

# Independent Environmental Audit on Sydney Metro City & Southwest – TSE Works

## Final Report

18<sup>th</sup> December 2018

**Contract works: Tunnel, Stations & Excavation Works (TSE)**

**Scope: Barangaroo Spoil barging compliance and operational readiness**

**Reference: SM18.19-065-CSW-TSE-ENV (JHCPBG TSE-022)**

<b>Audit Organisation:</b>	QEM Consulting	<b>Audit Date:</b>	27 <sup>th</sup> November 2018
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## 1. Executive Summary

### 1.1 Introduction

The purpose of this Independent Environmental Audit was to assess Principal Contractor John Holland CPB Ghella's Joint Venture (JHCPBG's) compliance with relevant Planning & Assessment Approvals relating to a marine transport alternative to land-based spoil transport required for the City & Southwest Tunnel, Stations and Excavation (TSE) works.

### 1.2 Background

Planning Approvals issued by the Department of Planning & Environment require Sydney Metro (formerly Transport for NSW) to develop an Environmental Audit Program for independent annual environmental auditing against the terms of the City & Southwest projects Critical State Significant Infrastructure (CSSI) Approval. QEM Consulting Pty Ltd have been engaged by Sydney Metro Delivery Office (SMDO) Safety, Sustainability & Environment (SSE) to deliver a program of Independent Environmental Audits. As background, Sydney Metro is delivering the Sydney Metro City & Southwest (C&SW) TSE infrastructure construction works on behalf of the NSW Government, and have engaged JHCPBG JV to Design and Construct this phase of the Project. Associated tunnel and station box excavations were assessed by the Project EIS to generate significant spoil volumes, with MCoA E84 requiring that alternatives to trucking spoil from Barangaroo be investigated and reported. Barging operations were subsequently proposed and formally reported to Planning NSW by Sydney Metro as intended delivery method to be undertaken by JHCPBG. As required by Planning Approval CSSI 15\_7400 Ministers Condition of Approval (MCoA) A39 and the associated Environmental Audit Program, an Independent Environmental Audit was undertaken to assess JHCPBG compliance with relevant Planning Approvals associated with removal of spoil from Barangaroo by barge planned for early 2019.

### 1.3 Objective and Scope

The purpose of the audit was to assess JHCPBG marine transport operational readiness associated with barging of spoil from Barangaroo to Clyde. The audit objective was to determine actual and likely compliance with relevant Planning Approvals, Revised Environmental Mitigation Measures and required agreements, permits and deed conditions with the aim of minimising impacts on community, waterway users and the environment. Audit criteria included SSI 15\_7400 Conditions of Approval, MCoA A8, A39, C2 a), d) & e), C3 c) & d) and the Sydney Metro C&SW Construction Environmental Management Framework, plus JHCPBG's Construction Environmental Management Plan, Spoil Management Plan, Soil & Water Management Plan, Air Quality Objectives (dust related) and the Marine Traffic Management Plan. The audit scope included the following focus areas:

- Barangaroo infrastructure, site control and responsibilities;
- Risk Assessment and Pollution Prevention;
- Barging Operational Management; and
- Environmental Management including compliance records.

Spoil transfer controls at Clyde were included in the audit scope, but Blues Point & Clyde sites and barging of Tunnel Boring Machine components was excluded.

## 1.4 Summary of Findings

The table below provides a summary of key observations and findings noted in this audit and the priority assigned to these findings.

Ref	Description	Priority*
Obs 1	The JHCPBG environment team, site construction and site engineering functions appeared committed to ensuring that spoil barging operational impacts and risks were responsibly managed.	Observation
Obs 2	Barge modifications and/or procedures developed by Ausbarge were risk focussed, these including spills, bad weather and vessel collision.	Observation
1.	Physical spoil spillage mitigation measures around the Barangaroo wharf loading area needed to be enhanced before commencement of barging, and should correlate with the Site Environmental Plan and Erosion & Sediment Control Plan.	Low
2.	The Barangaroo Site Environmental Plan required further revision to reflect actual and envisaged controls around spoil and barging operations.	Low
3.	The Barangaroo Erosion & Sediment Control Plan required minor update to reflect required water flows and physical protection measures around the wharf.	OFI
4.	Whilst at an advanced stage of preparation, the Barging Work Activity Pack Risk Assessment document required finalising, review, approval and awareness training prior to barging commencement.	Low
5.	A pollution incident response drill around barging needed to be confirmed, potentially possible at the same time as the Health & Safety incident response drills scheduled for mid-December 2018.	Low
6.	Australian Maritime Safety Authority (AMSA) and/or RMS approvals for 2 of the remaining nominated vessels was still awaited.	OFI

\* Priority Definition enclosed as Appendix 2

Note: Not all above-mentioned findings regarding control measures and documentation were required at the time of the audit (pre-operation), but rather upon commencement of spoil barging operations.

## 1.5 Overall Assessment

This section summarises the outcomes of an independent environment audit of JHCPBG's implementation, adequacy and readiness to undertake spoil barging operations in accordance with relevant Planning Approvals, Revised Environmental Mitigation Measures and legal obligations. Conducted on 27<sup>th</sup> November 2018 the audit comprised a Barangaroo infrastructure inspection, followed by an audit which included the marine barging contractor. It should be noted that barging had not commenced, however trials were planned before year-end, with operations expected to start in January 2019.

The assessment noted that considerable planning and preparation had been undertaken over the preceding months, establishing infrastructure at Clyde, obtaining approvals, engaging with the barging contractor and developing formal documentation articulating controls and mitigation measures. In general, ongoing implementation of existing Management Plans around Soil, Water and Air (dust) appeared appropriate, and should facilitate required compliance outcomes and satisfy Minister's Conditions of Approval such as MCoA C2 and C3 c) & d). No audit non-compliances were raised either as a result of non-implementation, or given the pre-operational status.

Compliance with MCoA C2 d) pertaining to risk analysis was evidenced through JHCPBG project and operational risk assessments and the Barging contractors' operational and activity-based risk assessments. MCoA C2 e) regarding risk management was addressed through engineering controls and procedural requirements, the latter including formal documents such as Marine Management Plans, a Work Activity Pack and tugboat specific procedures. Engineering controls included barge modifications (steel spoil containment walls and retractable cover) plus an enclosed loading conveyor and drop chute intended to minimise dust. Other dust mitigation measures such as spoil shed ventilation and/or water sprays had been determined as potentially unnecessary, given spoil was expected to be damp at excavation source. JHCPBG indicated that enhanced measures would be deployed should the need arise.

Emergency/Incident response plans were also documented for both land and marine-based incidents and accidents, these needing refresher training though, an Audit Finding requiring action prior to operation commencement. Marine Spill Kits were available, and a silt curtain was intended to be deployed between the barge and the wharf's edge.

Otherwise, approvals and deed requirements were substantially progressed and/or implemented, including RMS Special Conditions being addressed in aforementioned documentation. Records of barging operative competencies were also available, plus all but two of the eight nominated barges and tug boat certifications, the latter an Opportunity for Improvement should these vessels be deployed.

Lastly, and in summary, it was evident that the project, construction, environmental team and barging subcontractor were acutely aware of the operational risk profile and appeared committed to implementing the alternative spoil transportation methodology in a responsible and compliant manner.

### **Report Author (& Auditor):**

*LJ Weiss*  
**Larry Weiss**

## 2. Detailed Findings and Agreed Action Plan

### 2.1 Audit Findings & Action Plan

This section of the report provides details of audit findings and the agreed action plan, including allocation of responsibility and timeframes. It should be noted that some audit findings pertaining to documentation and controls were work-in-progress and not a compliance issue or risk until such time that (future) operations commenced.

Ref	Audit Finding	Risk or Impact	Classification (and Priority)	Action Plan
	<i>Positive observations / strengths:</i>			
Obs 1	The JHCPBG Environment Management team, plus site construction and engineering functions were engaging in the spoil barging infrastructure and operation, and were aware of public interest and pollution risks.		Observation	N/A
Obs 2	Ausbarge appeared to be a very professional experienced contractor, the Director who attended the audit demonstrating hands-on knowledge of routine procedures and customised management plans, with barge load cover mechanisms and spill related modifications undertaken to mitigate risks.		Observation	N/A
	<i>Audit findings requiring action:</i>			
1.	<p>Physical sediment or silt control measures needed to be enhanced in the vicinity of the conveyor loading point, alongside or near the wharf / water edge (silt control), to ensure ongoing compliance with MCoA E65</p> <p><i>It was noted that the loading zone was concrete and predominantly sloping away from the edge, however there were components that were not and Management Plans were conflicting in the depiction of barrier controls e.g.</i></p> <ul style="list-style-type: none"> <li>• Site Environment Plan had an unbroken retaining wall</li> <li>• Progressive ERSED Plan requires sandbags instead</li> </ul> <p><i>None of the above measures were implemented in entirety and/or presenting an impregnable barrier, as can be seen from the Photograph in Appendix 1B.</i></p> <p><i>JHCPBG noted that the conveyor delivered subsequent to this audit had top and bottom covers in place and were being used as another mitigation measure.</i></p>	Waterway pollution potential	Low	<p><b>Action to be taken by JHCPBG:</b> Hard barriers to be installed around the top edge of the load out area, plus a line of sandbags on the inside edge to prevent any runoff leaving site (noting the slab drains back in towards site). Also, silt curtains to be installed in the gap between wharf/barge. Lastly, old sandbags and materials would be removed from the area.</p> <p><b>Responsible person:</b> Environment, Approvals, Sustainability &amp; Interface Manager</p> <p><b>Due date:</b> 13 December 2018, or prior to barging.</p> <p><i>Prior to finalisation of this report, JHCPBG noted that the action had been undertaken.</i></p>

Ref	Audit Finding	Risk or Impact	Classification (and Priority)	Action Plan
2.	<p>Whilst updated 26/11/18, the Barangaroo Site Environmental Plan SEP-070037 did not reflect all actual and envisaged controls such as a silt curtain, marine spill kits and absorbent booms as yet.</p> <p><i>It should be noted that the SEP is a Barangaroo site commitment defined in JHCPBG report JCG-TBW-EM-RPT-097231 of 1/8/18, comprising the MCoA E84 submission to the NSW Planning Secretary.</i></p>	Waterway pollution potential	<b>Low</b>	<p><b>Action to be taken by JHCPBG:</b> Update Barangaroo Site Environmental Plan and to ensure that provided protection measures are correctly reflected.</p> <p><b>Responsible person:</b> Environment, Approvals, Sustainability &amp; Interface Manager</p> <p><b>Due date:</b> 21 December 2018</p>
3.	The Barangaroo Progressive Erosion & Sediment Control Plan dated 20/11/18 required minor update to reflect required water flows and physical protection measures around the wharf.	Waterway pollution potential	<b>OFI</b>	<p><b>Action to be taken by JHCPBG:</b> Update Barangaroo ESCP to ensure that provided protection measures are correctly reflected.</p> <p><b>Responsible person:</b> Environment, Approvals, Sustainability &amp; Interface Manager</p> <p><b>Due date:</b> 21 December 2018</p>
4.	<p>Whilst at an advanced stage, the (draft) Barging Work Activity Pack SBR-CN-WPK-061254 document required finalising, review and approval, plus implementation including induction / awareness training prior to trial barging commencement.</p> <p>Additionally Vendor supplied equipment maintenance instructions of Appendix A required further details especially when nominated as risk mitigation measures such is the case for the Clyde HPU's and Barangaroo Loading Conveyor.</p>	Potential administrative compliance issue	<b>Low</b>	<p><b>Action to be taken by JHCPBG:</b></p> <ul style="list-style-type: none"> <li>Update and finalise Work Activity Pack for functional area sign off, and</li> <li>Conduct training prior to commencement of barging.</li> </ul> <p><b>Responsible person:</b> Environment, Approvals, Sustainability &amp; Interface Manager</p> <p><b>Due date:</b> 21 December 2018 (or prior to trial barging commencement)</p>

Ref	Audit Finding	Risk or Impact	Classification (and Priority)	Action Plan
5.	<p>A JHCPBG pollution incident response drill nominated as mitigation measure in the Marine Works Activity Pack Risk Assessment (WAPRA rev2) needed to be conducted.</p> <p><i>The Barangaroo JHCPBG Safety Advisor indicated that this was a possible inclusion in upcoming Health &amp; Safety incident response drills scheduled for mid-December 2018.</i></p>	Proactive pollution mitigation measure	<b>Low</b>	<p><b>Action to be taken by JHCPBG:</b> A pollution incident response drill to be undertaken prior to routine barging operations commencing. This may be included as part of a WHS drill or separate</p> <p><b>Responsible person:</b> Environment, Approvals, Sustainability &amp; Interface Manager</p> <p><b>Due date:</b> 21 December 2018</p>
6.	Australian Maritime Safety Authority (AMSA) and/or RMS approvals for 2 of the remaining vessels nominated by the Ausbarge Marine Management Plan i.e. Barge INTAN 1806 and Tugboat (Narooma) were still awaited	Potential administrative compliance issue	<b>OFI</b>	<p><b>Action to be taken by JHCPBG:</b> JHCPBG have requested information from Ausbarge, who indicated an AMSA Certificate was awaited for Narooma and an "in-class" report for INTAN 1806 would be supplied.</p> <p><b>Responsible person:</b> Environment, Approvals, Sustainability &amp; Interface Manager</p> <p><b>Due date:</b> 30 January 2019</p>

\* Priority Definition enclosed as Appendix 2

## 2.2 Assessment Details

The following section of this report provides an overview of areas of focus including documentation, plans, records, infrastructure, facilities and equipment as outlined in the Audit Plan and associated Audit Checklist.

Area of Focus / Approvals	Objective / Requirements	Summary of Review
<b>1. Site Control</b> <ul style="list-style-type: none"> <li>○ MCoA C2 (e) (ii)</li> <li>○ MCoA C3 c) and d)</li> <li>○ MCoA E65</li> <li>○ MCoA E84</li> <li>○ REMM AQ9</li> </ul>	<ul style="list-style-type: none"> <li>• Spoil Storage Facilities, transfer equipment and wharf infrastructure in place and ready</li> </ul>	Spoil Shed in place, Water Treatment Facilities were being completed, and temporary Conveyor & Hopper were awaited. Barges AMS 1806 & 1808 were moored in waiting.
	<ul style="list-style-type: none"> <li>• Engineering measures to control storage, transfer, loading and marine operations</li> </ul>	Engineering measures included concreted areas sloping away from wharf edge, modified barges (retractable spoil covers atop steel walled enclosure) etc. Infrastructure was being finalised to remove water from the barge to the WT Plant Refer Audit Finding 1) above though and photograph further.
	<ul style="list-style-type: none"> <li>• Administrative procedures in place to facilitate controlled operations</li> </ul>	Whiteboard used in briefing area reflected Weekly Look Ahead risks and updates around wind and expected rainfall. A Site Environmental Plan was displayed, however both the SEP and ERSED Plan required further minor updates – refer Audit Findings 2) and 3). A comprehensive Barging Work Activity Pack was in the final stages of completion requiring review approval and awareness training though - Audit Finding 4)
	<ul style="list-style-type: none"> <li>• Incident response equipment to mitigate spoil, dust, run-off and spills into the harbour</li> </ul>	Incident response equipment including marine spill kits and silt curtain were available for deployment.
	<ul style="list-style-type: none"> <li>• Air quality and dust mitigation measures</li> </ul>	The temporary conveyor would have closed sides, a canvas cover and enclosed plastic chutes at the delivery point into the barge. Ventilation for the acoustic spoil shed was not envisaged per REMM AQ9 as the spoil would be wet at source and travel a short distance only. JHCPBG intimated that the need for any additional measures such as water sprays would be assessed during operation.
<b>2. Site / Engineering Accountability</b> <ul style="list-style-type: none"> <li>○ MCoA C2 d) &amp; e) &amp; j)</li> </ul>	<ul style="list-style-type: none"> <li>• Site-specific operational risk assessments or Marine Works Work Activity Pack Risk Assessment</li> </ul>	Marine Works WAPRA was developed (draft), identifying controls for several risks.



	<ul style="list-style-type: none"> <li>Operational interfaces and delineation of accountability</li> </ul>	<p>Marine and land / loading operations accountabilities were documented in the Ausbarge Marine Management Plan (role of competent vessel Master, plus the JHCPBG Marine Works Work Activity Pack. A dedicated function had been assigned to spoil management, supported by a Site Engineer and Tunnelling Manager involved in the readiness activities.</p>
<p><b>3. Spoil Pollution Prevention</b></p> <ul style="list-style-type: none"> <li>MCoA C2 (e) (ii)</li> </ul>	<p>Emergency Response Plan updated per CEMP as result of significant changes to activities?</p>	<p>Existing Emergency Response Plan (SMCSWTSE-JCG-TPW-GN-PLN-002081) was proposed to be used, with preparedness intended through barging/spoil specific drills. Additional emergency contact details of the Harbour Master and RMS had been added to the Pollution Incident Response Management Plan.</p>
	<p>Risk management details (required by Planning Approval</p>	<p>Awareness, documentation and knowledge of risks and mitigation measures was demonstrated by Project, Site and Ausbarge and/or reflected in this <a href="#">report</a>. Ausbarge indicated that incident response drills would continue and be enhanced. For JHCPBG, refer Audit Finding 5) above.</p>
	<p>Incident response equipment to mitigate spoil, dust, run-off and spills into the harbour</p>	<p>Response equipment and infrastructure were available as indicated above. Ausbarge vessels appeared to have acquired equipment on board. The MD tabled formal procedures and knowledge of Port Authority and VTS requirements for notification and request for specialised assistance</p>
<p><b>4. Barging Operational Management</b></p> <ul style="list-style-type: none"> <li>MCoA C2 (e) (ii)</li> <li>RMS Deed</li> </ul>	<ul style="list-style-type: none"> <li>Marine Management Plan current and addresses risks</li> </ul>	<p>Sydney Metro /JHCPBG contract-specific Marine Management Plan developed by Ausbarge, supported by so-called Safety Management System Manuals. The ARANA Safety Management System operational procedures included - Precautions for restricted visibility and bad weather; Mooring/Berthing Operations; Spillage of liquid cargo/bunkers and Reporting incidents and accidents</p>
	<ul style="list-style-type: none"> <li>Sydney Metro-specific operational risk assessment</li> </ul>	<p>SWMS Risk assessment incorporated in the Marine Management Plan included controls and mitigation measures for hazards such as the state of weather and harbour conditions; collision with another vessel, collision with bridge; tug breakdown and spillage of spoil/fuel. The MMP addressed Safe Locations (needed for poor weather and/or incident) and provided a Contact list</p>

	<ul style="list-style-type: none"> <li>• Specific Deed requirements</li> </ul>	Special Condition 23 d) was addressed in MMP including weather parameters, impacts to ferry services and other vessels, barge movements and routes etc.
	<ul style="list-style-type: none"> <li>• Approvals, Certifications, competency and compliance record keeping</li> </ul>	In preparation for barging, vessel certifications/inspections and operator competencies were available. Refer Audit Finding 6) though. Also, examples of Tug daily logbooks were provided, including notes of drills conducted. The MMP also provided for capture of numerous compliance records including inductions.
<b>5. Environment Management</b> <ul style="list-style-type: none"> <li>• MCoA C2 a) &amp; f)</li> <li>• MCoA C10</li> </ul>	<ul style="list-style-type: none"> <li>• CEMF, CEMP and related management plans reflect spoil and barging controls</li> </ul>	Barging briefly describing in CEMP, however more definitive narrative and procedures was covered elsewhere in documentation already mentioned in <a href="#">this</a> report.
	<ul style="list-style-type: none"> <li>• Inspections and monitoring cover barging operational risks</li> </ul>	Records of pre-existing inspection regime available (intended to be used for barging as well), Water Quality Monitoring program in place however locations of designated and endorsed monitoring points SWB01 and EPL discharge point BN02 probably won't facilitate confirmation on barging water quality performance outcomes.

## Appendix 1A: Audit information

The following indicates key systems, documents, reports, information and records that were reviewed, accessed or sighted during the audit process:

Documentation	Information / Records
<b>1. Sydney Metro Approval related documentation</b>	
Sydney Metro City & Southwest Construction Environmental Management Framework (CEMF) v3.1 dated 15/08/2016	Sydney Metro Report 2018-09-27 on Maximisation of Spoil Removal by Non-Road Methods Investigation Report (Part 1) dated 27/9/2018
<b>2. Site Control / Engineering Management</b>	
Barangaroo Site Environmental Plan dated 26/11/18	Refer Appendix 1B further
Erosion & Sediment Control Plan dated 20/11/18	JHCPBG correspondence dated 28/9/18 with Tricon Mining Equipment recon tracked for supply of (permanent) Terex Evoquip Barge Loader & Crusher
Spoil Management Plan TPW-EM-PLN-000594.03 dated 14/9/2018	Environment Inspection Report dated 20/11/18 re High Wind
Work Activity Pack, Barge Loading Barangaroo & Barge Unloading Clyde, SBR-CN-WPK-061254 rev 0.0 (draft)	Marine Works WAPRA rev2
<b>3. Spoil related Pollution Prevention</b>	
TPW-PM-PLN-002081 Emergency Response Plan rev 04 dated 9/11/2018	
TPW-EM-PLN-002018-Construction Air Quality Management Plan rev 04 dd 21/11/18	
TPW-EM-MPR-003009 Air Quality and Dust Management Procedure rev 02 dd 7/8/17	
Pollution Incident Response Management Plan Appendix F dated 9/11/18	
<b>4. Barging Operational Management</b>	
SMCSWTSE-JCG-TPW-CN-PLN-002333-Marine Works Management Plan rev01 dated 16-07-2018	Work and Tugboat licencing: Arana, RMS Certificate of Survey & Operation expiry 16/09/2020, Babinda expiry 07/02/2020, Morpeth expiry 17/12/2021, Saipan expiry 08/02/2021, Coramba expiry 17/08/2020
Ausbarge Marine Management Plan (TBM & Spoil Barging) v3.1 dated 22/11/2018	Logbook for Workboat / Tugboat Daily for Arana
ARANA Safety Management System (updated Nov 2017)	AMSA Inspection Report for Barges AMS 1806 & 1808, re-inspection dated 23/11/18
	AMSA individual Certificates of Competencies for Masters e.g. GH, AR, TP, BW & PW and Marine Engine Drivers e.g. PW, BB, BW & JG
<b>5. Environment Management, including approvals</b>	
Construction Environmental Management Plan PLN-000817-05 dd 13/05/2017	Barangaroo Surface Water Monitoring Summary to 30 September 2018
Surface Water Quality Monitoring Program TPW-EM-RPT-097238	RMS email dated 13/11/18 from Project Officer Commercial and Projects regarding barge Mooring over Christmas Period
Deed of Agreements between RMS and Sydney Metro and complimentary sub-licence between Sydney Metro and the JV, CN-001247 dated 19/10/18	Project Pack Web inspection information

## Appendix 1B: Audit inspection observations

The following summarises a few observations from the site inspection component of this audit:



**Above:** Moored Barge showing steel wall for spoil containment and retractable protective cover (closed as shown)

**Right (alongside):** Varied arrangements observed alongside the wharf edge, such as random sandbags and jersey kerbs, however no definitive uninterrupted barrier to prevent liquid or solid silt or sediment flowing over the edge.



## Appendix 2: Priority Definition

The priority for findings raised in this report is described in the table below.

Priority	Definition	Guidelines for Implementing Actions
<b>Very High</b>	A significant control weakness / issue or fundamental non-compliance that exposes the project or area under review to a very high level of risk	Requires immediate management attention, with actions plans to be developed and enforced within an agreed time frame. The matter will be escalated immediately to senior management from all parties
<b>High</b>	A control weakness / issue or non-compliance that may expose the project or area under review to a high level of risk	Action plans to be developed and implemented within an agreed time frame. The matter will be escalated to relevant senior executives where it is deemed necessary
<b>Medium</b>	A control weakness / issue or non-compliance that may expose the project or area under review to a moderate level of risk	Action plans to be developed and implemented within an agreed time frame
<b>Low</b>	A control weakness / issue or non-compliance that may expose the project or area under review to a low level of risk	Action plans to be developed and implemented within an agreed time frame
<b>OFI</b>	Opportunity For Improvement (OFI) – opportunity to implement a good or better practice to improve efficiency or further reduce exposure to risk	Suggestion to be considered for implementation
<b>Observation</b>	Good Practice – process / system in place and implemented effectively across business.	Maintain to current standard. Share with other areas of business.

## Appendix 3: Personnel Consulted and Timeline

We would like to extend our appreciation to the following individuals involved this audit:

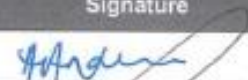
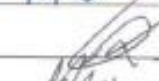






Name	Title
Anne Andersen	TSE Environment, Approvals, Sustainability & Interface Manager, JHCPBG
Stuart Ainstee	Senior Environment Co-ordinator, JHCPBG
Cindy Liles	Sustainability Graduate, JHCPBG
Andreas Mindt	Project Manager Tunnelling, JHCPBG
Vincent Ganet	Project Engineer, JHCPBG
Shane Gallagher	Senior Safety Advisor, JHCPBG
Vimala Ferrari	Third Party Interface Manager, JHCPBG
Greg Hall	Director, Ausbargo
Emily Russell	Environment Officer, TSE IG, Sydney Metro C&SW
Others:	Refer Attendance Register (Appendix below)

The Audit timeline is shown in the table below.

Milestone	Date
Briefing Meeting	14 November 2018
Issuance of Terms of Reference	14 November 2018
Desktop Audit	19 November 2018
Audit	27 November 2018
Issuance of Draft Audit Action List	6 December 2018
Issuance of Draft Report	11 December 2018
Issuance of Final Report	18 December 2018

## Appendix 4: Audit attendance register

### Attendance Sheet

Meeting:		Barging Audit		
Date:		27/11/2018		
Attendees	Company	Date	Signature	
Anne Andersen	JHCPBG	27/11/18		
EMILY ROJDELL	SM.	27/11/18		
Larry Weiss	QEM	"		
Umaria Ferrari	JHCPBG	"		
STEVEN KOTEVICH	JHCPBG	"		
Andreas Pindt	"	"		
Vincent GAVET	"	"		
SHANE GALLAGHER	"	"		

## Appendix 5: Audit Credentials

### Audit process

This Independent Environment Audit comprised an off-site desktop review, a project contractor audit including site inspection, and a post audit assessment of documentation and records. The audit utilised an assignment specific Audit Checklist based on relevant Planning & Assessment Approvals plus Revised Environmental Mitigation Measures. The entire process was undertaken by Larry Weiss, of QEM Consulting Pty Ltd in accordance with AS / NZS / ISO 19011:2018 – Guidelines for Auditing Management Systems.

### Auditor information

<b>Audit Organisation:</b>	QEM Consulting Pty Ltd
<b>Auditor &amp; Report Author</b>	Larry Weiss
<b>Auditor Qualification</b>	EMS Auditor, Exemplar Global Certification 12355
<b>Affiliations</b>	Member, Engineers Australia 938517

### Auditor certification

The abovementioned Auditor certifies as having personally undertaken this Independent Audit and preparing the contents of this Independent Audit Report; and that the findings of the audit are reported truthfully, accurately and completely; and that he has exercised due diligence and professional judgement in conducting the audit. The signed Statement of Interests and Association in our services agreement with Sydney Metro confirm our Auditor's independence and absence of pecuniary interest in the audited project.

### Audit disclaimer

It should be noted that this report is a snapshot in time, based on selected and supplied documentation, as well as observations on the day only, and does not purport to be a definitive confirmation of overall or potential compliance or vice-versa. Also, processes requiring implementation upon commencement of barging operations could not be assessed given the timing of this readiness audit conducted a few weeks prior to operational commencement.

----- **END REPORT** -----