METROLINX

Engineering Bulletin 11 November 2021

Facilities Engineering Assurance FEA-010

Amendment Notice: Generator Fuel Storage Requirements

This bulletin applies to and amends the following document:

- GO Design Requirements Manual (DRM), GO-DRM-STD-2017 Revision 4, dated September 2021

This Bulletin updates existing DRM (Sept. 2021) section 5.2.2.7 Backup Required Time.

The revised standard provides a framework for varying runtime requirements based on the Station Services assigned priority level of the station or site.

The introduction of this priority location driven generator backup time framework supersedes the 48-hour backup time requirement at all stations. This will allow optimization of limited station real estate for new projects and offers some minimal capital costs savings due to reduced storage tank size and in some cases removes the requirement of a separate fuel tank room.

Amendments to the DRM are provided in the following attachment:

- Revisions to GO DRM Sept. 2021 – Backup Required Time

On MyLinx, the Bulletin is located on the Go Manual page.

The Bulletin is also available for external users to download via the Metrolinx public download site (http://www.gosite.ca/engineering_public/).

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5.2.2.3 Balancing of Phases

5.2.2.3.1 Where single-phase power is taken from a 3-phase source, the loads shall be balanced among the three distribution phases.

5.2.2.3.2 Sites that have a single-phase source are to maintain the load on the distribution panels balanced.

5.2.2.4 Voltage Drop

5.2.2.4.1 The maximum allowable voltage drop is 2%.

5.2.2.5 Power Factor

5.2.2.5.1 The overall system power factor shall be greater than 90% or .9 PF.

5.2.2.5.2 Power factor design calculations are to be done using an 80% or .8 PF.

5.2.2.6 Backup Power Systems

5.2.2.6.1 This subject describes the functional requirements for Metrolinx facilities backup power system.

5.2.2.6.2 The power generated by the backup system shall be either true sinusoidal 60 Hz or DC, depending on the requirements. The intent is to ensure the continuing operation of essential equipment and services, and to effectively move passengers from station buildings and train platforms to outside parking areas in the event of a sustained power failure.

5.2.2.6.3 The final design of the backup power system must include an as-built schematic drawing of the system distribution. It shall also include a checklist for commissioning, operation, and maintenance, respectively.

5.2.2.6.4 Back-up power generators shall be installed in accordance with the Electrical Safety Authority (ESA), Technical Standards and Safety Authority (TSSA) and the regulations of the electrical inspection agency having jurisdiction. The back-up power generator shall be protected from surface deterioration caused by exposure to conditions (i.e: condensation, weather, winter maintenance and de-icing chemicals) producing corrosion. Flat surfaces which may retain water are not permitted. Provide safe access (min 1m).

5.2.2.7 Backup Required Time

5.2.2.7.1 Back-up power generators are a mandatory requirement, for providing the majority of our operational elements/ systems for the ~~48 hours~~ system operational duration ~~for the following~~ as per Table 39.

~~a) GO Rail Line Stations (including Parking Structures);~~

~~b) GO Bus Terminals (facilities with a station building only);~~

~~c) GO Rail Layover Facilities;~~

~~d) GO Operational Support Facilities (i.e. Wolfdale, GTCC, Middlefield);~~

~~e) GO Bus Maintenance Facilities;~~

~~f) GO Rail Maintenance Facilities.~~

Table 39: Backup Generator Run Time Requirement

Facility	Total Backup Time Requirement at Generator Full Load (hours)
Priority 1	48
Priority 2	24
Priority 3	8
Priority 4	0

Note: Consult with Metrolinx Project Delivery Team to determine the facility priority level as per Metrolinx Station Services requirements.

5.2.2.7.2 Backup Power System's design can include components such as Generator, UPS, Inverter, Rectifier, etc. As a minimum, the backup Power System shall include diesel or natural gas generator complete with UPS systems having a minimum of 30-minute duration or UPS systems with 90-minute minimum duration if there is no diesel/natural gas generator set.

5.2.2.7.3 In each case, the UPS shall be double conversion continuous duty type to provide the electronic communications systems with clean sine wave power. The UPS/Inverter shall be rated for life safety applications and be provided with signals for indication of general alarms and with dial in remote monitoring control, plus a remote alarm to the station alarm system and Network/ BAS.

5.2.2.7.4 There shall be one UPS for the site for operations critical equipment and one UPS/ Inverter dedicated to Life Safety equipment support as per the OESC. For further information on UPS inverters, rectifiers etc., refer to Metrolinx Standard Inverter Rectifier and Charger Specification 26 33 33.

5.2.2.7.5 Diesel is the preferred fuel for backup generators. Where site and operational conditions do not allow for the use of diesel fuel, natural gas fuel powered generators are acceptable with Metrolinx approval.

5.2.2.7.6 Rectifiers shall be used for backup DC power in maintenance and layover facilities where required.

5.2.2.8 Design Requirements

5.2.2.8.1 The following Table 39 shows a list of items that are considered essential. The table shows both backup power system conditions (i.e. Generator + UPS or UPS only).

5.2.2.8.2 The actual power draws shall be provided in the detail design.

Table 40: Backup Power Systems - Design Requirements

Backup Power Systems–Design Requirements			
Essential Load	**WITH Generator**	**No Generator**	