VISUAL ANALYSIS
GREEN MOUNTAIN POWER'S BRIDGE STREET SUBSTATION
BRIDGE STREET, BELLOWS FALLS, VERMONT

Introduction

Green Mountain Power Corporation (GMP), seeks Vermont Public Service Board (Board) approval and a Certificate of Public Good under 30 V.S.A. Section 248" to remove its Bridge Street Substation, jointly owned with New England Power Company d/a/b National Grid (National Grid) from the Bellows Falls downtown historic district on the west side of the Bellows Falls Canal and construct a new GMP-owned substation at a GMP-owned site on the nearby "Island" between the Canal and the Connecticut River. The project will improve the safety and reliability of the electric distribution infrastructure within the Town of Rockingham and Village of Bellows Falls. Project components include construction a new substation one-quarter mile east of the existing substation, upgrading portions of the distribution system, and removing the old substation from its prominent canal-side location across from the Bellows Falls post office.

This analysis assesses aesthetic changes due to planned removal of the Bridge Street substation, the construction of a new substation that will be better screened from public view and planned upgrades to the distribution infrastructure, and considers whether these changes create undue adverse impacts to the visual character and aesthetics of the areas and view sheds through which they pass according to the criteria set forth in 30 V.S.A. Section 248.

Section 248 (b) (15) states that before the Board issues a certificate of public good, it shall find that the project will not have an undue adverse effect on aesthetics. Furthermore, Section 248 incorporates the conditions and criteria of Act 250 (10 V.S.A § 6086) and in particular Criterion 8), aesthetics. Criterion 8 states that, before granting a permit, the Board shall find that the development will not have an undue adverse effect on the scenic or natural beauty (of the area) and aesthetics. Natural beauty implies visual harmony. When a project is in visual harmony with its surroundings it is said to "fit". "Adverseness" is a question of how well the project fits its particular site and the surrounding area.

In addition to the Section 248 Process, Rockingham in its Town Plan Chapter 10, Scenic Resources states that the built environment can both enhance and detract from scenic resources. The Town, recognizing that the scenic character of the community is visually attractive and an economic benefit, established as its goal the protection of the community's scenic resources for the benefit of residents and visitors. As a stated policy the Town assures the protection and preservation of river corridors, scenic highways, roads and views, and other scenic resources. The "Scenic and Recreational Resources Map" within the Town Plan lists examples of scenic areas in Rockingham and Bellows Falls Village. Bridge Street including the proposed project site for GMP's replacement Substation neither appears on the Town's list nor visually impacts any of these listed scenic areas.

The following analysis: describes the project, its particular site, and the surrounding area; evaluates the scenic value of project area; identifies changes caused by the proposed substation project; and determines whether these changes will have an adverse visual effect on the area. If there will be an adverse effect, the analysis goes on to determine if the adverse impact is undue. This analysis format is based on the Quechee Analysis was developed by the State Environmental Board to address aesthetics and clarify what is meant by "undue adverse

effect". The analysis concludes that GMP's proposed Bridge Street Substation Project fits with the surrounding area and will not have an undue adverse visual effect on the surrounding area. Arguably, removing the existing Bridge Street Substation may be viewed as a benefit to the downtown by creating open space and/or development opportunities that would compliment the nearby pocket park behind the historic Windham Hotel.

Project Description

The Project consists of several components including construction of a new Bridge Street Substation on the nearby Island, the removal of the existing Bridge Street Substation across from the post office, and upgrades to the power distribution system in the vicinity of the existing substation.

The proposed new Bridge Street Substation will occupy a 0.65 acre site on the south side of Bridge Street one-quarter mile east of the existing substation. The site is owned by GMP which currently uses it to store its poles and transformers. The new substation will be built as two gray-colored, open, steel, box frame structures, with approximate footprints of 16' x 32' and 16' x 48', enclosed by an 8 foot high chain-link security fence. The height of these two structures varies from 20' to 25' and with lightening rods attached the maximum height of the proposed substation is 30 feet. An oil containment pit and a 12-inch high and 2-foot wide crushed stone containment berm on the inside of the fenced compound will be constructed as part of a transformer oil containments system. Substation equipment consists of a 14 MVA transformer, three voltage regulators, a distinct metering point, and three separate outgoing circuits, two underground and one overhead. A number of "volunteer" trees and shrubs have seeded themselves in along the entrance drive and help buffer the project from Bridge Street.

To connect the new substation, National Grid will reconfigure its adjacent 46KV transmission taps. With respect to the existing 4401 tap the existing single pole adjacent to the existing Vilas Bridge substation will be replaced with a new 40-foot tall H-frame dead end structure and a new 35-foot tall H-frame terminal structure. With respect to the 4402 tap, three of the four existing poles structures outside the existing Vilas Bridge substation will be removed and replaced with a new 70-foot tall steel pole. This new steel pole will be significantly taller than the other adjacent poles or the substation structures themselves. Other improvements to the 46KV transmission lines are the subject of an unrelated National Grid project and were therefore no considered in this analysis.

Once the new substation is online, the old Bridge Street substation across from the Bellows Falls post office will be taken down and removed along with the attached overhead distribution lines that dominate this important space in the middle of downtown Bellows Falls. Although GMP does not own the land on which the current Bridge Street Substation sits (and will not control it following substation decommissioning and removal), the removal of these elements could clear the way for canal-side open space improvements and/or development to compliment the existing pocket park behind the historic Hotel Windham, should the Town of Rockingham reach agreement with the lot's owner, Transcanada Corporation.

Upgrades to the power distribution system in the vicinity of the existing Bridge Street Substation will include connecting the proposed substation to the downtown area and the National Grid. Two new 50' to 55' foot laminated wood poles will be installed to support three

overhead circuits, one at the north end of the Bridge Street canal crossing, and the other at the corner of Island and Bridge Streets. These two self-supporting poles are part of the final design, and by necessity, although they do not use a cross-arm construction like traditional utility poles, they are significantly taller than the rest of the existing and proposed wood poles in the immediate vicinity. Viewed from Bridge Street, they will likely break the skyline, and their height will make them focal points, albeit minor ones due to their narrow silhouettes. Temporary overhead circuits will cross over the Canal to a temporary pole adjacent to the old substation, then cross over Bridge Street and run behind the post office. Within one year after the new substation is completed, these temporary overhead circuits will be replaced with a permanent underground circuits. Other circuits running along the Canal will be upgraded and either bundled together to improve their visual appearance, as is the case along the east side of the Canal between Bridge Street and Depot Street; or removed entirely along the west side of the Canal from Bridge Street, north to the railroad crossing.

Project Surroundings and Scenic Resources

GMP's proposed site is immediately west of the New England Power Substation (National Grid) also referred to as the Vilas Bridge Substation. Its existing open frame steel lattice structure is similar in character to GMP's proposed substation, and together, the two substations will occupy a one acre plateau with an elevation of 325 feet. This portion of the island is approximately 10 feet above the downtown area on the opposite side of the Canal.

The land east and south of the proposed site drops off sharply toward the Connecticut River and provides views of Fall Mountain to the east of the Connecticut River, and the Connecticut River Valley to the south. Island Corporation's 150'x 220' single story brick building is 10 feet west of GMP's existing fence and its mass effectively screens the GMP site from downtown Bellows Falls. A sidewalk on the south side of Bridge Street connects the site with the downtown area. The north side of Bridge Street opposite GMP's site is paved, open access and parking for a fueling station and a number of commercial and industrial buildings. These structures block views to and from the north end of the Island.

The air space above the site and surrounding area currently contains a number of overhead power lines including the 46 KV transmission line, connections to the National Grid, and all other related distribution lines. Electric power generation and power distribution systems are dominant features of Bellows Falls and, by comparison, the proposed project facilities make up a very small portion of Bellows Falls' power generation and distribution systems.

Bellows Falls is significant because of its historical relationship to the Great Falls of the Connecticut River. At one time the river was an important transportation route, and river traffic was eventually expedited by constructing the Bellows falls Canal, one of the first canals in America. The Canal also provided water power for the areas emerging industry, and Bellows Falls became a manufacturing center and one of Northern New England's most important railroad junctions. Although industrial activity has declined, Bellows Falls retains much of the historic fabric that reflects its former importance as a manufacturing center, and it is actively engaged in conserving and promoting its history.

Today, the remaining electric power generation and distribution systems are visible evidence of Bellows Falls past historic significance. Elements of these power systems, including the hydro-electric dam and power house, substations, and overhead transmission lines, are in the foreground of many scenic views of its historic downtown buildings, the Connecticut River Valley, and the surrounding hills.

Electric power infrastructure is an integral part of the village and the surrounding area, and to a large degree, this infrastructure is part of the scenic resource that is Bellows Falls today. This supports the position that GMP's proposed Bridge Street Substation Project will not have an adverse effect on aesthetics and the scenic beauty of the area surrounding this Project. Moreover, many believe removing the existing substation from its prominent canal-side location and placing portions of the distribution system underground will have a beneficial impact on the appearance of downtown Bellows Falls.

Visual Analysis

On April 9, 2007 DuBois & King, Inc. met on-site with GMP representatives to review plans for the new substation and begin its investigation of the project's visual impact on its surroundings. Prior to this meeting and at the request of DuBois & King, Inc. GMP's crews erected a temporary wood utility pole with a cross arm and orange flagging attached at 30 feet above grade to mark the project site and simulate the height of the proposed substation. With pole and flagging in place, DuBois & King, Inc. representatives walked and drove the area within one quarter miles of the project site to find public places from which the 30' simulation pole and flagging could be seen. The deciduous trees had not yet leafed out and viewing conditions were optimum for spotting the simulation. Even so, the simulation flagging was often difficult to spot through the leafless tree crowns.

The ground level search resulted in the identification of ten view points from which portions of the simulation pole and orange flagging could be seen. Refer to the attached View Points Location Map and photographs of the site taken from view points A – J. With the exception of close-up view points A, B and C that are on the Island and across the street from the proposed substation site, the simulation flagging was difficult to see because of existing intervening development, topography, and vegetation that either screened the site from view, or caused viewers to focus their attention on foreground features and away from the project site.

Although the pole and flagging were useful in locating the site, they represent only a very small piece of the proposed substation. However the existing adjoining National Grid Substation is comparable in both its height and mass, and very little if any of its open-frame structure could be seen from view points off of the Island. This further indicates that the proposed substation will be difficult to see from a distance and against the background texture of Bellows Falls to the west, and Fall Mountain to the east in Walpole, NH.

The following View Points matrix describes view-points A through J and characterizes the view from each.

View Point Location	Location and Description	Direction	Distance

VP-A	From the north side of Bridge Street downhill from the proposed GMP substation. • Looking our across Bridge Street, up the steep vegetated bank, and passed the existing New England Power Substation to the site of the proposed GMP substation. • VP-A is 15' to 20' below the proposed GMP substation site. • The open frame steel substation structures will break the skyline and be highly visible from this industrial view point as will the new steel pole.	S	300 ft./0.05 mi.
VP-B	On the north side of Bridge Street across from the entrance drive to the proposed GMP substation. • Looking across Bridge Street and up the entrance drive to the proposed GMP substation site. • VP-B is 5' to 10' below the proposed GMP site. • The open frame of the proposed GMP Substation will break the skyline and the top of the frame will be visible as will the new 70' steel pole. Front yard vegetation will partially screen the lower two thirds of the substation.	S	200 ft./0.04 mi
VP-C	From the corner of Island and Bridge Street diagonally opposite the proposed GMP substation. • Looking across Bridge Street, through a narrow strip of naturally vegetated buffer in front of the proposed GMP substation site. • VP-C is 0' to 5' below the proposed GMP Substation site. • Existing natural vegetation provides a landscape buffer between Bridge Street and the proposed site. A substantial portion of this buffer will be disturbed during construction, and will be replanted with small under-wire trees and large shrubs to the extent possible without interfering with the three new circuits exiting the proposed GMP substation.	SE	250 ft./0.05 mi.
VP-D	From Bridge Street in front of the post office. • Looking across the bridge, through the existing leafless trees and up toward the proposed substation site. • VP-D is 15' to 20' below the proposed GMP substation site. • The proposed GMP Substation is well screened by existing trees and the adjoining Island Corporation Building west of the proposed GMP substation site. Two new proposed 50' to 55' laminated wood poles will be visible and prominent from this view point as will the upper portion of the new 70' steel pole. Many of the overhead wires in these photos will be removed with the upgrading of the distribution system.	NE	500 ft./0.1 mi.

VP-E	From the intersection of Rockingham and Bridge Streets by the historic Windham Hotel. • Looking down Bridge Street past the existing GMP substation, across the bridge and up towards the proposed GMP substation site. • VP-E is 5' to 10' below the proposed GMP substation site. • The proposed GMP Substation site is barely visible from behind the existing GMP substation; once the existing substation is removed, the proposed substation will be more visible depending on what type of development replaces the existing substation. The new steel pole will be visible but difficult to see with the backdrop of Fall Mountain.	NE	700 ft./0.13 mi.
VP-F	From the vacant lot on Westminster Street halfway between the Bridge Street and School Street intersections. • Looking out through leafless deciduous trees, over the treed east bank of the Canal and over the top of the Island Corporation building to the proposed GMP substation site. • VP-F is approximately at the same elevation as the proposed GMP substation. • From this view point without leaves on the trees, the top 10' of the proposed GMP substation and the upper half of the new steel pole will be visible but difficult to see because of the layers of intervening vegetation and the intricate landscape of Fall Mountain in the background.	NE	1000 ft./0.20 mi.
VP-G	From the intersection of School and Westminster Streets. • Looking out through a gap in the roadside vegetation and down over the rooftop of the Island Corporation building to the proposed GMP substation site. • VP-G is 5' to 10' above the proposed GMP Substation Site. • Although potentially visible from this view point, the proposed GMP Substation and the new steel pole will be difficult to see through the dense vegetation and against the detailed background of Fall Mountain.	NE	1200 ft./0.23 mi.
VP-H	From the backyard of the First Baptist Church on Church Street • Looking out through leafless trees and over the rooftops of downtown to the proposed GMP Substation site. • VP-H is 30' to 35' above the proposed GMP substation site. • It will be difficult to see the proposed GMP substation and new steel pole from this view point because of the intervening vegetative and the background detail of Fall Mountain.	NE	1000 ft./0.20 mi.

VP-I	From Route 12 South of the Bridge Street intersection on the New Hampshire side of the Connecticut River. • Looking across the Route 12 pavement, through river bank vegetation, and up toward the propose GMP substation site. • VP-I is 25' to 30' below the proposed GMP substation site. • Filtered views from the New Hampshire side of the River of the proposed GMP substation and the adjacent New England Power substation will be possible through the leafless riverside vegetation; with leafed-out vegetation, an occasion glimpse of theses structures may be possible. The relatively minor though elevated structures of GMP's proposed substation and National Grid's new H-structures/poles are but a small piece of this riverside panoramic view of the electric power generation fabric of Bellows Falls. The new steel pole will add to the already visible substation and poles which break the skyline and are visible from Route 12 in NH.	W	700 ft./0.13 mi.
VP-J	From NH Route 12 on the north side of the Bridge Street intersection. • Looking across the intersection and up through poles, wires and leafless vegetation to the proposed GMP substation site. • VP-J is 25' to 30' below the proposed GMP substation site. • The proposed GMP substation will be visible but difficult to see because of foreground vegetation, poles, wires, and Vilas Bridge traffic. The National Grid replacement/H-frames will be more visible breaking the skyline as they do currently.	SW	700 ft./0.13 mi.

At a distance of one-quarter mile and closer, a substation's visible features can be readily distinguished, particularly during the winter months without foliage. These same features will typically be more difficult to see during the spring, summer, and fall with foliage. Substation framework that appears at or below the horizon or skyline is much less visible than framework that breaks the skyline and extends above the horizon. This is the case with the proposed substation when viewed from western view points C, D, E, F, G, and H and seen against the heavily textured background landscape of Fall Mountain on the New Hampshire side of the River. This will not be the case when viewing the substation from view points A and B which face south along the low-lying Connecticut River Valley and provide clear views of the top portions of the substation's open frame structure and the upper section of the new steel pole in view A. This is also true when looking at the proposed site from view points I and J in New Hampshire on Route 12 from which the existing New England Power Substation and the GMP simulation flagging are clearly visible. From these out-of-state view points, the hydroelectric dam and related power facilities dominate the foreground view, and the combined presence of the New England Power and proposed GMP substations is but a small piece of these panoramic views of Bellows Falls' electric power landscape.

Besides the length of distance between viewer and object, topography, existing development, and vegetation also affect visibility. When either one or all of these features screens the project from view, visual impact is negligible. This will be the case when trying to see GMP's proposed substation from most of the identified public vantage point in the vicinity of the project. Topography, development and the intervening trees surrounding the proposed Island site will provide a year around visual buffer and help screen the substation from the public view.

Regardless of distance, topography, and vegetation and their effect on visibility, an overriding issue is determining a substation's visual impact is its compatibility with the surrounding landscape and development. As pointed out earlier, the power generating and distribution facilities in and around Bellows Falls are very much part of its working landscape. As a result, building a new substation next to an existing substation creates compatibility and is a good fit with the surrounding landscape of power generating facilities and related infrastructure. Other measures to consider when determining a project's compatibility with its surrounding are inherent in the following characteristics and questions presented in "Vermont's Scenic Landscapes: A Guide for Growth and Protection."

Pattern

Are the existing settlement and land use patterns compatible with the project?

Scale

Do the scale, height, and mass of the proposed facility and related site elements appear compatible with their surroundings?

Focal Points

Does the project respect existing natural and cultural focal points?

Forms

Do the structural forms and site layout respect and harmonize with patterns in the surrounding area?

Open Space

Is open space preserved to retain the character of the surrounding area and designed to be purposeful and of public benefit?

Landforms

Is the project designed to minimize changes to existing grades? Do the grade changes reflect natural topographic forms as closely as possible?

Vegetation

Is existing vegetation preserved and managed in a way that improves the visual quality of the project and reduces its impacts?

The answers to these questions are largely affirmative. The proposed Bridge Street Substation Project removes an existing substation from a highly visible location in downtown Bellows Falls and builds a replacement substation on the nearby Island next to the National Grid Substation on property owned by GMP and used for the storage of its poles and transformers. The new substation's materials and gray color, along with its open frame design make it compatible with adjacent substation and a good fit with surrounding land use and development. The upgraded electric distribution system: 1) replaces a number guyed, heavily ladened, wood cross-arm poles on the Island side of Bridge Street with two 50' to 55' self-supporting laminated wood poles with neatly bundled wires carried close to the pole; 2) undergrounds the circuit across the Canal and behind the post office; 3) replaces wood cross-arm poles and loosely space wires with slightly taller wood poles and neatly bundled wires along the east side of the Canal from Bridge Street north to the Trans Canada dam and on across the Connecticut River to the existing GMP circuit. 4) eliminates wires along the west side of the Canal from Bridge Street north to the railroad bridge and replaces them with a new overhead connection across the canal just north of the railroad bridge. Overall, these are positive visual changes to the distribution system and they will replace an excess of wires and cross-arm poles with simple, uniform replacement poles and neatly bundled wires.

Existing hydroelectric power generation and distribution facilities dominate the landscape of the Island's south end. For the public moving about with in and around downtown Bellows Falls, there are few views of the proposed substation that last for more than a few seconds. Members of the public who do catch a glimpse of the new substation are not likely to be offended by it. As for the removal of the existing substation, the Rockingham 2001 Town Plan for Land Use Planning indicates that the Town will welcome the change. .

Quechee Analysis

The preceding visual analysis is based on Part One of the Quechee Analysis created by the Vermont Environmental Board to help district environmental commissions determine whether or not a project will have an adverse aesthetic impact on the surrounding area. A District Commission, in this case the Board, determines adversity after reviewing the proposed project and its surroundings and deciding how the project will impact its surroundings. This visual analysis concludes that GMP's proposed "Bridge Street Substation" project will not have an adverse visual impact.

Part Two of the Quechee Analysis is used to determine whether or not an adverse impact is undue. It presents three questions that must be answered, and a negative response to any one of these questions is enough to determine that an adverse aesthetic impact is undue. For the proposed project, the answers to all three of the following questions are positive, and this analysis concludes that any potentially adverse visual impacts, though unlikely, will not be undue.

1. Is there a clear, written communication standard designed to preserve the scenic, aesthetic, or natural beauty of the area in the town in which the tower is to be located?

The Public Service Board's Section 248 Process (b)(5) was enacted in part to protect scenic resources and help insure that power related infrastructure is developed and modified in ways that will minimize its visual and environmental impacts and not have an undue adverse effect on aesthetics. Rockingham in its Town Plan, Section 10 Scenic Resources, recognizes the visual attractiveness and economic benefit of its scenic resources. As a policy, the Town assures the protection and preservation of river corridors, scenic highways, roads and views, and other scenic resources.

2. Is the project offensive or shocking to the average person because it is out of character with its surroundings or significantly diminishes the scenic qualities of the area?

   The applicant is proposing to: remove an existing substation from its prominent canal-side location in downtown Bellows Falls; build a replacement substation across the Canal and set back from Bridge Street next to an existing substation on land owned by GMP and used to store poles and transformer; and upgrade electric distribution lines on both sides of the canal including some underground and the elimination or bundling wires to reduce their visibility. The attached photographs demonstrate overall success in achieving compatibility and avoiding adversity.

3. What generally available mitigating steps has the applicant taken to improve the harmony of the project with its surroundings?

   Actions taken by the applicant to mitigate and help fit the project to its surroundings include:

   - *Locating the new substation on a parcel of land already owned by GMP and currently used for storing its poles and transformers in an area of the Bellows Falls Village that is not listed as a scenic area in the Rockingham's Town Plan.*
   - *Selecting a site that is adjacent to the existing National Grid Substation, an identical land use with similar visual characteristics;*
   - *Using a transparent, open-frame steel structural design that allows light and background features to show through thereby reducing its mass and visual impact;*
   - *Maintaining a steel gray color to blend the structure with background colors and the adjoining substation thereby making the new substation less conspicuous;*
   - *Maintaining the existing natural vegetation to continue to provide a landscape buffer so long as the trees do not interfere with the overhead wires;*

- *Planting several street trees and adding front yard plantings where feasible to augment the existing landscape buffer between GMP's proposed substation and Bridge Street;*
- *Maintaining fencing for the site for safety and to prevent unlawful trespass;*
- *Maintaining a driveway configuration that enters Bridge Street at right angles to continue to provide adequate sight distances in both directions;*
- *Removing the old substation from the downtown, canal-side historic district; and,*
- *Enhancing views of the canal by placing portions of the canal-side distribution lines underground and upgrading the remaining conductors to either eliminate or lessen their visual impact.*

Conclusion

This visual analysis of Green Mountain Power's proposed Bridge Street Substation upgrades concludes the project will not have an adverse visual impact on the area. Should others contend that the project will have an adverse impact, the adverse impact would not likely be considered undue according to Section 248 Review and the Quechee Analysis.

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