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**CSBP LIMITED**

**PROPOSED**

**AMMONIUM NITRATE EXPANSION PHASE 2**

**KWINANA**

**ENVIRONMENTAL NOISE ASSESSMENT**

AUGUST 2010

OUR REFERENCE: 11853-6-09205



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**ENVIRONMENTAL NOISE ASSESSMENT  
AMMONIUM NITRATE EXPANSION PHASE 2  
KWINANA**

Job No: 09205

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FOR

**CSBP LIMITED**

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## **EXECUTIVE SUMMARY**

CSBP Limited has commissioned Herring Storer Acoustics to acoustically model the proposed Ammonium Nitrate Expansion: Phase 2 project, which consists of a new Nitric Acid Ammonium Nitrate plant (NA-AN3), debottlenecking of the existing Nitric Acid Ammonium Nitrate plants (NA-AN1 and NA-AN2) and proposed debottlenecking of the 2008 Prill plant (PP2).

The acoustic design objectives are to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*. Specifically to comply with the expected Regulations following implementation of the Regulation Review recommendations, the requirements of which are:

- a) noise level at adjoining BP Refinery premises not to exceed 75  $L_{A10}$ , or 70  $L_{A10}$  if the noise contains tonal characteristics as defined under the Regulations; and
- b) noise level at nearest residential premises in Medina not to exceed 30  $L_{A10}$ .

The proposal incorporates a duplication of NA-AN2, with rotation by 180 degrees to limit noise emission to the northern boundary with the BP refinery, and allowance for noise control measures such as a section of acoustic barrier wall (though other measures may be employed in practise) to ensure the proposed industrial assigned level of 75  $L_{A10}$  can be achieved on the adjacent premises. Debottlenecking of NA-AN1, 2 and 3 and 2008 Prill Plant consists of minor modifications, some upgrading or addition of plant elements which will incorporate effective noise control in the existing design.

The predicted noise emissions show that the proposed addition of NA-AN3 does not have a significant impact on residential receiver locations.

With the provision of a 2.1m high acoustic barrier fence on part of the northern boundary or equivalent noise control measures, noise emissions to the adjacent BP Refinery premises are expected to comply with the proposed Regulation Review industrial 'assigned level'.

It is recommended that the following commitments be made to assist in ensuring that the noise emissions from the proposed new plant and the debottlenecking activities are limited:

- noise control for NA-AN3 to match or exceed that of NA-AN2;
- the debottlenecking changes be reviewed by an acoustic consultant following detailed design;
- noise control be implemented at the NA-AN3 plant to ensure noise emissions to the adjacent BP Refinery premises comply with the proposed Regulation Review industrial 'assigned level': and
- the commissioning process include verification measurements.

## 1. INTRODUCTION

CSBP Limited has commissioned Herring Storer Acoustics to acoustically model the proposed Ammonium Nitrate Expansion Phase 2 project, which consists of a new Nitric Acid Ammonium Nitrate plant (NA-AN3), debottlenecking of the existing Nitric Acid Ammonium Nitrate plants (NA-AN1 and NA-AN2) and proposed plant, and debottlenecking of the 2008 Prill plant (PP2).

The NA-AN3 model is a duplication of NA-AN2, and incorporates an upgrade of the model following measurement of NA-AN2 in 2010. It is assumed that the extensive compressor pipework vibration isolation and acoustic lagging applied to NA-AN2 will be duplicated for NA-AN3. The cooling tower selection and exhaust stack silencer performance is to match or better that of NA-AN2.

The proposal incorporates a duplication of NA-AN2 with rotation by 180 degrees to limit noise emission to the northern boundary with BP refinery, and has been modelled with allowance for a section of acoustic barrier wall to demonstrate the proposed industrial assigned level of 75  $L_{A10}$  can be achieved on the adjacent premises.

In addition, the proposed works also allow for:

- debottlenecking of the 2008 Prill Plant; and
- debottlenecking of NA-AN1, .2 and proposed NA-AN3.

The process of debottlenecking involves removing inefficiencies (such as flow restrictions) and some minor modifications (upgrading or addition of plant elements). Generally it is expected that there will be some reduction in noise emissions due to more efficient plant, and some increases in noise due to increased size of some equipment. It is recommended that when details of particular debottlenecking changes are identified, that these be reviewed by an acoustic consultant to ensure that noise emissions are controlled. Overall it is not expected that the debottlenecking of existing plant will result in significant increases in noise emissions.

## 2. ACOUSTIC CRITERIA

The acoustic design objectives were to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*. Specifically to comply with the current Regulations the requirements are:

- a) noise level at adjoining BP Refinery premises not to exceed 65  $L_{A10}$ , or 60  $L_{A10}$  if the noise contains tonal characteristics as defined under the Regulations; and
- b) noise level at nearest residential premises in Medina not to exceed 30  $L_{A10}$ .

### 2.1 RESIDENTIAL RECEIVERS

Noise levels at the nearest residential premises in Medina are not to exceed 30  $L_{A10}$  from a combination of CSBP's existing operations and the proposed plant. The proposal should comply with this design noise level under DOE Draft 8 'worst case' climatic conditions.

## 2.2 INDUSTRIAL RECEIVERS

The Regulation Review implemented in 2000 has recommended a number of changes to the Regulations, one of which is an increase in the industrial receiver 'assigned level' from an  $L_{A10}$  of 65 dB(A) to a nominal 75 dB(A). The process of making the regulatory changes has been delayed, however we expect the changes will occur prior to completion of the proposed changes and that an  $L_{A10}$  of 75 dB(A) will be the criteria applicable when it begins operation.

The industrial boundary design criteria is that the noise level at the adjoining BP Refinery premises should not exceed 75  $L_{A10}$ , or 70  $L_{A10}$  if the noise contains tonal characteristics as defined under the proposed changes to the Regulations.

## 3. METHODOLOGY

The assessment of the proposed project has been carried out using acoustic modelling. There is an existing acoustic model for CSBP's Kwinana operations which is represented using modelling software 'SoundPlan, version 7' and which has been utilised to predict noise emissions from the proposed project.

One of the options to control noise emissions to the northern boundary and the adjoining northern premises (BP Refinery) is to rotate the proposed NA-AN3 plant 180 degrees compared to the existing plants.

Because the original acoustic model for the existing plants had no requirement to be locally accurate on the southern side (there are existing buildings on the southern side which act as an acoustic barrier to the south) it was necessary to upgrade the acoustic model of the existing NA-AN2 plant so that the re-oriented duplication accurately models the expected noise emissions to the northern boundary.

Additional measurements were made around the existing NA-AN1 and NA-AN2 plants, and 'measurement noise contours' were generated by SoundPlan 7. These contours were used to assist in upgrading and verification of the acoustic model prior to using a duplication of the NA-AN2 data for the proposed NA-AN3 plant.

Appendix A shows the comparison of the 'measured noise contours' in dotted lines vs the 'predicted' noise contours from the upgraded acoustic model.

#### 4. PREDICTED NOISE LEVELS AT RESIDENTIAL PREMISES

Predicted noise levels from the single point calculations are summarised below in Table 3 'worst case' night-time conditions with wind from source to receiver and temperature inversion.

**TABLE 3 - RESULTS OF SINGLE POINT CALCULATIONS OPERATIONAL NOISE AT RESIDENTIAL PREMISES**

Location	Existing Predicted $L_{A10}$	NA-AN3 Predicted NA-AN3 Only $L_{A10}$	NA-AN3 Predicted Combined $L_{A10}$
Medina Residence	29	22	30
Calista Residence	28	13	28
Leda Residence	26	14	26
Hillman Residence	24	15	25
North Rockingham (near CBH)	25	17	26
East Rockingham (coast)	21	15	22

The predicted noise emissions show that the proposal will not have a significant impact on residential receiver locations. In terms of compliance with Regulations, noise emission contributions of 30 dB(A) or less are not 'significantly contributing' and therefore comply with the requirements. Appendix C shows predicted noise contours during 'worst case' night propagation conditions extending to the residential areas such as Kwinana – Calista – Leda and Hillman and North Rockingham.

#### 5. PREDICTED NOISE LEVELS AT INDUSTRIAL RECEIVERS

The predicted noise levels from the expansion at the nearest boundary with the BP Refinery under 'worst case' daytime wind conditions are shown in Appendix B.

The model incorporates a 2.1m high acoustic barrier fence on part of the northern boundary (as shown on the contour plot) to demonstrate that noise emissions to the adjacent BP Refinery premises can be expected to comply with the proposed Regulation Review industrial 'assigned level'. It has been assumed that the northern boundary noise emission will be tonal in characteristic. There may be alternative noise control options within the site (an internal barrier wall or additional noise control) which could be applied in lieu of a barrier fence on the northern boundary. This would be determined during the detailed design phase.

## 6. PROJECT COMMITMENTS

It is recommended that the following commitments be made to assist in ensuring that the noise emissions from the proposed NA-AN3 plant and the debottlenecking of NA-AN1, 2 and 3 and the 2008 Prill Plant are limited.

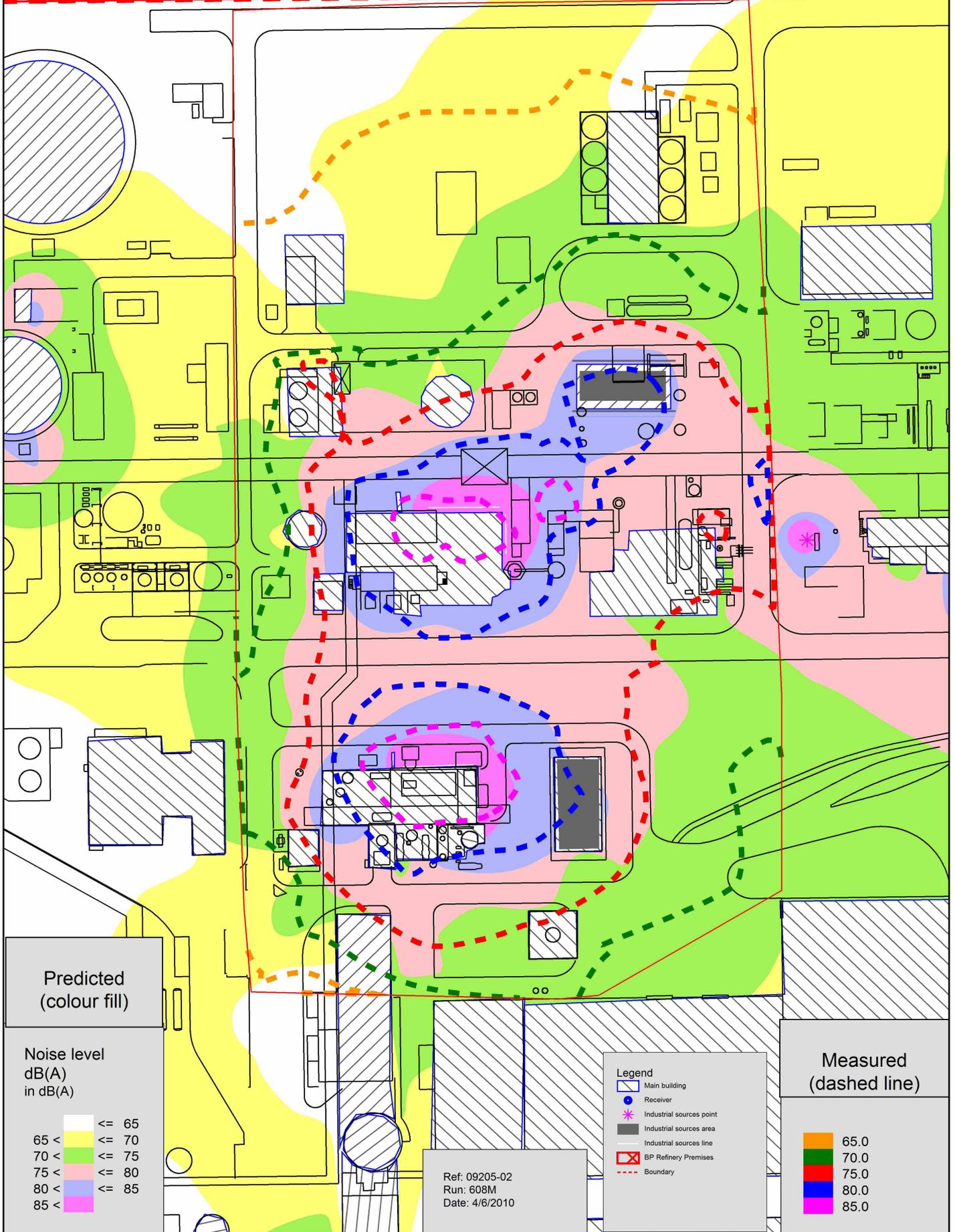
- noise control for NA-AN3 to match or exceed that of NA-AN2;
- the debottlenecking changes be reviewed by an acoustic consultant following detailed design;
- noise control be implemented at the NA-AN3 plant to ensure noise emissions to the adjacent BP Refinery premises comply with the proposed Regulation Review industrial 'assigned level': and
- the commissioning process include verification measurements.

## **APPENDIX A**

Existing - Northern Plant Predicted & Measured Noise Levels

CSBP KWINANA: 2010 PREDICTED NOISE EMISSIONS:  
Upgraded Prediction Compared to Measured Contours

Length scale 1:1500



Predicted  
(colour fill)

Noise level  
dB(A)  
in dB(A)

≤ 65	≤ 65
65 <	≤ 70
70 <	≤ 75
75 <	≤ 80
80 <	≤ 85
85 <	

Measured  
(dashed line)

65.0
70.0
75.0
80.0
85.0

Legend

- Main building
- Receiver
- Industrial sources point
- Industrial sources area
- Industrial sources line
- BP Refinery Premises
- Boundary

Ref: 09205-02  
Run: 608M  
Date: 4/6/2010

## **APPENDIX B**

Proposed & Existing - Northern Boundary Predicted Noise Levels

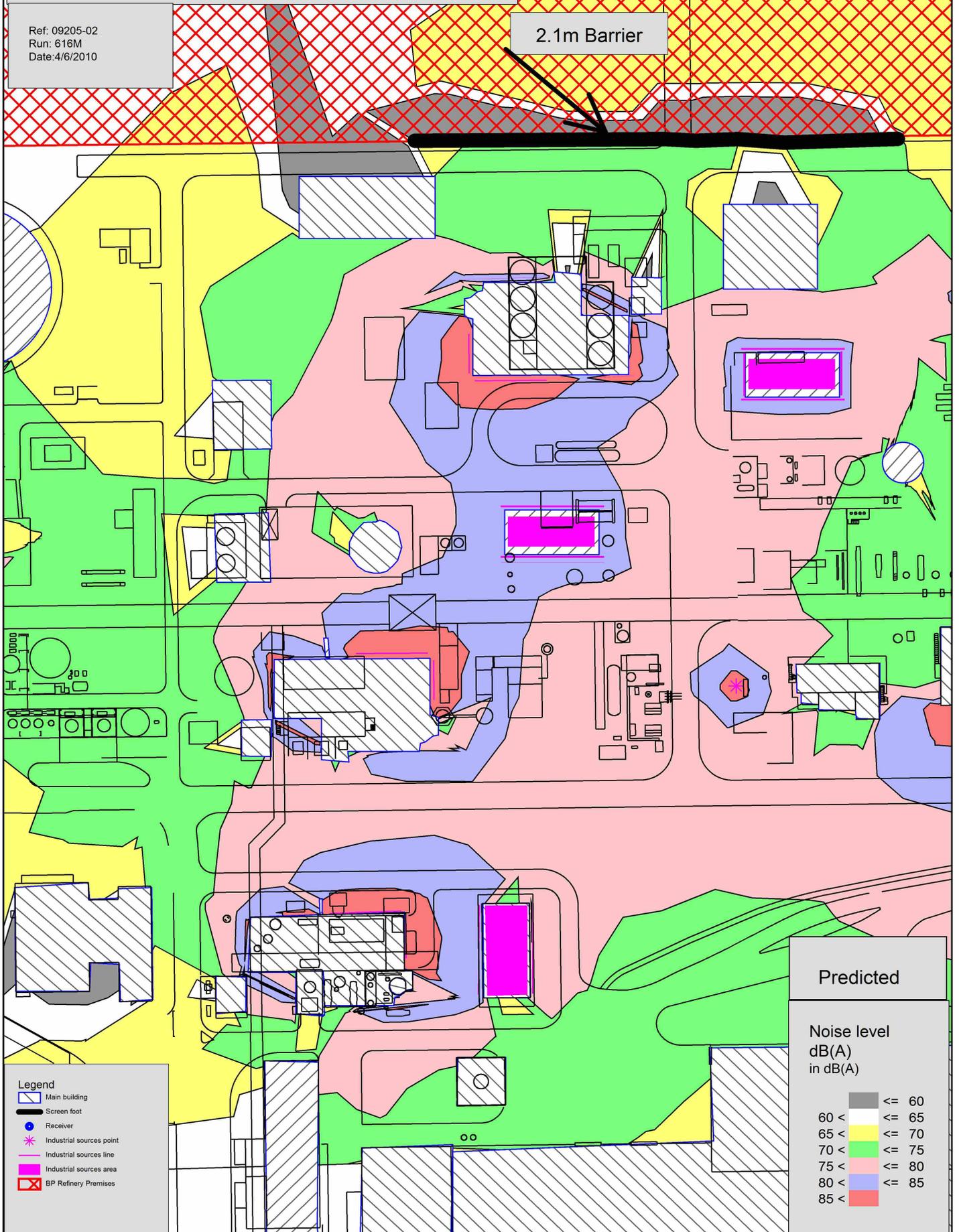
CSBP KWINANA: 2010 PREDICTED NOISE EMISSIONS:  
Upgraded Prediction NA3 with 2.1m northern boundary wall

Length scale 1:1500



Ref: 09205-02  
Run: 616M  
Date: 4/6/2010

2.1m Barrier



Legend

- Main building
- Screen foot
- Receiver
- Industrial sources point
- Industrial sources line
- Industrial sources area
- BP Refinery Premises

Predicted

Noise level  
dB(A)  
in dB(A)

- |  |            |
|--|------------|
|  | <= 60      |
|  | 60 < <= 65 |
|  | 65 < <= 70 |
|  | 70 < <= 75 |
|  | 75 < <= 80 |
|  | 80 < <= 85 |
|  | 85 <       |

## **APPENDIX C**

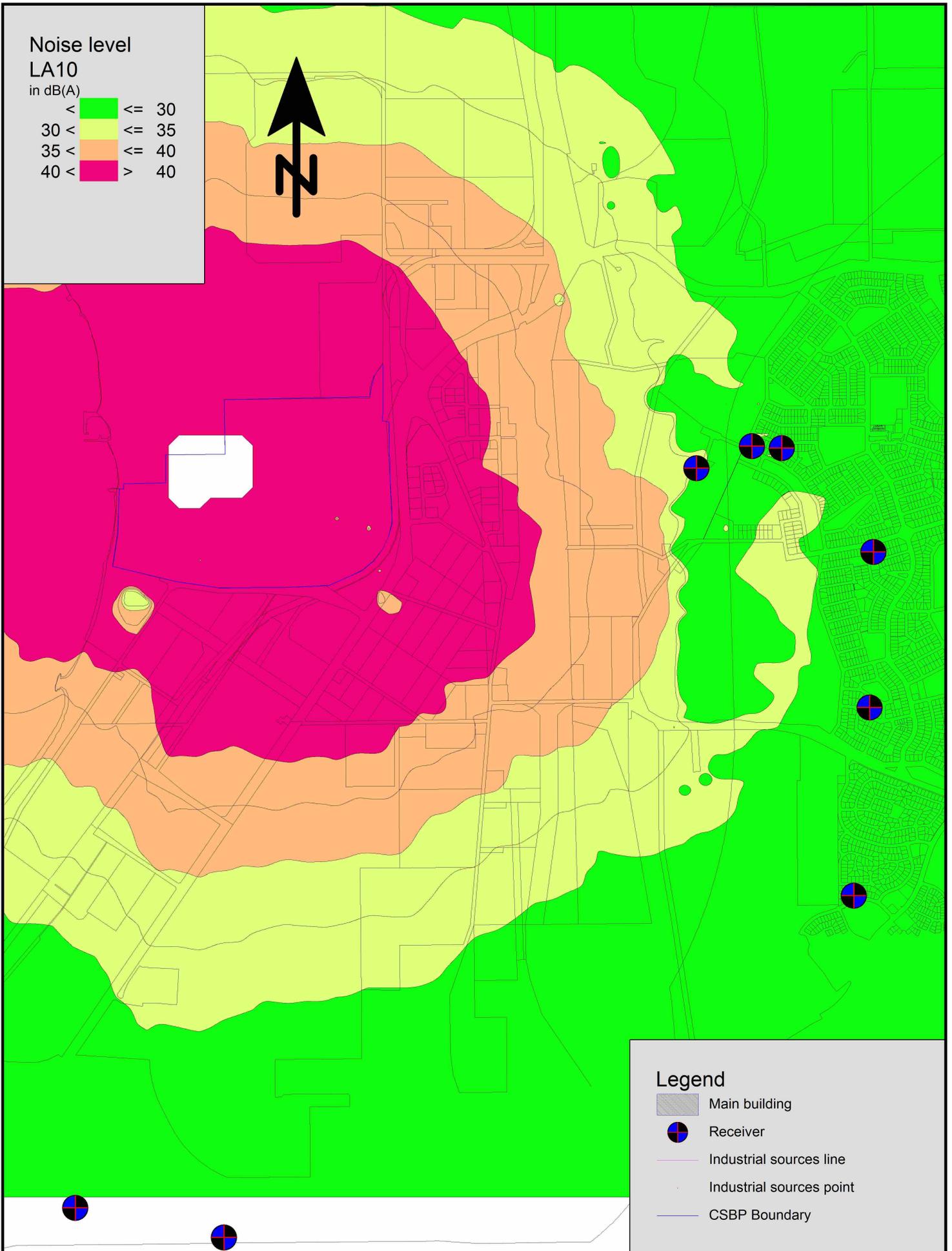
Proposed & Existing  
Contribution to Noise at Residential Locations

Noise level

LA10

in dB(A)

<	≤	30
30 <	≤	35
35 <	≤	40
40 <	>	40



Legend

- Main building
- Receiver
- Industrial sources line
- Industrial sources point
- CSBP Boundary

CSBP KWINANA: Expansion Noise Contours + Existing Night-time "worst case" scenario

Length scale 1:30000

