# CONNECTION ASSESSMENT & APPROVAL PROCESS

## *ASSESSMENT SUMMARY*

*Applicant:* *Great Lakes Power Inc.*

*Project:* *MacKay TS*
*Installation of a Generation Rejection Scheme*

***CAA ID No. 2002-EX074***

***Long Term Forecasts & Assessments Department***
***Consistent Information Set Department***

*Date:* *20th October 2002*

**ASSESSMENT SUMMARY**

**GREAT LAKES POWER Inc.**

***MACKAY TS - Install Generation Rejection Scheme***

## *1.0 GENERAL DESCRIPTION*

The following four generating stations are presently in operation on the Montreal River and incorporated via the 115kV system into MacKay TS, as shown in Diagram 1:

| | | |
|---|---|---|
| MacKay GS | 63.0MVA | incorporated directly into MacKay TS |
| Hogg GS | 16.7MVA } | |
| Gartshore GS | 22.2MVA, & } | Σ94MVA ~ incorporated via the two Gartshore 115kV circuits |
| Andrews GS | 55.1MVA. } | |

The two Gartshore circuits, Nos 1 & 2, have continuous summertime ratings of approximately 100MVA and 60MVA, respectively. However, since the combined capacity of the generating facilities incorporated via these two circuits totals approximately 94MVA, a contingency involving the Gartshore No. 1 circuit would result in the continuous rating of the lower-rated No. 2 circuit being exceeded.

To address this situation Great Lakes Power Inc. (GLP) has proposed that a generation rejection scheme be installed that would initiate automatic tripping of unit G3 at Andrews GS in response to a contingency involving the Gartshore No. 1 circuit during those periods when all generating facilities are in-service and operating at their maximum capacity.

The proposed in-service date for the new G/R Scheme is Q4-2002.

## *2.0 PROPOSED FACILITIES*

Diagram 2 provides an overview of the G/R Scheme that GLP is proposing to install. This consists of a latching relay (or programmable logic controller - PLC) located at MacKay TS which can be switched to the appropriate status via SCADA.

> [It is proposed to configure the latching relay or the PLCs so that the arrangement can be expanded to provide additional coverage for other contingency conditions and the rejection of further generating units should it be necessary in the future.]

Facilities are to be installed at the Gartshore GS and MacKay TS terminals of the 115kV Gartshore No. 1 circuit to detect a contingency condition involving this circuit, or the inadvertent opening of either of its terminals.

Duplicated, dedicated communication channels are to be provided between Gartshore GS and MacKay TS to relay the contingency detection signal to the '1 x 1' selection matrix at MacKay TS.

Similar duplicated, dedicated communication channels are to be provided between MacKay TS and Andrews GS to relay the trip signal from the '1 x 1' selection matrix to unit G3 at Andrews GS.

The G/R Scheme is to be armed by switching the latching relay into the closed position whenever sufficient generation capacity is in-service that a contingency involving the Gartshore No. 1 circuit would result in the overloading of the companion circuit. The status of the latching relay is to be telemetered to the IMO.

Diagrams 3 & 4 provide the details of the 'contingency detection facilities' that are to be installed at Gartshore GS and MacKay TS, respectively. These facilities are to be duplicated.

## *3.0 ASSESSMENT*

With the G/R Scheme in-service the maximum amount of generation capacity that would be rejected in response to a single-circuit contingency involving the Gartshore No. 1 circuit would be limited to only 32.5MVA. Since this would occur only when the remaining 61.5MVA of generating capacity on the Montreal River that is connected to the two Gartshore circuits is in-service, it will have a minimal effect on local voltages.

It is therefore considered that the installation of the fully duplicated G/R Scheme will have only a minimal impact on the IMO-controlled gid.

*Real-time Thermal Ratings*

'Real-time' thermal ratings for the individual transmission elements that comprise the GLP System (revised at hourly, or possibly shorter intervals) that are based on the prevailing ambient conditions, would minimise the periods over which the G/R Scheme would need to be armed.

Should GLP have concerns over the extent to which it is necessary to deploy the G/R Scheme, then it is recommended that consideration be given to implementing a mechanism that would provide the IMO with appropriate 'real-time' ratings.

## *4.0 NPCC REGISTRATION*

With the issuing of the Notification of Approval to Connect, the IMO will commence the registration process with NPCC. Until this process is complete, there may be restrictions on the deployment of the G/R Scheme.

## *5.0 NOTIFICATION OF APPROVAL*

Subject to meeting the IMO's requirements as detailed below, it is therefore recommended that a Notification of Approval of the Connection Proposal be issued.

*IMO's Requirements*

- The G/R Scheme must be fully duplicated (this includes contacts, relays, communications and batteries).
    - If latching relays are used, then since their status is to be monitored and any discrepancy will be alarmed, these do not need to be duplicated.
    - However, if PLCs are used, these must be duplicated with discrepancy monitoring installed on the PLCs.
- The status of the latching relay, or PLCs is to be telemetered to the IMO.
- The contingency detection facilities must use contacts from the breaker trip modules (to enhance the speed of operation of the generation rejection) as well as from the breaker pallet switches.

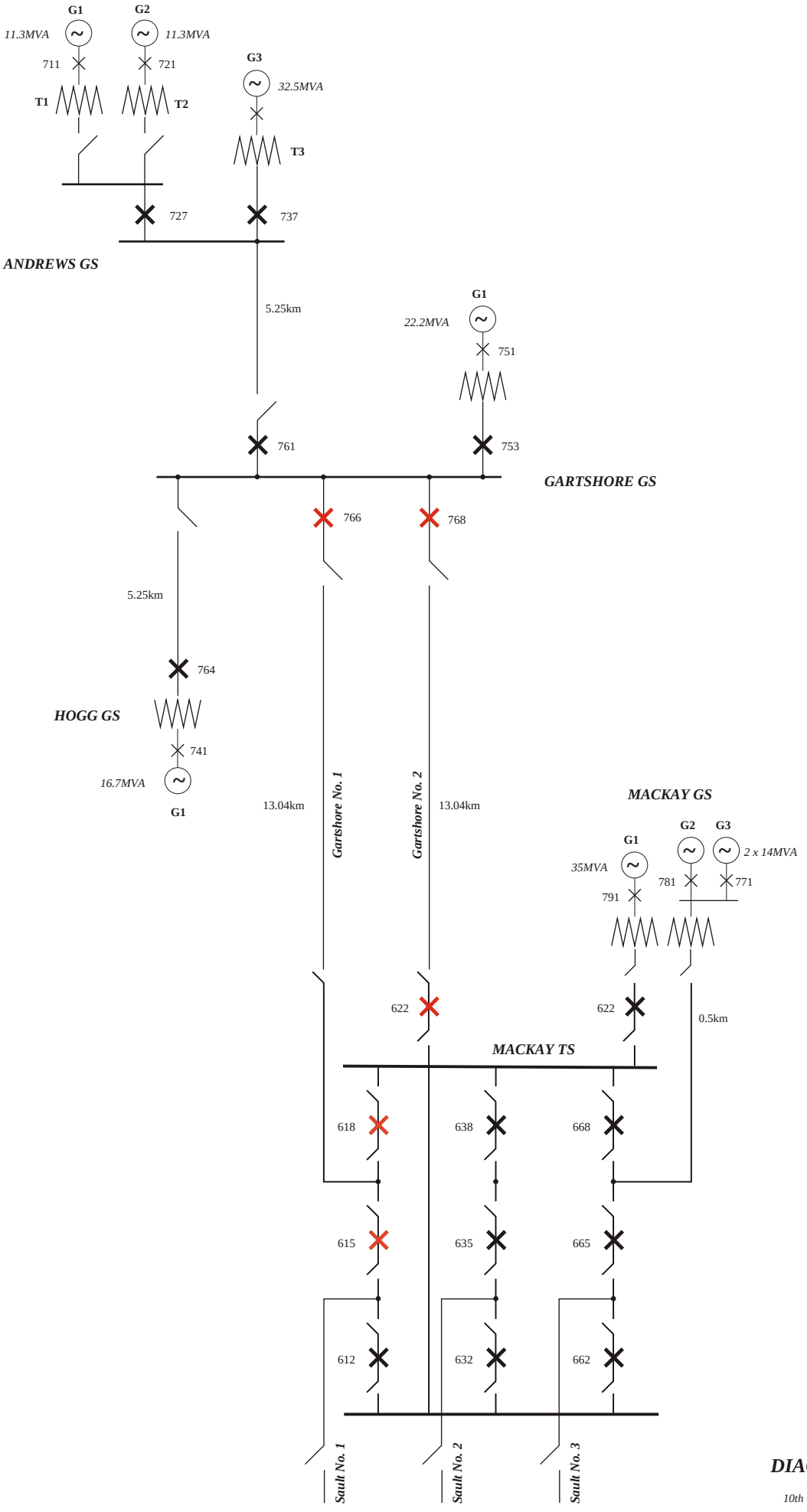
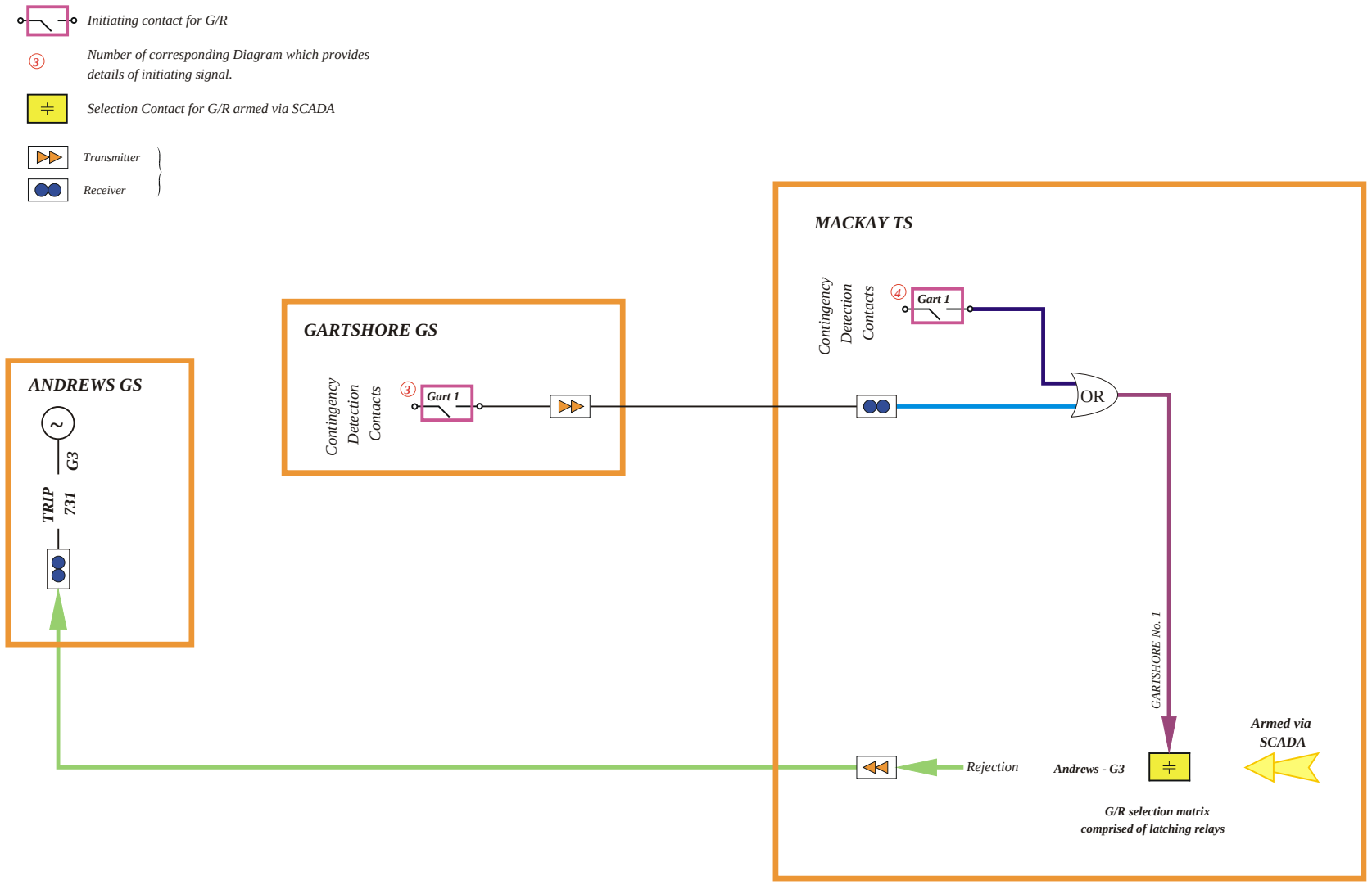



**DIAGRAM 1**

*10th October 2002*




***GREAT LAKES POWER***
***Gartshore G/R Scheme***

***DIAGRAM 2***

*9th October 2002*

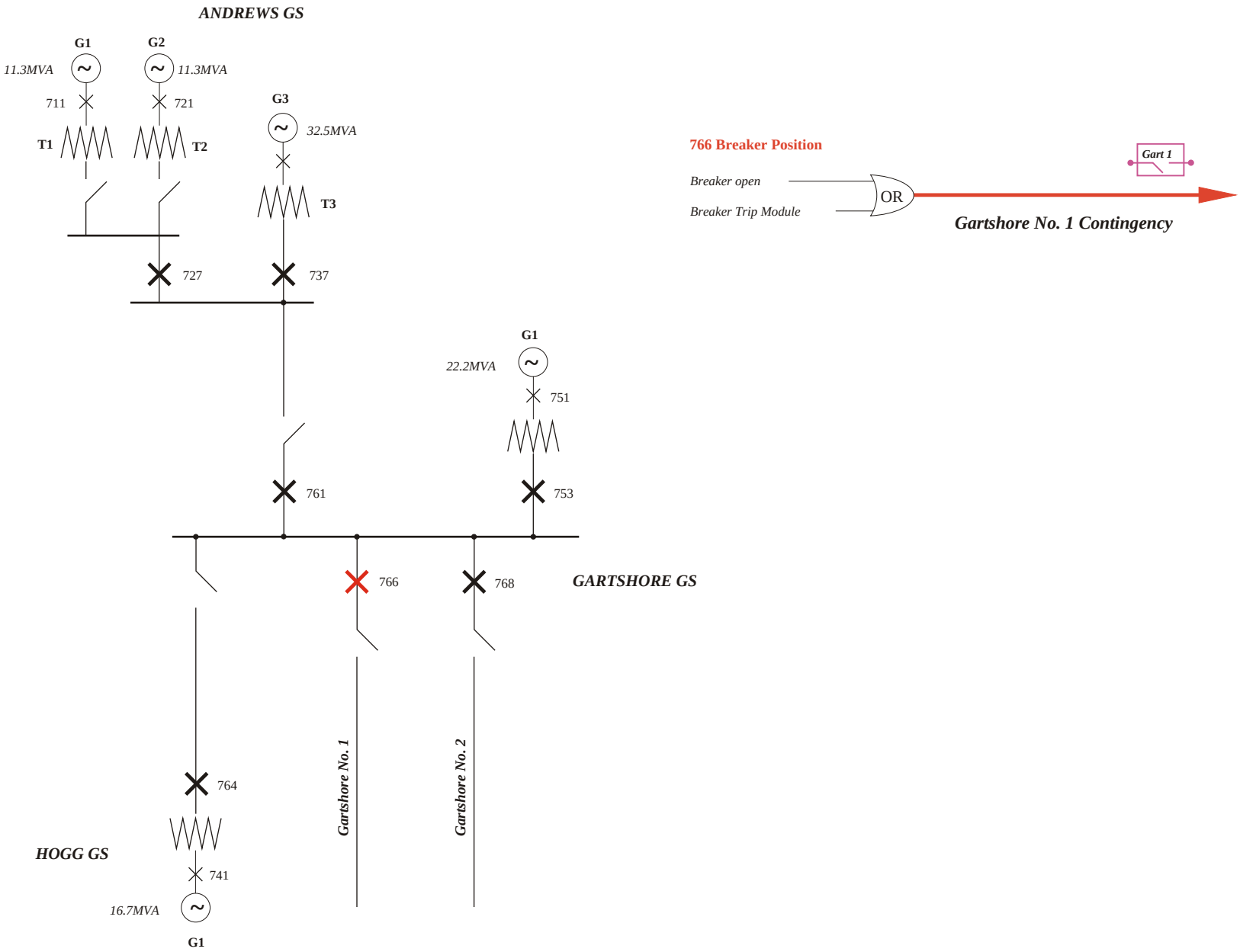
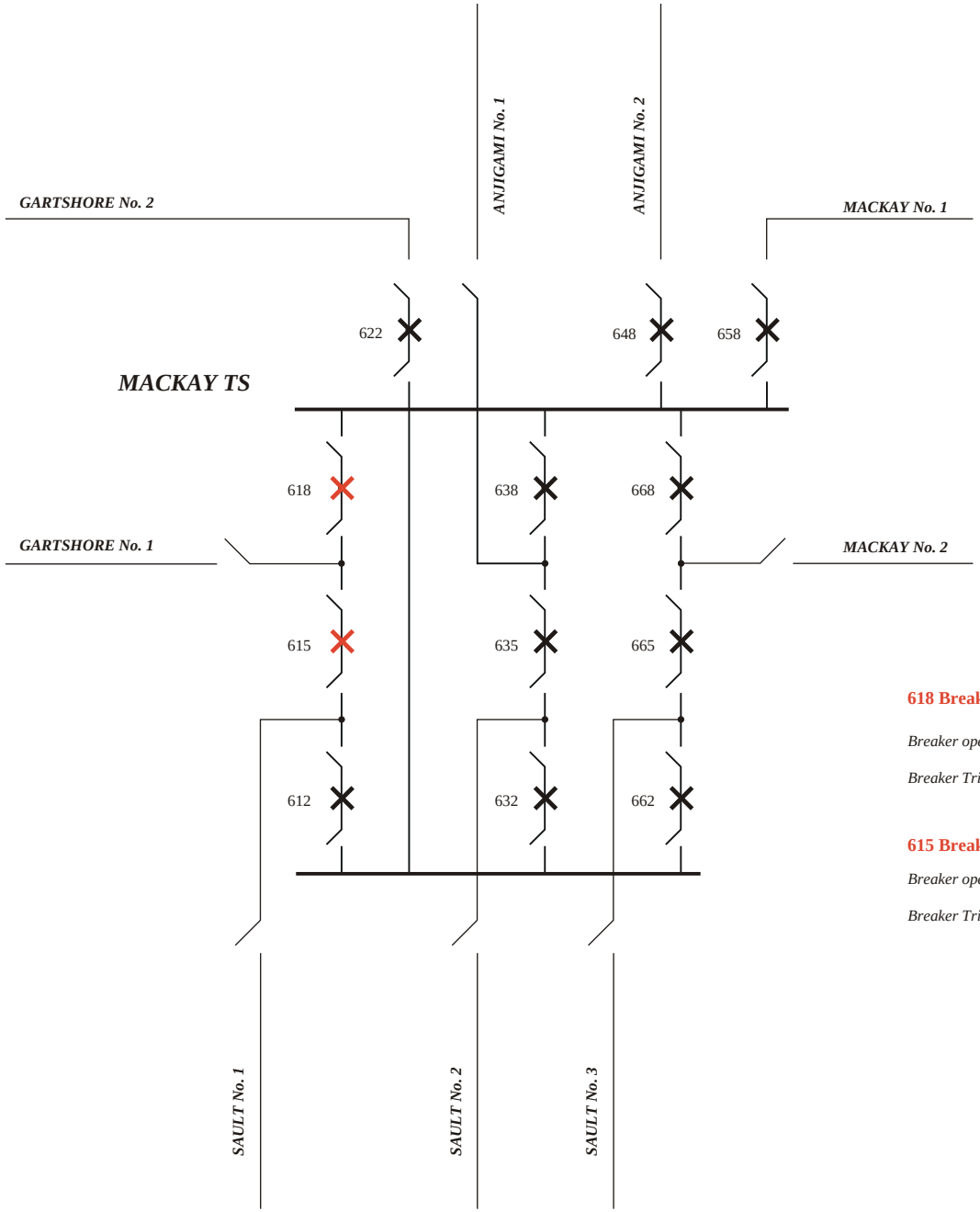



**DIAGRAM 3**

*10th October 2002*




**618 Breaker Position**

*Breaker open*

*Breaker Trip Module*

OR

**615 Breaker Position**

*Breaker open*

*Breaker Trip Module*

OR

AND

*Gart 1*

***Gartshore No. 1 Contingency***

***DIAGRAM 4***

*10th October 2002*