

**Final Draft**

**ASSESSMENT SUMMARY**

**1. GENERAL DESCRIPTION**

Norfolk TS and Bloomsburg MTS are supplied by a single 115 kV circuit (A1N). At Vanessa Jct, circuit A1N is connected to a double 115 kV circuit (C9 & C12) which connects to Caledonia TS.

An earlier SIA report, [CAA # 2002-EX070](#), assessed the installation of a second 115 kV line (C9) between Vanessa Jct and Norfolk TS to provide a dual supply to Norfolk TS. This line will be placed in-service by April 30, 2009. The earlier approval is still valid and the changes proposed in that report are not expected to have an material adverse impact on the IESO-controlled grid.

In addition, Hydro One is planning to upgrade A1N to the same rating as the new C9 and to rename A1N as C12. A new line tap will be installed between Bloomsburg MTS and the new C9. The targeted in-service date for this work is April 30, 2009. This work will be addressed in this assessment.

Bloomsburg MTS currently consists of one 3-phase 110/28 kV transformer T1 rated at 42 MVA. Norfolk Power Distribution is planning to install a bus tie switch, a line disconnect switch and a Q bus to facilitate future plans to upgrade Bloomsburg MTS to a DESN. The targeted in-service date for this work is April 30, 2009. This work will also be addressed in this assessment.

Changes to the existing configuration are shown in Figure 3.

**1.1 Responsibilities**

Hydro One is responsible for constructing C9, upgrading A1N (to be renamed C12), and constructing the line tap from C9 to Bloomsburg MTS. Norfolk Power Distribution is responsible for station work at Bloomsburg MTS.

**2. PROPOSED MODIFICATION**

A new disconnect switch T1A1N will be added to the existing line tap to be the transformer disconnect switch. The existing transformer disconnect switch will become the tie breaker switch T2A1N. A new disconnect switch T2A12N will be added to the new line tap to provide a supply for the future transformer. The ratings of the new disconnect switches will be similar to the rating of the existing disconnect switch, shown below. The locations of the disconnect switches are shown in Figure 3.

<b>New 115 kV Disconnect Switches at Bloomsburg MTS</b>	
<b>Designation</b>	T1A1N & T2A12N
<b>Configuration</b>	three phase
<b>Nominal Voltage</b>	115 kV
<b>Maximum Voltage</b>	138 kV
<b>Load Interrupting Current</b>	1200 A rms
<b>Interrupting Capability</b>	xx kA
<b>Manufacturer</b>	Southern States

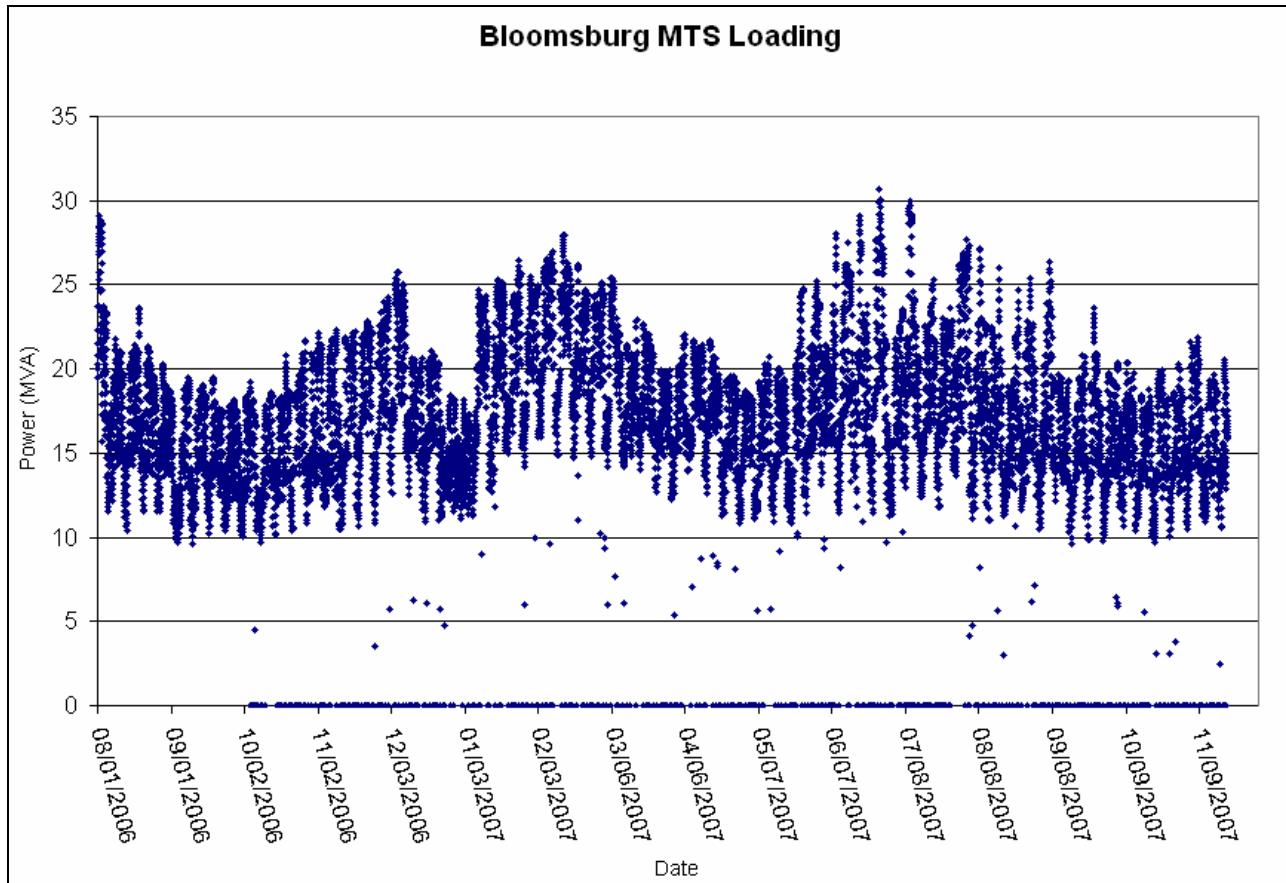
The summer continuous rating of the new line tap from C9 to Bloomsburg MTS will be 550 A or 109.5 MVA (115 kV) at 30 °C and 4 km/h wind speed.

The summer continuous rating of the new line C9 and the upgraded line C12 will be 650 A or 129.5 MVA (115 kV) at 30 °C and 4 km/h wind speed.

### 3. ASSESSMENT

#### 3.1 Bloomsburg MTS Loading Data

The 2006 peak load at Bloomsburg MTS of 29.1 MVA occurred on August 1, 2006 at 15:00. The 2007 peak load at Bloomsburg MTS of 30.6 MVA occurred on June 26, 2007 at 15:00. Figure 1 shows the loading at the LV side of Bloomsburg MTS.



**Figure 1 – Bloomsburg T1 Loading**

This peak load is below T1's continuous rating of 42 MVA and below the new line tap's rating of 109.5 MVA at 30 °C and 4 km/h wind speed.

#### 3.2 Load Forecast

The following load forecast for Bloomsburg TS and Norfolk TS was provided by Norfolk Power Distribution and Hydro One Networks.

	2010	2015	2017	2020	2025	2030
<b>Bloomsburg MTS Load</b>	26.3 MW	31.2 MW	31.9 MW	33.1 MW	35.2 MW	37.4 MW
<b>Norfolk TS Load</b>	60.5 MW	64.8 MW	66.6 MW	69.2 MW	73.9 MW	78.7 MW
<b>Total Load</b>	86.9 MW	96 MW	98.5 MW	102.3 MW	109.1 MW	116.2 MW
<b>Total S @ 0.9 PF</b>	96.5 MVA	106.6 MVA	109.4 MVA	113.7 MVA	121.2 MVA	129.1 MVA

The continuous rating of T1 at Bloomsburg MTS is 42 MVA. Therefore, T1 is capable of supplying its load until at least 2030.

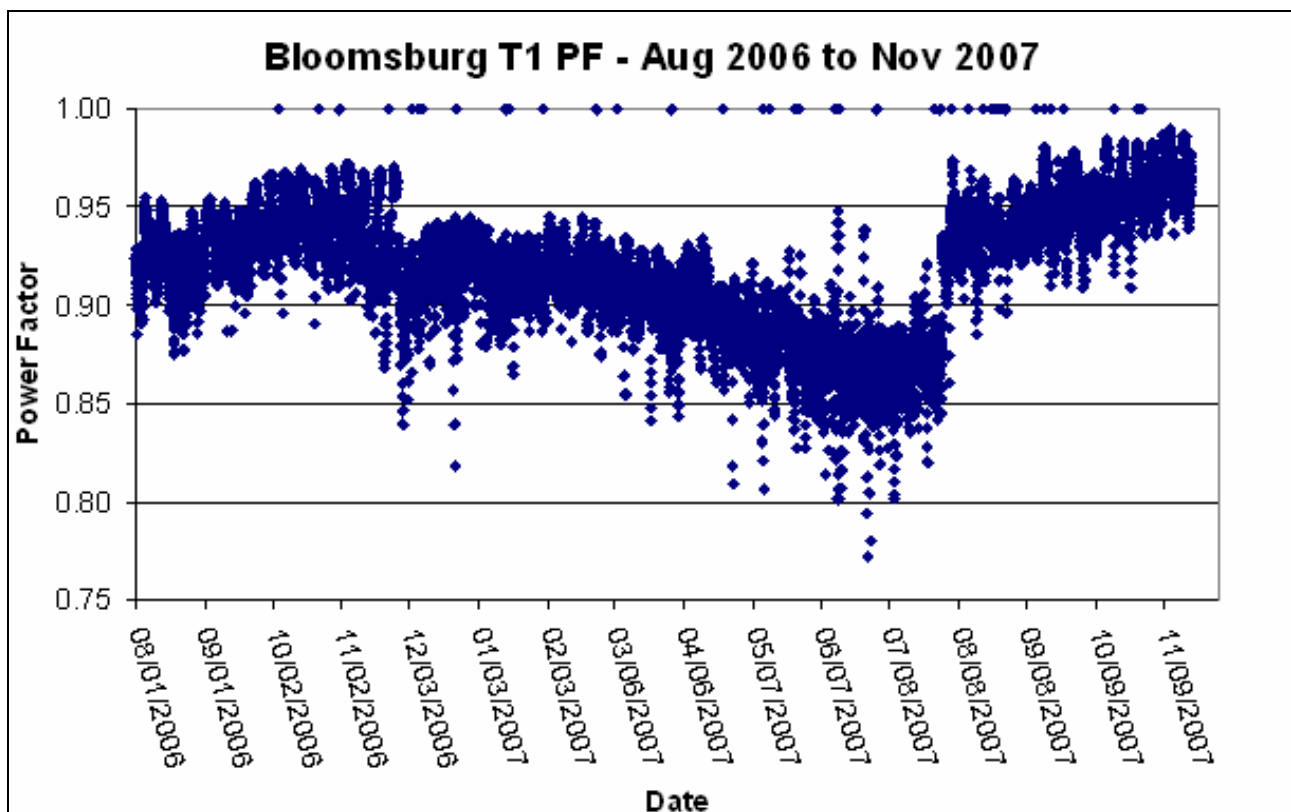
The new line tap is also capable of supplying the load until 2030.

In CAA report # 2002-EX070, 575 A was used for the continuous summer rating of the line C9.

However, the summer rating of the new line C9, as well as the existing line C12 (currently A1N), will actually be 650 A or 129.5 MVA at 115 kV, 30°C ambient and 4 km/h wind speed. According to future load growth at Norfolk TS and Bloomsburg MTS, either line should be capable of supplying the load until 2030 (assuming 0.9 power factor).

### 3.3 Power Factor

The power factor at Bloomsburg T1 was often lower than 0.9 during the summer before August 1, 2007 as shown in figure 2. On August 1, 2007, Norfolk Power Distribution placed a 1.8 MVar capacitor at Bloomsburg MTS. After the capacitor was put in service, the lowest power factor of 0.86 at the high voltage side of T1 occurred on August 3 and 4 2007.



It can be concluded that Bloomsburg TS meets and exceeds the Market Rules requirements with respect to power factor since the capacitor was placed in service.

**Figure 2 – Bloomsburg T1 PF**

#### **4. CONCLUSIONS**

The rating of the 115 kV line tap to Bloomsburg TS exceeds the load of Bloomsburg until 2017.

The rating of either the new or the upgraded 115 kV line exceeds the sum of Norfolk TS load and Bloomsburg MTS loads until 2030.

The rating of the equipment provided by Norfolk Power satisfies the requirement of the market rules.

This expedited System Impact Assessment concludes that the addition of the line, a line tap to Bloomsburg MTS, and reconstruction at Bloomsburg MTS is not expected to have a material adverse impact on the IESO-controlled grid.

#### **5. REQUIREMENTS**

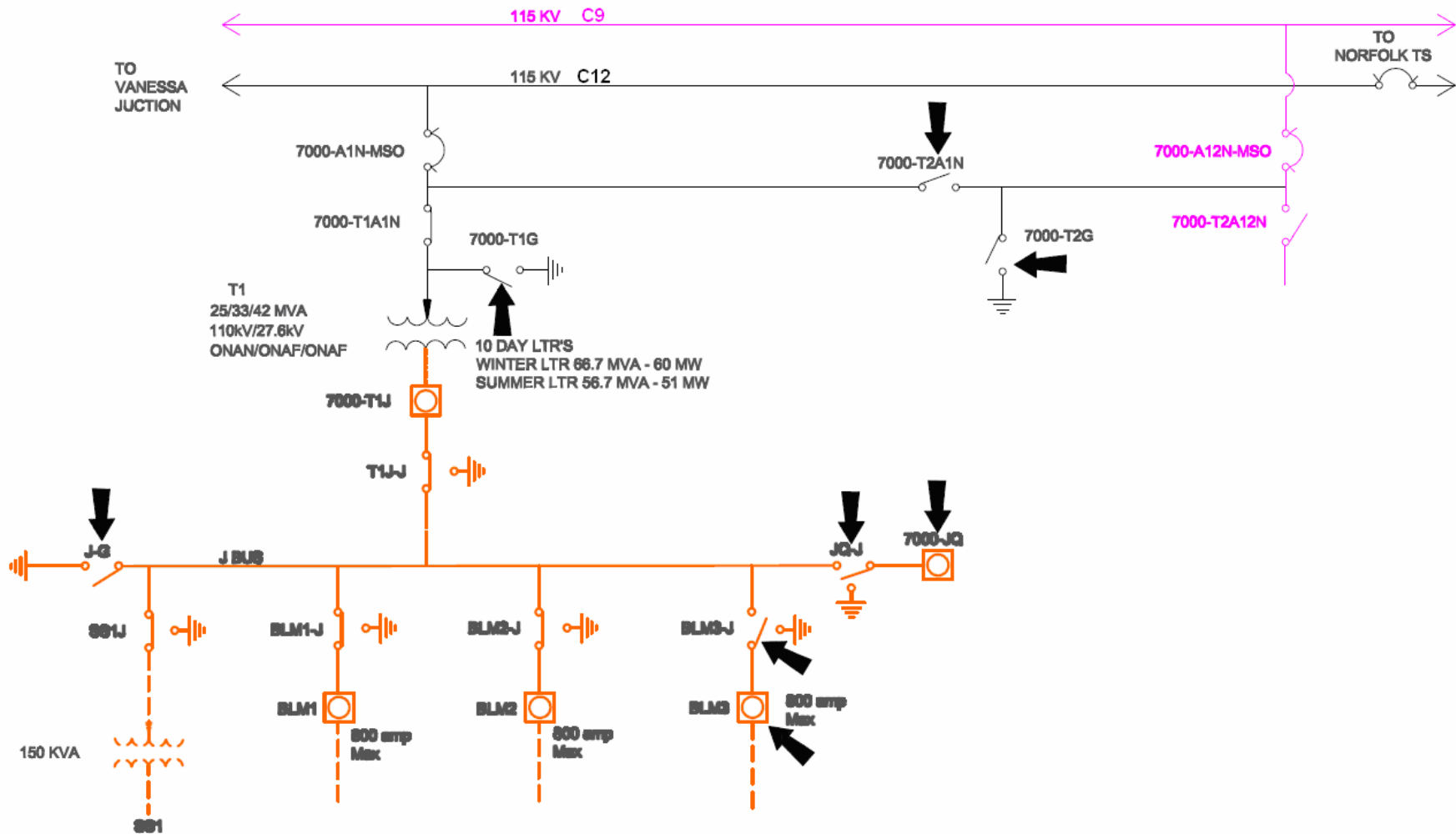
Hydro One Distribution Inc. and Norfolk Power Distribution Inc. are required to meet the requirements with respect to protection systems for the new line as outlined in the Transmission System Code.

The status of all disconnect switches, breakers and active and reactive power flows should be available to IESO on a continual basis.

#### **6. NOTIFICATION OF APPROVAL**

It is therefore recommended that a Notification of Approval of the Connection Proposal be issued subject to the implementation of the requirements listed in section 5.0.

**115 kV Line tap from C9 to Bloomsburg MTS & New Bus Tie Switch**  
**CAA ID Number: 2007-EX353**



**Figure 3: Future Configuration**