

# **Short Term Monitoring Program**

## Glen Forrest, WA

---

# Change Summary

Version 1: 31 Jul 2013		
Section/ Clause	Summary	NRFC
Figure 5 and Table 4	L90 values updated due to technical issue.	

## Table of Contents

<b>1.</b>	<b>Deployment Details.....</b>	<b>3</b>
1.1	Deployment Purpose .....	3
1.2	Deployment Monitoring Period .....	3
1.3	Noise Monitoring Terminal (NMT) Details.....	3
<b>2.</b>	<b>Location Images .....</b>	<b>4</b>
<b>3.</b>	<b>Deployment Findings .....</b>	<b>6</b>
3.1	Correlation Summary .....	6
3.2	Movement Analysis.....	6
3.3	Background Noise Levels and Threshold Settings.....	7
<b>4.</b>	<b>Noise Level Summary.....</b>	<b>8</b>
<b>5.</b>	<b>Aircraft Noise Levels .....</b>	<b>10</b>
<b>6.</b>	<b>Conclusions .....</b>	<b>11</b>
<b>7.</b>	<b>Further Information.....</b>	<b>11</b>
<b>8.</b>	<b>Contact us .....</b>	<b>12</b>
<b>9.</b>	<b>Glossary of Terms .....</b>	<b>12</b>

© Airservices Australia. All rights reserved.

This report contains a summary of data collected over the specified period and is intended to convey the best information available from the NFPMS at the time. The system databases are to some extent dependent upon external sources and errors may occur. All care is taken in preparation of the report but its complete accuracy can not be guaranteed. Airservices Australia does not accept any legal liability for any losses arising from reliance upon data in this report which may be found to be inaccurate.

---

## 1. Deployment Details

### 1.1 Deployment Purpose

Following recommendations made in the 'Review of the Perth Environmental Monitoring Units' undertaken by Airservices in 2011, Glen Forrest was selected as a Short Term Monitoring Location.

Glen Forrest is located to the north east of Perth airport. During the reporting period the suburb was predominately traversed by Runway 03 arrivals.

The purpose of this report is to provide a technical summary of the recorded aircraft noise and operational data collected at Glen Forrest over a four week period.

An explanation of terms used within this report can be found in the Glossary at the end of the report.

### 1.2 Deployment Monitoring Period

10/06/2013 12:00am – 08/07/2013 12:00am

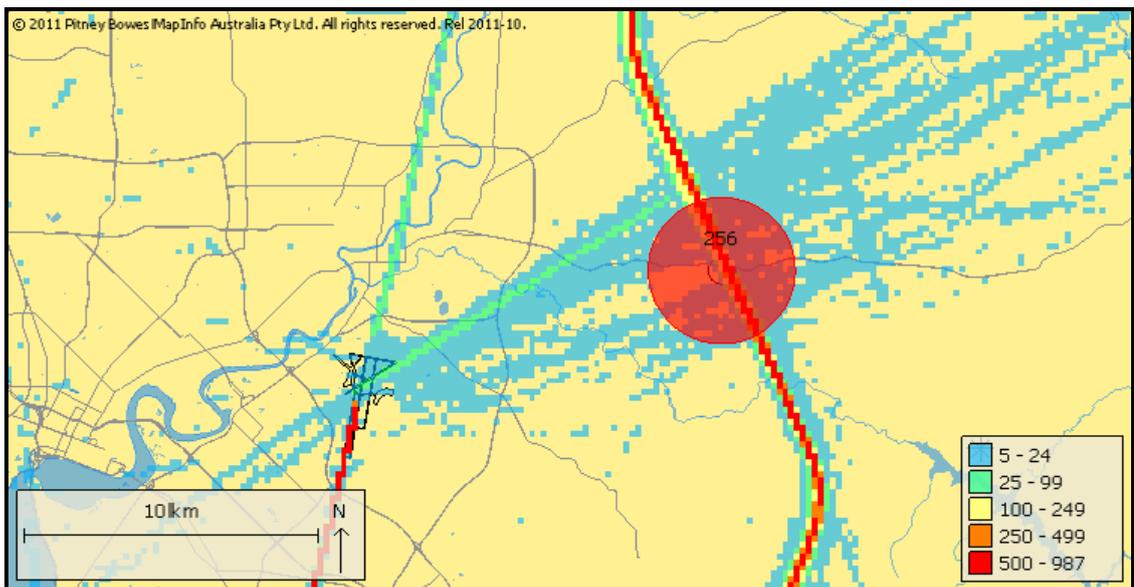
### 1.3 Noise Monitoring Terminal (NMT) Details

Location	Nyaania Crt Private Residence, Glen Forrest, WA 6071
Latitude	31°54'10.34"S
Longitude	116° 5'43.66"E
NMT Altitude	876ft above mean sea level
Capture Zone	2.5km radius with 8,000ft (above ground level) height for noise data capture
Threshold Settings	55.0 dB(A) to 59.0 dB(A) depending on time of day

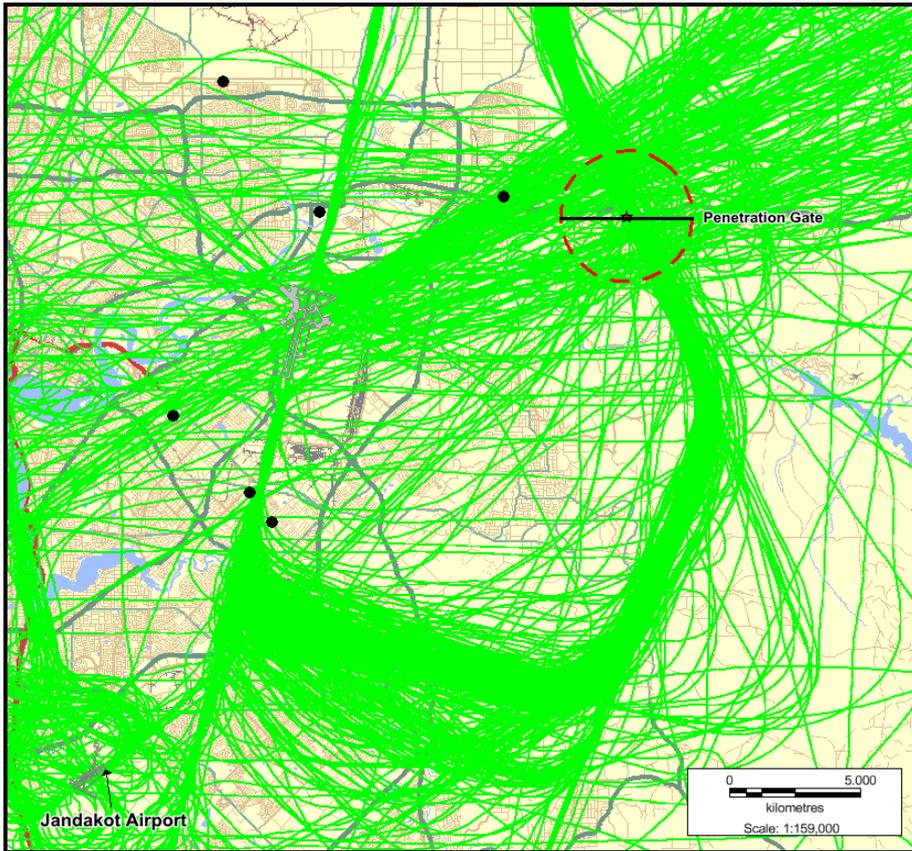
## 2. Location Images



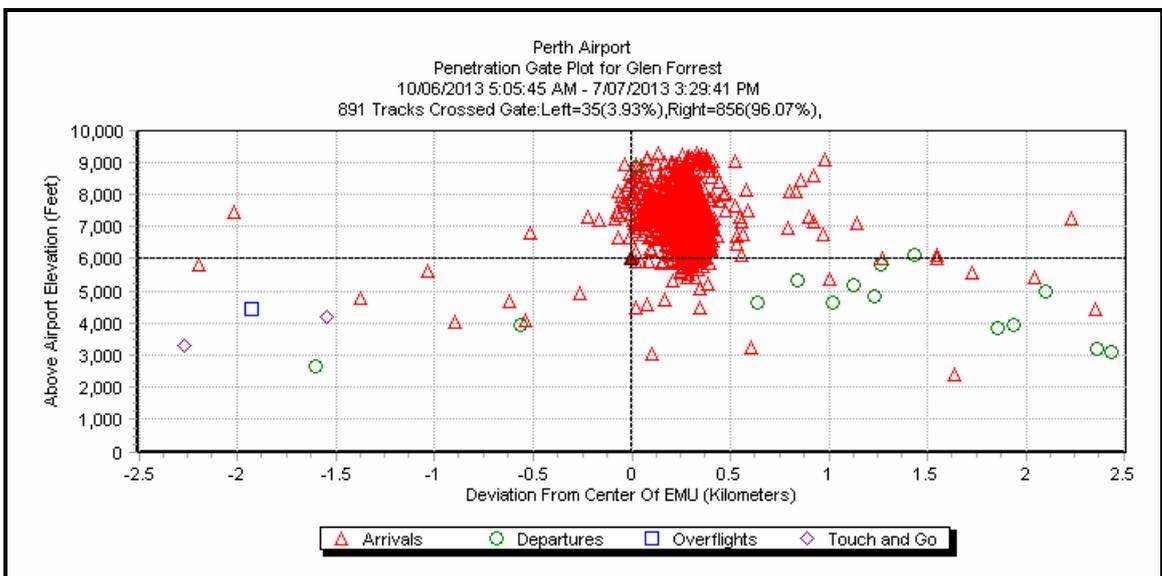
**Figure 1:** Perth Fixed EMU Locations and the Glen Forrest Short Term Monitoring Program Deployment Location



**Figure 2:** Total Movements Captured Track Density



**Figure 3:** Perth Airport Movements Captured



**Figure 4:** Glen Forrest Movements Through Capture Zone Penetration Gate

**Note:** Perth Airport is 67ft above mean sea level. NMT altitude is 876ft above mean sea level. The NMT altitude should be adjusted from the data shown above in order to draw conclusions about height above ground of aircraft operations.

The black line through the capture zone in Figure 3 is a penetration gate, which was crossed by all the flights shown in Figure 4. Some movements within the capture zone are not shown as they did not cross the penetration gate. Some flights may cross the penetration gate more than once, at different altitudes. This may happen, for example, if a flight passes through the penetration gate at a low altitude soon after take off, then again after having climbed to a higher altitude.

---

### 3. Deployment Findings

The following tables present a summary of the operations data.

**Table 1 Movement Summary (10/06/2013 12:00am – 08/07/2013 12:00am)**

Type of Operation	Perth Movements	All Movements
Number of Movements Through Capture Zone*	883	987
Number of Correlated Noise Events (CNE)	64	78
Number of Movements with Correlated Noise Events (CNE)	64	78
Correlation Summary	7.25%	7.90%

**Note:** \* Includes all aircraft with transponder flying through area, regardless of destination/origin airport.

**Note:** \*\* May include operations that produced multiple noise events.

#### 3.1 Correlation Summary

An evaluation of the number of aircraft operations were matched with noise events recorded by the NMT. This is an important aspect of assessing performance of the noise monitoring installation. Ideally, all operations passing the NMT within a reasonable proximity will be matched to the appropriate noise event. Whilst complete matching is not expected, a lack of matches will reveal the need to investigate the reason for anomalies. A correlation summary for all movements of 8% is considered to be a relatively low result, based on reviews of fixed noise monitoring terminals nationally.

#### 3.2 Movement Analysis

**Table 2 Height (in feet, above ground level) Above The Monitor Summary**

Type of Operation	Min*	Max*	Average*
Departures Through Capture Zone**	1,850	8,028	3,921
Arrivals Through Capture Zone**	1,599	8,492	6,347
All Operations Through Capture Zone**	1,599	8,492	6,296

**Note:** \* Flight tracks are susceptible to an altitude error of up to 200ft which is consistent with normal radar tolerances.

**Note:** \*\* Includes all airports within Perth Basin.

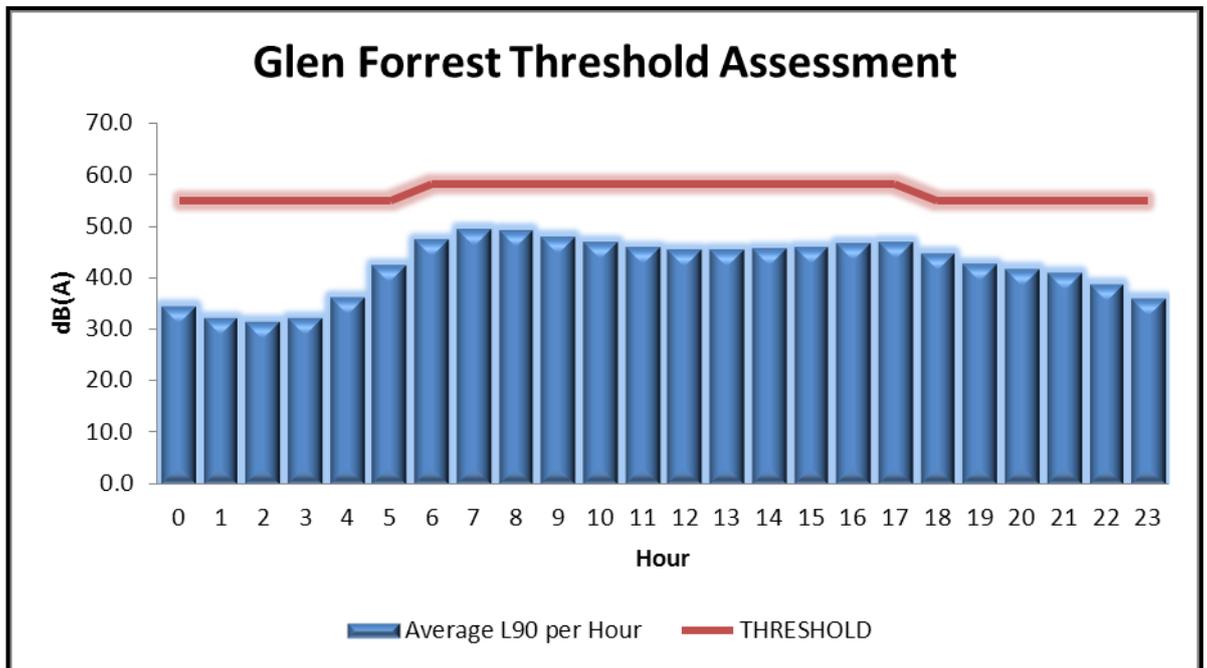
**Table 3 Captured Movements Breakdown By Airport and Aircraft Category**

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
Perth	679	198	6	0	0	883
Jandakot	2	17	80	0	3	102
Other	0	0	0	2	0	2
<b>Grand Total</b>	<b>681</b>	<b>215</b>	<b>86</b>	<b>2</b>	<b>3</b>	<b>987</b>

**Note:** \*These non-flight planned operations are generally recreational aircraft conducting private flights and will account for the very low altitudes by some aircraft.

### 3.3 Background Noise Levels and Threshold Settings

At the monitoring site, background noise levels are first assessed to determine the appropriate threshold settings for the NMT. The threshold setting must be above the background noise level in order to clearly distinguish aircraft noise events from other noise sources. The result of background noise assessment and threshold settings are provided below in Figure 5.



**Figure 5:** Background and Threshold Assessment

#### 4. Noise Level Summary

The following tables present a summary of the noise data for aircraft that flew through the capture zone and caused a Correlated Noise Event (CNE). Information is provided for Perth Airport movements that flew over the NMT, as well as all aircraft that flew over the NMT, noting that this area is affected by arrivals, departures and training flights, as shown in Figure 2 and Figure 3.

**Table 4 Noise Summary**

Noise Parameters	Noise Level (dB(A))
LAeq 24 hr, dB(A)	51.3
LAeq (night), dB(A)	45.4
Background Day (L90 dB(A))	45.3
Background Night (L90 dB(A))	35.0

**Note:** LAeq 24hr: The continuous equivalent noise level over a 24 hour period, including noise from aircraft and the wider environment.

**Note:** LAeq (night): The continuous equivalent noise level over the night time period (hours of 11:00pm to 6:00am), including noise from aircraft and the wider environment.

**Table 5 Correlated Noise Events Summary**

	Perth Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	64	78
Number of Correlated Noise Events at night (CNE night)	2	2
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE <sub>xx</sub> ) day/night	CNE <sub>xx</sub>	CNE <sub>xx</sub>
CNE <sub>60</sub> – day	56	68
CNE <sub>60</sub> - night	2	2
CNE <sub>65</sub> – day	15	19
CNE <sub>65</sub> – night	0	0
CNE <sub>70</sub> – day	3	3
CNE <sub>70</sub> - night	0	0
CNE <sub>75</sub> – day	0	0
CNE <sub>75</sub> - night	0	0
CNE <sub>80</sub> – day	0	0
CNE <sub>80</sub> - night	0	0

<b>Number of Correlated Noise Events (CNExx) per 24hr period min – max</b>	<b>Perth Movements</b>	<b>All Aircraft</b>
CNE <sub>60</sub>	0 to 12	0 to 13
CNE <sub>65</sub>	0 to 4	0 to 4
CNE <sub>70</sub>	0 to 1	0 to 1
CNE <sub>75</sub>	0 to 0	0 to 0
CNE <sub>80</sub>	0 to 0	0 to 0
<b>Average Number of Correlated Noise Events (CNExx Ave.) day/night</b>	<b>CNExx Ave.</b>	<b>CNExx Ave.</b>
CNE <sub>60</sub> Ave. – day	2.00	2.43
CNE <sub>60</sub> Ave. – night	0.07	0.07
CNE <sub>65</sub> Ave. – day	0.54	0.68
CNE <sub>65</sub> Ave. – night	0.00	0.00
CNE <sub>70</sub> Ave. – day	0.11	0.11
CNE <sub>70</sub> Ave. – night	0.00	0.00
CNE <sub>75</sub> Ave. – day	0.00	0.00
CNE <sub>75</sub> Ave. – night	0.00	0.00
CNE <sub>80</sub> Ave. – day	0.00	0.00
CNE <sub>80</sub> Ave. – night	0.00	0.00

**Note:** Day period is from 6:00am to 11:00pm. Night period is 11:00pm to 6:00am.

**Table 6 L<sub>Amax</sub> Summary**

<b>Min dB(A)</b>	<b>Max dB(A)</b>	<b>Average dB(A)</b>
56.7	74.1	63.1

**Note:** Summary for operations that passed through the correlation zone (2.5km radius with 8,000ft height AGL)

## 5. Aircraft Noise Levels

Table 7 presents the top 10 average noisiest aircraft types captured during the reporting period. Table 8 shows the 6 most correlated aircraft types that flew over the noise monitoring terminal.

**Table 7 Top 10 Average Aircraft Noise Levels (LAmax) at the Glen Forrest Noise Monitoring Terminal**

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Dash 8 Q400 (T)	Perth	A	03	1	73.9	73.9	1
Beechcraft BE58 Baron (P)	Jandakot	D	Unknown	1	69.6	69.6	1
Bell 412 (H)	Unknown	O	Unknown	1	67.9	67.9	1
Embraer E120 (T)	Perth	A	03	1	66.8	66.8	1
Piper PA-31 Navajo (P)	Perth	D	21	1	66.4	66.4	1
Beechcraft BE58 Baron (P)	Jandakot	D	24R	3	65.5	68.4	1
Fokker 100 (J)	Perth	A	03	8	65.3	74.1	5
Piper PA-44 Seminole (P)	Jandakot	D	30	1	64.3	64.3	1
Beechcraft BE58 Baron (P)	Jandakot	D	06L	3	64.3	65.8	1
Embraer E190 (J)	Perth	A	03	1	63.6	63.6	1

**Table 8 Top 6 Most Correlated Aircraft Types Over the Glen Forrest Noise Monitoring Terminal**

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Boeing 737-800 (J)	Perth	A	03	35	62.6	67.8	6
Fokker 100 (J)	Perth	A	03	8	65.3	74.1	5
Boeing 717-200 (J)	Perth	A	03	6	62.1	64.1	1
Airbus A330-300 (J)	Perth	A	03	3	60.5	61.0	1
Beechcraft BE58 Baron (P)	Jandakot	D	06L	3	64.3	65.8	1
Beechcraft BE58 Baron (P)	Jandakot	D	24R	3	65.5	68.4	1

**Note:** Aircraft Category: Jet (J), Turboprop (T), Propeller (P), Helicopter (H), Unknown (U)

**Note:** Only six aircraft types correlated more than once during the reporting period.

---

## 6. Conclusions

Short term noise monitoring was conducted in Glen Forrest during the period of 10th June to 8th July 2013. This followed the recommendations made in the 'Review of the Perth Environmental Monitoring Units' undertaken by Airservices in 2011. It was determined the most common aircraft movements to traverse the Glen Forrest community are Perth Regular Public Transport (RPT) Runway 03 jet arrivals.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 70dB(A) in one day was three. There were 2 correlated noise events above 60dB(A) that occurred during the hours of night. The average L<sub>Amax</sub> during the reporting period was 63.1dB(A), with a max level of 74.1dB(A) and minimum level of 56.7dB(A) recorded.

A review of Tables 7 and 8 indicates the most frequent movements to correlate at Glen Forrest tend to be Perth Airport arrivals.

The correlation summary of 8% for all movements is considered a relatively low result based on reviews of fixed noise monitoring terminals nationally. Whilst the noise created from the aircraft may be noticeable, they are not loud enough to create a noise event above the determined threshold settings.

Due to the distinctive flight paths and distance from Perth Airport, it is not expected the ratio of arrival and departure flights over Glen Forrest will change due to seasonal variation over a twelve month period.

## 7. Further Information

Further information about Airservices noise monitoring program is available on the Airservices website, including reports of the noise and operational data collected by the Noise and Flight Path Monitoring System, as well as fact sheets about topics related to aircraft noise. The website is available at:

<http://www.airservicesaustralia.com/aircraftnoise/>

---

## 8. Contact us

To lodge a complaint or make an enquiry about aircraft operations, you can go to WebTrak ([www.airservicesaustralia.com/aircraftnoise/webtrak/](http://www.airservicesaustralia.com/aircraftnoise/webtrak/)) use our online form ([www.airservicesaustralia.com/aircraftnoise/about-making-a-complaint/](http://www.airservicesaustralia.com/aircraftnoise/about-making-a-complaint/)) telephone 1800 802 584 (freecall) or 1300 302 240 (local call –Sydney) fax (02) 9556 6641 or write to, Noise Complaints and Information Service, PO Box 211, Mascot NSW 1460.

## 9. Glossary of Terms

A	Arrivals
AGL	Above Ground Level
Background noise level (L90)	The sound level in dB(A) that is exceeded 90% of the time
CNE	Correlated noise events - noise events which are matched with aircraft movements
CNE <sub>xx</sub>	Correlated noise events that are equal or greater than the noise level XX dB(A)
D	Departures
Day	6:00am to 11:00pm
H	Helicopters
Jet	Jet aircraft
LA <sub>eq</sub>	Continuous equivalent noise level over a time period
LA <sub>eq</sub> 24hr	Continuous equivalent noise level over a 24 hour period
LA <sub>eq</sub> night	Continuous equivalent noise level over the night time period (hours of 11:00pm to 6:00am)
LA <sub>max</sub>	Maximum sound level in dB(A)
Local	Operation that departs and arrives at the same airport. Local movements include circuits and training flights.
Movement	An aircraft operation, such as a take-off or landing
N <sub>xx</sub>	Average daily number of correlated noise events equal to or greater than XX dB(A)
Night	11:00pm to 6:00am
NFPMS	Noise and Flight Path Monitoring System
Noise Event	A noise that exceeds the threshold sound level for longer than the threshold time that is set
NMT	Noise Monitoring Terminal
Non-Jet	Non-jet aircraft
O	Overflight i.e. an aircraft movement that flew over the area but did not arrive or depart from the airport of concern
T	Local Operation (Departure & Arrival)

**Note:** For further information on the metrics used in this report refer to Australian Standard 1055.1–1997 “Acoustics – Description and measurement of environmental noise”.

**Note:** Airservices welcomes comments about this report. Please contact us via e-mail at [community.relations@airservicesaustralia.com](mailto:community.relations@airservicesaustralia.com) if you would like to provide feedback.