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# TOWN OF BETHLEHEM

## National Grid Van Dyke Road Project Review

**PROJECT NUMBER:**  
142699

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## 1 SUMMARY

POWER has reviewed common areas of concern that are typical for this type of project as well as addressing some specific questions that the public has so far raised. Commentary on these are provided in the following sections and based in part on information provided by Joseph Stadelmeyer, PE on behalf of National Grid in his February 20, 2015 [1] and November 9, 2015 [2] letters to the Zoning Board. The parenthetical numbers relate to footnotes in rear of document. This information, which includes the following, has been reviewed by POWER Engineers:

1. Site Plan Drawings
2. Full Environmental Assessment Form (EFA) that includes a Noise Assessment Report, Archeological Survey, and a Visual Impacts Assessment (VIA).
3. Stormwater Pollution Prevention Plan (SWPPP)

Additionally, POWER has considered the Town of Bethlehem Comprehensive Plan (2005) [2] and the Comprehensive Plan Assessment Committee's Report to Town Board (2013) [3]. Industry standards and guides were also considered and these included the National Electric Safety Code (NESC) [5] and the Design Guide for Rural Substations (RUS-1724E-300) [5].

Based on the information provided, POWER Engineers agrees with the National Grid's assessment that there is a need for upgrading the electrical infrastructure that provides power to the Town of Bethlehem community.

## 2 ADDITIONAL INFORMATION REQUESTS

The following information will be required to provide the most up to date review of National Grids application documents:

1. National Grid should provide updates for the most recent load information at each substation. See Table 5 and Table 6 in Mr. Stadelmeyer's February 2015 letter [1]
2. National Grid to provide approximate load growth for the Vista Technology Park from February 2015 to current
3. National Grid to provide photometric calculations for only substation security lighting
4. Request National Grid to provide previously completed and approved EMF studies associated with 115 kV transmission line and the 13.8 kV distribution feeder circuits. In addition, request National Grid provide validation that the existing calculations and associated values provided are applicable to the new line's anticipated loading and/or maximum line rating.

## 3 REPLIES TO ZONING BOARD AND COMMUNITY QUESTIONS

The Zoning Board and community members had requested from National Grid, at the November 5, 2014 public hearing, additional information and responses to questions. These were provided in a letter from National Grid [1]. In order to simplify the review process POWER has formatted this report to consolidate National Grid's responses into similar topic areas. The locations discussed below have been identified on the attached zoning map [4] for your reference.

### **3.1.1 Alignment to the Town's Comprehensive Plan**

ZBA Q22 and Q23 (Note: question numbers are referenced to the February 20, 2015 National Grid letter to the ZBA)

Public Comment Q20

#### *Comprehensive Plan Primary Objectives*

Reviewing the Town's Comprehensive Plan, originally adopted August 24, 2005, POWER has identified the following key goals, objectives, and projections that the Town desires to meet that will "contribute to the economic and environmental sustainability of Bethlehem, as well as preservation and enhancement of community character and quality of life". The following are highlights from the original Comprehensive Plan [2] and the June 2013 CPAC Assessment Report [3]:

- Support and ensure projected population growth occurs in accordance with the Town's goals
- Economic Development
  - Planning and land-use regulations should support the town wide economic development strategy
  - Promote commercial and industrial growth in specifically designated locations
- Consideration of environmental impacts

From the information provided by National Grid the Project location at 109 Van Dyke appears to meet the intent of the Town's plans for future population growth, support for the increase in technology based businesses (specifically the Vista Technology Park), and consideration for environmental impacts, community character, and quality of life.

However, the Comprehensive Plan's Plan Recommendation Map (see attached) shows a potential future road connection between the Delmar Bypass Extension where it terminates at Van Dyke Road and the Fisher Boulevard/Delaware Avenue intersection. The Inventory and Analysis Section 7 on page 7.35 of the Comprehensive Plan references this connection. National Grid should identify if the proposed location of the substation will preclude or constrain the Comprehensive Plan's recommendation for a road connection.

### **3.1.2 Visual Appearance**

The landscaping being proposed for the Project, as shown on pages 32 through 38 of National Grid's February 2015 letter, shows that plantings are to be located along the substations access road and north fence line. The Project's location is setback from Van Dyke Road approximately 150 feet.

- Did National Grid consider off-site plantings that are closer to the road to provide the desired additional screening from the road while keeping vegetation directly adjacent to the station to a minimum? This approach may achieve the desired balance between the visual appearance and security requirements.
- Did National Grid consider low profile equipment? Can this equipment be used at the Van Dyke Road location?
- Did National Grid consider whether the ground level of the substation can be placed below grade level (in an effort to reduce visibility and facilitate screening).
- Did National Grid consider enclosing the substation with a wall as an alternative for screening?

### **3.1.3 Substation Lighting**

The photometric plan drawing provided by National Grid (Sheet 13 of 13) that was included in the site plan set shows the calculated foot-candle values with all light fixtures turned on. These values are the maximum amount of light that will be produced only during night time emergency servicing and repair operations of outdoor substation yard equipment. However, it should be noted that for most of the time site lighting will be limited only to security lighting and this will be significantly less than what is shown in these calculations; particularly outside of the station fence line.

- Did National Grid consider the photometric calculations for only the security lighting calculated?

### **3.2 Planning for Load Growth and Demand**

*ZBA Q2 – Q5, and Q17*

*Public Comment Q18*

The primary drivers for this Project are to support the commercial development at the Vista Technology Park and provide service to the growing Bethlehem-Delmar area. The information provided indicates that the full development and buildout demand for the Vista Technology Park was estimated at approximately 11-MVA. This amount of demand, plus general load growth in the Bethlehem-Delmar area cannot be supported with the existing electrical infrastructure.

### **3.3 Construction Scope and Duration of Construction**

*ZBA Q8, Q9, and Q16*

The time required from breaking ground to project completion will be dependent on the actual start date, coordination with other possible outages on the 115kV line that will be tied into, equipment lead times, and other factors. That said the time duration of approximately 18 months, stated in National Grids letter, is a realistic timeline for this type of project.

Questions for National Grid:

- The construction was originally scheduled during the summer months when the schools are out of session and there would be less traffic present. However access for summer school traffic, including buses, will need to be maintained during construction.
- What type of line construction will be used for the overhead feeders to Vista Park? Will a “Hendrix” type of arrangement, tri-plexed cabling or traditional bare conductors?
- National Grid should provide the intended routes and types of construction for all feeders and express feeders from the Van Dyke Road location. This should include where underground and overhead installations are being proposed.
- If the express feeders to Vista Park follow Route 53 will all utility poles along this route be replaced?
- Will all street lighting along selected routes be upgraded to high efficiency LED lighting fixtures?

### **3.4 Alternative Locations**

*ZBA Q11 and Q15*

POWER has reviewed the information provided by the Town, National Grid, NESC, and the Design Guide for Rural Substations for evaluating the proposed location as well as several of the sites specifically listed by Nation Grid.

National Grid states that a total of 61 locations were first reviewed. Although a full list of these 61 locations were not provided to POWER for re-evaluation this is not something that would be required when considering the information that was provided. Considering that the number of suitable transmission lines of suitable voltage ( $\geq 115\text{kV}$ ) and with sufficient spare load capacity, located within a reasonable proximity to both the Bethlehem-Delmar load centers and the Vista Technology Park, the number of locations is very limited. This is not an unexpected result in the location numbers.

As the remaining locations were reviewed and evaluated with this information there was found to be several key objectives and factors that when balanced correctly will provide for the best short and long-term solution. The various objectives and factors included considerations for transmission lines, distribution lines, substations, and site locations. In addition the following is a partial list of other important considerations that have influence over this process:

- Increase of service reliability for customers
- Minimize and/or mitigate any potential environmental impacts
- Minimize community disruption during construction
- Minimize potential visual impacts from overhead lines serving existing and new loads
- Proximity to a source (Transmission Line) with voltage and capacity capable to support
- Provide capacity for load relief on the existing Juniper and Delmar substations
- Support of projected load growth for the Bethlehem-Delmar area
- Examination of existing substation locations, equipment ages, current loading, remaining equipment capacities, and available land for potential expansion and use

In addition to the above considerations the following was found notable that should also be considered in this evaluation:

- The Juniper Substation, which is located adjacent to the Elm Avenue Park on Delmar Bypass, is at full capacity of the stations summer rating. The Juniper Substation will not be able to support continued growth for its service area; including the Van Dyke Subdivision (4 lots) and Van Dyke Spinney Senior apartments (approx.. 100 units)
- The Project location on Van Dyke Road will accommodate continued load growth in the immediate area, including, 653 Delaware Apartments (six multi-family units), 822 Delaware Mixed Use (five multi-family units and commercial space), and also allow for the retirement and removal of the Juniper Substation.
- The Project will also serve loads currently served by the Delmar Substation, which is located off Adams Street adjacent to the Albany County Rail Trail, and allow for its retirement and removal
- Future load growth from the Delmar Pointe development of 46 single family lots; which is currently under construction.

### **3.4.1 Considered Company Sites**

The following short summary comments are based on the above considerations, specifically addressing each location summary that National Grid had provided for Company owned parcels. These are as follows:

***Bethlehem Substation***

This station's parcel lacks sufficient space for the expansion required and the surrounding residential parcels limit acquiring additional space. Additionally, distance to the existing load would require additional sets of overhead express feeders. This will impact the visual appearance of the neighborhoods and routes these feeders take. Environmental impacts (tree trimming/removal) are also a concern with routing multiple overhead feeders.

- *Based on the provided information POWER Engineers agrees that the Bethlehem Substation site is not a feasible location for the Project.*

***New Scotland Substation***

Each of the feeders to the Vista Technology Park would be significantly longer if sourced from this substation. Existing Right of Ways (ROW) around this station are currently filled with existing transmission and distribution lines. Additional easements would be required to add the express feeders to Vista and these limits would also make providing load relief to Juniper and Delmar difficult. These additional feeders and easements would impact the visual appearance of the neighborhood and routes of these feeders to the loads they would serve. Environmental impacts (tree trimming/removal) are also a concern with routing multiple overhead feeders.

- *Based on the provided information POWER Engineers agrees that the New Scotland Substation site is not a feasible location for the Project.*

***New Krumkill Substation***

This substation is served by a 115-kV transmission line that is currently operating at or close to its rated capacity. Additionally, the crossing of I-87 presents logistical, safety, and economic concerns.

- *Based on the provided information POWER Engineers agrees that the New Krumkill Substation site is not a feasible location for the Project.*

***Old Krumkill Substation***

After further research it appears that this station has been fully removed and is now a vacant lot. Utilization of this location would include the same issues and concerns as the above New Krumkill Substation.

- *Based on the provided information POWER Engineers agrees that the Old Krumkill Substation site is not a feasible location for the Project.*

***Juniper Substation***

This substation is hemmed in on the north by the Delmar Bypass and the Elm Avenue Park on the south side. There is not sufficient space in the existing ROW to install overhead distribution while maintaining NESC required safety clearances between the new distribution and the existing sub-transmission and transmission lines. Underground duct banks are being installed along Van Dyke Road for the proposed Project location and could be extended to the Juniper Substation, an additional 1,800 feet. However, this would add a significant cost to the project and not resolve concerns with regards location to schools/parks. Lastly, Juniper substation is served by a 34.5-kV sub-transmission line which is not capable of supporting the proposed substation.

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- *Based on the provided information POWER Engineers agrees that the Juniper Substation site is not a feasible location for the Project.*

***Unionville Substation***

The distance to Bethlehem-Delmar load centers would make providing load relief to these areas very difficult. The existing plot size is too small and additional land would be required to be purchased to accommodate the proposed substation. This would also impact the visual appearance of the neighborhoods along the routes of the additional feeders. Environmental impacts (tree trimming/removal) are also a concern with routing overhead feeders.

- *Based on the provided information POWER Engineers agrees that the Unionville Substation site is not a feasible location for the Project.*

***Delmar Substation***

The Delmar substation is surrounded on two sides by buildings, the Albany County Rail Trail, and Grove Street. The existing plot size is not large enough for the proposed substation and is also scheduled to be retired after completion of the Project.

- *Based on the provided information POWER Engineers agrees that the Delmar Substation site is not a feasible location for the Project.*

***Elsmere Substation***

The Elsmere substation is sourced from a sub-transmission line that is not capable of supporting the proposed substation and the plot size is not larger enough to accommodate the proposed substation.

- *Based on the provided information POWER Engineers agrees that the Elsmere Substation site is not a feasible location for the Project.*

***Parcel #97.15-4-1***

The distance from the Vista Technology Park is POWER's primary concern with this location. The number of overhead express feeders would cause impacts to the visual appearance in the neighborhoods they are run through to get to the technology park. Environmental impacts (tree trimming/removal) are also of a high concern with routing overhead feeders for this distance.

- *Based on the provided information POWER Engineers agrees that Parcel #97.15-4-1 location is not a feasible location for the Project.*

***Parcel #109.00-4-1***

The distance from the Vista Technology Park is POWER's primary concern with this location. The number of overhead express feeders would cause impacts to the visual appearance in the neighborhoods they run through to get to the technology park. Environmental impacts (tree trimming/removal) are also of a high concern with routing overhead feeders for this distance.

- *Based on the provided information POWER Engineers agrees that Parcel #109.00-4-1 location is not a feasible location for the Project.*

### **3.4.2 Additional Alternate Sites**

In addition to the above the ZBA had requested that the following additional parcels, not currently owned by National Grid, be evaluated as potential sites. The following are brief findings related to those properties based on Grid's November 9, 2015 letter:

#### ***Parcel 1 #95.-3-3.1***

This parcel is largely wooded and would require significant clearing. This could impact listed wildlife as well as have potential impacts on the adjacent property's wetlands and streams. In addition, multiple new feeders would be required to serve the intended load and these would require new right-of-ways and create an additional environmental impact too. The amount of environment impact risk is high and concerns related to acquiring new right-of-ways makes this parcel not an attractive option for the Project.

- *Based on the provided information POWER Engineers agrees that Parcel #95.-3-3.1 is not a feasible location for the Project.*

#### ***Parcel 2 #97.10-1-2***

In 2015 National Grid found that this site was already under development. No other information was available for this location.

- *Based on the provided information POWER Engineers agrees that Parcel #97.10-1-2 is not a feasible location for the Project.*

#### ***Parcel 3 #97.10-1-3***

It was noted that this parcel was found to have a pond and mapped wetlands near the center of the parcel area. There will be environmental risks when building near to or around wetlands and ponds. Additionally, accessing the 115kV transmission line would require additional work on adjacent transmission lines including taller structures. The multiple feeders to the intended load would be of considerable length and result in environmental and visual impacts along their routes due to tree removal and trimming requirements. Additionally, it was noted that this location will not be able to provide the load relief and retirement of the Delmar and Juniper Substations.

- *Based on the provided information POWER Engineers agrees that Parcel #97.10-1-3 is not a feasible location for the Project.*

#### ***Parcel 4 #97.09-2-102***

This parcel was identified as an open space set-aside that is associated with the Walden Fields residential subdivision.

- *Based on this parcel being a designated set-aside POWER Engineers agrees that Parcel #97.09-2-102 is not a feasible location for the Project.*

#### ***Parcel 5 #97.09-2-101***

This parcel was identified as an open space set-aside that is associated with the Walden Fields residential subdivision.

- *Based on this parcel being a designated set-aside POWER Engineers agrees that Parcel #97.09-2-101 is not a feasible location for the Project.*

**Parcel 6 #97.05-3-37**

This parcel is owned by Bethlehem Central School District and has deed restrictions for future development.

- *Based on parcel having deed restrictions and being owned by the school district POWER Engineers agrees that Parcel #97.10-1-3 is not a feasible location for the Project.*

**Parcel 7 #96.12-1-19**

At the time of consideration this parcel was under review for a proposed Elm Avenue residential subdivision.

- *Based on this information POWER Engineers agrees that Parcel #96.12-1-19 is not a feasible location for the Project.*

**Parcel 8 #96.00-1-6**

This parcel was noted to be comprised mostly (80%) of state-regulated wetlands.

- *Based on the provided information POWER Engineers agrees that Parcel #96.00-1-6 is not a feasible location for the Project.*

**Parcel 9 #95.-3-42**

This parcel has many environmental impact concerns, including a mapped stream, wetlands, and being largely forested. There are also wetlands adjacent to this parcel which could be impacted indirectly by development of this parcel.

- *Based on the provided information POWER Engineers agrees that Parcel #95.-3-42 is not a feasible location for the Project.*

**Parcel 10 #95.-3-42**

This location would require multiple new feeders to serve the intended load and will require new right-of-ways and create environmental impacts (tree removal and trimming) along their 2.1 mile route.

- *Based on the provided information POWER Engineers agrees that Parcel #95.-3-42 is not a feasible location for the Project.*

**Parcel 11 #95.00-4-5**

This location would require multiple new feeders to serve the intended load and will require new right-of-ways and create environmental impacts (tree removal and trimming) along their 2.1 mile route.

- *Based on the provided information POWER Engineers agrees that Parcel #95.-00-4-5 is not a feasible location for the Project.*

**Parcel 12 #97.09-1-1**

This parcel has a major stream and a mature forest. Additionally, this location is smaller than required for this project. These factors combined make this parcel not viable.

- *Based on the provided information POWER Engineers agrees that Parcel #97.09-1-1 is not a feasible location for the Project.*

***Parcel 13 – Mr. Charles Preska Alternate Location***

Mr. Preska has offered a potential land swap with National Grid. The land offered is a plot adjacent to the south side of the 115KV ROW. The plot size is less than 3 acres in size, which is too small for the proposed substation. In addition, placing the proposed substation to the south of the ROW places it across the sub-transmission lines from the transmission lines that are to be tapped. This will add the requirements for additional land and higher structures to maintain required conductor clearances where the substation tap conductors cross over the sub-transmission lines. These clearance requirements are mandated by safety codes.

- *Based on the provided information POWER Engineers agrees that the Preska Alternate Location is not a feasible location for the Project.*

***Parcel 14 – Delmar Bypass Dog Park/Water Tank***

This option was requested by the Town for POWER to evaluate in addition to those above. This location currently owned by the Town and is home to a Dog Park and water tank. It has been identified by Town DPW that this water tank may not be needed by the Town and removal may not disrupt the Town's water distribution system. The combined area of the fenced in dog park and water tank is approximately 3.4 acres. Extending the trees to the west provides approximately 4.1 acres of total area. This location is adjacent to the Elm Avenue Park.

This location also presents the issue of crossing the 115kV tap conductors over the sub-transmission line. This will add the requirements for higher structures to maintain required conductor clearances where the substation tap conductors cross over the sub-transmission lines. These clearance requirements are mandated by safety codes. These higher structures could exceed 100' in height and have a high visual impact to the surrounding area. This approach could result in possible delays for removal of the existing water tank, site preparation, and coordinating 115kV transmission outages for the installation of the new higher structures.

Additionally, there is not sufficient space in the existing ROW to install overhead distribution while maintaining NESC required safety clearances between the new distribution and the existing sub-transmission and transmission lines. Underground duct banks proposed along Van Dyke Road for the proposed Van Dyke Project location and could be extended to the Juniper Substation, an approximately additional 3,000 feet. This would add a significant cost to the project and not resolve concerns with regards location next to schools and public parks.

- *Based on the provided information POWER Engineers believes that the Delmar Bypass Dog Park Location could be a viable location for the Project. However, additional details would be required to identify visual impacts due to transmission, sub-transmission, and distribution clearances and how these would be addressed. Additionally, this option would be located adjacent to a public park and is anticipated to be met with similar public concern as the Van Dyke Road location.*

**Parcel 15 – Town Highway Department Building**

This parcel is operated by the Town Department of Public Works as a field site. There are existing natural gas pipelines and also a proposed natural gas transmission lines at this location. These lines limit the usable area at this location for the installation of an electrical substation.

- *Based on the provided information POWER Engineers agrees that the Town Highway Department Location is not a feasible location for the Project.*

**3.5 Proximity to Farms and Stray Voltage**

ZBA Q12 and Q14

Public Comment 19

After review POWER determined potential stray voltages associated with the proposed Van Dyke Road Substation were addressed to completion with the combination of both provided supplements [1] [2] through National Grid's adherence to applicable industrial standards and guidelines for design and maintenance. In addition, National Grid adheres to state mandated elevated voltage surveys which is specific to stray voltages and will apply to the proposed station.

- *Based on the provided information POWER Engineers agrees the proposed Van Dyke Road Substation is to be designed and maintained to minimize stray voltages below applicable industrial standards and guidelines.*

**3.6 Electromagnetic Field Levels**

ZBA Q10

Public Comment 21

Substation designs can and should be developed to provide minimal impacts, associated with EMF, to the surrounding area. As this site is utilizing new equipment and designs; omission of EMF can be limited to zero at the property line.

- *Based on the provided information POWER Engineers agrees the proposed Van Dyke Road Substation is to be designed and maintained to limit the omission of EMF to zero at the property line. However, to provide assurance this condition has been met after construction; POWER recommends that the Board and National Grid reach agreement that supporting documentation is provided from field testing showing this compliance is met when the site is operational.*

EMF associated with transmission and distribution lines can be minimized by design but are driven by the voltage and current associated with line. While the physical ground will shield the impacts of electric field associated with the voltage of the line; magnetic fields associated with the current flow on a line will be present regardless of the installation above or below ground. As such it was noted that the response did not address ZBA Q10 or the public comment 21 in the first supplement [1] regarding the distribution or transmission line.

National Grid provided clarification in a second supplement [2]. In this second supplement Section I.-3 addresses EMF for the distribution and transmission lines. POWER's review of this submission noted the existing transmission and distribution lines will not be physically modified or re-rated

outside of the substation, thus the existing EMF studies should be provided to satisfy the request for EMF strengths associated with each the transmission and distribution line.

- *Based on the provided information POWER Engineers recommends that the existing EMF studies reports are requested from National Grid showing the associated EMF values are below industrial standards and guidelines. In addition, National Grid should provide validation that the existing calculations and associated values provided are applicable to the new line's anticipated loading or maximum line rating, not the anticipated loading at the time of the original analysis; as this may have been less than that anticipated with the proposed Van Dyke Substation in service.*

#### **4 QUALIFICATION OF PROJECT NEED**

Reviewing the provided information from National Grid it is apparent that the existing local substations (Juniper and Delmar Substations) are inadequate to support the population, business and economic growth that are projected for the Bethlehem-Delmar area. It is POWER's opinion that the Bethlehem-Delmar areas electrical distribution sources and systems are in need of upgrades due to the source voltage and capacity limits of the existing substations. Without strengthening the local electrical distribution system, by providing a stronger source and more capacity, the future growth will be limited due to the restrictions of the existing electrical distribution system.

#### **5 IMPACTS OF PROJECT DELAY**

With the projected load that the Vista Technology Park is estimated to add to the system there will be a point where a potential company will not be able to be supported by the existing electrical distribution system. The improvements required to provide the required capacity will take time to design, build, and be available for the end user.

## Works Cited

- [1] P. Joseph Stadelmeyer, "Supplemental Information...For the Van Dyke Road Substation," National Grid, Albany, February 2015.
- [2] P. Joseph W. Stadelmyer, "Supplemental Information...For the Van Dyke Road Substation," PPL, Albany, November 2015.
- [3] Bethlehem Comprehensive Plan Committee, "Town of Bethlehem Comprehensive Plan and GEIS," Saratoga Associates, Town of Bethlehem, 2005.
- [4] Comprehensive Plan Assessment Committee, "Report to Town Board," Comprehensive Plan Assessment Committee, June 2013.
- [5] IEEE, National Electric Safety Code - C2-2017, New York: Institute of Electrical and Electronics Engineers, Inc., 2016. Available for viewing: <http://ieeexplore.ieee.org/browse/standards/reading-room/page/>
- [6] Rural Utilities Service, Design Guide for Rural Substations (RUS Bulletin 1724E-300), United States Department of Agriculture, 2001.
- [7] Town of Bethlehem, *Zoing Map*, Town of Bethlehem, April 2016.