ROCHESTER AREA RELIABILITY PROJECT

REPORT ON ALTERNATIVES ANALYSIS FOR SUBSTATION 255
AND ASSOCIATED TRANSMISSION LINES

JANUARY 16, 2014

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GLOSSARY OF TERMS AND ACRONYMS

AFUDC  Allowance for Funds Utilized During Construction
ALJ  Administrative Law Judge
CFMU  Crop Field Management Unit
©  Copy Right
DPS  New York State Department of Public Service
EM&CP  Environmental Management & Construction Plan
FEMA  Federal Emergency Management Agency
FIRM  Floodplain Insurance Rate Maps
GIS  Geographic Information Systems
kV  kilovolt
LIDAR  Laser-Based Method of Detection, Range Finding and Mapping
LWRP  Local Waterfront Revitalization Program
NED  National Elevation Dataset
NFIP  National Flood Insurance Program
NRCS  Natural Resources Conservation Service
NRHP  National Register of Historic Places
Noise Sensitive Receptors  Residences within 200’ of transmission line ROW and/or substation
NWI  National Wetlands Inventory
NYS Ag & Markets  New York State Department of Agriculture & Markets
NYSDEC  New York State Department of Environmental Conservation
NYPA  New York Power Authority
NYSPSC  New York State Public Service Commission
OPRHP  New York State Office of Parks, Recreation, and Historic Preservation
PEM  Palustrine Emergent
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PFO Palustrine Forested
PSS Palustrine Scrub-Shrub
Polygon GIS shape created to define area
RARP Rochester Area Reliability Project
RG&E Rochester Gas and Electric Corporation
ROW Right of Way
R&S Railroad Rochester and Southern Railroad
SFHA Special Flood Hazard Areas
SPDES State Pollutant Discharge Elimination System
SHPO State Historic Preservation Office
SWPPP Storm Water Pollution Prevention Plan
T&E Species Threatened and Endangered Species
T-Line Transmission Line
USACE United States Army Corps of Engineers
USDA United States Department of Agriculture
USFWS United States Fish & Wildlife Service
USGS United States Geological Survey
I. INTRODUCTION

1. Purpose

This Alternatives Analysis Report is being prepared in response to New York State Public Service Commission (NYSPSC) Order dated November 15, 2013 (“November NYSPSC Order”) reopening the record in RG&E’s Article VII case to allow for additional fact finding regarding the siting of Station 255 and routing of Circuits 40, 940 and 941. Specifically, this is designed to address Item 5 of the November NYSPSC Order directing RG&E to:

“...file an analysis of all alternatives for the location of Substation 255, including those proposed in the original application, those proposed by the Krenzers in their petition on rehearing or otherwise discussed in the course of the remand negotiations, and any located east of the Genesee River identified by the company, according to the schedule set by the ALJ.”

To assist it in complying with the November NYSPSC Order, Rochester Gas and Electric Corporation (RG&E) contracted with the URS Corporation (URS) to conduct the alternatives analysis and prepare this Report. The Report is based on existing published data and URS’s knowledge of engineering and construction techniques employed in the design and construction of transmission lines and substations. The data presented in this Report was not verified by site visits or field tests. The data presented represents a quantitative analysis. No conclusions or recommendations are included in the Report. A Results section is presented in the Report to provide summary comments only.

2. Project Description

The Rochester Area Reliability Project (RARP) is an electric transmission project designed to enhance the capacity and reliability of the electric system supply in the Rochester, New York area, and includes the construction of a new 345 kV/115 kV substation (Station 255), improvements to existing substations (Stations 23, 80 and 418), the construction of a new 345 kV transmission line (Circuit 40), the partial relocation and reconstruction of an existing 115 kV transmission line (Circuit 906), and the construction of two new 115 kV transmission lines (Circuits 940 and 941). Comprehensive routing studies for the new transmission lines and a detailed site selection study for the new substation were undertaken concurrently. The results of these studies were reflected in the proposed routes for Circuits 40, 940, and 941; and the proposed site for the new station as currently designed and on the record.

3. RARP Project Background

On September 29, 2011, pursuant to Article VII of the New York State Public Service Law, RG&E filed an application with the NYSPSC for a Certificate of Environmental Compatibility and Public Need to construct the RARP (“RARP Certificate”).

On December 12, 2012, a Joint Proposal was filed with the NYSPSC by RG&E, the New York State Department of Public Service (“DPS”), the New York State Department of Environmental Conservation
(“DEC”), and the New York State Department of Agriculture and Markets (“NYS Ag & Markets”). The Joint Proposal modified the initially proposed location of Station 255 to reduce agricultural impacts and modified the route of Circuits 940 and 941 to avoid a federal conservation easement. The Joint Proposal included numerous conditions regulating the construction and operation of the RARP.

On April 23, 2013 the NYSPSC issued an order adopting the terms of a joint proposal and granting certificate of environmental compatibility and public need, with conditions (April NYSPSC Order). Pursuant to the April NYSPSC Order, the NYSPSC certified the siting of Station 255 in the Town of Chili on a site adjacent to and south of the existing New York Power Authority (“NYPA”) 345 kV right-of-way (“NYPA ROW”). The certified route utilized existing transmission line and railroad right-of-way (ROW) corridors for most of its length, including a corridor along the Rochester and Southern Railroad (“R&S Railroad”).

In November 15, 2013, by a NYSPSC Order Reopening the Record for the Re-Examination of Location of Substation 255 and Route of Circuits 40, 940, and 941, the NYSPSC reopened the Record in RG&E’s Article VII case to allow for additional fact finding regarding the siting of Station 255 and routing of Circuits 40, 940 and 941. This alternatives analysis serves to meet the requirement to examine the possible alternatives for locations east and west of the R&S Railroad.
II. ALTERNATIVE SITE – GEOGRAPHIC DESCRIPTION OF ALTERNATIVES

As a result of the "November NYSPSC Order," RG&E undertook the additional effort to identify a potential alternate location for Station 255. Twenty five (25) Alternate Sites were identified and assessed. The sources of the Alternate Sites considered for this Report are as follows:

- Article VII Filing: Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7
- Additional RG&E Sites: Alternatives 8, 8A, 9, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 23 and 24
- ALJ David Van Ort: Alternative 15
- Passero Report: Alternative 16

Notes to items above:

- Site 17 does not exist. The site number was skipped during the analysis and has remained absent from the alternative site numbering.
- Sites 8A and 9 were already under consideration by RG&E when received from the NYS AG & Markets and NYSPSC, respectively, on December 19, 2013.

Descriptions of all 25 alternatives are provided below. All of the alternative substation sites are 12 acres in size with a rectangular shape configuration measuring 950 feet long by 550 feet wide. The layout for an access road to the alternative substation sites and transmission line ROWs were created and described only for those 13 that survived a screening analysis (identified below with an asterisk (*)). Wetland and floodplain acreages for each of the 13 considered alternatives were determined, while percentages of the remaining alternative substation sites were used to describe the remaining alternative wetland and floodplain impacts. All 25 alternative substation sites are presented on the Overall Alternatives Map, located after Section V - References. The 13 alternative substation sites that survived the screening analysis are presented on the Overall Alternatives Considered Map, located after Section V - References.

Alternative 1* (originally included in Article VII Proceeding)

Alternative 1 is located approximately 800 feet west of Chili-Scottsville Road and 75 feet north of an existing 345 kV NYPA overhead transmission line corridor in the Town of Chili, NY. The nearest residences are located approximately 800 feet to the west on Stottle Road and 1,200 feet to the east. The site ranges in elevation from approximately 556 to 591 feet above sea level. Current land cover is mostly comprised of active agricultural land and undeveloped upland woods. The remaining 1.65 acres is comprised of National Wetlands Inventory (NWI)-mapped wetlands. The substation site is outside of any mapped 100-year and 500-year floodplains. The substation access road enters approximately 800 feet to the west off Stottle Road and proceeds in an east-west orientation following the edge of an agricultural field. The route evaluated for Circuit 40 travels south from the site and then east along the south side of the NYPA transmission corridor for approximately 5.3 miles, crossing the Genesee River, to
Station 80 to the east. Circuits 940 and 941 travel east then northeast out of the alternative substation site for approximately 2.4 miles, until the circuits reach the R&S Railroad and head north. Circuits 940 and 941 cross Chili-Scottsville Road and Humphrey Road and span mapped wetlands, agricultural fields, and undeveloped upland woods.

**Alternative 2** (originally included in Article VII Proceeding)

Alternative 2 is located along the east side of Reed Road and 140 feet north of an existing 345 kV NYPA overhead transmission line corridor in the Town of Chili, NY. The substation footprint directly impacts one residence, and a second residence is directly across from the site on Reed Road. The site ranges in elevation from approximately 523 to 571 feet above sea level. Current land cover is comprised mostly of active agricultural land and undeveloped upland woods. The remaining 4.00 acres is comprised of NYSDEC-mapped wetland. The substation site is within 3.8 acres of the 100-year floodplain and is within 0.1 acres of the 500-year floodplain. The substation access road enters approximately 50 feet to the west off of Reed Road in an east-west orientation and before shifting north-south into the substation through the active agricultural field. Circuit 40 travels south from the site and travels east-west along the south side of the NYPA transmission corridor for approximately 3.7 miles, crossing the Genesee River, to Station 80 to the east. Circuits 940 and 941 travel south then head east for approximately 0.4 miles, until the circuits reach the R&S Railroad and head north. Circuits 40, 940 and 941 span mapped wetlands, agricultural fields, and undeveloped upland woods.

**Alternative 3** (originally included in Article VII Proceeding)

Alternative 3 is located on the west side of Krenzer Road and 152 feet north of an existing 345 kV NYPA overhead transmission line corridor in the Town of Chili, NY. The site ranges in elevation from approximately 522 to 532 feet above sea level. Current land cover is comprised mostly of active agricultural land and undeveloped upland woods. The remaining 3.88 acres is comprised of NWI-mapped wetland. The substation site is within 11.2 acres of the 100-year floodplain and is within 0.1 acres of the 500-year floodplain. The substation access road enters approximately 50 feet to the east off of Krenzer Road at the northeast corner through active agricultural land. Circuit 40 travels south from the site and travels east-west along the south side of the NYPA transmission corridor for approximately 3.4 miles, crossing the Genesee River, to Station 80 to the east. Circuits 940 and 941 travel north then east for 0.2 miles, until the circuits reach the R&S Railroad and head north. Circuit 40 spans mapped wetlands and agricultural fields.

**Alternative 4** (originally included in Article VII Proceeding)

Alternative 4 is located to the west of a former railroad corridor that is designated as part of the Genesee Valley Greenway Trail. The substation site is located approximately 2,400 feet east of Krenzer Road and approximately 1,600 feet west of Scottsville Road in the Town of Chili, NY. Alternative 4 is located 149 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site ranges in elevation from approximately 520 to 544 feet above sea level. Current land cover is comprised mostly
of active agricultural land. The remaining 1.27 acres is comprised of NWI-mapped wetland. The substation site is within 1.7 acres of the 100-year floodplain and is within 0.4 acres of the 500-year floodplain. The substation access road enters approximately 2,100 feet to the south off of Morgan Road in a north-south orientation along the edge of the agricultural field. Circuit 40 travels south from the site and travels east-west along the south side of the NYPA transmission corridor for approximately 2.7 miles, crossing the Genesee River, to Station 80 to the east. Circuits 940 and 941 travel north then west for 0.7 miles until the circuits reach the R&S Railroad and head north. Circuit 40 spans mapped wetlands and agricultural fields; while Circuits 940 and 941 span agricultural lands.

**Alternative 5** (originally included in Article VII Proceeding)

Alternative 5 is located approximately 1,400 feet east of Krenzer Road and approximately 1,100 feet north of Morgan Road in the Town of Chili, NY. Alternative 5 is located 223 feet south of an existing 345 kV NYPA overhead transmission line corridor. The site ranges in elevation from approximately 523 to 554 feet above sea level. The site is entirely active agricultural land and is outside any mapped wetlands. The substation site is within 0.1 acres of the 100-year floodplain and is within 0.1 acres of the 500-year floodplain. The substation access road enters approximately 1,100 feet to the south off of Morgan Road in a north-south orientation along the edge of the agricultural field. Circuit 40 travels north from the site and travels east-west along the south side of the NYPA transmission corridor for approximately 2.9 miles, crossing the Genesee River, to Station 80 to the east. Circuits 940 and 941 travel north then west for approximately 0.4 miles, until the circuits reach the R&S Railroad and head north. Circuits 40, 940 and 941 span mapped wetlands and agricultural fields.

**Alternative 6A** (originally included in Article VII Proceeding)

Alternative 6A is located approximately 800 feet west of Reed Road and approximately 1,800 feet north of Morgan Road in the Town of Chili, NY. Alternative 6A is located 75 feet south of an existing 345 kV NYPA overhead transmission line corridor and south of an existing underground Empire Gas Pipeline. The site ranges in elevation from approximately 567 to 593 feet above sea level. This site is mostly active agricultural land and is outside any mapped wetland or floodplain areas. The substation access road is approximately 1,000 feet long and enters from Reed Road to the east in an east-west orientation along the edge of an agricultural field and through undeveloped upland woods. Circuit 40 travels east from the site and travels east-west along the south side of the NYPA transmission corridor for approximately 4.0 miles, crossing the Genesee River, to Station 80 to the east. Circuits 940 and 941 travel northwest then northeast for approximately 1.5 miles, until they reach the R&S Railroad and head north. Circuits 40, 940 and 941 cross Reed Road and span mapped wetlands, agricultural fields, and undeveloped upland woods.

**Alternative 6B** (originally included in Article VII Proceeding)

Alternative 6B is located approximately 800 feet west of Reed Road and approximately 2,200 feet north of Morgan Road in the Town of Chili, NY. Alternative 6B is located directly under the existing 345 kV
NYPA overhead transmission line. The site can be generally described as having rolling topography at approximately 580 feet above sea level, is located entirely in active agricultural lands, and is outside any mapped wetlands or floodplain areas.

**Alternative 7** (originally included in Article VII Proceeding)

Three variations of Alternative 7 were evaluated which correspond to different routing for Circuits 940 and 941: the Certified Centerline Route, Conservation Easement Route, and Diagonal West Route.

- **Article VII Certified Site Alternative**

  The substation for the Article VII Certified Site Alternative is located approximately 2,000 feet east of Scottsville Road and approximately 2,500 feet south of Milewood Road in the Town of Chili, NY. The site is located 188 feet south of an existing 345 kV NYPA overhead transmission line corridor and south of an existing underground Empire Gas Pipeline. The site ranges in elevation from approximately 525 to 544 feet above sea level. The site is entirely within active agricultural land and is outside any mapped wetland or floodplain areas. The substation access road enters approximately 2,000 feet to the northeast off of Milewood Road in an east-west orientation along the edge of the agricultural field until the end of the field, in which the access road shifts to a north-south orientation. Circuit 40 travels north from the substation, then heads east-west along the south side of the NYPA transmission corridor for approximately 1.9 miles to Station 80 to the east. Circuit 40 crosses the Genesee River and spans agricultural fields and wetlands. The Article VII Certified Site Alternative route for Circuits 940 and 941 heads north from the substation and then west across Scottsville Road and the Genesee Valley Greenway Trail before heading north and then west through agricultural fields for a total of 1.55 miles until reaching the R&S Railroad and heading north. Circuits 940 and 941 cross Scottsville Road, the Genesee Valley Greenway Trail, and agricultural fields through the Article VII Certified Site Alternative route.

- **Conservation Easement Alternative**

  The substation for the Conservation Easement Alternative is located approximately 2,000 feet east of Scottsville Road and approximately 2,500 feet south of Milewood Road in the Town of Chili, NY. The site is located 188 feet south of an existing 345 kV NYPA overhead transmission line corridor and south of an existing underground Empire Gas Pipeline. The site ranges in elevation from approximately 525 to 544 feet above sea level. The site is entirely within active agricultural land and is outside any mapped wetland or floodplain areas. The substation access road enters approximately 2,000 feet to the northeast off of Milewood Road in an east-west orientation along the edge of the agricultural field until the end of the field, in which the access road shifts to a north-south orientation. Circuit 40 travels north from the substation, then heads east-west along the south side of the NYPA transmission corridor for approximately 1.9 miles to
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Station 80 to the east. Circuit 40 crosses the Genesee River and spans agricultural fields and wetlands. The Conservation Easement Route for Circuits 940 and 941 heads north from the substation and then west across Scottsville Road, the Genesee Valley Greenway Trail and a conservation easement for 1.45 miles before reaching the R&S Railroad and heading north. Circuits 940 and 941 cross Scottsville Road and the Genesee Valley Greenway Trail and span primarily agricultural fields, wetlands, and the conservation easement.

- Agricultural Mitigation Alternative

The substation for the Agricultural Mitigation Alternative is located approximately 2,000 feet east of Scottsville Road and approximately 2,500 feet south of Milewood Road in the Town of Chili, NY. The site is located 188 feet south of an existing 345 kV NYPA overhead transmission line corridor and south of an existing underground Empire Gas pipeline. The site ranges in elevation from approximately 525 to 544 feet above sea level. The site is entirely within active agricultural land and is outside any mapped wetland or floodplain areas. The substation access road enters approximately 2,000 feet to the northeast off of Milewood Road in an east-west orientation along the edge of the agricultural field until the end of the field, in which the access road shifts to a north-south orientation. Circuit 40 travels north from the substation, then heads east-west along the south side of the NYPA transmission corridor for approximately 1.9 miles to Station 80 to the east. Circuit 40 crosses the Genesee River and spans agricultural fields and wetlands. The Agricultural Mitigation Alternative route for Circuits 940 and 941 head northwest from the substation for 1.45 miles until the circuits reach the R&S Railroad and head north. Circuits 940 and 941 cross Scottsville Road and span primarily agricultural fields, edge areas of wooded wetlands, and undeveloped upland woods. All structures of Circuits 940 and 941 through the Agricultural Mitigation Alternative are designed with optimal spanning distances and sitings which minimize the number of such structures and minimize impacts to the mechanized farm operations pattern of each affected crop field. The opening for conducting the mitigation review and design resulted from the August 15, 2013 NYSPSC Order on Petitions for Rehearing, establishing a 30-day period of mediation. Pending on the instructions of ALJ Eleanor Stein, similar structural mitigation for agricultural lands affected by the circuits of other alternative substation sites may be explored in the future.

Alternative 8* (RG&E identified site)

Alternative 8 is located approximately 900 feet east of East River Road and approximately 1,000 feet north of Brooks Road in the Town of Henrietta, NY. Alternative 8 is located 116 feet south of an existing 345 kV NYPA overhead transmission line corridor and south of an existing underground Empire Gas Pipeline. The site ranges in elevation from approximately 554 to 589 feet above sea level. The site is mostly active agricultural land and is outside of any mapped wetlands or floodplain areas. The evaluated substation access road is approximately 1,000 feet long and enters from Brooks Road to the south in a north-south orientation along an agricultural field. Circuit 40 travels east-west from the
substation along the south side of the NYPA transmission corridor for approximately 0.6 miles, crossing East River Road, to Station 80 to the east. Circuits 940 and 941 travel north then west, and then northeast for approximately 3.0 miles until they reach the R&S Railroad and head north. Circuits 940 and 941 cross Scottsville Road and the Genesee River and span mapped wetlands, agricultural fields, grazing land, abandoned agricultural land, and undeveloped upland woods.

**Alternative 8A* (NYS Ag & Markets recommended site)**

Alternative 8A is located approximately 800 feet south of Lehigh Station Road and approximately 1,200 feet east of East River Road in the Town of Henrietta, NY. Alternative 8A is located 240 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site ranges in elevation from approximately 546 to 565 feet above sea level. Approximately 66 percent of the substation site is located within active agricultural land. Approximately 20 percent of the substation site is undeveloped upland wood areas with the remaining area consisting of developed land (portions of existing Station 419 and access road). The substation site is outside of any mapped wetlands or mapped floodplain areas. However, the western side of the site is within an area proposed for regulation as a wetland by the NYSDEC. The evaluated substation access road is the existing access road currently used for the nearby existing Station 419, approximately 800 feet entering from Lehigh Station Road in a north-south orientation. Circuit 40 travels south from the site and then travels east-west along the south side of the NYPA transmission corridor for approximately 0.6 miles to Station 80 to the east. Circuits 940 and 941 travel north then east, then northeast for approximately 2.8 miles until they reach the R&S Railroad. Circuits 940 and 941 cross Lehigh Station Road, Scottsville Road and the Genesee River and span mapped wetlands, agricultural fields, grazing land, abandoned agricultural land, and undeveloped upland woods.

**Alternative 9* (NYSPSC recommended site)**

Alternative 9 is located approximately 500 feet west of East River Road in the Town of Henrietta, NY, within the unoccupied former Kodak facility, which would require demolition. The Genesee River is approximately 300 feet to the west of the substation site. Alternative 9 is located 111 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site ranges in elevation from approximately 536 to 576 feet above sea level. Approximately 50 percent of the site is developed land (portions of unoccupied former Kodak facility buildings and driveways); the other 50 percent is undeveloped land. The substation is outside of any wetlands or mapped floodplain areas. The evaluated substation access road is the existing driveway that was used for access to the former Kodak facility, approximately 500 feet entering from East River Road in an east-west orientation. Circuit 40 travels south from the site and then east-west along the south side of the NYPA transmission corridor for approximately 1.1 miles, crossing East River Road, to Station 80. Circuits 940 and 941 travel north then northwest from the substation for approximately 2.2 miles and until the circuits reach the R&S Railroad. Circuits 940 and 941 cross Scottsville Road and the Genesee River and span mapped wetlands, agricultural fields, grazing land, abandoned agricultural land, and undeveloped upland woods.
Alternative 10 (RG&E identified site)

Alternative 10 is located approximately 1,600 feet east of Scottsville Road and along the north side of Milewood Road in the Town of Chili, NY. Alternative 10 is outside of any major utility ROWs. The site can be generally described as having rolling topography at approximately 540 feet above sea level. The site is located entirely in active agricultural land and is outside any mapped wetlands or floodplain areas.

Alternative 11 (RG&E identified site)

Alternative 11 is located approximately 3,500 feet east of Scottsville Road and approximately 200 feet south of Milewood Road in the Town of Chili, NY. The Genesee River is approximately 800 feet to the east the substation site. Alternative 11 is located approximately 700 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site can be generally described as rolling topography at approximately 550 feet above sea level. The site is located entirely in active agricultural land and outside any mapped wetlands or floodplain areas.

Alternative 12 (RG&E identified site)

Alternative 12 is located 85 feet west of a former railroad corridor that is designated as part of the Genesee Valley Greenway Trail. Alternative 12 is approximately 2,400 feet east of Krenzer Road and approximately 1,100 feet north of Morgan Road in the Town of Chili, NY. Alternative 12 is located approximately 100 feet south of an existing 345 kV NYPA overhead transmission line corridor. The site can be generally described as rolling topography at approximately 540 feet above sea level at the low point and approximately 560 feet above sea level at the high point. The site is located entirely in active agricultural land and is outside any mapped wetlands. The southeast corner of the substation is partly within the 100-year floodplain.

Alternative 13 (RG&E identified site)

Alternative 13 is located approximately 300 feet east of Krenzer Road and approximately 1,400 feet north of Morgan Road in the Town of Chili, NY. Alternative 13 is located approximately 300 feet south of an existing 345 kV NYPA overhead transmission line corridor. The site has an elevation of approximately 530 feet above sea level. Approximately 66 percent of the site is within NWI-mapped wetlands and approximately 50 percent of the site is within the 100-year floodplain. The remaining 34 percent of the site is within active agricultural land and undeveloped upland woods.

Alternative 14 (RG&E identified site)

Alternative 14 is located approximately 1,200 feet east of Krenzer Road and approximately 2,800 feet north of Morgan Road in the Town of Chili, NY. Alternative 14 is located approximately 1,100 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site has an elevation of approximately 520 feet above sea level. The site is located entirely in an NWI-mapped wetland and
approximately 60 percent of the site is located within NYSDEC-mapped wetland. The entire site is within the 100-year floodplain.

**Alternative 15* (ALJ David Van Ort identified site)**

Alternative 15 is located approximately 200 feet northeast of the northern end of Krenzer Road and approximately 3,400 feet north of Morgan Road in the Town of Chili, NY. Alternative 15 is located 1,245 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site ranges in elevation from approximately 526 to 535 feet above sea level. The site is located mostly within active agricultural land, with the remainder being undeveloped upland woods. The remaining 0.02 acres is comprised of NWI-mapped wetland. The substation site is within 0.8 acres of the 100-year floodplain and is within 1.1 acres of the 500-year floodplain. The substation access road is approximately 200 feet long and enters from the end of Krenzer Road in an east-west orientation through an agricultural field. Alternative 15 is located approximately 1,700 feet north of an existing 345 kV NYPA overhead transmission line corridor. Circuit 40 travels south from the site, then east along the south side of the NYPA transmission corridor for approximately 3.6 miles, crossing the Genesee River, through active agricultural lands and wetlands, to Station 80. Alternative 15 is located immediately adjacent to the R&S Railroad, so Circuits 940 and 941 immediately head north along the R&S Railroad ROW. Circuits 940 and 941 span a small portion of an agricultural field, however.

**Alternative 16* (Passero identified site)**

Alternative 16 is located approximately 300 feet west of Krenzer Road and approximately 1,600 feet north of Morgan Road in the Town of Chili, NY. Alternative 16 is located 130 feet south of an existing 345 kV NYPA overhead transmission line corridor. The site ranges in elevation from approximately 524 to 525 feet above sea level. Current land cover is comprised mostly of undeveloped upland woods. The remaining 4.23 acres is comprised of NWI-mapped wetland. The entire 12-acre substation site is within the 100-year floodplain and is outside of the mapped 500-year floodplain. The substation access road enters approximately 300 feet to the east off of Krenzer Road in an east-west orientation through undeveloped upland woods. Circuit 40 travels east from the site and travels east-west along the south side of the NYPA transmission corridor, through active agricultural lands, mapped wetlands and undeveloped land for approximately 3.5 miles, crossing the Genesee River, to Station 80. Circuits 940 and 941 travel north then east from the substation location for 0.2 miles until they reach the R&S Railroad. The routes for Circuits 940 and 941 span a small portion of undeveloped upland woods.

**Alternative 18 (RG&E identified site)**

Alternative 18 is located approximately 600 feet west of Union Street and approximately 1,300 feet north of Morgan Road in the Town of Chili, NY. Alternative 18 is located approximately 100 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site has an elevation of approximately 550 feet above sea level. The site is located entirely within undeveloped upland woods and is outside of any mapped wetlands or floodplain areas.
Alternative 19 (RG&E identified site)

Alternative 19 is located approximately 400 feet west of Stottle Road and approximately 1,200 feet north of Morgan Road in the Town of Chili, NY. Alternative 19 is located within an existing 345 kV NYPA overhead transmission line corridor ROW. The site has an elevation of approximately 590 feet above sea level. Approximately 33 percent of the site is located within an NWI-mapped wetland. Approximately 20 percent of the site is located within active agricultural field. The remainder of the site is located in undeveloped upland woods. The site is outside of any mapped floodplain areas.

Alternative 20* (RG&E identified site)

Alternative 20 is located approximately 1,000 feet west of East River Road and approximately 200 feet south of an existing parking lot of an unoccupied former Kodak facility in the Town of Henrietta, NY. The site is located approximately 400 feet east of the Genesee River. Alternative 20 is located 153 feet south of an existing 345 kV NYPA overhead transmission line corridor. The site ranges in elevation from approximately 535 to 560 feet above sea level. Current land cover is comprised mostly of undeveloped upland woods. The remaining 0.99 acres is comprised of NYSDEC-mapped and NWI-mapped wetlands. The site is outside of any mapped floodplain areas. The substation access road is approximately 1,100 feet to the west entering off of East River Road in an east-west orientation from the northeast corner of the substation and utilizes an existing driveway to the existing parking lot for the abandoned former Kodak facility. Circuit 40 travels east from the site and travels east-west along the south side of the NYPA transmission corridor for approximately 1.3 miles to Station 80 to the east. Circuits 940 and 941 head north then northwest from the substation for approximately 2.4 miles until the circuits reach the R&S Railroad. Circuits 940 and 941 cross Scottsville Road and the Genesee River and span mapped wetlands, agricultural fields, grazing land, abandoned agricultural land, and undeveloped upland woods.

Alternative 21 (RG&E identified site)

Alternative 21 is located approximately 100 feet south of Brook Road and approximately 1,100 feet west of Scottsville Road in the Town of Chili, NY. The site has an elevation of approximately 530 feet above sea level. Approximately 20 percent of the site is located within NYSDEC-mapped and NWI-mapped wetlands. Approximately 30 percent of the site is located within the 100-year floodplain. The remainder of the site is within undeveloped upland woods.

Alternative 22 (RG&E identified site)

Alternative 22 is located approximately 900 feet west of Stottle Road and approximately 1,700 feet north of Morgan Road in the Town of Chili, NY. Alternative 22 is located approximately 200 feet north of an existing 345 kV NYPA overhead transmission line corridor. The site has slight local relief at approximately 590 feet above sea level. Approximately 75 percent of the site is located within active agricultural land with the remainder in undeveloped upland woods. The site is outside of any mapped wetland or floodplain areas.
Alternative 23 (RG&E identified site)

Alternative 23 is located approximately 300 feet east of Stottle Road and approximately 1,400 feet north of Morgan Road in the Town of Chili, NY. Alternative 23 is located within an existing 345 kV NYPA overhead transmission line corridor ROW. The site has an elevation of approximately 590 feet above sea level. Approximately 33 percent of the site is within an NWI-mapped wetland. The remainder of the site is within active agricultural land. The site is outside of any mapped floodplain areas.

Alternative 24 (RG&E identified site)

Alternative 24 is located off a private drive approximately 6.0 miles south of the existing NYPA 345 kV ROW, approximately 900 feet west of West River Road (CR84) and approximately 2,100 feet north of Cameron Road (CR 74) in the Town of Caledonia, Livingston County, NY. The site is south of Dugan Creek and outside any mapped NWI or NYSDEC wetlands. The site can be generally described as having relatively level topography and ranges in elevation from approximately 602 to 620 feet above sea level. This undeveloped site is sparsely vegetated, but not currently in agricultural use.
III. METHODOLOGY

1. Purpose and Approach

The methodology section of this Report describes the screening process by which 25 alternatives were considered and evaluated for the location of Station 255, and how thirteen (13) were selected for additional study.

The analysis process was taken in a series of steps, as follows:

- Data collection
- Documentation of methodologies
- Report outline
- Data summary
- Data screening
- Further analysis and refinement
- Criteria matrix preparation
- Report finalization

Section III.4 also provides an explanation of the methods used to quantify the results which are provided in Section IV of this Report, and where appropriate, the assumptions and rationale utilized for comparison purposes. In addition to the 12-acre footprint of each alternative substation location, this analysis also takes into consideration the substation access road and associated Circuit 40, 940, 941, and 906 transmission line routes for each alternative that were selected for further analysis.

2. Screening of Alternatives

To focus on the most viable alternatives, the following screening criteria were established. The criteria were developed by subject matter experts representing Engineering, Agricultural, Environmental and Land Use disciplines from URS Corporation.

A total of 25 alternative sites were evaluated against the screening criteria identified below. The list of Alternatives were narrowed, as requested by ALJ Eleanor Stein by applying the criteria below. Screening criteria are not presented in a hierarchical format

Engineering Considerations

- Position of substation site in relation to NYPA 345kV lines (if under NYPA lines, then “no go”)
- Orientation of site to existing 345kV lines
- Size of available lot (12 acres necessary)
- T&D: minimize circuit angle at structures to <5 degrees if possible
- Assumed all 115 kV circuits require overhead transmission lines
Agricultural Considerations

- Agricultural field orientation; minimization of crop field management impacts associated with substation, transmission line and access road development
- Orientation of alternate substation site to incoming and outgoing circuits and relation to current agricultural lands
- Minimization or avoidance of NYS Ag & Markets-designated Ag District properties

Environmental Considerations

- Minimize impacts to wetlands and streams; including minimized clearing of forested wetlands
- Minimize impacts to mapped floodplains (substation reliability and constructability issues)
- Minimize impacts to noise receptors (proximity residential structures within 200 feet)
- Minimize visual impacts to neighboring residential properties

Land Use Considerations

- Property ownership (i.e., Conservation Easement; park & recreational lands)
- Width and distance of new/additional ROW and land acquisition required (assumes 200 foot wide corridor for 345kV, 150 foot wide corridor for 115kV, and 12 acres total for substation development)
- Assessed access road development
- Assessed transmission line route development

The 25 sites consisted of Alternatives 1, 2, 3, 4, 5, 6A, 6B, and 7 as identified and described in the Article VII application for the RARP; Alternatives 8, 8A (also recommended by NYS Ag & Markets), 9 (also recommended by NYSPSC), 10-14, and 18-24, which were all additional potential sites proposed by RG&E Alternative 15 as requested by the ALJ David Van Ort; and Alternative 16 as proposed by the Passero Report.

Alternatives to be assessed: Alternatives 1-7 as proposed & described in the RARP Article VII application, Alternative 15 (ALJ Eleanor Stein-proposed), and Alternative 16 (Passero Report-proposed). In addition, the following additional alternative sites were determined to not exceed the screening criteria, and therefore, were identified for future analysis: Alternatives 8, 8A, 9, & 20.

Alternative sites excluded from further analysis – The sole original Article VII alternative location excluded from further investigation and analysis was Alternative 6B, which was found to have a “fatal flaw” with its location sited directly under the existing NYPA 345kV lines. From an engineering perspective, this is not a viable option, so Alternative 6B was excluded from further analysis in this Report.
In addition to Alternative 6B, several other potential alternatives were found to exceed two (2) or more evaluation criteria, and therefore, were excluded by the screening team from further analysis at that time. Specific screening criteria are detailed in the Methodology section of this Report. The results of the alternative screening are indicated below in Table 1.

Table 1: Alternative Screening Results

<table>
<thead>
<tr>
<th>Alternative #</th>
<th>Engineering</th>
<th>Environmental</th>
<th>Agricultural</th>
<th>Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>6B</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>10</td>
<td>X</td>
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<td>X</td>
</tr>
</tbody>
</table>

“X” indicates the screening criteria for that particular possible alternative was considered excessive by the screening team.

3. Selection of Alternatives for Further Analysis

Following the initial screening process, 13 alternative sites remained that could be considered viable alternatives requiring a more detailed assessment. Those 13 alternatives included the following: Alternatives 1, 2, 3, 4, 5, 6A, and 7 as identified and described in the Article VII application for the RARP; Alternative 15 and 16 as proposed by the ALJ David Van Ort and the Passero Report respectively and directed by the NYSPSC Order, and the additional RG&E-proposed Alternatives 8, 8A, 9, and 20. Results of the initial alternative screening effort are provided in Table 1 of Section IV in this Report.

The selection of 13 alternatives includes assessment of the transmission line alignments to serve the alternative substation sites. Of the 13 sites, four are located east of the Genesee River; the same side as the existing Station 80. Nine sites are located west of the Genesee River. Alternative electrical transmission line routing alignments to and from each substation site are illustrated on the figures provided throughout the Appendices of this Report.

In order to assess and provide a quantitative basis for comparing the potential impacts for each substation alternative and their associated access roads and transmission line routes, a series of criteria
were established. Each major category of criteria has a series of metrics with several variables measured for each alternative.

These major categories include:

- Real Estate
- Land Use
- Permitting
- Environmental
- Engineering
- Impact to Project Budget
- Impact to Project Schedule

These major categories are further defined by various applicable subcriteria as shown on the attached Criteria Matrix.

4. **Methodologies for Quantitative Analysis and Comparison of Selected Alternatives.**

This section describes the methods utilized to site the required transmission line routes and access roads and to conduct the quantitative analysis of each alternative substation site.

The several different alternative points of departure of Circuits 940 and 941 from the R&S Railroad corridor are contingent on the locations of alternative Station 255 sites and the inherent features occupying the areas between such sites and the railroad corridor. The type and degree of impact which one alternative alignment has, either on a range of features or on one feature will differ from the impacts along another alternative alignment.

Major items considered in the assessment of transmission line routes for Circuits 40, 940 and 941 are:

- Residences and other buildings;
- Wetlands;
- Waterways/streams;
- Agricultural lands and respective crop field management units;
- Farmland status, i.e.: included in, or excluded from, County-State Agricultural Districts;
- Farmlands which include soils identified as “Prime Farmland” or “Important Farmland of New York”; and
- Transportation corridors.

While the alternative alignments of Circuits 940 and 941 vary considerably, no other option of alignment outside of the NYPA corridor’s proximity was found feasible for Circuit 40. However, the length of Circuit 40 and its impacts vary significantly, depending on the distance of respective alternative Station 255 sites from Station 80 and the features which are transected between them.
All assessments are desktop only and based on aerial map interpretation and available reference data only. No site visits were conducted to collect field data or to verify desktop values.

The methodologies presented below for the quantitative analysis criteria correspond numerically to the data provided in the accompanying Criteria Matrix (see attached after Section V - References).

A. Real Estate

In order to assess the potential impacts to land use and land cover from each substation alternative, the methodologies described below were followed. A brief explanation of the method, and where appropriate, the assumptions and rationale are described corresponding to the category and criteria assessed in the attached Criteria Matrix. Each substation alternative takes into consideration the substation access road and associated transmission lines (Circuits 40, 940, 941, and 906) corridors. Maps depicting real estate and land use data within the vicinity of the alternative substation sites, access roads and transmission line ROWs are presented in Appendix A.

1. Project Considerations

a. Substation Fully Located on RG&E Property? (y/n)

In order to quantify the number of landowners impacted by acquisition of land rights, a screening of ownership was conducted. A data layer containing parcel boundaries was created to identify the landowners of each parcel where an alternative substation site was located. Property ownership information was verified using data available from the Monroe County’s Real Property database, which provides tax map information. Ownership information from the Geographic Information Systems (GIS) database was accessed in order to determine if RG&E owned each of the alternative substation sites and/or if the alternative substation site is fully located on a single or multiple parcels.

b. Forested Clearing Needed for Substation (acres)

This criterion compares the area to be cleared of upland forest communities and dense shrubs. In order to quantify the required clearing for each alternative substation site, an aerial image was used from Digital Globe, dated April 2011. The aerial image was then overlaid with the alternative substation sites to view the land within the bounds of the each alternative substation. Quantifiable areas vegetated in trees and dense shrubs were determined by drawing polygons around each area and calculating the acreage using the Calculate Geometry tool in ArcGIS.

c. Total Transmission Centerline Length (miles)

The total length of transmission corridor(s) necessary to serve each alternative substation site provides a comparative measure of land use change and potential visual impact in the community and to
neighboring properties. Total length of transmission corridors is measured utilizing the conceptual centerlines that were digitized onto aerial imagery utilizing GIS. Centerline distances were then measured in miles of the entire transmission line, from Station 80 to each alternative substation site and then to the juncture of the 940/941 corridor along the R&S Railroad. The total transmission line length was calculated using the Calculate Geometry tool in ArcGIS.

d. **Forested Clearing Needed for ROW (acres)**

Where existing RG&E electrical transmission line corridors were not utilized, new transmission line corridors were created by taking the centerline of each transmission line and creating parallel lines of a fixed width on either side to achieve the total corridor width. For the Circuit 40 transmission line that runs parallel to and south of the existing NYPA ROW and Empire Gas Pipeline ROW, a corridor width of 190 feet was used. This roughly parallels the existing NYPA ROW. For all other routes of Circuit 40 transmission line as well as the NYPA lines entering and exiting the substation, a corridor width of 150 feet was used. For the two parallel Circuits 940 and 941, a total transmission line corridor width of 150 feet was used with a design distance between the lines of 25 feet.

The planned centerline separation between Circuits 940 and 941 is 25 feet. The typical span distance between structures on these circuits is 350 feet on average. For Circuit 40, the current centerline separation is approximately 200 feet to the NYPA transmission line centerline and span distance vary to match NYPA structures locations, typically between 700 feet to 1100 feet.

These distances were then used to create polygons of each transmission line alternative. These corridor polygons are then overlaid on the aerial imagery and a new data layer of polygons containing areas of vegetation that will have to be cleared was created. The acreage of each polygon is calculated using the Calculate Geometry tool in ArcGIS and totaled for each alternative transmission line corridor.

e. **New Access Road Length (miles)**

The length of access roads to serve each substation alternative site provides a comparative measure of land use change and potential visual and noise impacts to neighboring properties. For each alternative substation site, URS laid out a rational location for an access road. In order to determine the conceptual alignment, the following concerns were considered; minimize impacts on agricultural land, minimize clearing, minimize impacts to wetlands. Access roads linking each alternative substation location to the closest public highway were drawn utilizing desktop mapping of environmental features and available aerial photography. Engineering considerations for access roads included: available topography, mapped wetland and wetland buffer locations, agricultural land, length, undeveloped upland woods clearing, and existing residences, structures, and barriers. Once general alignments were determined, the access roads were digitized into ArcGIS and the length, in miles, of each access road was calculated using the Calculate Geometry tool in ArcGIS.
f. **Forested Clearing Needed for Access Road (acres)**

This criterion compares the area to be cleared of upland forest communities and dense shrubs for the installation of access roads for each alternative substation site. In order to quantify the required clearing for the access road for each alternative substation site, an aerial image was used from Digital Globe, dated April 2011. The conceptual access roads were then digitized in ArcGIS. Areas vegetated in upland forest communities and dense shrubs were determined by drawing polygons around each area and calculating the acreage using the Calculate Geometry tool in ArcGIS and totaled for each alternative substation access road. A 30-foot total width was assumed to quantify the area of disturbance for the access road.

2. **Land Area Needs**

   a. **Properties Affected by Transmission Lines (#)**

   In order to determine how many properties would be affected by new transmission lines for each substation alternative a data layer of tax map parcels was used to view tax map parcel boundaries. The number of properties crossed by each transmission line corridor(s) for each alternative substation was then counted. Property ownership information was verified using data available from the Monroe County Real Property database, which provides tax map information.

   b. **Total Land Needed for Transmission Line ROW (acres)**

   In order to compare the land area needed for the transmission line ROWs for each substation alternative, the corridor polygon was overlaid on the parcel data. Any parcels owned by RG&E were excluded and a new polygon was created using the Geoprocessing Clip tool in ArcGIS. The resulting acreage for each polygon for each alternative was then calculated using the Calculate Geometry tool in ArcGIS.

   c. **Total Land Needed for Substations (acres)**

   The base area (Inside the substation fence line) needed for all of the alternative substation sites is 12 acres.

   d. **Properties Affected by Substations (#)**

   Using the parcel data overlaid with the substation alternatives, the number of parcels touched by the substation footprint was counted.
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e. **Clearing Needed for Substations and Access Roads (acres)**

In order to determine how much area would need to be cleared for each substation alternative, the substation polygons were overlaid on an aerial image from Digital Globe, dated April 2011. Within the footprint of each substation, polygons of the areas of clearing needed are created and the acreage was calculated using the Calculate Geometry tool in ArcGIS.

f. **Total Area: Transmission Lines ROW Corridor and Substation (acres)**

In order to determine the total area needed for each alternative substation site, the total acreages previously calculated for transmission lines and substations were summed.

3. **Noise Receptors (residential structures within 200’)**

a. **Residences Within 200’ of Transmission Line ROW (#)**

In order to compare how many potential noise impacts may result from the new transmission lines, the number of residential structures within 200 feet of the transmission line ROWs were quantified. Using the transmission line ROW polygons, a 200 foot buffer was created for each transmission line segment using the editor buffer tool. This buffer was overlaid on the aerial imagery and the numbers of residential structures that lie within the polygons were counted.

b. **Distance of Structures to Closest Residence (feet)**

As another indicator of potential noise impact that may result from the project, the distance between the transmission line structures and the closest residence was calculated for each transmission line segment. Structures along the transmission line were created as point data in a separate data layer. That data layer was then overlaid on aerial imagery. The distance to the nearest residences was then measured using the measure tool in ArcGIS. The shortest distance to a residence from each structure along any potential transmission line for each substation site was recorded as the closest residence. A zero (0) in the table represents that a structure identified in A.3.a is located in the ROW.

c. **Residences Within 200’ of Proposed Substation (#)**

In order to identify and compare potential noise impacts between the alternative substation sites, the number of residential structures within 200 feet of each alternative site was quantified. Using the polygons for alternative substation sites, a 200 foot buffer was created for each transmission line segment using the editor buffer tool in ArcGIS. This buffer was overlaid on the aerial imagery and the numbers of residential structures that lie within the polygons were counted.
d. Distance of Substation to Closest Residence (feet)

As another indicator of potential noise impact that may result from the project, the distance between the alternative substation sites and their closest residential structure was calculated. The data layer containing the alternative substation footprints was laid over the aerial imagery. The distance to the nearest residences was measured using the measure tool in ArcGIS. The shortest distance to a residence from each substation site was recorded as the closest residence. A zero (0) in the table represents that a structure identified in A.3.c is located in the ROW.

B. Land Use

1. Residences

a. Other Residences Within 200’-300’ of Additional T-line ROW (#)

In order to identify and compare the number of residences impacted by the new transmission line ROWs required to serve alternative substation sites, a 300 foot buffer was created around each new transmission line corridor polygon using the editor buffer tool. This buffer was overlaid on the aerial imagery. The numbers of residences that lie within the buffered area for each new transmission line for each alternative were counted. The number of residences that lie within the area between 200 feet and 300 feet were then counted.

b. Other Residences Within 300’-500’ of Additional T-Line ROW (#)

In order to identify and compare the number of residences impacted by the new transmission line corridors required to serve alternative substation sites, a 500 foot buffer was created around each new transmission line corridor polygon using the editor buffer tool. The number of residences that lie within the area between 300 feet and 500 feet were then counted.

c. Substation: Single Property Owner? (y/n)

In order to determine how many properties would be affected by each alternative substation site and access road, a data layer of tax map parcels was used to display parcel boundaries overlaid with the alternative substation sites. The numbers of properties affected by the polygons for substation sites were then counted. Property ownership information was verified using data available from the Monroe County Real Property database, which provides tax map information.
d. Other Residences Within 200’-300’ of Substation (#)

In order to identify and compare the number of residences impacted by each alternative substation site, a 200 - 300 foot buffer was created around each new substation alternative polygon using the editor buffer tool in ArcGIS. This buffer layer and the substation layer were overlaid on the aerial imagery. The numbers of residences that lie within the buffer area were counted.

e. Other Residences Within 300’-500’ of Substation (#)

In order to identify and compare the number of residences impacted by each alternative substation site, a 300 - 500 foot buffer was created around each new substation alternative polygon using the editor buffer tool in ArcGIS. The number of residences that lie within the area between 300 feet and 500 feet were then counted.

2. Consistency with Comprehensive Plans

In order to assess if each alternative substation site is consistent with the adopted comprehensive plan for the Town where it is located, the methodologies described below were followed. Each substation alternative also takes into consideration the substation access road and associated transmission lines (Circuits 40, 940, 941, and 906). The methodology is described corresponding to the category and criteria presented in the attached Criteria Matrix.

a. Future Land Use Map (Chili sites)

In order to determine if the Project alternatives (alternative substation sites and their necessary transmission lines and access roads) are consistent with the Town of Chili land use policy, the Town of Chili 2030 Comprehensive Plan, adopted November 2011 (2030 Plan) was reviewed for reference to potential conflicts between provision of utilities and the town stated desires for future land use.

Page 2-43 of the Town of Chili 2030 Plan states that:

“One major electric power transmission line that crosses Chili is shown on all of the figures. It is not owned by RG&E but is connected to RG&E’s transmission and distribution system. Similar interconnections exist among all major electric utility companies allowing them to buy, sell, and transfer power as necessary, or appropriate, over great distances. Sometimes, power supplied to RG&E customers in Chili is actually generated by other utilities, just as their customers sometimes receive power generated by RG&E.”
And;

“Both the electric and gas facilities that serve Chili are in generally good condition and have adequate capacity for existing and anticipated development.”

Given that the 2030 Plan is otherwise silent on expansion of electric transmission capacity, it was determined that the future land use designations would be used to gauge if the Project is consistent with the plan.

The 2030 Plan includes a Future Land Use Map (Figure 1-1) and is described as “… a road map providing the pattern of land use development desired at this point in history.” The alternative substation sites located within the Town of Chili (sites 1, 2, 3, 4, 5, 6A, 7, 15, and 16) were manually located on the Town’s Future Land Use Map. Then the future land use designation for each location was taken from the map legend and entered on the Criteria Matrix.

b. Generalized Land Use Map (Henrietta sites)

In order to determine if the Project alternatives (alternative substation sites and their necessary transmission lines and access roads) are consistent with the Town of Henrietta land use policy, the Town of Henrietta Comprehensive Plan, April 2003 was reviewed for reference to potential conflicts between provision of utilities and the town stated desires for future land use.

The Comprehensive Land Use Plan does not specifically address expansion of transmission capacity or new electrical substations. Therefore, future land use designations were used to gauge if the Project is consistent with the Comprehensive Plan.

The Town of Henrietta Comprehensive Plan dated April 2003 includes a Generalized Land Use Plan (Figure 4-1). The existing Station 80 is located within an area designated for low density residential use.

The alternative substations sites located within the Town of Henrietta (sites 8, 8A, 9, and 20) were manually located on the Generalized Land Use Plan. Then the future land use designation for each location was taken from the map legend and entered on the Criteria Matrix.

c. Alternative Consistent with Comprehensive Plan? (y/n)

Chili: The alternative substation locations in Chili fall within the planning Sub-Area #9, where it is recommended that:

“The 2030 Plan recommends that no new applications for any type of non-agricultural commercial operations be granted in the delineated Agricultural areas within the corridor from the western town
boundary (Chili-Riga) easterly to Scottsville-Chili Road (NY 386) south of Black Creek to the Chili-Wheatland town line.”

Where the Project would be accommodated within the Town, the Goals and Objectives section of the 2030 Plan provides guidance for how the facilities should be developed.

Henrietta: The Comprehensive Land Use Plan does not specifically address expansion of transmission capacity or new electrical substations, nor their prohibition.

According to the Comprehensive Land Use Plan Figure 2.5-2 – Agricultural Districts, Alternatives 8, 8A, 9, and 20 are all located outside the Agricultural District and within areas designated for Resource Conservation—Limited Use, Resources Conservation-Residential, or Low Density Residential.

3. Recreation Lands Impacted

a. Public/Conservation Easement Lands Within 500’ of T-line ROW (y/n)

In order to determine if transmission lines serving each alternative substation site will cross or otherwise pose a potential impact to public lands or lands subject to conservation easements, a 500 foot buffer was created for each transmission line alternative and overlaid on a data layer containing public lands and known conservation easements. NYSDEC’s Geodata Inventory was utilized to determine the existence of public lands. Conservation easements were identified from Article VII – Exhibit 3. Then it was determined if each alternative was located within a known conservation easement area.

b. Public/Conservation Easement Lands Within 500’ of T-line ROW (acres)

In order to determine how much area of public lands or conservation easements is located within 500 feet of transmission line alternatives, the public lands or known conservation easements identified in B.3-a above are used as the input layer and the 500 foot buffer created for each alternative transmission line ROW is used as the clip layer for the Geoprocessing Clip tool in ArcGIS. The acreage of each of the resulting polygons was determined using the Calculate Geometry tool in ArcGIS and totaled for each alternative and category.

C. Permitting

In order to assess the need for permitting for each substation alternative, the methodologies described below for local and environmental permitting were followed. Each substation alternative assessment also takes into consideration the substation access road and associated transmission line corridors (Circuits 40, 940, 941, and 906).
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1. Local Permitting

   a. **Subdivision of Land**

      Within their respective municipalities, Chapter 245 of the Henrietta Town Code and Chapter 439 of the Chili Town Code each regulate the division of property with respect to lot size, arrangement and access. During the assessment of each alternative location, the following were considered:

      - Is the substation site under single ownership, or does it include more than one property?
      - Is the substation site land-locked?
      - Will the access road traverse multiple properties?

      The creation of a new parcel for Station 255 potentially could be subject to municipal subdivision control. It is anticipated that RG&E would request the NYS PSC to waive application of certain specific subdivision regulations. Note these considerations for local municipalities were not quantified in the attached Criteria Matrix.

   b. **Zoning**

      Within their respective communities, the Town of Chili Zoning (Chapter 500 of the Town Code) and Town of Henrietta Zoning (Chapter 295 of the Town Code) establish use districts, height and bulk regulations (including setbacks, maximum heights and building orientation). It is anticipated that RG&E would request the NYS PSC to waive application of the certain specific zoning regulations. Note these considerations for local municipalities were not quantified in the attached Criteria Matrix.

2. Environmental Permits

   a. **Federal Wetlands Permit Required? (y/n)**

      Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) regulates waters of the U.S. including wetlands that fall under their jurisdiction. The temporary or permanent placing of fill in a USACE jurisdictional wetland requires a federal permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbor Act of 1899.

      In order to determine the necessity for federal wetland permits for each alternative, the substation location, transmission line routes, and access road layout will be assessed for potential impacts to wetlands. Wetlands will initially be identified and mapped by reviewing information on topographical maps, the U.S. National Hydrography Dataset and Federal database searches and existing GIS-data available for Monroe County. Using GIS, the substation locations, access road layouts, and transmission
line routes were compared to wetland locations to quantify potential impacts to wetlands. Site visits were not conducted to field delineate wetlands for this Report.

b. **Wild, Scenic and Recreational Rivers? (y/n)**

Certain activities are regulated under the Wild, Scenic and Recreational Rivers Act. However, according to the NYSDEC website, the Genesee River is designated as a “Scenic” river only in Letchworth State Park, which is outside the RARP alternatives study area. Therefore, there is no permit jurisdiction under the New York State Wild, Scenic and Recreational Rivers permit program.

c. **Section 10 Rivers Permit Required? (y/n)**

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the USACE for the construction of any structure in or over any navigable water of the United States, the excavation/dredging or deposition of material in these waters or any obstruction or alteration in a "navigable water." Structure or work outside the limits defined for navigable waters of the U.S. require a Section 10 permit if the structure or work affects the course, location, condition, or capacity of the water body. A Section 10 permit would be obtained through the Joint Permit Application process.

d. **Stormwater Pollution Prevention Plan (y/n); and**

e. **SPDES General Permit Required? (y/n)**

Under the NYSDEC State Pollutant Discharge Elimination System (SPDES), construction activities disturbing one or more acres of soil must be authorized under the General Permit for Stormwater Discharges from Construction Activities. Permittees are required to develop a stormwater pollution prevention plan (SWPPP) to prevent discharges of construction-related pollutants to surface waters. A SWPPP will be prepared for the project as part of the requirements for coverage under the General Permit (GP-0-10-001). The New York SPDES program has been approved by the United States Environmental Protection Agency for the control of wastewater and stormwater discharges in accordance with the Clean Water Act.

f. **Consistency with Coastal Management Program and LWRP?**

According to the New York State Department of State (NYSDOS) website, the Landward Coastal Boundary for the Genesee River ends approximately 10 miles north of the RARP alternatives study area. A Coastal Consistency review under the New York State’s Coastal Management Program is not required for any of the alternatives.
The Federal Emergency Management Agency (FEMA) National Flood Insurance Program provides Flood Insurance Rate Maps (FIRM) that depict regulated floodplains. The regulated floodplain is the area where FEMA has determined would experience flooding during what is known as a 100-year storm, when excessive precipitation would lead to creeks and rivers overflowing their banks.

Special Flood Hazard Areas (SFHA), are areas that have been designated by FEMA. The Towns of Chili and Henrietta are participating communities in the National Flood Insurance Program (NFIP) having local floodplain management local laws to reduce future flood damage. Application for a Floodplain Development Permit from the Local Floodplain Administrator (typically Town Building Inspector) is required for permanent structures (substations) within the SFHA (i.e. substations and access roads).

D. Environmental

The environmental criteria analyzed for the substation alternatives include impacts to water resources, agricultural resources, and cultural resources, along with general environmental considerations. Each substation alternative also takes into consideration the substation access road and associated transmission line corridors (Circuits 40, 940, 941, and 906).

1. Water Resources

In order to assess potential impacts on water resources that could result from the construction and operation of each substation alternative, the methodologies described below were followed. For the purposes of this alternatives analysis, the term water resources includes federal and state wetlands, state wetland buffers, streams, rivers, and floodplains. Substation alternatives, transmission line routing, and access road designs were typically chosen to avoid impacts to water resources. NWI wetlands, NYSDEC wetlands, NYSDEC 100-foot wetland adjacent areas, and watercourses are depicted on the maps provided in Appendix E. Maps depicting 100-year floodplains and 500-year floodplains are provided in Appendix F.

a. USACE-Regulated Wetlands Impacted (acres)

In order to approximate impacts to USACE-regulated wetlands, the NWI wetlands were mapped onto an aerial image from Digital Globe, dated April 2011. The impacts must be quantified due to regulations on construction within wetlands, permitting requirements when impacting wetlands, and wetland mitigation. Delineations for some of the substation sites and transmission line routes are not currently available. Using the transmission line corridor and substation polygons as input layers to the Geoprocessing Clip tool in ArcGIS, along with the NWI wetlands data layer as the layer to be clipped, new polygons of NWI wetlands were created that are within the transmission line rights of way or the
footprint of the substation alternative. The acreages of these polygons were calculated using the Calculate Geometry tool in ArcGIS.

b. **NYSDEC-Regulated Freshwater Wetlands Impacted (acres)**

In order to calculate the impacts to NYSDEC-regulated wetlands, the NYSDEC wetlands information was obtained by GIS from the NYSDEC Geodata Inventory located in their website and mapped onto an aerial image from Digital Globe, dated April 2011. The impacts must be quantified due to regulations on construction within wetlands, permitting requirements when impacting wetlands, and wetland mitigation. Using the transmission line corridor and substation polygons as input layers to the Geoprocessing Clip tool in ArcGIS, along with the NYSDEC wetlands data layer as the layer to be clipped, new polygons of NYSDEC wetlands were created that are within the transmission line rights of way or within the footprint of the substation alternative. The acreages of these polygons were calculated using the Calculate Geometry tool in ArcGIS.

c. **NYSDEC-Regulated Freshwater Wetlands Adjacent Areas Impacted (acres)**

The impacts to wetland adjacent areas must be quantified due to regulations on construction within and adjacent to regulated wetlands, permitting requirements when impacting wetlands, and wetland mitigation. In order to calculate the impacts to NYSDEC-regulated wetlands adjacent areas, the NYSDEC wetlands information was obtained by GIS from the NYSDEC Geodata Inventory located in their website and mapped onto an aerial image from Digital Globe, dated April 2011. Wetland adjacent area polygons were created using the editor buffer tool in ArcGIS to create a 100 foot buffer around the NYSDEC wetlands. Using the newly created buffer layer and the transmission line corridor and substation polygons as input layers to the Geoprocessing Clip tool in ArcGIS, new polygons of the buffered wetlands were created. The acreages of these polygons were calculated using the Calculate Geometry tool in ArcGIS. In order to determine the acreages of only the adjacent areas to NYSDEC wetlands, the NYSDEC-mapped wetland area was subtracted from the buffered wetland acreages to provide the adjacent area acreage for the transmission line corridors and substation alternative footprints.

d. **Current Wetland Delineation Available (y/n)**

Wetland delineations were previously performed by Tetra Tech and URS field crews for the Certified route, which are also potentially within the ROWs of the transmission lines and substation sites for some of the various alternatives. The wetland delineation reports were examined to determine if the areas delineated provided sufficient data for all of the areas potentially affected by each alternative.
REPORT ON ALTERNATIVES ANALYSIS FOR SUBSTATION 255
AND ASSOCIATED TRANSMISSION LINES
Case 11-T-0534
January 16, 2014

e. **Wetland Mitigation Needed by ROW (in acres; assumes a 1.5:1 mitigation ratio);**
f. **Wetland Mitigation Needed by Access Road (in acres; assumes a 3:1 mitigation ratio);** and
g. **Wetland Mitigation Needed By Substation(in acres; assumes a 3:1 mitigation ratio)**

In order to determine the wetland mitigation acreages needed for each alternative, the NWI mapped forested wetlands impacts were quantified for each alternative. NYSDEC wetlands are consistently overlapped by NWI wetlands and the NWI designation was needed to identify forested wetlands for this analysis. Using the NWI wetland data allows for a more expansive impact analysis because NYSDEC only regulates wetlands greater than or equal to 12.4 acres. Forested wetlands were those identified as Palustrine Forested (PFO) by the United States Fish & Wildlife Service (USFWS). Wetland impacts created by substation and access road construction were included in the mitigation calculation regardless of wetland type whereas only forested wetland impacts created by transmission line corridor clearing were included in the mitigation calculation because other wetland types such as Palustrine Emergent (PEM) and Palustrine Scrub-Shrub (PSS) are only temporarily impacted, if at all, by the construction of the transmission line corridor. PFO wetlands need to be cleared and are permanently converted to PEM or PSS wetlands as a result of corridor construction and maintenance. The consideration of PFO wetland impacts for mitigation was previously determined by negotiations between the NYSDEC and RG&E. In addition, these negotiations also set forth a 1.5:1 mitigation ratio for transmission line ROW. A 3:1 ratio was used for alternative substation sites and access roads. Using the NWI wetland impacts calculated previously, all wetland impacts within substation footprints and access roads were added to the impacts to PFO wetlands along the transmission line corridors for each alternative.

h. **Protected Streams Crossed (#)**

Streams within New York State are regulated on the basis of their classification. The classification of AA or A is assigned to waters used as a drinking source. The classification of B represents waters best used for swimming or other contact recreation, but not for drinking. The classification of C represents waters supporting fisheries and suitable for non-contact recreation. These classifications may also be qualified with a standard of (T), indicating a trout population, or a (TS) indicating trout spawning. The lowest classification for a stream is D. All streams classified as AA, A, B, C(T), or C(TS) are to be protected.

In order to determine the number of protected streams crossed, the transmission line corridor and substation polygons were overlaid with the streams data obtained from the National Hydrography Dataset provided by the USGS. The stream crossings were determined for each alternative and protected streams were counted for each substation alternative and the associated transmission lines.

i. **Navigable River (Genesee) Crossed? (y/n)**

In order to determine if a navigable river is crossed by any of the alternatives, the transmission line corridor and substation polygons were overlaid in ArcGIS with the river data obtained from the National
Hydrography Dataset provided by the USGS. The only navigable river within the confines of the Project is the Genesee River, located to the west of existing Station 80. For each alternative substation site, access road, and associated transmission line ROWs, it was determined whether the Genesee River was crossed by each alternative.

j. **Hydric Soils crossed by T-Line (acres)**

Soil data obtained by GIS from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) was used as the base layer upon which the transmission line ROWs were overlain. Soils that are identified as Hydric Soils, were used to create a subset of soils using the select and export data tools in ArcGIS. This new data layer was clipped using the transmission line ROWs data layers. The resulting data layer contains all of the polygons of Hydric Soils contained within each of the alternatives. The acreages of impacts to Hydric Soils were then calculated using the Calculate Geometry tool in ArcGIS.

k. **Hydric Soils Impacted by Substation and Access Roads (acres)**

Soil data obtained by GIS from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) was used as the base layer upon which the alternative substation sites and access roads were overlain. Soils that are identified as Hydric Soils, were used to create a subset of soils using the select and export data tools in ArcGIS. This new data layer was clipped using the alternative substation sites and access roads data layers. The resulting data layer contains all of the polygons of Hydric Soils contained within each of the alternatives. The acreages of impacts to Hydric Soils were then calculated using the Calculate Geometry tool in ArcGIS.

l. **FEMA NFIP-Mapped 100 Year Floodplains Crossed (acres)**

The number of FEMA NFIP-mapped 100-year (mapped year 2008) floodplains crossed by the substation alternatives and the associated transmission lines were determined in order to assess the alternative’s risk for experiencing flooding during storms. In order to determine the number of 100-year floodplain crossings, the transmission line corridor and substation polygons for each alternative were overlaid with the 100-year floodplain data from the FEMA Map Service Center onto an aerial image from Digital Globe, dated April 2011. The National Flood Hazard Layer for Monroe County dated 5/24/2011 was used. Using the transmission line corridor and substation polygons as input layers to the Geoprocessing Clip tool in ArcGIS, along with the floodplain data layer as the layer to be clipped, new polygons were created of 100-year floodplains that are within the transmission line corridors or the footprint of each substation alternative. The acreages of these polygons were calculated using the Calculate Geometry tool in ArcGIS.
m. FEMA NFIP-Mapped 500 Year Floodplains Crossed (acres)

The number of FEMA NFIP-mapped 500-year floodplains (mapped year 2008) crossed by the substation alternatives and the associated transmission lines were determined in order to assess the alternative’s risk for experiencing flooding during storms. In order to determine the number of 500-year floodplain crossings, the transmission line corridor and substation polygons for each alternative were overlaid with the 500-year floodplain data from the FEMA Map Service Center onto an aerial image from Digital Globe, dated April 2011. The National Flood Hazard Layer for Monroe County dated 5/24/2011 was used. Using the transmission line corridor and substation polygons as input layers to the Geoprocessing Clip tool in ArcGIS, along with the floodplain data layer as the layer to be clipped, new polygons were created of 500-year floodplains that are within the transmission line corridors or the footprint of each substation alternative. The acreages of these polygons were calculated using the Calculate Geometry tool in ArcGIS.

2. Agricultural Resource Considerations

In order to assess potential impacts on agricultural resources that could result from the construction and operation of each substation alternative, the methodologies described below were followed. For the purposes of this alternatives analysis, the term agricultural resources includes active agricultural lands based on aerial mapping, NYS Ag & Markets-designated Agricultural District lands, prime agricultural soils, and farmlands of significant importance. Maps depicting agricultural resources within the vicinity of the alternative substation sites, access roads, and transmission line ROWs are provided in Appendix B. Maps delineating each affected crop field management unit (CFMU) addressed in conjunction with the estimate of farming efficiency reduction are in Appendix C. Maps depicting soil types within the alternative substation sites, access roads, and transmission line ROWs are depicted in maps in Appendix D.

Substation alternatives, transmission line routing, and access road designs were analyzed to minimize impacts to agricultural resources to the extent reasonably practical. For each of the alternative substation sites selected for detailed quantitative analysis, conceptual routing was developed for additional transmission lines. While the alternative alignments of Circuits 940 and 941 vary considerably, no other option of alignment outside of the NYPA corridor’s proximity was found feasible for the Circuit 40.

In order to better assess impacts to agricultural land and respective farming operations, the impact calculations were not confined to the footprint of the power line ROW and substation site. The acreage calculations were objectively prepared to reflect the impact on the actual operating CFMUs to be transected per alternative alignment and field bi-sectioning by the substation sites. The data per CFMU, per alternative alignment, estimates the level of farming efficiency reduction and is presented in Appendix C.
a. **Total Area of Crop Field Management Units (CFMUs) Crossed (acres)**

In order to assess the impacts that each alternative would have on the operator’s ability to farm using modern and powerful farm tractors and equipment, the acreages of all individually affected CFMUs were determined for each alternative. The URS Agricultural Specialist identified the active agricultural lands through desktop analysis and reported them using available aerial imagery and available soils data. (As noted, the Estimate of Farming Efficiency Reduction per Crop Field Management Unit Report and corresponding mapping are included in Appendix C.) These agricultural lands were provided for GIS and polygons were created from the aerial imagery, provided by Digital Globe, dated April 2011, and then overlaid with the transmission line corridor and substation alternative site data layers. The total acreages of all CFMUs were then calculated using the Calculate Geometry tool in ArcGIS. The polygons were identified by the alternative they belong to and calculated totals were summed by alternative. Based on aerial interpretation, without on-site review for verification of a field’s status as active cropland, pasture, fallow cropland or recently abandoned cropland, all lands which were potentially active cropland were assessed as cropland for purposes of the assessment. Any clarified exception to a field’s assessed status as cropland is so noted in the appended data.

b. **Impacts to NYS Ag & Markets-Designated Agricultural District Lands (acres)**

In order to calculate the impacts to NYS Ag & Markets-designated Agricultural District lands, agricultural district land data was obtained by GIS from the USDA NRCS. Locations where the transmission line corridors and substation alternative sites are located within the NYS Ag & Markets-designated Agricultural Districts were identified. The acreages of these whole CFMU lands, within NYS Ag & Markets-designated Agricultural District parcels, were calculated using the Calculate Geometry tool in ArcGIS.

c. **Prime Agricultural Soils Crossed by T-Line ROW (acres); and**

d. **Prime Agricultural Soils Crossed by Substation and Access Roads (acres)**

Soil data obtained by GIS from the USDA Natural Resources Conservation Service was used as the base layer of data for the entire acreage of all CFMUs affected by the transmission line corridors and/or substation alternative sites. Soils that are identified as Prime Agricultural Soils, were used to create a subset of soils using the select and export data tools in ArcGIS. This new data layer was incorporated onto the footprint of the alternative station site and/or new circuit(s) ROWs for every affected CFMU. The resulting data layer contains all of the polygons of Prime Agricultural Soils contained within each of the affected CFMUs. The acreages of impacts to Prime Agricultural Soils were then calculated using the Calculate Geometry tool in ArcGIS.
e. Important Farmland Soils Crossed by T-Line ROW (acres); and
f. Important Farmland Soils Crossed by Substation and Access Roads (acres)

Soil data obtained by GIS from the USDA Natural Resources Conservation Service was used as the base layer of data for the entire acreage of all CFMUs affected by the transmission line corridors and/or substation alternative sites. Soils that are identified as Farmlands of Significant Importance Soils were used to create a subset of soils using the select and export data tools in ArcGIS. This new data layer was calculated and incorporated onto the footprint of the alternative station site and/or new circuit(s) ROWs for every affected CFMU. The resulting data layer contains all of the polygons of Farmlands of Significant Importance Soils contained within each of the affected CFMUs.

g. Current Agricultural Use

Using an aerial image from Digital Globe, dated April 2011, and mapping, clear distinctions between active crop fields, pasture, temporarily fallow crop fields and recently abandoned farmland could not be made. Therefore, all such areas were assessed under the assumption they are active crop fields. Any clarified exception to this is so noted in the appended data. The location of each alternative substation site, the access road, and the transmission line routing were studied by the URS Agricultural Specialist in relationship to each affected CFMU’s long-term pattern of functional alignment for farm tractor and equipment operations based on usage for a rotation of corn, beans and wheat to estimate the approximate percentage of operational efficiency reduction per CFMU. This criteria is not included in the matrix, but is detailed in the Estimate of Farming Efficiency Reduction per Crop Field Management Unit Report and the mapping included in Appendix C.

3. Cultural Resource Considerations

In order to assess potential impacts on cultural resources that could result from the construction and operation of each substation alternative, the methodologies described below were followed. For the purposes of this alternatives analysis, the term cultural resources includes archeological sites, objects, and places, as well as historic buildings, structures, districts, and objects. The National Historic Preservation Act of 1966 and the New York State Historic Preservation Act of 1980 provide the regulatory framework for the review of cultural resource impact in New York. In New York, the Commissioner of the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), who is also the State Historic Preservation Officer, administers these programs. Substation alternatives, transmission line routing, and access road designs were typically chosen to avoid impacts to cultural resources. Maps indicating the cultural resources within one mile of the alternative substation sites, access roads, and transmission line ROWs are included in Appendix G.
a. Location within Archaeological Sensitive Areas? (y/n)

In order to identify if the substation alternative sites would have any potential to impact archaeological resources, a desktop search was conducted to determine if the substation alternatives are located within mapped archaeologically sensitive areas. The general boundary of archaeologically sensitive areas are mapped by the OPRHP Historic Preservation Office and are based on information and cultural resources studies previously reported to the OPRHP. In order to obtain these recognized archaeologically sensitive areas the OPRHP website and other publically accessible on-line GIS databases were utilized.

Much of the western portion of the Town of Henrietta and eastern portion of Chili is covered by Archaeologically Sensitive Areas, especially in the area along the Genesee River. The desktop review searched for archaeologically sensitive areas whose bounds were within one mile of the substation and transmission line and access road alternatives. The OPRHP website provided the mapped archaeologically sensitive areas and the number of sites within one mile of the alternatives were determined using scaling.

b. Historic Structures Within One Mile of T-Line ROW (#)

Historic Recourses include historic buildings, structures, districts, and objects and for the purposes of this alternatives analysis are defined as those resources on the New York State and National Registers. The State and National Registers of Historic Places are the official lists of buildings, structures, districts, objects, and sites significant in the history, architecture, archeology, engineering, and culture of New York and the nation.

A desktop search was conducted to determine if any State or National Register of Historic Places (NRHP) resources were located within or adjacent to the transmission line corridor; or within a 1-mile radius of those cultural resources. These resources include historic resources that are listed on the State and National Registers; or that have been formally determined to be eligible for listing on those registers.

One-mile buffer polygons for the transmission corridor data were created by using the editor tool in ArcGIS. The NHRP data layer provided by the OPRHP website and dated 2008 was overlaid on the buffer. The number of historic structures within one mile of the transmission line corridor was determined for each alternative.

c. Historic Structures Within One Mile of Substation (#)

A method similar to what was used for determining the number of historic structures within one mile of the transmission line corridor for each substation alternative was used to determine the location historic resources in the vicinity of each substation.
A desktop search was conducted to determine if any State or National Register of Historic Places (NRHP) resources were located on or adjacent to the substation site; or within a 1-mile radius of those cultural resources. These resources include historic resources that are listed on the State and National Registers; or that have been formally determined to be eligible for listing on those registers.

One-mile buffer polygons for the substation data were created by using the editor tool in ArcGIS. The NHRP data layer provided by the OPRHP website and dated 2008 was overlaid on the buffer. The number of historic structures within one mile of the substation was determined for each alternative.

4. General Environmental Considerations

In order to determine the need for further general environmental assessments that potentially could result from the construction and operation of each substation alternative, the methodologies described below were followed. For the purposes of this alternatives analysis, the term general environmental considerations includes whether invasive species surveys and threatened and endangered (T&E) species/unique habitat data are available.

a. Invasive Species Survey Available? (y/n)

Invasive species surveys were previously performed for the proposed Article VII preferred route.

b. T&E Species/Unique Habitat Data Available? (y/n)

T&E species studies were previously performed for the proposed Article VII preferred route.

c. Potential Visual Impacts to Resources within Three Miles (#)

In order to compare potential visual impacts on cultural and recreational resources that could result from the construction and operation of each alternative substation site, (including transmission line corridors and access roads) the methodology described below was followed. For the purposes of this alternatives analysis, the term visual resources includes: State, County and local parks, trails and recreation facilities; State Forest Preserve lands; conservation areas; wildlife management areas; and historic resources listed or known to be eligible for inclusion on the National or State Register of Historic Places. Maps depicting visual resources within three miles of the alternative substation sites, access roads and transmission line ROWs are presented in Appendix H.

In order to identify resources which would be potentially visually impacted by the Project, those scenic, historic and recreation resources within three (3) miles of each alternatives substation site, access road, and transmission line ROWs were located and quantified.
Using the polygons for alternative substation sites, access roads, and transmission line ROWs, a 3-mile buffer was created for each alternative substation site, access road, and transmission line segment using the editor buffer tool. The buffers were then overlaid with the cultural and recreational resources to identify potential impacts. The numbers of resources within the buffer for each alternative substation (transmission Line and access road) were then counted. Resources within the footprint for the substation, transmission line corridors and access roads, were excluded from the tabulation, as they represent a direct impact quantified elsewhere rather than as a visual impact.

Then considering topography and vegetation, a determination was made as to whether the location of these resources warranted specific assessment for potential visual impact.

E. Engineering

The engineering criteria analyzed for the substation alternatives include impacts to transmission line route mileage (Circuits 40, 940, 941, existing Circuit 906, and existing NYPA 345 kV circuit), substation considerations, and access road considerations for each alternative. Transmission line and access road routing and distances have been identified for each alternative and may require further analysis and alterations. Engineering considerations are included in Appendix I.

The planned centerline separation between Circuits 940 and 941 is 25 feet. The typical span distance between structures on these circuits is 350 feet on average. For Circuit 40, the current centerline separation is approximately 200 feet to the NYPA transmission line centerline. The span distances vary for Circuit 40 to match NYPA structures locations, typically between 700 feet to 1100 feet.

1. Transmission Line Route Mileage

In order to assess potential engineering impacts that could result from the construction and operation of transmission line routing for substation alternative, the methodologies described below were followed. For the purposes of this alternatives analysis, the transmission line routing includes lengths for Circuits 40, 940, and 941, relocation and reconstruction lengths for existing Circuit 906, and rerouting of existing 345 kV NYPA circuit. The transmission line routes were designed to minimize the line angle as much as possible and to avoid impacts to water resources, agricultural fields, existing utilities, cultural resources, adverse topography, and other sensitive areas to the maximum extent possible.

a. Total 345 kV Circuit 40 Transmission Line Length (miles)

A conceptual transmission line design was created for each alternative Circuit 40, which traverses between existing Station 80 and the Station 255 alternative site. Circuit 40 was digitized on ArcGIS and a data layer was created for the conceptual transmission line. The length of Circuit 40 was calculated using the Calculate Geometry tool in ArcGIS.
b. **Total 115 kV Circuit 940 Transmission Line Length (miles)**

A conceptual transmission line design was created for each alternative for Circuit 940, which traverses between the R&S Railroad and the Station 255 alternative site, parallel to Circuit 941. Circuit 940 was digitized on ArcGIS and a data layer was created for the conceptual transmission line. The length of Circuit 940 was calculated using the Calculate Geometry tool in ArcGIS.

c. **Total 115 kV Circuit 941 Transmission Line Length (miles)**

A conceptual transmission line design was created for each alternative for Circuit 941, which traverses between the R&S Railroad and the Station 255 alternative site, parallel to Circuit 940. Circuit 941 was digitized on ArcGIS and a data layer was created for the conceptual transmission line. The length of Circuit 941 was calculated using the Calculate Geometry tool in ArcGIS.

d. **Total 115 kV Circuit 906 Transmission Line Length (miles)**

In order to provide room for Circuits 940 and 941 to traverse along the west side of the R&S Railroad corridor, Circuit 906 will be relocated to the east side at the point that Circuits 940 and 941 reach the railroad. A conceptual transmission line relocation design was created for each alternative for existing Circuit 906, which shifts to the east side of the railroad until the transmission line route shifts east away from the railroad. Circuit 906 was digitized on ArcGIS and a data layer was created for the conceptual rerouted transmission line. The length of the new relocated Circuit 906 was calculated using the Calculate Geometry tool in ArcGIS.

e. **Total 345 kV NYPA Transmission Line Reroute Length (miles)**

The existing 345 kV NYPA transmission lines will reroute and tie into Station 255. For each alternative, a conceptual design for the NYPA transmission lines were created to reroute the existing lines into the substation. The rerouted NYPA transmission lines were digitized on ArcGIS and a data layer was created for the conceptual transmission lines. The length of the new relocated Circuit 906 was calculated using the Calculate Geometry tool in ArcGIS.

2. **Substation Considerations**

In order to assess potential engineering impacts that could result from the construction and operation of the Station 255 alternatives, the methodologies described below were followed. For the purposes of this alternatives analysis, substation considerations were given to proximity to the existing 345 kV NYPA transmission lines, Empire Gas Pipeline, and other existing utilities, number of barriers within the substation footprint, site elevation, and current availability of LIDAR. In order to facilitate construction and substation operations, substation locations were chosen which avoided impacts to water resources.
agricultural fields, existing utilities, cultural resources, adverse topography, geotechnical reports and other sensitive areas to the maximum extent possible.

a. **Proximity to Existing NYPA Transmission Lines (feet)**

The existing 345 kV NYPA transmission line will reroute into Station 255, therefore, it is important to quantify the distance from the transmission line to each alternative. The existing NYPA transmission line corridor traverses from the most western alternative site to existing Station 80, therefore, all alternative sites were analyzed for proximity to the transmission lines. The new lines were routed to minimize the line crossings for reliability. Electrical clearances must be maintained to bring the new and existing 345/115 kV lines into the new station. The structure locations were selected to minimize the outage on the existing 345kV line as much as possible. The 345 kV NYPA transmission line was added as a data layer to ArcGIS and was overlain with the substation alternatives data layer. The distance in feet from each substation alternative to the transmission lines was measured using the measure tool in ArcGIS.

b. **Proximity to Existing Empire Gas Pipeline (feet)**

The existing Empire Gas Pipeline traverses in close proximity to the existing NYPA transmission lines, therefore, the location of the pipeline has the potential to impact prospective substation locations. Construction, substation operations, vehicular traffic, and other activities that cross or approach the pipeline require that the pipeline be protected. The Empire Gas Pipeline was added as a data layer to ArcGIS and was overlain with the substation alternatives data layer. The distance in feet from each substation alternative to the pipeline was measured using the measure tool in ArcGIS.

c. **Site Elevation Range (feet above sea level)**

All alternatives were analyzed for site elevation to determine the need for grading and for elevation in comparison to its surroundings. Each alternative was exported into a .kmz file and viewed in Google Earth software. Various locations within the alternative footprint were measured for elevation and the lowest and highest values were documented to obtain the elevation range of each alternative.

d. **Current Availability of LIDAR (y/n)**

LIDAR was obtained to provide contour mapping for the alternatives studied in the Article VII. These areas have the potential to cover the additional substation alternatives. LIDAR obtained from the original analysis was examined to determine if the areas analyzed are within the affected alternative substation site footprints.
e. **Current Availability of Buried Utilities Survey (y/n)**

An investigation was completed to assess the availability of information identifying surveyed buried utilities for all areas covered within the Article VII filing, and in support of the preparation of the Environmental Management & Construction Plan (EM&CP). The utility information was studied to determine whether each alternative covered the extent of those areas.

f. **Suitable for Filling (y/n)**

The soil conditions at each of the alternative substation sites were evaluated by first reviewing the maps prepared by URS which illustrated the NRCS soil units located within each site and delineated wetlands mapped by the NYSDEC and the NWI. URS then reviewed the description of the mapped soil units for each site presented in the NRCS Soil Survey for Monroe County, New York to identify the soil composition, depositional setting and typical landform, drainage characteristics, depth to water table and typical subsurface profile. This information was used in conjunction with the wetland mapping (as confirmation) to identify potentially unsuitable soil conditions which could present problems for future fill placement operations. Unsuitable soil conditions for the purposes of this evaluation are defined as having the following:

- High silt and clay content (silt loam, clay loam, silty clay loam)
- Deposited in depressed topography as glacial lake sediments (glaciolaucustrine deposits)
- Poor drainage conditions
- Water Table at a depth of less than 6 inches
- Subsurface profile consisting of silt/clay loam soils extending through a depth of 60 inches.

Based on URS’s evaluation, Alternatives 2, 3, 4 and 16 may be unsuitable for fill placement. In addition, sites number 8A, 15 and 20 have smaller areas of soils which may be unsuitable for fill placement but the overall site appears to have satisfactory conditions. It should be noted that URS’ evaluation is based solely on the unit descriptions presented in the NRCS soils survey and that no site visits were conducted and no test data (i.e., density tests, soil borings, etc.) made available for review. The results of this methodology are presented in the Evaluation of Site Soil Mapping table in Appendix I.

3. **Access Road Considerations**

A conceptual access road was designed for each substation alternative. Access roads were designed to avoid or minimize impacts to water resources, agricultural fields, known existing utilities, cultural resources, and other sensitive areas. For the purposes of this alternatives analysis, the total length of the access roads and their proximity to existing utility locations were given further consideration for each alternative.
a. Conflicts With Other Existing Utilities (y/n)

In order to assess the location of alternative substation sites in respect to existing utilities in the area, utility information was acquired and the distances were determined to the access road for each alternative. For underground utility crossings, the pipelines need to be protected by permanent access bridges. These utilities would have to be protected from construction or substation operation measures, as well. The United States Department of Transportation (USDOT) National Pipeline Mapping System (NPMS) Public Map Viewer was consulted by GIS to determine gas transmission and hazardous liquid pipeline locations. This was combined with utility information from various utilities and municipalities. A data layer was created with the existing utility information and overlaid on the alternative substation site and access road data layer and conflicts between the utilities and access roads were determined.

F. Impact to Project Budget

In order to assess potential cost impacts to the existing project budget that could result from the construction and operation of the substation and transmission line routing for each substation alternative, the methodologies described below were followed. Base cost impacts resulting from each alternative are calculated and presented as either an increase or decrease to the cost budget established for the Article VII proceedings. The project’s cost budget for the Article VII proceedings is based on Station 255 being located at Alternative No. 7. Costs stated in this Report are approximate order of magnitude estimates. They are preliminary and are an indicator of potential impact to the project’s budget. The costs are not of sufficient accuracy to be considered suitable for funding of the project. To provide more accurate costs significantly more engineering and design will be required to define an alternative site cost to RG&E.

1. Transmission Line Route Cost Impact

a. Transmission Line Route Cost Impact

Employing cost data from the December 11, 2012, “Joint Proposal for Resolution of the Rochester Area Reliability Project,” Article VII Proceeding, specifically Exhibit 9, Cost of Proposed Facilities, preliminary order of magnitude cost estimates were prepared for the transmission line circuits and alternative sites. The preliminary cost estimates are used to assess the impact to the Project’s cost budget from the transmission line routes and changes to the Substations design and layout resulting from the alternative sites. The referenced Exhibit 9, Cost of Proposed Facilities is located in Appendix I.

The cost per mile for the transmission line circuits are summarized in the Table 2 below. The transmission line cost per mile was developed from Exhibit 9, Table 9-1: Cost of Proposed Facilities.
Table 2: Overhead Transmission Line Cost Per Mile

<table>
<thead>
<tr>
<th>Circuit No.</th>
<th>Art. VII Dist. (miles)</th>
<th>Art. VII Cost ($1,000)</th>
<th>Art. VII Cost per Mi. ($1,000)</th>
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<td>$4,329</td>
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<tr>
<td>940</td>
<td>6.3</td>
<td>$7,444</td>
<td>$1,182</td>
</tr>
<tr>
<td>941</td>
<td>10.3</td>
<td>$13,595</td>
<td>$1,320</td>
</tr>
</tbody>
</table>

Using the above average Article VII Cost per Mile for the transmission lines the cost for the transmission lines associated with the alternative site locations were calculated. The cost calculations for the alternative site locations are shown in Appendix I.

Reported in the Criteria Matrix are the potential cost impacts to the project budget as measured from the Article VII budget as either an increase or decrease to the project’s budget.

b. Transmission ROW Wetland Mitigation Cost Impact

Quantifiable areas of wetlands crossed by and requiring removal of areas vegetated in trees were determined by drawing polygons around each area and calculating the acreage using the Calculate Geometry tool in ArcGIS. The forested wetlands (USACE or NYSDEC) crossed by the alternative ROWs are mitigated based on a 1.5:1 ratio. Reference Appendix I for the cost summary calculations.

2. Access Road Route Cost Impact

a. Access Road Route Cost Impact

Preliminary access routes were established for each alternative location. Each route was reviewed to determine if existing soil types are suitable for road fill placement and if wetland conditions exist that would be unsuitable for fill placement. Access road construction costs were estimated and are reported in the Criteria Matrix as either an increase or decrease to the project’s budget. Reference Appendix I for the cost summary calculations.

b. Access Road Wetland Mitigation Cost Impact

Quantifiable areas of wetlands crossed by and requiring removal of all vegetation and structural fill for construction of the station’s access road were determined by drawing polygons around each access road route and calculating the acreage using the Calculate Geometry tool in ArcGIS. The wetlands (USACE or NYSDEC) permanently filled by the access road are mitigated based on a 3:1 ratio. Reference Appendix I for the cost summary calculations.
3. Substation Cost Impact

a. Substation Cost Impact

Each Alternative location for the Substation was reviewed for impact on the project’s budget. Addressed in the cost analysis are re-engineering costs resulting from the re-configuration of the Substation’s layout and locating the Substation in areas where the existing soils are un-suitable or require significant removal and replacement with engineered structural fill for the Substation’s equipment foundations. Alternative sites for the Substation north of the NYPA transmission line corridor will require the Substation’s layout be re-engineered. This re-engineering will impact both the Project’s cost and the engineering and construction schedule.

The following Engineering design studies will need to be reworked in order to move Substation 255 to any of the alterative locations, other than Alternative 7, which was designed in detail by RG&E previously.

- The Site Survey;
- Geotechnical Report;
- Site Drainage Report;
- Archaeological Survey;
- Wetland Delineation Survey;
- Access Road;
- Above Ground Structures and Fence Wind load Study;
- Grounding Grid Study;
- Lightning Study;
- Lighting Study;
- Communication Study,
- Noise Study;
- Oil Containment Study;
- Site Security Plan;

For Alternative No. 9, this site will require the demolition of four (4) buildings. Based on photographs of the buildings, they appear to be office buildings of masonry exterior construction. For this Report the buildings are assumed to have structural steel frames, slab on grade concrete floors, no basements, perimeter column footings, built up roof construction and may or may not contain asbestos. The cost estimate is based on demolition cost data published by the USACE for their Facilities Reduction Program, which essentially manages the demolition of surplus government owned buildings (Stripling, 2011). The cost estimate includes the consideration of asbestos removal.

In summary and based on the U.S. Army average cost of $9.68/square foot for a demolition cost, the preliminary cost for demolition of the four (4) buildings is as follows:
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Total Square Footage of the (4) Buildings 221,100 SF
Average Cost to Demolish $9.68/SF
TOTAL ESTIMATED COST $2,140,248

For additional information on how the above estimated cost was prepared, refer to Appendix I. A more accurate cost estimate, if needed, will require inspection of the buildings and testing for asbestos containing materials.

b. Substation Wetland Mitigation Cost Impact

Quantifiable areas of wetlands crossed by and requiring removal of all vegetation and structural fill for construction of the substation were determined by drawing polygons around each identifiable wetland within the substation’s 12 acres and calculating the acreage using the Calculate Geometry tool in ArcGIS. The permanent filling of a wetland (USACE or NYSDEC) for a substation is mitigated at a 3:1 ratio. A 12 acre site was used in the analysis for the alternative substation sites. Reference Appendix I for the cost summary calculations.

4. Indirect, Project Management and Financial Cost

In addition to the impact to project costs associated with engineering and design and labor and materials for construction of the project’s transmission lines, access road and substation, RG&E is required to provide costs for Allowance for Funds Utilized During Construction (AFUDC) and costs required for RG&E’s management of the project. Sub-criteria Items F.4.a and F.4.b, provide an estimated cost per month for AFUDC and RG&E’s project management and indirect expenses. RG&E’s total AFUDC for the project’s originally planned three(3) year duration is $18,000,000.00, or $500,000 per month. For each Alternative’s cost impact, the stated AFUDC financial cost per month times the total schedule delay (Item G.3.a), is reported in Item F.4.a.

RG&E Project Management and Indirect Costs, F.4.b, are estimated at $ 300,000 per month times the total schedule delay (Item G.3.a).

G. Impact to Project Schedule

In order to assess potential schedule impacts to the existing project schedule duration that could result from the engineering and construction durations required for the substation and transmission lines associated with each alternative site, the methodologies described below were followed.

Each alternative was reviewed to determine an alternative’s impact to the engineering schedule and construction schedule. Schedule impacts were determined to occur for the preparation of the EM&CP documents, for re-engineering of the Substation, for re-engineering of the transmission lines and for
extending the construction schedule. The EM&CP will require re-work of all supporting documents for a
new location of the Substation and route of the transmission lines. The Substation’s engineering and
construction documents will require changes to accommodate a re-arrangement of the Substation’s
layout if the Substation is moved from north of the NYPA transmission line to south of the transmission
lines. Locating the Substation at a new location will require new geotechnical investigations, site
surveys and the re-work of all civil site development construction documents including site grading,
drainage and foundations. Some alternative locations may have unsuitable soils for construction of the
Substations foundation. These locations will require additional geotechnical investigations to determine
their suitability for support of foundation systems.

The “Engineering plus Construction Delay” in months reported for each alternative in the Criteria Matrix
are additive to the existing project schedule of twenty (28) months for construction after an alternative
site is selected.
IV. RESULTS

A. Alternative Detailed Quantitative Analysis Results

As introduced earlier in this Report, this Alternative Analysis Report is designed to address Item 5 of the Commission’s November 15, 2013 Order directing RG&E to:

“...file an analysis of all alternatives for the location of Substation 255, including those proposed in the original application, those proposed by the Krenzers in their petition on rehearing or otherwise discussed in the course of the remand negotiations, and any located east of the Genesee River identified by the company, according to the schedule set by the ALJ.”

In support of this directive, a desktop analysis was conducted in December 2013-January 2014 to provide a detailed assessment of thirteen (13) potential alternative locations for RG&E’s Substation 255.

The results of the quantitative analysis comparing each alternative substation and their required transmission lines and access roads are presented in the attached Criteria Matrix.
V. REFERENCES


2. Order Reopening the Record for the Re-Examination of Location of Substation 255 and the Route of Circuits 40, 940 & 941, New York State Public Service Commission, November 14, 2013.


14. New York State General Permit for Discharges from Construction Activities. 


16. New York State Department of Environmental Conservation: Geodata Inventory. 

17. New York State Department of Environmental Conservation: Geodata Inventory Search Data Information. 

   Rochester Gas & Electric. Rochester, NY.

   Rochester Gas & Electric. Rochester, NY.


22. United State Department of Agriculture: Natural Resources Conservation Service. 


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34. Lacey, J.E. 2012. Ithaca Transmission Project – Affected Farms – Final Agricultural Follow Up Report. New York State Electric & Gas; SECO.


47. Renoll, E.S. 1960. Field Size and Machinery Efficiency. Research paper. Agricultural Experiment Station of Auburn University.


Appendix A
Real Estate Considerations
Appendix B
Agricultural Considerations
Appendix C
Estimate of Farming Efficiency
Appendix D

Soils
Appendix E
Wetlands and Watercourses
Appendix F
Floodplains
Appendix G
Cultural Resource Considerations
Appendix H
Visual Receptor Considerations
Appendix I

Engineering Considerations