

# Independent Peer Review (IPR) of Contaminated Land (CL) and Coastal Acid Sulfate Soil (CASS) Technical Report

for the Edithvale and Bonbeach Level Crossing Removal Projects

Presented by: Mark Stuckey



**ENVIRONMENTAL EARTH SCIENCES**  
CONTAMINATION RESOLVED

## Role/Tasks of the Independent Peer Reviewer

### Technical Report C – review

- existing reports (4) and background information (June 2017)
- scoping document/ sampling analysis quality plan (June/ July 2017)
- field soil and groundwater sampling procedures via a field visit (27 July 2017)
- draft versions of report, including discussions with report authors, and provision of Review Report on 3 November 2017 (August to December 2017)

**Technical Review** Report was provided on 24 January 2018

I further considered the requirement for additional soil and groundwater assessment, and reviewed and responded to all relevant submissions, in April and May 2018 and completed my

**Expert Report** on 28 May 2018, and reviewed all expert reports relating to groundwater and CL/ CASS (including those commissioned by Kingston City Council) on 30-31 May 2018



## Reports Reviewed

- Aecom GHD Joint Venture (2017a) *Contamination / PASS Desktop Assessment – Rail Under Road number 18 – Edithvale Road, Edithvale*. Report to LXRA dated 24 February 2017.
- Aecom GHD Joint Venture (2017b) *Contamination / PASS Desktop Assessment – Rail Under Road number 46 – Station Street/ Bondi Road, Bonbeach*. Report to LXRA dated 24 February 2017.
- Aecom GHD Joint Venture (JV) (2017c) *Preliminary Impact Assessment: Groundwater – Rail Under Road number 18 – Edithvale Road, Edithvale*. Report to LXRA dated 24 February 2017.
- Aecom GHD JV (2017d) *Preliminary Impact Assessment: Groundwater – Rail Under Road number 46 – Station Street/ Bondi Road, Bonbeach*. Report to LXRA dated 24 February 2017.
- Aecom GHD Joint Venture (2017e) **Provision of Technical Services – Indicative CASS proposed scope for Bonbeach and Edithvale Stage B, C, D**. Report to LXRA dated 16 June 2017 (Final).
- Aecom GHD JV (2017f) **Contamination and Spoil Management Impact Assessment Technical Report – Edithvale and Bonbeach Level Crossing Removal Projects Environmental Effects Statement**. Report to LXRA dated 24 July 2017 (Revision A).
- Aecom GHD JV (2018a) *Numerical Groundwater Modelling Report – Edithvale and Bonbeach Level Crossing Removal Projects Environmental Effects Statement Technical Report A, Appendix E*. Report to LXRA dated 2 February 2018 (Revision 0).
- Aecom GHD JV (2018b) *Acid Sulfate Soils and Contamination – Edithvale and Bonbeach Level Crossing Removal Projects Environmental Effects Statement Technical Report C*. Report to LXRA dated 21 February 2018 (Revision 1).
- Aecom GHD JV (2018c) *Groundwater Impact Assessment – Edithvale and Bonbeach Level Crossing Removal Projects Environmental Effects Statement Technical Report A*. Report to LXRA dated 22 February 2018 (Revision 1).
- Senversa (2018a) *Geotechnical, contaminated land and soil vapour review of the environmental effects statement*. Edithvale and Bonbeach Level Crossings, for Kingston City Council, 28 May 2018.
- Senversa (2018b) *Hydrogeology and acid sulfate soils review of the environmental effects statement*. Edithvale and Bonbeach Level Crossings, for Kingston City Council, 28 May 2018.

## Guidance Documents

### Acid Sulfate Soils:

- Ahern, C R, Sullivan, L A and McElnea, A E (2004) *Laboratory methods guidelines 2004 – Acid Sulfate Soils*. In *Queensland acid sulfate soil technical manual*. DNRE, Indooroopilly, Queensland, Australia.
- Dear, S E, Ahern, C R, O'Brien, L E, Dobos, S K, McElnea, A E, Moore, N G and Watling, K M (2014) *Soil management guidelines*. In *Queensland Acid Sulfate Soil Technical Manual*. DSITIA, Queensland. Version 4.0.
- Department of Sustainability and Environment (DSE) Victoria (2009) *Victorian Coastal Acid Sulfate Soils Strategy*.
- DSE (2010) *Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulfate Soils*. October 2010.
- EPA Victoria (2009) *Industrial waste resource guidelines (IWRG) (Acid Sulfate Soil and Rock)* publication 655.1.
- Watling, K M, Ahern C R and Hey K M (2004) *Acid Sulfate Soil Field pH Tests*. In *Acid Sulfate Soil Laboratory Methods Guidelines*, May 2004.

### Contaminated Land:

- ANZECC/ ARMCANZ, 2000. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. National Water Quality Management Strategy.
- EPA Victoria (2009) *Industrial Waste Resource Guidelines (IWRGs) – Soil Sampling*. Publication IWRG702 – June 2009.
- EPA Victoria (2017a) *Per- and polyfluorinated alkyl substances (PFAS)*. Publication 1611.3 – August 2017.
- EPA Victoria (2017b) *Interim position statement on PFAS*. Publication 1669.1 – November 2017.
- HEPA (2018) *PFAS National Environmental Management Plan*. January 2018.
- HEPA (2017) *PFAS National Environmental Management Plan*. Consultation Draft, August 2017.
- NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)*.
- NHMRC/ NRMCC (2011) *Australian drinking water guidelines*. National Water Quality Management Strategy.
- NHMRC/ NRMCC (2008) *Guidelines for managing risks in recreational water*. Australian Government, February 2008.
- Victorian Government (1997) *State Environmental Protection Policy (SEPP) (Groundwaters of Victoria) (GoV)*.

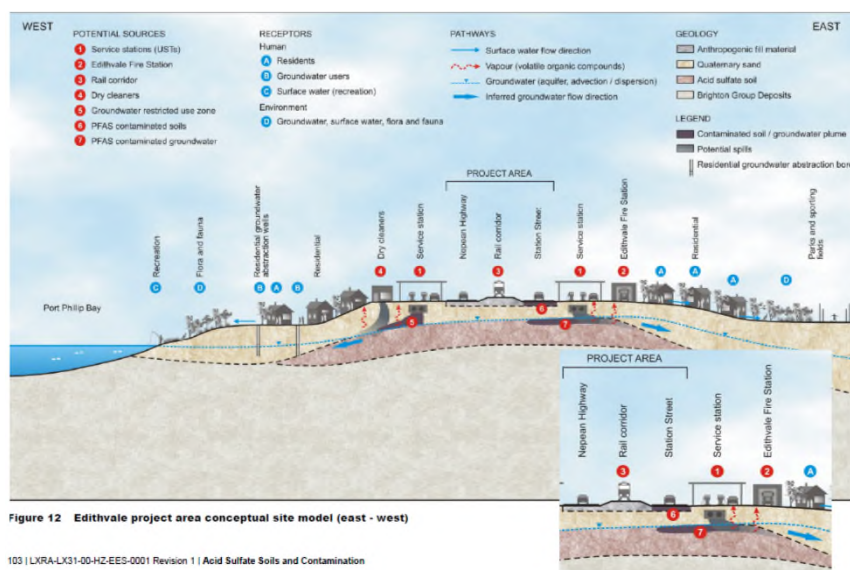
## Who is the Independent Peer Reviewer?

### Mark Stuckey

- BScAgr (Soil Science) University of Sydney 1994
- MSc (Groundwater Hydrology) Flinders University of SA 2006.
- Certified Professional Soil Scientist (CPSS) since 1997.
- EPA Victoria approved Environmental Auditor (Contaminated Land).
- Completed over 120 acid sulfate soil projects, including at nearby Wannarukladdin Wetlands, and sites in Edithvale and Seaford.
- Provided the draft Best Practice Management Guidelines for Coastal Acid Sulfate Soils in Victoria to DSE in February 2008.
- Expert witness roles relating to acid sulfate soils, including for sites in Victoria at Yaringa (including Panel Hearing), Barwon Heads and Bulla



## Conceptual Site Model – Edithvale E-W



**Investigation Locations** – 41 points (purple) across 17 ha, up to 22.5m depth, 1,045 soil samples collected & 292 primary samples analysed for CASS, 89 samples from 41 locations analysed for CL, 23 groundwater bores (green) sampled and analysed



## Submissions

Of 248 received, determined that 12 were relevant to my area of expertise:

- 11 raised issues associated with water-table lowering (CASS activation)
- 3 raised alteration of migration pathways of dissolved contaminant plumes
- 2 raised both of the above issues (EPAV and City of Kingston)

It is my determination that the issues raised, including by EPAV, and City of Kingston and their experts (Senversa 2018a and 2018b), are all dealt with adequately by the EPRs proposed in the EES



## Key Findings (Risks Identified)

Potential for the proposed works to:

- cause CASS activation due to water-table lowering
- change the migration pathway of dissolved contaminant plumes
- require off-site disposal of chemically impacted water (42.5 ML total volume estimated)
- require off-site disposal of CASS (and contaminated soil) generated from piling and trench excavation works– see below

**Table 43 Indicative ex-situ spoil volume estimates**

Spoil category	Edithvale level crossing removal (m3 ex-situ)	Bonbeach level crossing removal (m3 ex-situ)
Fill material	120,341	145,839
Solid inert waste	0	0
Contaminated spoil – Prescribed industrial waste		
Category A	0	50
Category B	0	50
Category C	11,440	28,704
Waste acid sulfate soil	43,355	8,515
<b>Total</b>	<b>175,136</b>	<b>182,958</b>

## Key Findings and associated Environmental Performance Requirements (EPRs)

Potential for the proposed works to:

- cause CASS activation due to water-table lowering – addressed by

EPR CL2 (CASS Management Plan),

EPR CL4 (construction phase groundwater monitoring, treatment, handling and disposal, contamination plume management),

EPR CL5 (operation phase groundwater management and mitigation, in particular beneficial use protection from acidic, contaminant and saline impacts),

EPR GW2 (tanked rail trench design to prevent mounding and drawdown),

EPR GW3 (groundwater management and monitoring plan implemented for at least 10 years post-construction – linked to EPR CL5 and triggered by changes in groundwater quality)

## Key Findings and associated Environmental Performance Requirements (EPRs)

### Potential for the proposed works to:

- change the migration pathway of dissolved contaminant plumes –  
addressed by

EPR CL5 (operation phase groundwater management and mitigation, in particular mitigate any impacts from changes to groundwater levels),

EPR GW2 (tanked rail trench design to prevent mounding and drawdown),

EPR GW3 (groundwater management and monitoring plan implemented for at least 10 years post-construction – linked to EPR CL5 and triggered by changes in groundwater levels)



## Key Findings and associated Environmental Performance Requirements (EPRs)

### Potential for the proposed works to:

- require off-site disposal of chemically impacted water – addressed by

EPR CL4 (construction phase groundwater collection, treatment, handling and disposal),

EPR SC1 (community and stakeholder engagement management plan, including addressing potential impacts associated with truck movements and associated impacts e.g. increased noise and vibration)



## Key Findings and associated Environmental Performance Requirements (EPRs)

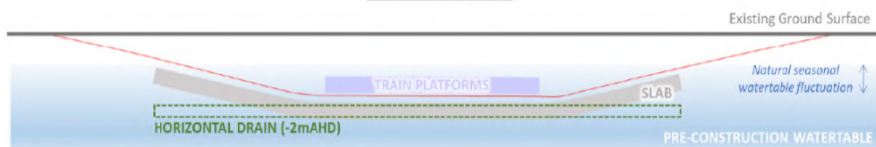
Potential for the proposed works to:

- require off-site disposal of CASS (and contaminated soil) – addressed by  
EPR CL1 (Spoil Management Plan development in consultation with EPA),  
EPR CL2 (CASS Management Plan development in consultation with EPA),  
EPR SC1 (community and stakeholder engagement management plan,  
including addressing potential impacts associated with truck movements  
and associated impacts e.g. increased noise and vibration)



Has enough been done? Mitigating mounding/ dewatering potential at Edithvale (not required at Bonbeach).....

Cross Section View



Plan View

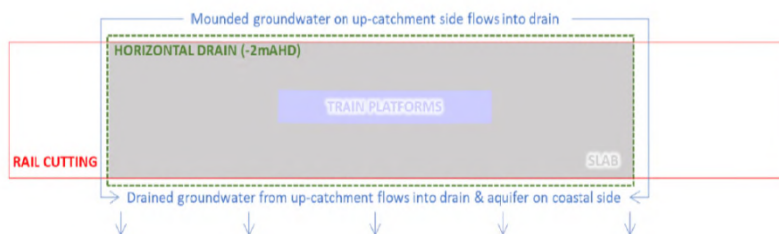
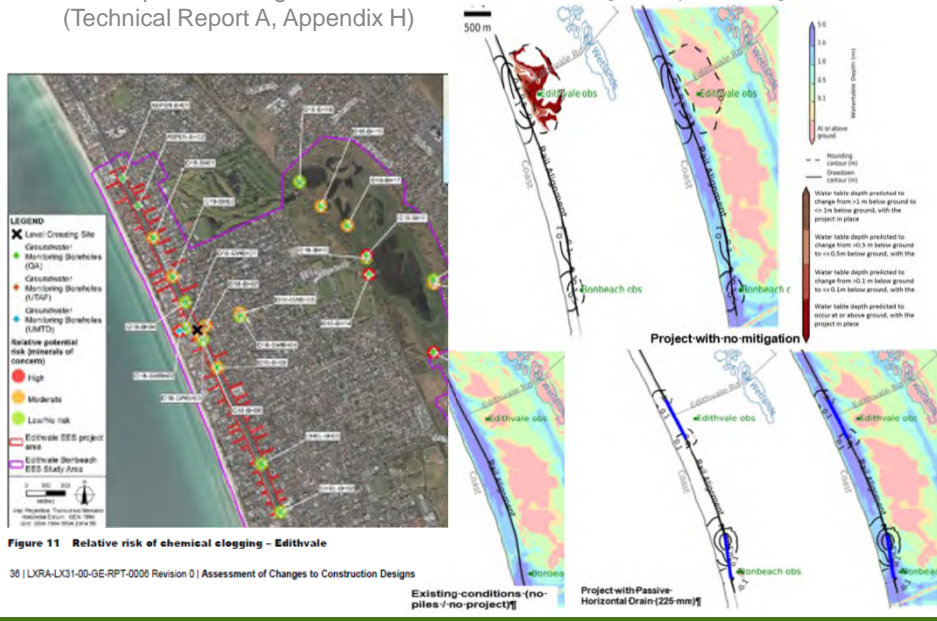
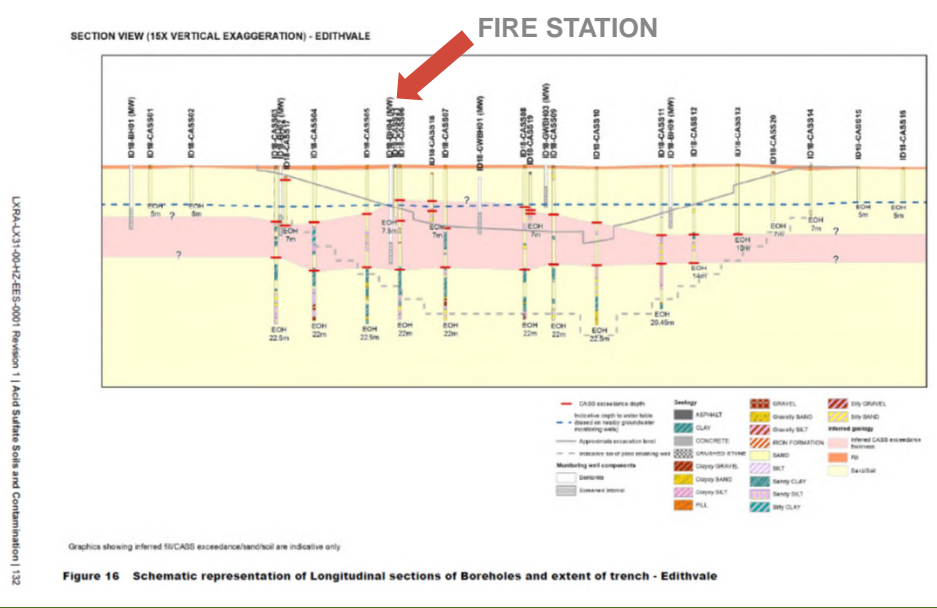


Figure 5 Schematic representation of the passive horizontal drain

.....To prevent/ mitigate CASS activation and changes to plume migration (Technical Report A, Appendix H)



CASS and water-table occurrence along alignment

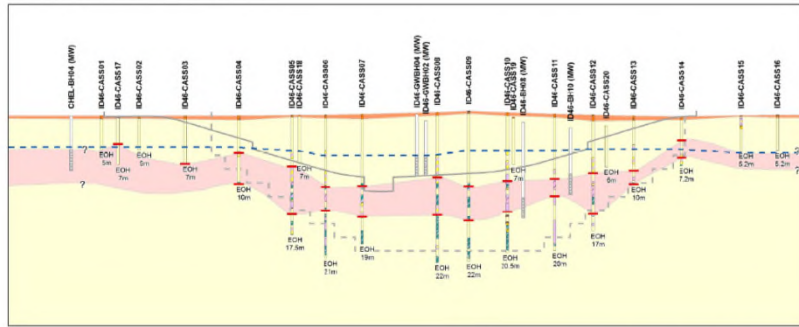




## CASS and water-table occurrence along alignment

1331 L104-L31-04-2-ES-001 Revision 1 Acid Sulfate Soils and Contamination

SECTION VIEW (15X VERTICAL EXAGGERATION) - BONBEACH



Graphics showing inferred CASS occurrence/sandfill are indicative only

Figure 17 Schematic representation of Longitudinal sections of Boreholes and extent of trench - Bonbeach

## Fire Station location and mitigated water-table drawdown prediction



Table 26 Summary of detectable PFASs

Sample ID	PFHxS+PFOS (µg/L)	PFHxS (µg/L)	0-2 FTS (µg/L)	PFOA (µg/L)	PFHxA (µg/L)	PFOS (µg/L)
PFAS NEMP 2017 Ecological freshwater 95% protection	-	-	-	220	-	0.13
PFAS NEMP 2017 Drinking water (health)	0.07	-	-	0.56	-	-
ID18-BH02	0.14	0.07	<0.05	0.03	0.02	0.07
ID18-BH04	0.07	0.04	0.13	<0.01	<0.02	0.06

Table 22 Summary of detectable PFASs

Investigation level	PFHxS (mg/kg)	PFOA (mg/kg)	PFOS (mg/kg)
PFAS NEMP 2017 - Soil health based screening level: Residential	0.009	0.1	0.009
PFAS NEMP 2017 - Soil health based screening level: Industrial/Commercial	20	100	20
PFAS NEMP 2017 - Soil health based screening level: Urban residential/Public open spaces	-	20	32
ID18CASS06_1,5	0.0006	0.0003	0.0015
ID18CASS06_1	0.0003	0.0002	0.0003
ID18CASS06_1,5	0.0005	0.0002	0.0006

## Summary of IPR Findings

- As all soil (and groundwater) in the trench alignment will need to be disposed off-site, classification (as per Table 43 of Technical Report C) of *ex-situ* spoil volumes is a critical outcome of the EES works, including minimising the volumes of waste (Category A, B, C and WASS) and maximising the volume of Fill Material.
- WASS should be beneficially disposed off-site below water-table if possible.
- Planned alteration of the construction design (passive horizontal drain) will greatly assist in mitigating
  - CASS activation due to water-table lowering
  - dissolved contaminant plume migration towards beneficial uses and potential receptors.
- EPRs CL1-5, GW1-4 and SC1 provide appropriate assurance on CL and CASS issues, in particular
- at least 3 months baseline chemical monitoring prior to construction works is considered appropriate.

