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NZ TRANSPORT AGENCY  
WAKA KOTAHI

Auckland Harbour Bridge  
Contract PSMC003

Annual Report 2010 - Maintenance Works  
Resource Consents 23954, 23955, 23956  
Discharge of Contaminants

April 2010

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# Auckland Harbour Bridge

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# Auckland Harbour Bridge

## 1 INTRODUCTION

This Annual Report presents information on compliance with the resource consents held by the NZ Transport Agency (NZTA) for the maintenance of the Auckland Harbour Bridge (AHB). Maintenance activities involve abrasive blasting (surface preparation) and spraypainting of new coatings. The relevant resource consents are:

- Discharge Permit No. 23954 for discharge to ground
- Discharge Permit No. 23955 for discharge to water
- Discharge Permit No. 23956 for discharge to air

The report covers the period from 1 October 2009 to 30 September 2010.

The report presents summaries of blasting and spraypainting works in relation to potential risks to the environment, as required by the consent conditions below. The information regarding spraypainting in [] has been added for clarity as although both consents refer to a "log of blasting", both blasting and spraypainting give rise to contaminant discharges.

### Discharge to ground and water (23954, 23955) Condition 14:

*That the Consent Holder shall maintain a daily log of blasting [and spraypainting] activity. The log shall include:*

- (a) the location and extent of blasting [and spraypainting]*
- (b) an estimation of the quantity (in kilograms) of abrasive blasting [and coating/paint] products used*
- (c) confirmation of the quantity of contaminants recovered, stored and disposed*
- (d) confirmation that no more than 10 square meters of blasting has been carried [out] in those areas where lead paint is known to be present*
- (e) any complaints received and their nature*
- (f) measures undertaken to avoid, remedy, or mitigate (including the reduction of blast media used) any adverse environmental effect*

*A summary of the log shall be submitted to the Manager on an annual basis, by 1 October each year.*

### Discharge to air (23956) Condition 18:

*That the Consent Holder shall maintain a daily log of blasting [and coating/spraypainting] activity. The log shall include:*

- (a) the date and time of commencement and duration of dry abrasive blasting and/or spray painting*



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- (b) a description of the section(s) of the bridge being blasted or painted*
- (c) the type of dry abrasive being used*
- (d) the wind speed and direction*
- (e) the condition of the screens and the areas where they are deployed*
- (f) confirmation that no abrasive blasting has been undertaken on surfaces coated with lead with concentrations greater than 5000 parts per million by weight in the dry film or containing other hazardous air pollutants*

*A summary of the log shall be submitted to the Manager by 1 October 2002 and annually thereafter.*

As the purpose of the resource consents is to manage actual and potential adverse effects of discharges on the environment, the report contains summaries of works on external parts of the AHB. Works on internal areas such as the box girders (clip-ons) are excluded as they do not give rise to discharges or the discharges are covered by other authorisations (eg tradewaste permits). Similarly, works undertaken by hand that do not give rise to discharges are also excluded from this report, although some are included in the raw data records.

The report has been prepared by Total Bridge Services (TBS) and reviewed by NZTA. TBS is the physical works contractor responsible for the painting of the AHB. TBS contract has a period of 10 years with a 3 year extension, expiring on 30 November 2011. TBS is a joint venture between TBS Farnsworth Limited, Fulton Hogan Limited and Opus International Consultants Limited.



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## 2 MAINTENANCE WORKS LOG

This section sets out information that demonstrates compliance with maintenance works logs required by the Land/Water consent (Condition 14) and Air consent (Condition 18).

TBS maintain daily work sheets of all works on the bridge and this information is transferred into a database which produces a log of blasting and spraypainting. The log is attached in Appendix A. Data for product use (abrasive agent and coatings) is attached in Appendix B.

### 2.1 Location, extent and timing of works

The consents require the following information regarding location, extent and/or timing of works:

#### Ground and Water (Log – Condition 14):

- (a) *the location and extent of blasting [and spraypainting]*

#### Air (Log – Condition 18):

- (a) *the date and time of commencement and duration of dry abrasive blasting and/or spray painting*
- (b) *a description of the section(s) of the bridge being blasted or painted*

The works log (Appendix A) includes columns for Date, Location (the part(s) of bridge being maintained) and Activity (including blasting and spraypainting). In summary the key work areas were on the original truss bridge and the extension ('clip-on') gantries as follows:

- truss bridge, below walkway:
  - o Span 7, Panel Points 3 – 10;
  - o Span 3, Panel Points 0 – 4;
- extension external surfaces and pier brackets
- general maintenance work to gantries and other plant refurbishing works

The extent of works and the time of commencement and duration are recorded on the TBS daily work sheets. The extent of works is also represented by the rate of product use (see product information below).

Blasting works are primarily dry abrasive blasting as has been the case since TBS stopped using basalt and switched to garnet. Garnet produces significantly less small fraction particulate matter than basalt (see product information below).

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Although not required by the conditions of consent, TBS time works in areas close to residential properties to the north (Stokes Point) and the café at the southern end of the bridge in order to minimise effects. Whenever possible works near the residential area are undertaken from 9am to 4pm (when most residents are at work) and works near the café are undertaken at night between 830pm and 1230am and between 4am and 7am (when the café is closed).

## 2.2 Product type and rate of use

The consents require the maintenance log is to include the following information regarding product type and rate of use:

### Ground and Water (Log – Condition 14):

- (b) *an estimation of the quantity (in kilograms) of abrasive blasting [and coating/paint] products used*

### Air (Log - Condition 18):

- (c) *the type of dry abrasive being used*

The product use data for both abrasive agent (garnet) and coatings/paints are calculated from site recorded usage data on a monthly basis. The data are attached in Appendix B. In summary the amount of product used is approximately:

#### Abrasive

Garnet Sand: 60 tonnes

#### Coatings (external)

Wasser MC Zinc (primer): 1,300 L

Wasser Miomastic (intermediate): 1,200 L

Wasser Ferrox A (topcoat): 2,100 L

Wasser Ferrox B (topcoat): 400 L

Wasser Thinners: 1,300 L

TBS use garnet for all abrasive blasting works (see Material Safety Data Sheet in Appendix C); the garnet type contains less than 5% dry free weight silica. The use of basalt has ceased (in 2002) and this has substantially reduced the amount of small fraction particulate discharged.



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## 2.3 Contaminant collection and disposal

The Land/Water consent requires the collection of spent abrasive and debris from sealed land where practicable and the maintenance log is to include the quantity as follows:

### Ground and Water (Log – Condition 14)

(c) *confirmation of the quantity of contaminants recovered, stored and disposed*

TBS recover spent abrasive and paint debris after abrasive blasting activities wherever practicable. This occurs mainly on sealed areas where sweeper trucks collect the abrasive/debris and a specialist waste company collects for disposal. In addition the maintenance crews sweep footpath area and bag the collected waste. When necessary a small 'push vacuum' is also used. Collection of abrasive and debris that builds up on the gantries (working platforms) has commenced over the last 4 weeks.

As this waste stream is not managed separately from other streams collected by the specialist waste company, the exact amount collected / disposed of is difficult to quantify.

## 2.4 Wind controls and screening

The Air consent requires wind controls for both wind speed and direction and the use of screens (south of Pier 5 and north of Pier 1) during dry blasting and spraypainting and the maintenance log is to include details as follows:

### Air (Log – Condition 18):

(d) *the wind speed and direction*

(e) *the condition of the screens and the areas where they are deployed*

TBS ensure all dry blasting and spraypainting work is undertaken in accordance with consent's wind controls. Records are included in the Maintenance Log (Appendix A). The maintenance teams follow a flowchart that summarises the requirements (refer Appendix D). The screens are always used during dry blasting and spraypainting south of Pier 5 and north of Pier 1 (*ie* irrespective of wind speed or direction), and their condition is monitored by TBS maintenance crew supervisors.



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## 2.5 Management of historic of lead based paint

The consents require specific management of maintenance in areas of the bridge that contain historic layers of lead based paint. The maintenance log is to include the following information:

### Ground and Water (Log – Condition 14):

- (d) *confirmation that no more than 10 square meters of blasting has been carried [out] in those areas where lead paint is known to be present*

### Air (Log – Condition 18):

- (f) *confirmation that no abrasive blasting has been undertaken on surfaces coated with lead with concentrations greater than 5000 parts per million by weight in the dry film or containing other hazardous air pollutants*

Historic lead based paint occurs on the bridge in specific areas of Span 7. The maintenance log (Appendix A) shows that dry blasting of lead areas has occurred – namely localised areas of Panels 5-6. The total area of these works was significantly less than 10m<sup>2</sup>. This is based of factors including the blasting type (*ie* spot blasting only), the intervention level *ie* rust grade at which maintenance is initiated (*ie* high intervention rates minimises area of spot blasting), the occurrence of lead based paint within Span 7 (*ie* localised areas of Panel 5-6 and 6-7) and previous blasting patterns (*ie* lead confined to the outer edges of the spots blasted). As a result, dry abrasive blasting of historic coatings with more than 5,000ppm lead has occurred. However as the surface area was less than 10m<sup>2</sup> this is considered compliant as envisaged by the Land/Water consent.

Maintenance work has also been undertaken on internal areas with historic lead (the extension box internals and pier brackets internals), however these areas do not give rise to discharges covered by the maintenance consents.

## 2.6 Management of complaints

The consents require specific management of complaints received in relation to the maintenance works and the maintenance log is to include relevant information.

### Ground and Water (Log – Condition 14):

- (e) *any complaints received and their nature*

No complaints were received during the reporting period. Results of the quarterly resident survey are attached in Appendix E. The results show that no complaints related to the works covered by the maintenance consents.

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## 2.7 Other measures to manage adverse effects

The consents require other measures to be used to minimise adverse effects and the maintenance log is to include:

### Ground and Water (Log – Condition 14):

*(f) measures undertaken to avoid, remedy, or mitigate (including the reduction of blast media used) any adverse environmental effect*

Other measures include:

- the use of high pressure water blasting to remove as much loose paint, scale and corrosion products from the surfaces as possible before abrasive blasting. Following the water blasting, sweep blasting is used to obtain a surface profile for anchorage of the paint film
- a current blasting philosophy based on spot blasting followed by a light sweep blast. This together with the high pressure water blasting where possible minimises the volume of material that is generated
- TBS commencement (during the current reporting period) of wrapping the external gantries prior to the commencement of blasting operations. The wrapping creates a limited containment that lessens the discharge of the spent garnet into the environment. The spent garnet is also then easily collected and removed off site as required
- displaying signage advising motorists and the public of abrasive blasting and spraypainting (as required by the Air consent)

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## APPENDIX A

### Maintenance Works Log

*Note some records are for coatings used on AHB internal areas which do not give rise to discharges covered by AC resource consents 23954, 23955 and 23956*





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Date	Work Package	Location	Activity	Weather Conditions	Rain	Wind Direction	Wind Speed m/s	Dry Bulb Temperature °C	Wet Bulb Temperature °C	Humidity %	Steel Temperature °C
1/10/2009	B7910	below walkway span 7 pp 9-10	touch ups ferrox	Overcast	Nil	SW	2	14.6	12.2	75	14
2/10/2009	B7910	below walkway span 7 pp 9-11	touch ups ferrox	Overcast	Nil	W	2	16.1	13.29	73	16
6/10/2009		below walkway span 7 pp 9-12	touch ups ferrox	Clear	Light	SW	2	9.3	7.3	75	10
8/10/2009	A701	above walkway span 7 pp 0-1	wash down	Overcast	Nil	NW	5	15	11.2	62	15
9/10/2009	A701	above walkway span 7 pp 0-2	wash down	Overcast	Nil	NW	0	13.6	13.4	97	13
12/10/2009	A701	above walkway span 7 pp 0-3	touch ups ferrox	Overcast	Nil	SW	4	15.3	12.47	72	15
13/10/2009	B778	below walkway span 7 pp 7-8	clean up de mob	Clear	Nil	NW	2	13.1	12.29	91	13
14/10/2009	B767	below walkway span 7 pp 6-7	set up gears	Overcast	Nil	N	6	16.8	14.06	74	16
19/10/2009	B767	below walkway span 7 pp 6-7	spray ferrox	Clear	Nil	SW	6	16.2	11.3	54	16
22/10/2009	B756	below walkway span 7 pp 5-6	spray ferrox	Overcast	Nil	W	6	16	13.87	79	16
3/12/2009	NOW	western extension bridge outer box 0-40	waterblast	Overcast	Nil	NW	4	19	18	90.82	19
4/12/2009	NOW	western extension bridge outer box 0-40	waterblast	Clear	Nil	E	8	17	15.45	85	17

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7/12/2009	NOW	western extension bridge outer box 0-40	spot blast&zinc stripe	Clear	Nil	NW	0	17	14.79	79	17
8/12/2009	NOW	western extension bridge outer box 0-40	spot blast&zinc stripe	Clear	Nil	NW	0	16	15.2	90	16
9/12/2009	NOW	western extension bridge outer box 0-40	spot blast&zinc stripe	Clear	Nil	SW	2	18	16.09	80	18
10/12/2009	NOW	western extension bridge outer box 0-40	spot blast&zinc stripe	Clear	Nil	NW	0	17	16.55	95	17
11/12/2009	NWI	western extension bridge outer box 0-40	maint/on gear	Overcast	Nil	N	2	17	17	100	17
14/12/2009	NOW	western extension bridge outer box 0-40	spray miomastic	Overcast	Light	W	5	16.5	16.15	96	16
15/12/2009	NOW	western extension bridge outer box 0-40	stripe mio brush work	Overcast	Nil	SW	8	15.5	12	72	15
16/12/2009	NOW	western extension bridge outer box 0-40	stripe mio brush work	Overcast	Nil	SW	8	17	13.17	60	17
17/12/2009		western extension bridge outer box 0-40	stripe mio brush work	Clear	Nil	S	4	16	14.1	78	16
18/12/2009	B712	below walkway span 7 pp 1-2	spot blast&zinc stripe	Clear	Nil	N	0	15	14.4	92	15
21/12/2009	B712	below walkway span 7 pp 1-2	spot blast&zinc stripe	Overcast	Nil	SW	7	15	11.79	64	15
22/12/2009	B712	below walkway span 7 pp 1-2	stripe miomastic	Clear	Nil	E	1	17	15.43	83	17
11/01/2010	NWI	western extension bridge inner box 0-	spray ferrox	Overcast	Nil	SW	7	16.2	14.48	81	16



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		16									
12/01/2010	NOW	western extension bridge outer box 0-40	spray ferrox	Clear	Nil	NW	0	18.7	16.1	73	19
13/01/2010	B734	below walkway span 7 pp 3-4	water blast set up	Clear	Nil	SW	8	20.5	17.4	70	21
14/01/2010	B7 3 4	below walkway span 7 pp 3-4	n /blast	Clear	Nil	S	2	17.6	16.38	87	18
15/01/2010	B7 3 4	below walkway span 7 pp 3-4	n /blast	Clear	Nil	SE	2	15.8	15.63	98	16
18/01/2010	B7 3 4	below walkway span 7 pp 3-4	n /blast	Overcast	Nil	SE	2	18.2	17.15	89	19
19/01/2010	B7 3 4	below walkway span 7 pp 3-4	n /blast	Clear	Nil	SW	3	21.8	18.49	70	22
20/01/2010	B7 3 4	below walkway span 7 pp 3-4	nightshift	Clear	Nil	E	2	19.1	19	98	19
21/01/2010	NWI	western extension bridge inner box 0-16	spray rust barrier	Overcast	Light	NW	6	24.5	20.67	68	25
26/01/2010	B7 2 3	below walkway span 7 pp 2-3	stripe miomastic	Clear	Nil	NW	0	18.2	17.73	95	18
27/01/2010	NOW	western extension bridge outer box 0-40	spot blast&zinc stripe	Clear	Nil	NW	0	18.6	17.94	93	18
3/02/2010	B7 2 3	below walkway span 7 pp 2-3	stripe miomastic	Clear	Nil	NW	0	19.6	18.9	92	19
4/02/2010	B7 2 3	below walkway span 7 pp 2-3	spray ferrox	Clear	Nil	SE	2	17.8	16.97	91	18
5/02/2010	B 7 1 2	below walkway span 7 pp 1-2	spray ferrox	Overcast	Nil	E	1	17.5	16.67	91	17





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8/02/2010	B 7 1 2	below walkway span 7 pp 1-2	water blast night/s	Clear	Nil	E	1	17	16.9	98	17
9/02/2010	B 7 1 2	below walkway span 7 pp 1-2	spot blast&zinc stripe	Clear	Nil	SW	3	21.9	20.08	83	22
10/02/2010	B 7 1 2	below walkway span 7 pp 1-2	spot blast&zinc stripe	Clear	Nil	SW	6	18.9	16.8	78	19
11/02/2010	B 7 1 2	below walkway span 7 pp 1-2	stripe miomastic	Clear	Nil	NW	0	19.2	18.3	90	19
12/02/2010	B 7 1 2	below walkway span 7 pp 1-2	stripe miomastic	Clear	Nil	NW	2	18.3	18	96	18
15/02/2010	B 7 1 2	below walkway span 7 pp 1-2	stripe miomastic	Overcast	Nil	N	2	19.6	18.8	91	19
16/02/2010	NOW	western extension bridge outer box 0-40	waterblast	Overcast	Nil	NE	0	24.8	21.59	73	25
17/02/2010	EI Span 2	east inner cantilever in Span 2	spot blast&zinc stripe	Overcast	Nil	NE	2	21.7	21.29	96	22
18/02/2010	EI Span 2	east inner cantilever in Span 2	spot blast&zinc stripe	Overcast	Nil	NW	0	20.3	19.39	91	20
19/02/2010	EI Span 2	east inner cantilever in Span 2	waterblast	Overcast	Nil	SW	10	18.1	16.47	83	18
22/02/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Clear	Nil	S	2	15.3	15.05	97	15
23/02/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Overcast	Nil	E	2	19.9	19.7	97	20
24/02/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Clear	Nil	NE	4	21.2	18.98	79	21

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25/02/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Overcast	Nil	SW	6	23.3	20.59	76	23
26/02/2010	EI Span 2	east inner cantilever in Span 2	spot blast&zinc stripe	Clear	Nil	SW	5	19.1	17.2	80	19
1/03/2010	EI Span 2	east inner cantilever in Span 2	spot blast&zinc stripe	Clear	Nil	SE	6	21.65	18.33	70	22
2/03/2010	EI Span 2	east inner cantilever in Span 2	spot blast&zinc stripe	Clear	Nil	NW	0	21.4	20.04	87	21
3/03/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Overcast	Nil	S	6	17.6	16.48	88	17
4/03/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Clear	Nil	NW	0	18.6	16.64	80	18
5/03/2010	EI Span 2	east inner cantilever in Span 2	spray ferrox	Clear	Nil	S	2	17.7	16.86	91	17
8/03/2010	EI Span 2	east inner cantilever in Span 2	spray ferrox	Clear	Nil	SE	1	13.6	12.69	89	13
9/03/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Clear	Nil	NE	1	13.9	13.49	85	13
11/03/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Clear	Nil	W	7	21.5	18.2	69	21
12/03/2010	EI Span 2	east inner cantilever in Span 2	stripe miomastic	Clear	Nil	SW	4	16.7	15.6	87	17
15/03/2010	EI Span 2	east inner cantilever in Span 2	spray ferrox	Overcast	Nil	SW	7	18.5	16.55	80	18



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16/03/2010	El Span 2	east inner cantilever in Span 2	spray ferrox	Overcast	Nil	S	5	15.8	15.19	93	16
17/03/2010	El Span 2	east inner cantilever in Span 2	spray ferrox	Clear	Nil	SW	5	17	15.4	82	17
25/03/2010	B 3 0 1	below walkway span 3 pp 0-1	set up gear sand run	Clear	Nil	NW	0	16.6	14.09	73	16
26/03/2010	B 3 0 1	below walkway span 3 pp 0-1	set up stages	Clear	Nil	NW	0	20.9	18	72	21
29/03/2010	B 3 0 1	below walkway span 3 pp 0-1	waterblast	Clear	Nil	NW	0	17	14.68	75	17
31/03/2010	B 3 0 1	below walkway span 3 pp 0-1	waterblast	Clear	Nil	NW	0	14.3	13.3	87	14
1/04/2010	B 3 0 1	below walkway span 3 pp 0-1	spot blast&zinc stripe	Overcast	Nil	NW	0	15.4	14.19	86	15
6/04/2010	B 3 0 1	below walkway span 3 pp 0-1	spot blast&zinc stripe	Overcast	Nil	NW	0	16	16	99	16
8/04/2010	B 3 0 1	below walkway span 3 pp 0-1	spot blast&zinc stripe	Clear	Nil	NW	0	10.7	9.59	85	10
12/04/2010	B 3 0 1	below walkway span 3 pp 0-1	stripe miomastic	Clear	Nil	NW	0	10.7	10.5	96	10
13/04/2010	B 3 0 1	below walkway span 3 pp 0-1	stripe miomastic	Overcast	Nil	NE	3	15.3	14.18	87	15
14/04/2010	B 3 0 1	below walkway span 3 pp 0-1	stripe miomastic	Clear	Nil	W	4	18.2	17.45	92	18
15/04/2010	B 3 0 1	below walkway span 3 pp 0-1	spray ferrox	Overcast	Nil	SW	3	17	15.7	85	17
16/04/2010	B 3 0 1	below walkway span 3 pp 0-1	spray ferrox	Clear	Nil	NW	0	16.7	16.07	93	16
26/04/2010	B 3 0 1	below walkway span 3 pp 0-1	spray ferrox	Clear	Nil	NE	3	17.2	16.84	96	17



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27/04/2010	B 3 0 1	below walkway span 3 pp 0-1	waterblast	Overcast	Nil	NE	9	18.3	17.55		18
5/05/2010	Span 3/0-1	below walkway span 3 pp 0-1	spot blast&zinc stripe	Overcast	Nil	NW	0	14	12	80%	13.5
6/05/2010	CORD/LATERALS			Clear	Nil	NW	0	17	14	73%	16.5
7/05/2010	SPAN 3/0-1	below walkway span 3 pp 0-1	spot blast&zinc stripe	Overcast	Nil	NW	0	16	11	60%	15.5
10/05/2010	SPAN3/0-1	below walkway span 3 pp 0-1	stripe miomastic	Fog	Nil	NW	0	17	15	81%	16.8
12/05/2010	SPAN3/0-1	below walkway span 3 pp 0-1	stripe miomastic	Clear	Nil	NW	0				
12/05/2010	SPAN3/0-1	below walkway span 3 pp 0-1	stripe miomastic	Overcast	Light	NW	0	16	16	100%	15.5
13/05/2010	WATERBLAST	below walkway span 3 pp 0-1	spray ferrox	Clear	Nil	NW	0	20	16	68%	18
14/05/2010	WATERBLAST	below walkway span 3 pp 0-1	stripe miomastic	Overcast	Nil	NW	0	18	15	67%	16.5
17/05/2010	WATERBLAST	below walkway span 3 pp 0-1	spray ferrox	Clear	Nil	NW	0	15	12	75%	13.5
18/05/2010	SPRAY MIDDLE OUTSIDE	below walkway span 3 pp 0-1	spray ferrox	Clear	Nil	NW	0	16	13	72%	15
19/05/2010	DEMOBILISE	below walkway span 3 pp 0-1	spray ferrox	Clear	Nil	NW	0	17	12.5	60	15
20/05/2010	DEMOBILISE	below walkway span 3 pp 0-1	wash down	Overcast	Moderate	NW	0	14	13	85%	13.5
27/05/2010	WATERBLAST	below walkway span 3 pp 1-2	hp waterblast	Clear	Moderate	NW	0	17	13	61%	15
28/05/2010	EAST BOX	east extension bridge internal	stripe coating	Overcast	Moderate	NW	0	17	15	72%	16
31/05/2010	EAST BOX	east extension bridge internal	stripe coating	Overcast	Nil	NW	0	15	12	73%	13.5



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2/06/2010	BW3	below walkway span 3 pp 1-2	spot blast&zinc stripe	Clear	Nil	NW	0	15.5	13	71%	14
3/06/2010	BW3	below walkway span 3 pp 1-2	spot blast&zinc stripe	Clear	Nil	NW	0	15	12	70	13.5
4/06/2010	BW3	below walkway span 3 pp 1-2	stripe miomastic	Clear	Nil	NW	0	13	10	74%	12
8/06/2010	BOTTOM CORD - QA	east extension bridge internal	stripe coating	Clear	Nil	NW	0	12	10	73%	11
9/06/2010	BW3	below walkway span 3 pp 1-2	stripe miomastic	Clear	Nil	NW	0	16	13	72%	14.5
10/06/2010	BW3	below walkway span 3 pp 1-2	stripe miomastic	Clear	Nil	NW	0	13	11	78%	11.5
16/06/2010	BW3	below walkway span 3 pp 1-2	spray ferrox	Clear	Nil	NW	0	15.5	12	70%	13.5
21/06/2010	SPAN3/0-1	below walkway span 3 pp 1-2	spray ferrox	Clear	Nil	NW	0	13	9	65%	10.5
22/06/2010	BW3	below walkway span 3 pp 1-2	spray ferrox	Clear	Nil	NW	0	15	12	77%	13.5
23/06/2010	BW3	below walkway span 3 pp 1-2	waterwash &check	Clear	Nil	NW	0	13.5	10	75%	12
24/06/2010	SPAN3/0-1	below walkway span 3 pp 1-2	waterwash &check	Overcast	Nil	NW	0	14.5	10.5	76%	12.5
26/07/2010	SPAN3/2-3	below walkway span 3 pp 2-3	mobilise gear	Clear	Nil	NW	0	17.5	15	76%	16
30/07/2010	SPAN3/2-3	below walkway span 3 pp 2-3	spot blast&zinc stripe	Fog	Nil	NW	0	15.5	14	82%	15
10/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	spot blast&zinc stripe	Clear	Nil	NW	0	17	14.5	75%	16.5
11/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	spot blast&zinc stripe	Clear	Nil	NW	0	16.5	15	85%	16

## Auckland Harbour Bridge

14/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	spot blast&zinc stripe	Overcast	Light	NW	0	17	15	80%	16.5
16/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	spot blast&zinc stripe	Clear	Nil	NW	0	16	13.5	76%	14.5
17/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	spot blast&zinc stripe	Overcast	Nil	NW	0	15.5	14	80%	15
19/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	waterwash diagonal	Overcast	Nil	NW	0	17	15	81%	16
24/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	stripe/west diagonal	Clear	Nil	NW	0	17	14.5	76%	16.5
27/08/2010	SPAN3/2-3	below walkway span 3 pp 2-3	stripe/west diagonal	Clear	Nil	E	1	17	13	62%	15.5
30/08/2010	BW3/2-3	below walkway span 3 pp 2-3	stripe/west diagonal	Overcast	Nil	E	1	18	13	57%	15.5
31/08/2010	BW3/2-3	below walkway span 3 pp 2-3	stripe/west diagonal	Clear	Nil	NW	1	17	11	65%	15
1/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Clear	Nil	SE	1	18	13	57%	16
2/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Clear	Nil	E	1	17	11	65%	15
6/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Overcast	Light	E	4	16	12	65%	14
7/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Overcast	Moderate	E	4	16	14	88%	15
8/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Overcast	Moderate	E	2	13	11	77%	12
14/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Overcast	Moderate	N	2	15	11	65%	12.5



## Auckland Harbour Bridge

15/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Clear	Nil	W	1	13	9	62%	11
16/09/2010	624	eastern extension bridge internal box 0-80	waterblast	Clear	Nil	W	1	16	12	63%	14
20/09/2010	624	eastern extension bridge internal box 0-80	waterblast	Clear	Nil	SW	11	18.3	14.2	78%	16.8
22/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Overcast	Nil	NW	2	16	12	63%	14.5
24/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Clear	Nil	NW	2	14	10	68%	12
26/09/2010	WATERBLAST			Clear	Nil	NW	0	14	13	85%	13.5
28/09/2010	624	eastern extension bridge internal box 0-80	stripe coating	Overcast	Moderate	W	1	14	11	72%	12.5
29/09/2010	624	eastern extension bridge internal box 0-80	demobilise	Overcast	Nil	W	2	14	12	81%	13
30/09/2010	624	eastern extension bridge internal box 0-80	waterwash/de mob	Clear	Nil	SW	1	16	12	63%	14

# Auckland Harbour Bridge

## APPENDIX B

### Product Use (Garnet and Coatings)



## Auckland Harbour Bridge

### Garnet Use (kgs)

Location	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	TOTAL
Truss Bridge below walkway Span 7 panel point 9-10	3700												3700
Truss Bridge below walkway Span 7 panel point 8- 9		1000											1000
Truss Bridge below walkway Span 7 panel point 7-8		2000											2000
Truss Bridge below walkway Span 7 panel point 5-6		2000											2000
Maintenance - blast pots in blast booth at south end		300											300
Truss Bridge below walkway Span 7 panel point 4-5			1000										1000
BGS: west box external, box 0- 80 ( spot paint )			4000	2000	3000								9000
Maintenance: expansion joint 1 refurb / anti-skid application				600									600
Maintenance: probe gantry refurb in blast booth at south end						250	250						500
Maintenance: blast pots refurb in blast booth at south end								250					250







## Auckland Harbour Bridge

maintenance team													
BGS: eastbox outer cantilever box 0-8											1500	1500	<b>3000</b>
BGS: eastbox inner cantilever box 0-8											1500	1500	<b>3000</b>
BGS: Pier 4 post-tensioning bar works											1000		<b>1000</b>
Sumitomo bolts on Pier brackets - roving painting maintenance team												1000	<b>1000</b>
<b>SUM</b>	3700	5300	5000	3600	10000	2750	2750	7250	2500	5000	7000	5000	<b>59850</b>



## Auckland Harbour Bridge

### Coatings Use (L)

Location	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	TOTAL
Truss Bridge below walkway Span 7 panel point 9-10	486												486
Truss Bridge below walkway Span 7 panel point 8- 9		68											68
Truss Bridge below walkway Span 7 panel point 7-8		68											68
Truss Bridge below walkway Span 7 panel point 6-7		120											120
Truss Bridge below walkway Span 7 panel point 5-6		196											196
Stringer debonding repairs - Northern steel Viaduct		36											36
East extension bridge externals		18			178				28		116	790	1130
West extension bridge externals			36	98	244	120	240						738
touch up Span 7 panel point 4- 3			88										88
touch up Span 7 panel point 5- 4			204										204
Maintenance			18	18		54	54				20		164
Truss Bridge below walkway				314									314



## Auckland Harbour Bridge

Span 7 panel point 2-1														
Truss Bridge below walkway Span 7 panel point 3-4				154	122									276
Truss Bridge below walkway Span 3 panel point 0-1						222	222	518						962
Windbracing						120				70				190
East extension bridge internals								234	880	520	690	740		3064
Truss Bridge below walkway Span 3 panel point 1-2									144					144
Span 1 - touch up									36	96				132
Pier 4										8	86			94
Span 3										222				222
Truss Bridge below walkway Span 3 panel point 2-3											92			92
Roving painting maintenance crew											92	30		122
Truss Bridge below walkway Span 3 panel point 3-4											184			184
Truss Bridge below walkway Span 3 panel point 2-3												236		236
<b>SUM</b>	486	506	346	584	544	516	516	752	1088	916	1280	1796		<b>9330</b>

# Auckland Harbour Bridge

## APPENDIX C

### Garnet MSDS



# Auckland Harbour Bridge



## **INDUSTRIAL** Minerals (NZ) Ltd

Freephone NZ 0800 646 372

Freephone AU 1800 309 734

148 Bush Road Albany Private Box 302 660, North Harbour. 0751

## MATERIAL SAFETY DATA SHEET

### IDENTIFICATION

**PRODUCT NAME:** GARNET SAND

Super/TBG/Red Diamond

**UN NUMBER:** N/A

**HAZCHEM CODE :** N/A

**DG CLASS :** N/A

**TOXIC SUBSTANCES SCH.:** N/A

**PHYSICAL DESCRIPTION /  
PROPERTIES**

Dark red, irregular angular shaped grains. Insoluble in water.

**DECOMPOSITION TEMPERATURE :**

**MELTING POINT :**

**CHEMICAL ANALYSIS :**

Garnet 97.0%  
Illminite Less Than 2.5%  
Quartz Less Than 0.5%

**SPECIFIC GRAVITY :** 4.3 – 4.7 g/cm<sup>3</sup>

### HEALTH HAZARD INFORMATION

**HEALTH EFFECTS**

**Swallowed:** Irritation

**Eye :** Irritation to cornea

**Skin :** None

**Inhaled :** Irritation to lungs,  
coughing or choking may occur.

**FIRST AID**

**Swallowed:** Give small quantities of water or milk.

**Eye :** Flush out with a gentle stream of clean water for about 5 minutes.

**Skin :** Wash with water.

**Inhaled :** Remove any obstruction to the air passages.  
Remove the patient from the affected area to an area of clean air.

The information provided is, to the best of our knowledge, representative of the product. Natural products do vary, so these figures are approximations for guidance only. As conditions of use are beyond our control, no liability is accepted for any loss or damage sustained arising from the use of this information or any products. Because of ongoing development the product parameters may be changed without notice.



# Auckland Harbour Bridge

## PRECAUTIONS FOR USE

EXPOSURE LIMITS (TWA) :	10mg/m3 respirable dust.
VENTILATION :	Normal requirements.
PERSONAL PROTECTION:	Wear a NIOSH/MSHA approved dust mask and eye and skin protection.
FLAMABILITY :	Non-flammable.

## SAFE HANDLING INFORMATION

STORAGE & TRANSPORTATION :	Store in original bags in a dry, well ventilated environment under cover.
SPILLS & DISPOSAL :	May be swept or shovelled and buried. Naturally occurring rock.
FIRE/EXPLOSION HAZARD :	Non-flammable and Non-explosive.

CONTACT PERSON :	Evan Thornton s9(2)(a) [REDACTED]
ISSUE : 3	DATE : 23rd February 2011

The information provided is, to the best of our knowledge, representative of the product. Natural products do vary, so these figures are approximations for guidance only. As conditions of use are beyond our control, no liability is accepted for any loss or damage sustained arising from the use of this information or any products. Because of ongoing development the product parameters may be changed without notice.

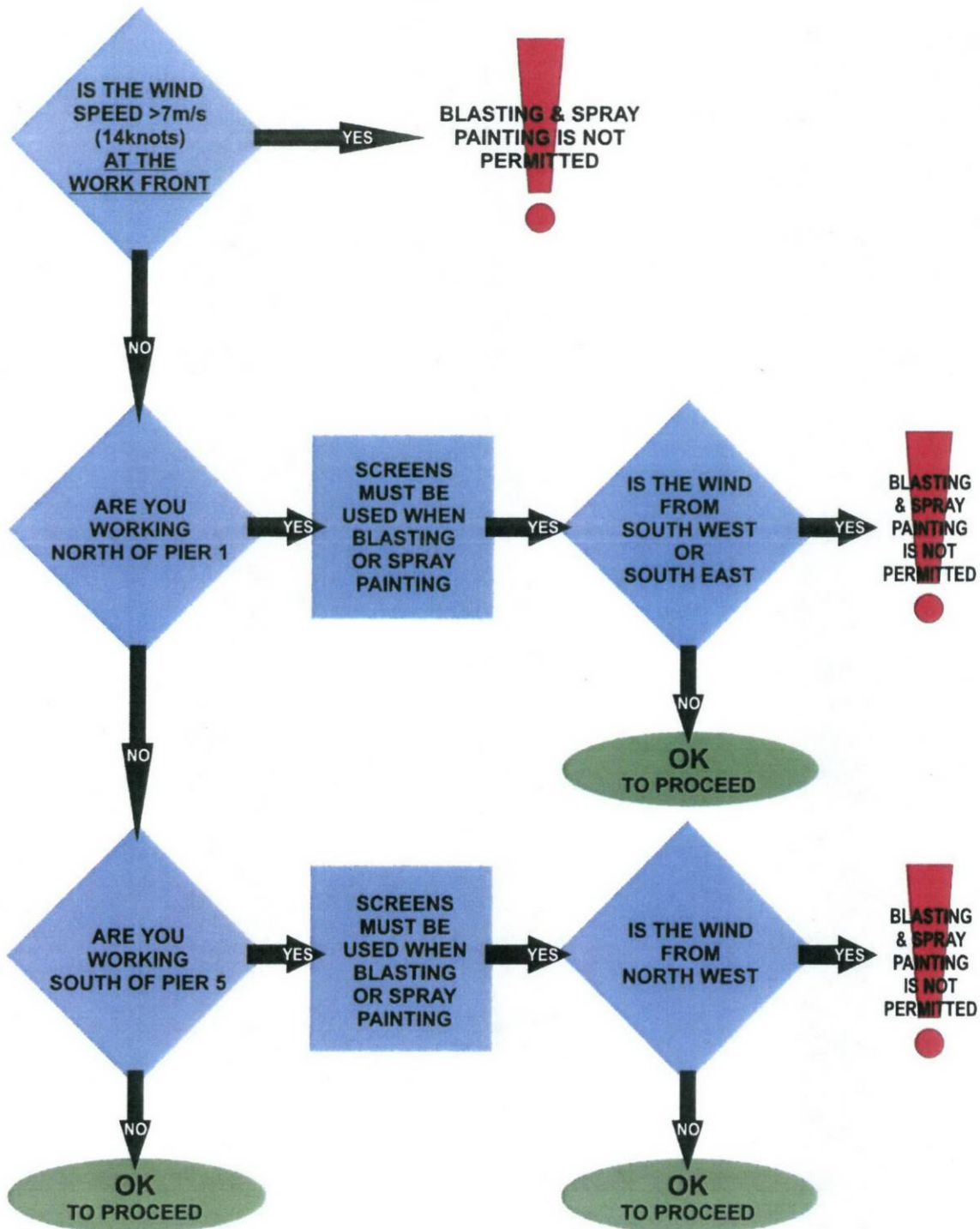
MSDS:GARNET/FEB2011

# Auckland Harbour Bridge

## APPENDIX D

### Dry blasting and Spraypainting Commencement Flowchart

# Auckland Harbour Bridge



**NOTE:**  
WIND SPEED & DIR  
MUST BE RECORDED  
ON THE DAILY RECORD SHEET



# Auckland Harbour Bridge

## APPENDIX E

### Local Residents Survey and Feedback



## Auckland Harbour Bridge

<b>Sent out:</b>	30 <sup>th</sup> October 2009
<b>Received:</b>	4 responses of 29 sent
<b>Complaints regarding work on the Bridge</b>	
<ul style="list-style-type: none"> <li>No complaints made</li> </ul>	
<b>Are they being adequately informed?</b>	
<ul style="list-style-type: none"> <li>All said they were kept well informed</li> </ul>	
<b>Suggestions and Comments</b>	
<ul style="list-style-type: none"> <li>None</li> </ul>	
<b>Actions/Responses</b>	
<ul style="list-style-type: none"> <li>None</li> </ul>	

<b>Sent out:</b>	25 <sup>th</sup> March 2010
<b>Received:</b>	3 responses of 29 sent
<b>Complaints regarding work on the Bridge</b>	
<ul style="list-style-type: none"> <li>A clanking noise getting worse – believes it is from the expansion joints</li> </ul>	
<b>Are they being adequately informed?</b>	
<ul style="list-style-type: none"> <li>All said they were kept well informed and were happy with the conduct of the guys around the site</li> </ul>	
<b>Suggestions and Comments</b>	
<ul style="list-style-type: none"> <li>Found staff have been co-operative, friendly and informative</li> </ul>	
<b>Actions/Responses</b>	
<ul style="list-style-type: none"> <li>Speak to residents s9(2)(a) about the noise and find out what the cause is and any possible solutions</li> </ul>	

## Auckland Harbour Bridge

<b>Sent out:</b>	30 <sup>th</sup> June 2010
<b>Received:</b>	2 responses of 29 sent
<b>Complaints regarding work on the Bridge</b>	
<ul style="list-style-type: none"> <li>• None</li> </ul>	
<b>Are they being adequately informed?</b>	
<ul style="list-style-type: none"> <li>• All said they were happy with the information provided</li> </ul>	
<b>Suggestions and Comments</b>	
<ul style="list-style-type: none"> <li>• It would be helpful to be notified when road closures taking place (Not TBS – but NZTA closures)</li> <li>• Expansion joints seem to be getting very noisy.</li> </ul>	
<b>Actions/Responses</b>	
<ul style="list-style-type: none"> <li>• None</li> </ul>	

<b>Sent out:</b>	29 <sup>th</sup> September 2010
<b>Received:</b>	4 responses of 29 sent
<b>Complaints regarding work on the Bridge</b>	
<ul style="list-style-type: none"> <li>• None expect for 1 – Comments from boat owners re dirt/grit on boats.</li> </ul>	
<b>Are they being adequately informed?</b>	
<ul style="list-style-type: none"> <li>• All said they were kept well informed and were happy with the conduct of the guys around the site</li> </ul>	
<b>Suggestions and Comments</b>	
<ul style="list-style-type: none"> <li>• It would be helpful to be notified when road closures taking place (not TBS – but NZTA closures)</li> <li>• Expansion joints seem to be getting very noisy.</li> </ul>	
<b>Actions/Responses</b>	
<ul style="list-style-type: none"> <li>• No recent works in vicinity that could have given rise to dirt/grit on boats</li> </ul>	