APPENDIX B6

Air Quality Management Sub Plan

Warrell Creek to Nambucca Heads

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Name	*Name*	*Name*
Manuel Gil AFJV Project Director	Jason Haslett AFJV Environmental Manager	Roads and Maritime Representative

Revision history

Revision	Date	Description	Approval
9	01/08/18	Removal of dust deposition gauges DDG1, DDG2, DDG3 and DDG4 post opening (dust generating works complete in these areas)	ER (DPE)
8	04/05/18	Removal of dust deposition gauges DDG5, DDGA1 and DDGA2 - agreed in April 18 ERG (dust generating works complete in these areas)	ER (DPE)
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1	RMS	3
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Glossary / Abbreviations

AFJV	ACCIONA Ferrovial Joint Venture
AQMP	Air Quality Management Sub Plan
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
DDG	Dust Deposition Gauge
EA	Environmental Assessment
EEC	Endangered Ecological Community
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
EWMS	Environmental Work Method Statements
FM Act	*Fisheries Management Act 1994*
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
PESCP	Progressive Erosion and Sediment Control Plan
SoC	Revised Statement of Commitments included in the Submissions Report
SWMP	Soil and Water Management Plan
WC2NH	Warrell Creek to Nambucca Heads Project (Stage 2 of WC2U)
WC2U	Warrell Creek to Urunga Project

1 Introduction

1.1 Context

This Air Quality Management Sub Plan (AQMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the upgrade of the Pacific Highway between Warrell Creek and Nambucca Heads (WC2NH). The WC2NH Project is Stage 2 of the Warrell Creek to Urunga (WC2U) Project, approved by the Minister for Planning and Infrastructure in 2011.

The WC2NH section of the WC2U Project involves the upgrade of approximately 19km of the Pacific Highway from the northern end of the Allgomera deviation south of Warrell Creek to Old Coast Road, west of Nambucca Heads. The WC2NH Project is being constructed by ACCIONA Ferrovial Joint Venture (AFJV).

This AQMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the Roads and Maritime Statement of Commitments (SoC), the mitigation measures listed in the Warrell Creek to Urunga Environmental Assessment (EA) and all applicable legislation.

1.2 Background

The *Warrell Creek to Urunga – Upgrading the Pacific Highway - Environmental Assessment* (RTA 2010) assessed the impacts of construction and operation of the Project on air quality, within chapter 19.

The EA identified the potential for minor impacts on air quality during construction typically associated with dust. However, it concluded any potential impacts could be managed by standard mitigation and management measures.

1.3 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Construction Environmental Management Plan (CEMP).

The AQMP is part of the AFJV environmental management framework for the Project, as described in Section 4.1 of the CEMP. Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS).

EWMS will be developed and signed off by environment and management representatives prior to associated works and construction personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the CEMP, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by AFJV personnel and contractors.

The review and document control processes for this Plan are described in Section 9 of the CEMP.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how AFJV proposes to manage and protect air quality during construction of the Project.

2.2 Objectives

The key objective of the AQMP is to ensure that impacts air quality are minimised and within the scope permitted by the planning approval. To achieve this objective, AFJV will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to avoid or minimise air quality impacts and potential adverse impacts to sensitive receivers along the Project corridor.
- Ensure appropriate measures are implemented to address the relevant CoA and SoC outlined in Table 3.1 and Table 3.2, and the mitigation measures detailed in the EA.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this Plan.

Refer to Appendix B7 Construction Waste and Energy Management Sub Plan for measures to reduce greenhouse gas emissions during construction.

2.3 Targets

The following targets have been established for the management of air quality impacts during construction of the Project:

- Ensure full compliance with the relevant legislative requirements, CoA and SoC.
- Implement feasible and reasonable air quality control measures with the aim of constructing the Project in a manner that minimises dust emissions from the site.
- Complaints from the community and stakeholders are minimised and managed.

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

Legislation relevant to air quality management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Protection of the Environment Operations Act 1997* (POEO Act).
- *National Greenhouse and Energy Reporting Act 2007*.
- Protection of the Environment Operations (Clean Air) Regulation, 2010.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the CEMP. Matters relating to the *National Greenhouse and Energy Reporting Act 2007 are addressed in the* Construction Waste and Energy Management Sub Plan.

3.1.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Plan include:

- National Environment Protection Council's (NEPC) – National Environment Protection Measure (NEPM) for Ambient Air Quality Guidelines.
- Roads and Maritime QA Specification G36 Environmental Protection.
- Roads and Maritime QA Specification G38 Soil and Water Management.
- Interim Dust Assessment Handbook – Upper Hunter Valley Open Cut Coal Mine (EPA Oct 2011).
- AS 3580.1.1-2007 Methods of Sampling Analysis of Ambient Air. Part 1.1 Guide to Siting Air Monitoring Equipment.
- AS 3580.10.1-2003 Methods of Sampling Analysis of Ambient Air. Determination of Particulate Matter – Deposited Matter - Gravimetric Method.
- Action for Air 2009 (NSW DECCW).
- Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (DEC 2005).
- Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC 2007).
- Air Quality Monitoring Criteria for Deposited Dust (DEC Guideline), Refer to Table 5-1 below.

3.2 Minister's Conditions of Approval

The CoA relevant to this Plan are listed Table 3-1 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-1 Conditions of Approval relevant to the AQMP

CoA No.	Condition Requirements	Document Reference
B30 (e) (i)	Measures to monitor and manage dust emissions including dust generated by haulage trucks, traffic on unsealed public	Table 7-1

CoA No.	Condition Requirements	Document Reference
	roads and stockpile management.	
C2	The Proponent shall employ all feasible and reasonable measures (including temporary cessation of relevant works, as appropriate) to ensure that the project is constructed in a manner that minimises dust emissions from the site, including wind-blown, traffic-generated dust, stockpiles and material tracking from construction sites onto public roads.	Table 7-1

3.3 Statement of commitments

Relevant SoC are listed Table 3-2 below. This includes reference to required outcomes, the timing of when the commitment applies, relevant documents or sections of the environmental assessment influencing the outcome and implementation.

Table 3-2 Statements of commitment relevant to this AQMP

Outcome	Ref #	Commitment	Timing	AQMP Reference
Minimise dust generation and impact to sensitive receivers.	AQ1	To minimise windblown, traffic generated or equipment generated dust emissions, there will be feasible and reasonable mitigation and management measures.	Construction	Table 7-1
	AQ2	Dust generating activities will stop where visible dust is being emitted outside the construction corridor and dust suppression measures are ineffective.	Construction	Table 7-1

4 Existing environment

The following sections summarise what is known about factors influencing air quality within and adjacent to the Project corridor.

The key reference document is chapter 19 of the EA.

4.1 Air quality records

There is limited information about air quality in the vicinity of the Project. Long-term monitoring is not usually undertaken outside metropolitan and/or industrial areas, because pollutants typically do not exist in concentrations that would cause adverse environmental or health impacts. However, there has been short-term air quality monitoring adjacent to a dual carriageway section of the Pacific Highway at Korora, which is located in an urban area approximately 30 kilometres north of the Urunga. A monitoring station was established at Korora to monitor the ambient air quality from October 2005 to January 2007.

Table 4-1 Korora air quality monitoring results

Pollutant	Averaging period	NEPM goals		Korora monitoring results	
		Maximum concentration	10-year goal (max allowable exceedence)	Maximum recorded concentration	Average recorded concentration
National standards and goals for ambient air quality					
Carbon monoxide	8hr	9.0 ppm (10 mg/m^3)	1 day a year	0.2 ppm (0.3 mg/m^3)	0.03 ppm (0.04 mg/m^3)
Nitrogen dioxide	1 hr	0.12 ppm (246 µg/m^3)	1 day a year	0.036 ppm (73.8 µg/m^3)	0.004 ppm (9.2 µg/m^3)
Particles as PM_{10}	1 day	50 µg/m^3	5 days a year	37.8 µg/m^3	20.3 µg/m^3
Advisory reporting goals					
$PM_{2.5}$	1 day	25 µg/m^3	Gather data to facilitate review of goal	15.4 µg/m^3	7.7 µg/m^3

The NSW Office of Environment and Heritage (OEH) website (http://www.environment.nsw.gov.au/aqms/index.htm) was accessed on 28 August 2014 and no additional air quality monitoring sites were located within the vicinity of the Project.

4.2 Rainfall, soil dryness and wind

The climate statistics from South West Rocks (Smoky Cape Lighthouse – Site number 059030) were accessed from the Bureau of Meteorology website (http://www.bom.gov.au/climate/averages/tables/cw_059030.shtml) on 28 August 2014. The records from South West Rocks have been selected to reflect the potential climatic conditions across the Project site due to its proximity to the overall site, and extent of available data (from 1939 to present). A summary of the records from the Bureau of Meteorology is provided in Table 4-2 below. The Macksville Country Club station (Site number 059018) is located closer to the Project site but only notes monthly rainfall statistics. The mean monthly rainfall statistics from Macksville were similar values to the mean monthly rainfall statistics for South West Rocks.

Table 4-2 Summary of rainfall records from South West Rocks (Smoky Cape Lighthouse)

Summary of rainfall record from 1888 to present													
	Summer / Autumn						Winter / Spring						
	Dec	Jan	Feb	Mar	Apr	Ma	Jun	July	Aug	Sep	Oct	Nov	Year
Mean rainfall (mm) *	117.6	146.9	171.3	183.0	171.5	131.4	139.6	77.4	78.7	55.6	92.6	117.1	1482.7
Mean rain days	10.2	10.8	11.8	12.9	10.7	9.4	8.6	6.3	6.4	6.2	8.6	9.5	111.4
Mean dry days (Clear Days)	8	8.1	6.1	8.2	9.3	10	10.9	13.4	14.7	13.8	10.3	8.3	121.1
Mean wind speed (km/h) @ 9am	17.6	17.8	16.8	16.8	17.3	19.8	22.2	22.2	19.3	18.2	18.4	18.5	18.7
Mean temp (^{0}C) @ 9am	22.0	22.7	22.6	21.9	19.8	17.0	14.8	14.0	15.0	17.3	19.4	20.5	18.9

The above table provides a consideration of typical climatic factors that contribute to the proliferation of dust particulates. In addition to the exposure of unconsolidated material during construction eg earthworks, climatic factors such as prolonged dry weather, combined with high winds, can increase the likelihood of dust particulate emissions.

The Project is located in the vicinity of Macksville. This locality has a humid subtropical climate. Rainfall is typically higher during summer and autumn. Winter and spring are typically drier periods during the year.

Climate models surveyed by the Bureau of Meteorology are varied regarding the chance of El Nino conditions developing in the coming months (from September). A drier than normal September to November is more likely for parts of the southeast mainland. However, the Project site is within an area with equal chances of having a wetter or drier than normal September to November (BOM, 2014).

Wind data from Port Macquarie has been selected to predict the likely wind speed across the project site (BOM 2014). Seasonal wind conditions at Port Macquarie are characterised by the following wind speed and directions:

- Morning (9am) wind conditions vary throughout the year. Between January and April, winds are calm to low (0-10km/hr) from the southwest. Between May and September, the wind direction is primarily from the west, while between October and December winds are generally moderate (10-20km/hr) from multiple directions.

- Afternoon conditions (3pm) are typically moderate (10-20km/hour) to high (20-30km/hr) throughout the year. Between August and April, the winds originate from the northeast and from the southwest between May and July.

In general, dust and suspended particles would be more likely to cause dust impacts during the afternoon than during the morning, due to the stronger prevailing afternoon North-easterly winds during August to April, and South-westerly during May to July.

4.3 Soil characteristics

The soil types along the Project are described in Table 4-3, with an indication of the potential for wind erosion i.e. dust emissions. The soil information is from the DLWC Soil Landscapes of the Macksville-Nambucca 1:100,000 Sheet (DLWC, 2000).

Table 4-3 Soil type and characteristics

Chainage	Soil type	Characteristics	Dust emission risk
41765-42300 42700-43550 44900-45200 45700-46000	Warrell Creek REwa	A residual soil landscape	Moderate - high
42300-42700 45450-45700 46800-47100	NAMBUCCA RIVER (ALnr)	Alluvial	Low
43500-44900 45200-45450 46000-46800 47100-47950 48400-49000	ROSEWOOD ROAD (ERrw)	An erosional soil landscape	Moderate
47950-48400 50350-50600 51200-52700	RALEIGH (ALra)	Alluvial	Low
49650-50350 50600-51200 52700-52800 53550-53850	Seven Oaks (SWse)	A swamp soil landscape	Low
49000-49650 52800-57650 57800-58350 58500-61300	NEWRY (Erne)	An erosional soil landscape	Moderate
54900-55500	CLYBUCCA (SWcy)	A swamp soil landscape	Low
57600-57800 58350-58500	BOWRA CREEK (TRba)	A transferral soil landscape	

Geotechnical Investigations have also been carried out that indicates that the soils that are likely to be disturbed consist of alluvial and sedimentary clays, silt and residual volcanic soils. There may be some minor variability (with different soil types, density, moisture content and particle shape) in terms of potential for dust generation, however this is not likely to be significant).

4.4 Sensitive receivers

The construction of the Project will interact with a number of sensitive receivers and natural environments. The lands surrounding the Project have been considered for potential sensitivity to dust and air quality impacts. The potential sensitive receivers include:

- Residences.
- Sensitive commercial, agricultural or industry users.
- Road users.
- Watercourses.

The nearest potentially affected non-residential sensitive receivers have been identified as including but not limited to, the following:

- Grey-headed flying fox camp
- Nambucca River
- Lower Warrell Creek
- Upper Warrell Creek
- Native vegetation and fauna habitat (including EEC).

Residential sensitive receivers have been identified in relation to their close proximity to the Project and the type of works being undertaken in each locale along the Project corridor. These receivers have been grouped into dust catchment areas, with key catchments identified as areas which are potentially more exposed due to the following factors:

- Proximity to construction works which may give rise to higher levels of dust (eg. intense earthworks, proposed batch plants within Ancillary Facilities, and stockpile areas).
- Prevailing wind directions and speeds.
- Soil dryness and soil types.
- Existing landscape (eg cleared areas between project works and receivers).

Based on this rationale, key “dust catchment areas” are considered to be in proximity to Rosewood Road, Kerr Drive, Letitia Close, Donnellyville, Macksville township and Mattick Road. The location and general extent of these key dust catchment areas and the non-residential sensitive receivers listed above are shown in Appendix A.

Dust deposition gauges (DDG) have been located within these key dust catchment areas to be representative of sensitive receivers along the length of the Project.
The location of representative dust gauges are shown in Appendix A and are described in Table 4-4.

Table 4-4 Dust monitoring locations

Table 4-4 describes the proposed dust monitoring locations. Locations will be finalised subject to agreement from private landowners (where applicable).

Gauge number	Approximate monitoring location	Rationale for site selection
DDG 6	Near sensitive receiver 711 off Letitia Close, North Macksville, east of Ch53100	Gauge site location adjacent to cluster of houses representative of potential worst-case scenario. Site is prone to the milder morning wind conditions (South-westerly up to 10km/hr) downwind of potential dust sources including major excavations on alignment and on Old Coast Road works and batch plant (ASF-5). Soil type of erosional soil landscape with moderate dust risk potential. Landscape generally cleared between Project works and dust catchment area.
DDG 7	Near sensitive receiver 809 / 810 on Mattick Road, North Macksville, east of Ch54500	Gauge site location representative of potential worst-case scenario for cluster of houses. Site is prone to the milder morning wind conditions (South-westerly up to 10km/hr) downwind of potential dust sources including batch plant (ASF-5) and alignment works (Cut CR). Soil type of erosional soil landscape with moderate dust risk potential. Landscape generally cleared between Project works and dust catchment area.
DDG 10	Near sensitive receiver 5 on Queenies Lane, Congarani, west of Ch 41940	Gauge site location representative of potential worst-case scenario for houses. Soil type of erosional soil landscape with moderate to high dust risk potential due to proximity to alignment. Landscape cleared between Project works and closest receiver.

5 Air quality criteria

The Environment Protection Authority (EPA) sets goals for ambient dust concentrations and dust deposition, which is a measure of the impacts of nuisance (EPA 2001).

The acceptable increment in annual average dust deposition depends on the existing deposition level. These are based on research by Dean (1990) and other investigations, which detail community response to dust fallout. It should be remembered that the air quality goals relate to the total dust burden in the air and not just the dust from the Project. In other words, there needs to be some consideration of background levels when using these goals to assess impacts.

Table 5-1 below details the air quality monitoring criteria for deposited dust.

Table 5-1 Air quality monitoring criteria for deposited dust[a]

Pollutant	Annual concentration		Source
Deposited dust[b]	2 g/m2/month[c]	4 g/m2/month[d]	NERDDC (1998)

Note:

a. *Adapted from DECCW guideline; Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DECCW 2005).

b. *Dust is assessed as insoluble solids as defined by AS 3580.10.1-2003 (AM-19).*

c. *Maximum increase in deposited dust level.*

d. *Maximum total deposited dust level.*

6 Environmental aspects and impacts

6.1 Construction activities

Emissions to the atmosphere during construction that could result in adverse impacts to air quality are typically divided into two categories. These are:

- Dust and particulates.
- Gaseous.

Key aspects of the Project that could result in dust emissions include:

- General earthworks particularly during site establishment.
- Vegetation clearing.
- Bulk Earthworks.
- Drilling and Blasting.
- Operating crushing and screening facilities.
- Operation of concrete / asphalt batching plants.
- Topsoil / material handling including stockpiling, material loading and material haulage.
- Vehicular movements over unpaved surface (including unsealed access roads).
- Wind erosion of exposed areas and temporary stockpiles.
- Tracking of dirt onto roads.

Air emissions, other than dust, which may be generated by construction activities include:

- Vehicle and plant exhaust emissions, which may be excessive if vehicles and plant are poorly maintained.
- Odours/gases released during:
  - Excavations of organic or contaminated materials.
  - Sealing works.
  - Operation of concrete / asphalt batching plants.
  - Stockpiling of mulch.

6.2 Factors likely to affect dust generation and impacts

In addition to the inherent risks of specific construction activities creating the potential to generate dust, a number of other environment factors also affect the likelihood of dust emissions. These include:

- Wind direction – determines whether dust and suspended particles are transported in the direction of the sensitive receivers.
- Wind speed - governs the potential suspension and drift resistance of particles.
- Soil type - more erodible soil types have an increased soil or dust erosion potential.
- Soil moisture – increased soil moisture reduces soil or dust erosion potential.

- Rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation.

6.3 Impacts

The potential for impacts on air quality will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction might include:

- Deposition of dust on surfaces where it may cause damage and/or lead to a need for increased cleaning or repair.
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces.
- Need for increased maintenance of air filtering systems (eg air conditioners etc).
- Potential adverse health effects including eye, nose and throat irritation from excessive inhalation of fine particles.
- Impacts on water quality and/or vegetation health from dust deposition.
- Impacts on residential sensitive receivers, including impacts on living areas, swimming pools, water tank drinking water and general amenities.
- Impacts on commercial or industrial premises.
- Complaints from the public relating to dust or odours.

Some impacts on air quality attributable to the Project are anticipated and have been described in the EA. Section 7 of this plan provides a suite of mitigation measures that will be implemented to avoid or minimise those impacts.

7 Environmental control measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the EA, Submission Report, Statement of Commitments, supplementary assessments, Conditions of Approval and Roads and Maritime documents, and from recent experience on similar road projects. Specific measures and requirements to address impacts on air quality are outlined in Table 7-1.

Table 7-1 Air quality management and mitigation measures

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
GENERAL					
AQ1	Training will be provided to all Project personnel, including relevant sub-contractors on sound air quality control practices and the requirements from this plan through inductions, toolboxes and targeted training. The training will also highlight the level of competency expected during the processing, handling, movement and storage of materials and substances used to carry out the activity to ensure impacts to air quality are minimised.	Training materials Reference documents	Pre-construction Construction	Construction Manager / Environment Manager	G38/G36, EPA Interim Dust Assessment Handbook, Good practice EPL
AQ2	Air quality control measures from this plan will be included in relevant Environmental Work Method Statements (EWMS) and/or Progressive Erosion and Sediment Control Plans (PESCP).	CEMP documents	Pre-construction / Construction	Site Engineer / Environmental Officer	This Sub Plan, EPA Interim Dust Assessment Handbook, Good practice
AQ3	Vegetation clearing will be staged where possible to minimise the area and time that surfaces are exposed.	EWMS	Construction	Site Engineer	G36
AQ4	Exposed surfaces with no scheduled work for two weeks will be treated to minimise dust generation. Exposed surfaces will be stabilised progressively using the most practical site specific methods, including watering and geo-fabrics for short term exposure and emulation spray, spray grass, soil compaction and revegetation for longer term exposed areas or final finishes.	Dust Suppressants Geo Fabrics Soil compactors	Construction	Foreman	G36
AQ5	Appropriate measures will be implemented to control the pollution of pollution of air in accordance with POEO Act	Dust Suppressants Procedures	Pre-construction / Construction	Site Engineer / Foreman	EPL
AQ6	All operations must be carried out in a manner that will minimise the generation and emission of dust.	Dust Suppressants Procedures	Pre-construction / Construction	Site Engineer / Foreman	EPL
AQ7	Deposited dust gauges will be used and deposited dust levels assessed against the criteria identified in the Approved methods publication for the modelling and assessment of air pollutants in NSW, published by the Department of Environment and Conservation August 2005.	Dust Gauges	Pre-construction / Construction	Environmental Officer	EPL Approved methods publication for the modelling and assessment of air pollutants in NSW

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
AQ8	Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase the generation or emission of dust.	Dust Suppressants Procedures Weather data	Construction	Foreman	G36, EPA Interim Dust Assessment Handbook
AQ9	Control measures including water carts, mechanical sweepers, sprinklers, sprays, dust screens or the application of geo-binding agents will be utilised where applicable to control dust emissions. The frequency of use will be modified to accommodate prevailing conditions.	Dust Suppressants Geo Fabrics Soil compactors	Construction	Foreman	G36
AQ10	Erosion control structures will be checked regularly for build up of silt and other materials to ensure deposits do not become a dust source.	Procedures	Construction	Foreman	Good practice
AQ11	Waste will be segregated and collected on a regular basis to ensure odours associated with waste do not become an issue.	Waste collection contractor Procedures	Construction	Foreman	Good practice
AQ12	The application of pesticides will be modified, reduced or controlled during high or unfavourable wind conditions where wind can carry pesticides outside of the defined treatment area.	Procedures Weather data	Construction	Foreman	G36
AQ13	Stockpiles will be located in accordance with the criteria established in Appendix I of the SWMP, Stockpile Management Protocol. A suitable cover crop (for completed stockpiles) or provision of other covering for incomplete stockpiles will be established where stockpiles prone to dust emissions are in place for longer than 4 weeks.	Stockpile management protocol Procedures	Construction	Site Engineer / Foreman	G36
AQ14	There will be no burning off of waste.	Tool box training material Procedures	Construction	Foreman	G36
VEHICLE MOVEMENT AND MATERIAL STORAGE					
AQ15	Areas of disturbed material and access roads will be stabilised where possible by methods such as compaction. Compounds, ancillary facilities, administration access roads and standing areas will be hard surfaced.		Construction	Superintendent	G36

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
AQ16	Measures will be implemented to minimise dust, soil or mud from being deposited by vehicles on public roads. This will be achieved by implementing mitigation measures such as rumble grids and large aggregate at entry/exit points. Manual cleaning will also be carried out where appropriate. In the event of any spillage or tracking, the spilt material will be removed within 24 hours.		Construction	Superintendent	G36
AQ17	Manual cleaning will also be carried out where appropriate. In the event of any spillage or tracking onto public roads, the material will be removed immediately, or as soon as reasonably practical after being identified, and measures (such as additional controls or restricting vehicle movements) implemented to prevent further tracking.		Construction	Superintendent	G36
AQ18	Hardstand areas and surrounding public roads will be cleaned, as required, using methods including brooms, bobcat attachments or street sweepers.		Construction	Foreman	Good practice
AQ19	Vehicle movement will be confined to designated haul roads and areas. These roads will have appropriate speed limits to ensure safe equipment operation and to reduce dust generation. Reduced speed limit maybe implemented where dust generation persists		Construction	Superintendent	G36, EPA Interim Dust Assessment Handbook
AQ20	All loaded haulage trucks will be covered where there is a risk of release of dust or other materials and at all times on public roads.		Construction	Foreman	G36, EPA Interim Dust Assessment Handbook
PLANT AND EQUIPMENT					
AQ21	Haul trucks and plant equipment will be switched off when not in operation for periods of more than 15 minutes.		Construction	Foreman / Operators	G36
AQ22	Engines of plant parked next to residents will be switched off when not in operation.		Construction	Foreman / Operators	Good practice
AQ23	Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer’s specifications to ensure that emissions do not exceed EPA regulations. Periodic visual checks will be undertaken to ensure ongoing compliance, typically weekly.		Construction	Foreman	G36 EPL

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
BATCH PLANTS					
AQ24	Water carts will be used to suppress dust around batch plants.		Construction	Foreman	Good practice
AQ25	Batch plants will be swept and cleaned to keep them in a tidy state to prevent the build up of dust weekly or more frequently if dust build up increases the risk of dust emission.		Construction	Foreman	Good practice
AQ26	High dust emitting structures or processors in batch plants (eg conveyer belts) will have water spraying systems installed to suppress dust.		Construction	Site Engineer	Good practice
AQ27	Concrete batch plants to be fitted with dust filters to minimise air quality impacts from batching operations.		Construction	Site Engineer	G36
BLASTING AND CRUSHING					
AQ28	Where practical during blasting, a combination of the following mitigation measures will be used to minimise dust: • Weather reports checked prior to blasting to ensure wind blown dust will not reach surrounding residents, if strong winds (>40km/hr) are predicted, the blast procedure must be discussed with the Environmental Manager prior to commencement. • Controlled blasts to minimise dust produced.		Construction	Foreman	EPA Interim Dust Assessment Handbook, Good practice
AQ29	Crushers will be positioned in protected areas, where practical, to reduce wind dispersion of dust particles (eg within cuts). Water spraying (or other suitable products) will be utilised if necessary.		Construction	Foreman	EPA Interim Dust Assessment Handbook, Good practice
INSPECTION, MONITORING AND RECORDS					
AQ30	Public roads will be inspected each day at main entry and exit points to and from areas where construction activities are taking place and compound. Material tracked onto the road pavement will be removed in accordance with AQ14.		Construction	Foreman	G36
AQ31	Dust deposition gauges at locations shown in Appendix A will be established three months prior to the		Pre-construction / Construction	Environmental Officer	G36

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	commencement of construction to establish background dust levels. Monitoring equipment will remain in place until completion of the construction works and/or where ground conditions are stable. Results will be captured on a monthly basis and collected in accordance with DEC's "Approved Method for the Sampling and Analysis of Air Pollutants in NSW" guidelines.				
AQ32	Weather forecast will be reviewed on a daily basis and appropriate measures implemented where unfavourable weather conditions (dry weather, strong winds) are anticipated.		Construction	Environmental Manage / Foreman	EPA Interim Dust Assessment Handbook, Good practice
AQ33	An onsite weather station will be established to record weather data. Rainfall at the premises will be measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office is established.		Pre-construction / Construction	Environmental Manager	Good practice
AQ34	Dust will be managed to meet the deposited dust criteria detailed in Table 5-1. Dust control and operational procedures will be reviewed and modified if results exceed the criteria and are attributable to construction activities.		Construction	Environmental Manager / Foreman	Good practice

8 Compliance management

8.1 Roles and responsibilities

The AFJV Project Team's organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 7 of this Plan.

8.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to air quality management issues. The induction training will address elements related to air quality management including:

- Existence and requirements of this sub plan.
- Relevant legislation and air quality criteria.
- Roles and responsibilities for air quality management.
- Air quality mitigation and management measures including key references for environmental control measures including G36 and the EPA Interim Dust Assessment Handbook.
- Procedure to be implemented in the event of an incident (eg release of dust or gaseous emissions from site).
- Relevant conditions of the EPL, particularly regarding the minimisation of dust and maintenance of plant and equipment.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in air quality management. Examples of training topics include:

- ERSED control installation methodology.
- Planning and preparedness for high wind events / dust risk periods.
- Lessons learnt from dusty periods, incidents and other event e.g. low rainfall/high wind.

Further details regarding staff induction and training are outlined in Section 5 of the CEMP.

8.3 Monitoring and inspection

Regular monitoring and inspections will be undertaken during construction. Monitoring and inspections will include, but not be limited to:

- Weekly formal inspections and informal daily checks will be undertaken by the Environmental Manager or Environmental Officer to identify and action any air quality issues.
- Monthly dust monitoring in accordance with DEC's "Approved Method for the Sampling and Analysis of Air Pollutants in NSW" guidelines.
- Weather data at the premises, including rainfall measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office is established.

Additional requirements and responsibilities in relation to inspections are documented in Section 8 of the CEMP.

8.4 Licenses and permits

An EPL will be obtained for the scheduled activities “road construction”, “crushing, grinding and separating” and “extractive activities”. The EPL typically prescribes air quality parameters to be measured. The air quality monitoring criteria for the Project is listed in Table 5-1.

Any other relevant licenses or permits will be obtained in the lead up to and during construction as required.

8.5 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, CoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 8.3 of the CEMP.

8.6 Reporting

Reporting requirements and responsibilities are documented in the Sections 8.4 and 8.5 of the CEMP.

9 Review and improvement

9.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.

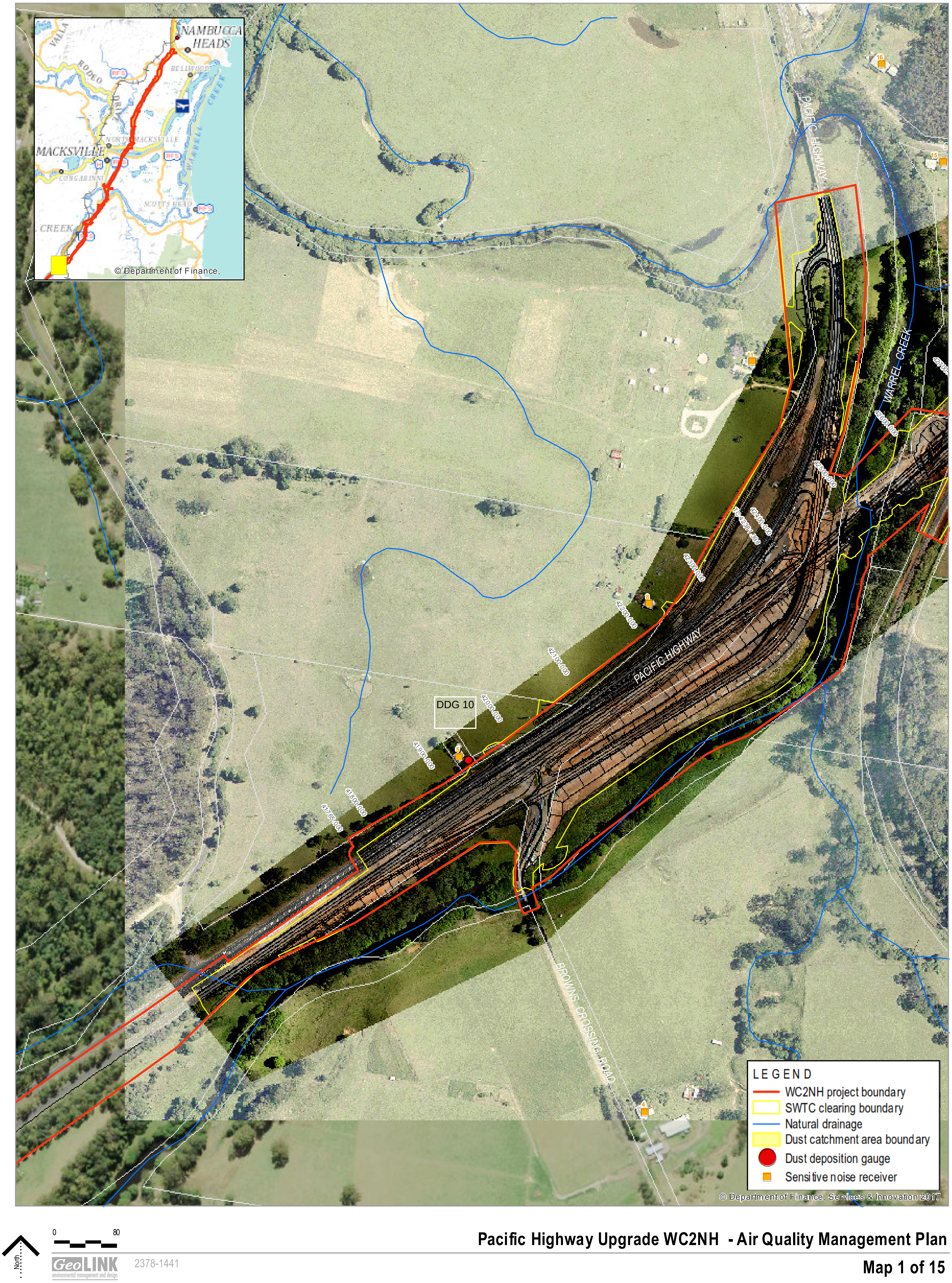
9.2 AQMP update and amendment

The processes described in Section 8 and Section 9 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Any revisions to this Plan will be in accordance with the process outlined in Section 1.6 of the CEMP and as required, be provided to relevant stakeholders for review and comment and forwarded to the Secretary of DPE for approval.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.2 of the CEMP.

Appendix A
Dust catchment areas and sensitive receivers


NAMBUCCA HEADS
MACKSVILLE
© Department of Finance.
PACIFIC HIGHWAY
WARREL CREEK
DDG 10
BROWNS CROSSING ROAD
LEGEND
WC2NH project boundary
SWTC clearing boundary
Natural drainage
Dust catchment area boundary
Dust deposition gauge
Sensitive noise receiver
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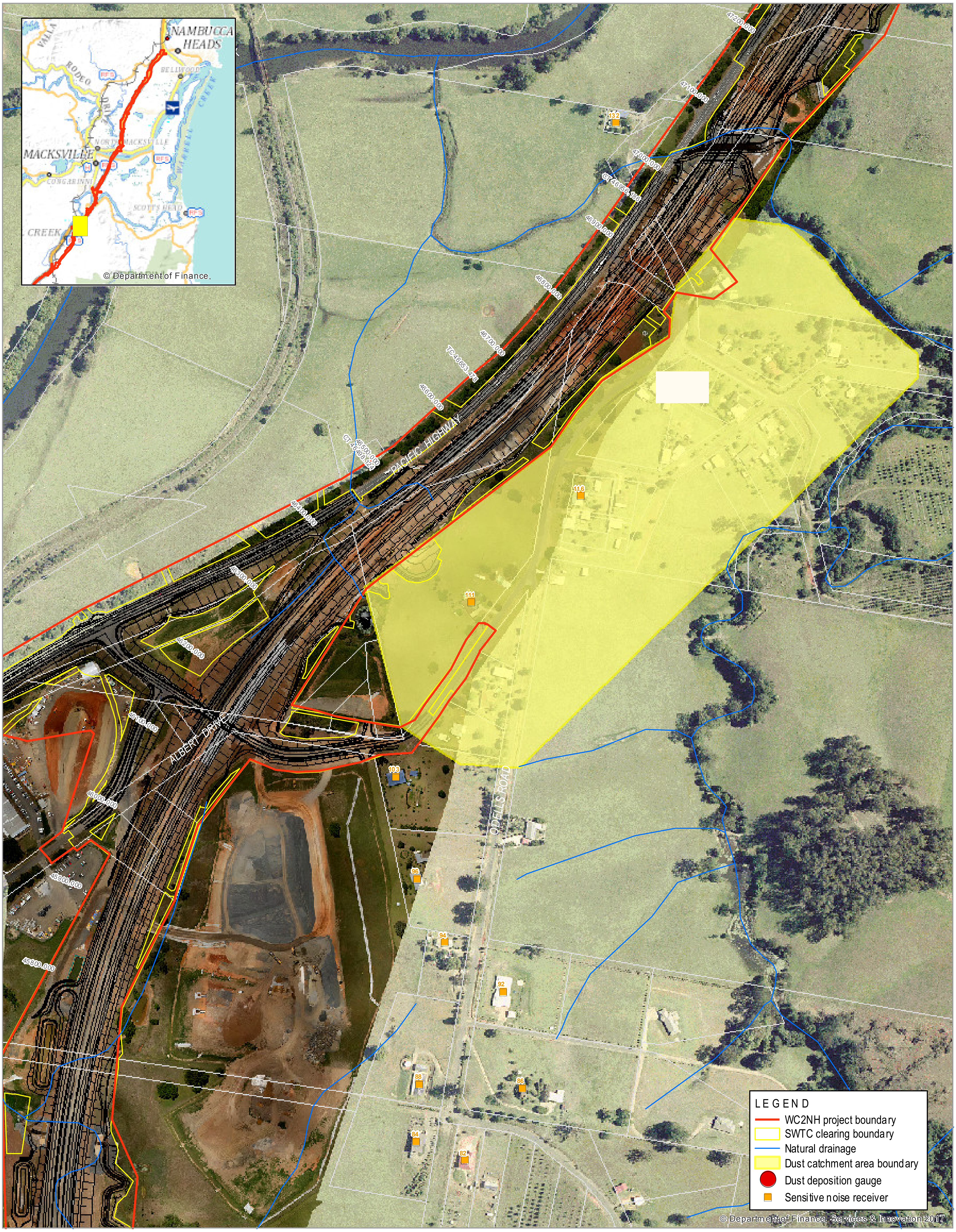

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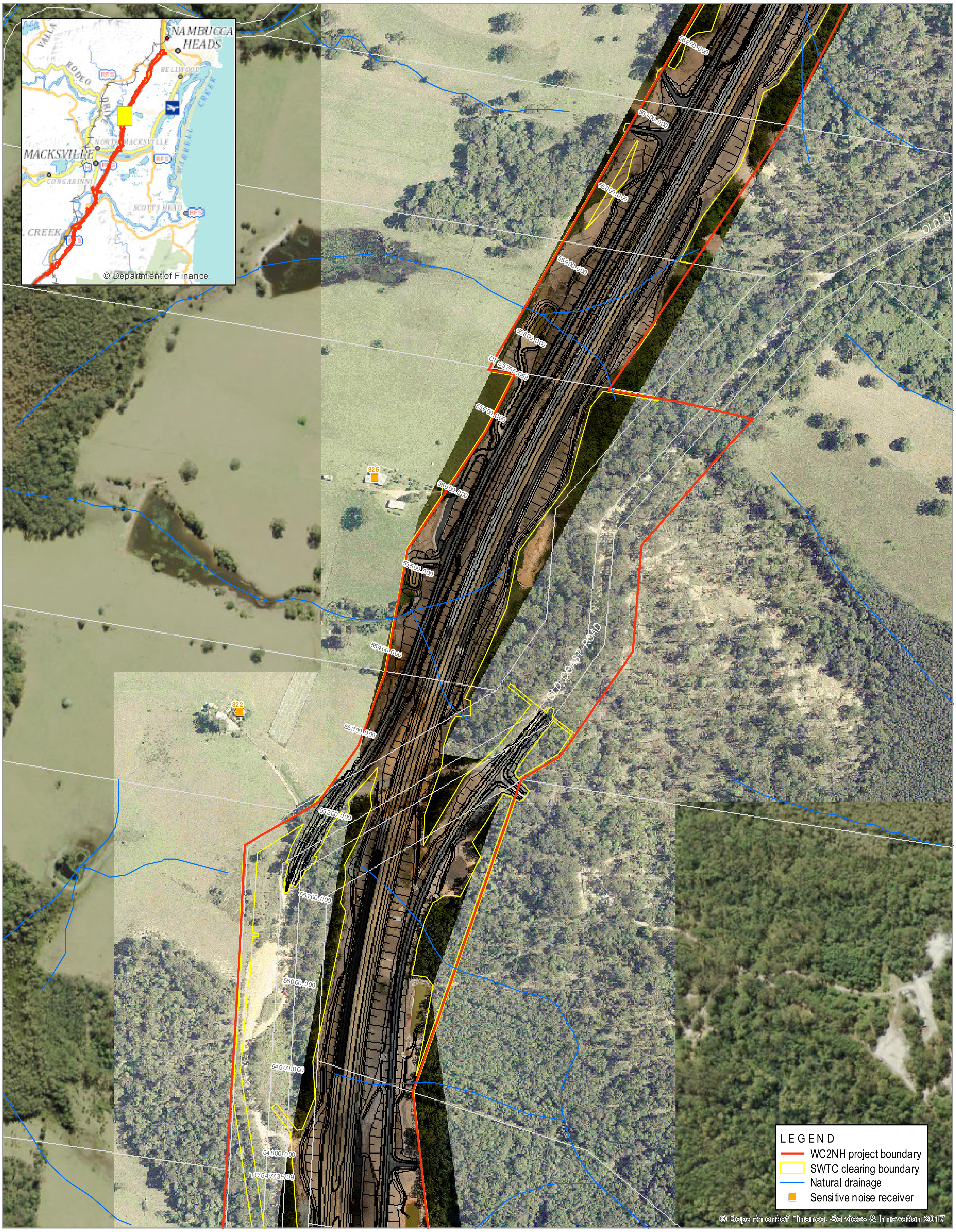

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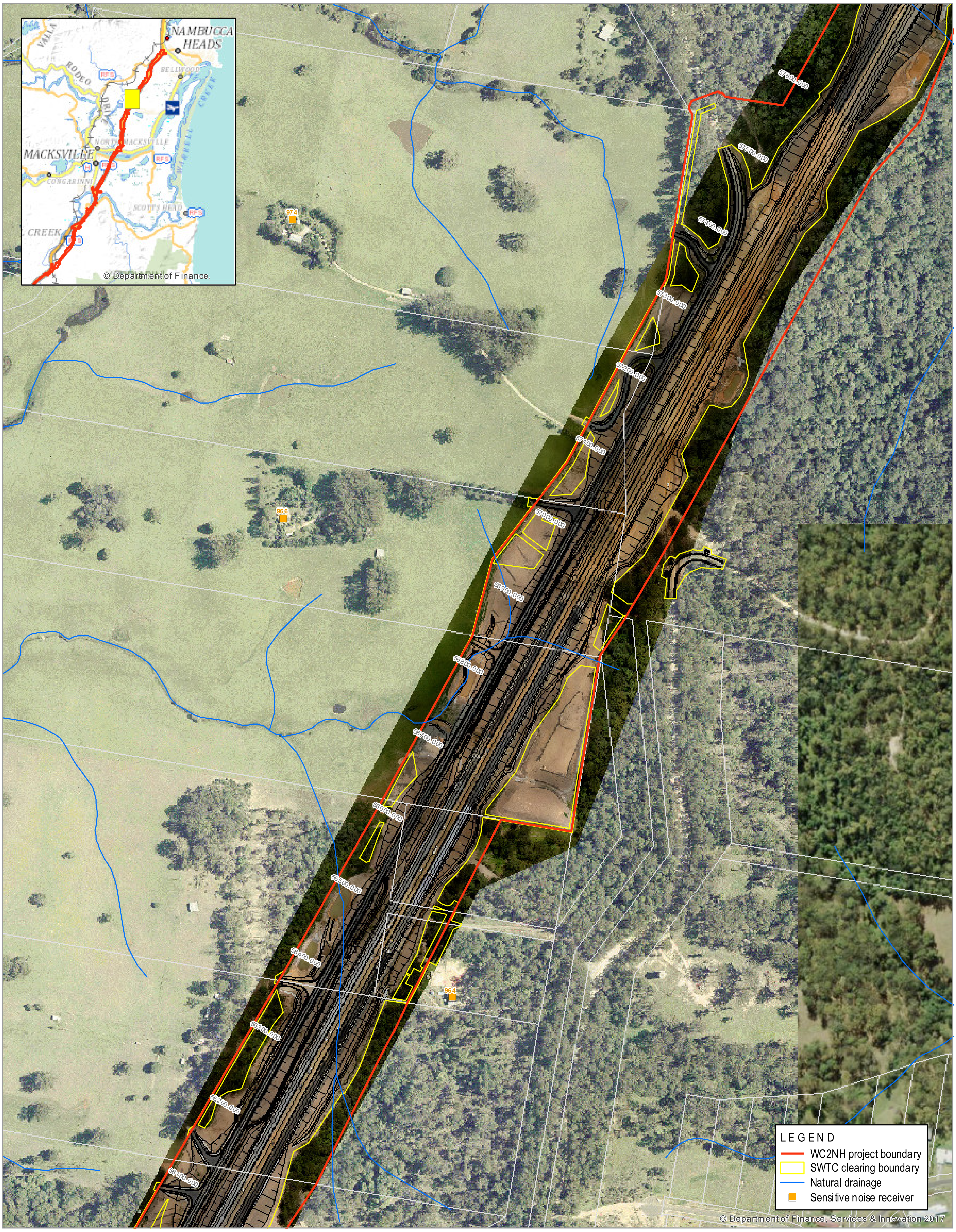

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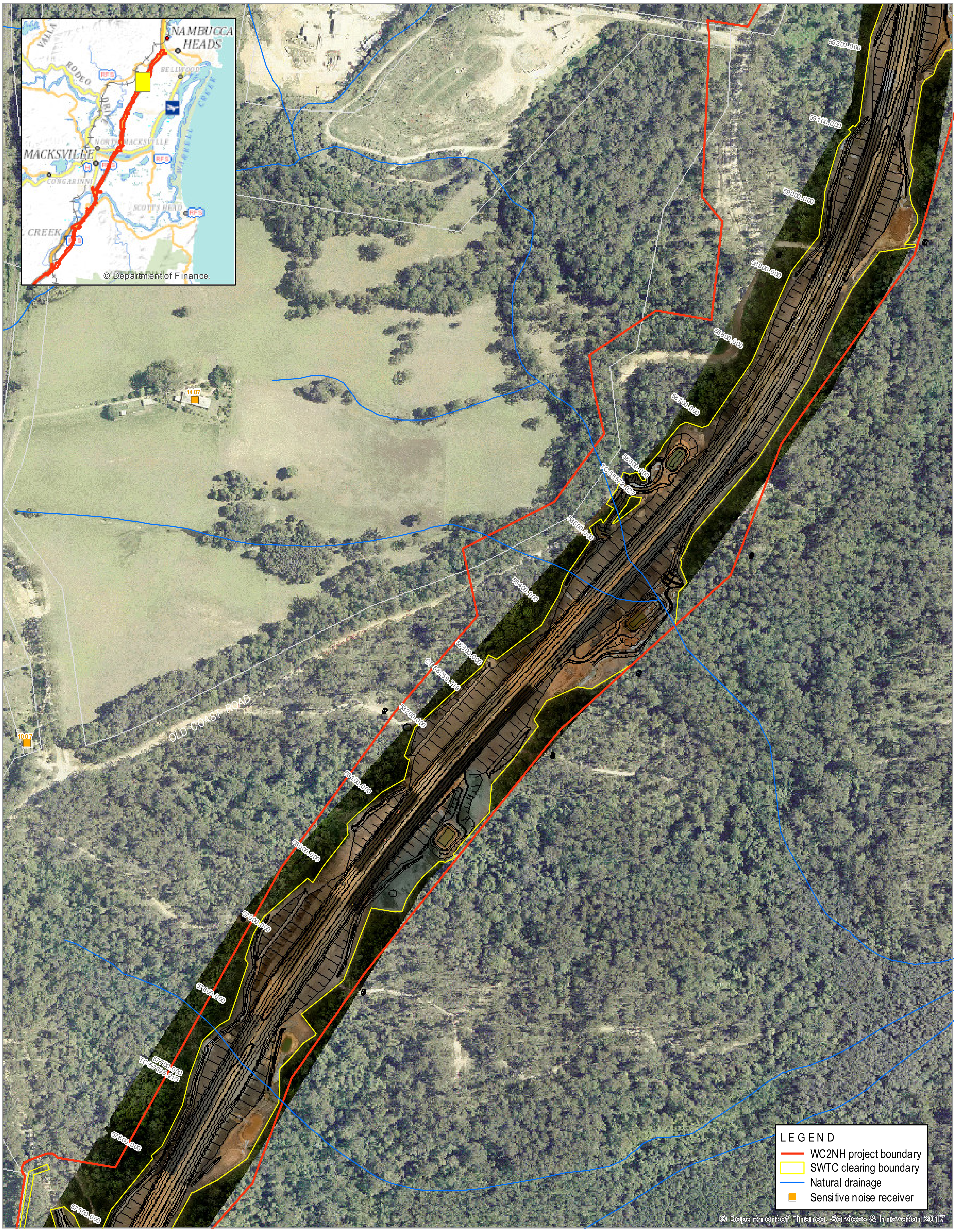

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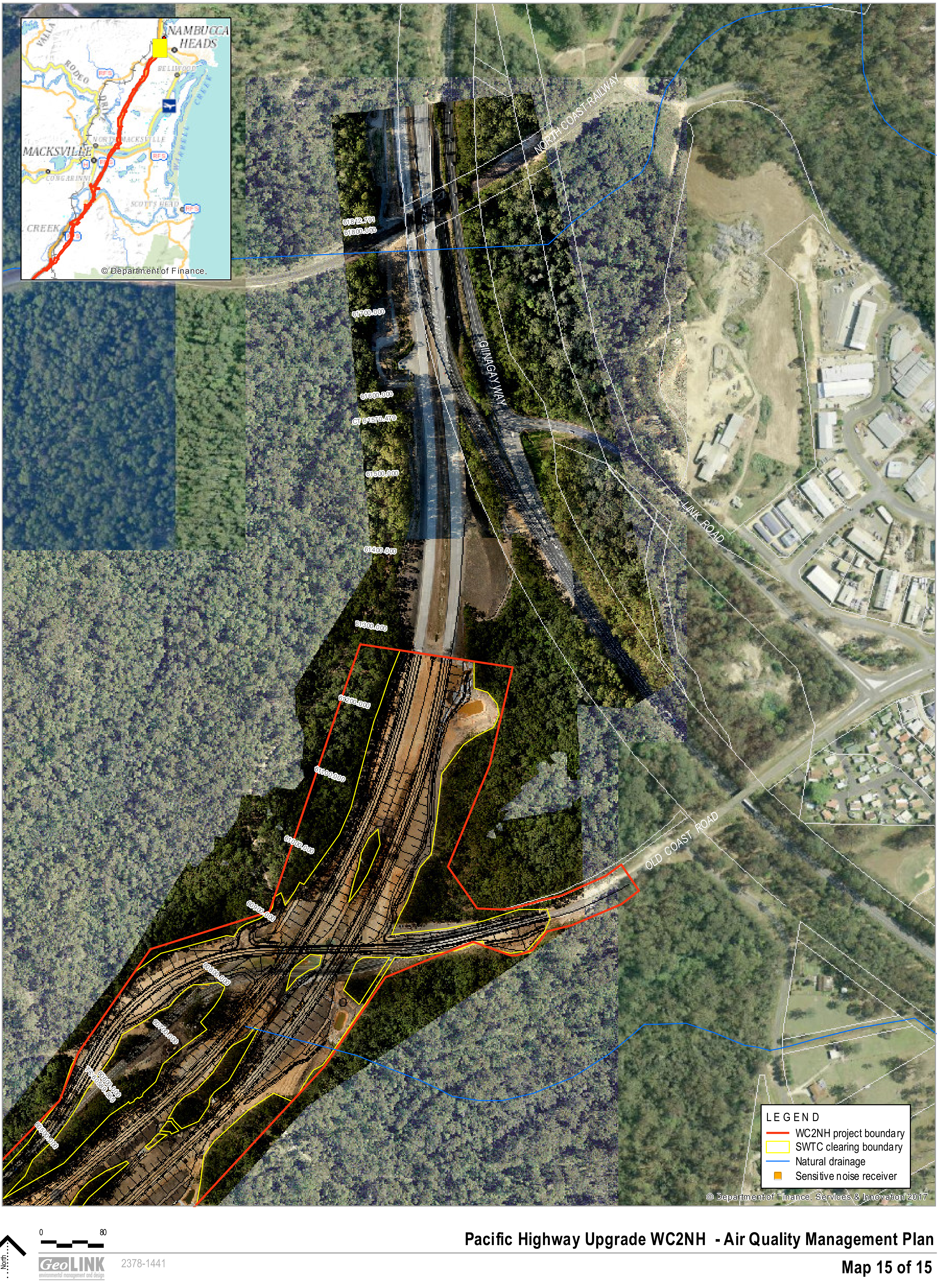

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