers was determined (using both vertical and horizontal degrees) and then averaged to summarize the overall prominence of towers within the central field of view.

The distance to the closest anticipated tower locations varies from less than one kilometer at viewpoint 10 to 1.6 km at viewpoint 5, with an average distance of 600 m (Table 17-13).

As a result, Project infrastructure is predicted to be highly prominent at 10 of the viewpoints, and moderately prominent at two of the viewpoints. Two of the viewpoints are anticipated to have obstructed views of the Project due to vegetation screening (viewpoints 5 and 6). In total, this results in a moderate prominence across the LAA, determined based on priority viewpoints.

Table 17-12 Baseline and Predicted Visual Conditions

Viewpoint	Visual Sensitivity Class	Visual Absorption Capacity	Baseline LCC	Baseline Alteration (%)	Predicted LCC	Predicted Overall Alteration (%)	Predicted Change
1 – Hutterite Colony I	Moderate (3)	Moderate	Rural/pastoral with distinguishable development	18.5	Rural/pastoral with distinguishable development	18.8	No change in LCC; very limited change in alteration
2 – Access to Sundown Lake and Grave Site	Low (4)	High	Rural/pastoral with minimal development	23.6	Rural/pastoral with distinguishable development	24.1	Change in LCC; very limited change in alteration
3 – Ridgeland Cemetery	Moderate (3)	Moderate	Rural/pastoral with distinguishable development	8.9	Rural/pastoral with distinguishable development	10.4	No change in LCC; noticeable change in alteration
4 – La Verendrye Golf Club	Moderate (3)	Moderate	Rural/pastoral with minimal development	0.0	Rural/pastoral with distinguishable development	0.4	Change in LCC; very limited change in alteration
5 – Oakwood Golf Course and Campground	N/A, View Obstructed	N/A, View Obstructed	Rural/pastoral with minimal development	1.9	N/A, View Obstructed	N/A, View Obstructed	No change in LCC or visible alteration
6 – Ste. Genevieve	N/A, View Obstructed	N/A, View Obstructed	Rural/pastoral with distinguishable development	13.1	N/A, View Obstructed	N/A, View Obstructed	No change in LCC or visible alteration

Viewpoint	Visual Sensitivity Class	Visual Absorption Capacity	Baseline LCC	Baseline Alteration (%)	Predicted LCC	Predicted Overall Alteration (%)	Predicted Change
7 – Hutterite Colony II	Moderate (3)	Low	Rural/pastoral with minimal development	0.3	Rural/pastoral with minimal development	0.7	No change in LCC; very limited change in alteration
8 – Hutterite Colony III	Moderate (3)	Moderate	Rural/pastoral with minimal development	10.7	Rural/pastoral with minimal development	11.6	No change in LCC; limited change in alteration
9 – Macdonald Road Residence	Moderate (3)	Moderate	Rural/pastoral with distinguishable development	14.3	Rural/pastoral with distinguishable development	15.7	No change in LCC; noticeable change in alteration
10 – TransCanada Trail Courchaine Bridge	Moderate (3)	Moderate	Rural/pastoral with minimal development	0.2	Rural/pastoral with distinguishable development	3.1	Change in LCC; noticeable change in alteration
11 – Red River Floodway at Chrypko Dr and Two Mile Rd	Moderate (3)	Moderate	Rural/pastoral	0.0	Rural/pastoral with minimal development	0.4	Change in LCC; very limited change in alteration
12 – Prairie Grove Rd 54N Near Van Dekeere Rd	Moderate (3)	Moderate	Rural/pastoral with minimal development	1.9	Rural/pastoral with distinguishable development	3.1	Change in LCC; noticeable change in alteration
13 – Road 58N Residence	Moderate (3)	Moderate	Rural/pastoral with distinguishable development	0.4	Rural/pastoral with distinguishable development	1.3	No change in LCC; limited change in alteration

Viewpoint	Visual Sensitivity Class	Visual Absorption Capacity	Baseline LCC	Baseline Alteration (%)	Predicted LCC	Predicted Overall Alteration (%)	Predicted Change
14 – Residences on Road 58N	Moderate (3)	Moderate	Rural/pastoral with distinguishable development	0.8	Rural/pastoral with distinguishable development	1.8	No change in LCC; limited change in alteration
			Average Baseline Visual Quality: Rural/Pastoral with Minimal Development		**Average Visual Quality Alteration:** Rural/Pastoral with Distinguishable Development		

NOTES:
LCC – Landscape Character Class

Table 17-13 Visual Prominence of the Project from Each Viewpoint

Viewpoint Note: numbers are not sequential	Distance to Tower (km)	Horizontal Angle (degrees)	Horizontal Prominence (score)	Vertical Angle (degrees)	Vertical Prominence (score)	Tower's Visual Prominence (score)	Visible Towers Prominence (score)
1 – Hutterite Colony I	1.3	0.6	L (1)	1.1	M (4)	Moderate (5)	Moderate (5)
	1.5	0.5	L (1)	0.7	M (4)	Moderate (5)	
	1.7	0.4	L (1)	0.6	M (4)	Moderate (5)	
2 – Access to Sundown Lake and Grave Site	0.3	0.4	L (1)	8.4	H (6)	High (7)	High (7)
3 – Ridgeland Cemetery	0.2	1.7	L (1)	6.5	H (6)	High (7)	High (7)
4 – La Verendrye Golf Club	0.4	1.2	L (1)	4.9	H (6)	High (7)	High (7)
5 – Oakwood Golf Course and Campground	1.6	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)
6 – Ste. Genevieve	1.2	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)	N/A, View Obstructed (vegetation)
7 – Hutterite Colony II	0.8	0.9	L (1)	3.4	H (6)	High (7)	Moderate (6)
	0.9	0.7	L (1)	2.1	M (4)	Moderate (5)	
8 – Hutterite Colony III	.02	4.2	L (1)	18.9	H (6)	High (7)	High (7)
9 – Macdonald Road Residence	0.5	1.2	L (1)	5.3	H (6)	High (7)	High (7)
	0.6	1.2	L (1)	4.8	H (6)	High (7)	
10 – TransCanada Trail Courchaine Bridge	0.1	6.8	M (2)	21.7	H (6)	High (8)	High (8)

Viewpoint Note: numbers are not sequential	Distance to Tower (km)	Horizontal Angle (degrees)	Horizontal Prominence (score)	Vertical Angle (degrees)	Vertical Prominence (score)	Tower's Visual Prominence (score)	Visible Towers Prominence (score)
11 – Red River Floodway at Chrypko Dr and Two Mile Rd	0.5	1.1	L (1)	5.4	H (6)	High (7)	High (7)
12 – Prairie Grove Rd 54N Near Van Dekeere Rd	0.2	2.6	L (1)	13.4	H (6)	High (7)	High (7)
13 – Road 58N Residence	0.3	1.9	L (1)	9.0	H (6)	High (7)	High (7)
14 – Residences on Road 58N	0.3	2.4	L (1)	9.4	H (6)	High (7)	High (7)
Average Prominence: Moderate (6.8)							

NOTES:
L – Low; M – Moderate; H - High

Several of the priority viewpoints were chosen to represent views from nearby residences. In other cases, recreational areas were chosen because scenic viewing is an important attraction to the area. In both cases, residents and visitors may have expectations that visual quality from those viewpoints will be maintained because of a combination of how often the landscape is viewed from that viewpoint, and because of the extended duration of viewing.

With mitigation, the effect to visual quality within the LAA will be lessened to varying degrees depending on the viewpoint. The residual effects will be confined to the LAA, within which priority viewpoints are anticipated to experience, on average, a moderate change in visual quality as a result of the Project.

The LAA is anticipated to be moderately resilient to further visual disturbance, and therefore able to accommodate some further visual disturbance without changing the overall landscape character of the LAA. This determination is a result of considering the following three factors:

- the importance of visual quality to residents' quality of life
- the occurrence of current and future residential development, recreational opportunities, and tourism development
- the topography and vegetation

Because visual quality changes for the LAA are the result of vegetation removal and new infrastructure development, residual effects will be continuous and permanent over the Project life, though ultimately reversible, should the Project be decommissioned.

17.5.5 Summary of Residual Environmental Effects on Visual Quality

Table 17-14 summarizes residual effects on visual quality.

The change in visual quality associated with the Project is anticipated to affect some residences, rural communities, First Nations and Metis, and stakeholders. The transmission line is expected to be highly visible to residents from one Hutterite community, the visitors and parishioners at the Ridgeland Cemetery, Red River Floodway at Chrypko Drive and Two Mile Road, Courchaine Bridge, La Verendrye Golf Club, and residences near MacDonald Road, 58N Road and Prairie Grove Road. Recreationists accessing the Sundown Lake, Oakwood Golf Course and campground may also be affected by the change in visual quality.

The average landscape character within the LAA is not anticipated to exceed the rural/pastoral with distinguishable development class despite a moderate to highly prominent view of the Project from most of the priority viewpoints. As well, local land use policy acknowledges but does not consider visual quality to be a principal planning objective. Therefore, the residual effects on visual quality are assessed to be not significant.

Table 17-14 Summary of Residual Environmental Effects on Visual Quality

Project Phase	Residual Environmental Effects Characterization						
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Socio-economic Context
	Change in Visual Quality						
Operation and Maintenance	A	M	LAA	P	C	R	MR

KEY

See Table 17-7 for detailed definitions

Direction: A: Adverse; N: Neutral; P: Positive

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: PDA: ROW/Site; LAA: Local Assessment Areal; RAA: Regional Assessment Area

Duration: ST: Short-term; MT: Medium-term; P: Permanent

Frequency: S: Single event; MI: Multiple Irregular event; R: Multiple Regular event; C: Continuous

Reversibility: R: Reversible: I: Irreversible

Socio-Economic Context: U:Undisturbed, D:Disturbed; LR: Low resilience, MR: Moderate resilience, HR: High resilience

N/A Not applicable

17.6 Assessment of Cumulative Environmental Effects on Visual Quality

The Project residual effects described in Section 17.5.4 are likely to interact cumulatively with residual effects of other physical activities as identified in this section and the resulting cumulative effects are assessed. This is followed by an analysis of the Project contribution to residual cumulative effects.

17.6.1 Identification of Project Residual Effects Likely to Interact Cumulatively

Table 7-4 in Chapter 7 – Assessment Methods, presents the project and physical activities inclusion list, which identifies other projects and physical activities that might act cumulatively with the Project. Where residual environmental effects from the Project act cumulatively with those from other projects and physical activities, a cumulative effects assessment is undertaken to determine their significance
(Table 17-15).

Effects identified in Table 17-15 as not likely to interact cumulatively with residual effects of other projects and physical activities (no check mark) are not discussed further.

Table 17-15 Potential Cumulative Environmental Effects on Visual Quality

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects and Change in Visual Quality
Past and Present Physical Activities and Resource Use	
Agriculture (Conversion, Livestock Operations, Cropping and Land Drainage)	✓
Residential Developments	✓
Existing Linear Developments	✓
Other Resource Activities (Forestry, Mining, Hunting, Trapping, Fishing)	✓
Recreational Activities	–
Future Physical Activities	
Bipole III Transmission Project	✓
St. Vital Transmission Complex	✓
Dorsey to Portage South Transmission Project	✓
Northwest Winnipeg Natural Gas Pipeline Project	–
Richer South Station to Spruce Station Transmission	✓
Energy East Pipeline Project	–
Southend Water Pollution Control Centre Upgrade Project	✓
St. Norbert Bypass	✓
Headingley Bypass	✓
Oakbank Corridor	✓
Residential Development	✓
Natural Gas Upgrade Projects	–
MIT Capital Projects (Highway Renewal)	–
Piney-Pinecreek Border Airport Expansion	–

NOTES:

"✓" = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual social effects.

"– " = Interactions between the residual effects of other projects and those of the Project residual effects are not expected.

17.6.2 Cumulative Effects Assessment for Change in Visual Quality

Past and present physical activities such as agriculture, and residential and infrastructure development are considered in the existing conditions for visual quality and provide the basis for the assessment of Project residual effects.

However, a number of reasonably foreseeable projects and physical activities have the potential to interact cumulatively with the Project to further affect visual quality in the RAA, including:

- continued agricultural and residential development
- linear developments (*i.e.*, Dorsey to Portage South Transmission Project, Bipole III and Richer South Station to Spruce Station transmission projects, Oakbank Corridor Project)
- Southend Water Pollution Control Centre Upgrade
- St. Vital Transmission Complex
- St. Norbert and Headingley bypasses
- resource activities such as forestry and mining

A number of existing and reasonably foreseeable projects and physical activities are not anticipated to interact cumulatively with the Project because:

- upgrades are likely to cause only minimal additional effects on visual quality (*i.e.*, natural gas upgrade projects; MIT Capital Projects; the Northwest Winnipeg Natural Gas project; the Piney-Pinecreek Border Airport Expansion) or
- the project is too far away from MMTP to interact visually (Energy East pipeline project) or
- land uses such as recreational activities are not expected to have an adverse effect on visual quality.

These activities are not assessed further in the assessment of cumulative effects because it is not anticipated that they will contribute to a cumulative effect on visual quality.

17.6.2.1 Cumulative Effect Pathways for Change in Visual Quality

The cumulative effect pathways of past and present projects, including agriculture, forestry, residential developments, transmission lines and mining, include long-term changes in vegetation patterns within the RAA and infrastructure development.

Proposed or reasonably foreseeable projects in the RAA are also expected to contribute to long-term changes in vegetation patterns and infrastructure development, as viewed from priority viewpoints.

The potential for cumulative interaction with these projects is a result of the viewsheds of MMTP and other projects overlapping in both time and space. This results in both an additive cumulative effect (the sum of effects on visual quality as a result of each project) as well as a synergistic cumulative effect (resulting effects are greater than the simple sum of the effects).

17.6.2.2 Mitigation for Cumulative Effects for Change in Visual Quality

A potential mitigation measure that could be implemented by Manitoba Hydro and other proponents to reduce the cumulative effects of the physical activities and works associated with future projects would be to co-locate other linear developments where feasible along the same visual corridor as MMTP.

While this mitigation is important to consider, Manitoba Hydro has little control on where or how projects by other proponents are developed.

17.6.2.3 Residual Cumulative Effects on Change in Visual Quality

While some views from assessed viewpoints have little existing visual disturbance, others are already experiencing substantial degrees of landscape disturbance that results in reduced visual quality
(Table 17-12). Effects of present and reasonably foreseeable future projects within the RAA may contribute to additional changes in vegetation patterns as well as the addition of built infrastructure as viewed from identified viewpoints. The Project contribution to a change in visual quality will often be noticeable, but is only one visual disturbance among many others. For example, the line is often located within the context of agricultural and residential development, in conjunction with other linear developments or near other transmission projects. The Project will contribute to adverse effects on visual quality within the RAA, from priority viewpoints that are moderate in magnitude, permanent, continuous and reversible, when considered in conjunction with other past, present and reasonably foreseeable visual disturbances.

17.6.3 Summary of Cumulative Effects

Past and present physical activities and resource uses are embodied in the existing conditions for visual quality, and provide the basis for the assessment of Project residual effects. It is not anticipated that any of these activities or uses will result in any additional effects on visual quality in the future that are not already present, and are therefore not considered further in the assessment of cumulative effects.

There are therefore nine future projects proposed for southern Manitoba whose residual effects have the potential to overlap temporally and spatially with the Project residual effects
(Table 17-15). The potential cumulative effects with visual quality is discussed in the subsections below. Table 17-16 summarizes cumulative environmental effects on visual quality.

Table 17-16 Summary of Cumulative Environmental Effects on Visual Quality

Cumulative Effect	Residual Cumulative Environmental Effects Characterization						
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Socio-economic Context
Cumulative Change in Visual Quality							
Cumulative social effect with the Project	A	M	RAA	P	C	R	MR
Contribution from the Project to the overall cumulative social effect	The Project is expected to contribute adverse visual effects that are permanent, continuous, moderate in magnitude and reversible within the moderately-resilient RAA.						

KEY

See Table 17-7 for detailed definitions

Direction: A: Adverse; N: Neutral; P: Positive

Magnitude: N: Negligible; L: Low; M: Moderate; H: High

Geographic Extent: PDA: ROW/Site; LAA: Local Assessment Areal; RAA: Regional Assessment Area

Duration: ST: Short-term; MT: Medium-term; P: Permanent

Frequency: S: Single event; MI: Multiple Irregular event; R: Multiple Regular event; C: Continuous

Reversibility: R: Reversible: I: Irreversible

Socio-Economic Context: U:Undisturbed, D:Disturbed; LR: Low resilience, MR: Moderate resilience, HR: High resilience

N/A Not applicable

17.7 Determinations of Significance

With mitigation measures, the Project and cumulative effects on visual quality will be not significant.

17.7.1 Significance of Environmental Effects from the Project

The change in visual quality associated with the Project is anticipated to affect some residences, rural communities, First Nations and Metis, and stakeholders. A number of mitigative adjustments (*i.e.* retaining vegetative buffers, shifting the alignment) have been made as a result of the transmission line routing and engagement processes to reduce visual effects of the line where possible. However, the transmission line is expected to be highly visible to residents from one Hutterite community, to visitors to the Ridgeland Cemetery, Red River Floodway at Chrypko Drive and Two Mile Road, Courchaine Bridge, La Verendrye Golf Club, and residences near Macdonald Road, 58N Road and Prairie Grove Road. Recreation users accessing the Sundown Lake, Oakwood Golf Course and campground may also be affected by views of the Project.

Manitoba Hydro acknowledges that changes in the viewshed from these viewpoints are a legitimate concern and that the transmission line will be a permanently visible on the landscape. Vegetative screening of the line from these viewpoints, and tower placement will seek to reduce the magnitude of the visual obstruction.

The average landscape character within the LAA is not anticipated to exceed the "rural/pastoral with distinguishable development class" despite a moderate to highly prominent view of the Project from most of the priority viewpoints. As well, local land use policy acknowledges but does not consider visual quality to be a principal planning objective. Therefore, the residual effects on visual quality are assessed to be not significant.

17.7.2 Significance of Cumulative Social Effects

With mitigation measures, the overall residual cumulative visual quality effects attributable to projects acting cumulatively within the RAA are assessed as not significant. The residual cumulative visual quality effects of past, present or reasonably foreseeable future projects are not anticipated to result in the exceedance of an average baseline character class of rural/pastoral with distinguishable development. Approximately 43% of the total final preferred route (92 km of 213 km) is located within an existing ROW and within a landscape that includes other extensive landscape changes. Finally, while the preservation of rural landscape character and importance of green space is identified in many of the Municipal Land Use Plans as important to community development, visual quality was not acknowledged as a principal planning objective.

The Project is one of a number of projects and activities that have resulted, or will result, in landscape disturbances and associated effects on visual quality. The extent of the Project's contribution to cumulative environmental effects on visual quality varies from viewpoint to viewpoint, as noted below.

The visual effects of the Project are anticipated to be most pronounced at the following viewpoints. Note that efforts will be made through tower spotting to reduce the effect where possible.

- Ridgeland Cemetery (viewpoint 3)
- MacDonald Road Residence (viewpoint 9)
- TransCanada Trail Courchaine Bridge (viewpoint 10)
- Prairie Grove Road (viewpoint 12)

The visual effects of the Project are anticipated to be minimal due to a greater distance and therefore lower prominence, or screened as a result of vegetation:

- Oakwood Golf Course and Campground (viewpoint 5)
- residences near Ste. Genevieve (viewpoint 6)
- residence near 58N (viewpoint 13)

17.7.3 Sensitivity of Prediction to Future Climate Change

Based on the climate change scenarios presented in the Hydroclimatic Study for the Project (Manitoba Hydro 2015b), some increase in temperatures and precipitation are projected for the future within the RAA. In addition, more extreme events are projected, though patterns are likely to be variable according to the season (*i.e.*, most temperature and precipitation increases are anticipated to correspond to winter months). Climate change is not anticipated to influence the predicted effect of the Project on visual quality because related storms or variable weather patterns would not be expected to cause substantial visual changes related to the associated built infrastructure or result in the need for additional vegetation clearing (which could result in expanded views of the Project). If anything, warmer temperatures in the winter may result in less snow, which would decrease the visual contrast of Project and improve visual quality. Similarly, increased cloud cover and precipitation could slightly decrease visibility of the Project due to the obscuring effect. However, views of the Project could increase as a result of greater tourism visitation in recreation areas and increased opportunities for nature-based recreation due to increased temperatures and the subsequent extension of the summer tourism season (Chapter 16, Section 16.7.4). Regardless, the predicted climate change scenarios would not change the significance determinations for visual quality, as they are not expected to measurably increase the magnitude of Project effects on visual quality.

17.8 Prediction Confidence

Prediction confidence is moderate in the conclusions related to Project effects on visual quality. While the methodology incorporated quantified techniques, it relied on conclusions made from a sample of representative viewpoints. However, the analysis was conservative in that photo simulations do not account for atmospheric conditions such as glare, fog and haze; therefore, modelling might overestimate the visibility of the Project. As well, confidence in the conclusion that the residual effects from the Project will be not significant is moderate. The potential overlapping effects of associated vegetation and landscape alteration, and infrastructure development from proposed and foreseeable projects and their associated viewsheds are not available or detailed enough (*i.e.*, in terms of routing, extent of related viewshed, size and type of visual effect) to be cumulatively assessed in detail.

17.9 Follow-up and Monitoring

There are no requirements under CEAA 2012 to undertake follow-up and monitoring with respect to Project effects on visual quality.

17.10 Summary

Visual quality is a VC because of the potential for Project-related changes in visual quality to affect a number of social aspects, including tourism and recreation values, property values, and contribute to stress and annoyance.

Project residual effects on visual quality are assessed as not significant. While the Project will be moderately to highly prominent from priority viewpoints, it will not substantially change the average landscape character within the LAA.

Cumulative effects on visual quality are assessed as not significant. In regard to visual quality, the combination of past, present, and reasonably foreseeable projects will not result in a change in visual quality that will exceed thresholds. The Project's contribution to cumulative effects will vary throughout the RAA, but overall represents only a fraction of the overall cumulative effects. Climate change is not expected to change significance determinations for visual quality.

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Appendix 17A
Baseline Photographs and Post-development Photo-Simulations with Alteration Calculations

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 1: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 1: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 2: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

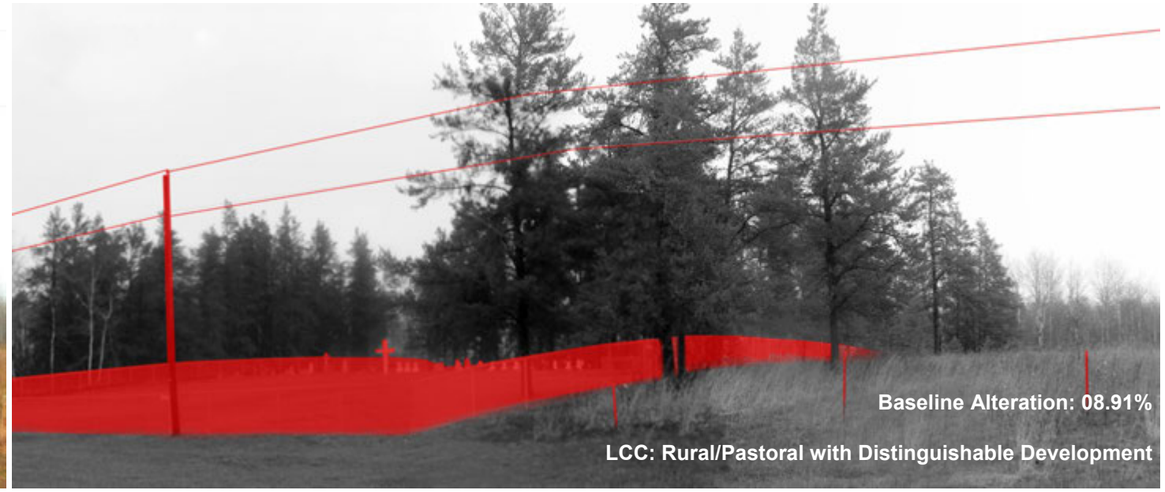
POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 2: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

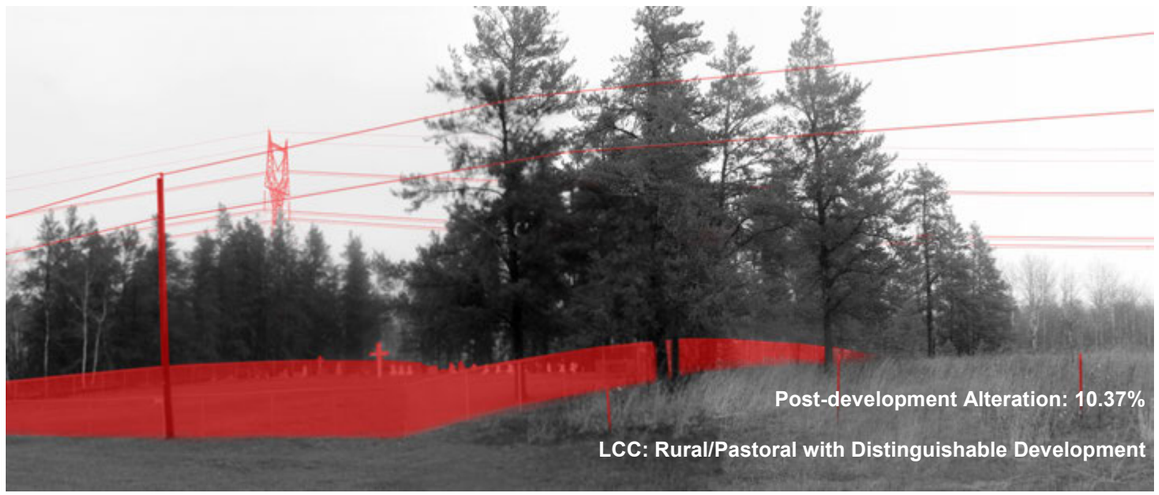


BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 3: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS



POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 3: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 4: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 4: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

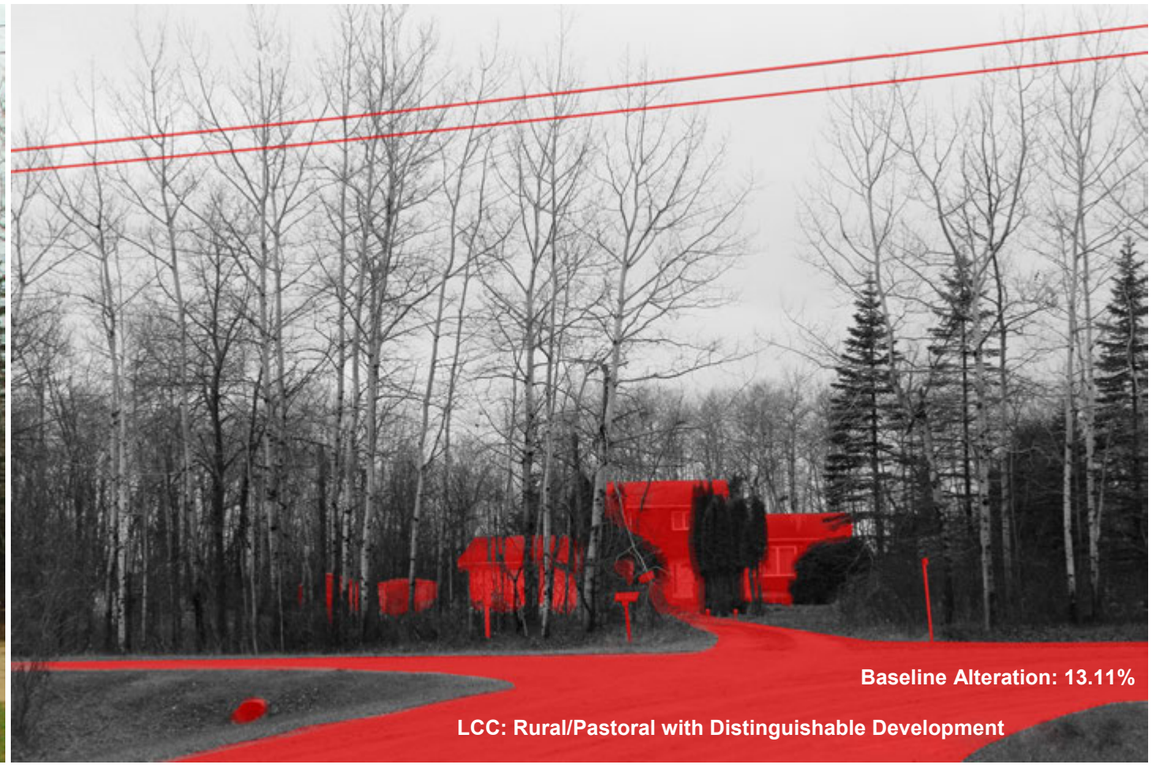
VIEWPOINT 5: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS (NO VISUAL CHANGE)

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 5: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS (NO VISUAL CHANGE)

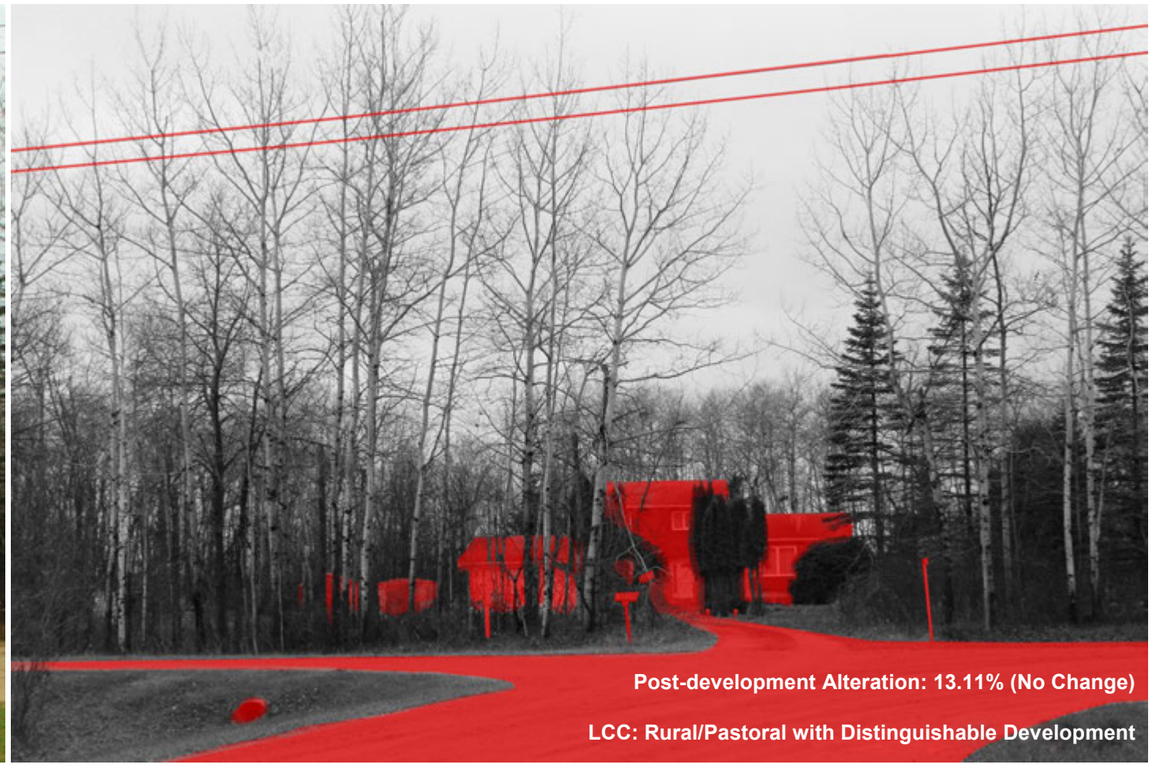


BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

VIEWPOINT 6: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS (NO VISUAL CHANGE)



POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

VIEWPOINT 6: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS (NO VISUAL CHANGE)

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 7: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 7: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

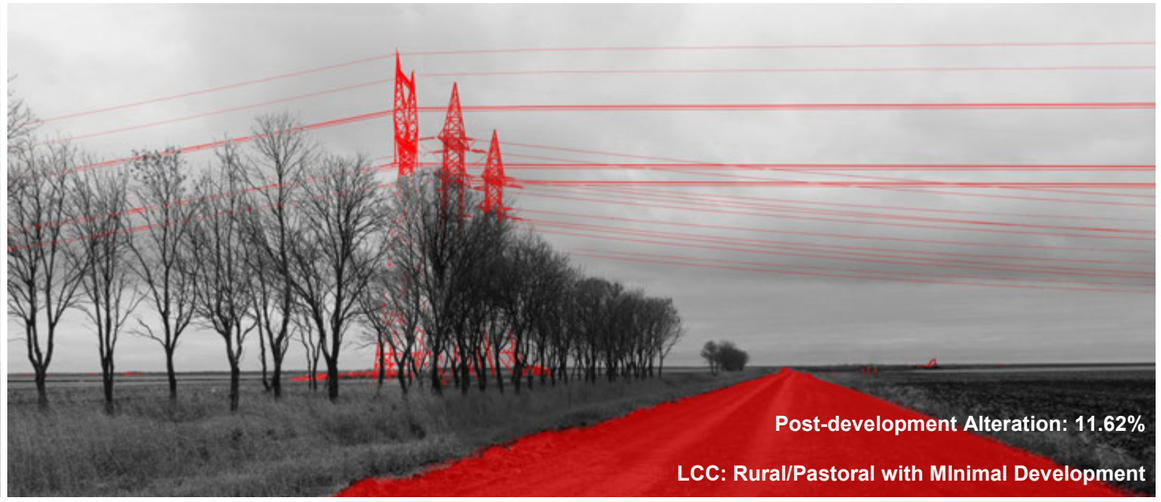
BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 8: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS



POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 8: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 9: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

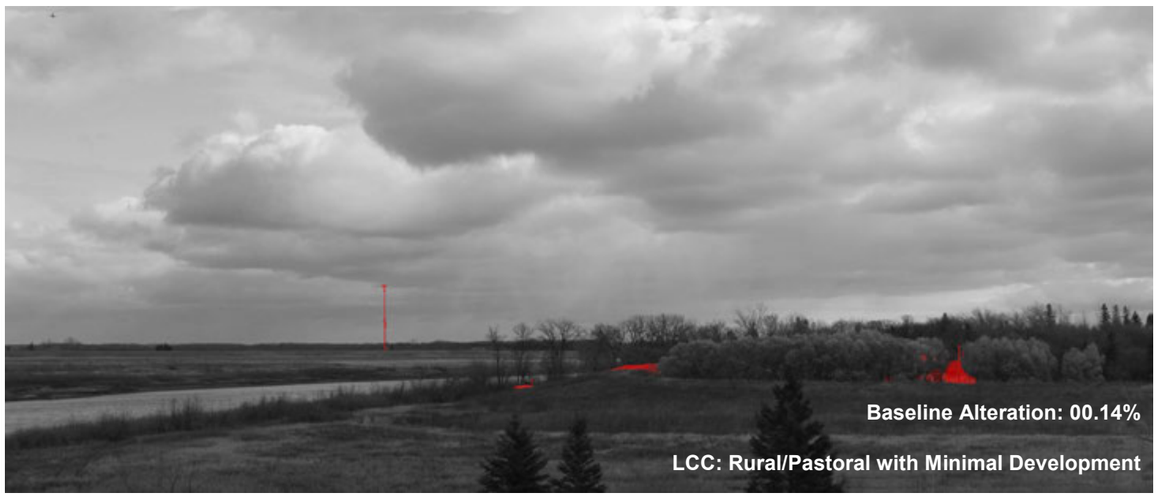
POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

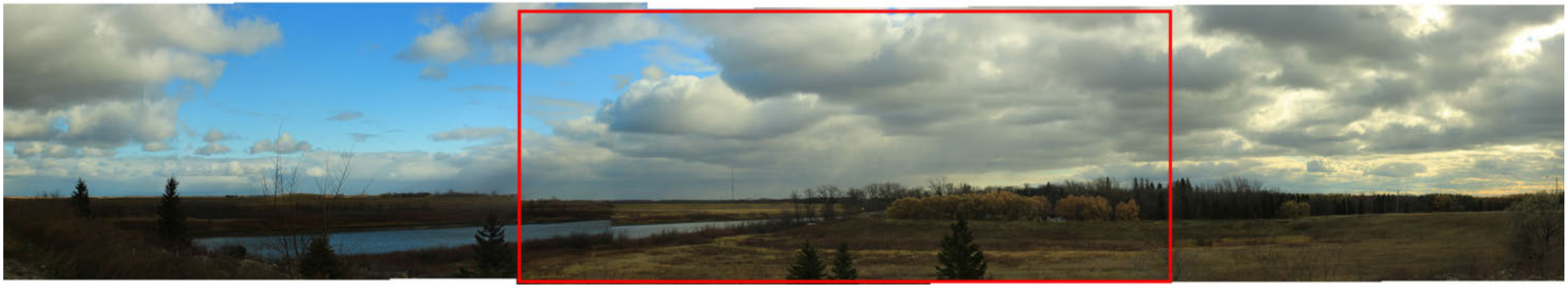
CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 9: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS



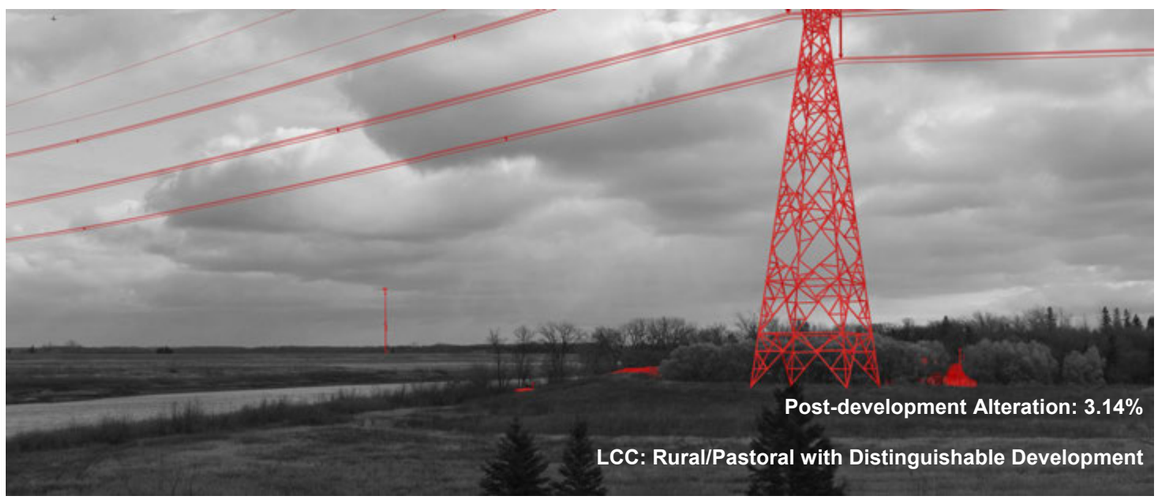
BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION



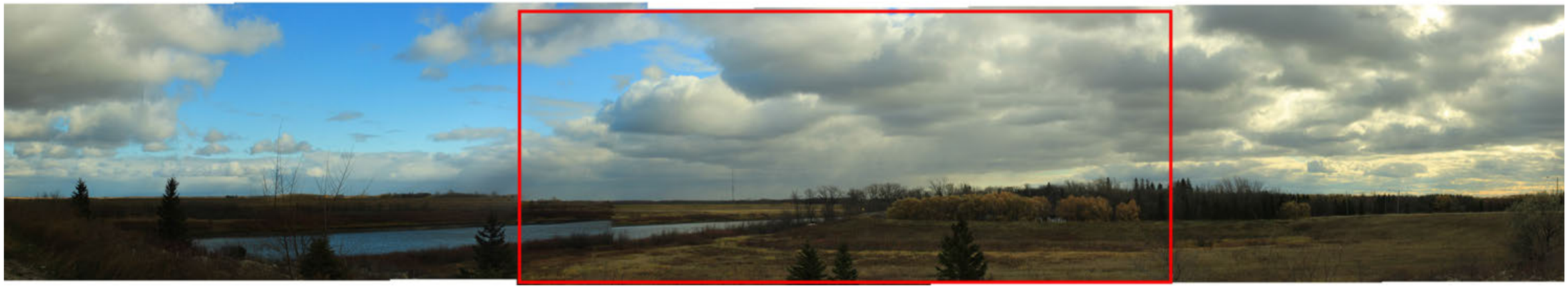
BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 10: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS



POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION



CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 10: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 11: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 11: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

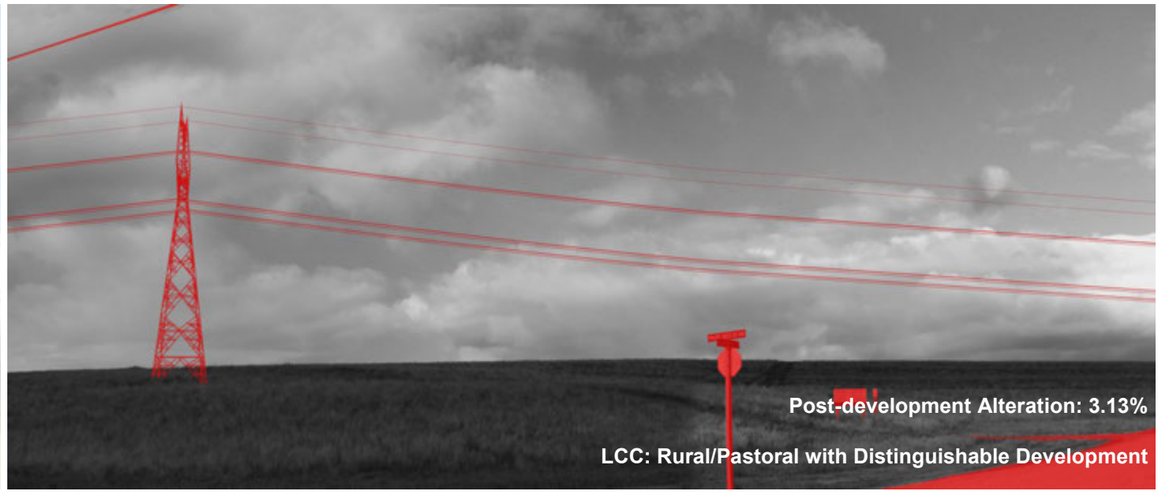
BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 12: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS



POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 12: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 13: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 13: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS

BASELINE CONDITIONS

BASELINE CONDITIONS – LANDSCAPE CHARACTER CLASS AND EXISTING ALTERATION

BASELINE CONDITIONS – CONTEXT PANORAMA

VIEWPOINT 14: BASELINE PHOTOS AND ASSOCIATED ANALYSIS

POST-DEVELOPMENT CONDITIONS

POST-DEVELOPMENT CONDITIONS – LANDSCAPE CHARACTER CLASS AND AREA OF ALTERATION

CONTEXT PANORAMA (BASELINE CONDITIONS SHOWN)

VIEWPOINT 14: POST-DEVELOPMENT PHOTO-SIMULATIONS AND ASSOCIATED ANALYSIS