

Sydney Football Stadium ONMP

Submitted to the Department of Planning, Industry and Environment
under SSD 9835 Condition D48, August 2022

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July 2022	Respond to DPE Request for Information	Draft V7
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1. Introduction

This Operational Noise Management Plan (ONMP) has been prepared to support the future operations of the Sydney Football Stadium (SFS). The ONMP has been developed to meet the statutory requirements of State Significant Development (SSD) 9835 relating to the Sydney Football Stadium Redevelopment.

1.1 Sydney Football Stadium Redevelopment

On 6 December 2018, the then Minister for Planning approved Stage 1 of Sydney Football Stadium (SFS) comprising a concept approval and concurrent early works package (SSD 9249) to facilitate redevelopment of the Sydney Football Stadium. The concept approval established the maximum building envelope, design and operational parameters for a new stadium with up to 45,000 seats for patrons and allowing for 55,000 patrons in concert mode. The concurrent Stage 1 works, which were completed on 28 February 2020, facilitated the demolition of the former SFS and associated buildings.

Stage 2 of the Sydney Football Stadium (SFS) Redevelopment (SSD 9835) was approved by the Minister for Planning and Public Spaces on 6 December 2019. Stage 2 provides for:

- construction of the stadium, including:
 - 45,000 seats (additional 10,000 - person capacity in the playing field in concert mode) in four tiers including general admission areas, members seating and corporate / premium seating;
 - roof cover over all permanent seats and a rectangular playing pitch;
 - a mezzanine level with staff and operational areas;
 - internal pedestrian circulation zones, media facilities and other administration areas on the seating levels;
 - a basement level (at the level of the playing pitch) accommodating pedestrian and vehicular circulation zones, 50 car parking spaces, facilities for teams and officials, media and broadcasting areas, storage and internal loading areas;
 - food and drink kiosks, corporate and media facilities; and
 - four signage zones.
- construction and establishment of the public domain within the site, including:
 - hard and soft landscaping works;
 - publicly accessible event and operational areas;
 - public art; and
 - provision of pedestrian and cycling facilities.
- wayfinding signage and lighting design within the site;
- reinstatement of the existing Moore Park Carpark 1 (MP1) upon completion of construction works with 540 at-grade car parking spaces and vehicular connection to the new stadium basement level;

- operation and use of the new stadium and the public domain areas within the site for a range of sporting and entertainment events; and
- extension and augmentation of utilities and infrastructure.

To date, SSD 9835 has been modified on six previous occasions as summarised in Table 1.

Table 1: Modifications to SSD 9835

Modification	Approved	Description
Modification 1	3 April 2020	Amend Conditions B14 and B15 to enable the condition to be satisfied in accordance with the principles and framework prescribed by the <i>Contaminated Land Management Act 1997</i> .
Modification 2	14 December 2020	Reinstate fitness facilities that were previously available within the former SFS.
Modification 3	7 December 2020	Alter the approved mezzanine slabs at the eastern and western stands and relocate the approved administration facilities. design amendments to the south western glazed façade. inclusion of an additional stadium signage condition.
Modification 4	22 April 2021	Relocate the photovoltaic (PV) cells from the stadium's roof to Level 5 (above the eastern and western plant rooms) and a reduction in the amount of kilowatts peak (kWp) generated.
Modification 5	8 June 2021	Minor modification to correct plan revisions and dates.
Modification 6	29 September 2021	Fit-out, use and operation of the eastern mezzanine of the stadium for the purpose of a dedicated training and administration facility for the Sydney Roosters NRL football club, known as the Sydney Roosters Centre of Excellence.
Modification 7	Pending determination	Design, construction and operation of the Precinct Village and Car Park development to align with the conditions and commitment established within SSD 9835, particularly relating to delivering a LEED Gold rated sustainable precinct, and will include: • up to a maximum of 1,500 space multi-level car park below the proposed ground level reconfiguration of the currently approved drop off requirements for the elderly and mobility impaired. • free flow level pedestrian access to and from the SFS concourse from Driver Ave and Moore Park Road

Modification	Approved	Description
		• electric car charging provision. • a versatile and community public domain, comprising: ○ provision for 4 x north-south orientated tennis courts on non-event days with the potential to become an event platform on event days; ○ children's playground; ○ 1,500m cafe / retail / restaurants with associated amenities in a single storey pavilion (6 metre) low level; ○ customer service office and ticket window; and ○ vertical transport provisions • utilities provision augmentation. • inclusion of an additional condition of consent requiring the use of the northern portion of EP2 (Upper Kippax) to cease immediately and for the southern portion of EP2 (Lower Kippax) to cease prior to the commencement of operation of Stage 2 of the Precinct Village and Car Park

1.2 SSD 9835 Noise and Vibration Assessment

A noise and vibration impact assessment was prepared for the SSD 9835 (DA - Noise and Vibration Impact Assessment, Arup, 2019), which identified potentially worst affected noise sensitive receivers and noise limits.

Condition D48 (c)(v) of SSD 9835 requires noise limits for sporting events, concerts and outdoor events with sound amplification to be consistent with the SSD, including the established Noise Catchment Areas (NCAs) and sensitive noise receivers.

Condition E2 of SSD 9835 provides non-event noise limits which apply to receivers identified in the SSD.

Noise limits apply to all receivers in accordance with SSD 9835, not just representative assessment locations.

Representative receivers are shown in Figure 1.

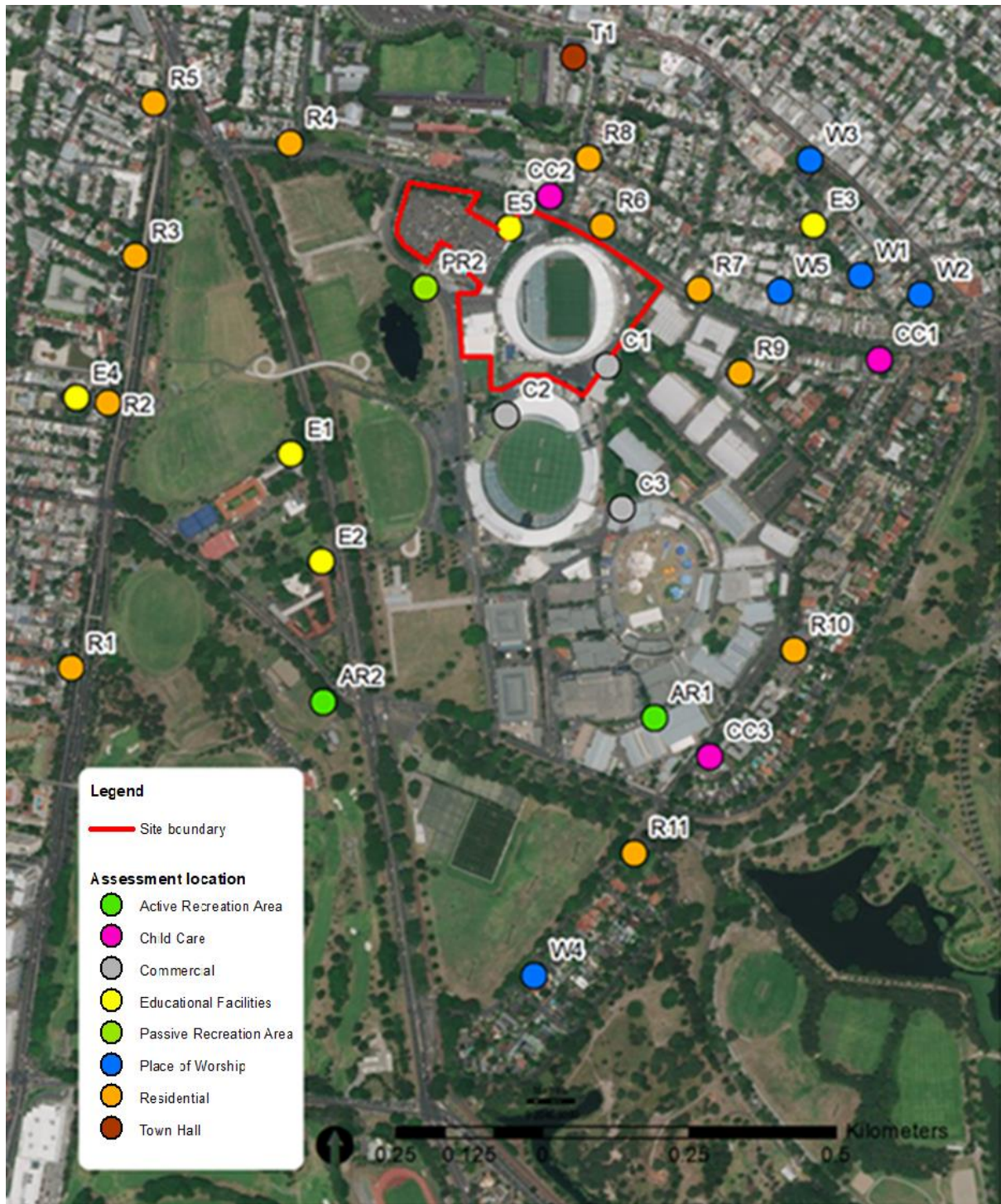


Figure 1: Site location, noise sensitive receivers

A list of representative residential noise sensitive receivers within the study area is presented in **Table 2**.

Table 2: Reasonably most-affected residential receivers

Receiver ID	Address	No. of floors
R1	749 South Dowling Street, Redfern	2
R2	635 South Dowling Street, Surry Hills	3
R3	553 South Dowling Street, Surry Hills	3
R4	111 Greens Rd, Paddington	2
R5	479 South Dowling Street, Surry Hills	3
R6	252 Moore Park Road, Paddington	2
R7	314 Moore Park Road, Paddington	2
R8	45 Oatley Road, Paddington	2
R9	5 Poate Road, Paddington	2
R10	107 Cook Road, Centennial Park	2
R11	2 Martin Road, Moore Park	3

A list of all non-residential noise sensitive receivers within the study area is presented in **Table 3**.

Table 3: Non-residential receivers

Receiver ID	Name	Address	No. of floors
Active Recreation Area			
AR1	Centennial Parklands Equestrian Centre	114-120 Lang Road, Moore Park	2
AR2	Moore Park Golf Course	Cleveland Street, Moore Park	0
Commercial			
C1	Fox Studios	38 Driver Avenue, Moore Park	2
C2	Sydney Cricket Ground	Driver Avenue, Moore Park	3
C3	Entertainment Quarter	122 Lang Road, Moore Park	3
C4	University of Technology Sydney Rugby Australia and NRL building	Moore Park Road and Driver Avenue, Moore Park	5
Child Care			
CC1	Gumnut Gardens Early Learning and Long Day Care Ce	61 Moore Park Road, Centennial Park	1

Receiver ID	Name	Address	No. of floors
CC2	Kira Child Care Centre	230 Moore Park Road, Paddington	1
CC3	Bambini's Child Care Centre	157/159 Cook Road, Centennial Park	2
Educational Facilities			
E1	Sydney Boys High School	556 Cleveland Street, Moore Park	3
E2	Sydney Girls High School	Corner of Anzac Parade and Cleveland Street, Surry Hills	2
E3	Paddington Public School	399-435 Oxford Street, Paddington	2
E4	Bourke Street Public School	590 Bourke Street, Surry Hills	2
E5	University of Technology Sydney Rugby Australia and NRL building	Moore Park Road and Driver Avenue, Moore Park	5
Passive Recreation Area			
PR2	Moore Park	Moore Park	0
Town Hall			
T1	Paddington Town Hall	249 Oxford Street, Paddington	2
Place of Worship			
W1	St Francis of Assisi Catholic Church	64 Gordon Street, Paddington	3
W2	St Mattias Anglican Church	471-475 Oxford Street, Paddington	2
W3	Paddington Uniting Church	395 Oxford Street, Paddington	2
W4	St. Vladimir's Russian Orthodox Church	31 Robertson Rd, Centennial Park	2
W5	Kingdom Hall of Jehovah's Witnesses	20 Leinster St, Paddington	2

Receivers are grouped into Noise Catchment Areas shown in Figure 2.



Figure 2: Noise Catchment Areas

1.3 Purpose and Objectives of this ONMP

This ONMP has been prepared to respond to the requirements of Condition D48.

The purpose of this ONMP is to provide measures to manage noise emissions from Events (see section 2.5 Definitions) at the SFS in accordance with SSD 9835; activities held at the SFS which fall outside this definition are 'deemed to comply' with noise limits.

The primary objective of this ONMP is to strike an appropriate balance between controlling Event noise impacts on the community and ensuring viable operation of the SFS as an Event venue in line with the NSW Government's expectations for the stadium within the Moore Park Sports and Entertainment Precinct.

1.4 ONMP Structure

This ONMP is structured as follows:

- Part 1 - Introduction
- Part 2 - ONMP Approval Requirements
- Part 3 - Developing the Operational Noise Management Plan
- Part 4 - Preventative management
- Part 5 - Responsive management
- Part 6 - Review mechanism
- Part 7 - Record of consultation
- Part 8 - Record of calibration and limiter settings

2. ONMP Approval Requirements

As required under Condition D48, an ONMP must be prepared by a Suitably Qualified Acoustic Consultant as defined in Table 6 in consultation with the Environment Protection Authority (EPA), the Department of Planning and Environment, and Venues NSW (the former SCSGT as referred to Condition D48).

2.1 SSD 9835 Noise Management Conditions

Table 4 reproduces Condition D48 and identifies where each component of the condition is addressed throughout this ONMP.

Table 4: SSD 9835 Condition D48 ONMP requirements

Consent Condition	Addressed in Section of this ONMP
D48. An Operational Noise Management Plan (ONMP) must be prepared prior to the commencement of operation of the stadium. The plan must:	
(a) be prepared by a suitably qualified and experienced acoustic expert in consultation with the EPA, the Department and the SCSGT;	Section 3.1 - Author's Qualifications, Table 6: Definitions and Section 7 - Record of consultation
(b) be submitted to the Planning Secretary for approval, at least 3 months prior to commencement of operation of the stadium and be supported by evidence of required consultation in D48(a);	Section 2.2 - Planning Secretary approval
(c) include (but not limited to) the following details that are (where relevant) consistent with the draft Noise Management Plan in the Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019;	Incorporated throughout
(i) hours of operation, number and type of events;	Section 4.2 - Time limits
(ii) details of sound-check timings associated with an event;	Section 4.2 - Time limits
(iii) identification and location of relevant sensitive receivers;	Section 1.2 - SSD 9835 Noise and Vibration Assessment
(iv) definition of the events that will be deemed-to-comply and those for which an Event Acoustic Report would be required;	Section 2.5 - Definitions
(v) noise limits for sporting events, concerts and outdoor events with sound amplification that are consistent with the Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019;	Section 4.3 - Event noise limits
(vi) noise limits and restrictions on use of the public domain areas within the site post completion of an event;	Section 4.4 - Non-event noise limits Section 4.8.3 - Mobile speaker systems

Consent Condition	Addressed in Section of this ONMP
(vii) noise limits for post event activities within the stadium, such as clean-up, resurfacing playfield within the stadium, maintenance of the playfield, use of power-equipment and other functions;	Section 4.3 - Event noise limits
(viii) a definition of non-compliance and a breach of conditions;	Section 4.3.1 - Definition of non-compliance
(ix) a chain of responsibility for management of noise in relation to the stadium activities and nomination of responsible persons and contact details;	Section 4.7 - Chain of responsibility
(x) a protocol for notification of events to residential and other sensitive receivers at least 5 days prior to an event and the relevant regulatory authorities;	Section 4.5.2 - Concert
(xi) definition of a trial period during which the noise limits and noise monitoring system are to be validated. This must be of a duration to enable a sufficient number of different types of events to establish robust relationships between the $L_{eq,5min}$ noise levels emitted from the events at the stadium and L_{Fmax} noise levels in the Notice of Prevention Action No 1003904 (by the EPA), and the relationship between intermediate monitoring locations and receiver locations;	Section 2.5 - Definitions
(xii) A requirement for review of the noise limits and monitoring locations must be included at the completion of the trial period;	Section 5.2.2 - Trial period
(xiii) measures to minimise impacts of sound checks, rehearsals, 'bump-in' and 'bump-out' activities, amplified sound from events, goods delivery, post event clean-up activities, amplified sound within and outside of the stadium, and waste collection services (including the noise impact of associated vehicular movements particularly any such movements occurring during the 'night period' or likely to activate reversing alarms), and stadium precinct grounds maintenance;	Section 4.3 - Event noise limits Section 4.2 - Time limits Section 4.6 - Permanent Noise Monitoring System (PNMS) Section 4.9 - Deliveries, maintenance and clean up
(xiv) a protocol for determining compliance with the noise limits including establishing noise limits at intermediate monitoring points for different event configurations and meteorological conditions;	Section 4.6.2 - Monitoring system transfer functions
(xv) a procedure for management actions and responsibilities to avoid non-compliances and to respond to non-compliances, in the event of detected exceedance of noise limits;	Section 4.6.6 - Exceedances of Event noise limits
(xvi) a complaints handling procedure, including operation of a telephone complaints line and action protocol;	Section 5.1 - Complaint handling
(xvii) a procedure and guidance on the frequency, time of occurrence and duration of pyrotechnic displays (if any), including a community notification strategy;	Section 4.5.3 - Pyrotechnics

Consent Condition	Addressed in Section of this ONMP
(xviii) the location of intermediate noise monitoring points and the applicable noise levels to demonstrate compliance with project noise requirements at sensitive receiver locations identified in the Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019;	Section 4.6.1 - Permanent monitor locations
(xix) the acoustic specifications, technical performance criteria, calibration regime and data storage for a noise monitoring system which includes the use of intermediate noise monitoring points;	Section 4.6.5 - Monitoring of noise levels during an Event
(xx) a protocol for validating the performance of the noise monitoring system to demonstrate that a reliable and repeatable measure of noise at receiver locations can be obtained through measurement at the intermediate noise monitoring locations. The protocol must include reporting of the empirical and theoretical measurements / calculations used to determine the intermediate noise levels to the EPA and Department;	Section 4.6.2 Monitoring system transfer functions
(xxi) a protocol for reporting the results of noise monitoring for events; and	Section 5.2 - Reporting requirements
(xxii) a mechanism for periodic review of the plan, to be in consultation with the EPA and the Department; and	Section 6 - Review mechanism
(xxiii) a method of continuous improvements to the ONMP and protocols, to ensure various music genres from the current and future events held at the stadium (both known and new events that cannot be considered in this instance) meet the noise objectives.	Section 6 - Review mechanism

Note: This requirements in condition D48(c) may need to be amended by the Planning Secretary, if required, during the approval of the ONMP.

Pursuant to Conditions E5 to E11 of SSD 9835, operation noise management measures are required to be implemented. Table 5 reproduces Conditions E5 - E11 and identifies where each condition is addressed throughout this ONMP.

Table 5: SSD 9835 Condition E5 - E11 Operation Noise Management requirements

Consent Condition	Addressed in Section of this ONMP
Operation Noise Management	
E5. The project must at all times comply with the approved ONMP required under condition D48 of this consent.	Application of this ONMP
E6. The noise monitoring system as required by condition D45 must be installed and be operative for all events at the stadium, except the deemed-to-comply events (as defined in the ONMP), so that real time data for noise measurement and noise monitoring are available at any point in time for measuring noise generation during events.	Section 2.5 - Definitions and Section 4.6.3 - Storage of measurement data

Consent Condition	Addressed in Section of this ONMP
E7. The Applicant must conduct regular monitoring of the noise generated by the stadium during the nominated and agreed trial period in the ONMP. Data regarding noise generated by a sufficient number of different types of events must be collected during this period to establish robust relationships between the L_{eq5min} and L_{Fmax} , and the relationship between intermediate monitoring locations and receiver locations.	Section 4.6.2 - Monitoring system transfer functions
E8. At the completion of the trial period, the Applicant must produce a report to the satisfaction of the Planning Secretary, which includes a detailed review of the noise limits and monitoring locations to demonstrate that the noise generated by the various types of events at the stadium comply with the intent of the noise limits established in Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019 and which was to ensure that noise impacts will be no greater than those experienced under the statutory Notice of Preventive Action 1003904 (as at the date of the development application and as varied from time to time). A copy of this report must be submitted to EPA for information.	Section 5.2.2 - At completion of Trial period
E9. In addition to the requirement of condition E8, real time noise measurement data from the first three music concerts must be provided to EPA and the Planning Secretary. The data should be obtained at the identified noise compliance points (including intermediate compliance points) as identified in the Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019 and be supported by analysis to demonstrate: (a) how, over the first three concerts, the Applicant or operator of the stadium undertook a range of measurements at selected receiver locations and intermediate sites to validate propagation predictions and allow comparisons of stadium levels to noise objectives established for the stadium in the Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019; (b) how the results of these tests have been used / will be used to inform the setting of noise level triggers for the stadium microphones to ensure compliance with the noise objectives established for the stadium; (c) that the equivalent noise levels at the sensitive receivers as identified in the Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019 are achieved at all times.	Section 5.2.1 - Following each of the first three Concert events
E10. The Applicant must submit a report with the noise measurement data and supporting analysis to EPA and the Planning Secretary within two weeks of the completion of each of the first three music concerts or any other event using amplified music to: (a) obtain written advice and comments from EPA and the Planning Secretary regarding compliance with condition E9 and validation of the ONMP after each event; and	Section 5.2.1 - Following each of the first three Concert events

Consent Condition	Addressed in Section of this ONMP
(b) obtain written advice from EPA and the Planning Secretary regarding any additional management measures and or refinement of the ONMP required having regard to compliance with condition E9.	
E11. If non-compliance is reported, the written advice from EPA and the Department must be obtained and appropriate actions undertaken including (but not limited to) refinement of the ONMP, prior to the commencement of the next music event at the stadium, following the event where the noise measurements were undertaken, and data was submitted.	Section 5.2.3 - Upon a non-compliance

2.2 Planning Secretary approval

The ONMP must be submitted to the Planning Secretary for approval, at least 3 months prior to the commencement of the operation of the new stadium.

The stadium is proposed to commence operation in Q3 2022. This ONMP was initially submitted to the Planning Secretary in June 2022, more than 3 months prior to the stadium's commencement.

2.3 Land to Which this ONMP Applies

This ONMP applies to the SFS Site, which is located at 40-44 Driver Avenue, Moore Park within the City of Sydney Local Government Area (LGA), and is legally described as Lot 11, Part Lot 10 and Part Lot 12 in DP 1255013.

The Site is located on the eastern edge of the city, approximately 3km from the Sydney CBD, and forms part of a larger entertainment and recreation precinct shared with Centennial and Moore Parks, Fox Studios, and the Entertainment Quarter. It is located in the northern corner of the precinct and is bounded by Moore Park Road to the north, Paddington Lane to the east, the existing Sydney Cricket Ground stadium to the south and Driver Avenue to the west. The site is located immediately to the south of the suburb of Paddington, with the suburbs of Centennial Park to the east and Surry Hills to the west.

The site is connected to Sydney's transport network through existing bus routes and benefits from a dedicated stop on the recently completed Sydney CBD and South East Light Rail.



Figure 3: SFS Site Location

2.4 Supporting documents

This ONMP has been informed by a number of key documents prepared for the SFS Redevelopment and Moore Park Precinct as summarised below:

- Stage 2 SSD DA - Noise and Vibration Impact Assessment, Arup, 2019;
- Stadium Fitness Facilities - Noise and Vibration Impact Assessment, Arup, 2020;
- Social Impact Monitoring Program, Urbis 2021
- Sydney Football Stadium Event Management Plan, Venues NSW, 2022
- Precinct Village and Car Park - Noise and Vibration Impact Assessment, Arup, 2021; and
- Notice of Preventative Action 1003904, NSW EPA, 2017.

This ONMP is not reliant on, or bound by, any other operational management plan. It should however be read in conjunction with the other operational management plans.

2.5 Definitions

Definitions used throughout this ONMP are outlined in Table 6.

Table 6: Definitions

Term	Definition
Suitably Qualified Acoustic Consultants	An acoustic consultant who is a member of one or more of the following organisations: • Association of Australian Acoustical Consultants;

Term	Definition
	• Australian Acoustical Society or • Institution of Engineers Australia.
Concert	An Event which incorporates the use of sound amplification equipment other than the SFS in-house PA system. This includes not only performances but <i>any different type of event which may</i> also include associated activities such as rehearsals and sound checks.
Event	A planned public or social occasion carried out within the SFS which involves 200 or more patrons.
Deemed to Comply activity	An activity within the SFS which involves less than 200 patrons.
Event Representative(s)	A person nominated by Venues NSW management who is appointed the responsibility and authority to exercise control of noise emissions from the SFS. The Event Representative will liaise with the user and all relevant stakeholders.
Receivers	Noise sensitive receivers which are defined as residences, classrooms in educational institutions, hospital wards, places of worship, active and passive recreation areas, child care centres and community centres such as town halls. Receivers have been identified and approved under SSD 9825 and are reproduced at Section 1.1.2 of this ONMP.
Trial period	The first two Twelve-Month Event Period following the commencement of operations at the SFS.
Twelve-Month Event Period	The calendar year following the first Event held at the stadium and each subsequent calendar year. <i>Note: The Twelve-Month Event Period has been established to align with Venues NSW's reporting obligations to the EPA.</i>

3. Developing the Operational Noise Management Plan

3.1 Author's Qualifications

This ONMP has been prepared by Mathew Simon of Arup, a suitably qualified acoustic engineer and a member of the Association of Australian Acoustical Consultants and the Australian Acoustical Society (Member ID M1238).

3.2 Stakeholder consultation

The ONMP has been developed over a period of more than 12 months and is the culmination of an extensive process of technical studies and investigations, and stakeholder consultation.

The views and responses of organisations and community members were received through a variety of channels at critical stages in the development of the ONMP. Consultation with the community began in 2017 with the public exhibition of the Stage 1 Concept Application (SSD 9249) and subsequent public exhibition of the Stage 2 SSD (SSD 9835). Over the course of 2021 and 2022, Venues NSW and its consultant team engaged with organisations and community members via a series of meetings, workshops and other engagement activities. The feedback received during these activities was used to inform the development of the ONMP.

The stakeholder consultation requirements prescribed by Condition D48 in relation to this ONMP, including their roles and responsibilities, is detailed in Table 7. Evidence of consultation outcomes is provided in Appendix A.

Table 7: Summary of stakeholder consultation process

Stakeholder	Description			
	Preparation	Consultation	Endorsement	Information*
Infrastructure NSW	✓			
Venues NSW (formerly SCSGT)	✓	✓		
NSW Environment Protection Authority		✓		
Department of Planning and Environment		✓	✓	
University of Technology, Sydney		✓		
Fox Studios		✓		
Kirra Child Care Centre		✓		
Adjoining landowners/occupiers		✓		

* Following endorsement by Planning Secretary

3.3 Continuing engagement and opportunities to participate

The engagement process has been, and will continue to be, a core part of the ONMP's implementation. All stakeholders will be kept informed of the progress of the ONMP and there will be opportunities to participate in future stages of planning and to comment on aspects of implementation, as appropriate.

3.4 Scope and methodology

The scope of the ONMP was determined by the (then) Department of Planning, Industry and Environment (DPIE) in imposing Condition D48.

This ONMP has been developed based on recommendations outlined in the Stage 2 SSD DA – Noise and Vibration Assessment (Arup, 2019). Mitigation measures have been further developed following planning approval in consultation with Infrastructure NSW in relation to the Permanent Noise Monitoring System and permanent weather station, and Venues NSW in relation to operational matters.

4. Preventative management

4.1 Number of concert events

In accordance with Condition A8 of SSD 9835, a maximum of six Concert Events per year (with an average of four per calendar year over any rolling five-year period between the stadium and the Sydney Cricket Ground (SCG)) are permitted within the stadium.

4.2 Time limits

Time limits of Sporting, Concert and Other Events are provided in Table 8.

Table 8: Activity time limits

Event Activity type	Time limits		
	Not to commence before	Not to finish after	Duration
Event			
Sporting Events	8:00 AM	11:00 PM	-
Concert Events - Performance	10:00 AM	11:00 PM	Maximum 5 hours duration ¹
Concert Events - Rehearsals and sound tests	10:00 AM	7:00 PM	Kept to absolute minimum
Other outdoor event with sound amplification - days preceding working days	10:00 AM	8:00 PM	-
Other outdoor event with sound amplification - days not preceding working days	10:00 AM	10:30 PM	-
Non-Event			
Organised temporary activities on event days in public domain areas at the site	8:00 AM	11:00 PM	-
All organised activities within the stadium and / or the public domain areas within the site, that could be potentially audible at nearby residential receptors.	8:00 AM	11:30 PM	-
Grounds and other maintenance work on the playing field and internal stadium	Mondays to Fridays 7:00 AM - 6:00 PM Saturdays and Sundays 8:00 AM - 4:00 PM		All works undertaken outside of these hours would be subject to the non-event operational noise limits

Event Activity type	Time limits		
	Not to commence before	Not to finish after	Duration
Stadium Members Facilities			
The operation of the Stadium Members Facilities	5:30am and 11:30pm Monday to Friday; 6:00am and 11:30pm on Saturdays; and 7am and 11pm on Sundays.		
Activities within the Public Domain			
Outlined in Table 6 of the Sydney Football Stadium Event Management Plan, Venues NSW, 2022			
1. Refers to Concert performance only, not including bump in and bump out which will not include amplified sound.			

4.3 Event noise limits

Noise limits for Events to take place at the SFS have been established in Stage 2 SSD DA – Noise and Vibration Assessment prepared by Arup dated 30 August 2019 for use of amplified sound systems.

Event noise limits for noise sensitive receivers are presented in Table 9.

Table 9: Event noise limits

Receivers	Amplified sounds limit ¹ , $L_{eq}(5min)$	
	dB(A)	1/1 octave, 63Hz dB(Z)
Concert Event	70	90
Sporting / Other Event	60	-
1. Applies at property boundary of all residences, 1.5m above occupied floors.		

A review of Event noise limits shall be conducted at the completion of the Trial Period.

These noise limits apply to wind speeds up to 5 m/s, above which wind generated noise on the microphone limits measurement accuracy. During periods of wind greater than 5 m/s, Venues NSW must continue to take all reasonable and feasible actions to minimise noise, which will include:

- adjusting the in-house sound system to limit the noise to settings established during the trial period; and
- maintaining Permanent Noise Monitoring System (PNMS) noise limits for Concert Events for intermittent periods where wind of less than 5m/s are recorded.

4.3.1 Definition of non-compliance

As a single exceedance of the Event noise limits does not directly translate to an unacceptable disturbance to the community, a single exceedance does not constitute a strict non-compliance with the consent.

An exceedance of the noise limits ($L_{Aeq(5min)}$ or $L_{Zeq(5min)}$ 63 Hz) during an Event will not be taken to be a breach of Project Approval conditions unless they satisfy the conditions outlined in Table 10.

Table 10: Breach of Project Approval conditions

Exceedance of limits	No. of consecutive exceedances in one Event	No. of separate occasions within the Event
Up to 2 dB	1	8
	2	3
	3	1
Up to 5 dB	1	4

4.4 Non-event noise limits

Non event noise limits have been established in accordance with NSW EPA's Noise Policy for Industry which are based on periods of the day.

Non-event noise includes all noise generated by the SFS and the stadium members facilities, excluding patron / crowd and music noise. Where activities in the Public Domain occur outside of Event time limits, such as extending after the duration of an Event, Non-event noise limits apply. In accordance with Condition E2 of SSDA 9835, Non-event noise generated at the premises must not exceed the noise limits at the times and locations in Table 11. Noise Catchment Areas are presented in Figure 2.

All post-event activities must comply with the non-event noise limits.

Table 11: Non-event noise limits

Noise Catchment Area	Day, $L_{Aeq(15min)}$	Evening, $L_{Aeq(15min)}$	Night, $L_{Aeq(15min)}$	Night, L_{Amax}
NCA 1	58	56	55	70
NCA 2	58	53	51	66
NCA 3	57	54	52	64
NCA 4	48	46	43	56
NCA 5	44	41	38	50
NCA 6	52	45	38	60

Noise Catchment Area	Day, $L_{Aeq}(15min)$	Evening, $L_{Aeq}(15min)$	Night, $L_{Aeq}(15min)$	Night, L_{Amax}
Notes: - Day: the period from 7 am to 6 pm Monday to Saturday; or 8 am to 6 pm on Sundays and Public Holidays; - Evening: the period from 6 pm to 10 pm; and - Night: the remaining period.				

The non-event operational noise must comply with the noise limits when the measurement is undertaken utilising the following criteria:

- the relevant noise monitoring equipment must be located at the reasonably most affected external point at the location, but no closer than 3 m to a vertical reflecting surface and between 1.2 to 1.5m above ground level for single storey residences and at a height between 1.2 to 1.5m above the finished floor level for multi-storey residences;
- noise measurements must not be undertaken where rain or wind speed at microphone level will affect the acquisition of valid measurements; and
- the modifying factor corrections in Table C1 in Fact Sheet C of the Noise Policy for Industry (EPA, 2017) may be applied, if appropriate, to the noise measurements by the noise monitoring equipment.

4.5 Notification

4.5.1 Sporting or other non-concert Events

Once a sporting event has been confirmed and scheduled at the venue by the Sporting Codes, notification of the event is updated on the Venues NSW website to provide event details including:

- date of the event;
- details of the participating teams as applicable;
- gate opening times (members and public); this is the earliest time that patrons will be allowed to enter the venue; and
- starting time for the match or main activity.

The website will be updated at least 5 to 14 days prior to any scheduled sporting or non-concert event.

Following the commencement of SFS operations, the community will be able to subscribe to the VNSW website and receive updates of new events being held at the SFS.

Similar information is also uploaded on each of the codes and club websites. Club and Stadium Fitness Facilities Members will also be notified of newly confirmed events.

Forecast sporting event schedules will continue to be provided to Moore Park Event Operations Group (MEOG)¹ and TfNSW as a forward projection of potential events to be held 6 to 12 months into the future. This enables coordination and planning across all precinct wide events. Once the sporting event is confirmed all stakeholders are notified including MEOG, TfNSW, TransDev, City Rail, NSW Police, Playbill, GSP, etc. Stakeholders will be provided details of the forecast crowd including event specific details. In addition, TfNSW issue transportation specific notifications via VMS signage across the road network to advise road users of upcoming events. This notification typically occurs 2 – 3 days ahead of events.

4.5.2 Concert Events

Once a concert has been confirmed and scheduled at the venue by the event Promoters, notification of the event is updated on the Venues NSW website to provide event details including:

- date of the event;
- details of the performing artist;
- gate opening times; this is the earliest time that patrons will be allowed to enter the venue;
- start time for opening act; and
- anticipated start time and finish time for main act.

Once the SFS is operational, the community will be able to subscribe to the VNSW website and receive updates of new events being held at the SFS.

Concerts are typically confirmed 6 to 8 months ahead of the scheduled event. Once the concert event is confirmed all stakeholders are notified including EPA, MEOG, TfNSW, TransDev, City Rail, NSW Police, Playbill, GSP, etc. Stakeholders are provided details of the forecast crowd including event specific details. In addition, TfNSW issue transportation specific notifications via VMS signage across the road network to advise road users of upcoming events. This notification typically occurs 2 – 3 days ahead of events.

5 to 14 days prior to any scheduled concert event, notification of upcoming concerts will be distributed by a letterbox drop to noise sensitive receivers within the notification resident boundary outlined in the approved Operational Noise Management Plan (Figure 4). This will include sensitive receivers as nominated in the development consent, being

¹ The Moore Park Event Operations Group (MEOG) develops operational plans to ensure the delivery of safe and successful events in the Moore Park sporting and entertainment Precinct and provides a forum for member agencies to work with event organisers on the effective traffic and parking operations in the precinct and its surrounds. MEOG is chaired and coordinated by Customer Journey Planning (CJP) Major Events. MEOG member agencies include Greater Sydney Parklands, Transport for NSW, NSW Police, Venues NSW, the City of Sydney, the NSW Taxi Council, the Bus and Coach Association, the Entertainment Quarter and Playbill Venues. The MEOG framework ensures that the multiple events occurring throughout the precinct are coordinated across all relevant stakeholders.

UTS, Disney Studios and Kirra Child Care Centre. The letter box drop will provide details of the event including:

- times of the concert rehearsal;
- duration of the concert rehearsal;
- times of planned sound tests/checks;
- duration of sound tests/checks;
- time of Concert including start time of opening act and main act, and any planned pyrotechnic displays, specifically including the details listed in Section 4.5.3 below in respect of any proposed aerial shells and other high noise impact pyrotechnics;
- duration of concert, description of concert and expected crowd attendance; and
- details of the contact person & website for feedback or complaints.

A copy of the letter box drop will also be provided to the EPA for information.

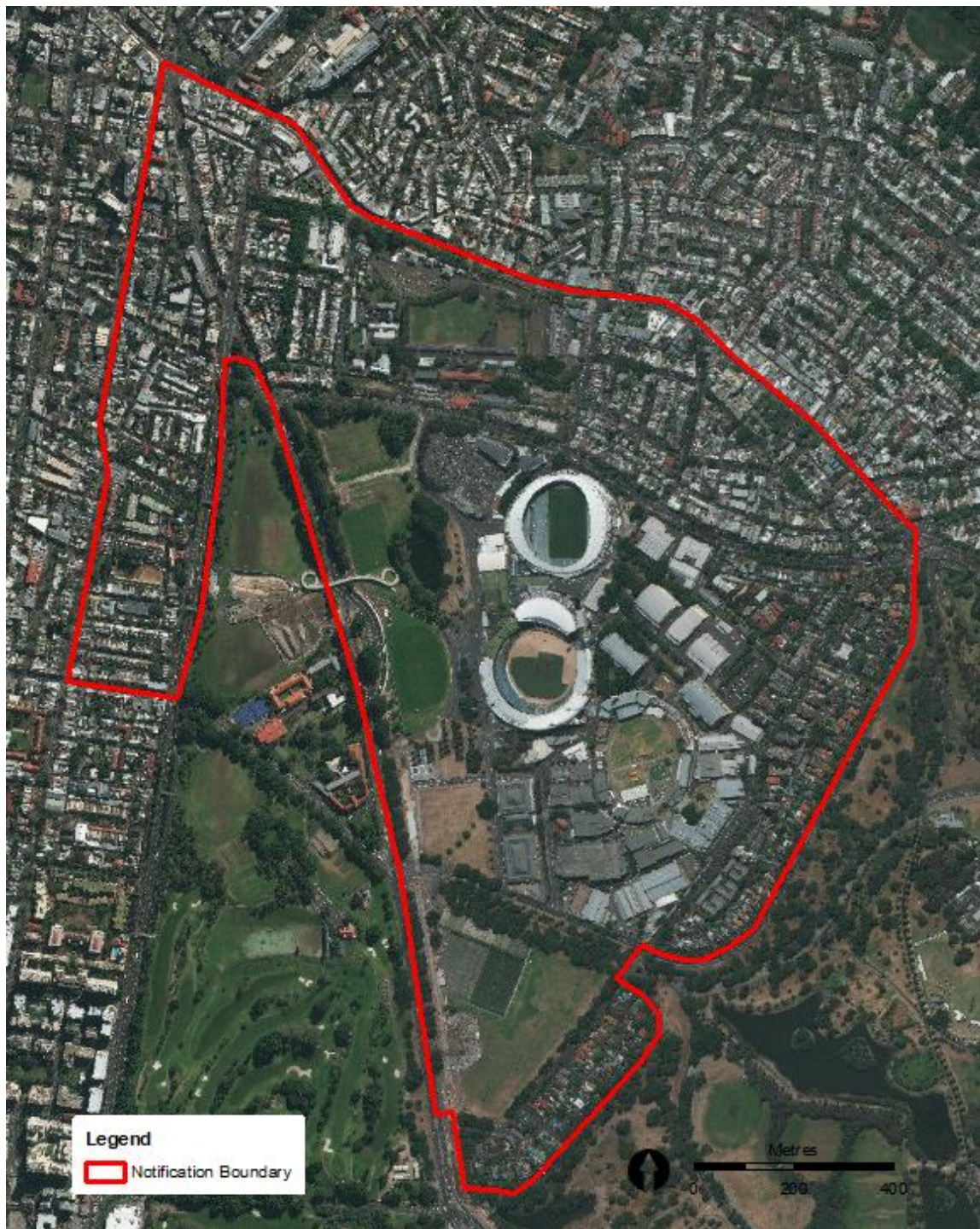


Figure 4: Notification boundary

4.5.3 Pyrotechnics

Requirements for Pyrotechnics displays at the SFS are provided in the following documents.

- Event Planning Pyrotechnics & Chief Warden Checklist (Venues NSW, 2021)
- Venues NSW Pyrotechnics & Special Effects Policy Recommendations (Foti International Fireworks, 2022) - outlines:

- minimum requirements for pyrotechnics and special effects contractors
- permitted areas for use for various aerial shells, ground fireworks, indoor and close proximity fireworks / pyrotechnics, and non-pyrotechnic special effects.
- the Pyrotechnics Policy (Venues NSW, 2021) - states:
Venues NSW does not authorise the use of pyrotechnics which will contradict any part of the act (NSW Protection of Environment Operations Act 1997) or regulation (POEO (Noise Control) Regulation 2008).

All efforts must be made to reduce the amount of noise caused by pyrotechnic displays. Venues NSW stadiums are surrounded by stakeholders who are significantly affected by noise. Pyrotechnics which produce loud noise also pose the risk of inciting crowd panic as loud explosions without warning may simulate gunfire or an explosion of hostile intent. Such issues should be considered when planning a pyrotechnic display and patrons should be given notice via Public Address (PA), Video Screens, IPTV and signage to inform them that pyrotechnics will be used. As a result, pyrotechnics which result in loud and sudden explosions should be avoided.

In the event where a pyrotechnics display is expected to have the potential to impact on surrounding stakeholders due to noise, the respective stakeholders must be notified in writing of the intention to undertake a display which may result in an impact to stakeholder/s. Contact should be made with the relevant representative/s of the stakeholder organisation with such notice as to allow the stakeholder to undertake an assessment of the impact this may pose to their own conditions and operations.

If aerial shells and other high noise impact pyrotechnics are used, the venue hirer, provider and/or the Venues NSW will notify local residents:

- by means of letterbox drop at least 21 days from the date of the display:
- letters will note the date, specific start and finish times of the display/s and details of the pyrotechnics used;
- letters will provide clear details of how to contact Venues NSW should residents have any questions or wish to make a complaint before, during or following the display; and
- letters will also provide details on the Venues NSW information hotline, email address and website where noise management information can be found, including access to a copy of the ONMP (as detailed in Section 5.1).

In addition to notification of pyrotechnics displays outlined in Section 4.5.2, the pyrotechnics provider shall submit a Risk Management Plan addressing noise impacts of pyrotechnic displays on local residents and wildlife shall be provided to Venues NSW, including:

- Transport to,
- bump in and bump out,
- setup,
- circuit testing,
- sleeping,

- firing,
- pack-up; and
- transport from the venue.

Aerial shells and other high noise impact pyrotechnics are not permitted to be used in any display at the SFS.

The Event Management Plan prepared pursuant to Condition D28 also includes details on the use of pyrotechnics and should be referred to,

4.6 Permanent Noise Monitoring System (PNMS)

A noise monitoring system comprising permanent on-site noise monitors has been installed to manage Concert Event noise emissions from the SFS. The Permanent Noise Monitoring System (PNMS) will continuously monitor noise levels during Concert Events which is comprised of the main event, sound checks, and rehearsals. A feedback of real-time noise monitoring data into the event operations control room shall be provided to allow both real-time management of noise emissions as well as facilitate timely response to measured exceedances of noise limits. The live read out shall be made available to front-of-house sound engineers managing the sound system.

The PNMS is not suitable for use with the in-house PA due to the proximity of the monitors to the in-house speakers.

4.6.1 Permanent monitor locations

Two permanent noise monitors have been installed around the perimeter of the stadium bowl. Noise monitor locations are presented in Figure 5 and Figure 6.

While the installation of two permanent noise monitors has been approved by the Planning Secretary's delegate pursuant to Conditions D45, D46 and D47 of SSD 9835, an assessment of the noise monitoring locations at the end of the Trial Period, pursuant to condition E8 of the consent is required to be undertaken at the conclusion of the Trial Period, to confirm that the number and suitability of microphone locations are appropriate.

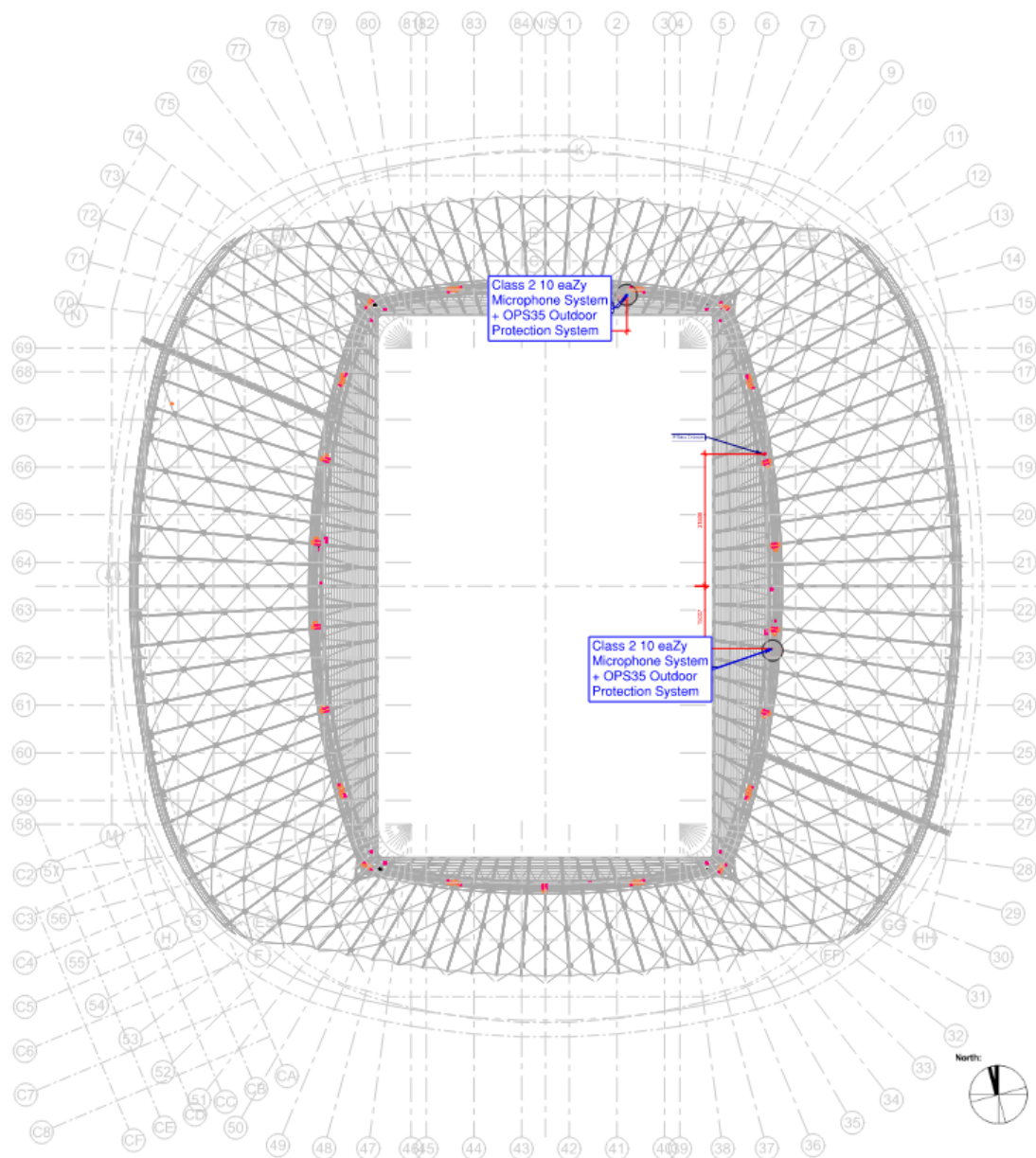


Figure 5: Noise monitor locations - plan view

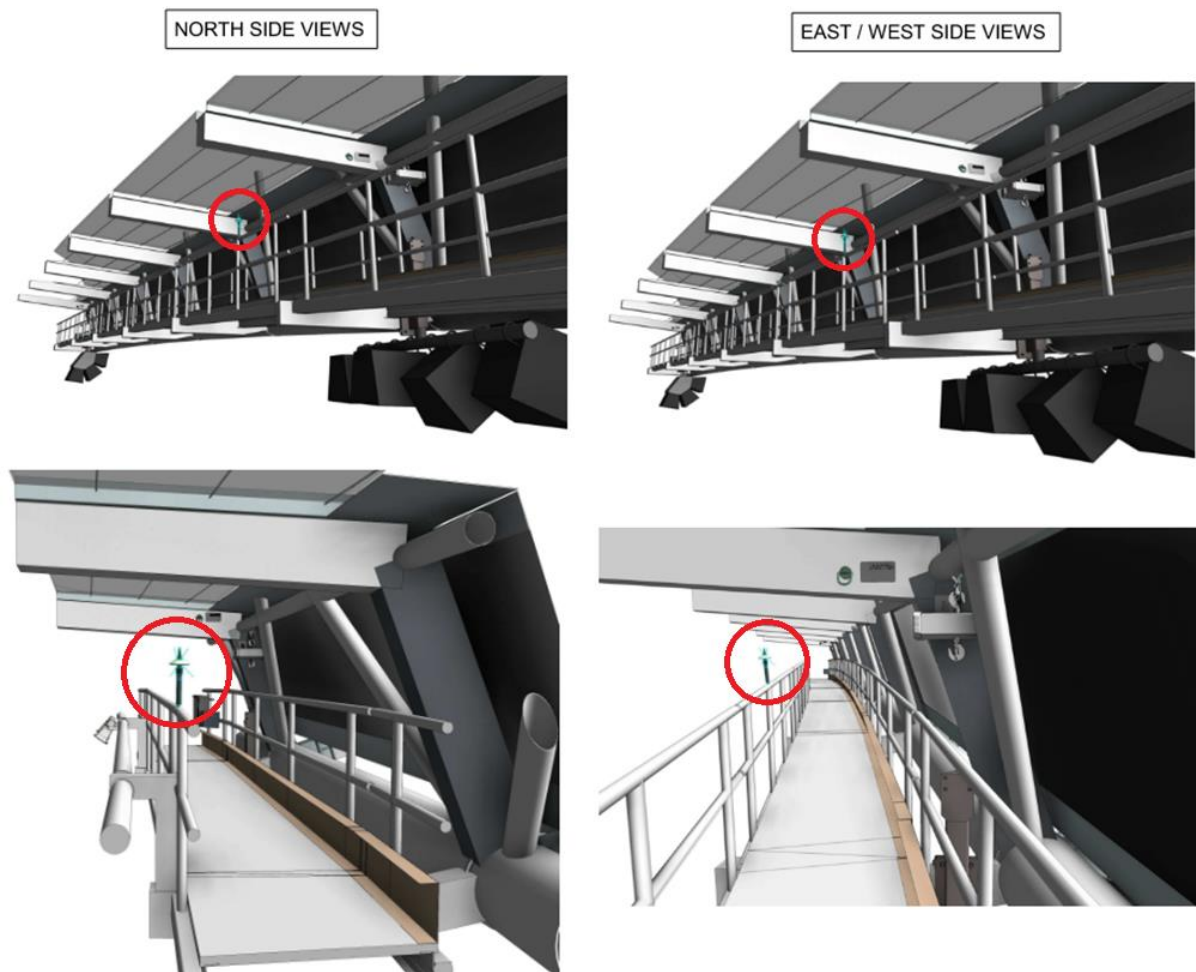


Figure 6: Noise monitor locations - detailed view

4.6.2 Monitoring system transfer functions

The PNMS shall be used to determine noise levels at corresponding worst affected receivers. These levels shall be used to assess compliance with noise limits outlined in Table 9.

Differences between noise levels at receivers and at corresponding permanent noise monitors (e.g. 252 Moore Park Road and northern noise monitor) are termed transfer functions. Transfer functions will vary based on each Concert Event's sound system layout, as discussed in Section 4.8.2. Transfer functions shall be a 1/1 octave bands spectrum rather than a single broadband value.

Transfer functions shall be determined prior to the Concert commencing and during preparatory activities, such as during sound checks. The procedure for establishing transfer functions through attended measurements would be as follows:

- Attended measurements shall be conducted at the potentially worst affected residential receivers, identified as 252 Moore Park Road and 5 Poate Street for typical north speaker facing south configuration (see Section 4.8.2).
- Pink noise (noise having equal energy per octave) shall be played through the Concert Sound System at a level at least 10dB above the background $L_{A90(5min)}$ noise level at the receivers such that the signal is clearly audible. The L_{A90} parameter shall be used to

determine the Sound System contribution. The measurements to derive the Transfer Functions shall only be made during the periods when sound checks are allowed.

- The difference between the octave band noise levels at the receivers and the corresponding permanent monitoring location, defined as the transfer function, shall be used to determine the Representative noise limits.
- The transfer function shall be subtracted from the monitoring system noise levels to determine corresponding noise levels at receivers.

Throughout the 'Trial Period' as defined in Table 6, attended measurements shall be conducted to establish transfer functions. The need for attended measurements to establish transfer functions following the Trial Period shall be subsequently reviewed by DPE following the issue of the Trial Period report, outlined in Section 5.2.2. Should Concert Event speaker configurations be proposed for which an appropriate transfer function has not been established (eg. north facing speakers), additional attended measurements shall be conducted to establish transfer function.

In addition to establishing transfer functions during sound checks, attended noise monitoring shall be conducted during Concert main events throughout the Trial Period. The data collected during this period can be used to determine whether transfer functions are significantly different between sound system configurations, and the need for on-going attended monitoring shall be reviewed after this period.

At the anticipated worst affected receivers along Moore Park Road, which are in the order of 50 metres from the SFS, meteorological conditions are not predicted to have a significant impact, therefore have not been further considered.

4.6.3 Storage of measurement data

Pursuant to Condition E6, the noise monitoring system must be installed and be operative for all Concert Events at the stadium so that real time data for noise measurement and noise monitoring are available at any point in time for the management of noise generation during events.

Data shall be stored on a SFS server such that it can be accessed at any time by the Event Representative.

4.6.4 On-going monitoring system calibration and weather condition check

An Event Representative (as defined in Table 6), will be provided training by a Suitably Qualified Acoustic Consultant, as defined in Table 6. Before and after the use of the PNMS the Event Representative will:

- Perform a calibration check on the monitoring system
- Perform a basic field check of the PWS to confirm wind speeds appear reasonable before each event; and
- Ensure the PWS is calibrated in accordance with the requirements of AS 3580.14:2014

No attended measurements are permitted to be conducted by Venue management, and must be conducted by a Suitably Qualified Acoustic Consultant.

Calibration training will include operating the calibrator, attaching it to the monitor and undertaking calibration using the monitor. In accordance with AS1055-1, in all cases, the

operating instructions for the instrument shall be followed carefully. If the instrumentation system registers a discrepancy equal to or greater than 1 dB between consecutive checks, any measurements in the interval between the two checks shall be considered invalid.

In the case a drift of 1 dB or greater is registered, a Suitably Qualified Acoustic Consultant shall be engaged to address the issue.

Annual calibration of the noise monitoring system is required to maintain accuracy of the system. Annual calibration shall be undertaken by a Suitably Qualified Acoustic Consultant, as defined in Section 2.5.

Annual calibration shall be recorded in Section 8.

Full details of the approved PNMS are provided in Appendix 9.

4.6.5 Monitoring of noise levels during an Event

Real-time feedback provided on the monitoring system displays shall be used by the sound desk operator to adjust sound system noise levels and maintain compliance with noise limits in Table 9, to be overseen by an Event Representative. Staff responsibilities are outlined in 4.7.

It should be noted a single exceedance of the noise limits does not constitute a strict non-compliance with the consent, with details provided in 4.3.1.

Noise monitoring data shall not be used in the assessment against noise limits if corresponding 5 minute average wind speeds exceed 5 m/s.

During periods of wind greater than 5m/s, Venues NSW must continue to take all reasonable and feasible actions to minimise noise in accordance with this Plan, and any other measures deemed reasonable by the Event Representative in the context of the particular situation.

4.6.6 Exceedances of Event noise limits

Should an exceedance of Event noise limits be measured, the Venues NSW Event Representative(s) shall immediately inform the Event operator of the magnitude of the exceedance, and the Event operator shall reduce the settings of the sound amplification system such that the likelihood of a subsequent exceedance is minimised.

The amount of adjustment may depend on the scale of exceedance or the nature of the exceedance event (e.g., a single musical crescendo resulting in an exceedance may not warrant a reduction in settings).

The responsibilities of each party are outlined in Section 4.7.

4.6.7 Non-compliance

If exceedances of noise limits result in a non-compliance, as defined in Section 4.3.1, the Planning Secretary must be notified in writing, as detailed in Section 5.2.3.

4.7 Chain of responsibility

4.7.1 Venues NSW Event Representative

Venues NSW retains ultimate control of the noise emissions from the SFSR, including those caused by any sound amplification equipment operated outdoors.

An Event Representative(s), as defined in Table 6, shall be appointed by Venues NSW for each event at the SFS, with the responsibility and appointed authority to exercise control of noise emissions from the SFS.

The Event Representative(s) shall:

- be provided with and be familiar with the requirements of this ONMP;
- be responsible for the implementation of the requirements of this ONMP;
- be provided with the necessary resources and authority to implement the requirements of this ONMP, including the authority to require the sound desk operator to reduce noise levels;
- be available throughout the event to receive complaints regarding event noise;
- be available throughout the event to provide event noise information via the Hot Line; and
- ensure prompt response and / or implementation of mitigation measures.

4.7.2 Event operator

Event operators, including sound engineers, and their subcontractors shall operate under the responsibility of Venues NSW, namely the Event Representative.

The Event Operator and staff shall:

- be provided with and be familiar with the requirements of this ONMP;
- be responsible for enacting the direction of the Event Representative and Venues NSW;
- be provided with the necessary resources and authority to implement the requirements of this ONMP;
- be available throughout the event to receive direction from the Event Representative and Venues NSW and be contractually required to act on those directions;
- be available throughout the event to provide event noise information to the Event Representative and Venues NSW; and
- ensure prompt response and / or implementation of mitigation measures as directed.

4.7.3 Venues NSW Operations Representative

A representative from Venues NSW's Operations team shall be responsible for the implementation of noise management measures outside of Event times, including the management of noise from grounds maintenance and deliveries waste collection outlined in Section 4.9.

4.8 Setup of sound amplification systems

4.8.1 In-House PA

During commissioning of the In-House PA system, the PA system noise level which corresponds with the amplified sound noise limits during sports or other events of $60\text{dB}L_{Aeq(5\text{min})}$ at surrounding residences shall be determined and a system noise limiter shall be applied at this level to ensure compliance is maintained. This may be undertaken using the attended monitoring method outlined in 4.6.2.

Limiter settings shall be reviewed annually by a Suitably Qualified Acoustic Consultant utilising the same attended monitoring method to account for drift. Results of the limiter setting review shall be recorded in Section 8.

Calibration of the noise limiter will be based on an $L_{Aeq(\text{period})}$ of a typical vocal announcement and musical recording of equivalent length, assuming the PA system may be used for 5 minutes consistently.

4.8.2 Concert Sound Systems

Sound systems for Concert Events will be provided by the Event Organisers. Concert speakers are likely to be arranged in one of three configurations:

1. Typical configuration: speakers are located at the north facing south, away from the nearest most potentially affected receivers along Moore Park Road.
2. Non-typical configuration A: Speakers located at the centre.
3. Non-typical configuration B: Speakers located at the south of the stadium.

Predicted differences in noise impacts to surrounding receivers between these scenarios are presented in Table 12.

Table 12: Noise emission comparison for varying Concert speaker configurations

Speaker configuration		Indicative noise emission comparison at worst affected receiver	
Name	Description	$L_{Aeq,5\text{minute}}$	$L_{Zeq,5\text{minute}}$ 63 Hz
North	Speakers located northern end facing south	Lowest noise configuration	Lowest noise configuration
Centre	Centre: Speakers located centre facing outwards	15 dB higher than North configuration	10 dB higher than North configuration
South	South: Speakers located at southern end facing north	20 dB higher than North configuration	15 dB higher than North configuration

For the non-typical speaker configuration where speakers are located in the centre of the stadium facing outwards, significantly higher noise levels at the worst affected receivers are anticipated. These configurations should therefore be avoided where Concert Event noise levels are anticipated to be an issue. Notwithstanding, it may be possible to operate

with non-typical speaker configurations while complying with Concert Event noise limits provided transfer functions are established using the procedure outlined in 4.6.2.

4.8.3 Mobile speaker systems

The use of mobile speaker systems, such as in the Precinct Village or Fitness Facilities outdoor areas, must meet amplified sound noise limits as outlined in Section 4.3 or Section 4.4 for an Event or Non-Event period respectively.

Compliance with the more conservative non-event noise criteria outlined in Section 4.4 may be demonstrated by meeting the compliant conditions outlined in Table 13.

Table 13: Compliant conditions for mobile speaker systems

Activity	Number of speakers outside stadium bowl	Noise limit of each speaker at 5 m with Pink Noise signal at operating volume	
		Distance of any speaker to nearest residence	
		100 m	200 m
Event – during an event	1 to 5	84 dB(A)	90 dB(A)
	6 to 10	81 dB(A)	87 dB(A)
	11 to 20	78 dB(A)	84 dB(A)
Non-event – 8am to 10 pm	1 to 5	69dB(A)	75dB(A)
	6 to 10	66 dB(A)	72 dB(A)
	11 to 20	63 dB(A)	69 dB(A)
Non-event – between 10pm and 8am - No mobile speakers to be used			

Consent for any stand-alone events on non-event days that are not captured by Conditions A17 and the Event Management Plan will be subject of a separate future approval.

4.9 Deliveries, maintenance and clean up

Maintenance work on the SFS precinct including playing field and internal stadium are limited to times outlined in Table 8. All works undertaken outside of these hours would be subject to the non-event operational noise limits in Section 4.4.

Loading dock and waste management procedures are outlined in the Loading Dock Management Plan (Venues NSW, July 2022) and Waste Management Plan (TTW, June 2022) respectively.

Where possible, bump-in and bump-out activities shall be restricted to the SFS basement loading dock where loading activity noise will be contained.

The following noise control measures shall also be implemented:

- traffic control around the stadium perimeter (limiting associated idling/ horn noise);
- position bin service area/loading bay away from entrances to shops or residential premises (limiting associated bin servicing/loading bay noise);

- minimising set-up and pack-down duration by scheduling contractors and activities; and
- contractor management for the minimisation of set-up and pack-down noise emissions.

A representative from Venues NSW's Operations team shall be responsible for the implementation of noise management measures outside of Event times, as specified in Section 4.7.3.

5. Responsive management

5.1 Complaint handling

Complaints during an event will be managed as per the Sydney Football Stadium Event Management Plan (Venues NSW, 2022). Complaints during an event will be collected via email, phone or through the Venues NSW app/website, each of which is detailed below:

- Complaints line: 02 9360 6601
- Email address: reception@venuesnsw.com
- Website: www.venuesnsw.com

The above details will also be provided within any notification letters distributed to adjoining properties as part of the notification processes describe in Section 4.5 of this ONMP.

In the event a noise complaint is made, the following steps shall be undertaken:

1. Complaint details will be recorded in a complaint register, to be maintained by Venues NSW. Details will include:
 - Name of staff receiving complaint;
 - Date and time of complaint and corresponding event;
 - Name, address and telephone number of complainant (if available);
 - Nature of complaint;
 - Wind speed and direction; and
 - Response action taken to date.
2. The Venues NSW Representative should immediately notify the venue operations centre. Following the end of the current 5-minute noise measurement period, should an exceedance of noise limits occur, noise levels shall be reduced by the amount of the exceedance.

If no exceedance is noted, current noise levels shall be recorded in the complaint register.

The record of complaints will be held by Venues NSW as the SFS operator for at least five (5) years after the complaint was made.

5.2 Reporting requirements

Reporting requirements following Concert Events are outlined below.

5.2.1 Following each of the first three Concert events

Real time noise measurement data from the first three Concert Events, as defined in Table 6, must be provided to the EPA and the Planning Secretary. The data shall be obtained at the identified permanent noise monitoring locations, to demonstrate:

- a. how measurements were conducted to determine transfer functions;

- b. how the results have been used / will be used to ensure compliance with the noise objectives established for the stadium; and
- c. that the equivalent noise limits at the sensitive receivers are achieved at all times.

Venues NSW must submit a report with the noise measurement data and supporting analysis to EPA and the Planning Secretary within two weeks of the completion of each of the first three Concert Events using amplified music to:

- a. obtain written advice and comments from the EPA and the Planning Secretary regarding compliance with the ONMP after each of the three Events; and
- b. obtain written advice from the EPA and the Planning Secretary regarding any additional management measures and or refinement of the ONMP required after each of the three Events. Such advice can be obtained for each individual Concert Event or cumulatively.

If non-compliance is reported during these Concert Events, the written advice from the EPA and the Planning Secretary must be obtained and appropriate actions undertaken including (but not limited to) refinement of the ONMP, prior to the commencement of the next music event at the stadium, following the Event where the noise measurements were undertaken, and data was submitted.

5.2.2 At completion of Trial period

At the completion of the Trial Period as defined in Section 2.5, Venues NSW must produce a report to the satisfaction of the Planning Secretary, which includes a detailed review of the noise limits and monitoring locations to demonstrate that the noise generated by the various types of Events at the stadium comply with the intent of the noise limits established in Stage 2 SSD DA – Noise and Vibration Assessment (Arup, 2019) and which was to ensure that noise impacts will be no greater than those experienced under the statutory Notice of Preventive Action 1003904.

Included in the report must be:

- Summary of all noise monitoring results of each of the first three music concerts or any other event using amplified music;
- Description of musical genre of each concert;
- Details of the exclusion of any data from wind, rain or crowd noise;
- Details of any exceedances and breeches of the noise limits;
- Review of the noise limits and complaints;
- Review of PNMS to confirm that the number and suitability of microphone locations are appropriate.

Pursuant to Condition D8 of SSD 9835 and the Planning Secretary delegate's approval of the permanent noise monitoring system approved to satisfy Condition D45, the Post Trial Completion Report will assess the performance and suitability of the noise monitoring locations at the end of the Trial Period and determine whether the approved and installed number of monitors (2) and suitability of microphone locations is appropriate or requires revision.

A copy of this report must be submitted to NSW EPA for information.

Written advice and comments from the EPA and the Planning Secretary shall be obtained along with any additional management measures and or refinement of the ONMP, having regard to compliance with Condition E9.

5.2.3 Upon a non-compliance

Within seven days of a non-compliance, defined in 4.3.1, the Planning Secretary must be notified in writing to compliance@planning.nsw.gov.au.

The notification must identify:

- the development and application number
- the Event, date and times in which the non-compliance occurred
- the number and magnitude of exceedances of noise limits which define the Event as non-compliant as outlined in 4.3.1
- the nature of activities taking place during the non-compliance
- the mitigation measures employed during the Event to reduce noise emissions
- details of any complaints which were registered during the Event as outlined in Section 5.1
- Proposed measures to prevent further non-compliances at future Events.

If a non-compliance is reported, the written advice from EPA and the Department must be obtained and appropriate actions undertaken including (but not limited to) refinement of the ONMP, prior to the commencement of the next music event at the stadium, following the event where the noise measurements were undertaken, and data was submitted.

5.2.4 Event Acoustic Report - Reporting requirements following a Concert Event

Noise monitoring results

Within 2 working days of completion of a concert event publishing noise monitoring results on a Venues NSW web page.

Reporting

Within 30 days of a concert, an Event Acoustic Report shall be submitted to the EPA, which would include:

- The name, address and telephone number of the report author;
- The relevant date(s) and the commencement and completion times of the test(s), rehearsal(s) and Concert(s) on each day;
- The estimated total number of people that were anticipated to attend the Concert(s) on each day and the number who actually attended;
- Musical genre of the Concert(s);
- A statement of any time(s) at which the noise level limits were exceeded and why, the level(s) and duration of any exceedance(s);

- A determination on whether these exceedances constituted a 'non-compliance' in accordance with Section 4.3.1;
- Any other information relevant to the consideration of the noise impact from the event on residents or other sensitive receptors;
- A summary of the number, location and times of any feedback received by the Trust;
- If any exceedances occurred or any feedback received, details of what the Trust intends to do (or do differently) for any future events; and
- Any other information relevant to the consideration of the noise impact from the event on residents or other sensitive receptors

6. Review mechanism

Venues NSW will implement an annual program of review for the ONMP to assess its effectiveness in achieving key noise objectives.

This ONMP shall be reviewed annually at the end of the Twelve-Month Event Period. The review shall be conducted in consultation with a Suitably Qualified Acoustic Consultant, the EPA and the DPE.

Recommendations from the EPA and the Department made to Venues NSW for changes to be made to the ONMP will be appropriately considered and addressed where feasible.

In conducting the ONMP review program the following steps will be undertaken:

- review of both the Concert and Non-concert Event noise limits with consideration to complaints received over the Trial period.
- review of the relationship between $L_{Aeq(5min)}$ and L_{Amax} for Concert Event noise.
- confirmation that the Concert noise impacts will be no greater than those experienced under the statutory Notice of Preventive Action 1003904 including a report to address condition E8.
- review any existing 'Opportunities for Improvement' identified during the previous annual review;
- assessment of compliance with noise and time limits through review and analysis of noise monitoring data;
- review of the complaints register, as well as any complaints made to the EPA or City of Sydney Council regarding Event noise to identify common causes or locations of complaints;
- an evaluation of the complaints register will be undertaken in conjunction with the assessment of compliance with noise and time limits to correlate complaints with limit exceedances;
- recommend 'Opportunities for Improvement' for the following Twelve-Month Event Period which have been identified as a result of the review process; and
- consider the outcomes of the review and incorporated relevant improvements into the ONMP revision in consultation with an Suitably Qualified Acoustic Consultants.

7. Record of consultation

7.1 EPA

Documentation has been provided to the EPA for the purpose of consultation. VNSW has received correspondence from the EPA (appended to this document), advising that “the draft ONMP has been submitted to the EPA in accordance with Condition D48 of SSD 9835 which states, “The plan must: be prepared by a suitably qualified and experienced acoustic expert in consultation with the EPA, the Department and SCSGT.” The EPA is the Appropriate Regulatory Authority (ARA) for outdoor entertainment activities under the Protection of the Environment Operations (General) Regulation 2021 and must maintain a regulatory arm’s length from commenting on post-approval management plans required by conditions of the SSD 9835. The EPA has no comments to provide on the draft ONMP, and no follow-up consultation is required”.

7.2 SCSGT

Venues NSW was established on 1 December 2020 following amendments to the Act to consolidate the responsibilities and operations of the former Venues NSW and the Sydney Cricket and Sports Ground Trust (SCSGT). The Sydney Cricket and Sports Ground Trust (SCSGT) is now known as Venues NSW. The ONMP has been prepared by Arup, however the plan is a Venues NSW issued document, endorsed and coordinated by Venues NSW.

7.3 The Department

This ONMP has been issued to the Department of Planning and Environment who have provided review comments (SSD-9835 - D48 Draft ONMP - DPE Consultation Table, DPE 2022).

These comments have been addressed and amendments incorporated into this ONMP (Draft V6) as required.

7.4 Consultation Schedule

The following schedule reproduces all feedback received from XX received during the preparation of the Operational Noise Management Plan and how that feedback has been addressed. It should be noted that during the drafting process section numbering and referencing changed and accordingly may differ between the *Feedback Provided* and the *Response* columns. The *Section Reference* column refers to the numbering as per this version of the Operational Noise Management Plan. Where feedback has been considered and not triggered a revision to the Operational Noise Management Plan, an ‘n/a’ has been inserted in the Section Reference column.

Feedback Provided	Response	Section Reference
EPA		
I note that the draft ONMP has been submitted to the EPA in	Noted.	N/A

accordance with Condition D48 of SSD 9835 which states, "The plan must: be prepared by a suitably qualified and experienced acoustic expert in consultation with the EPA, the Department and SCSGT."		
The EPA is the Appropriate Regulatory Authority (ARA) for outdoor entertainment activities under the Protection of the Environment Operations (General) Regulation 2021 and must maintain a regulatory arm's length from commenting on post-approval management plans required by conditions of the SSD 9835. The EPA has no comments to provide on the draft ONMP, and no follow-up consultation is required.	Noted.	N/A
The EPA notes that several aspects of the ONMP are inconsistent with the requirements set out in the Prevention Notice that covers this venue.	Comments provided by the DPE have been addressed to bring the ONMP into alignment with requirements in the Prevention Notice.	N/A
DPE - Feedback received 22 July 2022		
A draft version of the ONMP was provided to the Department for the purposes of consultation on 4 June 2022 as required by condition D48(a) - see comments below. The feedback provided in this consultation table does not preclude the Department from requesting further information once the Department is in receipt of the final version of the ONMP.	Noted	N/A
Please ensure that consultation with the EPA, the Department, and the SCSGT has been carried out and documented in accordance with the requirements of condition A24, and that evidence of compliance with A24 is appended to the final ONMP.	EPA: Documentation has been provided to the EPA for the purpose of consultation. VNSW received correspondence from the EPA advising that " the draft ONMP has been submitted to the EPA in accordance with Condition D48 of SSD 9835 which states, "The plan must: be prepared by a suitably qualified and experienced	This table

	acoustic expert in consultation with the EPA, the Department and SCSGT." The EPA is the Appropriate Regulatory Authority (ARA) for outdoor entertainment activities under the Protection of the Environment Operations (General) Regulation 2021 and must maintain a regulatory arm's length from commenting on post-approval management plans required by conditions of the SSD 9835. The EPA has no comments to provide on the draft ONMP, and no follow-up consultation is required" Details of this Consultation will be referenced in the plan. SCSGT: Venues NSW was established on 1 December 2020 following amendments to the Act to consolidate the responsibilities and operations of the former Venues NSW and the Sydney Cricket and Sports Ground Trust (SCSGT). The Sydney Cricket and Sports Ground Trust (SCSGT) is now known as Venues NSW. The ONMP has been prepared by Mat Simon of Arup, however the plan is a Venues NSW issued document, endorsed and coordinated by Venues NSW. No further validate should be required on this basis. The Department: Details of the Consultation (the subject of this document) will be listed as part of the plan.	
Table 8 of the ONMP states that the duration of concert events (rehearsals & sound tests) will be "Kept to absolute minimum". This is vague. How will timing be minimised in practice?	In practice, promoters do not hold lengthy rehearsals or sound tests as it is a costly exercise given the artist is in attendance. The statement "kept to absolute minimum" is accurate for what happens in practice.	Table 8: Activity time limits
Recommend adding a note to s1.2 of the ONMP that all receivers are relevant, and require compliance	ONMP was v4 updated accordingly.	Section 1.2

with the noise limits (not just representative receivers).		
Table 9 adopts a noise limit for "sporting/other events" as an LAeq(5min) 60 dBA level which was derived from the EIS. It is noted that this is significantly less stringent than the LAmix 60 dBA level in the EPAs Notice of Preventive Action 1003904, but is supported with justification in the 30 Aug 2019 Noise & Vibration Impact Assessment (NVIA) (s5.3.2.1). This condition requires the ONMP to have noise limits consistent with the EIS, which is what has been included in the ONMP. However, condition E8 requires that at the end of the trial period, the Applicant must produce a report for various types of events to ensure that noise impacts will be no greater than those experienced under the statutory Notice of Preventive Action 1003904. The "sporting/other event" noise limit would also need to be reviewed based on the outcome of the report required as part of condition E8 after the trial period. Additional comments regarding the above is provided further in the relevant sections below.	There exists ambiguity in the conditions, in that the sporting noise limits are prescribed as LAeq(5min) 60 dBA in accordance with the EIS and as per condition D48, however Condition E8 refers to the Notice. The intent of this Condition is understood to ensure a robust LAmix to LAeq conversion is developed for Concert Events only. During the preparation of the State Significant Development application, extensive studies and consultations were undertaken into establishing appropriate Concert and Non-concert event limits, with a report outlining and justifying the amended limits prepared for both DPE and EPA (AC06 v1 SFSR Alternative noise management framework, Arup, March 2019). This was followed by a face to face meeting with DPE and EPA, and receipt of an email from DPE to INSW (Sydney Football Stadium Stage 2 - alternative noise management framework, 16 April 2019) outlining key issues required to be addressed in relation to the alternative noise management framework. It addresses verification of Leq noise limits as equivalent to LAmix noise limits, but states the verification during the trial period is "required to validate if the -10dB correction in the ARUP report, used to derive the recommended LAeq noise criteria of 70 dB LAeq,5-min is equivalent to, or better than the LAmix 80 dB(A) criteria in the Prevention Notice." This does not refer to the 60dB LAmix level for sporting events, and is understood	Table 9: Event noise limits

	to have been omitted intentionally as the 60dBA LA_{max} level had been rationalised as inappropriate and impractical, and would be replaced with the 60dB LA_{eq} limit. The absence of issues raised with the proposed 60dBA LA_{eq} limit or the extensive justification presented during the meeting or subsequent report, indicates the 60dB LA_{eq} criteria was accepted as the revised non-event noise limit, and this was considered a consensus across all parties when the Consent Conditions were prepared. Notwithstanding, clarification of Condition E8 would be beneficial to reflect this intent.	
Section 4.3 of the ONMP states that noise limits only apply for wind speeds up to 5 m/s. The PNMS is designed based on best available technology to capture noise under the highest wind speed practicable and is not limited to 5 m/s. Condition D47 was included in the consent (post the EIS Draft ONMP which referred to 5 m/s) which requires that "reliable noise levels can be measured under the highest wind speed practicable" from the PNMS. The PNMS is proposed to be fitted with a GRAS high performance wind shield. The GRAS data sheet is attached for reference. The Noise Policy for Industry states, "Exceptions to this rule (i.e > 5m/s) are allowed provided the proponent is able to show that the wind-induced noise on the microphone, and sound levels due to rain, are at least 10 dB below the noise levels under investigation." Also, the Department notes that for LA_{eq}	It is a widely accepted point of view that the measurements under rain conditions are not generally valid. Rain raises the level of general noise in the ambient, which is impossible to overcome. The windshield has been created and provided to provide protection to the 5m/s wind speed, as is generally accepted. To be able to include that the measurements can be used at wind speeds above 5m/s the operator will need to compare data between weather events and periods of no wind to establish whether the wind shield provides greater protection than to what it was designed and created. This is not something that can be established pre operation as neither the consultant, installer nor the manufacturer can guarantee anything outside of the original manufacture specification.	Section 4.3

measurements, the period should be excluded based on an average wind speed as per the Noise Policy for Industry (EPA, 2017). Based on the addition of the high performance (low noise) wind shield, and the GRAS data sheet, the ONMP should be revised to provide maximum allowable wind speeds for each criteria (i.e 70 dBA, 90 dBZ@63Hz) based on the calculated transfer functions. It is noted that the measured noise level at the PNMS would be higher than the criteria at the receiver, and it is expected that the PNMS would function under most wind conditions.		
Please clarify if the in-house PA noise limiter will be set so that the noise level does not exceed an LAeq of 60 dB or will it be adjusted considering the typical time the PA is used over a 5 minute period during a sporting event? The reason for this question is, if the PA for sporting events is only used in short bursts then the received LAeq noise level could be much higher than 60 dBA and still be compliant with the LAeq(5min) noise limit. This would increase the risk of complaints, and for short term PA events, a 5 minute criteria may not be appropriate. This should be reviewed during the trial period to ensure "the intent of the noise limits established in Stage 2 SSDA - Noise and Vibration Assessment prepared by ARUP dated 30 August 2019 and which was to ensure that noise impacts will be no greater than those experienced under the statutory Notice of Preventive Action 1003904". It may be more appropriate to adjust the in-house PA noise limit based on	The LAeq(5min) parameter was developed over the SSDA in consultation with DPE and EPA and it is not considered feasible to amend the project noise limit parameters, stipulated in Condition D48c(v) as being consistent with the SSDA. As discussed in item 5, the intent of equivalency with the Notice was to establish Concert noise LAeq limits equal to LAmix limits, rather than non-concert limits. Moreover, the LAeq parameter requires a time period by definition, an LAeq level alone is undefined.	Section 4.8.1

an LAeq level as opposed to an LAeq(5min) level.		
This requirement is not detailed in section 4.1 as indicated in the Table 4 compliance matrix.	This row of Table 4 has been amended to refer to Section 4.4 - Non-event noise limits. Section 4.4 has been clarified to include: Where activities in the Public Domain occur outside of Event time limits, such as extending after the duration of an Event, non-event noise limits apply.	Table 4: SSD 9835 Condition D48 ONMP requirements
What events do Table 10 apply to? The table and description is unclear and could do with some more explanation on how it is applied, and how it was derived. The table could be taken to read that a non-compliance would only be triggered if there were multiple significant exceedances during an event. It seems to suggest: • Four separate exceedances above 5 dBA or for 20 minutes. • A 2-5 dB exceedance could occur for up to 40 min (8x5min) plus 30 min (3 x 10 min) plus 15 min (1 x 15 min). • In total 85 minutes of an event could be 2- 5 dB above the limit and an additional 20 minutes more than 5 dB above the limit. The adoption of this definition for non-compliance, could lead to multiple and significant exceedances of the concert event noise limit. Justification for this definition should be provided. The impacts will need to be shown to be no greater than those experienced under the statutory Notice of Preventive Action 1003904 at the end of the trial period.	These values were developed in consultation with DPE prior to the preparation of the Draft ONMP (August 2019) and are in line with the Sydney Opera House noise management protocols. Justification for more than a single exceedance being considered a non-compliance is to establish a degree of noise management in line with the previous noise management procedure for Allianz Stadium, where noise levels attributed to concert noise were based on periodic attended monitoring and were largely dependent on the particular time and location of the measurement, the influence of extraneous noise (eg. road traffic) and operator discretion on the level of contribution of concert noise to measured levels. Exceedances of noise limits outside of measurement periods would not have been recorded, but limits on practicality prevented any more concerted noise management. The introduction of the PNMS allows for continuous monitoring throughout the Concert duration, which provides a higher degree of control, but with this comes more scrutiny of noise emissions at any time during a Concert. Some leniency is considered necessary	Table 10: Breach of Project Approval conditions

	to equate the level of stringency of the new management system with the previous. Moreover, exceedances would only register at the end of a 5 minute measurement period, and sound system noise levels would be reduced retroactively, hence some periods of exceedance are necessary as part of a functioning active management system.	
The ONMP defines the trial period as 3 concert events. In the NVIA draft ONMP, the term 'Trial Period' is defined to extend over the first two "Twelve Month Event Periods". There is a significant disparity between what is proposed in the EIS and the submitted draft ONMP with regards to the trial period definition. Recommend revising the ONMP to align with that definition.	The ONMP has been revised with the Trial Period to extend over the first 12 months, providing additional time to assess validity of transfer functions over a number of Concerts and similar events. The robustness of the transfer functions and the need for additional attended measurements to establish transfer functions "shall be subsequently reviewed by DPE following the issue of the Trial Period report" as outlined in Section 4.6.2.	Table 6: Definitions
This condition requires the use of the PNMS during "different types of events" throughout the trial period, not just for concerts as proposed in s4.3 & s4.6 of the ONMP. Correspondence email from DPE (email dated 16/4/19 to Tom Kennedy attached) states that the alternative noise management methodology is based on a number of assumptions which must be validated based on actual events once the new stadium is operational, hence the requirement to monitor a sufficient number of different events. Recommend revising the ONMP to require the use of the PNMS during different types of events throughout the trial period.	The definition of a Concert Event is: An Event which incorporates the use of sound amplification equipment other than the SFS in-house PA system. This includes not only performances but also associated activities such as rehearsals and sound checks. Events other than Concert Events, by definition, must not use sound amplification other than the in-house PA. For these events (Non-concert Events), the electronic noise limiter will ensure compliance with the non-event noise limits. Since noise limits only apply to amplified sound, the application of the PNMS to 'Concert Events', and noise limiters to the in-house PA, are considered by definition to	Table 6: Definitions

	cover all events to which noise limits apply. To clarify the ONMP, the definition of a Concert Event has been amended to say: An Event which incorporates the use of sound amplification equipment other than the SFS in-house PA system. This includes not only performances but any different type of event which may also include associated activities such as rehearsals and sound checks.	
Recommend revising s4.6.2 to include a requirement for transfer functions to be established outside of the trial period for any concert configurations that don't have an established transfer function.	ONMP v4 was updated accordingly.	Section 4.6.2
It is noted that s5.2.2 addresses this condition. However, s4.3 specifically talks to noise limits. Recommend revising s4.3 to include a reference to condition E8 which requires a review of the noise limits at the completion of the trial period.	ONMP v4 was updated accordingly to refer to revising noise limits.	
Limited details have been provided in s4.9, and only some sources of noise are addressed. It is unclear how the control measures will be implemented, and who is responsible.	Reference to noise and time limits and the PNMS for management of amplified sound was included in ONMP v4. Additional items for the management of noise from deliveries, waste management and grounds maintenance have been included, with reference to the Loading Dock Management Plan and Waste Management Plan, as well as an additional requirement for a Venues NSW Operations representative to be responsible for non-event noise management measures.	Section 4.9

This has not been provided in sufficient detail to address this condition.	Section 4.5.3 – Pyrotechnics has been amended to include reference to: • Event Planning Pyrotechnics & Chief Warden Checklist (Venues NSW, 2021) • Venues NSW Pyrotechnics & Special Effects Policy Recommendations (Foti International Fireworks, 2022) • Pyrotechnics Policy (Venues NSW, 2021) and sections added from each relevant to noise management.	Section 4.5.3
S4.6.4 states, “The Event Representative will be permitted to only calibrate the monitoring system, as required before and after a Concert Event”. Recommend changing the wording to, “The Event Representative will perform a calibration check on the monitoring system before and after the use of the PNMS”.	ONMP v4 was updated accordingly.	Section 4.6.4
S5.2.1 is not consistent with condition E10 which includes reference to, “any other event using amplified music”. Recommend revising s5.2.1 to align with condition E10.	ONMP v4 was updated to read: <i>Real time noise measurement data from the first Concert Events, as defined in Table 6, must be provided to the EPA and the Planning Secretary.</i> <i>By definition, this includes any event which incorporates amplified music other than the in-house PA.</i>	Section 5.2.1
The review mechanism should include: • Review of both the concert and sporting/other event noise limits with consideration to complaints received over the trial period.	Following on from 5 c(v) above, ONMP v4 updated to say: • review of both the Concert and Non-concert Event noise limits with consideration to complaints received over the Trial period.	Section 6

Review of the relationship between LAeq(5min) and LAmax for event noise. Confirmation that the noise impacts will be no greater than those experienced under the statutory Notice of Preventive Action 1003904 including a report to address condition E8.	- review of the relationship between LAeq(5min) and LAmax for Concert Event noise. - confirmation that the Concert noise impacts will be no greater than those experienced under the statutory Notice of Preventive Action 1003904 including a report to address condition E8.	
Condition E6 requires that "The noise monitoring system as required by condition D45 must be installed and be operative for all events at the stadium, except the deemed-to-comply events". In the context of E6, the Department has considered the following: - Event is defined in the NVIA draft ONMP as, "An entertainment activity carried out outdoors which incorporates the use of sound amplification equipment.". There is a separate definition for concerts. However, the consent defines event as a planned public or social occasion. The definition provided in the consent prevails. - Appendix F of the NVIA states, "Under the proposed method, noise monitors will be installed within the stadium. The monitor will provide a continuous read out to staff operating the mixing desk (for concerts) or PA system (for sporting events)." This was also considered in the Department's assessment report.	The draft ONMP was prepared as an indication of the management framework which would be developed throughout the detailed design of the stadium and development of the PNMS. Further understanding of the capabilities and limitations of the PNMS have informed the use of the PNMS. The need to monitor the in-house PA system using the PNMS is considered necessary with the more reliable, less onerous method of implementing a noise limiter on the PA system. This was always considered the intent of the PNMS from inception through to design. The use of the PNMS to monitor in-house PA noise levels throughout each sporting event is not considered reasonable because: - A significant proportion of noise measured by the PNMS during sporting matches would be from the crowd, to which noise limits do not apply. Delineating crowd noise from PA noise is impractical, so measurements would not be considered useful in assessing against noise limits. This is not the case for Concert Events where sound system noise will be dominant. - No noise monitoring was previously conducted during sporting matches at Allianz	Section 4.8.1

Section 3.6.1 of the NVIA draft ONMP indicates that the noise monitoring system would be used for concerts, and s3.6 of the same plan provides that the PNMS will be installed to manage noise emissions from the SFS generally. These statements do not preclude sporting events. Based on above points, and as E6 currently stands, the PNMS is to be used for all events at the stadium, except deemed-to-comply events. Therefore, the system will need to be used for sporting events. Section 4.6 of the ONMP states, "The PNMS is not suitable for use with the in-house PA due to the proximity of the monitors to the in-house speakers." The PNMS does appear close to the in-house system (though noting the speakers are directional and could be directed away). The PNMS could still be used to confirm the noise limiter is operating correctly for sporting events. This data would also be used for evaluation purposes at the end of the trial period. Therefore, please revise the ONMP to require the use of the PNMS to monitor noise emissions from all events at the stadium.	Stadium. The introduction of the PNMS was intended to replace the previously conducted attended monitoring during Concert Events. - The use of the PNMS in addition to the noise limiter to control in-house PA outputs is considered redundant. Using the PNMS as a 'back up' check in case the noise limiter fails is considered an impractical cost for the very unlikely scenario of a limiter failure, and would be difficult to detect during a match in any case due to the influence of crowd noise. - The requirement to conduct calibration checks before and after each Event, in addition to data storage and weather checks required for use, and development of a transfer function for the in-house PA, with no practical purpose for the measured data, is not considered reasonable. The in-house PA noise limiter will require calibration at the nearest residents and the limiter will be constantly operational throughout its lifetime, which alone is considered a reliable means of controlling amplified noise output.	
S4.6.1 should include justification why two PNMS is sufficient (as opposed to the NVIA draft ONMP which proposes 4). Therefore, the proposed 2 monitoring locations is inconsistent with the NVIA draft ONMP. The Department may recommend revising the ONMP to require 4 monitoring locations if no strong justification is provided in the ONMP.	While preparing the system and in the context of the site, it was identified that the limiting factor in terms of noise levels was the northern and eastern site, which are covered by the two proposed monitors. The sites that could be affected on the southern side are at a far greater distance and therefore, when calibrated, these monitors would never be used as limiters.	Section 4.6.1

	The northern and eastern monitors would trigger at far lower levels. Two monitors simplify equipment installation and maintenance as well as compliance.	
The conditions of consent require the trial period to: • Conduct regular monitoring of the noise generated by the stadium (E7); • Establish robust relationships between the Leq5min and LFmax and intermediate monitoring locations (E7); • Obtain data to undertake a detailed review of the noise limits and monitoring locations to demonstrate that the noise generated by the various types of events at the stadium comply with the intent of the noise limits established in the Approvals (E8); and • Validate noise limits and noise monitoring system (D48 (xi)). Correspondence email from DPE (email dated 16/4/19 to Tom Kennedy attached) states that the alternative noise management methodology is based on a number of assumptions which must be validated based on actual events once the new stadium is operational, hence the requirement to monitor a sufficient number of different types of events. The trial period should include monitoring of sporting events to confirm the in-house PA system is operating correctly, the receivers are compliant, and data is obtained for analysis at the end of the trial period as required by E8. Recommend revising the ONMP to	As per comment provided above.	Section 5.2.2

require a sufficient number of attended monitoring events during the trial period for a range of sporting events including, but not limited to, a Big Bash League event, state or finals events, and the like. It is noted that the ONMP defines the trial period as 3 concert events. However, in the NVIA draft ONMP, "Trial Period" is defined to extend over the first two "Twelve Month Event Periods". The trial period should be sufficient to evaluate all the requirements of the trial period.		
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8. Record of calibration and limiter settings

[illegible]

9. Approved PNMS Details

Ms. Stephanie Ballango
Director
Consultant to Infrastructure NSW
P.O. Box R220
Royal Exchange, NSW 1225

25/07/2022

Dear Ms. Ballango,

**Sydney Football Stadium Stage 2 Redevelopment (SSD-9835)
Permanent Noise Monitoring System and Permanent Weather Station
Conditions D45, D46 and D47**

I refer to your Permanent Noise Monitoring System (PNMS) and Permanent Weather Station (PWS) submission seeking approval of the Planning Secretary in accordance with condition D47 of SSD-9835. I acknowledge and thank you for your response to the Department's review comments, and requests for additional information.

I note that the submission:

- has been reviewed by the Applicant, and no issues have been raised;
- contains the information required by condition D45 and D46 of the consent; and
- has been submitted to the Department prior to operation of the Stadium.

As nominee of the Planning Secretary, I approve the PNMS as detailed in documentation compiled by Auditoria dated 24 February 2022, and the PWS as detailed in documentation compiled by Davis Instruments dated 14 April 2020, in accordance with condition D47 of SSD-9835. The PNMS and PWS are approved subject to the following. The Applicant must:

1. Install only Class 1 sound level meters at the two noise monitoring locations.
2. Ensure the Stadium Operational Noise Management Plan (ONMP) requires an assessment of the noise monitoring locations at the end of the trial period, pursuant to condition E8 of the consent, to confirm that the number and suitability of microphone locations are appropriate.
3. Submit the final details of the PNMS to the EPA for their information as required by condition D47 of the consent.
4. Ensure the ONMP requires:
 - (a) a basic field check of the PWS to confirm wind speeds appear reasonable before each event; and
 - (b) the PWS is calibrated in accordance with the requirements of AS 3580.14:2014.
5. Ensure the PWS is capable of providing a 5-minute average of the wind speed.
6. Ensure the ONMP describes the exclusion rules for invalid noise data. The rules must ensure that the exclusion of LAeq measurements are based on average wind speeds and discusses the

procedures for determining the average wind speed above which, noise measurements may be excluded so that data is obtained under the highest wind speed practicable.

7. Prior to the first concert event occurring at the Stadium, install an anemometer at each noise monitoring location as required by AS 1055:2018, if the requirements of AS 3580.14:2014 cannot be achieved, as part of the PWS.

If you wish to discuss the matter further, please contact Hala Fua, who can be contacted at hala.fua@planning.nsw.gov.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'D Crinnion', with a horizontal line drawn above it.

Dominic Crinnion
Acting Director
Infrastructure Management
As nominee of the Planning Secretary



Noise Monitoring System Proposal for Sydney Football Stadium – Amended Proposal

Date: Thursday, 24 February 2022

This document presents the proposed noise monitoring systems for SFS. This document is an amendment of the previous system proposed for the stadium. We conducted a trial of the system and it became clear that custom software would be required to achieve the measurements included in the Sound Management Plan that will be in place for the venue.

Background and discussion

The system presented in this document directly addresses Section D45 and D47 of the Head Contract. The characteristics that the system must conform to, as stated in that document are:

- Permanent and real time.
- Records noise generated by the stadium activities.
- Capable of reporting different frequencies and metrics including 5 minute L_{eq} and 63 Hz octave data.
- Protection for wind noise. It is stated that windspeeds allowed need to be above 5 m/s.
- System must be installed prior to commencement of operations.
- System must be submitted to the satisfaction of the Planning Secretary at least 3 months prior to commencement of operations and submitted to the EPA for information.

It is understood that, ultimately, a noise management plan will be prepared to limit emissions from the stadium. The system proposed in this document addresses the characteristics above as well as typical requirements of systems for compliance with a Sound Management Plan. It should be noted that conditions in a venue's Sound Management Plan can differ widely. We have reviewed the Sound Management Plans for the Sydney Cricket Ground, Bankwest Stadium (now CommBank Stadium), the Sydney Opera House, the Domain and Centennial Park. The system that we propose would be able to comply with the measurement descriptors set in any of the above. Measurement location strategies differ in the above. This is addressed in the following sections.

An additional document that has been reviewed is AS1055:2018 Acoustics – Description and measurement of environmental noise. This standard describes typical requirements and methods for the measurement of sound that are relevant to this application.

Measurement system description

The proposed system is a 10Eazy Class 2 microphone and interface solution. The microphone and interface will connect to a computer running Rational Acoustics Smaart SPL.



The system complies with the requirements of a Class 2 system as deemed suitable in AS1055:2018 for outdoor noise measurements. It is worth mentioning that AS1055:2018 only requires a Class 1 system when correction for impulsive sources as required. This would not be the case in this application. The system will be delivered calibrated according to NATA. The measurement system will be supplied with a calibrator under current calibration.

The system will be supplied complete with a weather protection unit. The proposed protection unit is the iSemCon OPS 35-285, which provide protection against condensation and dust. A simple wind shield is included in the unit. Further to that, we are in the process of procuring a high performance custom microphone windshield as manufactured by G.R.A.S.

The measurement system would be able to log different temporal characteristics including instantaneous levels (Fast and Slow) as well as timed averages ($L_{eq-x \text{ minutes}}$). Percentage levels could be derived from the units log. The measurement system will be able to provide frequency spectrum characteristics including A and C-weighted measurements, as well as octave band data. A combination of all spectrum and time options are available. This addresses the requirements of the Head Contract as well as the differing requirements from the Sound Management Plans mentioned above.

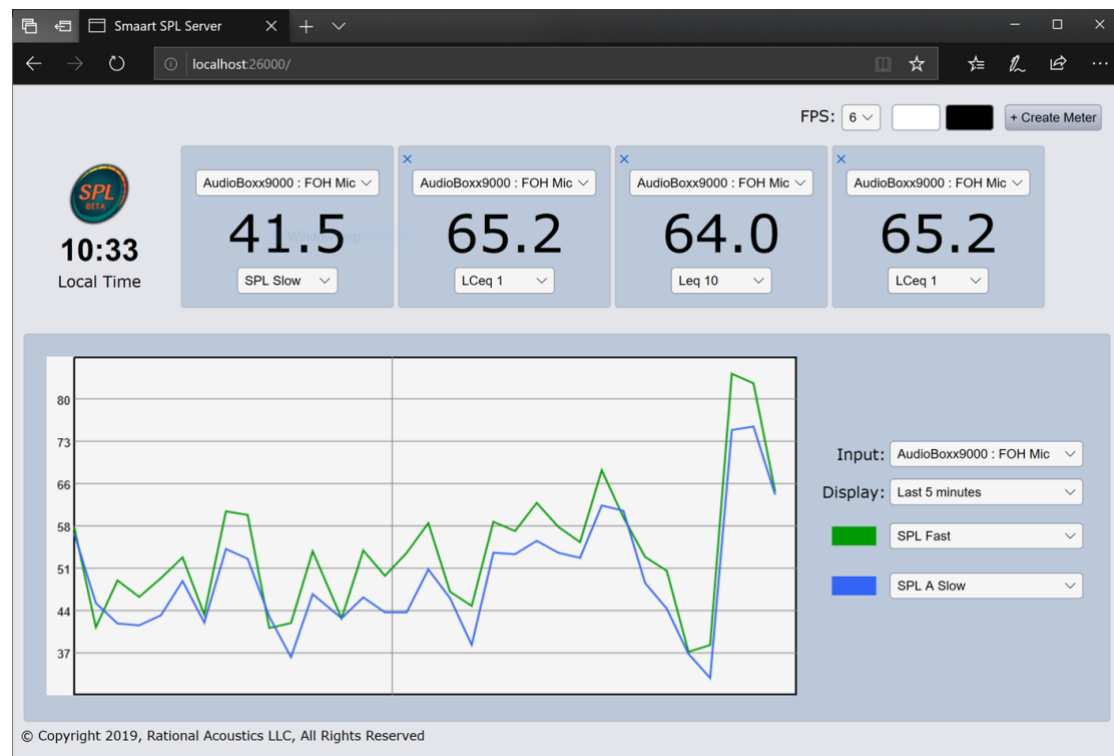
The system is run through a rugged minicomputer to which the two interfaces will be connected. Data is stored on the computer and available for further analysis. This addresses the requirement of recording of data as included in the Head Contract as well as making reporting possible as generally required by Sound Management Plans.

The interface at the main monitoring location includes a clear view of all the measurements of interest as well as a system of alarms to alert the user when levels are getting close to breaches or have surpassed the limits. The interface is highly customisable, an example is shown below.





Smaart SPL provides the ability to share and display information over a web browser interface. In terms of operation, the system will be primarily used to limit and inform FOH operators. We believe that the familiarity of the Smaart interface is a great advantage in providing the people trusted to manage levels at the venue with the best possible tools. Screen shots of the web interface are shown below. Please note that the descriptors being shown can be customised.



Measurement strategy

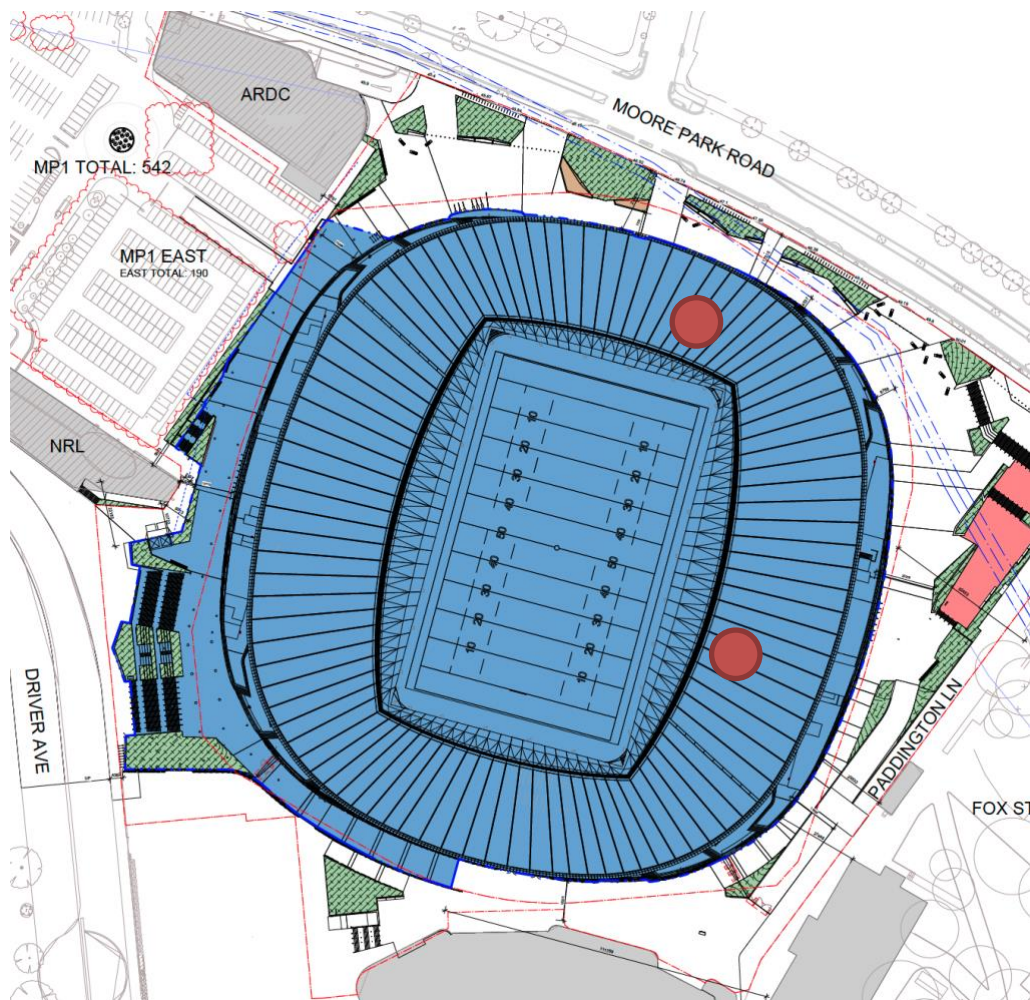
The requirements of a permanent system and current trends in noise monitoring point to a location within the stadium as the best possible option for installing the proposed system. We believe the best possible solution is to install the system within the gantries or catwalks of the stadium.

Historically, noise measurements for limiting purposes have been conducted near or at the most affected receivers. However, in recent years, this trend has reversed and an approach in which measurements closer to the source are conducted has been favoured. This is in place now at the Sydney Opera House for outdoor events, CommBank Stadium and The Domain. One of the main reasons for this is that there is less uncertainty about the source of the noise. In urban environments, noise metering at the receiver is typically affected much more by local sources than the source of noise, making very difficult to show compliance or resolve disputes. When measuring closer to the source, we ensure that the level of the source is accurately described. This also has the advantage of not requiring manned verification in most scenarios. We have reviewed the set of documents titled Noise contours, prepared by Arup and dated 04/06/2018. The noise contours are presented for a sporting event as well as a concert event.

These contours clearly show that the worst affected sensitive receivers are to the north and east of the site.

We understand that the noise measurement system needs to address different scenarios. The scenarios we have investigated are the sports system to be permanently installed in the stadium as well as the scenarios shown in the Flexibility Report prepared by Cox and dated Aug 2021. Under the Flexibility Report, it is clear that the use of the venue that could have the greatest impact on nearby residents in terms of noise is the concert setting. The report shows that provisions have been made to support a south facing stage located in the northern part of the stadium. We believe this is the most benign location in terms of noise intrusions to sensitive receivers.

Based on the nearest residents and spill as shown in the noise plots, the configuration of the sports system and the possible configuration of large overlay systems, we would propose two locations as permanent sound monitoring locations. The two locations are shown below in red.





Final details of the locations would be resolved on site. The two locations cover the main areas of concern. The northern point would provide a representation of the typical sound levels of an end section during sports presentation and would capture rear spill from the stage including main system and stage sources in a concert scenario. The location to the east would capture the typical sound levels of a lateral stand during sports presentation and would capture a combination of main and side fill elements in a concert scenario. Both are located in direct line to the nearest affected receivers.

Details of the measurement methodology (i.e. temporal integration and frequency characteristics) would follow the venue's Sound Management Plan. However, the general strategy would be to calibrate the system so that a level within the stadium relates to a maximum prescribed level at the nearest resident. We do not envision that calibration will be required for every day sports presentation. Concerts present too many variables to adequately do without calibration regardless of number of measurement locations. Calibration would be advisable for that type of event.

Another advantage of placing the systems in the gantry is that of additional cover against wind. The Head Contract states measurements with winds above 5 m/s. The proposed system includes weather protection that reduces wind noise. The two strategies ensure that the system excludes wind noise as feasibly possible.

Summary

We trust the system presented in this document addresses the requirements included in the Head Contract. Additionally, the system can be customised to capture, display and report the most common scenarios included in typical Sound Management Plans.

If you would like to discuss any part of this document please contact me at your convenience.

Yours Sincerely,

Luis Miranda Jofre PhD
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