

# Project Controls

## Master Specification

## PC-ENV4 Noise Assessment, Treatment Design and Implementation

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1	Initial issue (formerly G53 Noise Mitigation Treatments) and amended.	05/03/19
2	Formatting for publishing	19/09/19
3	Addition of Clause 3 (Guideline scoping)	August 2020

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# PC-ENV4 Noise Assessment, Treatment Design and Implementation

## 1 General

- 1.1 This Standard Specification sets out the minimum Noise Assessment requirements for the Works under the Contract.
- 1.2 For the purpose of this Part, the 'Works' can be activities associated with planning, design, supply, construction, maintenance or operation as defined by the Contract.
- 1.3 Where readily available and accessible to the Principal, previous or preliminary assessments will be provided to the Contractor.
- 1.4 Department environmental publications are available from <https://www.dpti.sa.gov.au/standards/environment>.

## 2 Contractor's Obligations

- 2.1 The Contractor shall undertake noise assessments, design noise mitigation treatments and where included in the project scope implement all necessary noise treatments for the operational phase of the project and demonstrate compliance at all sensitive receivers in accordance with:
  - a) for road traffic noise – the Department's Road Traffic Noise Guidelines (RTNG);
  - b) for rail noise – the EPA: Guidelines for the assessment of noise from railway infrastructure (EPA GANRI); and
  - c) other noise sources—the Environment Protection Act 1993 and Environment Protection Policy requirements.
  - d) Department Noise Mitigation Manual.
- 2.2 The Contractor may propose an approach that does not conform to the requirements of this Standard Specification. The Contractor shall obtain the Principal's approval, and where necessary the relevant authority's approval, to adopt the proposed approach, which shall constitute a **Hold Point**.
- 2.3 Where the noise assessment is undertaken in accordance with the EPA GANRI or Environment Protection Policies, the Contractor shall consult with the SA EPA as necessary to determine the application of the guidelines.
- 2.4 Where noise treatment is required, priority shall be given to treating the noise at the source, to applicable standards, over treatment at the receiver. Noise treatment measures shall be approved by the Principal.
- 2.5 Where noise criteria are unable to be achieved with the maximum barrier height specified in the RTNG or as specified in the Contract Documents, the Contractor shall seek approval from the Principal to provide property facade treatments.
- 2.6 All modelling and design works under this Standard Specification shall be undertaken by a suitably qualified Acoustic Specialist.
- 2.7 The Contractor shall review all previous or preliminary assessments provided by the Principal to determine, and undertake, all necessary updates to the assessments (including any changes in geometry, traffic volumes, etc.) or determine if they meet the requirements under this Standard Specification.

## 3 Guideline Scoping

- 3.1 The Contractor shall undertake an assessment to determine the applicability, or otherwise, of the RTNG, the EPA GANRI or other relevant guideline based on the scope of the project and the principles of application of the guideline.

- 3.2 Where a guideline is initially deemed not to apply and there is a change in the scope of the project or design modifications, the applicability of the guideline shall be reassessed.
- 3.3 Submission of the Guideline Scoping Report demonstrating the application of a guideline, or otherwise, shall constitute a **Hold Point**.
- 3.4 Where a guideline is deemed not to apply, and accepted by the Principal, no further work under this Part is required.

## 4 Preliminary Noise Assessment

- 4.1 If not completed previously by the Principal, the Contractor shall undertake a Preliminary Noise Assessment including necessary modelling in accordance with this Standard Specification and prepare a Report that includes as a minimum:
  - a) Noise Assessment Boundary;
  - b) all identified assumptions (including calibration factors and existing and proposed pavement type, rail fixing type, rail / traffic volumes);
  - c) monitoring and modelling inputs, results and outputs;
  - d) details of the existing noise levels, predicted noise levels (on opening and 10 years post opening), the relevant noise targets / criteria and the noise achieved at each noise sensitive property (each property to be identified by an ID number that corresponds to a plan);
  - e) identification of noise sensitive receivers eligible to receive noise mitigation treatments under the RTNG and GARNI
  - f) details of the noise mitigation options to be implemented to achieve the noise criteria (e.g. pavement type, barriers, façade treatments, etc);
  - g) noise contour plots and treatment plans (including noise barriers and façade treatments)
  - h) an evaluation of the reasonable and practical noise mitigation measures in accordance with Section 4.5 of the RTNG
  - i) other supporting information as required.
- 4.2 Submission of the Preliminary Noise Assessment Report shall constitute a **Hold Point**.

## 5 Design Basis Report - Noise

- 5.1 For road projects, the Contractor shall undertake a preliminary assessment to determine the applicability of the RTNG (refer Section 3, Assessment Process) and the need to undertake a noise assessment. This would include an assessment as to whether the changes in road geometry are likely to result in a significant increase in received noise levels at sensitive receivers.
- 5.2 Where the noise assessment is to be undertaken utilising the RTNG, the assumptions and modelling inputs shall be provided in the Design Basis Report for approval prior to further works under this part being undertaken.

## 6 Noise Modelling and Mitigation Design Report

- 6.1 The Noise Modelling and Mitigation Design Report shall, at a minimum, include:
  - a) noise assessment boundary;
  - b) all identified assumptions (including calibration factors and existing and proposed pavement type, rail fixing type, rail / traffic volumes);
  - c) monitoring and modelling inputs, results and outputs;
  - d) details of the existing noise levels, predicted noise levels (on opening and 10 years post opening), the relevant noise targets / criteria and the noise achieved at each noise sensitive property (each property to be identified by an ID number that corresponds to a plan);

- e) details of the noise mitigation to be implemented to achieve the noise criteria (e.g. barriers and / or façade treatments);
  - f) detail the level of Façade Treatment requirements for each sensitive receivers;
  - g) noise contour plots and treatment plans (including noise barriers and façade treatments); and
- 6.2 The Contractor must prepare detailed design drawings for all noise mitigation and attenuation treatments identified within the Noise Modelling and Mitigation Design Report including details of barrier locations, heights, materials, finishes, urban design, typical construction details, start and end chainage, total length;
- 6.3 GIS spatial data (i.e. shapefiles) shall be provided for all noise treatments including barriers and house treatments per package.

## 7 Noise Barriers

### Noise Barrier Minimum Design Requirements

- 7.1 Noise barrier design shall be undertaken in accordance with and comply with the Department's Noise Mitigation Manual (Chapter 3).
- 7.2 The following minimum requirements apply to noise barrier design:
- a) Noise barriers shall be designed so as to produce a continuous solid construction, without gaps that would permit the passage of sound. Where gaps are required in barriers for other purposes (e.g. access, drainage, etc) this would require an overlap of noise barriers to achieve the equivalent noise reduction as a continuous solid construction
  - b) Barrier panels shall be constructed with a material to achieve a Weighted Sound Reduction Index  $R_w$ , when determined in accordance with AS/NZS ISO 717.1, of not less than 26 for normal use and an  $R_w$  of not less than 31 where noise reductions of more than 10 dB(A) are required.
- 7.3 The Design Report shall provide documentary evidence that the materials proposed for wall panels and walls comply with the above requirements.
- 7.4 Unless specified otherwise, all design and / or documentation must comply with the requirements of this Part and the Urban Design aspects of the Contract Documents. Consideration shall also be given to the Roads and Maritime Services: Noise wall design guideline (<http://www.rms.nsw.gov.au/documents/projects/planning-principles/urban-design/noise-wall-design-guideline.pdf>).

### Noise Barrier Implementation

- 7.5 Where noise barriers are proposed to be located on the property boundary (private, Local Government, etc) the Contractor is responsible for:
- a) installing the noise barrier as per the design requirements;
  - b) undertaking all necessary community engagement and negotiations to enable noise barrier implementation;
  - c) identifying the existing conditions of the property to enable appropriate reinstatement;
  - d) obtaining a Deed of Consent and Agreement signed by the property owner(s) and co-signed by the Commissioner of Highways (unless otherwise specified by the Principal) prior to undertaking the works, including seeking agreement on details such as finishes and make good provisions. An example of Consent and Agreement can be found in the Department's Noise Mitigation Manual;
  - e) schedule works and arrange access to the property with the owner(s) identified in the Deed of Consent and Agreement or the owner(s) representative (e.g. property management person) as nominated by the owner(s). This will also require seeking an access agreement with any property tenants;

- f) ensure the property is secured to 'lock up' standard overnight or when the Contractor(s) are not on site; and
  - g) obtain a signed Completion of Works certificate when the works have been accepted as complete being co-signed by the property owner(s) and the Contractor's Representative.
- 7.6 The Contractor shall not undertake property works until the Deed of Consent and Agreement has been signed by the property owner(s) and co-signed by the Commissioner of Highways.
- 7.7 The Completion of Works certificates shall be provided to the Principal within two weeks of being signed.

## 8 Property Treatment

- 8.1 The Contractor shall determine sensitive receives eligible to receive Noise Mitigation Treatment Packages in accordance with the RTNG and design and install house treatments in accordance with the RTNG, EPA GARNI, Department Noise Mitigation Manual and / or as specified in this part.

### Property Assessments and Scope of Works

- 8.2 Where noise mitigation façade treatments are to be installed at private properties, the Contractor shall undertake property inspections and consultation with the affected landowners to determine the exact nature of the treatments.
- 8.3 Property inspections shall include attendance by key personnel including an acoustic engineer and community engagement representative. The Contractor shall engage an Architect experienced in acoustic design and installation for design of noise treatments to heritage listed properties and other properties as required.
- 8.4 The Contractor shall:
- a) develop a Scope of Works Document for each property eligible to receive a Façade Treatment Package, including as a minimum:
  - b) a plan detailing building orientation, room use and applicable treatment package;
  - c) scope of noise mitigation treatments to be offered;
  - d) information regarding fixtures identified for treatments (measurements, photographs, observations regarding practical implications for installation); and
  - e) photographs of pre-existing conditions and work area;
  - f) ensure that when designing mitigation treatments, consideration is given to the existing property features to ensure that (where reasonable and practical) proposed treatments conform to the existing style and character;
  - g) undertake discussions and negotiations with the property owners to finalise the Scope of Works and agree on details such as finishes and make good provisions; and
  - h) ensure that the final design generating the Scope of Works for each property will meet the requirements of the approved Noise Assessment and Mitigation Design Report and the Building Code of Australia when the treatments are installed.

### Façade Treatments Design

- 8.5 All Façade Treatments installed shall comply with the Department's - Property Noise Mitigation – Façade Treatment Package Specification. Contractor should particularly note Part 1 - Summary and Part 3 - Drawings. The Specification shall supplement the Scope of Works documents and provides further information regarding:
- a) reference to acoustic performance and specification requirements and suitable proprietary products;
  - b) typical construction drawing details; and
  - c) construction notes regarding practical implications for installation.

## Property Owner Agreement

- 8.6 The Contractor shall obtain a Deed of Consent and Agreement signed by the property owner(s) and co-signed by the Commissioner of Highways (unless otherwise specified by the Principal) prior to undertaking the works, including seeking agreement on details such as finishes and make good provisions.
- 8.7 An example of Consent and Agreement can be found in the Department's Noise Mitigation Manual.
- 8.8 The Agreement, to be approved by the Principal, shall include:
- a) details of the agreed Scope of Works; and
  - b) authority to access the property and undertake works.
- 8.9 The Contractor shall not undertake property works until the Agreement has been signed by the property owner and approval provided by the Principal. Where the property has a tenant an access agreement shall be obtained prior to undertaking works on the property.

## Façade Treatment Implementation

- 8.10 The Contractor shall:
- a) Allow for full time on-site supervision and management to manage work crews and interfacing trades.
  - b) Supervise unloading, storage, movement and installation of all materials on site.
  - c) Allow for the preliminary preparation and full reinstatement (where applicable) and clean-up of the residence during and prior to demobilisation.
  - d) Allow for the removal and disposal of all rubbish and recyclables.
  - e) Only use products that have been approved by the Principal.
  - f) Schedule works and arrange access to the property with the owner(s) identified in the Deed of Consent and Agreement or the owner(s) representative (e.g. property management person) as nominated by the owner(s).
  - g) Ensure access ways within and external to the property are kept free of materials and safe for entry / egress.
  - h) Ensure the property is secured to 'lock up' standard overnight or when the Contractor is not on site, in cases where a window or door has been temporarily removed – e.g. temporary boarding of windows or doors shall be completed if necessary.
  - i) Be responsible for all preliminary and associated works, including temporary preparation of work area, cleaning up and returning furniture to original positions.
  - j) On completion, undertake an inspection of the works and provide a signed Completion of Works certificate when the works have been accepted as complete and co-signed by the property owner(s).
  - k) Issue a Certificate of Compliance with the Building Code of Australia for all works undertaken. The builder shall be appropriately qualified to issue the Certificate of Compliance in accordance with the Australian Building Code.
  - l) Provide a warranty period of two (2) years from the date of co-signing of the Completion of Works certificate by the property owner for all property façade treatments.
- 8.11 The Completion of Works certificates and Certificates of Compliance shall be provided to the Principal within two weeks of being signed.

## 9 Noise Assessment Verification

- 9.1 The Contractor shall verify that noise mitigation treatments comply with relevant noise criteria by completing verification noise monitoring and verification modelling.

- 9.2 Following Completion and the operation of the transport infrastructure at ultimate speeds, the Contractor shall undertake operational noise measurements at or as near as possible to previously monitored locations, to validate the accuracy of the noise models and mitigation provided;
- 9.3 Operational monitoring shall be used to confirm that the implemented noise mitigation meets RTNG and EPA GANRI / Environment Protection Policy requirements by extrapolating the measured levels to traffic / rail volumes forecast in the design year and by validating the noise model.
- 9.4 Adjustments shall be made for traffic / rail flow rates and likely road surface noise corrections at the time of monitoring;
- 9.5 The Contractor shall be responsible for rectifying the implemented noise treatments if the monitoring and verification modelling results do not comply with the RTNG and EPA GANRI / Environment Protection Policy at all sensitive receivers.
- 9.6 The verification shall be undertaken by a suitably qualified Acoustic Specialist.

## 10 Records

- 10.1 The Contract shall supply all monitoring data, reports and modelling data specified in this Part.
- 10.2 Spatial information of final noise treatments implemented, including but not limited to, barriers and house treatments (noise treatment package specific) shall be provided at Completion.
- 10.3 Spatial information shall be provided in accordance with Part PC – SI4 Geographic Information Systems (GIS).

## 11 Hold Points

- 11.1 The following is a summary of Hold Points referenced in this Part:

**Table PC-ENV4 11-1 Hold Points**

Document Ref.	Hold Point	Response Time
2.2	Principal's approval to adopt a proposed approach that does not conform to the requirements of this Standard specification.	10 Working Days
3.3	Submission of Guideline Scoping Report	10 Working Days
4.2	Submission of Preliminary Noise Assessment Report	10 Working Days