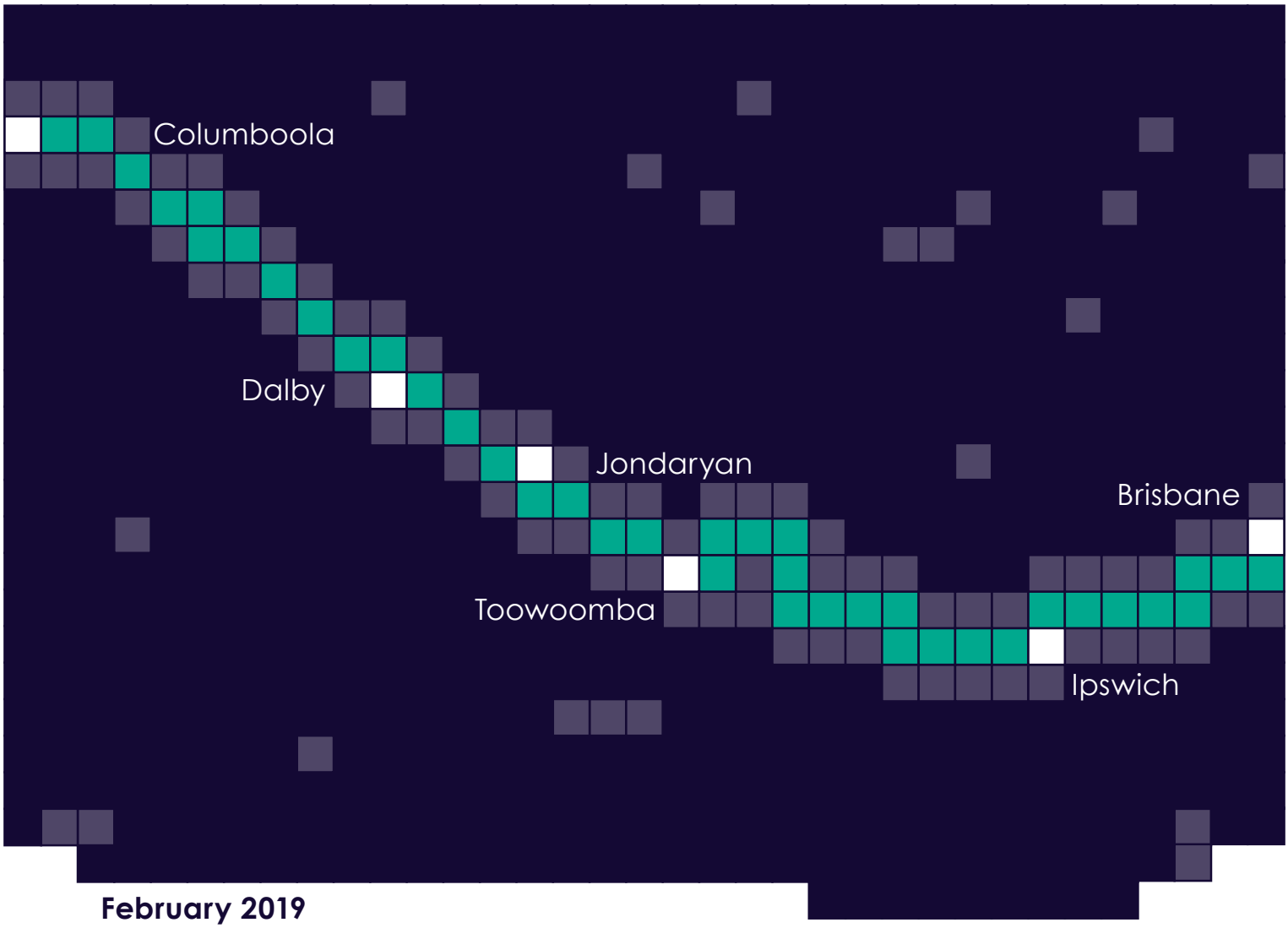

February 2019

South West Supply Chain

Coal Dust Management Plan

1 INTRODUCTION

This Coal Dust Management Plan (the Plan) focuses on the operations of the South West Supply Chain (the Supply Chain), including the transport of coal on the Western-Metropolitan Rail System (WMRS), the train loading processes at the mines, and the train unloading processes at the Port of Brisbane. It is an update to the Coal Dust Management Plan[6] released in 2013.

The purpose of the Plan is to:

- Present information, based on scientific evidence, in a transparent way for community awareness;
- Provide an overview of the leading measures employed by the Supply Chain to mitigate and manage coal dust on the WMRS;
- Demonstrate the performance and effectiveness of these mitigation and management measures, which have been implemented according to the commitments in the previous Coal Dust Management Plan[6], against Government regulated air quality criteria; and
- Outline mechanisms to respond to community concerns.

All members of the Supply Chain strive to maintain a strong social licence to operate, and accordingly take air quality management and community obligations very seriously. The Supply Chain has, and continues to, adopt a coordinated approach to coal dust mitigation and management, as outlined in this Plan, to give the community and Government confidence in its responsible operations.

This Plan provides evidence that confirms that the members of the Supply Chain have:

- Proactively addressed coal dust on the rail corridor;
- Made associated information publicly available to help address community concerns; and
- Achieved, and continues to maintain, dust levels that are well below all air quality criteria for the health and amenity of residents along the WMRS.

KEY MESSAGES

- Not all black dust is coal dust along the WMRS. It is often mistaken with black rubber dust or soot.
- Supply Chain members implement a range of mitigation and management measures to minimise coal dust along the WMRS.
- Independent, peer-reviewed monitoring demonstrates that dust levels along the WMRS were compliant with air quality criteria pre- and post-implementation of additional mitigation and management measures (e.g. veneering and load profiling).
- Coal dust makes up a minor fraction of total deposited dust levels along the WMRS with soil or rock dust being the major contributor.
- Ongoing monitoring indicates the Supply Chain's mitigation and management measures continue to perform effectively in minimising coal dust along the WMRS.
- The Queensland Department of Transport and Main Roads (DTMR) recognised that the implementation of mitigation and management measures by the Supply Chain has been, and continues to be, highly effective in reducing the loss of coal dust from loaded rail wagons during transport.
- The Queensland Department of Health concluded that dust levels along the WMRS are unlikely to result in any adverse health effects.

2 SOUTH WEST SUPPLY CHAIN OVERVIEW

2.1 The Supply Chain

The Supply Chain is the smallest coal network in Australia. It is made up of two coal producers, a rail transport operator, a rail network manager and a coal export terminal operator (see **Table 1**).

TABLE 1: MEMBERS OF THE SOUTH WEST SUPPLY CHAIN

Company	Operations
Aurizon	Rail Operator
New Hope Group	Coal producer, New Acland (near Jondaryan) and Jeebropilly (near Ebenezer)
Queensland Bulk Handling	Coal export terminal operator, Port of Brisbane
Queensland Rail	Rail network manager
Yancoal	Coal producer, Cameby Downs (near Columboola)

Up to 10 million tonnes per annum of coal can be extracted from the Clarence-Moreton and Surat Basins in southern Queensland. Coal extracted is then hauled via the WMRS (approximately 650 kilometres return) for export through the Port of Brisbane (see **Figure 1**).

In addition to coal transport, the WMRS is used by passenger trains and freight trains, which haul grain and livestock.

Rail is widely recognised as the most efficient transport system for bulk materials. One coal train on the WMRS carries 1,940 tonnes.

This equates to 625 truck cycles (carrying 40 tonnes) per day that would otherwise operate through Toowoomba, over the Toowoomba ranges and through the urban communities of Brisbane every day.

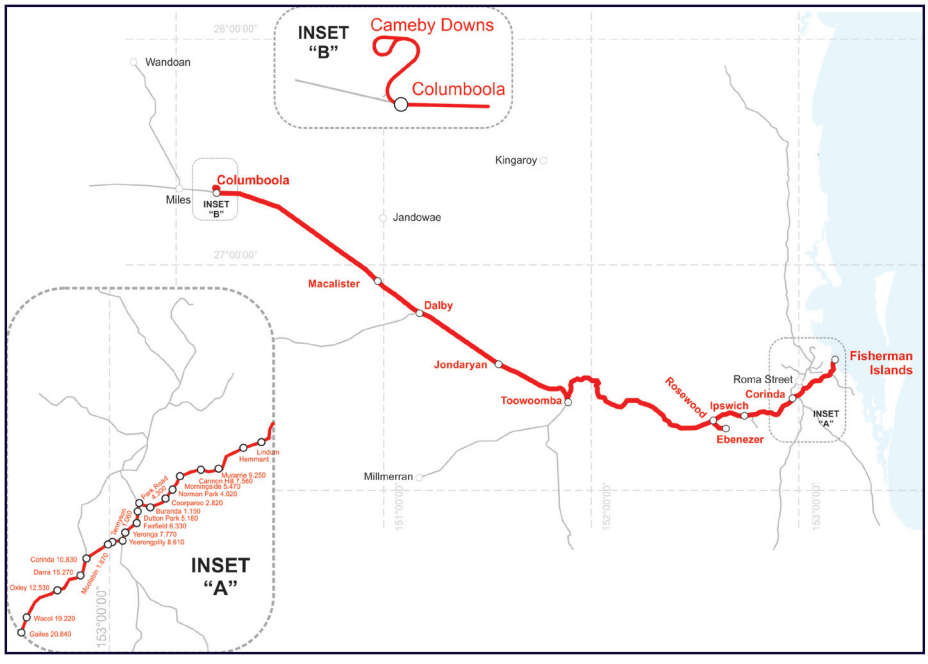

Figure 1: *Western-Metropolitan Rail System*

2.2 Community contribution and economic investment

The Supply Chain is a significant contributor to the Queensland economy supporting thousands of jobs and delivering millions of dollars to local communities through wages, business purchases, royalties and community donations. In 2016-17 alone, members directly and indirectly supported over 3,800 full-time workers. Once business purchases and Government payments are included, the Supply Chain contributed over $675 million to gross regional product in 2016-17—directly supporting 225 regional businesses.

The Supply Chain has a shared interest in their communities and provides significant funding to a range of community projects.
In 2016-17, members directly supported 75 community organisations by providing funding for a range of education, health, welfare and environmental initiatives.

All of the Supply Chain members have long term interests in continuing responsible operations in the region. They are committed to communities in which they operate, and work to hire and contract locally, where possible.

Members also invest in a range of trainee, graduate and apprentice programs aimed at developing the skills within the region and creating career pathways.

2.3 Collaborative approach to coal dust management

Members of the Supply Chain work together to deliver operational efficiencies across the network while ensuring effective mitigation and management of environmental matters of interest to the community, such as coal dust.

In addition, the Supply Chain has worked with the following Government departments and industry peak body to monitor, analyse and report back to the public on coal dust management:

- DTMR;
- Queensland Department of Environment and Science (DES), an amalgamation of the former Department of Science, Information Technology and Innovation (DSITI) and the Department of Environment and Heritage Protection in early 2018; and
- Queensland Resources Council (QRC).

These parties have contributed to the development of this Plan.

3 BACKGROUND ON COAL DUST

Dust is a key focus for communities and the Government due to the potential impact it can have on human health and amenity (nuisance).

This Plan aims to help people understand the facts about coal dust with the support of scientific evidence.

3.1 What is dust?

Dust is small particles (also known as particulate matter), which come from a range of different sources (see **Figure 2**). Dust can take a number of forms and sizes. For environmental and health purposes, dust is usually described by size.

Figure 2: *Sources of particulate matter*

$PM_{2.5}$ and PM_{10} are invisible to the naked eye. For context, **Figure 3** illustrates how small these particles are when compared to the size of a single thread of human hair or grain of sand.

The extent of the impact of dust depends largely upon the concentration, size of particles and the duration of exposure. Elevated levels of particles smaller than PM_{10} (including $PM_{2.5}$) are of greater health concern than larger particles as they can reach the air sacs in the lungs. In contrast, amenity (nuisance) impacts are generally associated with particles that are PM_{10} and greater. These larger particles tend to settle out of the air (deposited dust) close to its source.

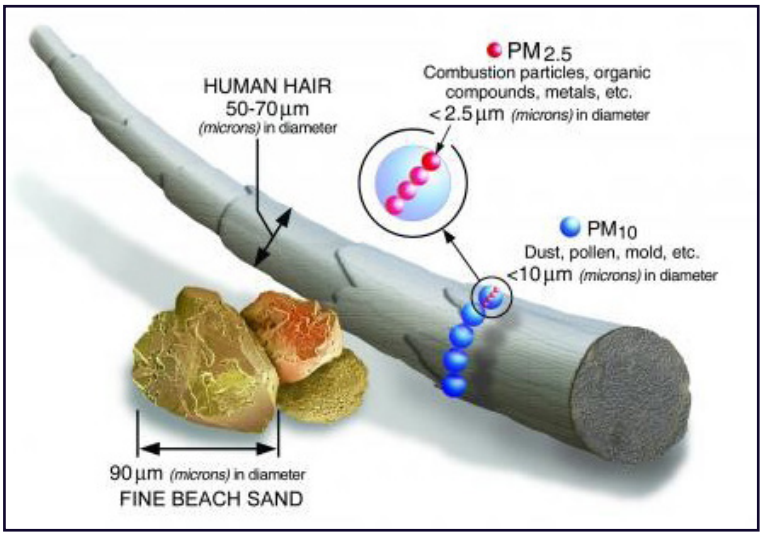

Figure 3: *Size comparison of particulate matter*[1]

Collectively, the total of all particles suspended in the air is referred to as Total Suspended Particulate (TSP) matter. When these particles settle out of the air they are referred to as deposited dust. Generally, deposited dust can include particles of any size, but often comprises particles larger than 20 microns in diameter (i.e. greater than PM_{10}) that rapidly settle out of the air near its source[2].

3.2 What is coal dust and where does it come from?

Product coal from mines is typically crushed and washed to remove most of the loose particulate matter (coal dust) before being transported, increase moisture content and meet strict customer specifications. Where coal dust remains, it is generally between 50 and 200 microns in diameter[3] (i.e. greater than PM_{10}). If particles of this size become airborne, they generally settle (as deposited dust) within 10 metres of the rail corridor[11].

Coal dust can be lost from loaded trains as a result of:

- Wind erosion of the coal surface of loaded wagons;
- Leakage from the doors of un/loaded wagons;
- Deposited coal left on sills and wagons; and
- Residual coal from unloaded wagons[11].

3.3 Is all black dust coal dust?

Black dust that has settled out of the air (i.e. deposited dust) and is visible on surfaces is often thought to be coal dust if there is a coal mine, terminal or railway nearby. However, black dust can come from a range of other sources not related to coal production, processing or transportation. Monitoring has shown this to be the case for the transportation of coal on the WMRS.

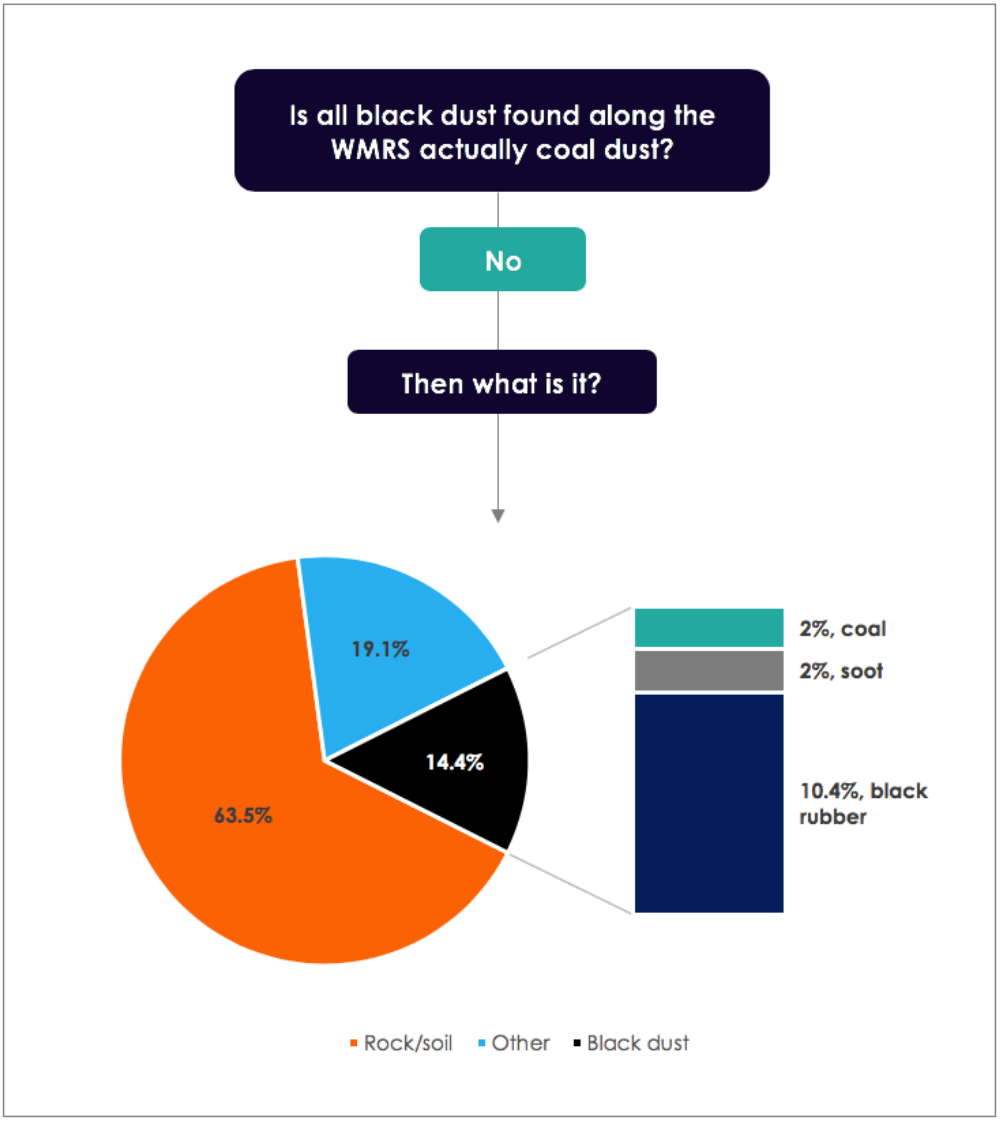

Figure 4 shows the main sources of dust near the WMRS measured by DSITI (now DES) in 2017 as part of the monitoring program commissioned by the Supply Chain (see also **Section 4** and **6**).

Black dust makes up 14.4% of the total dust measured. Only 2% of the sample is coal dust with the majority black rubber dust (e.g. vehicle tyre wear). The remainder of the sample is made up of soil, rock and other particles.

Since 2013, monitoring has demonstrated decreased levels of coal dust in the deposited dust samples following the implementation of additional mitigation measures across the Supply Chain (see **Section 4** and **7**).

Figure 4: *Sources of 'black dust' on the Western-Metropolitan Rail System 2017*[13]

Note: Average proportions of dust between January to December 2017

3.4 Government regulation of dust

The Queensland and Commonwealth Governments have set criteria for outdoor (ambient) air quality, based on independent national and international studies, to ensure the ongoing health and wellbeing of communities and the environment.

Table 2 outlines the criteria for particulate matter, including coal dust, under the:

- Queensland *Environment Protection (Air) Policy 2008* (EPP Air);
- Queensland *Application requirements for activities with impacts to air* (Air Impacts Guideline); and
- Commonwealth *National Environment Protection (Ambient Air Quality) Measure* (AAQ NEPM).

Matter	Averaging period	Max. concentration	Criteria
PM_{10}	1 day	50µg/m^3	EPP Air, AAQ NEPM
	1 year	25µg/m^3	AAQ NEPM
$PM_{2.5}$	1 day	25µg/m^3	EPP Air, AAQ NEPM
	1 year	8µg/m^3	EPP Air, AAQ NEPM
TSP	1 day	60µg/m^3	Air Impacts Guideline
	1 year	90µg/m^3	EPP Air
Dust Deposition	30 days	120mg/m^2/day	Air Impacts Guideline

Table 2: *Queensland and Commonwealth air quality criteria*

4 UNDERSTANDING COAL DUST ON THE WESTERN-METROPOLITAN RAIL SYSTEM

4.1 Responding to community concern

$PM_{2.5}$ and PM_{10} have been associated with health impacts, while particles that settle out of the air (deposited dust) can be an amenity or nuisance issue.

In late 2012 and into 2013, communities along the WMRS raised concern with the Queensland Government that coal dust generated from uncovered rail wagons transporting product coal to the Port of Brisbane was a nuisance, particularly for neighbouring residences. In response to this concern, the Supply Chain, in collaboration with the Government, took action to understand the sources and impacts of coal dust through air quality monitoring and implement additional mitigation and management measures.

4.2 Coal characteristics and other influencing factors

The coal produced by mines that are part of the Supply Chain is recognised on an international scale as having a low Hardgrove Grindability Index rating between 35 and 39 (the highest rating is 100). The Index is used in specifications for coal and other commodities to indicate the grinding property. The lower the rating the harder the coal is to grind, making it less likely to produce coal dust.

In addition, almost all of the coal transported by the Supply Chain is washed to meet customer specifications. This process removes the majority of coal dust that might exist and adds moisture content to the product coal further reducing dust generation. A small proportion of the coal from the Supply Chain's producers is not washed because of its low dust characteristics.

Once in transit, the speed of trains can also influence the generation of coal dust. Trains on the WMRS operate at a slower speed than other supply chains in Queensland and Australia partly because they transit the metropolitan area. It is recognised that reduced speed minimises the potential for coal dust to lift off the top of loaded wagons.

4.3 Establishment of baseline monitoring

Scientific evidence is essential to establish an accurate picture of air quality and coal dust deposition levels along the WMRS. QRC, on behalf of the Supply Chain, commissioned DSITI (now DES) to conduct independent baseline air quality monitoring along the WMRS between March and May 2013. Monitoring focused on acquiring data, including PM_{10}, $PM_{2.5}$, and dust deposition, to assess both health and nuisance impacts on the community and to identify the contribution of coal dust to total deposited dust levels.

Six locations along the WMRS were selected for monitoring, including Oakey, Willowburn (Toowoomba), Dinmore, Tennyson, Fairfield and Coorparoo.

DSITI reported that rail transport emissions, including coal haulage, was **compliant with air quality criteria** for PM_{10}, $PM_{2.5}$ and dust deposition along the WMRS. Coal dust made up a minor fraction of total deposited dust levels with soil or rock dust being the major contributor.

Full details of the monitoring are published in the *Western-Metropolitan Rail Systems Coal Dust Monitoring Program, Pre-veneering monitoring period results*[4]. A copy can be accessed via the QRC and DES website.

Although the monitoring showed coal haulage met air quality criteria, the Supply Chain voluntarily adopted additional dust mitigation and management measures, including veneering and load profiling, to further improve overall environmental performance and to address community concerns. Further information on veneering and load profiling is provided in **Section 4.4.1** and **5**.

4.4 Understanding the effectiveness of additional mitigation and management measures

4.4.1 Early implementation of veneering and load profiling

Once a baseline had been established, on 2 May 2013, New Hope Group's New Acland mine was the first to implement:

- Veneering, which involves the application of a biodegradable, non-toxic, binding agent onto the loaded wagon coal surface. The veneer forms a crust over the coal load and minimises coal dust lift-off when exposed to air passing over the surface in transit; and
- Load profiling of rail wagons, which involves shaping the exposed coal above the sill of the wagon into a 'garden bed' profile to minimise coal dust lift-off when exposed to air passing over the surface in transit.

Refer to images of veneering and load profiling in **Section 5**.

New Acland mine accounted for approximately 60% of total coal movements along the WMRS at the time. Following the early implementation at New Acland mine, New Hope Group and Yancoal subsequently introduced veneering and load profiling during late 2013 across its other coal operations.

4.4.2 Testing effectiveness of additional mitigation and management measures

To provide an early signal of the effectiveness of additional dust mitigation and management measures at New Acland mine, DSITI continued monitoring through to early July 2013.

DSITI reported that rail transport emissions, including coal haulage, **remained compliant with air quality criteria** for PM_{10}, $PM_{2.5}$ and dust deposition along the WMRS.

A number of observations pointed to regional urban sources rather than rail transport, including coal haulage, as the major contributor to PM_{10} and $PM_{2.5}$ levels along the WMRS. It also showed that total dust levels on the rail corridor were equivalent to dust levels at other monitoring locations elsewhere in Brisbane where coal haulage does not occur. Coal dust made up a minor fraction of total deposited dust levels with soil or rock dust once again being the major contributor.

Positively, the monitoring demonstrated a general trend towards decreased levels of coal dust in the deposited dust samples following the implementation of veneering and load profiling at the New Acland mine (see **Figure 5**). In this regard, the Queensland Department of Health concluded that dust levels along the WMRS are unlikely to result in any adverse health effects[5].

Full details of the monitoring are published in the *Western-Metropolitan Rail Systems Coal Dust Monitoring Program, Final report*[5]. A copy can be accessed via the QRC and DES website.

Although there was a demonstrated reduction in the loss of coal dust during transit, the Supply Chain agreed to continue monitoring over a longer period to validate the trend long-term following implementation of measures at New Acland and across the remainder of the Supply Chain (see **Section 4.4.3**).

4.4.3 Full implementation across the South West Supply Chain

By the end of 2013, the actions at New Acland mine had been complemented with additional coal dust mitigation and management measures across the remainder of the Supply Chain (see **Section 5**), as committed under the previous Coal Dust Management Plan[6].

DSITI recommenced monitoring in February 2014 and continued through to December 2015 to obtain a long-term data trend for TSP, PM_{10}, $PM_{2.5}$ and dust deposition, and to assess the ongoing effectiveness of the Supply Chain's efforts. In this next phase of monitoring, DSITI revised the monitoring locations while still being representative of sensitive receivers (e.g. residences) along the WMRS.

A permanent monitoring site was established in Cannon Hill to measure PM_{10}, $PM_{2.5}$ and TSP on a continuous basis. Deposited dust samplers were sited at Cannon Hill, Fairfield and Toowoomba. At each location, two samplers were deployed, one on each side of the rail corridor.

In line with early results associated with measures implemented at New Acland mine, the monitoring demonstrated that rail transport emissions, including coal haulage, continued to comply with air quality criteria for TSP, PM_{10}, $PM_{2.5}$ and dust deposition with coal dust making up a minor fraction of total deposited dust levels (see **Figure 5**).

The following should be considered when interpreting **Figure 5**:

- Dust deposition is recorded monthly. Month-by-month measurements differ to the average annual measurements outlined above;
- The Air Impact Guideline sets a dust deposition limit of 120 mg/m^2/day averaged over 1 month; and
- Seasonal variations and changing weather affects the dust deposition measurements, which can be seen by the peaks and troughs.

The monitoring also highlighted that the implementation of additional mitigation and management measures provided in the previous Coal Dust Management Plan[6] had been highly effective in maintaining compliance and further reducing the loss of coal dust from loaded rail wagons during transit.

Full details of the monitoring are published in the *Western-Metropolitan Rail System Phase 2 Coal Dust Monitoring Program, February 2014 to December 2015*[7]. A copy can be accessed via the QRC and DES website.

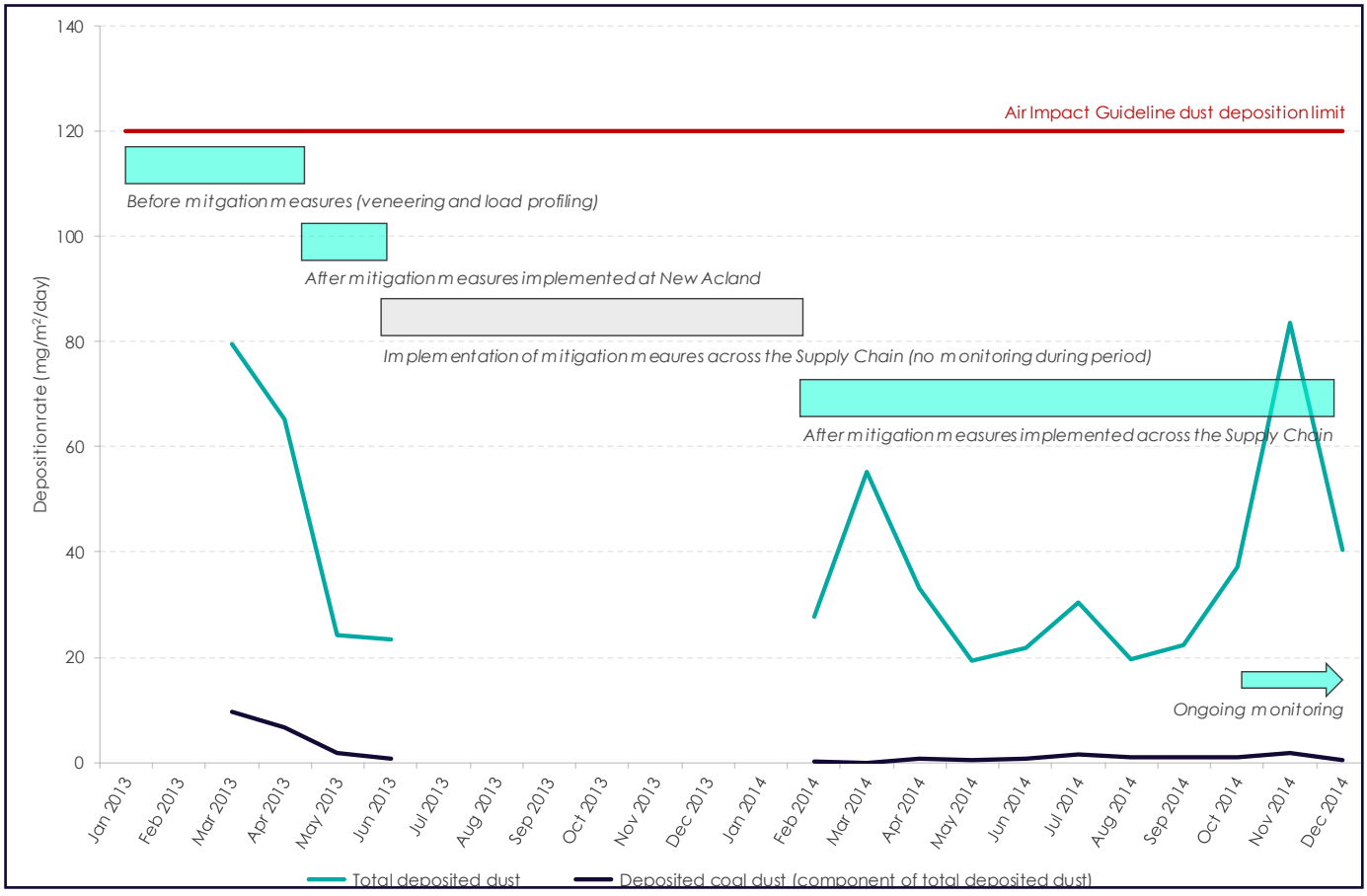

Figure 5: Total dust and coal dust trends pre and post-full implementation of additional coal dust mitigation and management measures across the Supply Chain[5,7]

4.5 Validating the monitoring results

Each of DSITI's monitoring reports[4,5,7] were validated through a peer review process. In all circumstances, the peer reviewer found that monitoring was undertaken using an appropriate method and design, and that the weight of evidence confirms the conclusions in the reports are valid and well supported by the data[8,9]. A copy of the peer reviews can be accessed via the QRC and DES website.

4.6 Other studies

4.6.1 Review of dust from coal trains in Queensland

In 2013, Katestone Environmental Pty Ltd[10] undertook a desktop review (the Review) of studies related to the effect of coal trains on air quality, focusing on the impacts of coal dust from trains during transit between mine and export terminal. The Review found that:

- Where air quality monitoring is conducted in a rail corridor and around rail systems, *"whilst coal dust and the influence of coal trains on dust levels has been detected, the levels of coal dust were found to be well below the air quality objectives for the protection of human health and amenity impacts";*
- *"…outside the rail corridor, defined as approximately 10 metres from the tracks, coal dust concentrations were much lower than within the corridor and were even further below air quality objectives for the protection of human health and amenity";*
- Coal dust tends to be found in particulate sizes greater than PM_{10} and therefore is not likely to be able to penetrate the human lungs; and
- All PM_{10} and $PM_{2.5}$ measurements recorded as part of the monitoring program conducted by DSITI (as outlined in **Section 4.4**) were well below relevant air quality criteria. The Queensland Department of Health added that, *"for people living along the rail corridor, the dust concentrations measured during the investigation are unlikely to result in any additional adverse health effects"*.

4.6.2 Environmental evaluation of fugitive coal dust emissions from coal trains

In 2008, Connell Hatch[11] carried out an environmental evaluation (the Evaluation) of fugitive coal dust emissions from coal trains along the Goonyella, Blackwater and Moura Coal Rail Systems, on behalf of QR Limited.

The Evaluation identified ways by which coal dust could be lost during rail haulage, consistent with **Section 3.2**, including:

- Coal properties such as: dustiness, moisture content and particle size;
- Frequency of train movements;
- Vibration of the wagons;
- Profile of the coal load;
- Transport distance;
- Exposure to wind; and
- Precipitation.

5 CURRENT COAL DUST MITIGATION AND MANAGEMENT ON THE WESTERN-METROPOLITAN RAIL SYSTEM

The Supply Chain continues to operate in accordance with strict environmental conditions and proactively undertakes coal dust mitigation and management measures to ensure the health and wellbeing of the community and the environment.

Some of the key coal dust mitigation and management measures carried out by the Supply Chain include (but are not limited to):

- **Load profiling** of rail wagons, which involves shaping the exposed coal above the sill of the wagon into a 'garden bed' profile to minimise coal dust lift-off when exposed to air passing over the surface in transit;
- **Veneering**, which involves the application of a biodegradable, non-toxic, binding agent onto the loaded wagon coal surface. The veneer forms a crust over the coal load and minimises coal dust lift-off when exposed to air passing over the surface in transit; and
- **Air quality monitoring**.
  Details about the ongoing coal dust monitoring, commissioned on behalf of the Supply Chain, are provided in **Section 6**.

The full list of coal dust mitigation and management measures carried out by the Supply Chain is provided in the following sections.

Example of load profiling

Example of veneering

Example of veneering

5.1 Measures implemented by coal producers

Coal producers implement the following coal dust mitigation and management measures:

- Load profiling;
- Veneering;
- Monitoring of loading against procedures to minimise spilled coal;
- Use of a high-pressure water system to remove spilled coal from wagon edges prior to transit;
- Routine cleaning of coal spillage between and around rails at the train load out;
- Monitoring of wagons to ensure that the doors are firmly closed prior to loading and departing to ensure coal is not lost during loading and transit;
- Routine training for staff, including loading procedures and providing awareness as to why the effective and clean loading of trains is important for the coal dust management on the WMRS; and
- Provides support and funding for the air quality monitoring program on the WMRS.

In addition to the commitments made by the Supply Chain, New Hope Group actively wash all of the coal sent to market to meet customer specifications. This process also removes the majority of coal dust that might exist and adds moisture content to the product coal further reducing dust generation.

Similarly, Yancoal wash approximately 60% of their coal. The remaining portion is not washed due to its low dust characteristics, and as such is blended with washed coal product when railed to the port.

5.2 Measures implemented by the rail network manager

The rail network manager implements the following coal dust mitigation and management measures:

- Reviews the risks with regards to accessing and operating on the rail network, including environmental management. Where necessary, the rail network manager imposes conditions on the rail operator to implement controls for the reduction or mitigation of these risks; and
- Provides support and funding for the air quality monitoring program on the WMRS.

5.3 Measures implemented by the rail operator

The rail operator implements the following coal dust mitigation and management measures:

- Adherence by locomotive drivers to speeds of 60 kilometres per hour for loaded coal trains, which has been shown through extensive wind-tunnel testing to be a speed that minimises the coal dust lift-off from the top of wagons[11];
- Operating detectors near the mines and port to notify locomotive drivers immediately if a door opens in a wagon. Drivers then stop the train in order to prevent spillage of coal from the bottom of the wagons;
- Routine training for locomotive drivers, including prevention of hard braking, bunching and vibration of wagons to reduce coal shifting and spillage; and
- Provides support and funding for the air quality monitoring program on the WMRS.

5.4 Measures implemented by the coal terminal manager at the Port of Brisbane

The coal terminal manager at the Port of Brisbane implements the following coal dust mitigation and management measures:

- Operation of covered in-load dump stations and enclosed conveyors, which transport coal to stockpiles;
- Video recording of coal unloading practices and use of Light Detection and Ranging (LIDAR) technology to monitor the levels of residual coal remaining in wagons and opened doors, which are reported to the rail operator for agreed action. If required, loading will cease until the operator can identify and stop the cause;
- Operation of a high hopper alarm, which identifies possible coal overflows from in-load hoppers in order to avoid coal being transferred into the adjacent ballast or build up on the wagon wheels and axles;
- Operation of an automated unload, which monitors the height of coal in the bins to reduce the drop distance, and hence dust generation, for subsequent unloaded product;
- Use of water fogging sprays at the rail receival hoppers to reduce coal dust as coal is transferred to stockpiles;
- Monitoring of sills of wagons prior to return journey along the WMRS to prevent coal spillage; and
- Monitoring of dust deposition in communities near the Port of Brisbane and at the terminal.

6 ONGOING MONITORING OF MITIGATION AND MANAGEMENT PERFORMANCE ON THE WESTERN METROPOLITAN RAIL SYSTEM

6.1 Monitoring network

As outlined in **Section 4.4** the air quality monitoring network established by DSITI, on behalf of the Supply Chain, comprises of:

- A permanent monitor at Cannon Hill, which measures PM_{10}, $PM_{2.5}$ and TSP on a continuous basis; and
- Five deposited dust samplers located at Cannon Hill, Fairfield and Toowoomba. At each location there are two samplers; one on each side of the rail corridor except for Fairfield, which only has one sampler on the western side of the corridor. The second sampler on the eastern side was removed after ongoing vandalism.

The monitoring network is shown in the Western–Metropolitan Rail System Coal Dust Monitoring Program reports. A copy of the reports can be accessed via the QRC and DES website.

6.2 Monitoring results 2016

For the period January to December 2016, PM_{10}, $PM_{2.5}$ and TSP concentrations at Cannon Hill **complied with air quality criteria** except for one day when $PM_{2.5}$ concentrations exceeded the 24-hour criterion. Winds on this day indicated that long-range transport of smoke from inland areas, and not rail transport, was the primary cause of the elevated $PM_{2.5}$ levels.

Measured dust deposition rates, resulting from all sources including coal trains, at all monitoring sites **complied with the air quality criterion** of 120 mg/m^2/day.

The amount of coal deposited across the WMRS was very low with the annual average coal dust deposition rate less than 1 mg/m^2/day. For context, this is a very small amount when compared to the air quality criterion of 120 mg/m^2/day.

Full details of the monitoring are published in the *Western–Metropolitan Rail System Coal Dust Monitoring Program, January to December 2016*[12]. A copy can be accessed via the QRC and DES website.

6.3 Monitoring results 2017

For the period January to December 2017, PM_{10}, $PM_{2.5}$ and TSP concentrations at Cannon Hill **complied with air quality criteria** except for one day when TSP concentrations exceeded the 24-hour dust nuisance criterion of 60µg/m^3 for avoidance of dust nuisance in residential areas. The direction of winds on this day indicated that windblown dust from sources outside the rail corridor, not rail transport, was responsible for this exceedance.

Measured dust deposition rates, resulting from all sources including coal trains, at all monitoring sites **complied with the air quality criterion** of 120 mg/m^2/day except for two monitoring locations in January and one monitoring location in July and October. In all cases where deposited dust levels exceeded the dust nuisance criterion, wind conditions and/or composition of the collected dust indicated that the exceedance was the result of non-rail dust sources.

The amount of coal deposited across the WMRS was very low with the annual average coal dust deposition rate less than 1 mg/m^2/day. For context, this is a very small amount when compared to the air quality criterion of 120 mg/m^2/day.

Full details of the monitoring are published in the *Western–Metropolitan Rail System Coal Dust Monitoring Program, January to December 2017*[13]. A copy can be accessed via the QRC and DES website.

6.4 Next steps

The monitoring results for 2016 and 2017 confirm that the coal dust mitigation and management measures implemented under the previous Coal Dust Management Plan[6] (and now current as outlined in **Section 5**) continue to be highly effective in reducing the loss of coal dust from loaded rail wagons during transit. Nevertheless, the Supply Chain has a long-term commitment to demonstrate ongoing compliance with all air quality criteria on the WMRS. Air quality monitoring will remain ongoing along the WMRS. Full details of the monitoring going forward will be made available via the QRC and DES website.

7 SUMMARY OF PERFORMANCE

Monitoring results published by DSITI between March 2013 and December 2017[4,5,7,12,13] (pre- and post-implementation of additional coal dust mitigation and management measures) show that rail transport emissions, including coal haulage, were compliant with air quality criteria for TSP, PM_{10}, $PM_{2.5}$ and dust deposition.

Since the full implementation of additional coal dust mitigation and management measures by the Supply Chain in 2013, the annual average coal dust deposition rate across the WMRS remains less than 1 mg/m^2/day. This is down from the recorded 7.9 mg/m^2/day prior to execution of the actions in the previous Coal Dust Management Plan[6] and demonstrates the work of the Supply Chain has been highly effective in reducing the loss of coal dust from loaded rail wagons during transit.

Figure 6 shows the trend in total dust deposition levels recorded on a monthly-basis between March 2013 and December 2017. It also demonstrates that coal dust makes up a minor fraction of total deposited dust levels.

The following should be considered when interpreting **Figure 6**:

- Dust deposition is recorded monthly. Month-by-month measurements differ from the average annual measurements outlined above;
- The Air Impact Guideline sets a dust deposition limit of 120 mg/m^2/day averaged over 1 month; and
- Seasonal variations and changing weather affects the dust deposition measurements, which can be seen by the peaks and troughs.

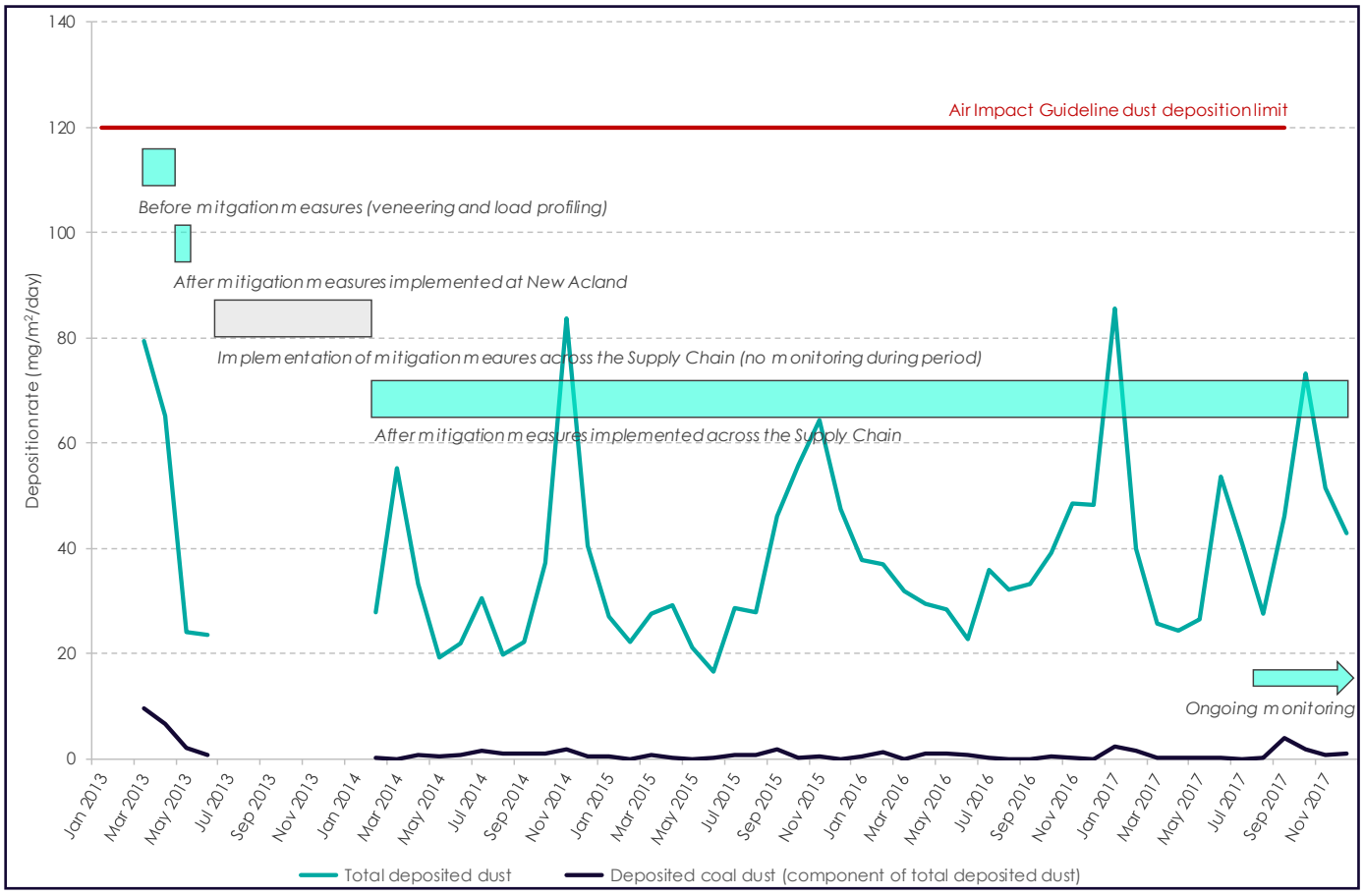

Figure 6: Long-term total dust and coal dust deposition trends[5,7,12,13]

8 GOVERNMENT REVIEW

In 2013, in response to the *Western-Metropolitan Rail Systems Coal Dust Monitoring Program, Final Report*[5], the Queensland Department of Health stated that:

> *"The air monitoring results reveal that airborne dust concentration complied with the air quality objectives in the Queensland Environmental Protection (Air) Policy 2008 (EPP Air) at all of the six rail corridor monitoring sites during both the pre- and post-veneering monitoring periods. The monitoring results were also similar to airborne dust concentration results in other areas of Brisbane…*
>
> *Based on the currently available evidence, the air quality objectives in the Queensland EPP Air are considered to be protective of public health to the extent that any health impact of the pollutant is not likely to be discernible from the background rate of the health condition. Therefore, for people living along the rail corridor, the dust concentrations, resulting from all particle sources, measured during the investigation are unlikely to result in any additional adverse health effects".*

In 2015, the Queensland Labor Government made an election commitment to "*support an independent, scientific review of mitigation treatments and implement best practices and support further technological improvements for coal dust adjacent to the South West Metropolitan rail corridor*". The review was tasked to DTMR.

On 30 July 2018, DTMR released its *Review of Coal Dust Mitigation Treatments and Air Quality Monitoring Programs on the Western-Metropolitan Rail System*[14] (the Review). DTMR reported that, based on the *Western-Metropolitan Rail System Phase 2 Coal Dust Monitoring Program, February 2014 to December 2015*[7], "*…full implementation of SWS-CDMP measures (including load profiling and veneering), has been and continues to be highly effective in reducing the loss of coal dust from loaded rail wagons during transport*".

The Review also outlines a set of recommendations for the Supply Chain's consideration, including ongoing monitoring. As provided in **Section 6.4**, air quality monitoring will remain ongoing along the WMRS.

A copy of DTMR's review can be accessed via the QRC website.

9 COMPLAINTS MANAGEMENT

Community complaints regarding coal dust are handled by the relevant member of the Supply Chain depending on the source of the concern (i.e. at the mine, along the rail line, or at the port). The contact details of each member of the Supply Chain is provided on **page 22**.

Once a complaint has been received and logged by the relevant member, it is allocated to the appropriate personnel for investigation and action. The lead or other customer service representative subsequently responds to the complainant and provides an outline of the key findings of the investigation, and where necessary, measures undertaken to resolve the concern. In some circumstances, information supporting the investigation is provided to Government to demonstrate compliance or corrective action.

10 STAKEHOLDER ENGAGEMENT

The members of the Supply Chain, collectively and individually, are committed to a transparent process of sharing information with stakeholders, including community members and Government, about the ongoing mitigation and management of coal dust along the WMRS.

Each member of the Supply Chain can be contacted direct (see **page 22**) or via any of the following forums to discuss concerns regarding coal dust:

- New Acland Community Reference Group;
- New Oakleigh Community Consultation Group;
- Oakey Community Information Centre;
- Cameby Downs Community Reference Group (servicing Chinchilla and Miles); and/or
- Port of Brisbane Community Consultation Committee.

The Supply Chain will continue to regularly engage with stakeholders and provide up to date information on matters relating to coal dust.

11 REFERENCES

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[5] Queensland Government, Department of Information Technology, Science, Innovation and the Arts (2013b) Western-Metropolitan Rail Systems Coal Dust Monitoring Program, Final Report

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[8] Bofinger, N. (2013) Western – Metropolitan Rail Systems Coal Dust Monitoring Program Independent Peer Review

[9] Bofinger, N. (2016) Peer Review of Western – Metropolitan Rail System Phase 2 Coal Dust Monitoring Program

[10] Katestone Environmental Pty Ltd (2013) Review of Dust from Coal Trains in Queensland, report to the Senate Standing Committee on Community Affairs Inquiry: The impacts of health on air quality in Australia, prepared for Queensland Resources Council

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[12] Queensland Government, Department of Information Technology, Science and Innovation (2017) Western-Metropolitan Rail System Coal Dust Monitoring Program, January to December 2016

[13] Queensland Government, Department of Environment and Science (2018) Western-Metropolitan Rail System Coal Dust Monitoring Program, January to December 2017

[14] Queensland Government, Department of Transport and Main Roads (2017) Review of Coal Dust Mitigation Treatments and Air Quality Monitoring Programs on the Western-Metropolitan Rail System

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