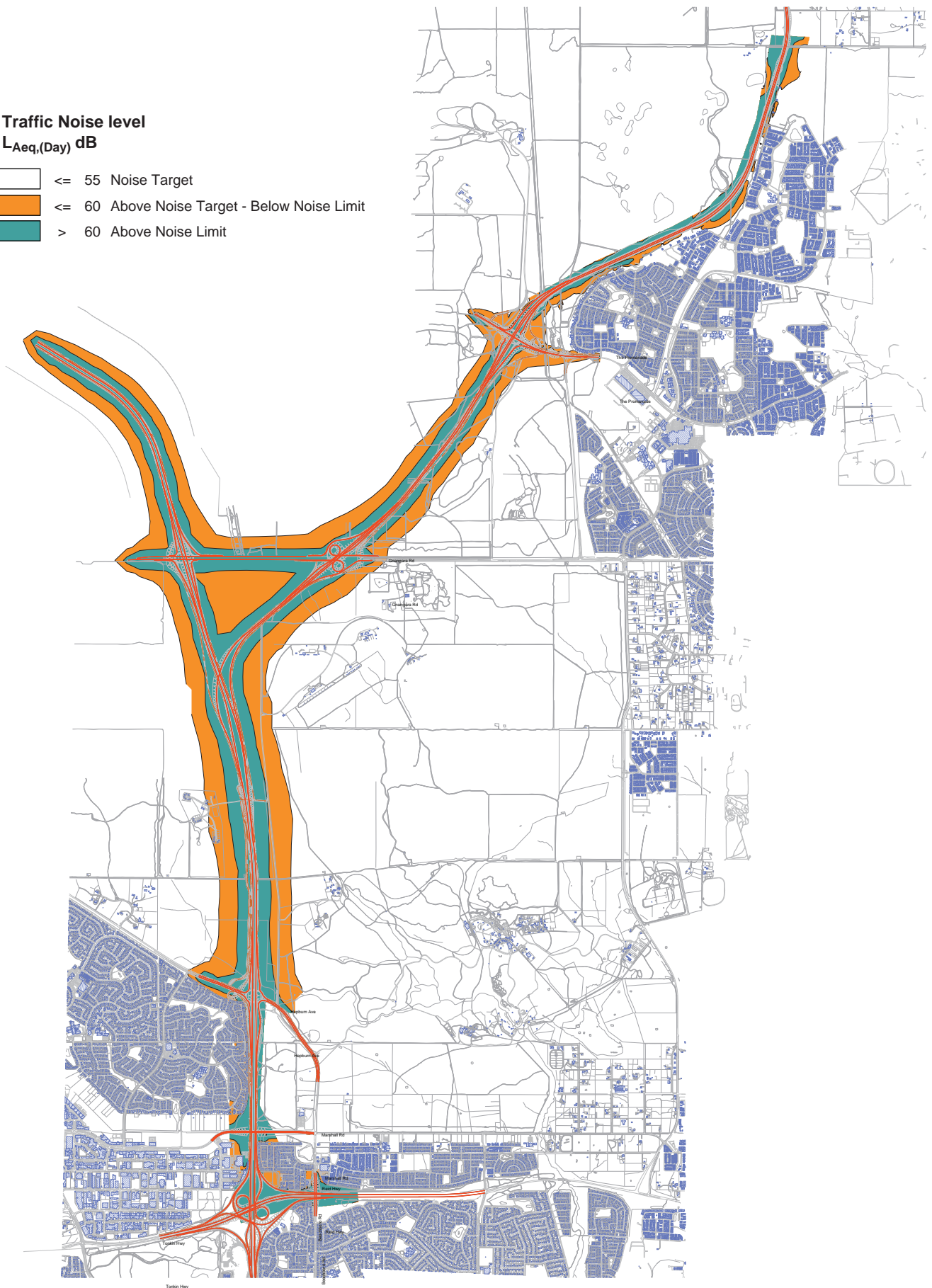
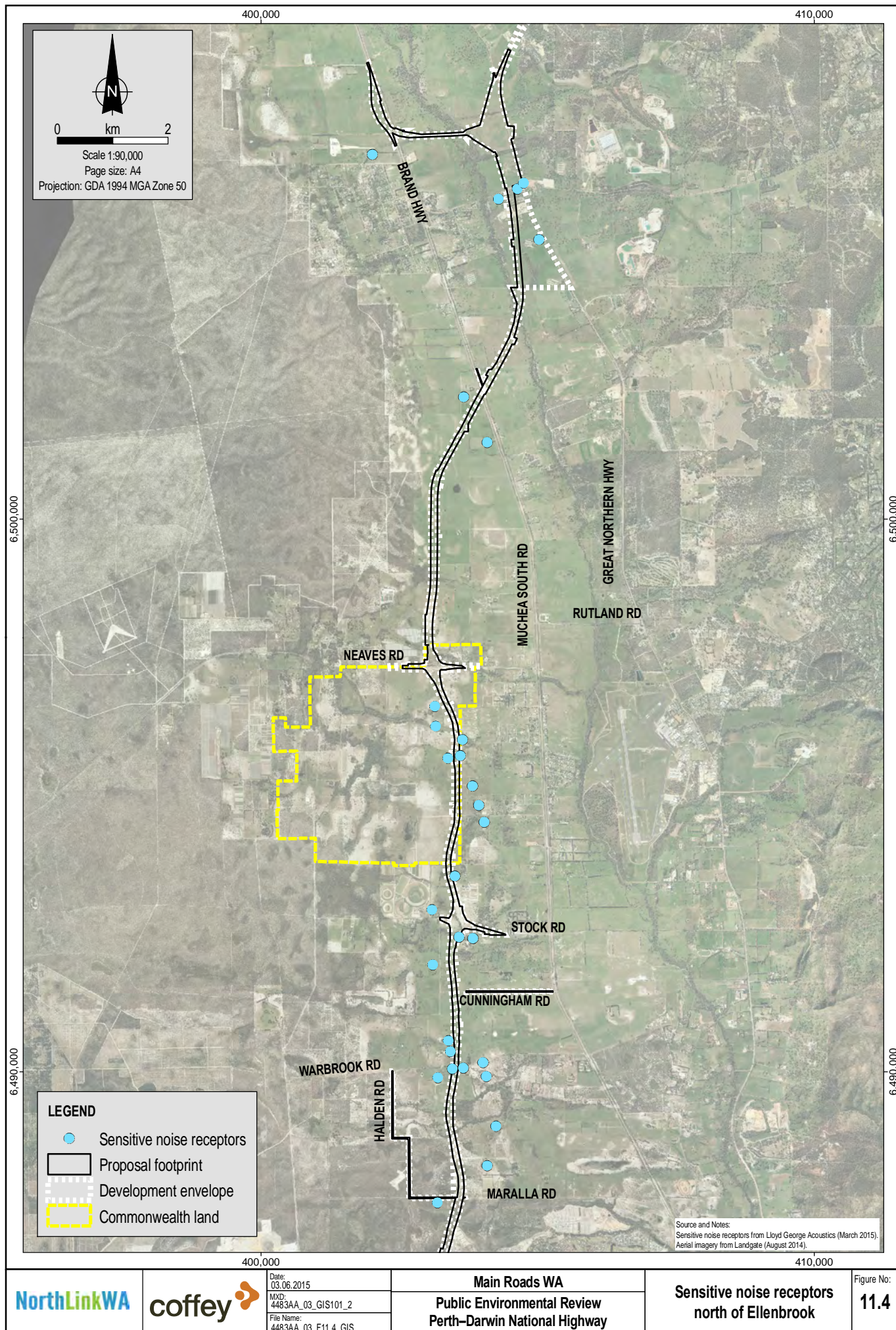


Traffic Noise level

$L_{Aeq, (Day)}$ dB

- ≤ 55 Noise Target
- ≤ 60 Above Noise Target - Below Noise Limit
- > 60 Above Noise Limit







11.6.1 Construction Noise and Vibration

Construction noise will comply with Regulation 13 of the Noise Regulations.


A Construction Noise and Vibration Management Plan (CNVMP) will be developed for any out of hours works (outside of 7.00 a.m. to 7.00 p.m. Monday to Saturday) in accordance with the Environmental Protection (Noise) Regulations 1997, to the satisfaction of DER and relevant local government authorities. The CNVMP will be developed prior to construction to ensure all works are carried out in accordance with AS 2436:2010 - Guide to Noise and Vibration control on Construction, Demolition and Maintenance sites, and will include the following mitigation/management measures:

- Using equipment with low noise levels and maintaining noise control devices on equipment.
- Using broadband reversing alarms on construction equipment.
- Taking precautionary measures to avoid vibration damage to buildings near work sites.
- Vibration will not exceed a particle velocity of 5 mm/s during construction.
- A dilapidation survey will be undertaken prior to construction.
- Providing a 24-hour noise and vibration complaint hotline during construction and maintaining a complaints register.
- Obtaining necessary approval to work outside of normal working hours, if required.
- Providing public notification where receptors may be impacted by construction noise and/or vibration, particularly when works will occur outside normal working hours.
- Minimising the amount of night-time traffic and construction adjacent to residential areas.
- Undertaking noise and vibration monitoring during construction in response to complaints or at potentially affected locations to alert operators of exceedances of noise and vibration limits.

11.6.2 Operation Noise

Management of noise during the operation phase will require the following to be developed during the final design of the proposal and will be implemented prior to the end of construction:

- Locating the road infrastructure as far to the west within the road reserve as far as is practicable, in the vicinity of Ellenbrook, to minimise noise impacts.
- Using the quietest practical road surface.
- Constructing noise walls to a maximum height of 5 m at noise sensitive premises adjacent to the alignment between Reid Highway and Hepburn Avenue to ensure noise levels do not exceed the noise limit of 60 dB L_{Aeq} at these premises. The location of noise walls are indicated in Figure 11.3.
- Constructing noise walls to a maximum height of 5 m at noise sensitive premises adjacent to the alignment between Hepburn Avenue and Ellenbrook with the aim to ensure noise levels do not exceed the noise target of 55 dB L_{Aeq} at these premises, as far as is reasonably practicable. Noise walls will be constructed of material with a surface density exceeding 15 kg/m². The location of noise walls are indicated in Figure 11.3.
- Should the construction of noise walls not result in achieving the noise target of 55 dB L_{Aeq} at noise sensitive receptors between Hepburn Avenue and Ellenbrook, efforts will be made to achieve the noise limit of 60 dB L_{Aeq} .

- 
- Where the road is located within 100 m of residential properties north of Ellenbrook, a visual screening wall will be constructed of 2.4 m in height.
 - Façade protection packages will be implemented at identified properties north of Ellenbrook where noise levels are likely to exceed the day limit criteria of 60 dB L_{Aeq} . The level of treatment provided will be determined on a case-by-case basis in consultation with affected property owners and is likely to consist of 6 mm thick glazing to windows (see Figure 11.4).

11.7 Residual Impact

Noise and vibration impacts will be localised and temporary during the construction phase of the proposal. With the implementation of mitigation and management measures the effects are expected to be manageable and within the requirements of the Noise Regulations. As such, construction noise and vibration is likely to meet the EPA's objective.

For areas between Reid Highway and Hepburn Avenue the noise limit of 60 dB L_{Aeq} can be achieved through the construction of noise walls. Implementation of appropriate mitigation measures will therefore achieve noise limits as prescribed in State Planning Policy 5.4. As such, the proposal is likely to meet the EPA's objective along this section of the development envelope.

For areas between Hepburn Avenue and Ellenbrook, achieving the noise target of 55 dB L_{Aeq} may not be achievable at all noise sensitive receptors through the construction of noise walls (to a maximum height of 5 m). However, the noise limit of 60 dB L_{Aeq} will not be exceeded at any noise sensitive receptors along this section of the proposal. As such, the proposal is likely to meet the EPA's objective along this section of the development envelope.

It is expected that the daytime noise target of 55 dB L_{Aeq} will not be achieved at eight rural residential properties north of Ellenbrook due to limitations on noise wall locations. All reasonable and practicable management measures will be implemented to meet the EPA's objectives in respect of noise north of Ellenbrook.

A summary of the proposal's residual impacts on amenity following the implementation of mitigation and management measures is provided in Table 11.3.

Table 11.3 Summary of residual noise impacts following implementation of management and mitigation measures

Aspect	Predicted impacts	Management and mitigation	Residual impacts
Construction noise and vibration	Changes in amenity for local communities.	<p>A CNVMP will be developed for any out of hours works, prior to construction, to ensure all works are carried out in accordance with AS 2436:2010 - Guide to Noise and Vibration control on Construction, Demolition and Maintenance sites, and will include the following mitigation/management measures:</p> <ul style="list-style-type: none"> • Using equipment with low noise levels and maintaining noise control devices on equipment. • Using broadband reversing alarms on construction equipment. • Taking precautionary measures to avoid vibration damage to buildings near work sites. • Ensure construction vibration does not exceed 5 mm/s. • Providing a 24-hour noise complaint hotline during construction. • Obtaining necessary approval to work outside of normal working hours, if required. • Providing public notification where receptors may be impacted by construction noise and/or vibration, particularly when works will occur outside normal working hours. • Minimising the amount of night-time traffic and construction adjacent to residential areas. • Conducting a dilapidation survey prior to construction. • Undertaking noise and vibration monitoring during construction in response to complaints or at potentially affected locations to alert operators of exceedances of noise and vibration limits. 	Noise and vibration impacts will temporarily occur during the construction phase of the proposal. With the implementation of mitigation and management measures the effects are expected to be manageable and within the requirements of the Noise Regulations.

Aspect	Predicted impacts	Management and mitigation	Residual impacts
Road traffic using PDNH	Changes in amenity for local communities.	<ul style="list-style-type: none"> • Locating the highway as far to the west of Ellenbrook as practicable. • Using the quietest practical road surface. • Constructing noise walls to a maximum height of 5 m adjacent to noise sensitive premises between Reid Highway and Ellenbrook and of a material with a surface density exceeding 15 kg/m². • Should the construction of noise walls not result in achieving the noise target of 55 dB LAeq at noise sensitive receptors between Hepburn Avenue and Ellenbrook, efforts will be made to achieve the noise limit of 60 dB LAeq. • Constructing screening walls of a maximum height of 2.4 m at noise sensitive premises north of Ellenbrook. • Where the limit can't be achieved north of Ellenbrook, facade treatments will be applied to reduce indoor noise. 	<p>For brownfields areas between Reid Highway and Hepburn Avenue the proposal will achieve the noise limits of 60 dB LAeq prescribed in State Planning Policy 5.4.</p> <p>For greenfields areas between Hepburn Avenue and Ellenbrook the proposal will achieve the noise target of 55 dB LAeq at noise sensitive receptors where practicable, while achieving the noise limit of 60 dB LAeq at remaining noise sensitive receptors where 55 dB LAeq cannot be achieved.</p> <p>Mitigation measures will not achieve the 55 dB LAeq target for eight rural residential properties north of Ellenbrook. Façade treatment will be provided to achieve indoor noise targets, but will not necessarily reduce external noise.</p>