

4 December 2015

TG584-01F04 (r2) RE NV Response to submissions

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Dear Madam

Riverstone East Precinct Noise Assessment - Response to Submissions

Introduction

Following exhibition of the Riverstone East Precinct ('Precinct') Indicative Layout Plan and supporting documentation, responses have been received from Transport for NSW (TfNSW) and the public (67 and 87 Tallawong Road and 6 Oak Street) regarding acoustics and land use zoning around the Sydney Metro Trains Facility (SMTF, previously Rapid Transit Rail Facility - RTRF).

Renzo Tonin & Associates carried out the noise and vibration assessment supplementing the Precinct planning, and the following responds to the matters raised in the submissions.

Submissions

67 and 87 Tallawong Road

The public submissions on behalf of 67 and 87 Tallawong Road were both supplemented by a report prepared by Atkins Acoustics (45.7007.R1/GA/DT/2015). The report prepared by Atkins Acoustics however does not refer specifically to 67 Tallawong Road and appears primarily focused with 87 Tallawong Road. The acoustic considerations for both properties differ given their varying proximity to the SMTF, as shown in Figure 1.

The conclusion of the Atkins report is that residential development at 87 Tallawong Road should be acceptable given that other residential development is proposed in closer proximity to the SMTF, and in the same direction (eg. 14 Oaks St and 84 Tallawong Road). The same conclusion however cannot be drawn for 67 Tallawong Road. While the conclusion of the Atkins report is reasonable, the current location of sporting fields is not based on acoustic matters alone. Furthermore, the consideration of

land use development at 87 Tallawong Road cannot be considered in isolation, as the proposed sporting field requires a minimum land area to be functional, and without incorporation of 87 Tallawong Road, the remaining land would be insufficient for use as a sporting field.

Therefore, the proposed land use of 87 Tallawong Road also needs to be considered in the context of possible development of 67, 77 and 83 Tallawong Road.

Figure 1: 67 and 87 Tallawong Road



As outlined in the NWRL RTRF EIS noise report [SLR, NWRL-10046-R-NO-00030-v1.0-Stabling], and reiterated in the Riverstone East Precinct noise and vibration report, the land use planning immediately surrounding the RTRF should aim to incorporate less noise sensitive development or provide some buffer to noise sensitive development. This recommendation based on a precautionary approach particularly as the detailed design of the SMTF is still ongoing. As outlined in the EIS, there were a number of possible mitigation and management measures for the SMTF that would be subject to further assessment. With the uncertainty of these aspects, use of 67 Tallawong Road and 77 Tallawong Road as a minimum buffers were recommended, particularly given their proximity to the maintenance building and other operations at the northern end of the SMTF.

While it is also acknowledged that noise mitigation measures could feasibly be incorporated into future residential development, to mitigate noise from the SMTF, this approach is not commonly adopted for industrial uses, and has only been considered where residential uses were considered the highest and best use with regard to other planning objectives. This occurred on the eastern side of Tallawong Road, where high density residential development was sought in proximity to the Cudjegong Road Station Precinct. The controls required to mitigate potential impacts upon the future residential uses in this area are further discussed in response to the TfNSW submission below.

The Atkins report also raises the matter of noise impacts from the sporting field onto adjacent residential uses. It is noted that the ILP stage is not for the purpose of presenting specific and detailed assessment of proposed uses but rather to assess potential land use conflicts and seek to minimise these as far as practical. Detailed assessments of specific uses will be subject to additional planning and approvals processes. It is however acknowledged that sporting fields can generate noise that impacts surrounding uses dependant on the surrounding environment, proximity to receptors and specific usage. In considering appropriate sites, a location that is secluded from residential uses is unlikely to meet other planning objectives and it is noted that the alternative locations presented in public submission Attachment 3 (Clouston Associates report S15-0106) are also within proposed residential zones. The current location proposed within the ILP was however considered to provide benefits with regard to potential acoustics impact, as follows:

- No residential receivers to the south,
- No residential uses immediately to east due to Tallawong Road,
- Riparian corridor along western boundary provides buffer to residential development, and
- Potentially reduced intrusive impacts at surrounding residential uses based on expected higher background noise levels given the proximity to industrial and commercial uses.

6 Oak Street

Issue 5 discussed in public submission for 6 Oak Street, Schofields relates to the acoustic interface between the subject lot and the SMTF (see Figure 2) and argues that noise from the SMTF will be acceptable due to the stabling area being removed from the northern boundary and buffered by the maintenance building.

Figure 2: 6 Oak Street and relationship to SMTF



The SMTF differs significantly to the stabling facility at Macdonaldtown, both in terms of scale and also that it is a maintenance facility. As outlined in the NWRL RTRF EIS noise report [SLR, NWRL-10046-R-NO-00030-v1.0-Stabling], the predicted noise emission from the facility, emanating to the receivers to the north was predicted to exceed the accepted standards. With regard to Figure 24 in the public submission, other aspects of the SMTF, such as the train wash, wheel lathe, substations and maintenance building are all sources of potential noise impact upon noise sensitive receptors. Furthermore, the proposed R3 zone, which could permit heights up to 12m, would likely result in upper levels being above the maintenance building and therefore buffering from the stabling area would be reduced.

It should also be noted that buildings don't 'absorb excess noise' but can only buffer developments behind them if of an appropriate size. This is what is being demonstrated in Figure 26 in the submission. The façades of buildings exposed to the SMTF would be impacted and likely require mitigation treatment, potential alternative measures for ventilation (rather than open windows).

Transport for NSW

In their submission, Transport for NSW (TfNSW) requested that appropriate planning controls be provided for the residential land adjacent to the SMTF to mitigate the impact of noise from the facility.

As outlined above, the future noise emission from the SMTF is currently unknown. While the Planning Approval for the SMTF requires that all reasonable and feasible noise mitigation measures be adopted in the design of the SMTF, and assessment includes current residential uses surrounding the facility, this does not guarantee that compliance at all future noise receptors will be achieved. Furthermore, the operations of the SMTF are proposed to expand beyond that assessed in the EIS with future expansion of the Sydney Metro network.

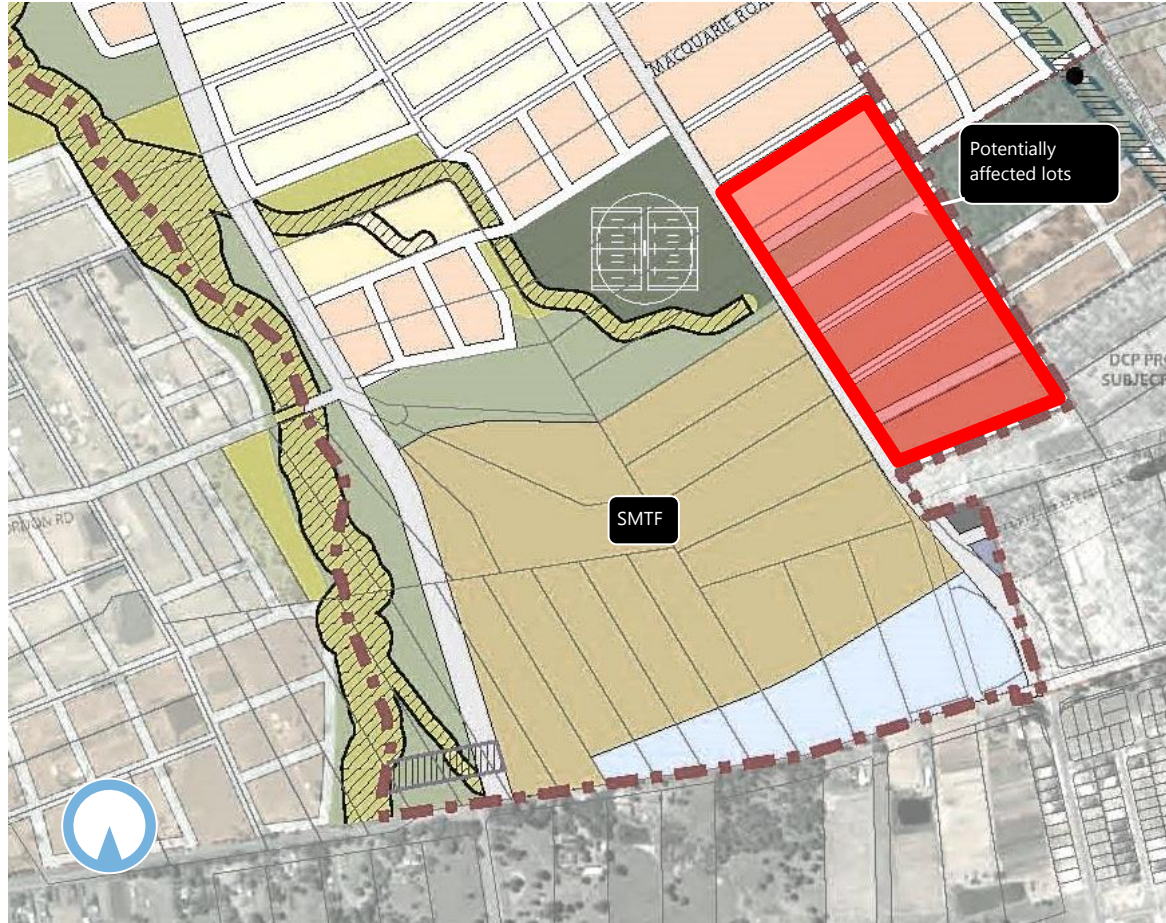
Future noise emission from the SMTF is likely to be better understood following completion and exhibition of the Operational Noise and Vibration Review (ONVR), which is required to be prepared at completion of the detailed design of the SMTF. As this will occur after finalisation of the Riverstone East Precinct ILP, but before development of potentially affected lots, the following approach is proposed for residential development surrounding the SMTF within the Riverstone East Precinct:

- Identify residential lots that may be impacted by future noise from the SMTF and require that site specific development applications be referred to TfNSW for consultation and approval,
- Developers of identified lots to consult with TfNSW regarding potential future noise impacts from the SMTF. Reference may be made to the ONVR or supplementary information available to TfNSW at the time of application,
- Based on the predicted future noise emission from the SMTF, incorporating any considerations by TfNSW regarding future expansion of SMTF, the developer will be required to assess impacts upon the proposed development and provide any required noise mitigation treatment to the building.
- The noise criteria proposed for the future residential development is discussed below.

SMTF potentially affected lots

The potentially affected lots required to be referred to TfNSW are presented in Figure 3.

Figure 3: Potentially affected residential lots [Base map from exhibited ILP]



Noise criteria

Similar to the assessment of residential premises in proximity to busy roads or rail corridors, the consideration and design of residential premises is made with regard to the internal noise levels within the premises. Building orientation and location of sensitive rooms (eg bedrooms) away from the noise source can assist reducing impacts to external areas however external noise criteria, particularly for high density residential development is not always practically achieved. An external noise trigger level can however be set in order to determine whether acoustic mitigation may be required to the building.

External noise trigger levels

The external trigger levels are proposed to be in accordance with the NSW Industrial Noise Policy (INP). The INP sets criteria to protect noise amenity for residential receivers. The basis for its policy relies on two components:

- Controlling intrusive noise impacts in the short term for residences, and

- Maintaining noise level amenity for particular land uses for residences and other land uses.

Noise intrusiveness ensures that industrial noise does not exceed the existing background noise level by an excessive margin. This is commonly referred to as the 'background plus 5' criterion, that is, that the noise level from the new industrial development should not exceed the existing background noise level (measured in the absence of that development) by more than 5dB(A).

Noise amenity ensures that industrial noise levels do not increase without limit, for if a number of industrial noise sources are permitted to increase the background noise level by 5dB(A), in turn there would be a point where the ultimate noise level is unacceptable. A limit on the ultimate acceptable noise level is therefore included in the INP as a way of ensuring that cumulative noise impact from industrial growth is curtailed. This limit is referred to as the amenity goal. The appropriate limit in any circumstance relates to the land use category, for example, there are different limits for rural, suburban and urban areas.

Regarding changes of land use, such as residential subdivisions encroaching upon pre-existing industrial development the concept of there being a background noise level absent of industrial noise is likely to be non-existent. Residents would therefore come to an area with prevalent industrial noise and the question therefore becomes whether or not that industrial noise is an acceptable noise for the proposed land use. This issue is discussed in the INP:

Land uses can change—sometimes dramatically—with an increase in industrial activities, construction of new freeways, or the development of new residential suburbs. A consequence of this is that the land-use designation of an area may change. Changes in designation occur as a result of urban type residential subdivisions in a village or rural area with few residences, or the encroachment of industrial developments near residential areas and vice versa.

In such cases, the primary decision by planning authorities to cause or allow the development would take account of the many consequent implications. As developments introduce increased activities, they also increase environmental noise levels. Therefore, previously low ambient noise levels will not be maintained, and assessments of noise sources for control purposes should be made against the acceptable noise level relevant to the modified land use.

In the circumstances of the Riverstone East Precinct and SMTF, the proposed residential development near the SMTF contemplated in the INP as one in which the previously low ambient noise levels will not be maintained and therefore assessment of the acceptability of the development should be made against the acceptable amenity noise level relevant to the modified land use.

Table 2.1 of the INP sets appropriate noise amenity limits for residential premises for different indicative noise amenity areas for day, evening and night-time periods. In regard to the noise amenity area, the potentially affected lots are considered to be an Urban category for the future environment. The relevant external noise criteria are outlined in Table 1. It is noted that the 'acceptable' levels should be adopted rather than the recommended maximum.

Table 1: Recommended L_{Aeq} noise levels from industrial noise sources

| Type of receiver | Indicative noise amenity area | Time of day | Recommended L_{Aeq} Noise Level, dB(A) for day, evening or night period | |
|------------------|-------------------------------|-------------|---|---------------------|
| | | | Acceptable | Recommended maximum |
| Residence | Urban | Day | 60 | 65 |
| | | Evening | 50 | 55 |
| | | Night | 45 | 50 |

Notes: The recommended acceptable noise levels refer only to noise from industrial sources.

Rural—means an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic.

Suburban—an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry.

Urban—an area with an acoustical environment that is dominated by 'urban hum' or industrial source noise or has through traffic with characteristically heavy and continuous traffic flows during peak periods or is near commercial districts or industrial districts or has any combination of the above, where 'urban hum' means the aggregate sound of many unidentifiable, mostly traffic-related sound sources.

Day: the period 7:00am to 6:00pm Monday to Saturday; or 8:00am to 6:00pm on Sundays and public holidays

Evening: the period from 6:00pm to 10:00pm

Night: the remaining periods.

The acceptable and recommended maximum L_{Aeq} noise levels can provide a guide to applying the negotiation process set out in Section 8 of the INP. While negotiation between the proponent and the community for an agreed noise level can occur at any time, typically the proponent would negotiate with the EPA where noise-level emissions fall between the acceptable and recommended maximum. For site levels beyond the recommended maximum levels, the proponent would need to negotiate directly with the community.

While the Amenity criteria are assessed as an L_{Aeq} over the entire assessment period (day, evening and night), it is recommended that the $L_{Aeq(15\text{minute})}$ period is adopted in line with the INP intrusive criteria, as the peak operating conditions of the SMTF during the relevant assessment periods is more likely to be quantified.

Internal noise criteria

Industrial noise policy

The NSW INP does not outline recommended internal criteria where the external noise levels may exceed the recommended amenity criteria. However if it is considered that acceptable internal noise levels are achieved for residential developments where the Amenity targets are satisfied without the need for building mitigation, then equivalent internal noise criteria can be determined. For a building that does not require noise mitigation, it is assumed that windows/doors can be open. The typical noise reduction from the outside environment to inside a premise via an open window (open 5% of the floor area in accordance with the Building Code of Australia requirements for natural ventilation) is 10dB(A). Table 2 summarises the external trigger levels and equivalent internal noise criteria on this basis.

Table 2: Recommended L_{Aeq} external trigger levels and internal noise criteria for industrial noise sources

| Type of receiver | Indicative noise amenity area | Time of day | Recommended $L_{eq(15minute)}$ Noise Level, dB(A) for day, evening or night period | |
|------------------|-------------------------------|-------------|--|--------------------------------|
| | | | External noise trigger level [^] | Internal criteria [*] |
| Residence | Urban | Day | 60 | 50 |
| | | Evening | 50 | 40 |
| | | Night | 45 | 35 |

Notes: The recommended acceptable noise levels refer only to noise from industrial sources.

Day: the period 7:00am to 6:00pm Monday to Saturday; or 8:00am to 6:00pm on Sundays and public holidays

Evening: the period from 6:00pm to 10:00pm

Night: the remaining periods.

[^] External 'free field' noise level assessed at any window/door of any residential dwelling

^{*} Where the internal noise criteria cannot be achieved with windows/doors open, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

AS2107:2000

In addition to the above, AS2107-2000 "Recommended design sound levels and reverberation time", while not intended for transient or variable sources, does include external industrial noise as a relevant design consideration. The recommended sound levels in AS2107:2000 for residential building vary however dependant on the level of transportation and not an industrial interface. Typically reference is made to the 'major roads' category for the maximum level of acceptability.

Table 3: Recommended design sound levels for different areas of occupancy in buildings

| Type of occupancy/ activity | Recommended design sound level, L_{Aeq} , dB(A) | | Recommended reverberation time (T),s |
|--|---|---------|--------------------------------------|
| | Satisfactory | Maximum | |
| Houses in areas with negligible transportation - | | | |
| Sleeping areas | 25 | 30 | - |
| Houses and apartments near minor roads - | | | |
| Living areas | 30 | 40 | - |
| Sleeping areas | 30 | 35 | - |
| Work areas | 35 | 40 | - |
| Apartment common areas (e.g. foyer, lift lobby) | 45 | 55 | See Note 3 |
| Houses and apartments near major roads - | | | |
| Living areas | 35 | 45 | - |
| Sleeping areas | 30 | 40 | - |
| Work areas | 35 | 45 | - |

NOTES: * See Appendix A of AS2017:2000

1. The recommended design sound levels are for a fully fitted out and completed building. Attention is drawn to the additive noise effect of many machines within the same area and adjacent areas. Allowance for the total number and type of noise sources should therefore be made in the selection of equipment and in the design of building spaces. A building owner or developer may consider an allowance of 3-5 dB(A) to be appropriate.
2. Recommended reverberation time is 10 percent to 20 percent higher than Curve 1 of Appendix A.
3. Reverberation time should be minimized as far as practicable for noise control.

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)

While the ISEPP is applied for development near busy roads and rail corridors rather than industry, the noise criteria has been established by reference to AS2017:2000. The ISEPP is supported by the Department of Planning publication 'Development near rail corridors and busy roads – Interim guideline' (2008) which clarifies aspects such as the time period of measurement and assessment.

Table 4 presents the ISEPP internal noise criteria for residential premises. The noise levels for living rooms are at the mid-point between the satisfactory and maximum noise levels within AS2107-2000 for developments near major roads and apply at all times. Criteria for the bedrooms differ between the day and night time period, with the day time period aligning with living rooms, while the night time period again being the mid-point between the satisfactory and maximum noise levels within AS2107-2000 for developments near major roads.

Table 4: ISEPP noise criteria for new residential development

| Room | Location | L _{Aeq, 15hr} Day 7am – 10pm | L _{Aeq 9hr} Night 10pm – 7am |
|---------------------------------------|--------------------------|--|--|
| Bedrooms | Internal, windows closed | 40 | 35 |
| Living room and other habitable rooms | Internal, windows closed | 40 | 40 |

Proposed project goals

On the basis of the noise criteria discussed above, the following internal noise objectives are proposed for industrial noise intrusion where the external noise amenity targets are exceeded.

Table 5: Recommended L_{Aeq15minute} residential internal noise criteria for industrial noise sources

| Indicative noise amenity area | Time of day | Room type | Recommended L _{eq(15minute)} , internal noise level, dB(A)* |
|-------------------------------|-------------|--|--|
| Urban | Day/Evening | Bedrooms | 40 |
| | | Living rooms and other habitable rooms | 40 |
| | Night | Bedrooms | 35 |
| | | Living rooms and other habitable rooms | 40 |

Notes: The recommended acceptable noise levels refer only to noise from industrial sources.

Day: the period 7:00am to 6:00pm Monday to Saturday; or 8:00am to 6:00pm on Sundays and public holidays

Evening: the period from 6:00pm to 10:00pm

Night: the remaining periods.

* Where the internal noise criteria cannot be achieved with windows/doors open, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

Design for mitigation of external noise should also consider the cumulative impact of industrial noise with other ambient noise such as road traffic. Reference to other policies and guidelines, such as the ISEPP and supporting guideline should be made with regard to assessment time periods.

Indicative design implications

As an indication of the potential implications for residential buildings proposed on the eastern side of Tallawong Road, a brief assessment with regard to the building mitigation measures has been carried out. With reference to the unmitigated SMTF operational scenarios presented in the NWRL EIS, external noise levels of up to 53dB(A) were predicted during the early morning period to the east of the site. Generally standard building constructions can achieve noise reductions of at least 20dB(A) from outside to inside with windows/doors closed, without the need for specific noise control treatment. With the exception of potential requirements to provide mechanical ventilation to affected rooms, the internal noise criteria and resulting noise mitigation treatment of residential buildings is unlikely to involve significant building upgrades such as double glazing.

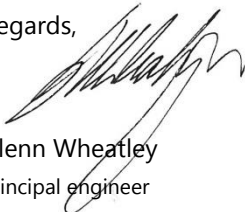
Conclusion

This letter responds to submissions received from TfNSW and the public regarding the noise assessment prepared for the Riverstone East Precinct planning process. The submissions focused on the land use planning around the Sydney Metro Train Facility (SMTF, previously RTRF) and the required controls for mitigating noise impacts and protecting residential amenity.

Discussion has been provided with regard to the adoption of active open space to the north of the SMTF as well as proposed controls for the protection of residential development proposed on Tallawong Road opposite the SMTF.

The development assessment process and criteria relevant to proposed residential dwellings opposite the SMTF on Tallawong Road are to be incorporated into the Riverstone East Development Control Plan.

Regards,



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