Planning Proposal

AMENDMENT TO THE MAITLAND LEP 2011

To rezone land from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation at 30 Swan Street, Morpeth (Lot 3 DP237264)

Version 3.0
15/02/2016

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Version 2.0 – 22.09.2014 (Council Report - Request for Gateway)

Version 3.0 – 15.02.2014 (Council Report – Request to make LEP)

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INTRODUCTION

This planning proposal has been prepared in accordance with Section 55 of the Environmental Planning and Assessment Act 1979. It explains the intended effect of, and justification for the proposed amendment to Maitland Local Environmental Plan 2011 to rezone land at 30 Swan Street, Morpeth described as Lot 3 DP237264 from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation. The minimum lot size will also be reduced from 40ha to 450m^2 for the area of R1 General Residential.

A location plan is included at APPENDIX One.

This planning proposal is the result of an application made by Pulver, Cooper & Blackley Pty Ltd on behalf of the landowner to seek the rezoning of the land.

The land is an identified Urban Extension Site in the Maitland Urban Settlement Strategy 2012 (MUSS 2012).

The planning proposal was exhibited for an extended period of 6 weeks between 17 December 2015 and 29 January 2016. Five submissions were received during the exhibition period. The key issues were: heritage, community benefits and impacts, visual impacts, timing of notification letters, trees, loss of views and contamination. These have been considered in PART 5: COMMUNITY CONSULTATION of this planning proposal.

The planning proposal was also referred to the Office of Environment and Heritage (NSW Heritage Council). OEH has responded with no objection to the proposal. The response does contain some recommendations that are discussed in SECTION D – STATE AND COMMONWEALTH INTERESTS of the planning proposal. A copy of the submission is at attachment APPENDIX TEN. OFFICE OF ENVIRONMENT AND HERITAGE: HERTIAGE COUNCIL RESPONSE.

The Gateway Determination issued by the Department of Planning and dated 13 November 2015 specifically requested that Council consider the cumulative impacts of their decisions on the heritage significance of Morpeth. A discussion has been provided in PART 3: JUSTIFICATION FOR PROPOSED REZONING of this planning proposal.

The submissions and agency response have been considered. It is considered that the proposal to rezone the land at 30 Swan Street, Morpeth from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation is appropriate. Therefore, it is requested that the Minister of Planning make the Local Environmental Plan in accordance with this planning proposal.

PART 1: OBJECTIVES OR INTENDED OUTCOMES

The objectives of the proposal are:

1. To rezone the subject site to permit residential development.
2. To protect the public views to the rural land.
3. To respond to the heritage, contamination and flooding constraints affecting the site.

PART 2: EXPLANATION OF PROVISIONS

The planning proposal seeks to amend the Maitland LEP 2011 to rezone the subject land from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation and to amend the minimum lot size map so that a minimum lot size of 450m^2 applies to the R1 General Residential area of the site.

PART 3: JUSTIFICATION FOR PROPOSED REZONING

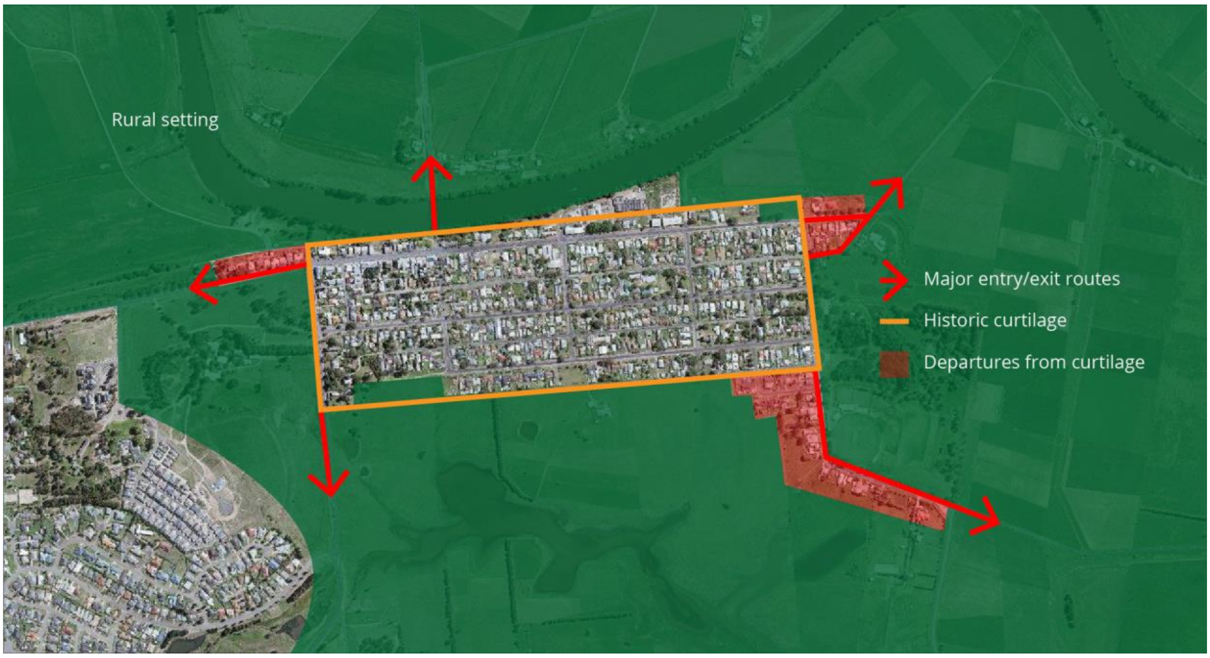
In accordance with the Department of Planning's 'Guide to Preparing Planning Proposals', this section provides a response to the following issues:

- Section A: Need for the planning proposal;
- Section B: Relationship to strategic planning framework;
- Section C: Environmental, social and economic impact; and
- Section D: State and Commonwealth interests.

The Department of Planning and Environment have encouraged Council to consider the cumulative impacts of their decisions on the heritage significance of Morpeth. This was requested in the Department's Gateway Determination for the proposal. The request was provoked by the number of proposals that Council has received for development and rezoning in Morpeth.

The heritage significance of Morpeth has been a key consideration in Council's decisions for development in Morpeth. For the most part the decisions have contained development within the curtilage set by the 1840s town plan.
The town plan was influenced by two major factors – the river and Lt Edward Charles Close's theories of town planning. The block structure planned in the 1840s remains evident. The originally planned street hierarchy is also still evident with three major roads and two service lanes in an east-west orientation and five major roads in a north-south orientation. The development pattern and original street layout by Close was simpler than the pattern now in existence. However, the fundamental hierarchy and alignment clearly remain today. The curtilage of Morpeth is informed by the 1840's blocks and the road layout and is illustrated below.

Morpeth is described as a distinct urban entity in a rural landscape. This is a fundamental quality of the township and its heritage significance. Despite some minor encroachment into the rural buffer from the southwest, the town remains distinctly surrounded by a rural, open space buffer. Only minor departures from the four block layout have occurred. However, these minor departures along Duckenfield Road, Brisbane Fields Road and Morpeth Road have significance in themselves as the main historic routes into and out of the township. It is logical that development extended along these routes.



In 2007, Council refused to support a proposal for a seniors living development in Duke Street. This decision was again upheld for a revised seniors living proposal at its meeting of 8 September 2015. At that meeting, Council requested the Department of Planning and Environment not to issue a site compatibility certificate (SCC) because of adverse impacts on the rural curtilage and historical setting of the village of Morpeth. The Department of Planning and

Environment refused the SCC on 25 September 2015.
The reasons for refusing to issue a SCC were:

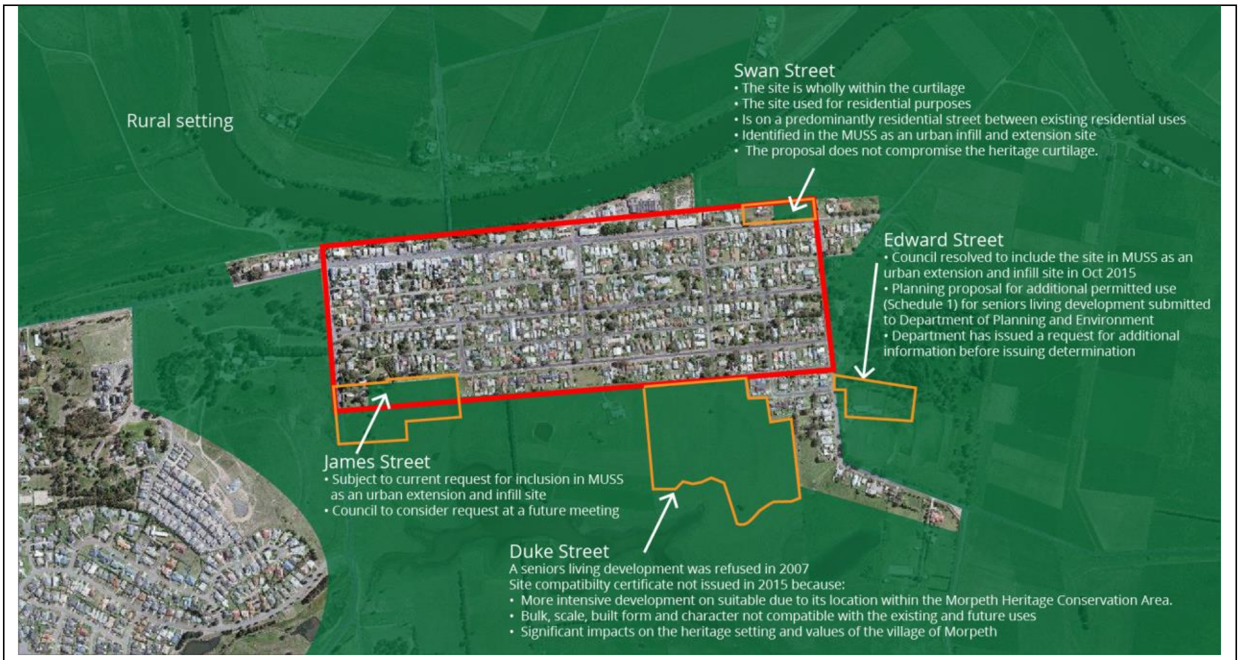
- The site is not considered suitable for more intensive development, due to its location within the Morpeth Heritage Conservation Area.
- The development is of bulk, scale, built form and character not compatible with the existing and future uses in the vicinity of the development, and
- Council's analysis identifies a range of significant impacts on the heritage setting and values of the village of Morpeth that could not be reasonably and effectively mitigated.

In October 2015, Council agreed to include 24 Edward Street, Morpeth in the Maitland Urban Settlement Strategy as an urban extension and infill site. A planning proposal has been received for that site and is currently with the Department of Planning and Environment for a Schedule 1 amendment to allow a seniors living development on the site. The Department has issued a request for additional information before issuing a determination on the proposal. Therefore, the development outcome for the site is unknown at this stage.

Council has also received a request to include an area south of James Street to be considered as an urban extension and infill site in the Maitland Urban Settlement Strategy. This proposal anticipates rezoning that area to R1 General Residential. Council Officers are currently assessing the proposal. A recommendation will be presented to Council in the near future.

Swan Street, the subject of this planning proposal, is supported on the basis that:

- The site is wholly within the heritage curtilage
- The site is currently used for residential purposes
- The adjoining uses are principally residential
- The street is predominantly residential
- The contamination on the site can be addressed at the development application stage
- The reduction of the view corridors illustrated in the Maitland Development Control Plan (MDCP) is supported by an Independent Heritage Consultant and a private view has been secured at the intersection of Swan and Edward Streets. Views between buildings will provided by the increased setback requirements required by the MDCP.
- The Office of Environment and Heritage: Heritage Council raised no objections to the proposal.



Swan Street
- The site is wholly within the curtilage
- The site used for residential purposes
- Is on a predominantly residential street between existing residential uses
- Identified in the MUSS as an urban infill and extension site
- The proposal does not compromise the heritage curtilage.

Edward Street
- Council resolved to include the site in MUSS as an urban extension and infill site in Oct 2015
- Planning proposal for additional permitted use (Schedule 1) for seniors living development submitted to Department of Planning and Environment
- Department has issued a request for additional information before issuing determination

James Street
- Subject to current request for inclusion in MUSS as an urban extension and infill site
- Council to consider request at a future meeting

Duke Street
A seniors living development was refused in 2007
Site compatibilty certificate not issued in 2015 because:
- More intensive development on suitable due to its location within the Morpeth Heritage Conservation Area.
- Bulk, scale, built form and character not compatible with the existing and future uses
- Significant impacts on the heritage setting and values of the village of Morpeth

From the summary above it is clear that Council has considered the cumulative impacts of development in Morpeth. All decisions (apart from Edward Street which is undetermined at this stage) have maintained development within the important historic curtilage as defined by the 1840s plan and been considerate of the key heritage values of the town.

SECTION A – NEED FOR THE PLANNING PROPOSAL

1. Is the planning proposal a result of any strategic study or report?

During the review of the Maitland Urban Settlement Strategy in 2012 Council received a submission from the land owners of 30 Swan Street, Morpeth requesting Council consider the site as an urban extension site in the Maitland Urban Settlement Strategy. The site met the definition for an urban extension site being:

> “Sites adjoining urban areas of less than 15 hectares or have potential for less than 50 residential lots. Only development proposals matching these size criteria will be considered by Council on their merits for rezoning, where the broad planning objectives of this strategy in relation to character, environment, infrastructure and design are clearly demonstrated and justified in the development proposal.”

The site was assessed against the assessment criteria specified in table 11 of the MUSS. It was determined that the proposal met those criteria and the site was included in the Maitland Urban Settlement Strategy 2012.

Council received an application to rezone the subject site in May 2014.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

There is no other way to permit residential development on the land other than to amend the Maitland Local Environmental Plan to rezone the land for general residential purposes.

3. Is there a net community benefit?

No net community benefit test has been undertaken as part of this application. It is unlikely that the development will result in significant community benefit. It will provide a small amount of employment for a limited period of time and provide some additional housing.

The loss of views across the rural land may be considered a negative impact on the community. However, the proposal is supported by a visual impact assessment (VIA) and an Independent Peer Review of the VIA. Both of these conclude the maintenance of a view corridor at the intersection of Edward Street and Swan Street is adequate to preserve the public view to the rural land.

It is considered that the net community benefit is neutral.

SECTION B – RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

4. Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy?

<u>Draft Hunter Regional Plan 2015 and Hunter City Plan 2015 (Department of Planning and Environment)</u>

The Draft Hunter Regional Plan 2015 and Hunter City Plan 2015 (Department of Planning and Environment) support additional housing in appropriate locations including in existing urban areas. However, there are no specific directions or actions that apply to this proposal. The proposal will provide up to 8-9 new lots within an existing urban area. The heritage qualities of the town and the constraints have been considered and the proposal has been deemed suitable.

<u>Lower Hunter Regional Strategy (NSW Department of Planning and Infrastructure) 2006</u>

The LHRS seeks to provide for up to 117,200 new dwellings across the region by 2031, with 16,000 of these new dwellings to be accommodated as urban infill. Morpeth is an existing urban area identified in the LHRS. Therefore, this planning proposal is consistent with this objective of the LHRS.

The LHRS recognises the importance of the historic cultural landscapes of the region and their contribution to the Lower Hunter's unique sense of place. It acknowledges that all places, precincts and landscapes of cultural heritage significance in the region are identified and protected in planning instruments.

The LHRS requires that all development opportunities created by land use zonings and densities are compatible with the underlying heritage values of the place.

The planning proposal is supported by a Statement of Heritage Significance and a Visual Impact Assessment. These have also been peer reviewed. A copy of the documents and the peer review are attached to this planning proposal.

5. Is the planning proposal consistent with the local council's Community Strategic Plan, or other local strategic plan?

Maitland +10 (Community Strategic Plan)

The proposal supports the following objectives of the Council's community strategic plan (Maitland +10);

Our Built Space

- Our infrastructure is well-planned, integrated and timely, meeting community needs now and into the future.
- Our unique built heritage is maintained and enhanced, coupled with sustainable new developments to meet the needs of our growing community.

Our natural environment

- The potential impacts of our growing community on the environment and our natural resources are actively managed.

Maitland Urban Settlement Strategy (MUSS)

The site is identified in Table 12: Urban Infill & Extension Sites of the MUSS. The site was included as part of a city wide review of suitable sites for investigation for urban extension. The site's inclusion does not infer a development outcome.

The Maitland Urban Settlement Strategy supports urban extension and infill development subject to assessment against Council's development and other policies. The site has been comprehensively assessed and the issues identified have been adequately addressed to support the rezoning of the site to R1 General Residential and E2 Environmental Conservation.

6. Is the planning proposal consistent with applicable State Environmental Planning Policies?

An assessment of the planning proposal against the relevant SEPPs is provided in the table below.

Table 1: Relevant State Environmental Planning Policies.

RELEVANCE	CONSISTENCY AND IMPLICATIONS
SEPP (INFRASTRUCTURE) 2007	**NOT APPLICABLE**
Provides a consistent approach for infrastructure and the provision of services across NSW, and to support greater efficiency	Nothing in this planning proposal affects the aims and provisions of this SEPP. The rezoning and development of the subject land for

RELEVANCE	CONSISTENCY AND IMPLICATIONS
in the location of infrastructure and service facilities.	residential purposes will result in the efficient use of existing services and infrastructure available in the locality.
SEPP (RURAL LANDS) 2008	**CONSISTENT**
Provides state-wide planning controls to facilitate the orderly and economic use and development of rural lands for rural and related purposes. In addition it identifies the Rural Planning Principles and the Rural Subdivision Principles so as to assist in the proper management, development and protection of rural lands for the purposes of promoting the social, economic and environmental welfare of the State.	This SEPP is relevant since the site is currently zoned RU1 Primary Production under the Maitland LEP 2011. The site is currently incapable of meeting the objectives of the RU1 Primary Production zone, given the size and dimensions of the existing allotment, and the location of the existing dwelling and ancillary structures present on the land. Nothing in this plan is inconsistent with the objectives of this SEPP.
SEPP NO. 55 REMEDIATION OF LAND	**CONSISTENT**
Provides state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed.	The site was formerly used as a train terminal and uncontrolled fill was historically, placed across the site in conjunction with levelling of the site to accommodate the rail line. The proponent has provided a Detailed Contamination Assessment (DCA). The DCA identified contamination on the site associated with previous uses. Contaminants identified on site included arsenic and lead. The proponent has also submitted a Remediation Action Plan (RAP) which demonstrates that the site can be adequately remediated. Remediation would occur prior to any development consent for future residential development on the site. The remediation is likely to comprise a combination of excavation and capping of hotspots/aesthetic impacts.

7. Is the planning proposal consistent with applicable Ministerial Directions for Local Plan making?

Table 2: s117 Directions.

s117 DIRECTIONS	CONSISTENCY AND IMPLICATIONS
1. EMPLOYMENT AND RESOURCES	
1.1 Business and Industrial zones	**Not applicable**
1.2 Rural Zones	**Inconsistent**

s117 DIRECTIONS	CONSISTENCY AND IMPLICATIONS
The objective of this direction is to protect the agricultural production value of rural land.	The subject land is zoned RU1 Primary Production land. However, it cannot meet the objectives of the RU1 zone. The land is adjoining predominately residential land. The lot itself is unlikely to support a viable agricultural enterprise without causing some significant impact on the adjoining residences. It is considered appropriate that this inconsistency is justified in these circumstances.
1.5 Rural Lands	**Inconsistent**
The objectives of this direction are to protect the agricultural production value of rural land and to facilitate the orderly and economic development of rural lands for rural and related purposes.	See 1.2 above.
2. ENVIRONMENT AND HERITAGE	
2.3 Heritage Protection	**Consistent**
The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.	The subject land is located within the Morpeth Heritage Conservation Area, as identified in the Maitland LEP 2011 and in the Maitland Citywide DCP Chapter: Special Precincts – Heritage Conservation Areas. There are no items of heritage significance located within or directly adjoining the subject site. However there is an historic mile marker in the road reserve in front of the site. The proposed rezoning does not directly impact upon heritage items within the Morpeth Heritage Conservation Area. The proposal satisfies the provisions of this direction, given that the land will continue to be identified as part of the Morpeth Heritage Conservation Area under the Maitland LEP 2011, and the Maitland Citywide DCP chapter: Special Precincts – Heritage Conservation Areas will be amended to remove the site from the “Rural Outskirts Precinct” and instead insert the site in the “Residential Precinct”. A Statement of Heritage Significance and Visual Impact Assessment have been prepared in support of the proposal. These documents have been independently reviewed. The independent review also supports the proposal to rezone land from rural to

s117 DIRECTIONS	CONSISTENCY AND IMPLICATIONS
	residential (and environmental conservation). Despite, the heritage reports supporting the change of use to residential, it is expected that further consideration of heritage impacts will have to be given to the subdivision proposal and also for each building erected on the lots. The proposal was also referred to the Office of Environment and Heritage: Heritage Council. They have raised no objection to the proposal to rezone land to residential on the basis that: *"the rezoning of the subject site from RU1 Primary Production to part R1 General Residential and E2 Environmental Conservation as the rezoning will have minimal adverse impact to the historic setting of the Morpeth HCA and to items of local heritage significance in the area."* The submission is discussed further in SECTION D – STATE AND COMMONWEALTH INTERESTS.
3. HOUSING, INFRASTRUCTURE AND URBAN DEVELOPMENT	
3.1 Residential Zones	**Consistent**
Encourage a variety and choice of housing, minimise the impact of residential development on the environmental and resource lands and make efficient use of infrastructure and services	It is unlikely that the proposal will contribute significantly to the variety or choice of housing as heritage considerations will restrict the type of housing that is appropriate in the location. However, the use of the site for residential purposes makes efficient use of existing infrastructure and services in the location.
3.3 Home Occupations	**Consistent**
The objective of this direction is to encourage the carrying out of low-impact small businesses in dwelling houses.	The proposal is consistent with this direction, given that the land is proposed to be developed in the future for residential purposes. The rezoning will form an amendment to the MLEP 2011. Currently, 'Home Occupation' is permitted without consent in the R1 General Residential zone.
3.4 Integrating Land Use and Transport	**Consistent**
The objectives relate to the location of urban land and its proximity to public transport infrastructure and road networks, and improving access to housing, jobs and services by methods other than private vehicles.	The land is well located to support the surrounding residential development and to provide high levels of accessibility to existing road and public transport networks. The proposal is consistent with this direction.
HAZARD and RISK	

s117 DIRECTIONS	CONSISTENCY AND IMPLICATIONS
4.1 Acid Sulfate Soils	**Consistent**
To avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulphate soils.	The Maitland LEP 2011 identifies Class 5 Acid Sulphate Soils over the site. The Preliminary Contamination Assessment report found that as the disturbance of the soil 2m below the surface is unlikely, further assessment of acid sulfate soils is not considered necessary. The proposal is therefore consistent with this direction.
4.3 Flood Prone Land	**Consistent**
The objectives of this direction are: (a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and (b) (b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.	A small portion to the rear of the subject land is positioned below the 1 in 100 year flood level. The majority of the site is above the 1:100 year flood level, with future buildings able to be constructed with a 500m freeboard to the flood level with no significant filling of the site necessary. The site is capable of supporting residential development. The proposal is considered to be consistent with this direction.
REGIONAL PLANNING	
5.1 Implementation of Regional Strategies	**Consistent**
This direction requires a draft amendment to be consistent with relevant state strategies that apply to the LGA.	The planning proposal is considered to be consistent with the Lower Hunter Regional Strategy as it provides for new housing in accordance with the adopted MUSS 2012.
LOCAL PLAN MAKING	
6.1 Approval and Referral	**Consistent**
The direction aims to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	No additional LEP provisions will be required.

SECTION C – ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACT

8. **Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?**

The land to which this planning proposal applies is totally cleared, apart from some cultural plantings adjoining Swan Street. The land has historically been used for railway purposes, grazing and residential occupation. It is therefore unlikely that any threatened species, populations or ecological communities, or their habitats will be adversely affected as a result of the proposed rezoning.

9. Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

Contamination is a key issue for the site. The site was formerly used as a train terminal and uncontrolled fill was, historically, placed across the site in conjunction with levelling of the site to accommodate the rail line.

The proponent has provided a Detailed Contamination Assessment (DCA). The DCA identified contamination on the site associated with previous uses. The proponent has also submitted a Remediation Action Plan (RAP) which demonstrates that the site can be adequately remediated. Remediation would occur prior to any development consent for future residential development on the site.

Stormwater will need to be addressed at the subdivision stage in accordance with an approved stormwater management plan.

10. How has the planning proposal adequately addressed any social and economic effects?

The proponent has undertaken preliminary studies in relation to Aboriginal archaeology and potential land contamination, the results of which are discussed above in the context of potential environmental issues for the identified land.

There will be some loss of existing, private views by residents opposite the site. However, a public view (from the Edward Street intersection) will be protected.

The proposal is unlikely to have any significant positive or adverse social or economic impacts.

SECTION D – STATE AND COMMONWEALTH INTERESTS

11. Is there adequate public infrastructure for the planning proposal?

The precinct is adequately serviced by existing infrastructure.

<u>Traffic generation</u>

The future yield is anticipated at approximately 9 - 10 residential lots. The planning proposal would result in only a marginal increase in traffic in the immediate locality.

12. What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

The planning proposal was referred to the Office of Environment and Heritage (Heritage Council of NSW). The Heritage Council raised no objection to the proposal to rezone the land from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation. However they suggested Council consider the following:

- <u>The significance of the Morpeth Conservation Area and measure to maintain and</u>

enhance its character.

Response: The site is within the Morpeth Heritage Conservation Area. Therefore, any development of the site will be subject to the comprehensive development controls applying to the precinct.

- Developing a subdivision pattern and development guidelines that reflect the character of the Precinct, Conservation Area and adjacent residential properties.

  Response: The site is within the Morpeth Heritage Conservation Area. The DCP: Morpeth Heritage Conservation Area will be amended to include the site within the "Residential Precinct" of that document. It is considered that the development provisions that exist are adequate to affect a good design outcome on the site.

- The potential for any significant historic archaeology or relics that may be uncovered by future excavation or ground disturbance.

  Response: A condition relating to archaeology and relics will be applied to the subdivision and development approvals.

- Larger lots sizes to allow views through the subject site in order to retain visual relationship with the farmland and the river.

  Response: The Maitland DCP: Morpeth Heritage Conservation Area has detailed provisions to control the subdivisions and development outcome. The recommendation by Heritage NSW to increase lot sizes is not considered necessary as the indicative subdivision layout provided by the proponent show lots that are around 750m^2. The lot sizes in the vicinity of the site range generally between 360m^2-600m^2. It is considered more important to achieve a quality built outcome that provides views through the lots rather than to impose an additional minimum lot size. The Morpeth DCP requires that:

  "Side setbacks are to be the standard 900mm minimum on one side, but increased to 2.5 - 3.5m minimum on the other to maintain views between buildings and low density characteristics."

  This development standard will be imposed on any future development to achieve views between the buildings to the farmland and the river.

A copy of the Office of Environment and Heritage: Heritage Council submission is at APPENDIX TEN. OFFICE OF ENVIRONMENT AND HERITAGE: HERTIAGE COUNCIL RESPONSE.

PART 4: MAPS

The proposal seeks to amend the land use map (LZN) and the minimum lot size map (LSZ). A copy of the existing maps and the proposed maps are at Appendix Two and Three.

PART 5: COMMUNITY CONSULTATION

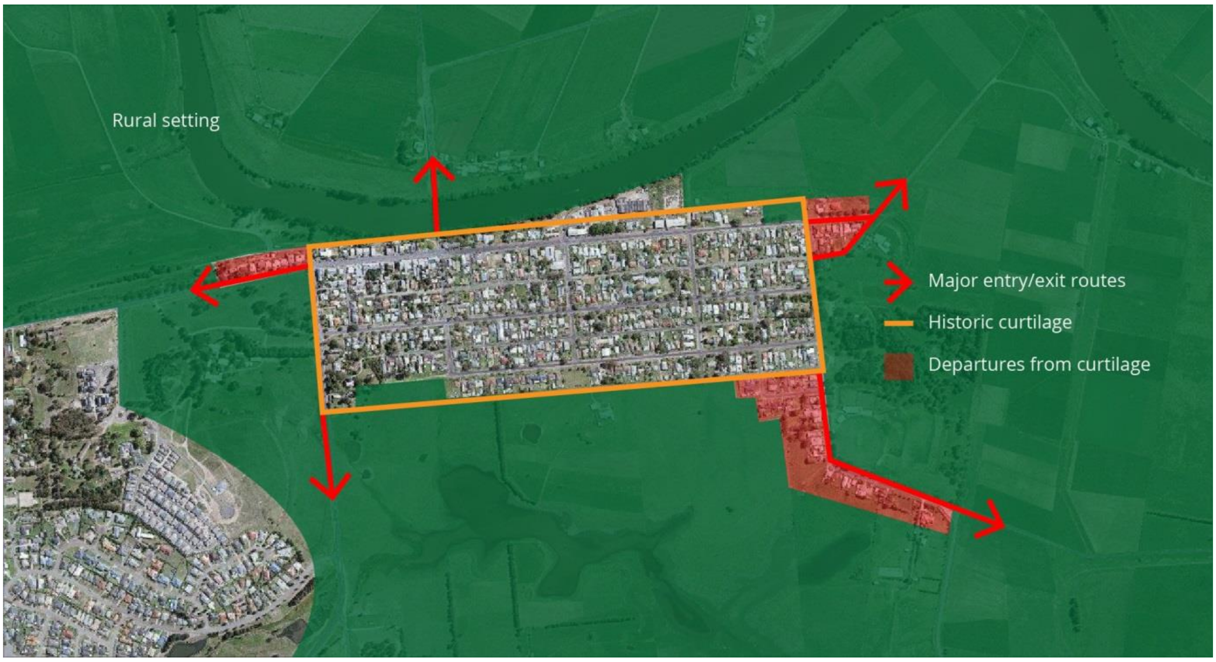
This proposal was publically exhibited for an extended period of 6-weeks (17 December 2015 – 29 January 2016). During the exhibition period five submissions were received. The following summarises the issues raised and provides a response to these concerns.

HERITAGE
Issues
The proposal will make a permanent change to the historic footprint and its rural curtilage.
The historic road marker must be protected.

Response
Heritage has been a key consideration in determining the appropriateness of this proposal. Morpeth's heritage significance is strongly informed by the layout of the town including its blocks and streets and also its rural setting.

The original town plan (1840) was influenced by two major factors – the river and Lt Edward Charles Close's theories of town planning. The block structure planned in the 1840s remains evident. The originally planned street hierarchy is also still evident with three major roads and two service lanes in an east-west orientation and five major roads in a north-south orientation. The development pattern and original street layout by Close was simpler than the pattern now in existence. However, the fundamental hierarchy and alignment clearly remain today.

Morpeth is described as a distinct urban entity in a rural landscape. This is a fundamental quality of the township and its heritage significance. Despite some minor encroachment into the rural buffer from the southwest, the town remains distinctly surrounded by a rural, open space buffer. There are also only minor departures to the four block layout have occurred. However, these minor departures along Duckenfield Road, Brisbane Fields Road and Morpeth Road have significance in themselves as the main historic routes into and out of the township. It is logical that development extended along these routes. The fundamental curtilage of Morpeth is informed by the blocks and the road layout and is illustrated below. The Swan Street site falls within the town's curtilage. Therefore, it will not have an adverse impact on the town's historic bounds.



The historic road marker lies outside the site. Any work associated with the remediation, subdivision and development of the site will require that the item is protected.

COMMUNITY BENEFITS AND IMPACTS

Issues

There is no net community benefit.

There is no social or economic advantage to the proposal. The rezoning will have a negative result on the town itself and for the future generations living in or visiting Morpeth.

More traffic, not enough amenities for existing residents such as preschools, schools, doctor's surgeries.

No economic benefit to the community of Morpeth. Negative impact on Morpeth tourism industry.

Response

No net community benefit test accompanied the proposal. However, it is considered that the proposal will have a neutral net community benefit. The proposal will result in the partial loss of private views. However, a public view at the end of Edward Street will be secured. The additional 8-9 residences and potentially 22 additional residents (8-9 x 2.7 people per household) will not make any significant economic contribution to the community and the development will only generate minor, short-term employment. However, it is unlikely to have an adverse economic impact.

The additional 22 people are unlikely to impose any significant burden on local facilities and traffic generation from such a small development will be negligible.

The site is within the curtilage of the township and therefore the integrity of the town's heritage quality is unlikely to be compromised. There are adequate development controls to ensure a quality built-form outcome on the lots created.

The treatment of onsite contamination will improve the site and minimise future exposure.

On a community scale the proposal will have no significant adverse or beneficial impact. On a personal scale, it is acknowledged that the partial loss of some private views for those residents opposite will occur.

VISUAL IMPACT

Issues

The proposal is inconsistent with Point 1.1 'Views' of Morpeth Management Plan 2000 that reads: "views of the rural surrounds from roads, parks and other public spaces to remain un-obscured … view from the approach roads to be retained."

The proposal is inconsistent with Point 1.2 'Views' that reads: "Existing trees part of the heritage and character of the town …Swan Street eastern end Ficus, etc)."

The proposal is inconsistent with Maitland DCP "To protect scenic values of the landscape particularly providing attractive entrances … and encouraging development to be unobtrusive and sympathetic to the surrounding rural setting."

Loss of views to Hunter River and Hinton.

One of the last uninterrupted vistas for tourists, visitors and residents across the farmlands to Hinton and beyond.

The photos in the RLA Report and the Terras Visual Impact Assessment do not accurately reflect the loss of vistas which actually occur.

"The same roadside site was designated for public picnic tables – a very popular spot for tourists to stop and admire rural outlook while having a cup of coffee and for wedding pictures".

Response

This issue has been discussed previously in this report.

Council engaged an independent heritage consultant to review the proponent's visual impact assessment and provide comment. The independent review supports the proposal with the protection of the view corridor at the end of Edward Street. To achieve this, the view corridor identified is proposed to be zoned E2 Environmental Conservation. This will ensure that that area of the site remains free of any significant structures.

The Office of Environment and Heritage in their response agrees that the proposal will not have any significant impact on the heritage value of the area.

The Morpeth Management Plan does include a map showing a proposed picnic area in the road reserve in front of the site. However, it is unlikely that Council would support additional picnic infrastructure in this location given that a formal picnic area already exists 200m away in the Morpeth Common.

TIMING OF LETTERS AND COUNCIL MEETING

Issue

Concern that notification letters arrived after Council meeting.

Response

Letters are sent in the week prior to the Council meeting. This is consistent with Council's existing notification policy.

TREES

Issues

Trees will be adversely affected by building works including root systems from driveways, drainage, sewerage etc.
Remediation work will affect trees.
Trees have wildlife and provide shade and windbreak.
Approving the proposed rezoning Council automatically gives the permission to build driveways over tree roots which will the kill the trees.

Response

The value of the four trees along Swan Street in front of the site is acknowledged.
The rezoning of the site will not have any impact on the trees. However the remediation works and the resulting development for residential purposes will need to be regulated to ensure that no damage occurs.

This is best achieved at the development application stage. An application will be required for the subdivisions (which will condition the remediation of the site) and again for each dwelling. Council has recently approved a development on the adjoining site that has a number of the same trees along its frontage. Council conditioned: "All trees located along the frontage of the site shall be retained. An Arborist report is to be prepared and submitted to Council prior to the issue of the Construction Certificate detailing the location of each tree and any measures that are to be implemented during construction to ensure damage to the trees is minimised." A similar condition will be placed on any future application for subdivision and development.

PERSONAL LOSS

Issue

Residents bought properties because of the rural views.

Response

The partial loss of personal views for those residents opposite the site is acknowledged.
The Maitland Development Control Plan includes controls to encourage views between buildings. Specifically: "In the residential area, side setbacks are to be the standard 900mm minimum on one side, but increased to 2.5 - 3.5m minimum on the other to maintain views between buildings and low density characteristics."
A public view has been secured at the intersection with Edward and Swan Streets.

CONTAMINATION

Issue

The site is contaminated.

Response

The proponent has submitted a preliminary and detailed contamination assessment and a remediation action plan demonstrating that the site can be remediated. Remediation will be required prior to any development occurring on the site.

APPENDIX ONE. LOCATION PLAN

Scale : NTS
Printing Date: June 2014

NORTH

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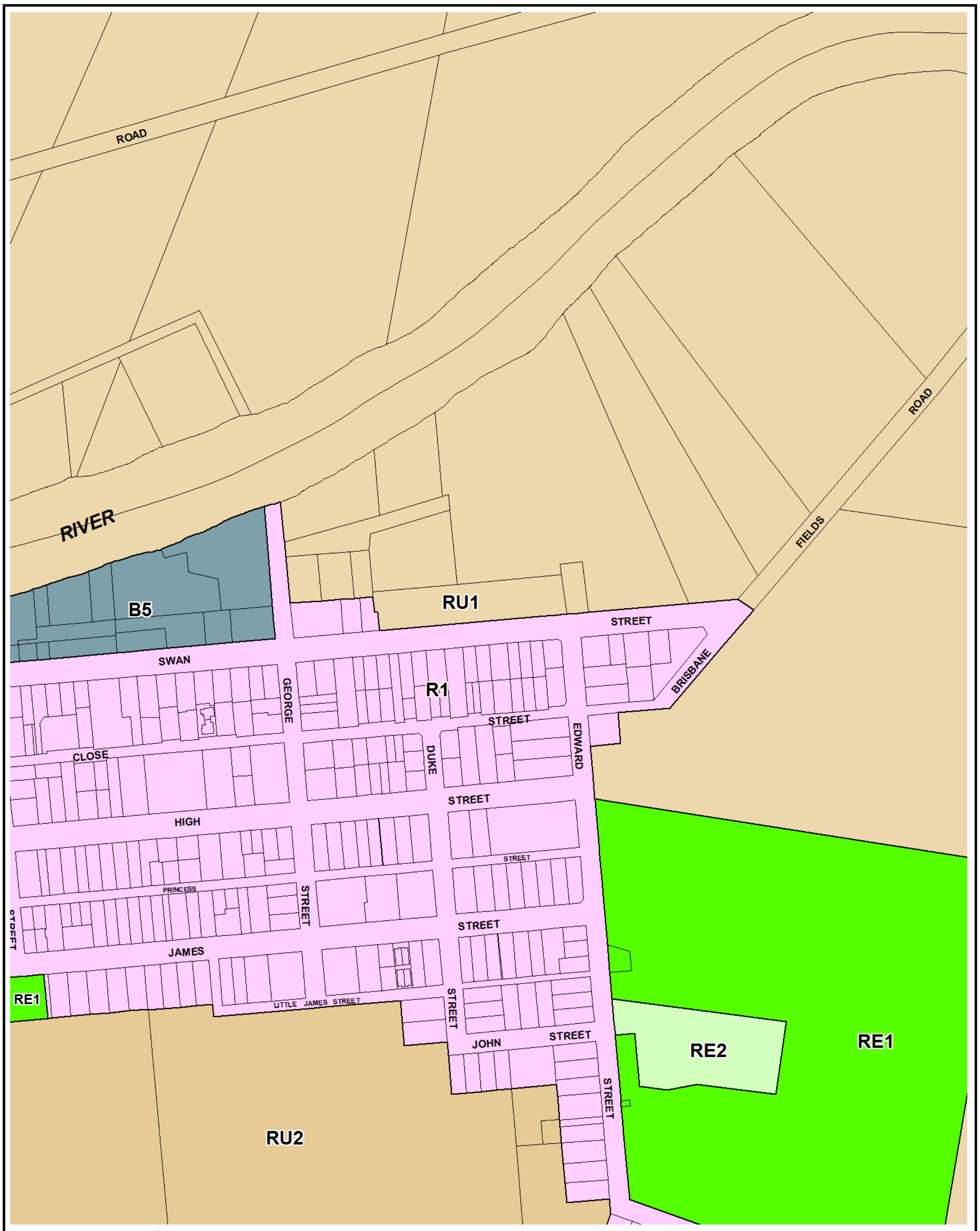
© NSW LPMA 03/03/1997

Lot 30 DP237264
Morpeth Extension Site

This map has been prepared on the basis of information available to Council at the date of issue. However, that information may be subject to change over a limited time and should therefore be verified with Maitland City Council

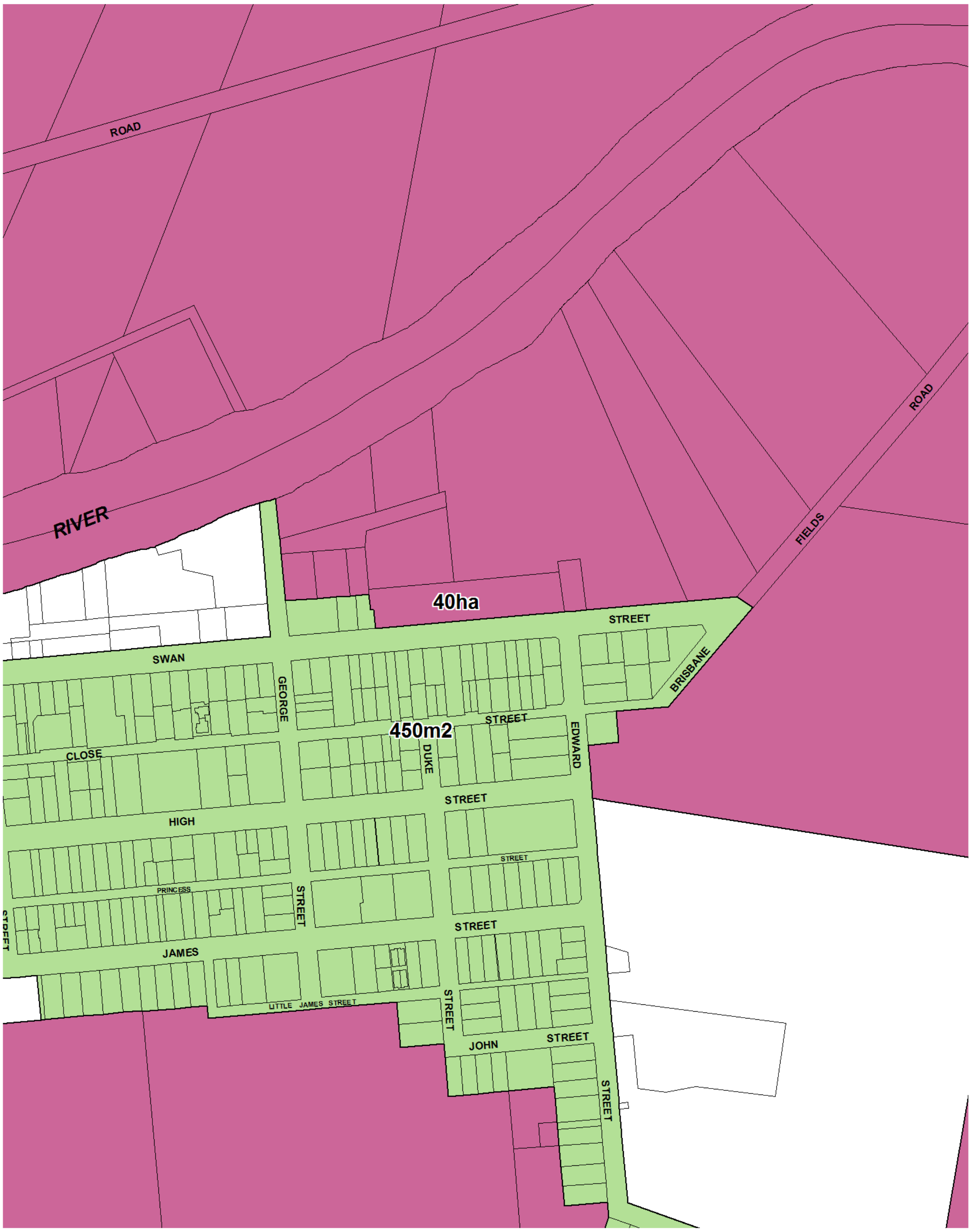
APPENDIX TWO EXISTING LEP PLANS



Scale NTS
Printing Date: June 2015

NORTH

Existing lot zoning
Morpeth



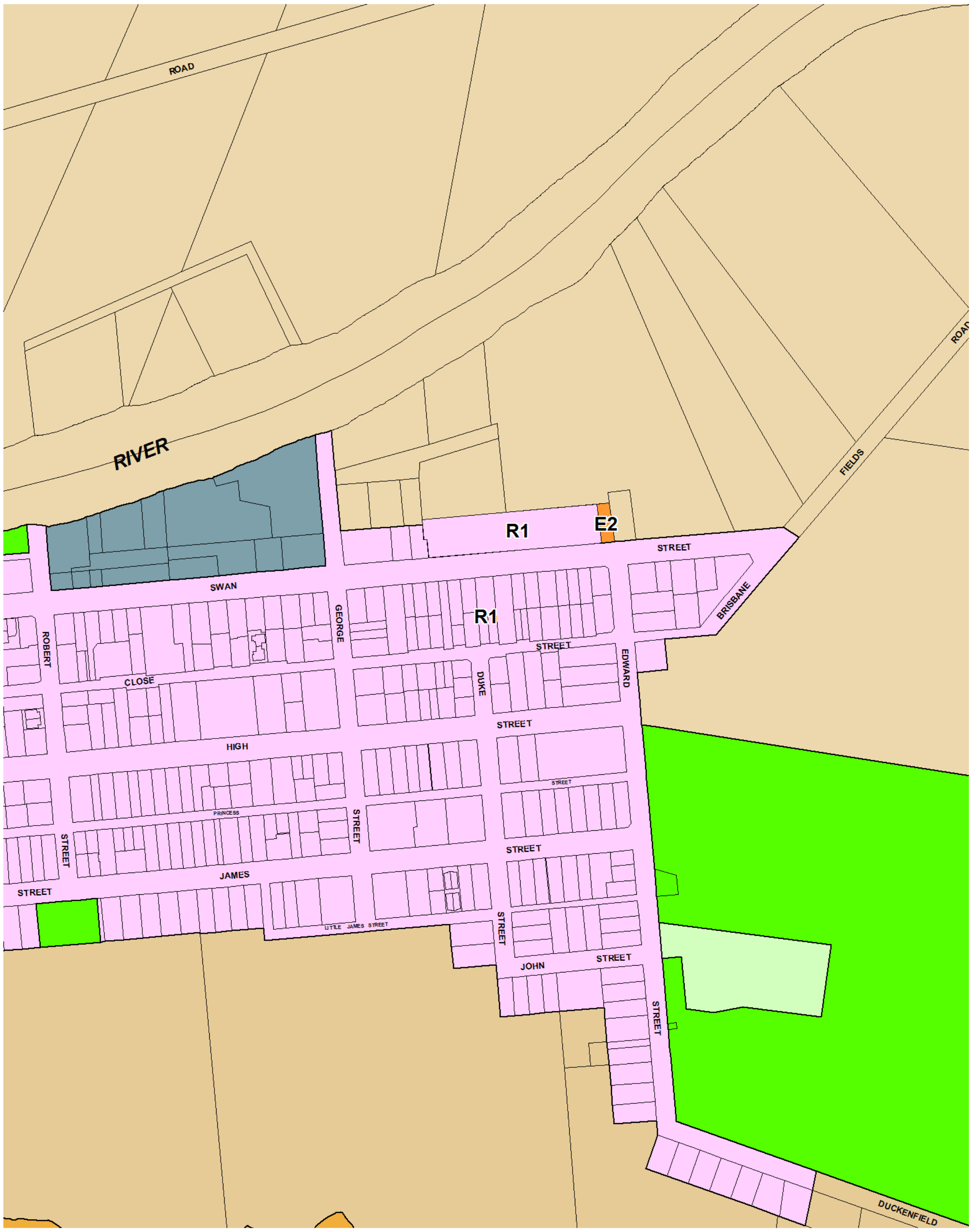
Scale NTS
Printing Date: June 2015

NORTH

Existing lot size
Morpeth

MAITLAND CITY COUNCIL

APPENDIX THREE PROPOSED LEP PLANS

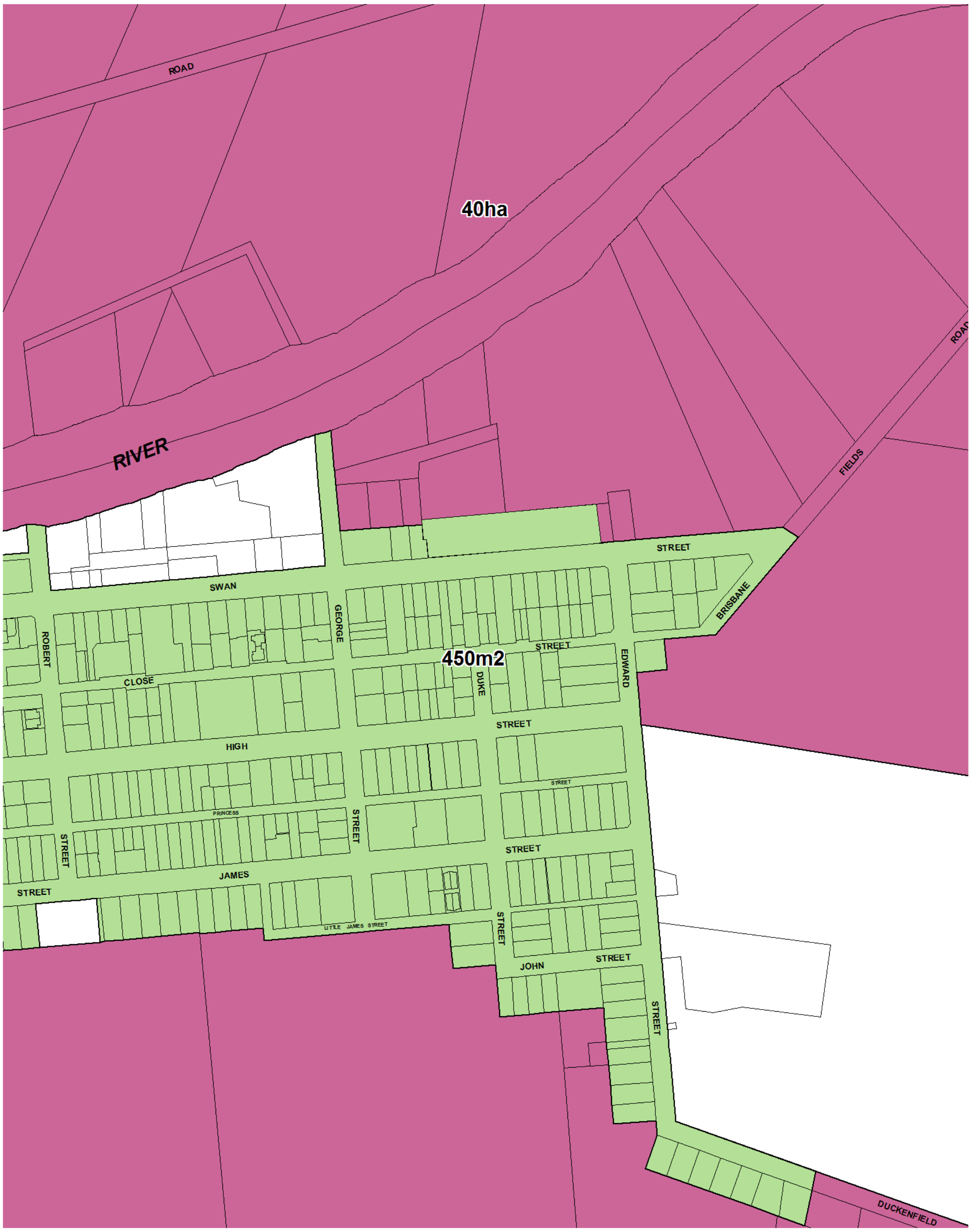


MAITLAND
CITY COUNCIL

Scale NTS
Printing Date: June 2015

NORTH

Proposed land use zone
Morpeth



MAITLAND
CITY COUNCIL

Scale NTS
Printing Date: June 2015

NORTH

Proposed lot size
Morpeth

APPENDIX FOUR. STATEMENT OF HERITAGE IMPACT

STATEMENT OF HERITAGE IMPACT

PROPOSED REZONING AND SUBDIVISION

30 SWAN STREET
MORPETH NSW 2321

Lot 3 DP 237264

412 king street
newcastle nsw 2300

p 02 4929 2353
f 02 4926 3069
e mail@eje.com.au

ACN 002 912 843
ABN 82 644 649 849

Prepared by EJE Heritage
April 2014
10301-SOHI-001 Issue B

TABLE OF CONTENTS

1. INTRODUCTION

EJE Heritage has been requested to provide a Heritage Assessment and subsequent Heritage Impact Statement for the proposed rezoning and subdivision for residential purposes of the subject land at 30 Swan Street, Morpeth, Lot 3 DP 237264.

The initial section of the report places the site within an historical context, and examines its physical condition and context. With the history and physical condition and context of the building understood, a heritage assessment of the site can be completed using the NSW Heritage Division guidelines encompassing the Australia ICOMOS *Burra Charter 2013* heritage values: historical significance; aesthetic significance; scientific significance; and social significance.

The Statement of Heritage Impact that follows examines the proposed works, identifying any impacts which the proposal might have on the significance of the heritage items, and any measures which should be taken to mitigate any negative impacts, if these are in fact identified.

The Historical Context section of this report was prepared by David Campbell.
This Statement of Heritage Impact was prepared by EJE Heritage. The project team consisted of:

- ❑ Barney Collins – (Director), Conservation Architect.
- ❑ David Campbell – Heritage Consultant.

1.1 METHODOLOGY

This report has been undertaken in accordance with the NSW Heritage Office publications, *Assessing Heritage Significance and Statements of Heritage Impact*, together with the Australia ICOMOS *Burra Charter 2013*.

1.2 HERITAGE LISTINGS

The site and building do not compose a Heritage Item in Maitland Local Environmental Plan 2011 (‘LEP 2011’), but is within the Morpeth Heritage Conservation Area, which has local significance. It is, in addition, within proximity to LEP 2011 Heritage Items as listed below:

Morpeth	Police station	32 High Street	Lot 1, DP 904664	Local	I193
Morpeth	Morpeth Public School	36–46 High Street and 35 Close Street	Lot 1, DP 724176; Lot 1, DP 782470; Lot 1, DP 782303; Lots 1 and 2, DP 782304	Local	I194
Morpeth	White’s Factory	7 Robert Street	Lots 3 and 4, DP 592403	Local	I206
Morpeth	Marlborough House	75 Swan Street	Lot 631, DP 1091885	Local	I207
Morpeth	Former Queens Wharf and Railway Station	90 Swan Street	Lot 1, DP 714289	Local	I208
Morpeth	Post office and residence	105 Swan Street	Lot A, DP 411508	Local	I209
Morpeth	Former Bond Store group	122 Swan Street	Lots 1, 2, 5 and 6, DP 260922; Lots 7 and 8, DP 628665	Local	I210

Other heritage items within the Morpeth Heritage Conservation Area include:

Morpeth	Former bakery	98 Close Street	Lot B, DP 161543	Local	I190
Morpeth	Grandstand	20 Edward Street	Lot 7001, DP 1052969	Local	I191
Morpeth	"Kiora"	7 High Street	Lot 1, DP 535966	Local	I192
Morpeth	Police station	32 High Street	Lot 1, DP 904664	Local	I193
Morpeth	Morpeth Public School	36–46 High Street and 35 Close Street	Lot 1, DP 724176; Lot 1, DP 782470; Lot 1, DP 782303; Lots 1 and 2, DP 782304	Local	I194
Morpeth	Former cinema	85 High Street	Lot 1, DP 64366	Local	I195
Morpeth	School of Arts	110 High Street	Lot 1, DP 782444	Local	I196
Morpeth	St James Parish Hall	138 High Street	Lot 200, DP 872144	Local	I197
Morpeth	Roman Catholic Church	James Street	Lot 3, DP 844638	Local	I198
Morpeth	Former Catholic school and convent group	20 James Street	Lots 1 and 2, DP 844638	Local	I199
Morpeth	Georgian house	5 John Street	Lot 1, DP 924593	Local	I200
Morpeth	Morpeth House, Closebourne House, adjoining chapels and Diocesan Registry group	Morpeth Road	Lot 2 and Part Lot 3, DP 841759	State	I201
Morpeth	Avenue of Brush Box trees	363 Morpeth Road	Part Lot 3, DP 841759	State	I204
Morpeth	"Closebourne House" and adjoining Chapel and Diocesan Registry (former)	363 Morpeth Road	Part Lot 3, DP 841759	State	I202
Morpeth	Former Diocesan Registry	363 Morpeth Road	Part Lot 3, DP 841759	State	I203
Morpeth	Morpeth Bridge over the Hunter River	Northumberland Street	Road reserve	State	I205
Morpeth	White's Factory	7 Robert Street	Lots 3 and 4, DP 592403	Local	I206
Morpeth	Marlborough House	75 Swan Street	Lot 631, DP 1091885	Local	I207
Morpeth	Former Queens Wharf and Railway Station	90 Swan Street	Lot 1, DP 714289	Local	I208
Morpeth	Post office and residence	105 Swan Street	Lot A, DP 411508	Local	I209
Morpeth	Former Bond Store group	122 Swan Street	Lots 1, 2, 5 and 6, DP 260922; Lots 7 and 8, DP 628665	Local	I210
Morpeth	Former courthouse	123 Swan Street	Part Lot 1, DP 526098	Local	I211

Morpeth	Commercial Hotel	127 Swan Street	Lot 1, DP 744896	Local	I212
Morpeth	Former CBC Bank	149 Swan Street	Lot 10, DP 57156	Local	I213
Morpeth	Former Campbell's Store	175 Swan Street	Lot 1, DP 735924	Local	I214
Morpeth	General Cemetery	Tank Street	Lots 1–4, DP 775155	Local	I215
Morpeth	St James group	19 Tank Street	Part Lot 63, DP 755205; Lot 631, DP 1137280	Local	I216

1.3 SITE IDENTIFICATION

The site is identified as 30 Swan Street, Morpeth NSW 2321. The subject site is located within the Maitland Local Government Area. The real property description is: Lot 3 DP 237264. The site is zoned RU1: Primary Production, is adjacent to land to the south and west zoned R1: General Residential.

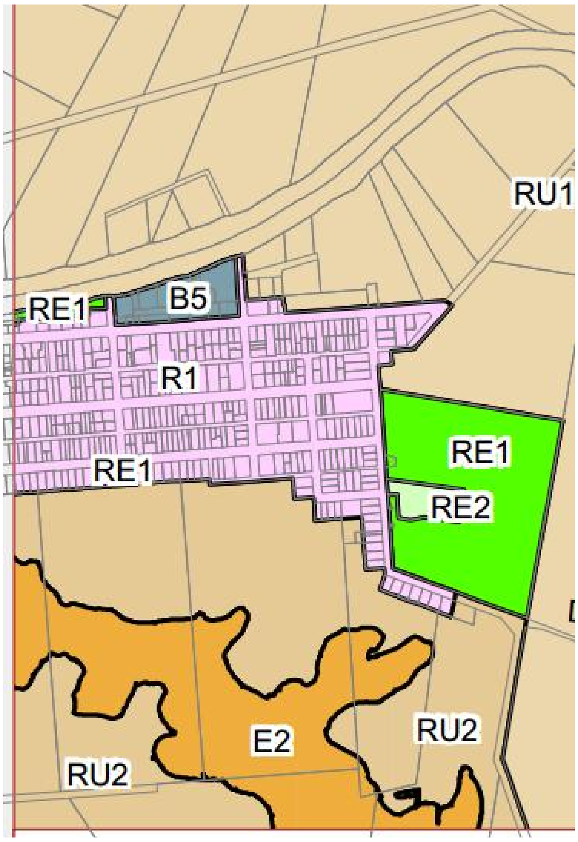


Figure 1. Detail of Land Zoning Map LZN_006, LEP 2011.

Figure 2. The subject land, showing its relationship with the surrounding area. ***Nearmap (by licence)***

Figure 3. A closer view of the subject land. ***Nearmap (by licence)***

1.4 CONSTRAINTS AND LIMITATIONS

EJE is not qualified to offer structural opinions. This report is not intended to convey any opinion as to the structural adequacy or integrity of the structure, nor should it in any way be construed as so doing. Similarly, the author's observations are limited to the fabric only: he does not comment on the capacity, adequacy, or statutory compliance of any building services.

2. HISTORICAL CONTEXT

The subject land was formerly the site of one of Morpeth's railway stations, of which there were three. The following description seeks to provide the historical context by which the history of the site may be understood.

2.1 The Founding of Morpeth

The European settlement ultimately called Morpeth was founded in the early 1820s by Lieutenant Edward Charles Close, a veteran of the 48th Regiment of Foot ('The Heroes of Talavera') in the Peninsular War of 1807 – 1814. Born in Rangamatti, Bengal, on 12 March 1790, he and his mother some seven years later removed to England, where at the age of 18 he joined the 48th Regiment of Foot to defend his country against Bonaparte.[1] Surviving several significant actions, including the great battles of Albuera and Talavera, Close arrived in Sydney with a detachment of his Regiment on 3 August 1817.[2] In 1821, he decided to sell his Commission, as one could in those days, and was promised 1,200 acres of land reserved for his use[3] at a place known to the traditional owners, the Wonnarua people, as Illulong,[4] Illalaung[5] or Illullaung,[6] and to the Europeans as the Green Hills,[7] about 29 miles by water from Newcastle.[8] The area had first been seen by Europeans in June 1801, during the expedition of the *Lady Nelson* up river from Newcastle; it appears to have been Lieutenant-Colonel Paterson, leading member of this enterprise, who first conferred on the area the title of 'Greenhill'.[9] This was at the head of navigation for ocean-going vessels proceeding up-river from Newcastle; and although vessels of lighter draught could navigate as far as Wallis Plains, also called Molly Morgan's, where merchants Captain William Powditch and Frederick Boucher established a wharf and warehouse,[10] the distance by land was so much shorter than that by water as to give Green Hills the advantage as a landing place. West Maitland may have been known to the Wonnarua as *Boyen*.[11]

The reservation of land at the Green Hills, however, had no basis in law. The land could not be granted to him, as it was, at this time, illegal for serving Officers to be granted Crown land. This obstacle was overcome by Close's new appointment, allowing the grant to be made on 2

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[1] Edward Charles Close, *The Diary of E.C. Close*. Sydney: W.E. Smith, 1892, p. 5

[2] *Diary of E.C. Close*, p. 64.

[3] *Ibid.*, p. 65.

[4] From Memorandum of E.C. Close, in *Australian Town and Country Journal*, 12 January 1878, p. 8.

[5] Joseph Cross, 'Map of the River Hunter, and its Branches, shewing the Lands reserved thereon for Church purposes, the Locations made to Settlers, and the Settlement and part of the Lands of the Australian Agricultural Company at Port Stephens together with the Station of the Mission to the Aborigines belonging to the London Missionary Society on Lake Macquarie, New South Wales 1828'. National Library of Australia, Map NK 646. *NSW Government Gazette*, 19 February 1834.

[6] 'Town of Morpeth formerly called Illulaung' (1834), Maps/0186, State Library of NSW.

[7] William Henry Wells, *A Geographical Dictionary or Gazetteer of the Australian Colonies: their Physical and Political Geography: together with a Brief Notice of all the Capitals, Principal Towns, and Villages*. Sydney: W. & F. Ford, Sydney, 1848, p. 269.

[8] *Diary of E.C. Close*, 1892, p. 65; *W. Allen Wood, Dawn in the Valley: The Early History of the Hunter Valley Settlement to 1833*. Sydney: Wentworth Books, 1972, pp. 18-21; William Henry Wells, *Geographical Dictionary*, p. 269.

[9] 'Lieutenant-Colonel Paterson's Journal and Discoveries at Hunter River', in F.M. Bladen (ed.), *Historical Records of New South Wales*, vol. 4. Sydney: Charles Potter, 1896, pp. 448-453.

[10] *Sydney Gazette and New South Wales Advertiser*, 31 October 1825, p. 3. Boucher is said to have been a confidence man, guilty of much sharp practice and even forgery.

[11] See Memorandum of E.C. Close, in *Australian Town and Country Journal*, 12 January 1878, p. 8.

November 1822.[12] Sir Thomas Brisbane, Macquarie's successor, added to the grant; and Close himself subsequently added to his holdings by purchase, enabling him to control much of the flood-free land on southern side of the Hunter River, a stream said to have been known to the Wonnarua as *Coonanbarra*.[13]

Close, then, enjoyed a unique advantage at a time when the Hunter Valley was being opened to free settlement. Resigning his position as Engineer at Newcastle, he and his wife devoted themselves to improving the *Illalaung* estate.

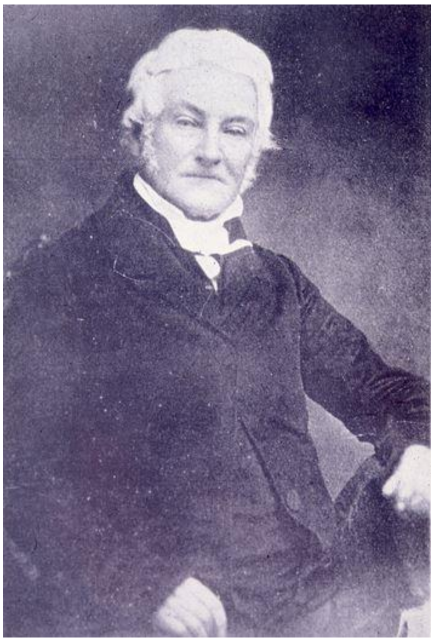

Figure 4. Lieutenant Edward Charles Close, in later life. The photograph betrays something of the man's hard-won confidence, fortitude and determination. ***University of Newcastle Cultural Collections***

William Tyrrell, first Bishop of Newcastle, later described their struggle:

> Those who know the place only as it is, have little idea of the labour involved in bringing a piece of forest land into cultivation, and fitting it for the purpose of trade. Mr. Close found that country a dense bush, covered with scrub and ancient trees, whose arched branches almost concealed the river, and whose leafy boughs were so impervious to light that to walk beneath them even in broad daylight was like walking in the dimness of twilight. This dense forest and bush land Mr. Close set to work to clear, with all the obstacles and impediments incident to the then lawless condition of an ignorant and criminal population; and the result of his labours now is before us in fertile meads and peaceful habitations.[14]

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[12] Henry Dangar, 'Index and Directory to Map of the Country Bordering upon the River Hunter: the lands of the Australian Agricultural Company, with the Ground Plan and Allotments of King's Town, New South Wales'. London: Joseph Cross, 1828, p. 2; Michael Breen, *Morpeth Survival: A Look into the Past through Morpeth's Surviving Heritage*. Morpeth: M.&T. Breen, 2000, pp. 9-10.

[13] See Memorandum of E.C. Close, in *Australian Town and Country Journal*, 12 January 1878, p. 8.

[14] William Tyrrell, 'The Demise of E.C. Close, Sen., Esq.', *Church Chronicle*, 21 May 1866, cited in *Diary of E.C. Close*, pp. 71-72.

In the absence of a proper road between Newcastle and Wallis Plains, that commenced in November 1824,[15] on Governor Brisbane's order, having not yet been completed, the river remained the main artery of communication, along which coastal vessels travelled to and from Sydney and other ports. Immigrants and travellers making their way from Sydney to the interior made use of the landing place at which Queen's Wharf was later built, then walked or were conveyed along the track to Wallis Plains. All were technically guilty of trespass, for the land was of course controlled by Close. Goods, together with carts and carriages[16] bound for Wallis Plains, later to be called West Maitland, and for settlements and stations further inland, were also landed here. These activities stimulated commercial enterprise, for in 1832 licences were issued for the establishment nearby of two inns, John Hillier's 'Illalaung Hotel'[17] and James Cracknell's 'The Wheatsheaf Inn'. Hillier's removal from the Ship Inn, Newcastle, illustrated the rising importance of the Green Hills. This was further demonstrated when the government, from 1833,[18] used convict labour to build a made road from the latter place to (East) Maitland,[19] the site of which is said to have been called *Cooloogooloogheit* by the Wannarua.[20] The closer settlement of districts to the west and north-west,[21] together with the development of the wheat wool, tallow and tanning industries, further stimulated the port, to the extent that it gradually became a principal outport of the Colony, supported by infrastructure at East and West Maitland.[22] While the remarks of an auctioneer in 1842 that Morpeth "already possesses the germ of a large and influential city", and that "*every* article consumed in Maitland and the Upper Hunter passes through Morpeth" were exaggerated, his willingness to make them is instructive.

2.2 The Influence of E.C. Close on the Development of Morpeth

E.C. Close, who gradually leased portions of his estate for residential and commercial purposes,[23] lived long enough to see the growth of Morpeth into a comparatively compact but growing town, free of the fear of flooding that haunted other townships along the rivers Hunter and Williams. Unlike those settlements, however, Morpeth was a private town and long remained so, for Close subdivided and sold comparatively few allotments, and that at irregular intervals and at high prices,[24] providing little motivation for the erection of substantial improvements. The Surveyor-General's department was, moreover, naturally unable to follow its usual practice of setting apart sites for public buildings.[25] General Sir Ralph Darling, a Governor very careful of public moneys, understood these difficulties, but was unable to persuade Close to sell his land for the laying out of a properly planned town in what was, after all, the most suitable local site.[26] These circumstances appear to have slowed the growth of Morpeth as a residential locality, and to have instead favoured that of East Maitland, the

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[15] *The Sydney Gazette and New South Wales Advertiser*, 25 November 1824, p. 2.

[16] See Peter Cunningham, *Two years in New South Wale: a Series of Letters, comprising Sketches of the Actual State of Society in that Colony, of its Peculiar Advantages to Emigrants, of its Topography, Natural History, &c. &c*. London: H. Colburn, 1827, p. 144.

[17] See advertisement, *Sydney Gazette and New South Wales Advertiser*, 7 July 1832, p. 1.

[18] *Sydney Gazette and New South Wales Advertiser*, 7 November 1833, p. 2.

[19] *Sydney Monitor*, 25 March 1834, p. 3.

[20] See Memorandum of E.C. Close, *Australian Town and Country Journal*, 12 January 1878, p. 8.

[21] *Sydney Gazette and New South Wales Advertiser*, 7 November 1833, p. 2.

[22] William Henry Wells, *Geographical Dictionary*, p. 249.

[23] *Ibid., Geographical Dictionary*, p. 269.

[24] See, for example, 'Plan of Fourteen Building Allotments in the Town of Morpeth Hunter's River, for sale by the Hunter's River Auction Company on the 19th January 1841'. State Library of NSW, ZM2 811.259/MORPETH/1841/1.

[25] *Australian*, 13 July 1832, p. 3.

[26] See *Colonist*, 5 February 1835, pp. 43-44; W. Allan Wood, *Dawn in the Valley*, p.20; see also Maitland City Council, *Maitland, 1863 – 1963*. Sydney: Oswald Ziegler Publications, 1963, p. 12.

government town,[27] and West Maitland, where rich agricultural land was available. They also left the best wharf frontage, some of which Close did indeed sell, in private hands, allowing the steamship companies trading to Morpeth to discourage competition from other parties. While Close agreed to sell to the Crown a waterfront reserve for public wharfage and the standing of cargos, the site was comparatively undesirable, being on low-lying land liable to flooding and comparatively difficult of access. Its Wonnarua name is said to have been *Waywerryghein*.[28] The wharf itself, later called Queen's Wharf after Queen Victoria, was exposed to the vagaries of the river, and was expensive to maintain. The best-capitalised buildings and facilities, such as the warehouses of James 'Squire' Taylor, continued to occupy the higher ground above the private wharfs.

The origins of the port of Morpeth are interesting. The river was deep enough for vessels to come alongside and unload their cargos on its banks; a wharf was, naturally, desirable, but evidently beyond Close's immediate resources. The deficiency was supplied in the form of a hulk, the St. Michael, which was made fast to the southern bank of the river was made fast to the northern bank adjacent to what is now Green Street. With her decks roofed and boarded over, she became a store-ship at which cargos could be handled, warehoused and sold. In December 1841 she sank at her moorings,[29] by which time the southern bank had become the main focus of maritime activity. Another store-ship, the Alexander, met a similar fate in late February 1844, only her shingled roof remaining for a time above water.[30] By this time, private wharfs and warehouses, some of them of stone, had been built, with others in contemplation.

2.3 The Development of the Town

In early 1834, Close sold the first town allotments at *Illalaung*, a name which he had but recently changed to the less authentic but more commercially attractive name of 'Morpeth',[31] originally the name of the entire parish, and one formerly but abortively applied to Wallis Plains, afterwards called West Maitland.[32] These included the area between High Street in the south and Tank Street, named for a nearby dam, later called the Bishop's Tank, in the west, with Northumberland Street joining the two thoroughfares.[33] Lots along the riverfront, suitable for wharfs and warehouses, were particularly attractive to steamship companies and merchants.[34] In 1840 20 town lots were advertised, with more put up for sale in 1841 and January 1842,[35] although Close was disappointed in his plan to sell lots in a new village, which he called 'Closebourne', probably after his house of that name, some distance to the east along the road to East Maitland. Although the new township, as it was optimistically titled, was laid out by surveyor's plan into 100 lots, nothing is heard of it after about 1842.[36] This lack of success was probably due to the severe economic depression of the 'Hungry Forties'. Some of the area was later incorporated into the village of Raworth. In 1848, when Europe was plagued by revolution,

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[27] See, for example, the opinion expressed in the *Sydney Gazette and New South Wales Advertiser*, 21 December 1841, p. 2.

[28] See Memorandum of E.C. Close, *Australian Town and Country Journal*, 12 January 1878, p. 8.

[29] *Australian*, 11 December 1841.

[30] *Maitland Mercury*, 2 March 1844, p. 2.

[31] See advertisement, *Australian*, 24 June 1834.

[32] The named was applied to Wallis Plains in 1827, but it was not popularly used: see *The Australian*, 9 May 1827; W. Allan Wood, *Dawn in the Valley*, p.243.

[33] '[Plan of] Town of Morpeth formerly called Illulaung' (1834), Maps/0186, State Library of NSW.

[34] *Sydney Herald*, 26 June 1834, p. 3.

[35] See advertisements for sale of land, *Sydney Gazette and New South Wales Advertiser*, 21 December 1841, p. 3.

[36] *Ibid*; see also 5 May 1841, p. 4.

Morpeth was distinguished only by a quiet prosperity. According William Henry Wells, a pioneering geographical gazetteer, it contained

> …about 635 inhabitants, viz. : — 334 males and 301 females, an Episcopalian church and parsonage, a Wesleyan chapel, a ladies' school, and two day schools ; fine inns, one steam flour mill, a soap and candle manufactory, five large stores, some excellent shops, 37 stone and brick buildings, and about 117 wooden dwellings; steamers constantly ply between this place and Sydney ; coal promises to be abundant at a very short distance from this river…The extensive wharf of the Hunter River Steam Navigation Company is here, and throughout the greater part of the year there is a daily communication to and from the metropolis by the steam vessels of the Company; a considerable number of sailing vessels also trade between this place and Sydney…A coal mine is in actual operation under the direction of Mr. Close, jun., also the extensive steam flour mill of Mr. John Portus. About two acres on the bank of the river are used as a Government wharf; an officer of the Custom house from Newcastle is stationed here.[37]

Portus' flour mill, an imposing building with a high chimney testified to the suitability of the surrounding country for the growing of wheat before the onset in the 1860s of the fungal disease, usually called 'the Rust', that ruined the industry in the lower Hunter. The building was later used by John Eales, of the Duckenfield estate, as a storehouse, before being purchased by Thomas Adam, who used portion of it as a saw mill.[38] The candle manufactory was that of Frederick Nainby,[39] whose raw materials came partly from his boiling-down establishment at Richmond Vale. Having trained in England as an apothecary, he also ran a chemist shop at Morpeth.[40] Among the stores were the bonded stores of James 'Squire' Taylor, Captain Patterson, and James Campbell; the latter also kept a large general store. The ladies' school, opened in 1834, was conducted by Mrs Luke.[41] In this year, also, Bishop William Tyrrell arrived from England via Sydney, and took advantage of Close's ready hospitality in using Morpeth, with its "Three long lines of straggling streets",[42] as they were later described by his assistant, Rev. R.G. Boodle, as a base for his first efforts within the new Diocese of Newcastle. So convenient did he find the locality, and so superior did he think its church to his tumbledown 'Cathedral' high on the hill at Newcastle, that he chose Morpeth for his place of residence, effectively making it the centre of the diocese.[43] He lived first in the St. James' parsonage; but Close, always willing to assist, in the late 1840s sold Tyrrell his house, *Closebourne*, in which his Lordship and his successors for many years dwelt.[44] The Wonnarua name for its site is said to have been *Terrymilla*.[45] In 1853, Close sold eight more town allotments.[46]

The three lines of streets of which Boodle wrote were, in fact, Swan Street, James Street and High Street. The first appears to have been named after John Swan, a convict who is thought

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[37] William Henry Wells, *Geographical Dictionary or Gazetteer of the Australian Colonies: their Physical and Political Geography: together with a Brief Notice of all the Capitals, Principal Towns, and Villages*. Sydney: W. & F. Ford, Sydney, 1848, p. 269.
[38] *The Maitland Daily Mercury*, 27 January 1931, p. 2.
[39] *Sydney Morning Herald*, 8 January 1846, p. 3
[40] *Maitland Mercury*, 18 March1886, p. 6.
[41] *Sydney Herald*, 3 April 1834; see also *Brisbane Courier*, 2 October 1928, p. 22.
[42] Richard Boodle, 'Recollections of Ministerial Work in New South Wales', in John Halcombe, *The Emigrant and the Heathen; or, Sketches of Missionary Life.* London: Society for Promoting Christian Knowledge, 1874, p. 8.
[43] *Ibid.*, pp. 14-15.
[44] A. P. Elkin, *The Diocese of Newcastle: A History of the Diocese of Newcastle, NSW, Australia*. Glebe: Australian Medical Publishing Company, 1955, p. 160.
[45] See Memorandum of E.C. Close, in *Australian Town and Country Journal*, 12 January 1878, p. 8.
[46] *Maitland Mercury*, 23 February 1853.

to have been the earliest settler at Paterson's Plains;[47] the second, for St. James and the church named for him; the third, being central to the town, may have been intended to be the 'high street', the principal thoroughfare, although Swan Street took on this role with the construction of the road to East Maitland and the development of the waterfront. Another explanation may be that its earliest, western length ran along the top of the ridge. By 1860, during which year Close sold more lots, Robert Street had been laid out to the east. The sale involved the creation of two more, but shorter, roads, which were named Green Street and Market Street, while two others, Ann Street and Elizabeth Street, were also laid out.[48] The thoroughfares later called Close Street and Princess Street were at that time lanes by which the original lots were separated, and by which rear access was afforded to the lots addressing the roads themselves.[49] Their status as lanes encouraged the development of outbuildings, back-of-house facilities for commercial premises, and the various small scale industries, such as ostling and blacksmithing, usually to be found in a nineteenth century township. There were also some residences, although these were usually of a quality and size inferior to those found in the streets themselves. The high-quality stone kerbing and guttering associated with the principal streets was not replicated along the lanes.

The convict-built route from East Maitland, along which stage coaches ran, was known, practically enough, as Morpeth Road, from which a lane extended to the river at Queen's Wharf.[50] Steamer Street provided access to the Queen's Wharf railway station. The non-geographically specific street names owe their titles mostly to Close's natural children and their dependents, or to loyal feelings for the Royal family.

As Meredith Walker and Gardner Browne have shown, the street layout and allotment pattern of Morpeth significantly differed from those of other contemporaneous settlements, such as Clarencetown (1832), Paterson (1833) and Dungog (1837), all of which had been laid out by the Colonial government. In these townships the streets are of a width of 1 or 1 ½ chains, with intersections every 10 chains; allotments are of 1 chain in width and 5 chains depth. By way of contrast, the streets of the historic portion of Morpeth, as developed by E.C. Close, are comparatively narrower. Swan Street is 88'5'' wide; High Street is 86'6'' wide; James Street is 77'10'' wide. Close Street and Princess Street, originally lanes, are 33' wide. The five cross streets are each 66' wide. Many of the town allotments, of 2 chains width, have been sold and re-subdivided with variable widths.[51] The depths of the allotments are variable, but are considerably less than the standard 5 chains, or of the later government standard of 2 ½ chains. Walker and Brown further point out that this gives the streets a more intimate character than that of the typical Australian town of the era.[52]

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[47] Cynthia Hunter, *Bound for Wallis Plains: Maitland's Convict Settlers.* Maitland: Maitland City Council, 2012, p. 25.

[48] 'Plan of Allotments of Land at Morpeth'. National Library of Australia Map F827A.

[49] See 'Plan of Allotments for Sale in Morpeth, NSW', Reuss and Brown, Surveyors, 134 Pitt Street, Sydney, 28/5/[18]60. National Library of Australia, Map F827B; see also

[50] *Ibid.*

[51] See 'Morpeth Management Plan' (May 2000), Appendix B, A6.

[52] See Meredith Walker and Gardner Brown, 'Morpeth Conservation Planning Study' (1982), p. 15.

Figure 5. 'Town of Morpeth, 1868', from Meredith Walker and Gardner Browne, 'Morpeth Conservation Planning Study' (1982). The laneways that became Close Street and Princess Street are shown, serving the three principal streets. Note the numbers of structures already erected along them. (The prominent cross-lines are merely repair marks)

Figure 6. Detail of Reuss and Browne, 'Allotments for Sale in Morpeth, N.S.W, 1860'. The three main streets within the town are shown, as are the roads to Hinton, East Maitland and Queen's Wharf. ***National Library of Australia***

If Close prospered through his sale of allotments in his private town, he continued to return a good deal to 'his' community by way of involvement in public affairs. In September 1862, for example, just after the completion of the Court House in Swan Street, he laid the foundation stone of a relatively imposing Doric building for the Morpeth School of Arts, reimbursing the full price of the land as well as contributing in other ways.[53] Designed and built by John Wiltshire Pender, apparently as his first significant commission, and opened twelve months later,[54] from 1865 it served as the chambers of the Municipal Council until the disbandment of that body in 1944. It also accommodated the initial meetings of the Synod of the Diocese of Newcastle, and the many smaller events, displays, concerts and meetings characterising the life of the town. The Wonnarua name for its site is said to have been *Baybeg*.[55]

In satisfaction of an oath made during a battle of the Peninsular War, in which he was spared while his comrades fell on every side,[56] he donated the land and payed much of the expense incurred in the building of the first Church and parsonage of St. James. In further gifts to the Diocese of Newcastle and to the wider community,[57] Close for many years played the part of the respectable country squire, serving the growing town in a variety of ways, including his agreement to take on the office of magistrate. Close's time on the bench was generally uncontroversial, although in his conduct in the case of Lieutenant Nathaniel Lowe, who had, in his murderous treatment of Aboriginal prisoners,[58] outraged civilised feeling, he appears to have placed accustomed military loyalties above his duty to the law. This did not prevent his later appointment as Warden of the Maitland District Council;[59] nor did it prevent his becoming a member of the Legislative Council. By the time of his death in May 1866, the year after Morpeth was proclaimed a municipality, Close was generally regarded not only as the founder of Morpeth, but as its genial mainspring, a "fine old English gentleman", as he was described by the press.[60] His Morpeth estate was variously allocated to four surviving children, although the portion given to his married daughter had, at that time, to be held in trust for her.[61] The residue of the estate, eventually administered by trustees, was not finally broken up until the great auction sale of 30 October 1920.[62]

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[53] *Maitland Mercury*, 25 September 1862, p. 2.

[54] *Ibid.*, 26 September 1863, p. 4.

[55] See Memorandum of E.C. Close, in *Australian Town and Country Journal*, 12 January 1878, p. 8.

[56] Richard Boodle, *The Life and Labours of the Right Rev. William Tyrrell, D.D. : First Bishop of Newcastle, New South Wales*. London: W. Gardner, Darton & Co., 1881, p. 9; Close's son, E.C. Close Jnr, at the laying of the foundation stone of the rebuilt Church of St. James in April 1875, related details of the oath: see *Maitland Mercury*, 17 April 1875, p. 2.

[57] Such as the first schoolhouse at Morpeth, where missionary James Backhouse preached in 1836: see James Backhouse, *A Narrative of a Visit to the Australian Colonies*. London: Hamilton, Adams & Co., 1843, pp. 397-398.

[58] See *Australian*, 23 May 1927, pp. 3-4.

[59] See, for example, *Sydney Morning Herald*, 17 January 1844, p. 2.

[60] *Sydney Morning Herald*, 9 May 1866.

[61] The *Married Women's Property Act 1879* (NSW) had not yet commenced.

[62] See 'Close's Estate, Morpeth: for Auction Sale on the Ground, Saturday, Oct. 30th 1920', National Library of Australia, Map F95.

Figure 7. Oswald Rose Campbell's 'Morpeth, on the Hunter River, New South Wales', engraved by Walter Hart, and published in the *Illustrated Melbourne News* in 1865. The nearest large wharf is that of the Australasian Steam Navigation Company; the next is that of the Hunter River New Steam Navigation Company. Other, smaller wharfs are visible. Queen's Wharf, open to the public, is further up river. Note the contrast in size between the two ocean-going steamers and the smaller river steamer between them. Some of the stone warehouses along the river bank were later demolished to make way for the extension of the railway, opened in 1870, although Portus' mill, behind the tied-up coastal steamer, long remained extant. *State Library of Victoria*

2.4 The Influence of the Railway

The opening of the Great Northern Railway between Honeysuckle Point and East Maitland, and its subsequent extension into Newcastle and West Maitland, gave rise to fears on the part of shareholders in the steamship companies that dominated the coastal trade that Morpeth would become progressively isolated as further railway extensions attracted wool and coal traffic to the port of Newcastle. Attempts in 1860 and 1861 to interest the Colonial government in the building of a railway from East Maitland to Morpeth having proved abortive, during the following year the Maitland and Morpeth Railway Company, an enterprise identified with the steamship interests, endeavoured to obtain an Act of Parliament enabling it to build such a line. This met with opposition; but the Colonial government was now successfully pressed to construct the branch railway. Its opening on Monday 2 May 1864[63] was ill-starred, for the line terminated too far from the river front to be of practical benefit either to the town or to the shipping companies: a reluctance on the part of some to sell the necessary land for reasonable prices,[64] appears to have encouraged a belief that trade would, instead, be attracted to the public wharf, called Queen's Wharf, that was located near the terminus. Expensive coal staithes, to which a siding

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[63] *Sydney Morning Herald,* 21 May 1864. p. 8.
[64] *Ibid*, 4 May 1864, p. 5.

was constructed from the initial terminus in Steamer Street, west of Tank Street, were erected near Queen's Wharf in 1866 in the hope that colliery proprietors would take advantage of them;[65] but they were scarcely used, and won renown only as a white elephant.[66] Queen's Wharf, in the event, attracted little cargo; and it was not long before the whole situation became a political embarrassment.

A proposed extension of the line was delayed by the insistence of the Australasian Steam Navigation Company that it should be compensated for the land required for the laying of the line to the wharf of the Hunter River New Steam Navigation Company, its competitor.[67] This dispute, the fruit of bitter rivalry, was overcome only by considerable effort on behalf of the authorities. By 1870, when the line was opened to its new terminus,[68] all but very limited coal traffic had been lost to Newcastle,[69] and it was too late to divert it, for it was by now more convenient for shippers to send coal along the Great Northern Railway to the advanced loading facilities at Newcastle than to be delayed by the marshalling and remarshalling of wagons involved in the running of the light trains along the Morpeth branch line.

The local application by the railways of differential freight rates, too, stimulated by the government's willingness to undercut the Morpeth trade to increase traffic to Newcastle, also appears to have played a significant role.[70] The trade in general goods also suffered, a circumstance worsened by the demolition of several large warehouses and hotels near the waterfront to make way for the railway extension and its associated cutting along the rocky river front,[71] although the railway seems to have assisted in the bringing of wheat to Rundle's flour mill, opened by John Portus in 1839,[72] two decades before the onset of fungal wheat rust put an end to the growing of wheat in the lower Hunter River district. Wool traffic was, however, a different story, with the steamship companies being well equipped to handle wool bales in their sidings and warehouses. So substantial was this trade that a new stone-faced Queen's Wharf, extending either side of what the *Maitland Mercury* called "that useless monument of expenditure, the Morpeth coal staithes",[73] was erected in 1870.[74]

This growing trade certainly stimulated commercial and residential activity, as did the continuing success of Duncan Sim's foundry, the Swan Street enterprise founded by Sim upon his return from the gold diggings after 1853:[75]

> The town of Morpeth, for a long time almost stationary, appears to have reached a more promising point in its history...whereas there was a number of tenements empty and going to decay, dwelling houses are now in demand, and as a result, the untenanted buildings are now being renovated for occupation.[76]

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[65] *Maitland Mercury*, 12 June 1866, p. 2.
[66] See, for example, *Evening News*, 16 June 1877, p. 4.
[67] *Maitland Mercury*, 29 July 1869, p. 2.
[68] *Ibid.*, 7 July 1870, p. 1.
[69] *Maitland Mercury*, 1 May 1875, p. 2.
[70] See *Maitland Mercury*, 26 July 1870, p. 2.
[71] See Cynthia Hunter and W. Ranald Boydell, *Time Gentlemen, Please! Maitland's Hotels Past and Present*. Maitland: Maitland City Heritage Group, 2004, p. 16.
[72] *Maitland Mercury*, 'Death of Mr John Portus', 19 June 1860, p. 2.
[73] *Ibid.*, 24 September 1870, p. 2.
[74] *Empire*, 4 November 1870, p. 3.
[75] See Judith MacLeod, *Duncan Sim, 1818 – 1892: A Morpeth Ironfounder and his Family*, p. 19.
[76] *Australian Town and Country Journal*, 3 August 1878.

The staithes, to serve which an all-too prominent embankment and timber trestle had been constructed to support a long siding leading off the Morpeth railway just east of the original railway terminus, long proved an embarrassment, attracting the notice of a Sydney press that questioned government expenditure on regional projects. The *Evening News*, for instance, under a headline advertising "Some Big Railway Blunders", thundered that

> The country, of course, knows of that fearful shame, the coal staiths at Morpeth, which stand unused after being fifteen years finished – nearly a quarter of a mile of solid elevated railway work put up for trucks that were never to run, and for the convenience of colliers that were never to sail above Hexham Flats. That was a job, it is nearly forgotten now, though the work still stands there as a placard of political and engineering bungling…[77]

The Morpeth-Sydney wool trade, however, continued to prosper, although much wool was also exported through the port of Newcastle, either to Sydney or to the United Kingdom. Large new wool stores, complete with railway sidings, were erected at the Morpeth wharfs of both the Hunter River New Steam Navigation Company and the Australasian Steam Navigation Company.[78] The latter company in 1880 retired from the Hunter River run, selling its local vessels and interests to a new enterprise, the Newcastle Steamship Company Ltd, which for a time provided determined competition as to pricing. Such prosperity was, however, overtaken soon after the opening of the great Hawkesbury River bridge that at last connected the northern and southern portions of the Homebush to Waratah railway, ending the physical separation of the Northern railway system. So expensive had the unifying line proved, and so influential were the Sydney mercantile interests that coveted the Morpeth wool for Darling Harbour and Circular Quay, that the Colonial government widened the application of the differential rail freight rates that had hitherto favoured Newcastle subsidising the carriage of wool to Sydney and discouraging its transport to either Morpeth or Newcastle. As Robert Lee has written,

> Thus, in New South Wales railway rate policy deliberately and consciously centralised rail traffic on Sydney and prevented the development of rival ports.[79]

The ability to have wool shipped direct from the Northern districts to the Sydney wool stores saved the cost of loading at Morpeth and unloading at Sydney,[80] although this also badly affected the port of Newcastle, which experienced a decline of over 33% in bales dispatched between 1888 and 1890.[81] Despite these disadvantages, in 1889 the port of Morpeth handled about 34,000 bales.[82] Such was the impact of the differential rates that, in 1891, the two steamship companies decided to amalgamate; on 1 January 1892, the new company, the Newcastle and Hunter River Steamship Company Ltd, commenced operations.[83] These were, at first, attended by some success: in 1893, as much wool was shipped at Morpeth as at Newcastle, while in 1899 a record 82,361 bales were loaded at the river port; but any repetition

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[77] *Evening News*, 26 August 1887, p. 3.

[78] *Maitland Mercury*, 29 August 1878, p. 4.

[79] Linking a Nation: Australia's Transport and Communications 1788 – 1970, Chapter 2: Ports and Shipping, 1788 – 1970,

[80] See Parliamentary Standing Committee on Public Works, 'Minutes of Evidence, Railway to Connect the North Shore Railway with Port Jackson, at Milson's Point', Evidence of Hugh McLachlan, Secretary to the Railway Commissioners, 8 July 1890. *Votes and Proceedings of the Legislative Assembly of New South Wales*, 1890, vol. VI, p. 47.

[81] *Ibid.*, Evidence of Cecil Darley, Engineer in Chief for Harbours and Rivers, 26 June 1890, p. 22.

[82] *Ibid.*, Evidence of Hugh McLachlan, Secretary to the Railway Commissioners, 8 July 1890, p. 47.

[83] Newcastle and Hunter River Steamship Company, *The Newcastle and Hunter River District Tourists' Guide*. Newcastle: The Company 1907, p. 20.

of these efforts was prevented by the redoubled determination of the government railways to obtain the traffic.[84] It was this intervention by a government instrumentality, rather than the silting of the river, that undermined the viability of the port of Morpeth. In consequence, the premises of the former Newcastle Steamship Company, originally those of the Australasian Steam Navigation Company, were no longer required: the site was made available to the Bowthorne Co-operative Dairy society, which in 1910 opened a butter factory there.[85]

Although the government's railway policies had a negative influence on the port, they also for a time brought increased prosperity to the local manufacturing sector. Duncan Sim was awarded contracts for the supply of rolling stock, now easily dispatched along the Morpeth branch railway. Sim was pleased to have added this additional work to his usual manufacture of "Hay presses, Mowing Machines, Horse rakes, cornshellers, ploughs, Drays, wagons & ce."[86]

Sim's continued success, and the activities of the Hunter District Water Supply and Sewerage Board, attracted the attention of Pope, Maher & Co., of Darlington, Sydney. In 1896 they opened a steel pipe fabrication workshop in Swan Street, adjoining the Newcastle and Hunter River company's wharf.[87] This was served by both rail and water transport.[88] The opening in June 1898, of the Northumberland Street bridge over the Hunter River,[89] followed by that of the Hinton Bridge, the caissons for which were supplied by Pope, Maher & Co., in February 1901,[90] allowed large loads to be conveniently conveyed by road, also. The metals industry for a time remained attractive enough for the Sim family to find a buyer for their foundry after their withdrawal from the industry in 1926. The purchaser was J.D. Couston, a prominent businessman.[91]

2.5 The Decline of Morpeth

Hopes that Morpeth might become an industrial centre were, however, disappointed. River-borne trade continued to decrease. In July 1931, the Newcastle and Hunter River Steamship Company was forced to retire from the Sydney to Morpeth trade, closing its Morpeth wharf,[92] although a small wooden-hulled steamer, the *SS Allyn River*, until 1939 continued to carry flour and small quantities of provisions for shops. The Depression of the 1930s emptied Couston's order book, and in the middle of that decade he was forced to close the Swan Street foundry. Pope, Maher & Co. had by this time also vacated their site. The conclusion of the Second World War brought no revival in the metals trade, but some new business opportunities were forthcoming. In 1946, for example, British American Tobacco opened a tobacco plant in the milk dehydration works built by the Commonwealth government during the recently concluded world war.[93] This year, however, also saw the end of the shipping trade, when the last

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[84] See John Turner, 'The Development of the Urban Pattern of Newcastle: A Critique', in *Australian Economic History Review*, vol. XI, September 1971, p. 181.
[85] *Maitland Mercury*, 22 August 1910, p. 2.
[86] Letter from Duncan Sim to Peter Sim, reproduced in Judith MacLeod, *Duncan Sim*, p. 19.
[87] *Sydney Morning Herald*, 21 March 1896, p. 9.
[88] See *Maitland Daily Mercury*, 21 March 1896, p. 6.
[89] *Sydney Morning Herald*, 16 June 1898, p. 5.
[90] See *Maitland Daily Mercury*, 14 February 1901, p. 2.
[91] *Sydney Morning Herald*, 29 September 1926, p. 16.
[92] See *Maitland Daily Mercury*, 9 July 1931, p. 6.
[93] *Singleton Argus*, 2 August 1946.

commercial vessel to visit Morpeth, the *SS Doepel*, of only 389 tons, conveyed a cargo of newsprint from Sydney.[94] The remaining wharfs were dismantled in mid-1951.[95]

The tobacco factory did not prosper, for it was closed not long after April 1951, when the Bowthorne butter factory also ceased to trade, its activities being centralised at the Hunter Valley Dairy Co-operative ('Oak') facility at Hexham.[96] The demise of these enterprises further undermined the viability of the Morpeth branch railway, already badly affected by the cessation of river traffic.[97] The line was closed on 31 August 1953,[98] the President of the Morpeth Progress Association describing the loss as being "like losing a right arm".[99]

The loss of so many jobs put an end to hopes that the local economy could survive the eclipse of the port of Morpeth. The increasing availability of motor cars and buses brought the town within the orbit of East and West Maitland, with which the municipality had been amalgamated in 1944 to form the City of Maitland. Morpeth residents increasingly looked to Maitland for both shopping and business transactions, further undermining the viability of local businesses. This led to the abandonment of several comparatively large buildings, such as the former Anlaby's Inn and Campbell's store in Swan Street. Some of these were demolished, while others were simply allowed to fall down. A lack of demand for commercial space contributed to a general air of dilapidation and declining land values, although the connection of the town with the district sewerage scheme in late 1939[100] does appear to have encouraged the construction of some new dwellings.

2.6 Revival

Conditions began to change in the 1970s, when businessmen such as Trevor Richards identified the potential of Morpeth as a tourist and heritage destination, as well as being a convenient place in which to reside. The town is now very popular, particularly on weekends, with cultural pursuits vying with commercial and residential activities, the latter being supported by extensive new subdivisions outside the historic precinct.

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2.7 Morpeth's Railway Station Controversy[101]

The extension of the railway from the initial terminus to the new one, opened in July 1870,[102] was of course a boon to the steamship companies, and for those wishing to receive or dispatch general goods up country. The question as to the most suitable location for the passenger terminus was, however, quite a different matter, and became the subject of much dispute.[103] A

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[94] See generally David Campbell, 'Railways of the Newcastle District of New South Wales, 1840 – 1865: Some Influences on their Development', in *Stories of the GNR*. Newcastle: Newcastle Regional Museum and Engineers Australia, 2007.
[95] *Singleton Argus*, 16 May 1951, p. 2.
[96] *Muswellbrook Chronicle*, 6 April 1951, p. 2.
[97] See *Singleton Argus*, 29 May 1953, p. 6.
[98] *Sydney Morning Herald*, 7 October 1953, p. 8.
[99] *Ibid*.
[100] See *Maitland Daily Mercury*, 5 August 1939, p. 10.
[101] The author has been guided in the following discussion by the pioneering work of Ian Dunn and the late Cyril Singleton: see Ian Dunn, 'The Morpeth Branch', in *Byways of Steam 14: On the Railways of New South Wales*. Matraville: Eveleigh Press, 1998; see also C.C. Singleton, *Australian Railway Historical Society Bulletin*, September 1953, pp. 104-106, October, 1953, pp. 113-117.
[102] *Maitland Mercury*, 26 July 1870, p. 2.
[103] *Ibid*., 29 July 1869, p. 2.

site to the north of Swan Street, near its intersection with Northumberland Street, and adjoining the government wharf at which private persons could come and go via river transport without trespassing on private property, was locally favoured. This, however, was situated in the riverfront cutting earlier mentioned, from which it was difficult to obtain access to Swan Street, with its shops and post office . These restrictions, together with the periodic flooding of the river, rendered it impracticable to establish at this location the terminal facilities necessary for the working of the line. Such was the depth of local feeling in what was, after all, a politically influential community that the authorities decided to provide not one, but two new passenger stations, both of which were opened in July 1870.[104]

The first of these, later known as Northumberland Street, was indeed constructed on the site above described. Its difficult situation involved the construction of a steep flight of sandstone steps, which caused a good deal of inconvenience, although they were undoubtedly better than the "deep, precipitous incline, paved with loose, rough stones" by which access was originally available.[105]

The other railway station, known simply as 'Morpeth', was at the new terminus. Tenders for its erection are said to have been called in September 1869; the successful contractor was William Cains. The four-roomed station house, of brick relieved by stone coping, with a roof of galvanised iron, was described as "a very neat little building",[106] said to have been approximately 54' in length and 16' 6'' inches in width, was roofed in corrugated iron, with a stone flagged and columned front verandah addressing Swan Street, the main thoroughfare of the town. Railings were supported by a stone course. The four rooms consisted of a porters' room; a ticket office; a general waiting room; and a ladies' waiting room.[107] The platform, complete with a canopy supported by columns, faced in brick with stone coping, and stone flagged, was 220' long, with an 80' carriage dock at the western end. As befitted a town without sanitary services, the lavatory facilities were detached from the building.[108]

Up until this time, the site of the terminus appears to have been vacant land, although some cottages appear to have existed just east of the intersection of Swan Street and George Street.

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[104] *Maitland Mercury*, 29 July 1869, p. 2.
[105] *Ibid.*, 26 July 1870, p. 2.
[106] *Ibid.*, 16 June 1870, p. 3.
[107] *Ibid.*, 21 April 1870, p. 3.
[108] *Ibid.*

Figure 8. Plan of Morpeth, 22 June 1849. ***University of Newcastle Cultural Collections***

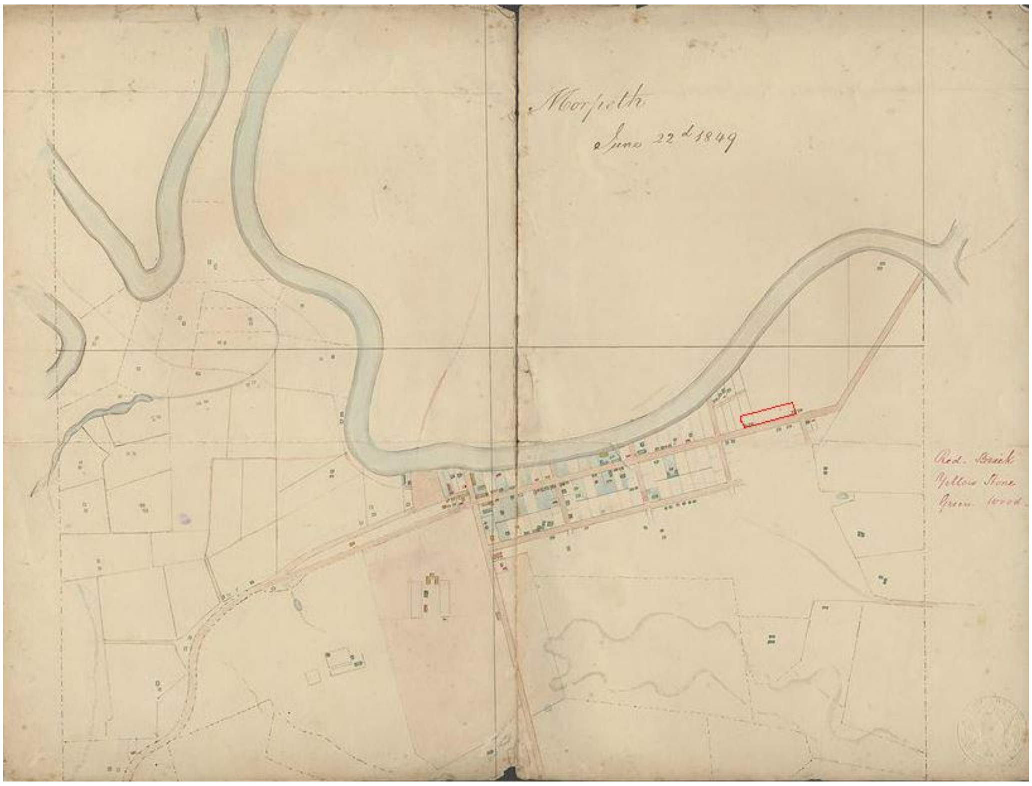

Figure 9. The subsequent location of the railway terminus is outlined in red.

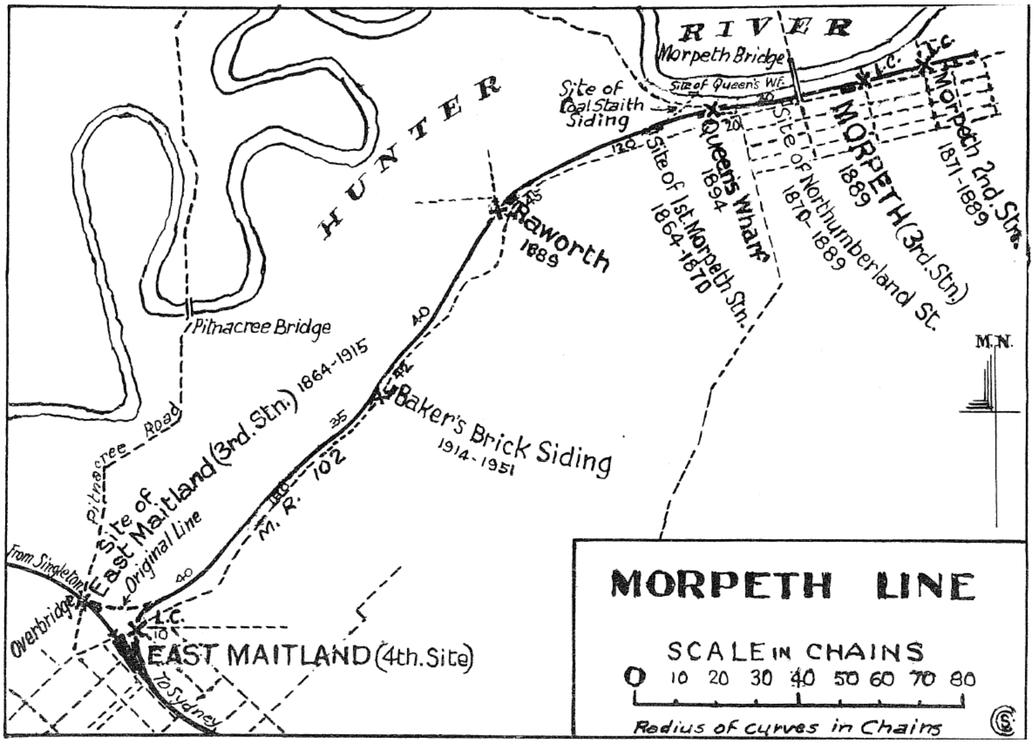

Figure 10. Plan of the Morpeth branch railway, showing the facilities with which it was associated, as drawn by the late C.C. Singleton. Note the second Morpeth station, locally known as the Edward Street station, near the terminus at extreme right. From C.C. Singleton, 'The Morpeth Branch Line', in *Australian Railway Historical Society Bulletin*, September-October 1953.

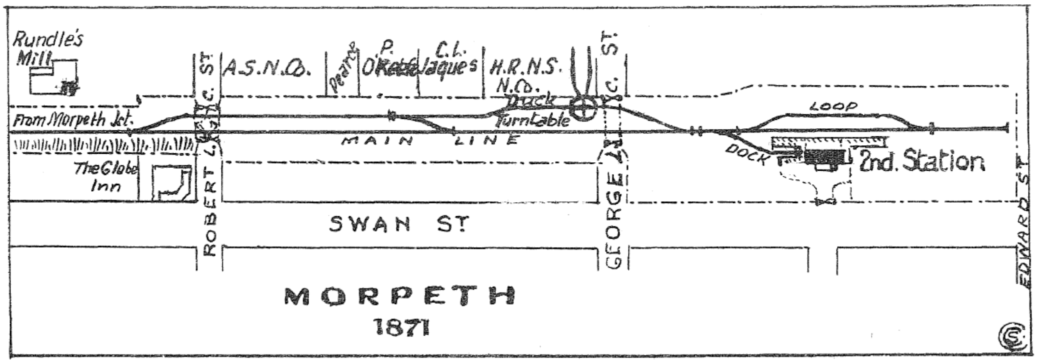

Figure 11. The terminal station of 1870. Note George Street level crossing. From C.C. Singleton, 'The Morpeth Branch Line', in *Australian Railway Historical Society Bulletin*, September-October 1953.

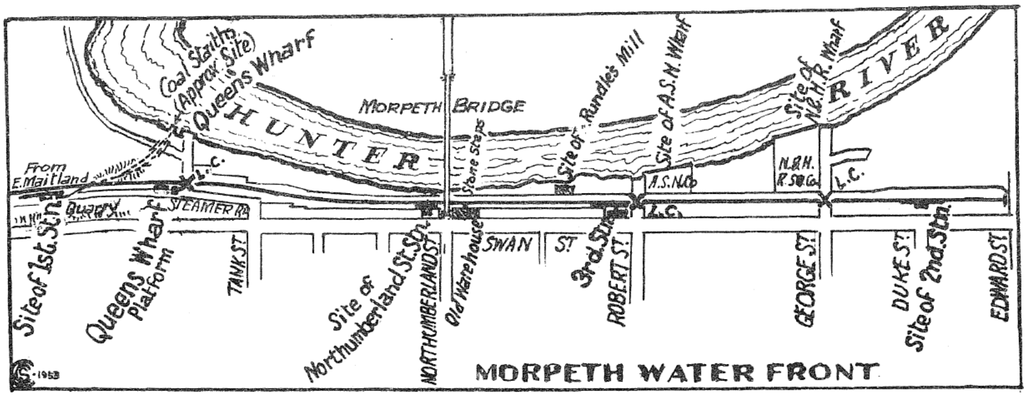

Figure 12. The Morpeth river front, showing the extraordinary number of railway stations with which Morpeth was associated. From C.C. Singleton, 'The Morpeth Branch Line', in *Australian Railway Historical Society Bulletin*, September-October 1953.

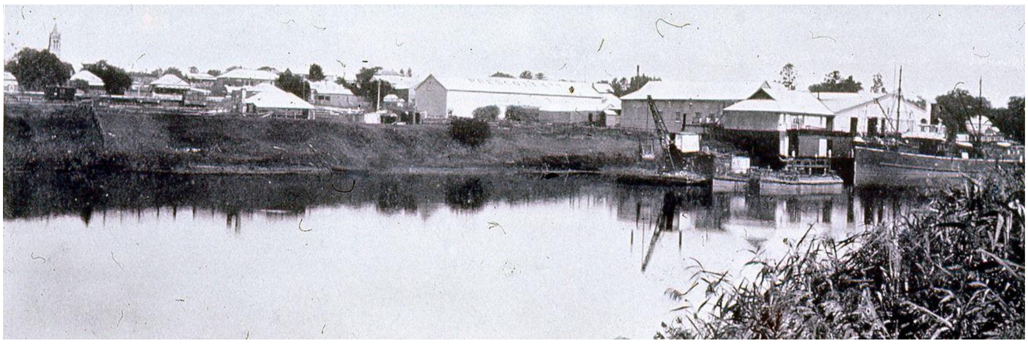

Figure 13. The approximate location of the subject land is marked by the marshalled train, at extreme left, standing on the Morpeth goods siding. The former passenger station, since 1889 the Station Master's residence, is out of shot to the left. Prescott's, produce agents occupy the large Newcastle and Hunter River Steam Navigation Company store, centre, on the southern side of the railway, just west of the George Street level crossing. This building survives to this day. The wharf and warehouses of the Newcastle and Hunter River Steam Navigation Company are at right. The larger vessel is the Clyde-built S.S. *Archer*, which was in the possession of the N&HRSN Co. between 1901 and 1933. Note the steam crane, used for the loading of bunker coal into the company's steamers. The Church of the Immaculate Conception, the tower of which is visible at extreme left, was built in 1897. The photograph, taken from the northern bank of the Hunter River, would appear to date from the 1920s.

Edward Street, which provided the main approach from the south, and with which the station was locally identified, provided access to the river port of Raymond Terrace and the confluence of the Williams River and Hunter River, while the nearby river punts promoted traffic with Largs and Hinton.

The dock siding is said to have been extended in an easterly direction in 1902 to serve a goods siding laid along a timber-faced bank of a height suitable for the loading and unloading of railway wagons, complete with a hand-operated jib crane of five tons capacity and a ten-ton cart weighbridge.[109] This facility handled wool bales consigned to the nearby wharfs; it must have relieved pressure on the brick-built goods shed, 60 feet long and 27 feet wide with internal and external loading platforms, not opened until 1878, following a press campaign, the deficiency having in the meantime been freely supplied by the steamship companies.[110] The goods shed was similar in design to that later built at St. Mary's railway station. Through its arched portals,[111] trains passed for the loading and unloading of the wide variety of articles associated with the government railways as the State's common carrier. The nearby Hunter River New Steam Navigation Company (N. & H.R.N.S.N.) featured a wagon turntable, allowing these to be run directly into its capacious warehouse, which was free from flooding, for loading or unloading, the goods being conveyed by two narrow-gauge funiculars to and from the wharf below.[112] The company also constructed other large sheds fronting Swan Street. A stock yard and stock races in association with the goods shed siding are said to have been provided in 1882. From 1911, the wool bank siding also served the Coastal Farmers' Co-operative Company lucerne shed, said to have had a capacity of about 4,000 bales.[113] In 1877, a timber-built, galvanised iron-clad engine shed with coal stage, and water tanks elevated by means of a timber-built 'pig sty', were provided for the servicing of locomotives,[114] which were usually tank engines.

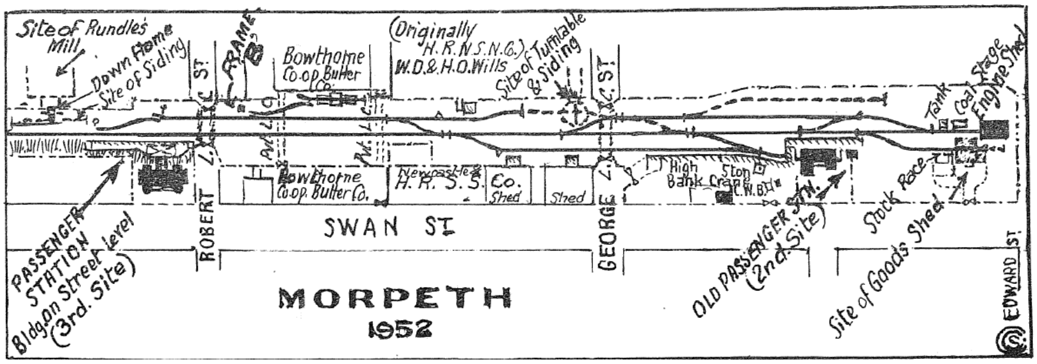

Figure 14. Railway facilities around the Morpeth terminus in 1952, just prior to the closure of the line, as drawn by the late Cyril Singleton. The long-closed passenger station of 1870 (locally known as the Edward Street station) is at right. The plan appears to show the still-extant dwelling, perhaps former commercial premises, known as 36 Swan Street. From C.C. Singleton, 'The Morpeth Branch Line', in *Australian Railway Historical Society Bulletin*, September-October 1953, pp. 113-117.

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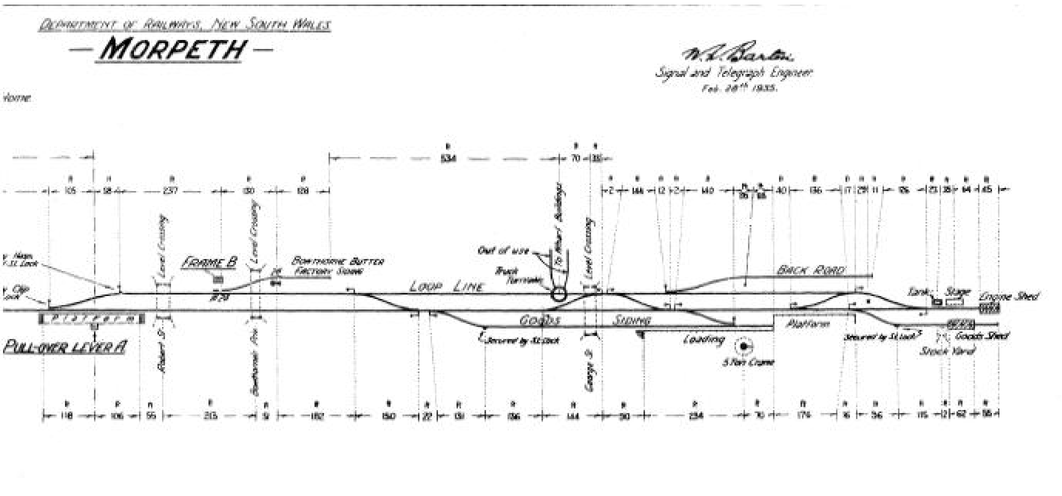
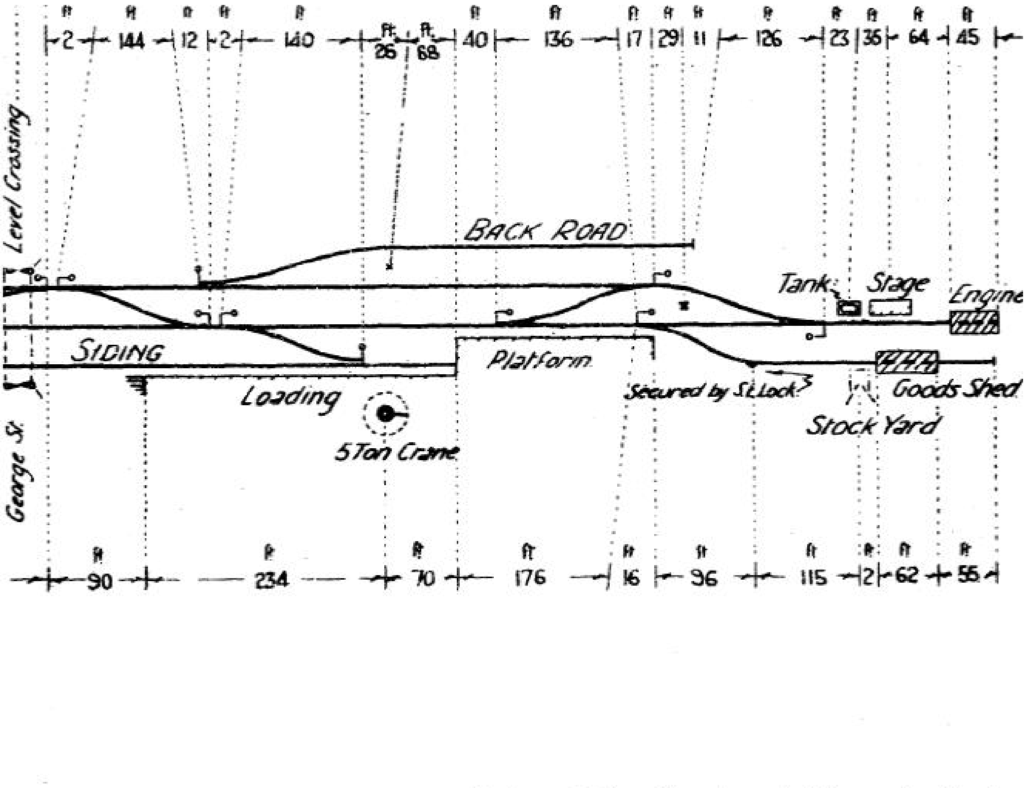
[109] Ian Dunn, 'The Morpeth Branch', p. 27.
[110] See *Maitland Mercury*, 8 August 1878. p. 4, 27 July 1877, p. 4.
[111] Photographic evidence shows that these were later replaced by square openings.
[112] *Maitland Mercury*, 14 April 1870, p. 4.
[113] *Sydney Morning Herald*, 9 October 1911, p. 6.
[114] Ian Dunn, 'The Morpeth Branch', p. 29.

The station yard ultimately consisted of the goods shed and stock siding, served by a stock yard; the goods siding along the wool loading bank, served by a trucking yard, weighbridge and 5-ton jib crane; a back siding general purposes; a run-around loop; and the points and crossovers necessary for running and shunting.



Office of the Signal and Telegraph Engineer, Sydney

Figure 15. Portion of arrangements at Morpeth, February 1935. *NSWGR*

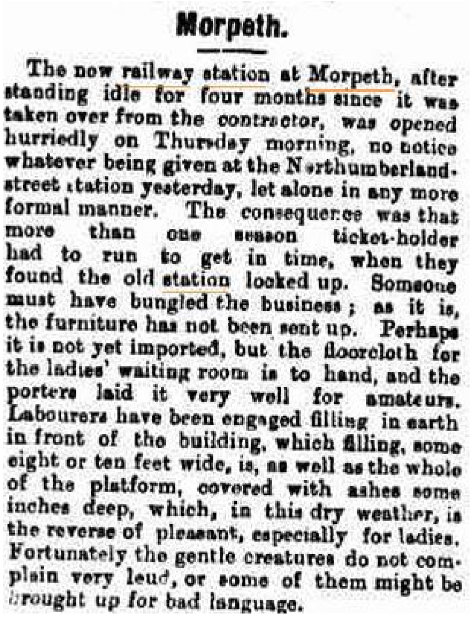


Office of the Signal and Telegraph Enginee

Figure 16. Detail of above. Note the loading bank and 5-ton capacity manually-operated jib crane, which allowed loading and unloading to and from the trucking yard. The George Street level crossing is shown; the surviving cottage, not being located on railway property, is not.

While the Edward Street station and yard was the main centre for the handling of general goods and parcels traffic, and also the passenger terminus, other sidings and platforms, as earlier described, were located along the line.

In early 1889, work began on the construction of a new railway station, the town's third. This project aimed to provide one central station approximately midway between the other two, which might then be closed to economise on staffing and other costs.[115] The Edward Street station, soon to become redundant, was converted into a residence for the Station Master,[116] work which possibly included the incorporation of the outhouse lavatory within the habitable areas. The passenger platform was at some time fenced off from the running lines, probably for reasons of safety. The station, then, replaced the original Station Master's residence, on the site of which the new station was built.[117] The Edward Street and Northumberland Street platforms ceased to be available to passengers from the time of the opening of the new station on the morning of 19 December 1889, although the railway authorities appear to have been remiss in providing notice of this. The effects of this failure are made evident in the rather amusing news clipping set out below:



Morpeth.

The new railway station at Morpeth, after standing idle for four months since it was taken over from the contractor, was opened hurriedly on Thursday morning, no notice whatever being given at the Northumberland-street station yesterday, let alone in any more formal manner. The consequence was that more than one season ticket-holder had to run to get in time, when they found the old station locked up. Someone must have bungled the business; as it is, the furniture has not been sent up. Perhaps it is not yet imported, but the floorcloth for the ladies' waiting room is to hand, and the porters laid it very well for amateurs. Labourers have been engaged filling in earth in front of the building, which filling, some eight or ten feet wide, is, as well as the whole of the platform, covered with ashes some inches deep, which, in this dry weather, is the reverse of pleasant, especially for ladies. Fortunately the gentle creatures do not complain very loud, or some of them might be brought up for bad language.

Figure 17. From *Maitland Mercury*, 20 December 1889, p. 8.

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[115] *Maitland Mercury*, 14 November 1889, p. 5.
[116] *Newcastle Morning Herald and Miners' Advocate*, 28 March 1889, p. 5.
[117] *Maitland Mercury*, 28 November 1889, p. 4.

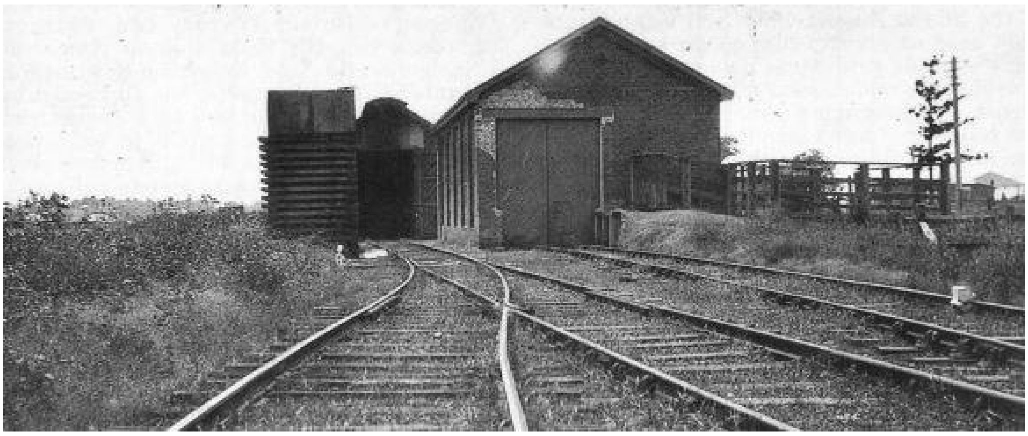

Figure 18. Terminal facilities, 1935, looking east from the former passenger station. From left: water tanks supported by timber pig-sty, with coaling stage beyond; timber and galvanised iron-built engine shed; brick-built goods shed, modified through replacement of arched doors by lintels; and stock yard and races.

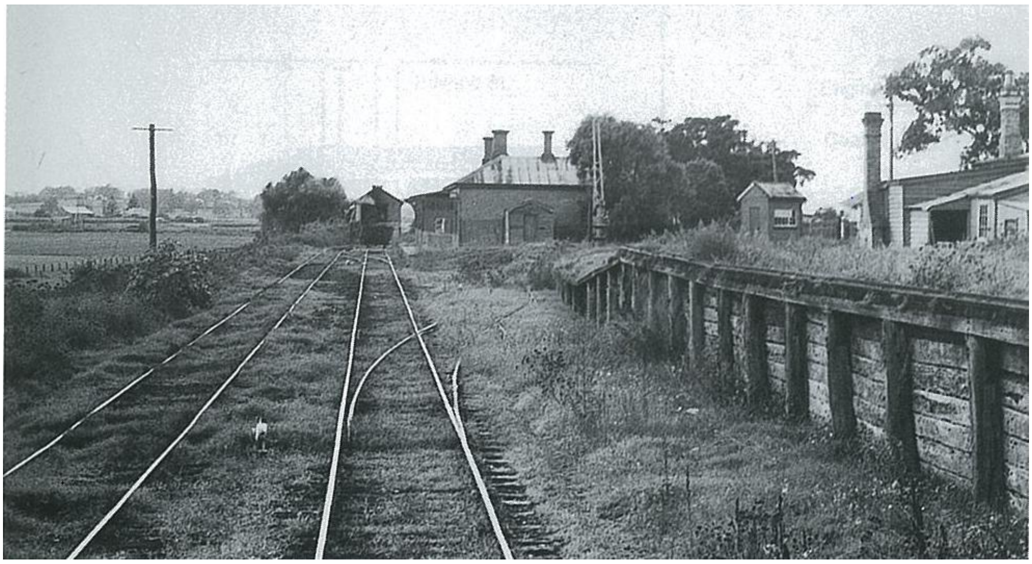

Figure 19. The terminus on 12 March 1953. The timber-faced loading bank, next to which runs the barely-visible goods siding, is at right; behind it is the weighbridge associated with the trucking yard; the 5-ton capacity manually-operated jib crane; the former passenger station; and the engine shed. The goods shed has already been demolished. The cottage at extreme right, perhaps former commercial premises, known as 36 Swan Street, still stands. ***Late C.C. Singleton***

The railway itself had an unexciting history, governed largely by the waxing and waning of demand from the shipping companies, lucerne undertakings and small industries, later including the dairy and butter factory. Except on special occasions, passenger traffic was light, although from about 1915 to 1951 comparatively large quantities of milk were dispatched to both

Newcastle and Sydney.[118] From 1893, trains traffic were usually hauled by a four-wheeled steam tram motor, rather than by a locomotive; after the reintroduction of locomotives in 1913, no fireman was rostered, with operational responsibility falling to the driver and guard only.[119] One particular incident, reflecting the potential dangers of one-man operation of locomotives, occurred on 18 April 1950, when a Z-20 class tank engine, with driver Bob Green on the footplate, crashed through the end of the engine shed and down the low embankment on which it was built; it took two days to drag the locomotive back onto the line. Bob Green, by coincidence, also drove the last timetabled train between Morpeth and East Maitland.[120] Photographic evidence suggests that, by the time of the closure of the railway in August 1953, the terminal station, which for over half a century after its closure had accommodated the Station Master, had received very little maintenance, particularly with regard to the now-redundant passenger platform and its associated canopy. The goods shed, which would appear at some time to have suffered structural damage, perhaps from ground movement or the inadequacy of footings, was demolished some time before the closure of the railway.

Figure 20. The Morpeth terminal railway station, used for half a century as a Station Master's residence, shown shortly before the closure of the Morpeth branch line. The carriages are temporarily standing on the original platform road, probably while the locomotive runs around its train in preparation for the return to East Maitland. Note the poor condition of the platform canopy. *Late C.C. Singleton*

The building, together with the engine shed, goods shed, elevated water tanks and timber-faced bank, was demolished at some stage after the closure of the line. While the date of demolition has not been established, the *Maitland to Morpeth Railway (Cessation of Operation) Act 1953* (NSW), which commenced on 31 August 1953, authorised the dismantling of infrastructure associated with the line, as well as the sale of the associated land, including the land at the

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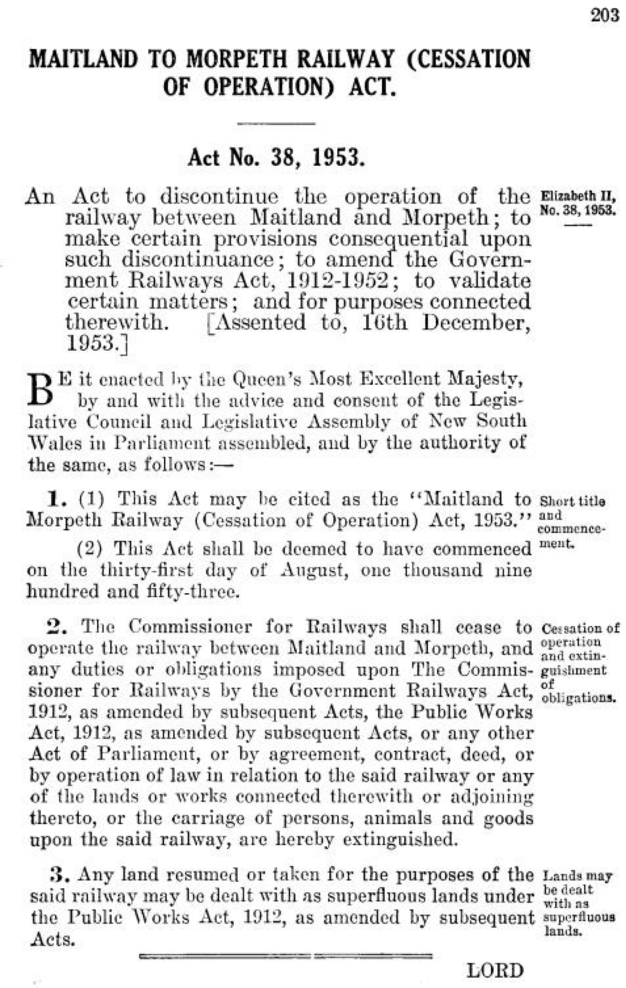
[118] Ian Dunn, 'The Morpeth Branch', p. 28.
[119] *Ibid*., p. 43.
[120] *Ibid*., pp. 29-35, 43.

terminus. As lifting of the track is said to have begun shortly after closure,[121] it seems likely that the buildings at the terminus did not long survive.

The demolition and removal of this infrastructure gradually erased the railway from sight, although it is remembered by some older residents.



203

MAITLAND TO MORPETH RAILWAY (CESSATION OF OPERATION) ACT.

Act No. 38, 1953.

An Act to discontinue the operation of the railway between Maitland and Morpeth; to make certain provisions consequential upon such discontinuance; to amend the Government Railways Act, 1912-1952; to validate certain matters; and for purposes connected therewith. [Assented to, 16th December, 1953.]

Elizabeth II, No. 38, 1953.

BE it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Legislative Council and Legislative Assembly of New South Wales in Parliament assembled, and by the authority of the same, as follows:—

Short title and commencement.

1. (1) This Act may be cited as the "Maitland to Morpeth Railway (Cessation of Operation) Act, 1953."

(2) This Act shall be deemed to have commenced on the thirty-first day of August, one thousand nine hundred and fifty-three.

Cessation of operation and extinguishment of obligations.

2. The Commissioner for Railways shall cease to operate the railway between Maitland and Morpeth, and any duties or obligations imposed upon The Commissioner for Railways by the Government Railways Act, 1912, as amended by subsequent Acts, the Public Works Act, 1912, as amended by subsequent Acts, or any other Act of Parliament, or by agreement, contract, deed, or by operation of law in relation to the said railway or any of the lands or works connected therewith or adjoining thereto, or the carriage of persons, animals and goods upon the said railway, are hereby extinguished.

Lands may be dealt with as superfluous lands.

3. Any land resumed or taken for the purposes of the said railway may be dealt with as superfluous lands under the Public Works Act, 1912, as amended by subsequent Acts.

LORD

Figure 21. The single-page Act by which the line was closed; this authorised the sale of its facilities and easement.

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[121] *Ibid.*

3. PHYSICAL CONDITION AND CONTEXT

3.1 SITE AREA

The site covers an area of approximately 7,908².

3.2 CURRENT USE

The subject land is occupied by an existing dwelling and tennis court.

3.3 PAST USE

Between 1870 and the mid-1950s, the subject land was occupied by the Morpeth railway terminus, including a comparatively impressive brick-built passenger station, closed in 1889, but thereafter occupied by the Station Master of the facility that replaced it; a goods shed, demolished before 1953; an engine shed with coaling stage and elevated water tanks; stock yard and races; a loading bank with associated manually-operated jib crane; a trucking yard with weighbridge; and their associated running roads and sidings.

3.4 CONDITION

The lot is regularly mown.

3.5 SURROUNDING CONTEXT

To the east, the subject land adjoins a redundant cattle yard and associated barn; to the west, the dwelling known as 36 Swan Street; to the north, vacant land; and to the south, Swan Street.

To the north and east, the site overlooks agricultural land gradually sloping down to the Hunter River flood plain, although views of the Hunter River, which is to the north, are obscured by levee banks.

A dwelling, formerly commercial premises, known as 36 Swan Street, situated about 30m to the west, addressing Swan Street, is potentially of some antiquity, but is not listed as a Heritage Item in Maitland LEP 2011. Beyond it are several modern dwellings and a light industrial area, formerly the site of shipping warehouses, pipe fabrication plant and butter factory.

A road milestone stands on Crown land vested in Council just south of the property boundary, proximally to 36 Swan Street. This item is not affected by the proposed rezoning.

Figure 22. Surrounding Context. *Nearmap (by licence)*

Figure 23. Surrounding Context, showing real property descriptors. *PCB Surveyors*

4. HERITAGE SIGNIFICANCE

The NSW heritage assessment criteria encompass four generic values in the Australian ICOMOS *Burra Charter 2013*: historical significance; aesthetic significance; scientific significance; and social significance.

These criteria will be used in assessing heritage significance of the place.

The basis of assessment used in this report is the methodology and terminology of the *Burra Charter 2013*; James Semple Kerr, *The Conservation Plan: A Guide to the Preparation of Conservation Plans for Places of European Cultural Significance*;[122] and the criteria promulgated by the Heritage Division of the NSW Office of Environment and Heritage. The *Burra Charter 2013*, Article 26, 26.1, states that:

> *Work on a place should be preceded by studies to understand the place which should include analysis of physical, documentary, oral and other evidence, drawing on appropriate knowledge, skills and disciplines.*

Places and items of significance are those which permit an understanding of the past and enrich the present, allowing heritage values to be interpreted and re-interpreted by current and future generations.

The significance of the place is determined by the analysis and assessment of the documentary, oral and physical evidence presented in the previous sections of this document. An understanding of significance allows decisions to be made about the future management of the place. It is important that such decisions do not endanger its cultural significance.

The *NSW Heritage Manual*, prepared by the former NSW Heritage Branch and Department of Urban Affairs and Planning and endorsed by the Heritage Division of the NSW Office of Environment and Heritage, outlines the four broad criteria and processes for assessing the nature of heritage significance, along with two added criteria for assessing comparative significance of an item.

Heritage Significance Criteria

The NSW assessment criteria listed below encompass the following four values of significance:

- ❑ Historical significance
- ❑ Aesthetic significance
- ❑ Research/technical significance
- ❑ Social significance

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[122] (7th ed). Burwood: Australia ICOMOS, 2013.

Listed below are the relevant Heritage Assessment Criteria identified in the *Heritage Act 1977* (NSW):

Criterion (a)	An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).
Criterion (b)	An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).
Criterion (c)	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).
Criterion (d)	An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.
Criterion (e)	An item has the potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).
Criterion (f)	An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).
Criterion (g)	An item is important in demonstrating the principle characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural places; or cultural or natural environments).

An Assessment of Significance requires that a level of significance be determined for the place. The detailed analysis uses the levels of significance below:

LOCAL	Of significance to the local government area.
STATE	Of significance to the people of NSW.
NATIONAL	Exhibiting a high degree of significance, interpretability to the people of Australia.

4.1 ANALYSIS OF SIGNIFICANCE

Historical Significance

Criterion (a) An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).

The subject land is associated with the former terminus of the Morpeth branch railway, which included not only a passenger station and general goods and stock facilities, but also infrastructure necessary for the operation of steam locomotives. The terminus was important in the wool trade at a period when a large percentage of Northern and New England wool was exported through the port of Morpeth, to the prosperity of which the railway was very important. The closure of the railway in 1953, and the resultant demolition of the infrastructure at the terminus, has so altered the site as to no longer provide obvious evidence of its former associations, although the goods shed footings and 5-ton capacity jib crane base remain.

Criterion (b) An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).

The subject land is not known to be associated with any significant event, person or group of persons, with the exception of a general relationship with the former New South Wales Government Railways and a comparatively small number of local staff. Relatives of Bob Green may recall his involvement in the locomotive accident of 1950, and also the fact of his having driven the last timetabled train from Morpeth to East Maitland.

Aesthetic And Technical Significance

Criterion (c) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).

The demolition of all above-ground structures, particularly the once-elegant passenger station, formerly associated with the railway terminus has negated any such significance.

Social Significance

Criterion (d) An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.

Although the railway terminus was closed 61 years ago, and the associated structures appear to have been demolished shortly afterwards, a comparatively small minority of long-standing residents of Morpeth and district may continue to share a special association with the site.

Research Significance

Criterion (e) An item has the potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).

The demolition of all above-ground structures formerly associated with the railway terminus has removed most such potential. It is, however, possible that the footings of the former goods shed may provide some insight into the nature of late nineteenth century government railway goods handling facilities, although this will not provide information not available elsewhere in a local or State context, for example, at Wallsend NSW (private railway) and St. Mary's NSW (NSWGR). The concrete pad for the 5-ton capacity jib crane also remains, although similar items are extant at Awaba, Condobolin, Fairfield, Moss Vale, Scone and Windsor, to name but a few.

Rarity Significance

Criterion (f)	An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).

The demolition of the above-ground structures negates the potential of the subject land to provide evidence of now-defunct processes or activities, or of designs and techniques of exceptional interest. The goods shed footings and 5-ton jib crane pad are not uncommon, rare or endangered in either a State or local context, being present in locations where these have been provided and subsequently demolished.

Representative Significance

Criterion (g)	An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural places; or cultural or natural environments).

The subject land is not a fine example of its type; nor is it outstanding because of its setting, size or condition. It does not possess the principal characteristics of a railway terminus, and is not known to be held in high esteem either by the Morpeth community, nor that of the wider Local Government Area.

4.2 STATEMENT OF SIGNIFICANCE

The subject land, formerly the site of the ultimate terminus of the branch railway between East Maitland and the river port of Morpeth, played an important part in the economic and social development of the Maitland district in general, and of the town of Morpeth in particular. For perhaps three decades, the terminal infrastructure, which at first included both passenger and goods facilities, allowed Morpeth to survive against competition from the expanding port of Newcastle, although government transport policy favourable to Sydney interests later brought about its decline and eventual demise as a transport hub. The closure of the railway, followed by the demolition of all the structures with which it had been associated, has, however, so altered the site as to have considerably degraded its heritage significance, to the extent that its past importance is no longer legible.

The survival of the pad of the 5-ton capacity jib crane, and also that of the footings of the brick goods shed, does little to retrieve this situation, although these items do provide some limited and specialised evidence of the historical associations of the place.

The subject land must, therefore, be assessed as having moderate significance in a local context.

5. PROPOSED WORKS

These involve an application to rezone and subdivide the subject land for residential purposes. The existing zoning is RU1: Primary Production; the proposed zoning is R1: General Residential, like the land to the south and west, on which dwellings already exist. The number of proposed lots has yet to be determined.

5.1 COMPLIANCE WITH MAITLAND URBAN SETTLEMENT STRATEGY 2012

The subject land is identified in the *Maitland Urban Settlement Strategy 2012* ('MUSS 2012') as non-residential zoned land, located within or adjoining land zoned residential, which satisfies the principles and definition of urban extension or urban infill development. Its inclusion within the table of Urban Infill and Urban Extension Potential Development Sites indicates that it will be considered by Council for potential future development, pending the lodgement of a rezoning proposal that justifies the lands as urban infill or urban extension, with due consideration of opportunities and constraints.

Extract of Table 12: Urban Infill & Extension Sites
MUSS 2012, p. 132.

Property No.	*Lot No.*	*DP No.*	*Locality*	*Suburb*	*Category*
25423	*3*	*237264*	*Swan Street*	*Morpeth*	*2*

6. STATEMENT OF HERITAGE IMPACT

This is the Statement of Heritage Impact for:	Proposed rezoning and subdivision, 30 Swan Street, Morpeth NSW 2321
Date:	This statement was completed in April 2014
Address and Property Description:	30 Swan Street, Morpeth NSW 2321; Lot 3 DP 237264
Prepared by:	EJE Heritage
Prepared for:	Mr H. Lantry

The following aspects of the proposal respect or enhance the heritage significance of the item or area for the following reasons:

The proposed rezoning and subdivision recognises that, from 1849 or earlier, much of the subject land has not been used for primary production. Cartographic evidence dating from 1849 suggests the presence of dwellings, perhaps including the former commercial premises and dwelling known as 36 Swan Street, while between 1870 or 1953 the land was occupied by the terminus of the Morpeth branch railway. Despite the demolition and removal of the railway facilities and infrastructure, the subsequent subdivision of the railway easement prevented the re-incorporation of the subject land into the farm land to the north and east.

The proposed rezoning and subdivision, moreover, forms part of a process of alienation and subdivision of land associated with the former railway, one that began in the mid-1950s and continued until the yielded lots had been sold, and some of them had been built upon.

The redundant cattle yard and associated barn, of unknown provenance, to the east of the subject land, will not be affected by the proposed rezoning and subdivision.

The following aspects of the proposal could detrimentally impact on the heritage significance of the item or area for the following reasons:

It is not considered that the proposed rezoning and subdivision has such potential, for some of the subject land has in any case long been used for residential purposes, while the remainder is historically associated with railway activities, specifically the operation over some 83 years of passenger trains, goods trains and mixed trains. All railway infrastructure has long been removed, while no physical evidence of such infrastructure is known to exist above ground level.

The following sympathetic design solutions were considered and discounted for the following reasons:

Retention of the RU1: Primary Production zoning and lot boundaries were considered, but were rejected, given the long-standing use for residential purposes of much of the land, and the previous use of the remainder for railway purposes, such as the operation of trains; the handling and conveyance of goods and livestock; and the servicing of steam locomotives. The subject land, moreover, is identified in the *Maitland Urban Settlement Strategy 2012* ('MUSS 2012') as being suitable for consideration by Council for potential residential development in terms of urban infill or urban extension.

The following actions are recommended to minimise disturbance and/or enhance the interpretation of the heritage significance of the item or area:

Mandatory Actions

The process of rezoning and subdivision will, of themselves, not involve the excavation of the subject land. That said, future registered proprietors considering building works within the new lots may need to have regard to the requirements of the *Heritage Act 1977* (NSW).

The subject land may contain historical relics within the meaning of the *Heritage Act 1977* (NSW), s. 4(1), as set out below,

> *relic* means any deposit, artefact, object or material evidence that:
>
> (a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and
>
> (b) is of State or local heritage significance.

Should this in fact be the case, before the commencement of excavations, it will be necessary for the proponent to obtain from the Heritage Council of NSW an Excavation Permit under s. 139:

> 139 Excavation permit required in certain circumstances
>
> (1) A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.
> (2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

Should any items properly described as relics, for example footings of demolished structures, in fact be unearthed in the course of site or construction works, notification must be made in accordance with s. 146, as follows:

> 146 Notification of discovery of relic
>
> A person who is aware or believes that he or she has discovered or located a relic (in any circumstances, and whether or not the person has been issued with a permit) must:
> (a) within a reasonable time after he or she first becomes aware or believes that he or she has discovered or located that relic, notify the Heritage Council of the location of the relic, unless he or she believes on reasonable grounds that the Heritage Council is aware of the location of the relic, and
> (b) within the period required by the Heritage Council, furnish the Heritage Council with such information concerning the relic as the Heritage Council may reasonably require.

The Heritage Council should be contacted via the Heritage Division of the NSW Office of Environment and Heritage, 3 Marist Place, Parramatta NSW 2150, telephone: 02 9873 8500, and by email at heritage@heritage.nsw.gov.au

In the event of such a discovery, Council's Heritage Officer, Ms Clare James, should immediately be contacted at 4974 2000 or 4934 9700, and by email at clarej@maitland.nsw.gov.au

Recommended Actions

It is recommended that printed and PDF copies of this Statement of Heritage Impact should be made available to Maitland City Library, Morpeth Museum and University of Newcastle Cultural Collections.

The surviving pad of the 5-ton capacity jib crane, together with the footings of the brick goods shed, while not affected by the proposed subdivision, might well be sympathetically re-used or otherwise dealt with, in the preparation of later Development Applications involving the lots on which they are located. Similarly, the nearby mile stone, while not situated within the boundaries of the subject land, should be protected from damage during and after any site works associated with either the proposed subdivision or with any subsequent works.

6.1 Compliance with City of Maitland Conservation and Design Guidelines

The *City of Maitland Conservation and Design Guidelines*, Part 2 – Conservation Areas: 2.10 (Morpeth-Conservation Policies), specifies policies with reference to proposed development within the Morpeth Conservation Area. These are both set out and addressed below:

6.1.1 'What to Keep'

All buildings and structures constructed prior to 1949.
The dwelling, with tennis court, on the subject land was constructed in the 1970s.

Retain business activity within the existing 3(a) Business Zones.
The proposed rezoning is for residential purposes.

The rural character of the land on the edges.
The abutting land to the north, north-east and south is not subject to a rezoning proposal. The abutting lots to the west, and those to the south on the other side of Swan Street, are already occupied by dwellings.

The distinctive sandstone kerb and guttering .
Princess Street features concrete guttering.

The narrow sealed carriageways with (gravel) differentiated verges.
Swan Street is asphalt sealed to its full width.

Important view corridors to river and rural surrounds.
As the subject land is not elevated views of rural surroundings from the subject land are not significant. Views of the river itself are disrupted by levee banks.

Front fences and outbuildings consistent with residential area.

Star picket and wire fencing will be retained until the sale of lots takes place, after which fencing will become the responsibility of the new registered proprietors. There are no outbuildings on the subject land.

The single-storey and detached nature of residential development.
Future residential development will be the responsibility of the new registered proprietors.

The existing overall form, character and diversity of Swan Street.
It is submitted that the existence of a large dwelling on part of the subject land, together with its historic use for railway purposes, and the presence to the south dwellings addressing Swan Street, means that the proposed rezoning will not negatively affect the form, character and diversity of Swan Street.

The original subdivision pattern: wide lots in main streets, rear lane access.
The proposed lots will be similar in width to those opposite. The subject land, having been used for railway purposes, has never been subject to the original Morpeth subdivision pattern.

6.1.2 ‘New Development’

Character Assessment

General Building Forms and Overall Heights
These will be the responsibility of future registered proprietors.

Front and Side Setback
These will be the responsibility of future registered proprietors.

Materials
These will be the responsibility of future registered proprietors.

Building Use (Past and Present if Different)
The existing 1970s dwelling will continue to be used for residential purposes.

New buildings should not obstruct streetscape views of pre-1949 buildings.
The proposed rezoning does not have this potential.

Buildings should be set back no less than 7 metres, except in lanes. In Close and Princess Street, the setback is to be no less than 6 metres, and in Green, Berkeley, Elizabeth, Ann, Market and William Streets the setback is to be a minimum of 2 metres.
These will be the responsibility of future registered proprietors. The existing dwelling complies with these standards.

If a building is demolished, any new building must comply with new setback standards.
The proposed rezoning does not involve the demolition of an existing building.

In the residential area, side setbacks are to be the standard 900mm minimum on one side, but increased to 2.5m – 3.5m minimum on the other, to maintain views between buildings and low density characteristics.
These will be the responsibility of future registered proprietors.

Scale

The single storey and detached nature of the residential area should be maintained. Single-storey is the preferred from for new dwellings in the residential zone.

This will be the responsibility of future registered proprietors.

Additional floor area may be accommodated in the roof space, providing that the overall roof height and pitch is in keeping with surrounding structures.
These are not applicable.

Two storeys may be permitted on steep sites, providing the building is only single storey at the road frontage.
This is not applicable to the subject land.

Dual Occupancies

The detached house should be maintained as the principal residential form.
Dual occupancies are not considered appropriate at Morpeth.
This will be the responsibility of future registered proprietors.

New Development in the Business Zone

The existing overall form, character and diversity of buildings in Swan Street should be maintained.

The subject land is not in the Business Zone.

Subdivision

The general subdivision pattern of wide lots fronting the main streets, with vehicular access from rear lanes, should be maintained, in addition to sandstone kerbing and guttering.
The subject land has never been influenced by the general historic subdivision pattern. The existing kerbing and guttering is of concrete.

Any subdivision of allotments facing Swan Street, High Street and James Street are appropriate only where rear lane access to all lots can be provided, and/or use existing kerb crossing.
Access to the subject land will be via Swan Street. The subject land is exceptional, as it has never been influenced by the general historic subdivision pattern.

Frontages to the east-west streets (Swan, Close, High, Princess and James) shall not be reduced to less than 15 metres, and frontages to the side streets to not less than 40 metres.
The frontages of the proposed lots are not less than 15 m.

Rear access to properties fronting Swan Street, High Street and James Streets should be maintained.
Rear access has never been available to the subject land.

The amalgamation of sites is not considered appropriate.
This is not applicable to the proposed subdivision.

Rural Surrounds

The subject land is adjacent to existing residential development, and will not adversely affect the rural land to the north, north east and east. The subject land is identified in the *Maitland Urban Settlement Strategy 2012* ('MUSS 2012') as non-residential zoned land, located within or adjoining land zoned residential land, satisfying the principles and definition of urban extension or urban infill development.

Driveways, Kerbing and Guttering

Paths from front gates to kerb and driveway crossings are acceptable, with hard paving minimised to reduce run-off.
These will be the responsibility of future registered proprietors.

Driveway crossings should be paired strips, rather than the full width. Unadorned concrete is preferred.
These will be the responsibility of future registered proprietors.

No new kerb crossings in areas of sandstone kerb and guttering will be permitted. Where required, access is to be provided from rear lanes.
The kerbing and guttering addressing the relevant length of Swan Street is of concrete.

Where new crossings of sandstone kerb and guttering is unavoidable, bridge crossings are preferred to alteration of old stonework.
The kerbing and guttering addressing the relevant length of Swan Street is of concrete.

6.1.3 'What to Avoid'

Most two-storey project homes.
The nature of future development will be the responsibility of future registered proprietors.

Demolition of any pre-1949 structure.
The existing dwelling, with tennis court, dates from the 1970s. No earlier structure is extant, although footings and pads of some demolished buildings may be present; those of the former goods shed and 5-ton capacity jib crane are known to be present. Responsibility for these will devolve to future registered proprietors.

Multi-dwelling/medium density and attached dual occupancy development.
The proposed subdivision will create new residential lots. The nature of future development will be the responsibility of future registered proprietors.

Additions which involve altering the existing roof height or shape.
The proposed subdivision will not involve alterations and additions to the existing 1970s dwelling.

Full width sealed driveway entrances over grassed footways.
Driveway design will be the responsibility of future registered proprietors.

Visually prominent garages which front the street.
Residential design will be the responsibility of future residential proprietors.
New crossings within the existing sandstone kerb and guttering.

The kerbing and guttering along the relevant length of Swan Street is of concrete.

Amalgamation of sites.
A new subdivision of the existing lot is proposed. Adjoining lots are not involved.

New buildings obstructing streetscape view of pre-1949 buildings.
The existing dwelling, with tennis court, dates from the 1970s. Views of the much older dwelling known as 36 Swan Street will not be affected.

6.2 RELATIONSHIP OF HISTORIC TRACK LAYOUT TO SUBJECT LAND

Figure 24. Overlay of 1935 track layout and subject land. The 10-ton capacity weighbridge, which is not shown, was located to the right of the jib crane.
EJE/NSWGR/Nearmap by licence

An overlay of the 1935 track layout and the subject land shows the sites of now-demolished railway buildings and infrastructure. While rails and pointwork have been removed, portions of trackbed appear to remain. The site of the former passenger station is occupied by the 1970s dwelling and tennis court at 32 Swan Street. The concrete pad for the 5-ton capacity manually-operated jib crane remains just above ground level in the former trucking yard. The footings of the brick goods shed are evident at ground level. Footings of the timber-framed engine shed and coaling stage may remain at or below ground level. It is unlikely that anything remains of the 'pig sty' base of the locomotive water supply tank. The track bed of the branch line and its associated sidings is no longer discernable, but the former railway easement may be traced through the light industrial area to the west.

The rezoning application does not have the potential to disturb these items, or historic relics that may or may not be concealed beneath the surface. Subdivision does, however, have the potential to place the goods shed footings within more than a single lot, while any excavation or site works associated with future development applications may have the potential to disturb both items. This is a matter for future registered proprietors, rather than for the present proponent.

7. CONCLUSION

The proposed rezoning and subdivision of the land known as 30 Swan Street, Morpeth NSW, Lot 3 DP 237264, will not negatively affect its heritage significance, or that of the Morpeth Heritage Conservation Area. The site is adjacent to land zoned for residential purposes, as well as residential development of long standing. The subject land is identified in the *Maitland Urban Settlement Strategy 2012* as non-residential zoned land, located within or adjoining land zoned residential, satisfying the principles and definition of urban extension or urban infill development. Its inclusion within the table of Urban Infill and Urban Extension Potential Development Sites indicates that it will be considered by Council for potential future development, pending the lodgement of a rezoning proposal that justifies the lands as urban infill or urban extension, with due consideration of opportunities and constraints.

The subject land was for over seven decades the site of important railway infrastructure associated not only with the East Maitland to Morpeth branch railway, but with the coastal shipping trade. The demolition of the structures above ground level, compounded by the construction in the 1970s of a residence and tennis court on the site of the former passenger station, has, however, so altered the place as to render it practically illegible in terms of its historic purpose. The concrete pad of the former 5-ton capacity, manually-operated jib crane, together with the footings of the long-since demolished brick goods shed, will not be affected by the rezoning application, although their presence, as well as the possible discovery, during any future excavation, of historic relics, should be addressed in development applications concerning the proposed lots within which they are situated. The mile post and marker plaque addressing Swan Street, although not within the boundaries of the subject land, should be protected from disturbance during any activities associated not only with the present application but with any future development nearby.

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APPENDIX FIVE. VISUAL IMPACT STATEMENT PEER REVIEW

richard lamb & associates

30 Swan Street, Morpeth

Planning Proposal to rezone land

Visual Impact Statement Peer Review

Maitland City Council

Author: Dr. Richard Lamb

20 May 2015

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Table of Contents

May 2015

Rob Corken
Strategic Town Planner
Maitland City Council
285-287 High Street
Maitland

By email: robc@maitland.nsw.gov.au

Dear Rob,

Visual Impact Statement - Peer Review at 30 Swan Street, Morpeth

I refer to the above and to Council's commission to Richard Lamb and Associates for an independent peer review of Visual Impact Statement prepared by Terras Landscape Architects in relation to a planning proposal to re zone land at 30 Swan Street.

I understand that the planning proposal is to re zone land from RU1 Primary Production to R1 General Residential. An indicative subdivision plan showing 9 lots has been prepared which appears to indicate that view corridors along Edward Street and from parts of Swan Street as outlined in the Morpeth Development Control Plan (Morpeth Heritage Conservation Area) may be affected.

Summary of my experience and CV

I, Richard Lamb, author of this report, am a professional consultant specialising in visual impacts assessment and the principal of Richard Lamb and Associates (RLA). I have taught at the University of Sydney and specialised in heritage conservation, environmental impact assessment and visual perception studies for 30 years.

I provide professional services, expert advice and landscape and aesthetic assessments in many different contexts. I carry out strategic planning studies to protect and enhance scenic quality and landscape heritage values, conduct scenic and aesthetic assessments in all contexts, from rural to urban, provide advice on view loss and view sharing and conduct landscape heritage studies. I act for various client groups on an independent basis, including local councils, government departments and private clients. I provide expert advice, testimony and evidence to the Land and Environment Court of NSW in various classes of litigation. I have appeared in over 200 cases and made submissions to several Commissions of Inquiry. I have been the principal consultant for over 500 consultancies concerning the visual impacts and landscape heritage area of expertise during the last ten years.

At the University of Sydney I had the responsibility for teaching and research in my areas of expertise, which are visual perception and cognition, aesthetic assessment, landscape assessment, interpretation of heritage items and places and cultural transformations of environments. I taught both undergraduate and postgraduate students in these areas, giving specialised elective courses in visual and aesthetic assessment. I continue to supervise postgraduate research students undertaking PhD and Masters degree academic research in the area of heritage conservation and Environment Behaviour Studies (EBS). The latter field is based around empirical research into human aspects of the built environment, in particular, in my area of expertise, aspects of visual perception, landscape preference and environmental cognition.

I have had a number of empirical academic research papers on landscape perception and preference, landscape aesthetics and heritage conservation published in international journals.

I have developed my own methods for landscape assessment, based on my education, knowledge from research and practical experience. I am familiar with research and technology associated with the assessing and representing the visual impacts of wind farms.

My CV can be viewed on my website at www.richardlamb.com.au at the People tab. The CV is under revision at the moment but will give an idea of the range of work I have undertaken.

1.0 Executive Summary

- The proposal (planning application) is in relation to a site at the north eastern edge of Morpeth Town centre on Swan Street, which is one of the town's original primary planned roads.
- Swan Street is laid out parallel to the Hunter River and in accordance with a strict grid system and hierarchy of roads established when it was a private town in the early 19th century.
- The subdivision pattern in Swan Street reflects its historical layout in that the north and south sides exhibit a relatively uniform settlement pattern in terms of individual dwellings or commercial buildings, similar lot size, similar side and front setbacks.
- The south side at the eastern end of Swan Street is characterised by individual residential development dwellings, some early and original 19th C Victorian cottages and others early to mid-20th C origin, but many share similar architectural elements.
- The north side of Swan Street east of Robert Street is characterised by larger sized lots and built form including industrial and commercial development but is characterised by a similar underlying grid system with lots addressing the primary street, Swan Street. Four residential dwellings are located east of the industrial precinct and fill the space between it and the subject site.
- The subject site is largely undeveloped which increases the extent of views available from the public domain in this part of Swan Street and from Edward Street further east.
- Private domain views are also potentially available from dwellings located along the south side of Swan Street in the vicinity of the subject site.
- Public and private domain views include a visual connection to the Hunter River flood plain and filtered views to rural lands to the north, to Hinton and other smaller settlements to the north, north west and north east.
- In the reverse direction, the subject site is not highly visually exposed to the north due to the lower elevation of viewing locations across the Hunter River floodplain, intervening vegetation for example along the river banks and intervening development, depending on the location of the viewer.
- No definitive methodology is accepted as best practice in the field of Visual Assessment in NSW. RLA have used our own methodology developed over the last 30 years by Dr Richard Lamb as a bench mark by which to evaluate the key components set out in the Visual Impact Statement (VIS) prepared by Terras Landscape Architects.
- We note that the Statement of Heritage Impact supports the application on the basis that the proposed development does not significantly affect the heritage significance of the site. This report also states that the site is listed within the table Urban Infill and Urban Extension included in the Maitland Urban Settlement Strategy 2012.

- Table 1 provides a summary of our comments and general overview of the adequacy of the VIS.
- The assessment in our opinion, although adequate overall, does not clearly address the following;

    1. The relationship or importance of the underlying Morpeth historic 'Darling Plan style' grid subdivision pattern.
    2. An analysis of the streetscape character as a basis to assess compatibility and visual fit and the impacts of the visual effects on the streetscape character and quality, of the intended end use of the subdivision.
    3. The link between visual effects and impacts. The analysis of views is in relation to a table, the ratings on which are in some cases inconsistent with comments in the text.
    4. The relationship between the historic layout and subdivision pattern of Morpeth and how this related to the views plan in MDCP.
    5. Adequate justification for an alternative view corridor focussing on Edward Street, supported by retention of views between buildings in a future subdivision.

Although there are some deficiencies in this regard, I generally agree with the conclusions of the VIS that the planning proposal can be supported on visual grounds.

2.0 Purpose of Report

The purpose of this report is to provide an independent analytical review of the Visual Impact statement (VIS) prepared Terras Landscape Architects in December 2014, which supports the planning proposal to re zone land at 30 Swan Street. The report will provide a summary in relation to the adequacy of the methodology followed in the VIS and assessment of whether fundamental issues have been analysed and considered adequately in relation to the relevant strategic and statutory planning framework, including Heritage issues and views.

This report is in response to Council's request that we comment on the methodology adopted by the proponent's visual impact consultants and its adequacy in regard to consideration of the impacts of the proposal at the local Morpeth Village scale and wider visual context and whether potential visual impacts have been adequately assessed.

Morpeth is recognised as a town with heritage significance in itself as well as containing a number or individually listed items and places of cultural significance. A primary consideration for this report therefore relates to the potential for Morpeth firstly to sustain new residential development and secondly whether such development is compatible with the existing landscape and heritage character and qualities of Morpeth, in visual terms.

In answering these questions, it is necessary to ascertain whether the existing landscape and character of Morpeth can support new residential development and if so in what area or areas. A second issue to be addressed is whether the existing historical character and process of development of Morpeth indicates opportunities and constraints for new residential development that could guide the appropriate form of that development.

This report is structured to consider each of these issues, i.e.:

1. to review the adequacy of the Visual Impact Statement including a determination as to whether the proposal satisfies the consideration of the MMP 2000 and the MDCP 2011.
2. In so doing the review is to objectively assess the existing landscape, scenic and heritage character of Morpeth to ascertain whether there is potential for new residential development at 30 Swan Street.
3. To identify opportunities and constraints for the future use of this site for residential uses in the context of the historic patterns of development, views and existing qualities of Morpeth.
4. If appropriate to recommend performance standards for the location, form and detailing of future residential development.

3.0 Documents Reviewed

- Visual Impact Statement revision A prepared by Terras Landscape Architects in December 2014.
- Statement of Heritage Impact (SoHI) prepared by EJE Heritage in 2014.
- Morpeth Management Plan 2000 (MMP).
- Morpeth Development Control Plan 2011 (MDCP) for the Morpeth Heritage Conservation Area.
- Planning Proposal for rezoning prepared by Pulver Cooper and Blackley in May 2014

4.0 Site and Historical Context.

RLA provide this brief historical summary as part of our review of the importance of the historical context of Morpeth and the relationship of the subject site and proposed development to it. In our opinion an appreciation of the historical context of Morpeth is relevant to this proposal in that it contributes to the basis of whether the proposal is compatible and responsive to the underlying 'Darling Plan style' town grid and underlying subdivision pattern and thereby also in relation to the existing streetscape character.

The subject site is at 30 Swan, Morpeth, located on the northern side and at the eastern end of the road and is described as Lot 3 DP 237264. The site was formerly partly occupied by one of three of Morpeth's railway stations which although not a heritage item itself played an important role historically in the early and mid 20th C in to the development and subsequent decline of Morpeth's shipping activities.

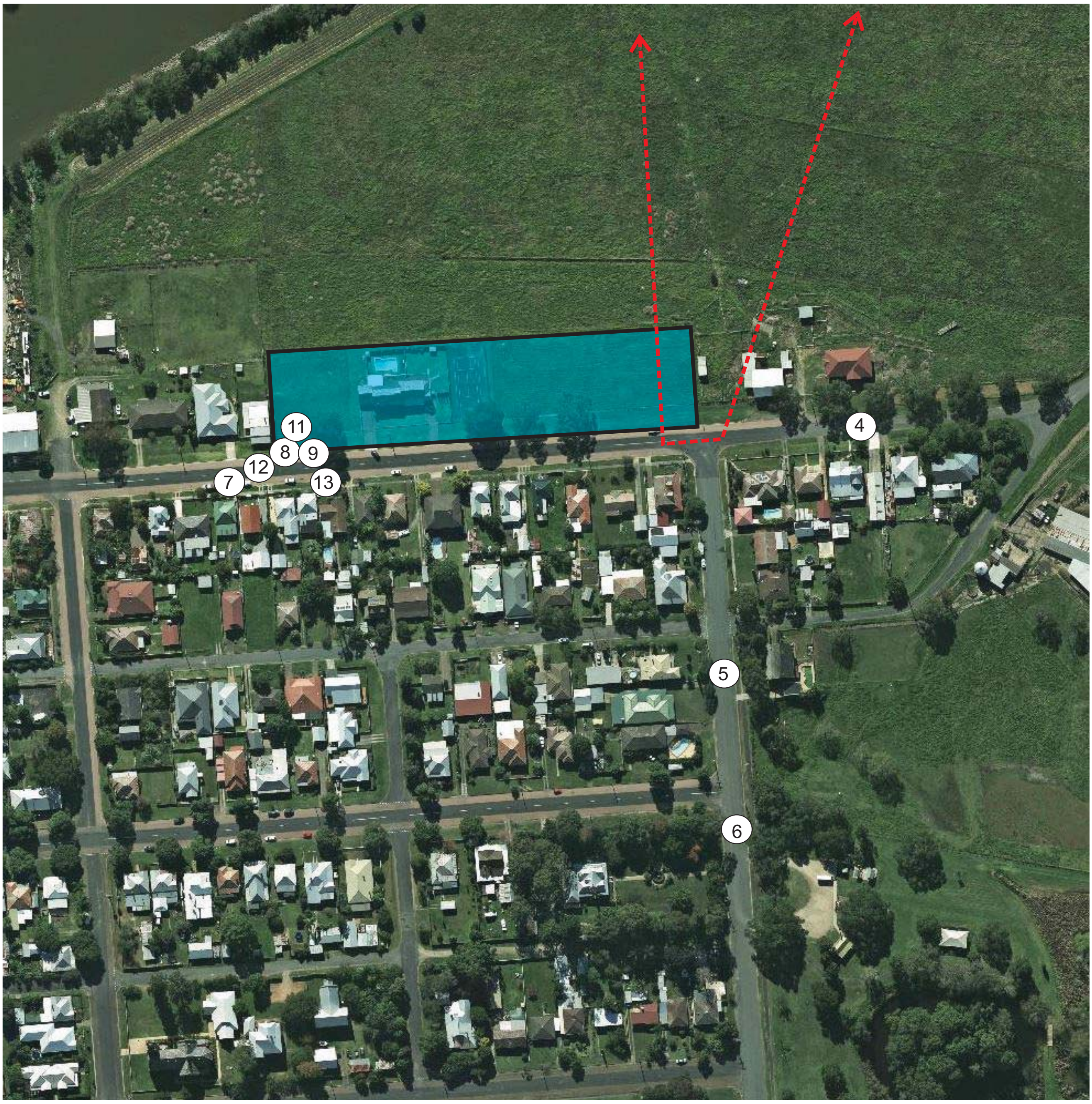
4.1. Site and Existing Streetscape Character

The subject site is relatively flat and appears to be have been modified or levelled to support the railway tracks and yard facilities which once stood on the site. The site is characterised by one individual two storey circa 1970s residence, tennis court and open lawn areas and is otherwise of a rural appearance. It is surrounded to the west and south by detached residential development and to the north and east by rural land or rural activities.

A sandstone post is located outside but close to the Swan Street boundary of the site and appears to be a mile post or marker. The stone is accompanied by another stone and plaque which was unveiled in 1991. The plaque reads as follows;

"This stone was placed in 1858 to mark the commencement of the first Great Northern Road in the Colony of New South Wales, Morpeth and District Progress Association Project"

We note that the SoHI report instructs that this item should be protected from disturbance. In addition we observed that two large timber gate posts at the eastern end of the Swan Street



Map 1: Immediate Viewing Locations

🟦 Approximate location of subject site

Suggested alternative view cone cf. map in MDCP

④ Viewing Location (refer to Photographic Figures)

NORTH

Not to Scale

Map 2: Wider Visual Catchment Viewing Locations

🟦 Approximate location of subject site

④ Viewing Location (refer to Photographic Figures)

NORTH

Not to Scale

Map 3: Suggested alternative view cone relative to MDCP map

⇡⇡ Suggested alternative view cone cf. map in MDCP

NORTH

Not to Scale

Map 4: Suggested alternative view cone with zoning amendments

🟪	Zone R1 General Residential
🟧	Zone E2 Environmental Conservation
⇈	Suggested alternative view cone cf. map in MDCP

NORTH

Not to Scale

boundary appear to be those used when the site was still operating as a railyway station and yard area and are approximately in line with the former access to the goods shed at the eastern end of the site. A further assessment of this feature may be required as a mandatory action in accordance with the Heritage Act 1977 (NSW)

Swan Street was planned to be the main commercial and residential street in the private town of Morpeth and as such was laid out parallel to the Hunter River and in accordance with a strict grid system and hierarchy of roads.

Swan Street is divided into four blocks by the four original secondary roads which run perpendicular to Swan Street. Each block within this development pattern along the southern side of Swan Street appears to share similar characteristics in terms of lot size and building siting with the front elevation of each building presenting to the main street.

This general arrangement continues east along Swan Street particularly along the south side and at the eastern end which although it includes infill housing development, still exhibits a relatively uniform settlement pattern, for example individual dwellings on similar sized lots, with similar width side and aligned front setbacks. The south side is characterised by original early original 19th C Victorian cottages, many with Georgian proportions and others modified more recently, many of which share similar architectural elements, scale and form. Among these are early to mid 20th century detached residences.

The blocks located along the north side of Swan Street display similar characteristics except between Robert Street and George Street. This block is characterised by larger sized lots and built form including industrial and commercial development but is set within a similar arrangement defined by the same underlying grid system, with lots addressing the primary street, Swan Street. A subdivision plan of Morpeth circa 1860 shows that an additional 4 lots east of George Street up to the boundary of the former railway yards and the existing boundary of the subject site were planned.

Given that the town's planned subdivision stopped at the subject sites boundary its appears to have remained as one large lot to the present day and in this regard is still largely undeveloped. The resultant predominant open character of the site may have contributed to the actual and perceived visual connection with rural lands to the north and may have given rise to the location of view 'corridors' in the MDCP Part E Special Precincts Heritage Conservation Areas View Corridors Map, one of which appears to cover the entire subject site.

4.1.2 Ownership

Originally known as Green Hill or Illulaung, the site of Morpeth was granted to Lt Edward Charles Close in 1821. By 1823 a small settlement was established at the site and by 1834 the official layout of the township was established and allotments of Close's grant were released for sale and lease. Morpeth thereby began its life as a private town. It wasn't until 1920 that all of Close's land was finally sold off.

The influence of Close and his vision for the layout of the town and disposition of land uses remains until today. The original geometry of the town and the spatial influence of the ideology of the place as a centre for commerce and also of a tenanted rural landscape can still be discerned.

4.1.3 Development Process

The original layout of the town followed two major influences, that of the river and of Close's theories of town planning (Figure 1). The figure gives an indication of the effect of the river alignment on the location of the first street, which became Swan Street. Swan Street is one of the bounding streets that was intended to contain Morpeth. The early subdivision of land followed access to Morpeth from the river and from the east (Maitland) and west (Patricks Plains). Close's first plan appears to have been drawn by a surveyor who had little understanding of the appropriate scale of the lots which soon were found to be too large, but who understood the fashion for the geometry of town plans laid out by Close and others (See Figure 3). The subdivision plan is similar in layout to parts of other settlements established in the Governor Darling era of planning (eg. Newcastle, Bolwarra, parts of East Maitland, Forbes, Braidwood, etc.). Darling served as a military secretary in America and the West Indies and may have been influenced by the same theories of colonial planning as other contemporaries of Close, such as Brisbane and Dangar.

The 1830's saw Morpeth develop commercially as well as residentially. Morpeth originally developed along Swan, Tank, High, Northumberland and Robert Streets in a generally two block grid pattern. The land along the river front developed beyond Robert and Tank Streets at the same time (Figure 2). Perhaps because it began as Close's private town, Morpeth did not develop a formal civic centre and is not organised around public open space. Civic buildings were added to the town later, as infill buildings among already established residential and commercial streets.

The original subdivision followed a pattern of dividing each block into seven, with the ends each being divided into three allotments facing the side streets and the remainder divided into two allotments, each facing the streets to the north or south, totalling sixteen allotments per block. Close Street is essentially a lane splitting the block pattern along the rear boundaries of lots facing Swan and High Street and requiring the subdivision of the central lot on the secondary north-south streets. It is indicated on an auctioneer's advertisement circa 1841 when the Hunters River Auction Company auctioned 14 allotments in January that year. The 1849 plan of Morpeth does not show Close Street in existence at this time and indeed it may not have been established until much later. The subdivision of larger lots between primary streets with laneways that bisected the blocks reflected the pressure for commercial development and subdivision of land into more practically sized lots near the commercial area of Swan Street and the river, as well as the need for rear access to commercial properties. The development of Close Street saw the beginning of the re-interpretation of the original subdivision pattern and also of a fashion in subdivision that featured bisecting laneways as the third level of a hierarchical street pattern. This fashion lasted into the mid 20th century in many country towns that experienced boom growth in the inter-war period.

A clear street hierarchy thus exists in Morpeth. The development pattern and original street layout by Close was simpler than the pattern now in existence. Later subdivision and division of blocks longitudinally eventually led to a series of tertiary streets or lanes which further subdivided the underlying pattern of primary and secondary streets. Primary streets run

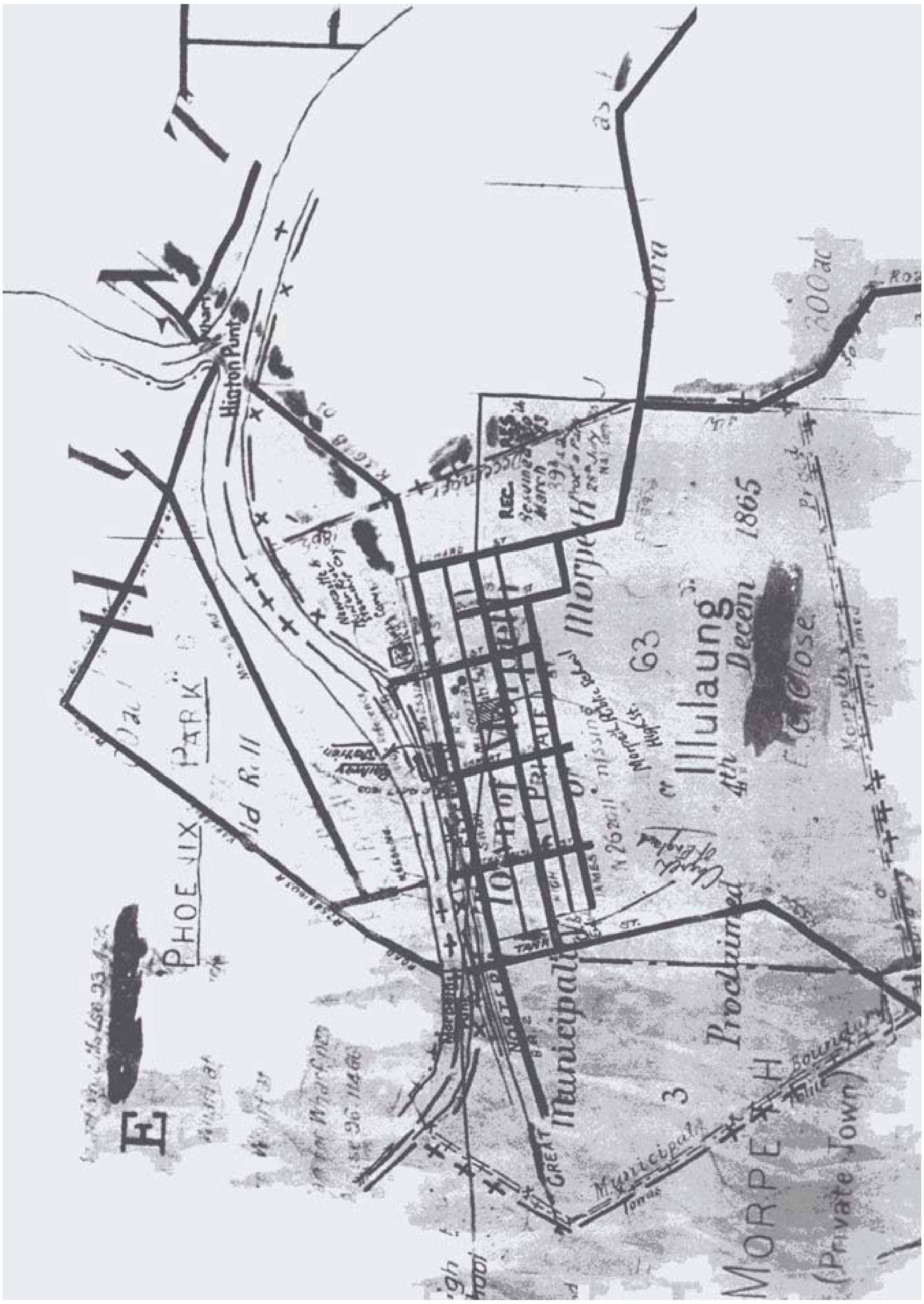


Figure 1

Morpeth parish map circa 1865 with later annotations

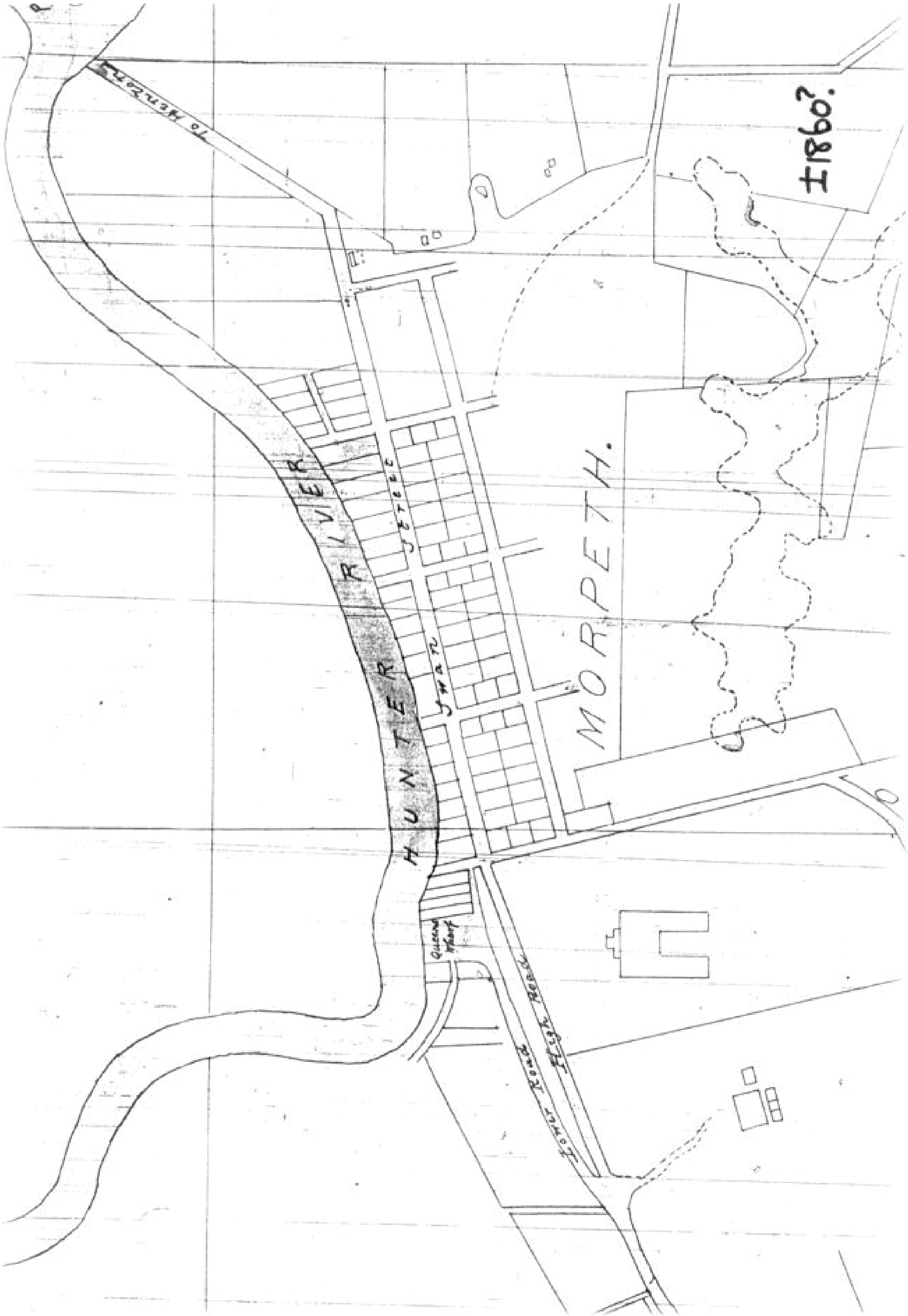


Figure 2 Morpeth circa 1860

Figure 3 Subdivision pattern of Morpeth circa 2010

east west, secondary north south and the tertiary streets and lanes run predominantly, but not exclusively, east west. Figures 8 to 10 illustrate the relationship between each street hierarchy type. Figure 11 shows the complete existing street hierarchy of Morpeth including the bounding streets.

4.1.4 Relevance of the Historical Context of Morpeth

The urban contemporary context of Morpeth is based on the framework of the past. The framework is important as a means to inform future planning, design and heritage conservation. The urban context in Morpeth includes elements of the following; Architectural quality, detail and character, heritage conservation areas, character neighbourhood quality, streetscape and public domain design, cultural patterns and development, precincts, localities, neighbourhoods and cultural places.

Morpeth's Character has been derived from ongoing settlement processes from its establishment in the early and mid 19th Century. This includes overlays of different historic periods of development onto the physical and biological landscape such as constraints on development by flooding growth of rail and road infrastructure, demand for space for residential development, industrial land and commercial activities. Changes in technology, siltation and later regulation of the river, rise of irrigated agriculture economy, population drift to the city, decline of rural industry and pressure for heritage tourism.

The physical and biological constraints and opportunities for development and the process of historical development in Morpeth provide an intact and legible example of the typical development of private towns throughout NSW. Its history can be understood in relation to a small number of distinct districts that retain original character. In our opinion these attributes should be considered in relation to the merits of any rezoning application and urban infill proposal.

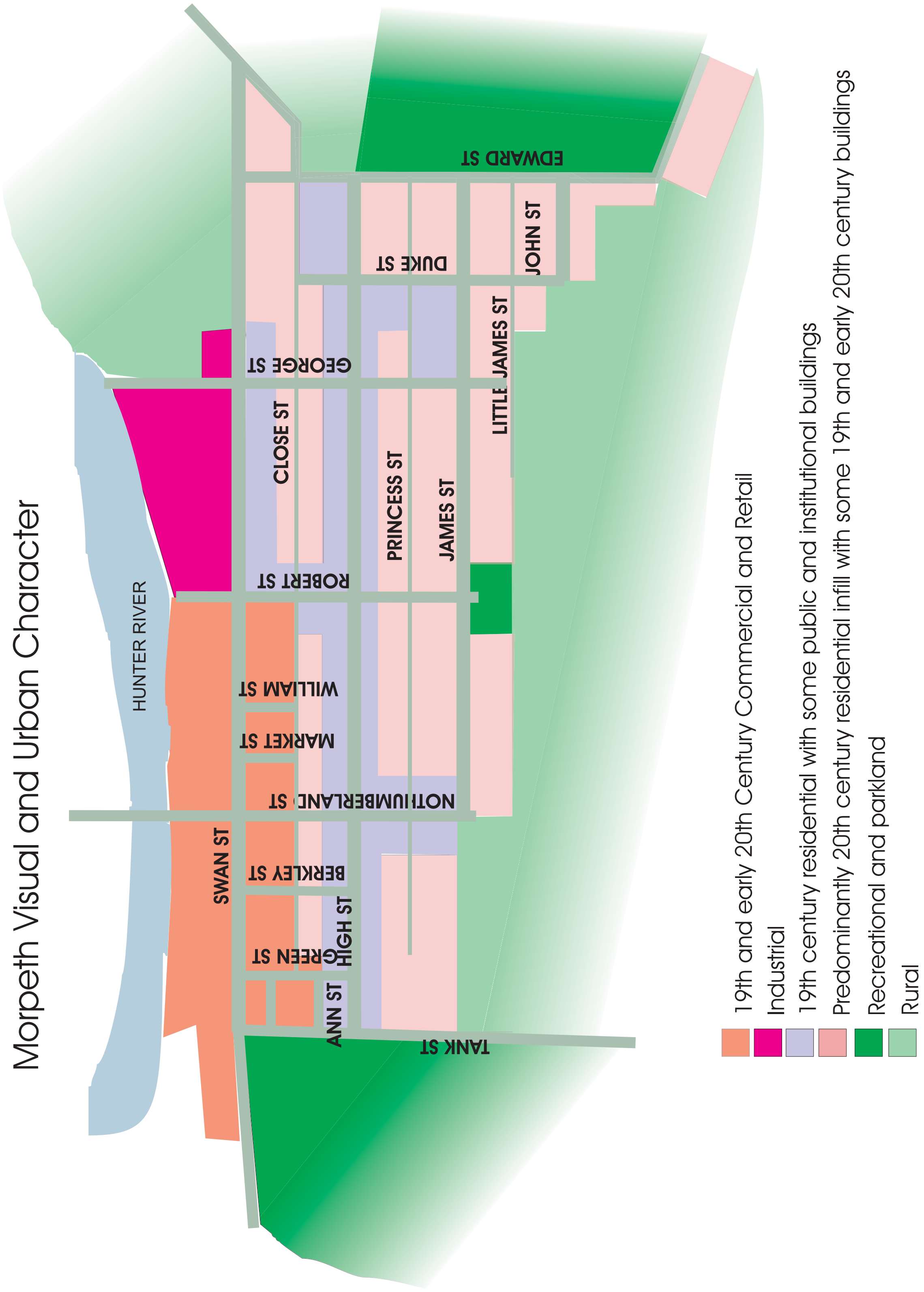


Figure 4 Diagrammatic visual and urban character of Morpeth

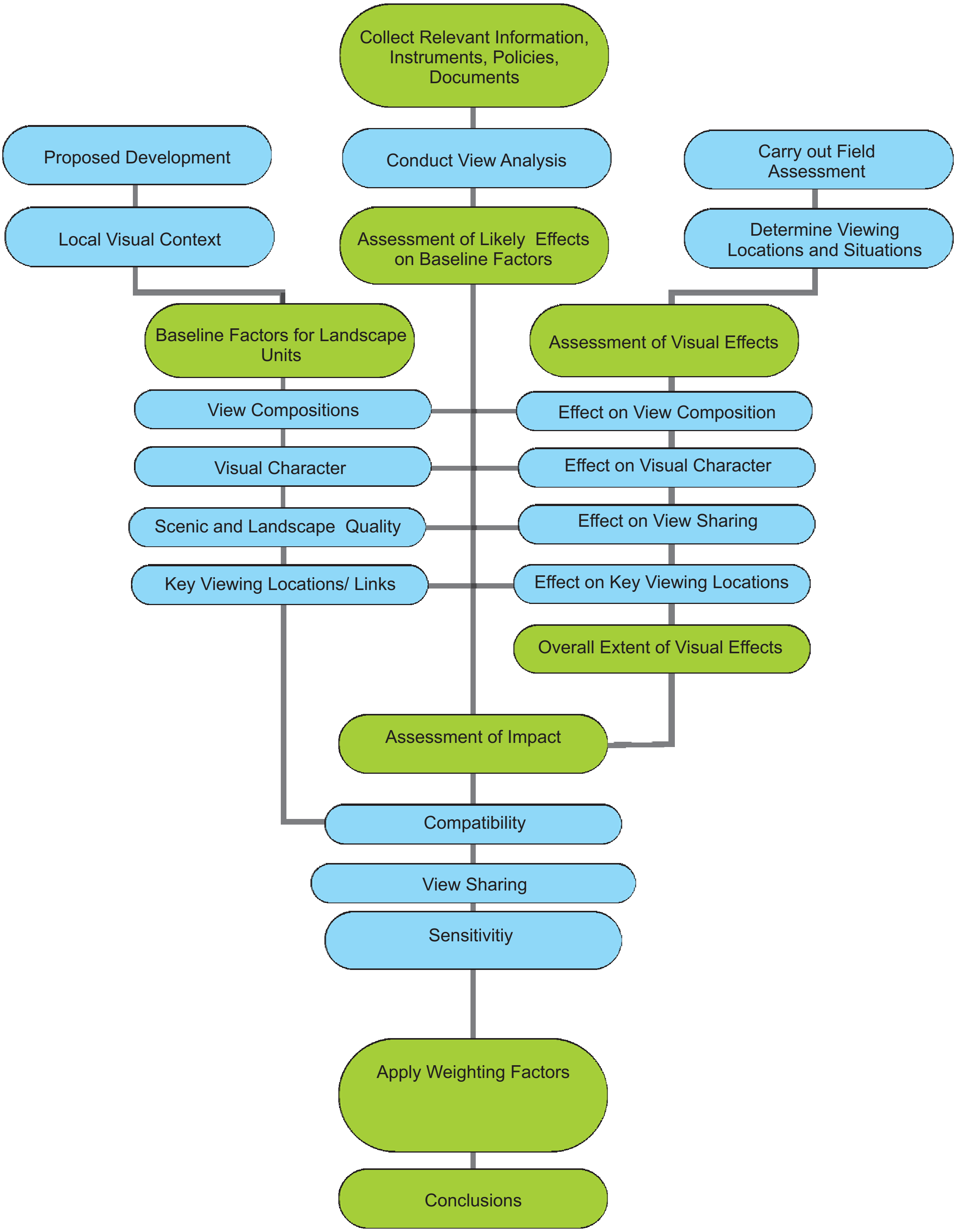
5.0 Review of Methodology for the Visual Impact Statement (VIS)

The Department of Planning and Environment does not provide guidence as to the inclusions and requirements of Visual Impact Assessments or Statements. This review accepts that there is no industry standard of best practice that determines how such reports are conducted and that a wide range of approaches are possible. Typically such an assessment is required to provide information in relation to the landscape character and values and any specific scenic or sginificant vistas of the area potentially affected by the proposed development.

Over a 30 year period RLA have developed our own methodology for Visual Impact Assessment. This method is shown in the flow chart below which is a graphic representation of the parameters of the assessment and the logic and sequence of analysis and assessment tasks undertaken. In our opinion as a minimum the following key attributes of any proposed development should be analysed and assessed in order to determine potential visual effects, impacts and therefore the appropriate scale or form of development within a specific visual environment;

- Assess the local Visual Context in terms of its existing baseline factors ie visual character, quality, key viewing locations etc. including those identified in the MDCP.
- Understand the proposed development sufficiently to be able to assess the potential visual effects of it, within this visual (and heritage) setting ie effects on the visual character and quality, effects on existing views (composition) as seen from appropriate viewing locations.
- Assess the impacts of the effects in the context of compatibility, view sharing and sensitivity

We have summarised and tabulated the key components of the Terras Visual Impact Statement and compared them to the essential elements of our methodology in Table 1 below.



Richard Lamb and Associates Visual Impact Analysis and Assessment Method Flow Chart

Table 1

Terra Landscape Architects VIS Methodology Component	RLA Comment
Consideration of the proposed development within the local visual context	
Visual Character	Section 02.1.2 addresses the local area character and has been adequately represented and assessed.
Streetscape quality	The streetscape character in the vicinity of the site has not been specifically analysed or assessed, nor the relationship of the subject site to the underlying subdivision pattern and alignment of properties to Swan Street. In this regard no comment is made in relation to the heritage significance of this established underlying settlement pattern. Limited passing comments are included in the document in section 05 View point Analysis. However in our opinion, the indicative subdivision plan submitted appropriately responds to the existing subdivision pattern of Swan Street and the wider character of Morpeth in terms of its lot sizes and orientation to Swan Street. The proposed lots vary in width as do those opposite the site along the south side of Swan Street. In our opinion development controls included in the Maitland DCP Heriatge Conservation Area: Morpeth are adequate to ensure that the overall streetscape character of Swan Street can be maintained.
Visual Catchment	A view point analysis map is shown at Figure 5.0 and includes locations within 500m and up to approximately 3km from the site. Photographs from each view point show representative views, compositions and confirm the visibility of the proposed development site. In our opinion the site has a limited visual catchment and low external visibility despite its slightly elevated location adjacent to rural land. In this regard in our opinion the visual catchment has been satisfactorily determined and an adequate number and range of viewing locations are represented in the report.
Key viewing locations	Section 04 includes a commentary regarding significant view corridors in Morpeth and in particular view corridors shown in the MDCP 2011.

Terra Landscape Architects **VIS Methodology Component**	**RLA Comment**
	Photographs 1 and 2 from Swan Street and Edward Street respectively both appear to be locations which fall within cone shaped view corridors shown on the MDCP Part E special precincts Heritage Conservation Areas View Corridors Map. Photograph 5 taken from Hunter Street in Hinton also appears to be from a direction which is covered by a wide arc on the map and labelled as 'View from Hinton'. The Terras report therefore addresses the requirements within the MDCP. In our opinion their commentary is adequate. We comment further that the site's external visibility is extremely limited from the north and north west due to intervening riverside vegetation and development and in this regard the proposed development is unlikely to be visible at all from Hinton. Views from Swan Street to rural lands north west, north and north east of the site remain accessible from the public domain via side setback and height controls to be applied during the DA process. The axial view corridor north along Edward Street can be similarly protected with the application of an easement or setback which is proposed by Terrras Landscape Architects and supported by RLA.
Assessment of Visual Effects	
Composition, Character Streetscape Quality	This assessment is limited. Visual effects are described briefly below each view point photograph and the weighting of the effect is indicated by a 'X' in a corresponding box on each view point sheet. The assessment is displayed in a matrix and read horizontally across each line. Components such as viewer access, sensitivity, effect and impact are assessed as low, medium or high individually. The two most important and potentially impacted views are 1 and 2 from Swan and Edward Streets respectively. As previously noted the streetscape character of the site has not been established, therefore the level of visual effects on the streetscape character cannot be determined. Although the ratings appear to be logical there is a missing step as to the compatibility of the effect and therefore its impact on potentilal future streetscape quality. RLA concur with

Terra Landscape Architects **VIS Methodology Component**	**RLA Comment**
	the assessment of components in each case and overall would rate the visual impacts of the Swan Street view as High and the visual impacts of the Edward Street view as moderate, given that the development, once easement or side setback controls are applied will not form part of the focal view. In our opinion this assessment is adequate.
<u>Assessment of overall Visual Impacts</u>	
<u>Visual impacts, compatibility, sensitivity and view loss</u>	The assessment of visual impacts appears to be mixed in with the assessment of visual effects. There is limited commentary as to how the impacts of the proposed development will affect the composition in each view, and if so the sensitivity of that viewing location or any potential impacts on the streetscape etc. It is not clear what is the overall or summary weighting or resultant impact in each case. The rating of visual effects shown on the table with the views does not always appear to be linked accurately to the associated comments or to the impacts rating for each viewpoint location. Having said that, RLA concur that due to limited external visibility of the site, views 1 and 2 are the most important. If I considered the approval of the planning proposal and the potential development of 9 dwellings on the site and were to apply our own methodology it is likely my ratings would be similar. View 1 from Swan Street would have an overall rating of high visual effects but moderate visual impact due to general compatibility with the settlement pattern and View 2 from Edward Street would have a low visual effect (subject to MDCP controls) and a moderate visual impact, given that all effects are not within a direct axial view which is of greater heritage significance and deserves protection, as proposed, and most of the existing view will remain unaffected by the proposed development.

6.0 Review of Supplementary Information and Studies where relevant to the Visual Impact Statement.

The Visual Impact Statement has been reviewed in the context of a number of statutory and non-statutory reports which guide the development and strategic planning of the Maitland Local Government Area (LGA) and Morpeth itself.

The historic town of Morpeth sits within the north ward of the Maitland Local Government Area, north and east of Maitland.

6.1 Morpeth Local Environmental Plan 2011

Many individual heritage items are identified within Morpeth and are recorded in Schedule 5 of the MLEP 2011. We note that no individual items exist within the subject site but that the entire site sits within the Heritage Conservation Area of Morpeth Town which has local significance.

6.2 Morpeth Management Plan May 2000;

The Morpeth Management Plan provides the overarching basis and framework for management of the Maitland City Councils responsibilities in Morpeth and provides objectives and policies which relate to the management of the Heritage Conservation Area.

Overarching Principles for management of Morpeth and which are relevant to the planning proposal include the following

- Understanding and sustaining Morpeth's Heritage and Character
- Protecting local amenity, village character and community life.

Comment

The management plan primarily works at a broad level offering guidance for strategic planning and conceptual design of ongoing development, urban infill and subdivision in Morpeth.

Objectives 1 and 2 above have not explicitly been explored or assessed within the VIS or considered in relation to this planning proposal. Our review however concludes that the conceptual subdivision proposed is of a nature and scale which fits appropriately within the wider historic and visual context of Morpeth and the immediate visual character of Swan Street.

6.3 Maitland City Wide Development Control Plan (MDCP)

The subject site is located at the east end of Swan Street on its northern side, approximately 200m south of the Hunter River. This end of Swan Street does not share the same visual character as Swan Street to its west and within the town centre but nonetheless sits within the Morpeth Heritage Conservation Area. Any proposed development in this part of Swan Street is required to be considered sensitively in the context of its wider heritage setting and values.

DCP Part E Special Precincts 2011 includes the subject site within the Rural Outskirts Precinct which includes recreational space and rural plains that surround the township of Morpeth. An industrial special precinct sits immediately adjacent and west of the subject site and a residential precinct is opposite the site along the entire length of the south side of Swan Street.

Rural Outskirts Precinct

This precinct is characterised by open rural areas and open pasture, low scale isolated buildings and rural dwellings.

> *The specific characteristics of this precinct can be summarised by the following:*
>
> - *Rural surrounds which features barns and farm houses and evidence of floods.*
> - *Open farming plains that provide clear views to the township of Morpeth from surrounding areas.*
> - *Incorporates the floodplains and meandering Hunter River.*

Comment

The proposed development (proposal to rezone land) will not in itself cause any significant change to the specific visual characteristics of the site or precinct. If the proposed development is approved, further individual development across the lots on the site will be subject to the objectives and controls for residential development in the MDCP which in our opinion are appropriate and sufficient to ensure that the existing and desired future character of the immediate and wider context is protected and enhanced.

Views from the township to Rural Surrounds

Views

> *Morpeth is elevated above surrounding agricultural land and river flats and has a very strong connection to these rural surrounds. Views along streets, gaps between buildings and open land at the axis of streets are of particular significance. Significant views and view corridors have been identified on the map below.*

Aim

> *The relationship between the town and the rural surrounds should be maintained through the protection of these significant view corridors.*

Comment

Section 4.1 of the VIS provides commentary on the response of the proposal to views defined in the MDCP. The VIS interprets the view corridors map as showing a corridor extending across the entire site and suggests that this is an unreasonable control on a site that has had extensive development on it in the past. RLA agree with this interpretation and suggest that the corridor which covers the subject site is there by virtue of the fact that the site has been largely undeveloped in recent history. Intensive development on the site has not occurred because of the existing zoning applied to the site and the resultant low scale and low density built forms on site have allowed incidental views to the rural surrounds from this part of Swan Street to exist. These incidental views across the subject site appear to have assumed greater importance as shown in the MDCP than is warranted. In our opinion these view while they provide a setting for outward views from one part of the edge of the existing township are not heritage views, specifically planned for the purposes of creating visual links between Heritage Items or specific scenic or important items, but have simply occurred incidentally.

In our opinion if the proposed development was to be approved, the most important heritage view axes down Swan and Edward Streets can be preserved with the application of an easement to prevent incursion into the Edward Street corridor and residential development controls included in the MDCP.

An axial view to rural lands exists along Edward Street. As one of the early planned secondary streets, the axis is significant both in visual impacts and heritage terms. The view is constrained to the road alignment and by street tree planting and residential development along the west and eastern sides of Edward Street and centres on a small rural shed which is located on an adjacent property east of the subject side. A small part of the subject site along its eastern boundary aligns with Edward Street and forms part of the composition of this view as the viewer approaches the northern end of Edward Street. North of Close Street the arc of the view become less constrained by roadside development and wider. In this approximate location the proposed development will form a greater part of the view.

We concur with conclusions in the VIS that views to the north and north east from the intersection of Swan and Edward Street are important and should be protected. In our opinion an amended or alternative cone of view from this location should be defined relative to the MDCP map (Figure 3). The alternative cone is consistent with our recommendations for protection of the view in that cone and could be implemented with the application of an appropriate zoning, which would act to prohibit built structures in the view cone as it crosses the subject site. We have included a plan of an indicative view cone for Council’s consideration (see Figures 1 and 3).

7.0 Conclusion

RLA have reviewed the Visual Impact Statement in respect of the 30 Swan Street Planning Proposal prepared by Terras Landscape Architects and find that the logic and methodology used in their assessment is sufficient and adequate. On this basis I can support their conclusions and recommendations.

Although commentary in relation to visual effects, visual fit and compatibility of the proposed development is not explored fully, the conclusions I reach are similar to those in the VIS in that on balance a subdivision of this scale and in the design shown interacts appropriately with the local visual and historical context and is in my opinion compatible with it.

I support suggested mitigation strategies in the VIS and the inclusion of appropriate protection of views from the end of Edward Street across part of the subject site and to the north and north east. However I do not think that an easement over part of the future subdivision, as proposed by the applicants, is sufficient or likely to be effective in controlling the potential construction of buildings and other structures and thereby retain views, as required. I suggest that an appropriate Environmental Protection zoning would be more effective and appropriate.

I am of the view that existing MDCP controls in relation to side setbacks, height, form and scale of individual dwellings on each block if applied consistently and cognisant of the need to retain some views of the rural landscape beyond would be sufficient to retain through site view corridors from the private and public domain along Swan Street and that no further special controls are warranted.

Richard Lamb

Yours sincerely

Dr Richard Lamb
Richard Lamb & Associates

Location 1: View south west from Brisbane Fields Road.

Location 2: View south west from Brisbane Fields Road.

Location 3: View south west close to the end of Swan Street and similar to Terras Viewpoint 3.

Location 4: View west along Swan Street just east of the subject site boundary.

Location 5: Axial view north along Edward Street from south of its intersection with Close Street.

Location 6: Distant axial view north along Edward Street from south of its intersection with John Street.

Location 7: View north east to the site from near No 35 Swan Street, similar to Terras Viewpoint 1.

Location 8: Detail of marker post and plaque in front of 30 Swan Street.

Location 9: Detail of commemorative plaque.

Location 10: View south from Hinton Road similar to Terras Viewpoint 4.

Location 11: View north east across the site towards Hinton Bridge

Location 12: Streetscape view east along Swan Street in the vicinity of the site.

Location 13: Streetscape view of dwellings in the vicinity of the site.

Location 14: View west from Hunter Street in Hinton, similar to Terras Viewpoint 5

Appendix 2: Curriculum Vitae

Summary Curriculum Vitae: Dr Richard Lamb

Summary

- Professional consultant specialising in visual and herittage impacts assessment and the principal of Richard Lamb and Associates (RLA)
- Senior lecturer in Architecture and Heritage Conservation in the Faculty of Architecture, Design and Planning at the University of Sydne, 1980-2007
- Director of Master of Heritage Conservation Program, University of Sydney, 1998-2004.
- 30 years experinence in teaching and research in environmental impact, heritage and visual impact assessment.
- Teaching and research expertise in interpretation of heritage items and places, cultural transformations of environments, conservation methods and practices.
- Teaching and research experience in visual perception and cognition, aesthetic assessment and landscape assessment,.
- Supervision of Master and PhD students postgraduate students in heritage conservation and environment/behaviour studies..
- Experience in academic empirical research into human aspects of the built environment, in particular aspects of aesthetic assessment, visual perception, landscape preference and environmental psychology.
- Richard Lamb and Associates provides:
    - professional services, expert advice and landscape and aesthetic assessments in many different contexts
    - Strategic planning studies to protect and enhance scenic quality and landscape heritage values
    - Scenic and aesthetic assessments in all contexts, from rural to urban, provide advice on view loss, view sharing and landscape heritage studies.
- Dr Lamb provides:
    - Expert advice, testimony and evidence to the Land and Environment Court of NSW and Planning and Environment Court of Queensland in various classes of litigation.
    - Specialisation in mattes of heritage landscapes, visual impacts, and urban design
    - Appearances in over 150 cases and submissions to several Commissions of Inquiry and the principal consultant for over 400 consultancies.
- Qualifications
    - Bachelor of Science - First Class Honours, University of New England
    - Doctor of Philosophy, University of New England in 1975
    - Accredited Administrator and Assessor, Myers Briggs Psychological Type Indicator
- International Journals for which Publications are Refereed
    - Landscape & Urban Planning
    - Journal of Architectural & Planning Research
    - Architectural Science Review
    - People and Physical Environment Research
    - Journal of Environmental Psychology
    - Australasian Journal of Environmental Management
    - Ecological Management & Restoration
    - Urban Design Review International

APPENDIX SIX. ABORIGINAL HERITAGE DUE DILIGENCE ASSESSMENT

ABORIGINAL AND HISTORIC HERITAGE DESKTOP DUE DILIGENCE ASSESSMENT

For

LOT 3 DP 237264, 30 Swan Street Morpeth

A Report to

Mr H. Lantry

PO Box 2

MORPETH NSW 2321

By

Giles Hamm
Cultural Heritage Consultant

May 2014

Project Name.	**Lot 3 DP 237264 30 Swann St Morpeth**		
Document Description	Aboriginal and Historic Heritage Desktop Due Diligence Assessment Rezoning Project Lot 3 DP 237264 Swan St Morpeth		
	Name	**Signed**	**Date**
ARAS Project Manager(s)	Giles Hamm		12th of May 2014
Document Manager	**Giles Hamm**		
Authors	Giles Hamm		
External Review	**Mark Daniels Planning Manager PCB**		
Document Status	**Final Draft**		
Date	12th of May 2014		
Prepared for:	Mr Hilary Lantry		

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1. INTRODUCTION & BACKGROUND

The consultant was engaged by Pulver, Cooper & Blackley (PCB) on behalf of Mr Hilary Lantry to carry out an Aboriginal and Historic Heritage Desktop due diligence assessment. The assessment was required in order to determine likely Aboriginal and European heritage constraints and opportunities for a re-zoning proposal of land identified as: Lot 3 DP: 237264 located at 30 Swan St Morpeth. The proposed rezoning project is being carried out on behalf of local land-owner Mr Hilary Lantry.

Currently the land is zoned RU1 Primary Production under the Maitland Local Environmental Plan 2011 and the intention is to rezone the land to residential R1 General Residential. The land is located within the Maitland City Council Local Government Area (See Figure 1 & 2: Appendix 1.). The assessment area covers approximately 1 hectare or 7908m2.

The aims of this desktop assessment were to:

- Review any relevant existing Aboriginal and Historic heritage information and relevant data-bases;
- Carry out an archaeological desktop risk assessment to identify likely Aboriginal or Historic heritage issues on the ground and make an assessment of likely Aboriginal and Historic heritage potential;
- Provide advice as to the likely land use restrictions posed by known Aboriginal or Historic heritage objects or potential Aboriginal heritage objects;
- Provide appropriate risk management advice in order to reduce any likely impacts on identified Aboriginal or Historic heritage places or sites as a result of the rezoning proposal; and
- Determine whether or not further archaeological investigation is required.

1.1 Project Description

The proposed rezoning assessment area is made up of riverine floodplain terrace units of the Hunter River all of which have been disturbed as a result of previous urban residential and infrastructure development in the village of Morpeth. Approximately 1 hectares of rural/residential land farm land is being assessed having been identified as potential long term residential expansion.

2. LEGISLATIVE FRAMEWORK

2.1 The National Parks and Wildlife Act 1974 (NSW)

The *National Parks and Wildlife Act 1974* (NSW) (the 'NPW Act') is the primary piece of legislation for the protection of Aboriginal cultural heritage in New South Wales. The Office of Environment and Heritage (OEH) administer the NPW Act. The NPW Act provides statutory protection for Aboriginal objects by making it illegal to harm Aboriginal objects and Aboriginal places, and by providing two tiers of offence against which individuals or corporations who harm Aboriginal objects or Aboriginal places can be prosecuted. The NPW Act defines Aboriginal objects and Aboriginal places:

> *Aboriginal object means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*
>
> *Aboriginal place means any place declared to be an Aboriginal place under section 84.*

The highest tier offences are reserved for knowledgeable harm of Aboriginal objects or knowledgeable desecration of Aboriginal places. Second tier offences are strict liability offences—that is, offences regardless of whether or not the offender knows they are harming an Aboriginal object or desecrating and Aboriginal place—against which defences may be established under the *National Parks and Wildlife Regulation 2009* (NSW) (the 'NPW Regulation').

Section 87 of the NPW Act establishes defences against prosecution under s.86 (1), (2) or (4). The defences are as follows:

- An Aboriginal Heritage Impact Permit (AHIP) authorising the harm (s.87(1))
- Exercising due diligence to establish Aboriginal objects will not be harmed (s.87(2)) Due diligence may be achieved by compliance with requirements set out in the *National Parks and Wildlife Regulation 2009* (the NPW Regulation) or a code of practice adopted or prescribed by the NPW Regulation (s.87(3))
- Undertaking "low impact" activities (s.87 (4)).

This assessment report follows the Due Diligence Code and aims to establish whether Aboriginal objects would be harmed by the proposed rezoning project in accordance with S.87(2) of the NWP Regulation.

2.2 The National Parks and Wildlife Regulation 2009 (NSW)

The NPW Regulation 2009 (cl.80A) assigns the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (NSW Department of Environment, Climate Change and Water 2010)(the Code) as one of the codes of practice that can be complied with pursuant to s.87 of the NPW Act.

In addition the NPW Regulation describes “certain low impact activities” in s.80B. Disturbed land is defined by cl.80B (4) as “disturbed if it has been the subject of a human activity that has changed the land’s surface, being changes that remain clear and observable”. Examples given in the notes to cl.80B (4) include “construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure)”.

2.3 The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales 2010

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (the Code) describes the process that must be followed and the actions that must be taken by a proponent, and the site conditions that must be satisfied, to show due diligence in the consideration of potential harm to Aboriginal objects.

The Due Diligence Code sets out a basic framework with the following steps followed in order to make an assessment of whether or not proposed activities may impact Aboriginal objects:

Step 1.	*Will the activity disturb the ground surface?*
Step 2a.	*Search the AHIMS database and use any other sources of information of which you are already aware*
Step 2b.	*Activities in areas where landscape features indicate the presence of Aboriginal objects*
Step 4:	*Desktop assessment and visual inspection*
Step 5.	*Further investigations and impact assessment*

The process set out in the Code involves consideration of harm to Aboriginal objects at increasing levels of detail, with additional information incorporated at each step and used to support the decisions being made. If the proposed activities are not “low impact activities” (a defence for which is provided under the Regulation) the considerations result in a determination of whether or not:

- further approval (an AHIP) under the NPW Act is required, or;
- Due Diligence obligations for the protection of Aboriginal objects are discharged by the process under the Code.

2.4 Provisions of the NSW Heritage Act 1977

Items and relics that are found within the boundaries of the assessment area will have to be managed under the *NSW Heritage Act (1977).* There may be other items or relics that have not yet been found that will require managing under the *NSW Heritage Act (1977).* Under the *Heritage Act 1977,* relics are defined as:

"relic" means any deposit, object or material evidence:

a) which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and

b) which is 50 or more years old.

Section 139 states:

139 Excavation permit required in certain cases.

(1) A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.

(2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

(3) This section does not apply to a relic that is subject to an interim heritage order made by the Minister or a listing on the State Heritage Register.

(4) The Heritage Council may by order published in the Gazette create exceptions to this section, either unconditionally or subject to conditions, in respect of any of the following:

  (a) (a) any relic of a specified kind or description,

  (b) (b) any disturbance or excavation of a specified kind or description,

  (c) (c) any disturbance or excavation of land in a specified location or having specified features or attributes,

  (d) (d) any disturbance or excavation of land in respect of which an archaeological assessment approved by the Heritage Council indicates:

    (i) that there is little likelihood of there being any relics in the land, or

    (ii) that any relics in the land are unlikely to have State or local heritage significance.

(5) This section does not prevent a person from disturbing or excavating land in which a historic shipwreck is situated in accordance with a historic shipwrecks permit in force in respect of that shipwreck.

3. BACKGROUND ABORIGINAL HERITAGE RESEARCH

Through the NSW Office of Environment and Heritage (OEH) an extensive Aboriginal Heritage Information Management System (AHIMS) search was conducted by ARAS Pty Ltd on 25th of March 2014 (AHIMS search ID 129594). The search covered an area of approximately 3 km^2 that encompassed the project area. There are no registered Aboriginal archaeological sites located near (within 500m) or directly on the search area. The AHIMS search results are presented in Table 1 below. A majority of these registered Aboriginal sites are located to the north of Morpeth, near the locality of Hinton or to the south near Four Mile Creek catchment (Figure 3: Appendix 1).

Table 1: AHIM's search results (ID#129594) for sites located within the project area

OEH Site ID No.	**Site name**	**Grid Reference**	**Site Type**
38-4-0988	Hunter River Morpeth	370900 6378200	Open site: Hearth
38-4-1209	Hinton PADs (1-3)	373260 6379000	Open sites partially destroyed
38-4-1521	HINTON BRIDGE MIDDEN	373164 6379406	Open site-shell midden
38-4-0148	Kanawarry	377350 6379580	Open Campsite

The above Aboriginal site distribution list is only a small portion of what is known for the entire Morpeth/Maitland region in the Lower Hunter Valley. Aboriginal occupation sites have been recorded along the following major riverine landforms, creek catchments and associated forest/wetlands but are not necessarily registered:

- Hunter River;
- Paterson River;
- Tenambit;
- Largs;
- Bolwarra Heights;
- McClement Swamp;and
- Four Mile Creek.

The land is located within the boundary area of the Wonnarua Aboriginal language group (Tindale 1974, Horton 1994.) According to OEH database records, there are no existing or proposed Aboriginal place declarations for the land in question.

3.1 Previous Archaeological Research

Previous archaeological work in the Lower Hunter (See, Baker (1997), Beasant (2002), Brayshaw (1984), Hamm (2005, 2008), HLA-Envirosciences Pty Ltd (1995) Kuskie (1994, 2000, 2004, 2006), Kuskie & Kamminga (2000), Umwelt Australia (1991, 1999a, 2001a); ERM (2002a);; Dagg (1996); Curran (Resource Planning 1994); Curran (Resource Planning 1993); Dean-Jones (1986) and Silcox & Ruig 1995 have provided solid evidence concerning the known site patterning and Aboriginal occupation models. At a local government level Maitland City Council commissioned a study to look at Aboriginal heritage landscapes in the general Thornton area (i.e. Thornton Masterplan). This study (Beasant 2002) came up with a number of criteria showing where Aboriginal sites and objects would be detected. It predicted that:

- Sites increase in density on slopes less than 5 degrees;
- Sites increase in density as they are found near or adjacent to existing wetlands;
- Knolls located adjacent to wetlands containing outcrops of flakeable stone are likely to contain sites; and
- Sites are less likely to occur on land with slopes greater than 10 degrees (Beasant 11: 2002).

In her work in the Rouse Hill area in Sydney, McDonald (2001) suggests that site patterning and intensity of occupation correlates well with stream order. Sites located near permanent water were more likely to contain complex and overlapping use over longer periods of time. The amount of land-use disturbance is also a significant factor in the survival of archaeological evidence as is the nature of the depositional environment.

The most significant archaeological work conducted near the Rutherford area is that undertaken by Kuskie and Kamminga at Black Hill and Woods Gully (Kuskie & Kamminga 2000). This project was located within the Hexham land-system (Story et al 1963) approximately 17km north-west of Newcastle and approximately 30 km south-east of Maitland. The area consists of undulating low hills and rises. Hexham Swamp is located approximately 36km south-east of the study area, with the Hunter River located a few kilometres to the north. The land under investigation was to be developed as part of the RTA's F3 freeway extension between Minmi and the New England Highway.

Three archaeologists have contributed to this project (Effenberger 1995, Baker 1996, Kuskie & Kamminga 2000). The most significant excavation and salvage work has been undertaken by Kuskie & Kamminga (2000). The original survey work and sub-surface testing was focussed on two sites: Black Hill 2 (38-4-376) and Woods Gully (38-4-410). Both sites were originally recorded as scatters of stone artefacts with extensive sub-surface deposits. However, the main concern for researchers was how much sub-surface evidence was actually present at the two sites.

The principal problem in the salvage of both sites was to determine the extent of sub-surface deposits and to ascertain how that could be effectively recovered. The work of Kuskie and Kamminga (2000) is significant in that it attempts to use a range of recovery techniques, assessing the validity of each one. It also uses finer scale analytical techniques. These include:

- On-site lithic work station, where every lithic item was examined under a low magnification binocular microscope and identified and recorded database;
- Residue and usewear analysis on a significant number of recovered items using a total retrieval process;
- Replicative microblade and microlith knapping experiments; and
- A combination of test excavation, broad area excavation by shovel and trowel, and mechanical surface scrapes.
- The main results are summarised below:
- In the **first phase**, 612 test pits (0.25m x 0.25m) were dug, initially measuring 38.25m^2. These were excavated 3m apart on a rectangular grid across each site. This approach was used to initially detect the basic patterns of sub surface evidence.
- In the **second phase**, larger areas were opened up using broad area excavation by shovel and trowel.
- At Black Hill, 63m^2 were excavated on a ridge crest. At Woods Gully, 87m^2 were excavated adjacent to a watercourse including 39m^2 of narrow trench leading away from the creek upslope. Hand excavation was carried out, digging in 0.25m x 25m unit squares in successive 5–10cm spits. Each bucket of deposit was labelled and transported to a sieving station. The method of 'total sieve retrieval' was used for the first time anywhere in the Hunter Valley. This method involved retention of all residues in the sieve, which was artificially dried. Items were later extracted under laboratory conditions.
- In the **third phase**, surface scrapes were used to detect larger features such as hearth and heat treatment pits. Five surface scrapes were used to remove grass cover and upper soil layers at Black Hill 2 and two at Woods Gully. After each surface scrape had been undertaken, spoils were examined carefully and any material recovered. An additional area was identified for broad excavation (8m^2) using this technique.
- A total area of 196.25m^2 was excavated by hand with surface scrapes making up a combined area of 34,422m^2. A total of 72.4 tonnes of soil were excavated. A total of 37,585 cultural items were identified and recorded. This was made up of 22,921 recognisable artefacts with 14,664 lithic fragments. Approximately 546.2 artefacts/m^3 were recovered from Black Hill 2 and 209.5 artefacts/m^3 from Woods Gully.
- 44 artefact categories were defined for Black Hill 2 and Woods Gully. Six stone working activities were identified, these being: bi-polar, microblade production, non-specific stone working, backing retouch of microblades, loss or intentional discard of non-microlithic tools and intentional loss or discard of microlithic tools. Production of microblades was the most common stone working activity.
- Replicative microblade and microlithic knapping experiments using silcrete and rhyolitic tuff (mudstone) showed that possibly less than 150 bondi points were made on site at broad area C3/B and less than half that number at broad area F5/A. A huge amount of microblade debitage was recovered showing a high percentage of 'waste'. A considerable time was spent preparing silcrete for heat treatment and subsequent flaking. Researchers concluded that given the amount of bondi point production, its role and purpose may have been of some social significance.

- Artefact assemblages are predominantly small (89%) measuring less than 20mm in length. Over 60% of all artefacts recorded measured less than 10mm in length. This recording of high density numbers of small artefacts was probably the result of intense microblade production and the use of the total sieve retrieval method. Over 70% of the assemblages from Black Hill 2 and Woods Gully contain rhyolitic tuff with silcrete making up just over 20% of the raw materials used.

- There is substantial evidence that a high proportion of silcrete assemblages have been heat-affected, with two heat-treatment pits being identified for the Black Hill 2 site.

- Spatial analysis of environmental variables shows that human activity was focused on the level crest and gently inclined north-facing upper slope at zone C3 (Black Hill 2). A single direct date of 2,130+ years BP was retrieved from a fireplace from Woods Gully. It is assumed that no site was likely to be older than 4,000 years BP.

- Kuskie and Kamminga argue that broad area excavation has allowed them to address all of their relevant research questions. They suggest that tuff and silcrete were the primary stone raw materials used for production of tools in the Central Lowlands of the Hunter Valley. Heat treatment of silcrete was widespread. A majority of artefacts recorded are the result of microblade production with implements occurring widely but in low numbers. Bi-polar knapping occurs on sites but in low frequency.

- A model of occupation was put forward for Black Hill 2 and Woods Gully. Human settlement probably represented one or more nuclear or extended family base camps, involving low numbers of people and several episodes of short-term occupation.

Woodberry Swamp Test Excavations: Thornton North Lot 2 & 310

Archaeological test excavation work undertaken at Thornton North by Hamm (2008) for land overlooking Woodberry Swamp has also revealed interesting regional archaeological results. This area is located within the Lower Hunter Wetlands environmental zone and has relevance to the current study. The principal method of archaeological testing used was shovel test pitting and grader scrapes. Shovel testing was also used where intact deposits may have been detected. The grader scrapes were strategically positioned near existing sites on Lots 2 and 310 and within a ridge crest land unit on Lot 2.

- A total of 67 (1.0m x 0.50mx 0.20m averaged) shovel test pits were excavated parallel to the main ephemeral drainage on Lot 2 within 50–100 metres of the existing flood-line. A total of 209 artefacts were recovered from these test pits.

- A total of 13 grader scrapes were undertaken across Lots 2 & 310. These were positioned in relation to the main gully/ephemeral stream section on Lot 310 adjacent to the existing sites and on the main ridge crest land unit on Lot 2. A total of 58 artefacts were recovered as a result of this mechanical testing.

- A total 14.23 tonnes of soil was wet sieved using standard 5mm and 8 mm sieve mesh.

- A total of 267 artefacts were recovered from the shovel test pits and grader scrapes at Lot 2.

- No artefacts were recovered from Lot 310 as a result of grader scrapes.

- No cultural features (i.e. hearths or campsite structures) were recorded for Lots 310 or 2.

- The majority of the artefacts recovered were made from red or yellow silcrete, with minor quantities of tuff being present.

- The majority of the artefacts recovered were broken flakes, followed by complete flakes and flaked pieces made from silcrete raw materials. Retouched or utilised stone tool items were poorly represented within the salvaged assemblage. Only 5 exhausted blade like cores were recovered and three broken backed items.

- Artefact analysis shows that the majority of the assemblage recovered reveals opportunistic flaking patterns and general maintenance activity associated with small tool production and manufacture principally with silcrete raw materials.A large piece of heat treated silcrete also adds weight to the argument that people were preparing stone for specialised flaking rather than general domestic use. It is likely that prepared cores were already in use while Aboriginal people were camping in this area in the past.

- A low density retouched assemblage and an absence of finished tools (i.e. food processing type tools) indicates that Lot 2 was probably a hunting camp more likely to be associated with gearing up tool kits for backed item production. A lack of hearth like structures and associated hearth heat retainers would also indicate a short term hunting camp rather than a more permanent base camp occupation area with multiple activities taking place on site.

- The location of a site on Lot 2 adjacent to an existing drainage feature associated with Woodberry Swamp supports previous land-use models for the general area (i.e. Kuskie 2004, 2006). The relationship to stream type and the impact of land-use is critical in detecting larger more significant base camp sites in this region.

- The archaeological material recovered on Lot 2 is assessed to be commonly represented in the local area and not considered scientifically significant based on previous archaeological research, Aboriginal community values, past land-use impacts and the nature of the recovered material.

- The above evidence also indicates that surface evidence alone cannot adequately detect the real extent of prehistoric Aboriginal settlement patterns in this type of Lower Hunter Wetland landscape.

- The distribution and size of recovered artefacts shows that flood damage may have removed a larger proportion of smaller items from the deposits over time.

- The distribution pattern and the density of artefacts recovered show a narrow band of occupation from within 50–70 metres either side of the existing creek-line within a gentle slope alluvial land-unit.

- A lack of artefacts detected on top of Lot 2's main ridge crest indicates that Aboriginal people were rather specific about where they positioned their hunting camps in the past.

- It is likely based on previous research in the area and given the nature of the sediments excavated that the artefacts recovered are likely to be no more than late Holocene in age (i.e. within the last 2,000 years BP).

- The grader scrapes and shovel testing have revealed that much of the deposits within Lots 310 & 2 are disturbed from either ploughing and or bioturbation through plant and insect activity. No charcoal deposit examined can be described as cultural in origin. As a result no samples were extracted for dating purposes.

Recent archaeological test excavation work undertaken by Reeves pers comm 2012 (Niche Environment & Heritge 2012) at Thornton Rural Fire Brigade site for the RTA has revealed an extensive open site. This area is part of the Woodberry swamp complex. Over 22,000 artefacts were recovered in the test excavation work from an area of approximately 400 sqm tested.

3.2 Regional Modelling, Site Distribution and Cultural Landscape Values

Whilst no regional or local Aboriginal heritage study is available for the Lower Hunter region, it is acknowledged that evidence of Aboriginal occupation is widespread and in some locations particularly abundant. A regional study completed for the Upper Hunter which covers parts of the Central Lowlands land system (see ERM 2004) tried to model which areas of landscape might contain highly unique potential for Aboriginal archaeological resources. In their base-line report on behalf of the Upper Hunter Heritage Trust (ERM) states that:

> *The overwhelming majority of archaeological sites recorded in the study area are stone artefact scatters and isolated artefacts. These sites are common in most regions, have been recorded and many (in the Central Lowlands) have been salvaged and the assemblages are available for archaeologists for further investigation. Most other site types are quite rare and have not been well recorded studied or salvaged. (ERM 2004:74).*

These rarer site types include burials, scarred trees, carved trees, stone arrangements and estuarine shell middens.

In addition to the above site type assessment, some landscapes and geomorphic units contain potential for unique archaeology or Pleistocene Age cultural remains. Some of these landform types are also considered to be poorly understood for the region. These landform features include:

- sand dunes;
- sand sheets; and
- Hunter River terraces.

As well as these rarer landforms which could contain significant cultural resources, other local landscapes may contain cultural landscape values which are important to Aboriginal people. Examples of these cultural landscapes in the Lower Hunter region may include fringe campsites and mission sites, pristine wetlands, riverine corridors, untouched woodlands, forested landscapes and prominent scenic escarpments, all having a natural and cultural heritage quality.

3.3 Definition of a 'site'

The NSW Office of Environment & Heritage (OEH) advises developers and consultants that the term 'site' is used to group Aboriginal Objects or define a location where an Aboriginal Object or cultural item occurs. They propose general criteria to assist in the classification of a site. *Sites* can be defined as:

- exposures where archaeological evidence is revealed;

- a topographic or land form unit where occupation evidence has been recorded. This may be an entire landform unit (ridge, creek, valley) or part of a landform unit (saddle on ridge, creek bank);

- sites which have physical boundaries defined by rocks (stone arrangement), earthworks (mounds) or cleared land (ceremonial ground);

- sites defined by Aboriginal community groups as culturally significant;

- arbitrary or the assignation of a boundary for the convenience of recording (in cases where the site would probably be much larger if based on the criteria above). Arbitrary criteria include the use of a fence-line, dirt track or gully as a boundary. In some cases the area may simply be designated as 50m x 50m, or as a smaller sample plot, on the basis of convenience;

- artefact density. (In some cases a site boundary may be defined by the average number of flakes per square metre.) This is a specialised type of arbitrary criterion and justification of the rules used must be made explicit; and

- the chosen definition of a site or isolated find needs to be specified for the study. It is the consultant's responsibility to decide on an appropriate definition, suited to the particular project, the research goals and comparability with other regional studies. OEH requires site forms to be completed for isolated finds.

3.4 Aboriginal Site Types likely to be found in the general assessment area.

Aboriginal site types that have been typically recorded in the general region include:

- Open campsites made up of stone artefacts dominated by tuff, silcrete and quartz assemblages and sometimes containing hearth material in the form of burnt or cracked sandstone heat retainers. These sites vary in complexity and density depending on their physical condition in the modern landscape and their proximity to major resource zones;

- Isolated Find representing a single isolated artefact located on its own in the landscape;

- Artefact Scatter representing a collection or scatter of stone artefacts exposed by erosion that appear to be defined by their spatial relationship to one another and the land unit they are located on;

- Archaeological Deposit representing a buried surface which has some soil depth and structure likely to contain archaeological remains;

- Scarred Trees representing Aboriginal removal of bark material to make shelters, dishes, canoes, string, shields, boomerangs and carved trees. Within the study area most Aboriginal scars are found on River Red Gum (*Eucalyptus camaldensis*) or Blakely's Red Gum (*Eucalyptus blakelyi*), White Box (*Eucalyptus albens)* and Grey Box (*Eucalyptus largiflorens*). There is a strong correlation between large canoe type scars and more permanent river;

- Burial sites are sites that show evidence of Aboriginal burial in discrete locations. Burials in the study region are usually associated with major areas of occupation found next to rivers, lagoons, lakes, waterholes and some creeks. Skeletal material is normally discovered eroding out of sandy deposits, where interment is easiest. Burials may occur in an isolated context or they may be part of a larger cemetery;

- Axe grinding grooves. These types of sites are associated with Aboriginal people using sandstone outcrops to sharpen stone implements and in particular stone axes. Grinding grooves are usually 5–20cm in length and 2–3cm in depth depending on how often the person is using the groove section. Grooves may be found in clusters and are usually concentrated around a surface rock pool where people use water to assist them in sharpening an edge;

- Contact sites. A contact site is site where there is evidence of Aboriginal people living traditionally in close proximity to European settlement. Aboriginal people may be using European items in traditional hunting and gathering practices, for instance bottle glass as a substitute for stone, or metal as a substitute for bone or stone;

- Sites may be associated with Aboriginal people working for European settlers, such as gathering bark sheeting for bark slab huts. Often historic items associated with that contact would be found in certain traditional campsites; and

- Waterhole/well. These types of sites, as well as being important places for obtaining water, may also be sacred places and of religious significance to living Aboriginal people.

Hunter Valley researchers such Dean Jones & Mitchell (1993) argue that many of the sites recorded in the Hunter Valley have been distributed along drainage lines. They observe that far fewer sites have been recorded on landforms remote from watercourses. This, they argue is due in part to how surface erosion processes are concentrated along drainage features and the historical focus of archaeological assessment. Less is known about how Aboriginal occupation may have been structured in higher altitude locations especially areas that contain a range of relief types.

In her analysis of site location across the Hunter Valley, Koettig argues that:

"sites in the Central Lowlands often comprise discrete concentrations of artefacts distributed in a continuous, but apparently unpatterned way across creek flats. These concentrations varied in frequency, size, content and association, possibly representing different activities (manufacturing, maintenance and or tool production)" (Koettig 1994: 7). In the Hunter Valley, a number of researchers have expressed concern with the effectiveness of surveying for sites, which are constantly obscured due to a lack of ground visibility. In their overview of methodological issues for the assessment of Hunter Valley archaeological resources, Dean-Jones and Mitchell summarise the most important site detection issues as factors affecting site visibility which include:

- The original size and pattern of the deposit;

- The present vegetation cover;

- Post depositional processes causing artefact burial and/or erosion; and

- Artefact density and clustering, and presumably the increasing age of the site (Dean Jones & Mitchell 1993: 46)."

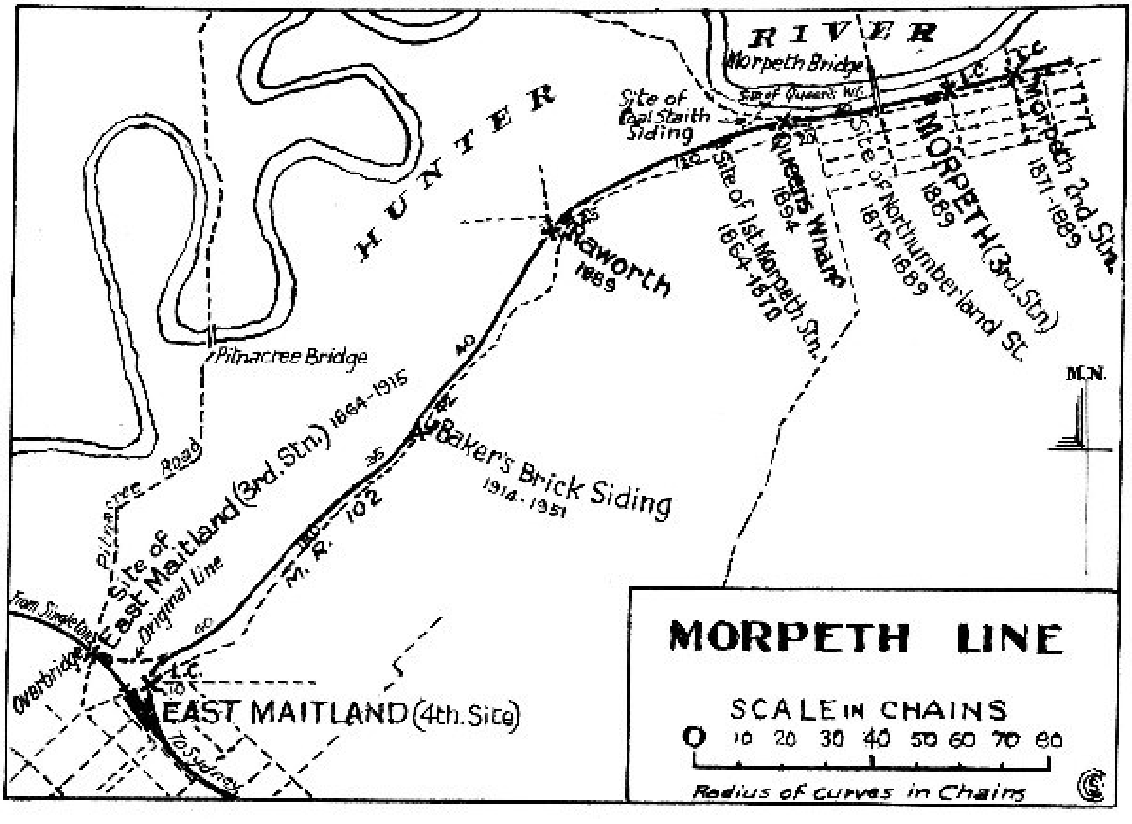
Other researchers such as Koettig (1990) point out, in the Hunter Valley survey strategies and thus the success of site detection have varied considerably. Archaeological surveys carried out during the 1970's, 1980's and some even in the early 1990's, often only inspected areas of *potential* leaving a higher proportion of development areas unsurveyed. Koettig defines these areas as "lesser" archaeological potential usually resulting in certain land units being ignored by surveyors (i.e. hillslopes, ridgecrests etc.) in favour of land units associated with creek-lines and watercourses.

3.5 Historic Heritage Background Research and Archaeological Sites

Morpeth was first settled in 1821 and free settler Edward Charles Close a retired military officer took up land in and around the future site of Morpeth township. He and others built a number of commercial buildings (e.g. stores and shipping offices) to take advantage of river transport activities that were beginning to grow and developed in response to commercial activity associated with the wool industry and coal mining in the Hunter Valley(Jervis 1953).

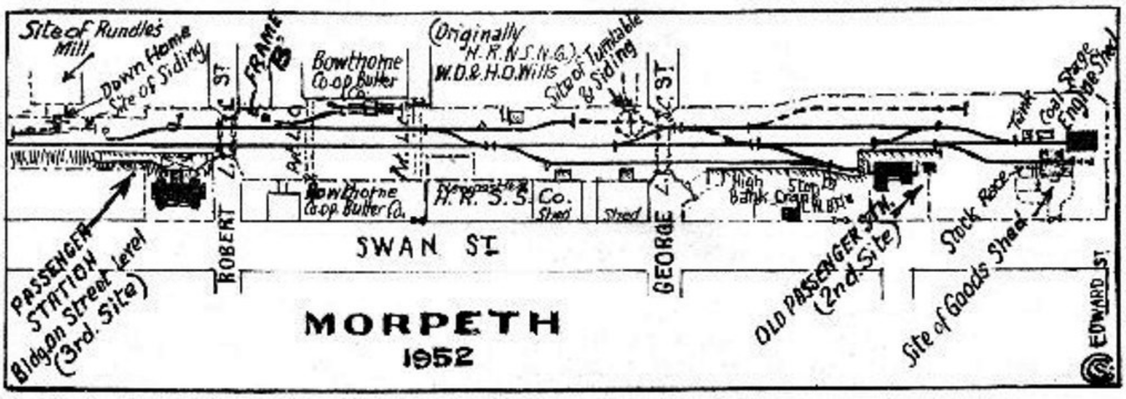
By the 1830s' steam ships were commonly used up and down the Hunter River and Morpeth became a port hub for the transfer of goods from ships to road transport (Jervis 1953). The major wharf located at Morpeth was called Queens Wharf. The town began to grow rapidly with a watch-house, school house and post office built between 1836 and 1838s (Jervis 1953). In the 1840's coal mining shipments began to replace agricultural trade and a local coal mine owned by Edward Close was opened approximately half a mile from Morpeth. As a shipping transport hub Morpeth continued to be important until the 1860's when a railway was built to the north of the town. The rail-line was built in two phase; the first phase(in the 1860's) saw a rail built to Queen's Wharf (1862-1863) and then a second extension into the town north of Swan St was built in 1868 (Figs 4-5).

Figure 4: Maitland–Morpeth rail-line route (from Singleton 1953)



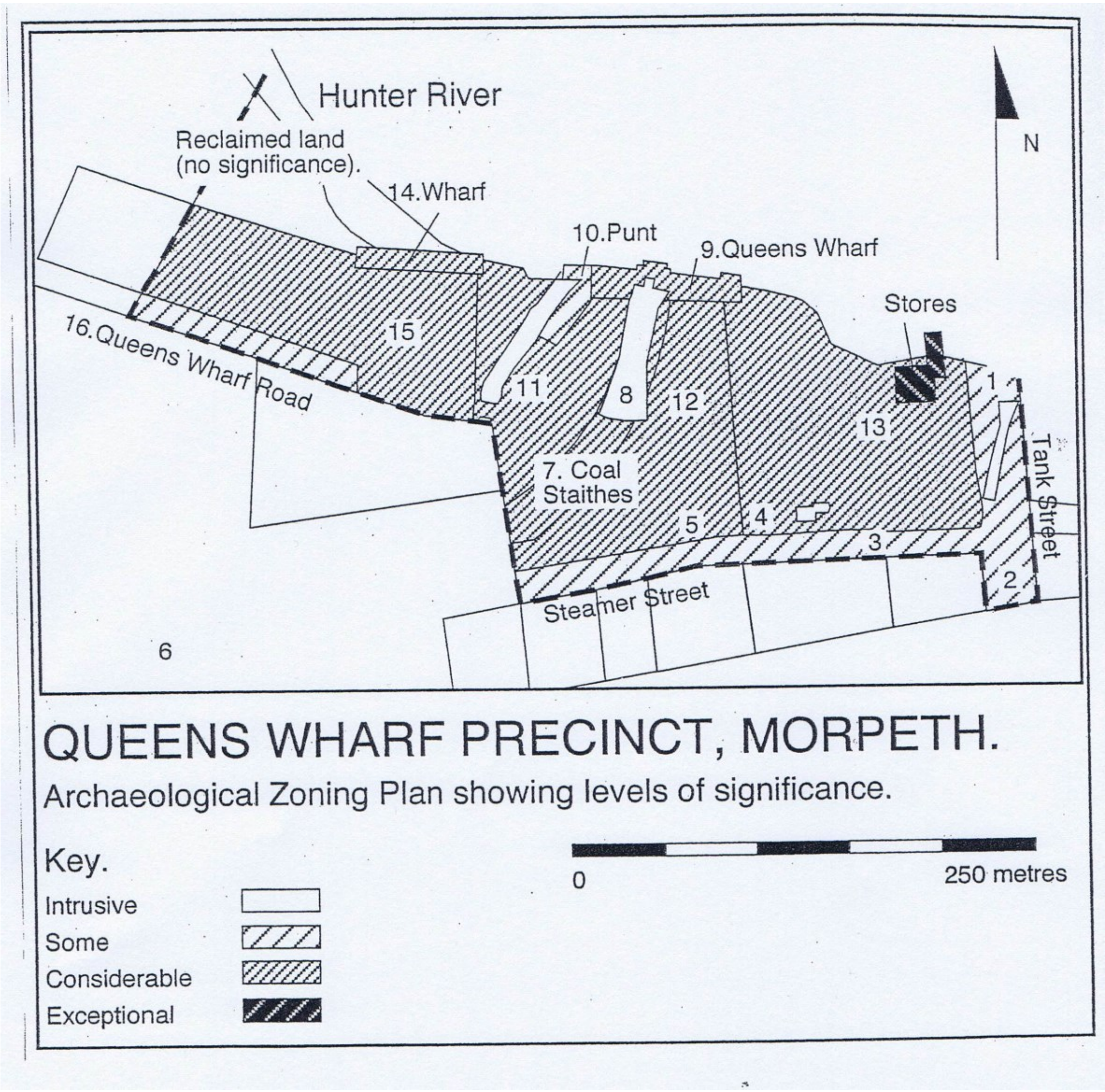
By 1877, an engine shed and a water tank were erected at the dead-end section of the rail line (east of 30 Swan St) and just east of the second Morpeth station (Figure 4). In 1878, a 60 feet x 27 feet brick goods shed was built adjacent to the engine shed, with a goods siding which extended from the dock past a high timber-faced wool bank to beyond the George Street crossing. A stock race was also added in 1882. In 1880, a siding was laid in to serve Bundle's Flour-Mill. In 1904, the siding was still in existence but was known as Eales' Duckenfield siding, the large stone building having been converted into a warehouse (Singleton, 1953). There is no evidence that either the brick building or the rail siding still exists today.

Figure 5: Location plan of the Maitland- Morpeth rail line as it enters Morpeth (source Singleton 1953)



Given the historical significance of Morpeth, a number of historical archaeological sites have been identified by various studies. The most relevant is that undertaken by Higginbotham (2002). This work identified the Queens Wharf precinct area as being of archaeological significance and defined its archaeological values by providing a detailed archaeological zoning plan. This plan shows which areas within the Queens Wharf precinct have different levels of archaeological significance (Figure 6).

Figure 6: Archaeological Zoning Plan from Higgenbotham (2002)



In their historical reference book *The Morpeth Story* (Morpeth Progess Association Inc. 1971) there is reference to a convict road being built between Maitland and Green Hills (near Morpeth). This is listed as The Start of the Great North Road in Fig 1 on page 32. Further review of the NSW Roads and Maritime Heritage Register shows that there is no reference to the Great North Road in this part of Morpeth. Additional enquires to Maitland City Council (Steve Punch peers comm 2014) also confirm that based on current knowledge there is no physical evidence of the Great North Road in any part of Swan St Morpeth.

The cultural significance of Morpeth is that of a town that has retained its historic heritage significance as a place that represents an early colonial river port in the European settlement of the Hunter Valley Region. The town has a unique historical character, outstanding for its urban design and rural setting. It contains early historic buildings and residential buildings from all eras. From

1982, its heritage qualities and the potential for cultural tourism have been documented. Some of the existing heritage buildings have been refurbished and rehabilitated (Morpeth POM 2000).

According to the Morpeth POM, homes built since 1950 make up 60% of all dwellings; and over 100 new dwellings have been built since 1982. Growth in tourism has led to intrusion in local residents' amenity; but it has also supported local business and employment. Regional traffic associated with coal mining and urban development, especially heavy vehicles, is impacting on amenity for residents and businesses.

There is a need from the community that a balance is required to retain the long-term overall amenity of Morpeth as a place with its own identity, local businesses and community life, as well as a place outstanding for its heritage and that also attracts visitors (Morpeth POM 2000).

3.6 Historic Heritage Site Searches.

3.6.1 NSW State Heritage Register Search

The *State Heritage Register* (SHR) holds items that have been assessed as being of State Significance to New South Wales. The *State Heritage Inventory* (SHI) contains items that are listed on Local Environmental Plans and/or on a State Government Agency's Section 170 registers (NSW Office of Environment and Heritage Website – www.heritage.nsw.gov.au/index.html - searched on the 25th of March 2014). An assessment of heritage significance is required for items greater than 50 years in age. Items appearing on either the SHR or SHI have been granted a defined level of statutory protection under NSW legislation. Searches of the SHR and SHI were completed on the 25th of March 2014. A number of heritage items were found registered on the SHR or SHI. These state heritage listed items are detailed in Table 2 below and Figure 7.

Table 2: Heritage items listed for Morpeth village as having state significance according to the NSW State Heritage Register and State Heritage Inventory.

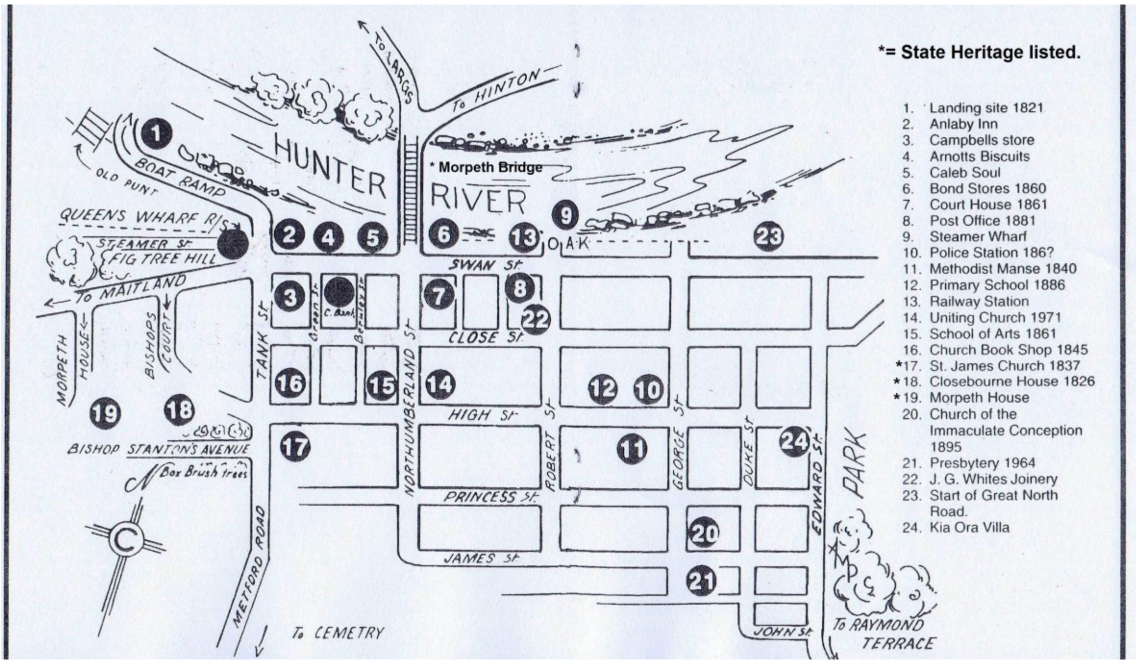
Table 2: Heritage items listed for Morpeth village as having state significance according to the NSW State Heritage Register and State Heritage Inventory

Suburb	Item Name	Item Address	Property description	Heritage Significance level	Item ID
Morpeth	Morpeth House, Closebourne House, adjoining chapels and Diocesan Registry group	Morpeth Road	Lot 2 and Part Lot 3, DP 841759	State	I201
Morpeth	Avenue of Brush Box trees	363 Morpeth Road	Part Lot 3, DP 841759	State	I204
Morpeth	"Closebourne House" and adjoining Chapel	363 Morpeth Road	Part Lot 3, DP 841759	State	I202
Morpeth	Former Diocesan Registry	363 Morpeth Road	Part Lot 3, DP 841759	State	I203

Suburb	**Item Name**	**Item Address**	**Property description**	**Heritage Significance level**	**Item ID**
Morpeth	Morpeth Bridge over the Hunter River	Northumberland Street	Road reserve	State	I205

All these state heritage listed items are located at the western end of Morpeth Township (Figure 6), approximately 300-500 metres west from 30 Swann St Morpeth.

Figure 7: Distribution of historically important heritage listed items including those of state heritage significance in Morpeth (Map from The Morpeth Story, Morpeth Progress Association Inc. 1971



3.6.2 National Heritage Register

Under the Commonwealth's *Environment Protection Biodiversity Conservation Act 1999*- Amendments (No. 88, 2003), two mechanisms have been created for the protection of heritage places of National or Commonwealth significance) – the National Heritage List (NHL) and the Commonwealth Heritage List (CHL). The NHL provides protection to places of cultural significance to the nation of Australia, while the CHL comprises natural, Aboriginal and historic heritage places owned and controlled by the Commonwealth. There are no management constraints associated with listing on the Register of the National Estate unless the listed place is owned by a Commonwealth agency. Searches of the NHL and RNE were undertaken on the 25th of March, 2014. No items were identified to be located within the assessment area.

3.6.3 Maitland Local Environmental Plan (LEP) 2011

Each Local Government Area (LGA) is required to create and maintain an LEP that identifies and conserves Aboriginal and Historic heritage items. These items are protected under the EP&A Act 1979 and the Heritage Act 1977.

A search of the Maitland City Council LEP (2011) was undertaken on the 25th March 2014. A number of heritage items were listed in Schedule 5: Environmental Heritage in the LEP are located within or in close proximity to the assessment area. These are described in Table 3 below. These items are classified as being of local heritage significance.

Table 3: Heritage listed items from Schedule 5 of the Maitland City Council LEP located in the township of Morpeth

Suburb	Item Name	Item Address	Property description	Heritage Significance level	Item ID
Morpeth	Former bakery	98 Close Street	Lot B, DP 161543	Local	I190
Morpeth	Grandstand	20 Edward Street	Lot 7001, DP 1052969	Local	I191
Morpeth	“Kiora”	7 High Street	Lot 1, DP 535966	Local	I192
Morpeth	Police station	32 High Street	Lot 1, DP 904664	Local	I193
Morpeth	Morpeth Public School	36–46 High Street and 35 Close Street	Lot 1, DP 724176; Lot 1, DP 782470; Lot 1, DP 782303; Lots 1 and 2, DP 782304	Local	I194
Morpeth	Grandstand	20 Edward Street	Lot 7001, DP 1052969	Local	I191
Morpeth	Former cinema	85 High Street	Lot 1, DP 64366	Local	I195
Morpeth	School of Arts	110 High Street	Lot 1, DP 782444	Local	I196
Morpeth	St James Parish Hall	138 High Street	Lot 200, DP 872144	Local	I197
Morpeth	Roman Catholic Church	James Street	Lot 3, DP 844638	Local	I198
Morpeth	Former Catholic school and convent group	20 James Street	Lots 1 and 2, DP 844638	Local	I199
Morpeth	Georgian house	5 John Street	Lot 1, DP 924593	Local	I200
Morpeth	White’s Factory	7 Robert Street	Lots 3 and 4, DP 592403	Local	I206
Morpeth	Marlborough House	75 Swan Street	Lot 631, DP 1091885	Local	I207
Morpeth	Former Queens Wharf and Railway Station	90 Swan Street	Lot 1, DP 714289	Local	I208
Morpeth	Post office and residence	105 Swan Street	Lot A, DP 411508	Local	I209
Morpeth	Former Bond Store group	122 Swan Street	Lots 1, 2, 5 and 6, DP 260922;	Local	I210

Suburb	**Item Name**	**Item Address**	**Property description**	**Heritage Significance level**	**Item ID**
			Lots 7 and 8, DP 628665		
Morpeth	Former courthouse	123 Swan Street	Part Lot 1, DP 526098	Local	I211
Morpeth	Commercial Hotel	127 Swan Street	Lot 1, DP 744896	Local	I212
Morpeth	Former CBC Bank	149 Swan Street	Lot 10, DP 57156	Local	I213
Morpeth	Former Campbell's Store	175 Swan Street	Lot 1, DP 735924	Local	I214
Morpeth	General Cemetery	Tank Street	Lots 1–4, DP 775155	Local	I215
Morpeth	St James group	19 Tank Street	Part Lot 63, DP 755205; Lot 631, DP 1137280	Local	I216

Three locally listed sites: the Former Cinema (85 High St), Marlborough House (75 Swann St) and a Villa (67/69 Swann St) are located within 300-500m of 30 Swann Street Morpeth.

3.6.4 Heritage Planning and Conservation Issues

Number 30 Swan St Morpeth is currently zoned RU1 Primary Production under the Maitland City Council LEP 2011. However, 30 Swann St Morpeth is also zoned as part of a Heritage Conservation area (part of the Morpeth Heritage Conservation Area, Figure 8) under the provisions of the Maitland City Council's Development Control plans and section 5.10 which states (in respect of sub section b):

Heritage assessment

The consent authority may, before granting consent to any development:

(a) on land on which a heritage item is located, or

(b) on land that is within a heritage conservation area, or

(c) on land that is within the vicinity of land referred to in paragraph (a) or (b),

require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned.

3.6.5 Morpeth Management Plan

Maitland City Council has also prepared an overarching plan of management document (Morpeth Plan of Management) for the Morpeth Township (Maitland CC 2000). This POM aims to:

- Focus on the key issues for the management of public land and other responsibilities of the Maitland City Council in the town of Morpeth, and its immediate surrounds; and

- Provide a framework for long term management, decision-making and action and will be implemented in accordance with available resources.

Its key objectives are to build on the information and reports already available about Morpeth and to:

- Analyse the issues relating to the existing and future development of Morpeth;
- Consult with the Morpeth community;
- Build on the information and reports already available about Morpeth;
- Analyse the issues relating to the existing and future development of Morpeth;
- Provide material that can be translated into Council's Local Environment Plan (LEP) and Development Control Plan (DCP);
- Consult with the Morpeth community; and
- Provide recommendations with priorities and staging and a time frame for monitoring and review.

3.6.6 Guiding principles for management of heritage listed items.

There are key provides overarching principles on which the POM is based. These are:

(i) Understanding and sustaining Morpeth's heritage and character;

(ii) Protecting local amenity, village character and community life;

(iii) Tourism business and activities respecting local concerns and amenity;

(iv) Recognizing the interdependence (mutual benefits) of heritage, tourism business and local business;

(v) Providing facilities that benefit the Morpeth community and visitors;

(vi) Making the significance of Morpeth accessible to both the community and visitors;

(vii) Marketing derived from significance and facilities; and

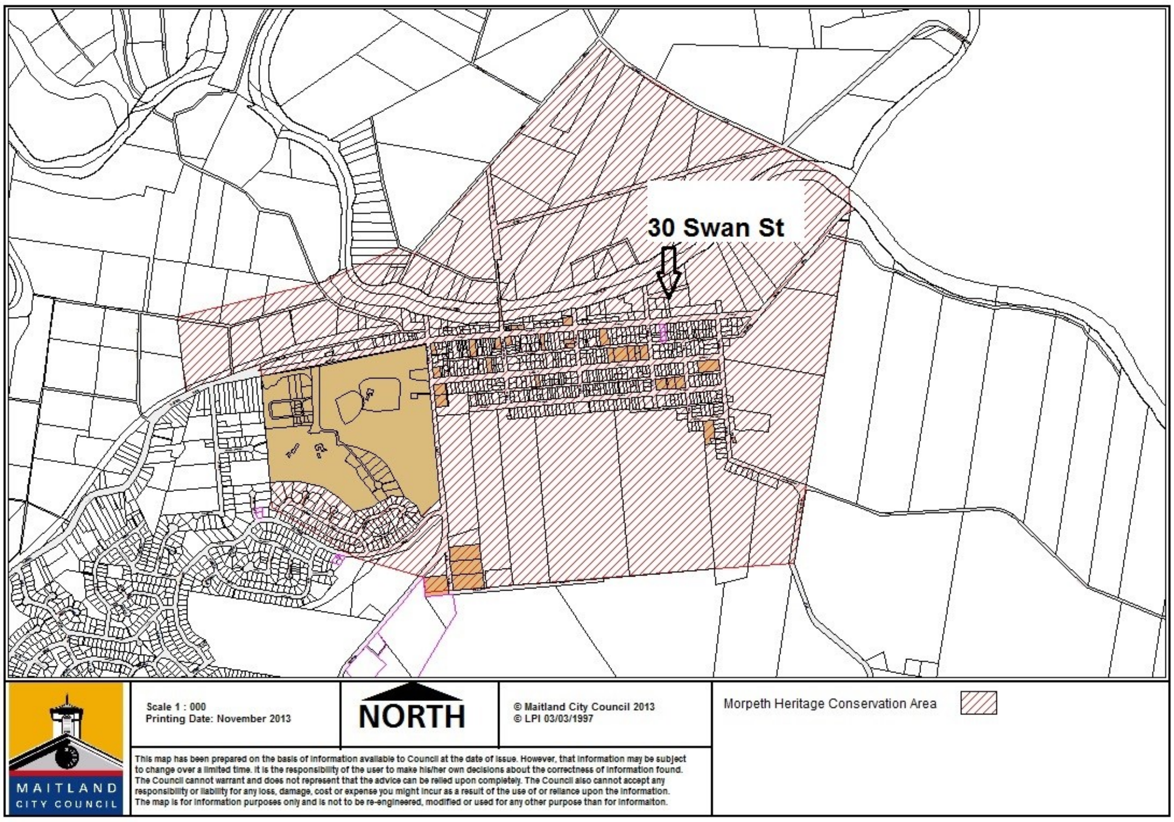
(viii) Sustaining Morpeth as a place with industrial workplaces.

(ix) Working with indigenous people; and

(x) Continual improvement and service excellence.

These principles are derived from discussions at workshops and meetings; from the Heritage Tourism Principles published by the Australian Heritage Commission and the Australian Tourism Council in late 1999 (Morpeth Plan of Management 2000: 1).

Figure 8: Maitland City Council's Morpeth Heritage Conservation Area map and 30 Swan St



This map has been prepared on the basis of information available to Council at the date of issue. However, that information may be subject to change over a limited time. It is the responsibility of the user to make his/her own decisions about the correctness of information found. The Council cannot warrant and does not represent that the advice can be relied upon completely. The Council also cannot accept any responsibility or liability for any loss, damage, cost or expense you might incur as a result of the use of or reliance upon the information. The map is for information purposes only and is not to be re-engineered, modified or used for any other purpose than for informaiton.

4. LAND USE HISTORY

4.1 Existing Environment and Land Use History

The assessment area falls within the Lower Hunter Plain topographic/physiographic region of the Lower Hunter Valley. The assessment area comprises of principally of Quaternary alluvial creek floodplain landforms made up of a series of river terrace features (Matthei 1995). Generally the land is described as flat with slopes > 1% and elevation being between 2-11 m with local relief to 2m. There are swampy backplain features, levees, oxbows and point bar deposits (Matthei 1995). Soils are dominated by Prairie Soils, with some Chernozems, Brown Clays and Humic Clays in the lower Hunter delta. Solonchaks occur on the tidal flats. Brown Podzolics Soils and Red and Yellow Earths are found on alluvial terraces.

Prior to European settlement, vegetation communities found locally in the assessment area would have been dominated by tall open forest with Casuarina cunninghamiana (river oak) and the occasional Melaleuca styphelioides (prickly –leaved paper bark-Matthei 1995).

The major land uses of the Morpeth region are dairy farming, Lucerne cropping, turf farming and animal grazing. Initially the town of Morpeth grew from the 1830's and by the 1880's many fine building were erected. As a river port it served as a transport hub until the rail easement from Maitland was put through. When the Hawkesbury River Bridge was opened in 1889, the river port operations of Morpeth also declined drastically finally ceasing in 1931. The Queens Wharf continued to operate for a brief period in 1940 when a local coal miner used its facilities. In 1953 the rail branch line to the wharf was closed (DUAP 1996).

Current Land use impacts at 30 Swan St Morpeth

The land proposed for rezoning contains the following features: (Figure 2 Appendix 1 & Plates 1-7: Appendix 2):

- A brick veneer house with inbuilt garage built in the 1970's;
- Tennis court and swimming pool built in the 1970;
- Modern fencing dated to the 1960-70's;and
- A number of vehicle and farm tracks.

The majority of land use disturbance within the assessment area is associated with house construction, tree clearing for past rail infrastructure development and pasture improvement with some flood mitigation works.

Prior to the 1970's, the Morpeth railway line was built along the upper river terrace of 30 Swan St. According to the existing historic records some of the existing track way may still be intact along sections of the land proposed for rezoning (Figure 5).

5. ABORIGINAL CONSULTATION

As this project aims to avoid any culturally sensitive areas it did not require consultation with Aboriginal community stakeholders.

6. RESULTS & DISCUSSION

No known Aboriginal sites or potential Aboriginal sites were identified within the area proposed for rezoning as a result of this desktop assessment. No known historic heritage sites were identified within the area proposed for rezoning as a result of this desktop assessment. Given the scale of previous development on 30 Swan St Morpeth, most physical cultural heritage evidence has probably been removed.

7. RECOMMENDATIONS

The following recommendations are made in light of the above due diligence desktop assessment results based on the existing and proposed legal requirements of the NSW National Parks and Wildlife Act (1974), NSW Heritage Act 1977 and the type of archaeological evidence found on: LOT 3 DP 237264, 30 Swan Street Morpeth . It is recommended that:

- The assessment area is located within the Maitland City Council's zoned Morpeth Heritage Conservation Area;
- The assessment area is considered to have **low** Aboriginal heritage potential;
- The assessment area is considered to have **low** Historic heritage potential; and
- The above conclusion is reached based on background archaeological/historical research, and land-use history.

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APPENDIX 1
FIGURES

APPENDIX 2
PLATES

Plate 1: Looking west along 30 Swan St Morpeth with old fig trees in road reserve

Plate 2: Looking west from the eastern boundary of 30 Swan St Morpeth open horse paddock

Plate 3: Looking west along the upper river terrace and northern boundary 30 Swan St Morpeth

Plate 4: Evidence of shed remains or concrete foundation blocks scattered on surface of upper terrace

Plate 5: Looking north-west to western boundary and local neighbour's fence-line

Plate 6: Looking at the eastern end of Lot 3/30 Swan St Morpeth upper river terraces

APPENDIX 3
GENERAL GLOSSARY OF TERMS

Analysis	Evaluation of archaeological data to determine the archaeological significance of sites recorded within an impact area
Analytical Recording	A process of site recording which obtains detailed archaeological data useful in archaeological analysis
Archaeological Comparability	The evaluation of whether archaeological sites are uniformly different or similar across an impact area
Archaeological Data	Archaeological information that is recorded as a result of an archaeological investigation
Archaeological Deposit	A layer of soil material containing archaeological remains
Aboriginal object	A statutory term defined under the National Parks and Wildlife Act 1974 meaning, 'any deposit, object or material evidence (not being handicraft made for sale) relating to Aboriginal habitation of the area comprising NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes human remains
Archaeological Investigation	The process of assessing the archaeological potential of an impact area by a qualified archaeologist
Artefact Scatter	A collection of artefacts usually lying as a lag deposit on an eroding surface
Artefact	Any object made by human agency (e.g. stone artefacts)
Assemblage	1 - A group of stone artefacts found in close association with one another 2 - Any group of items designated for analysis - without any assumptions of chronological or spatial relatedness (Witter 1995)
Avoidance	A management strategy which protects Aboriginal Sites within an impact area by avoiding them totally in development
Broken Flake	A flake which is either a distal fragment or proximal fragment
Campsite	A site which contains a variety of artefactual data not specific to one type of stone tool reduction sequence

Complete Flake	A flake which is whole and not broken
Core	A lump or nodule of stone from which flakes have been removed
Debitage	Unmodified flakes or fragments of stone material removed as a result of stone tool manufacture or modification
Flake	A piece of stone detached from a core, displaying a bulb of percussion and striking platform
Flaked Piece	A fragment of stone where negative flake scarring is visible but no obvious striking platforms are present
Hearth	The site of a campfire represented by charcoal, burnt earth, ash and sometimes stones used as heat retainers
Impact Area	An area that requires archaeological investigation and management assessment
In situ	Latin words meaning 'on the spot, undisturbed'
Isolated Find	A single artefact found in an isolated context
Knapping Floor	A location on a site which normally represents a stone artefact reduction episode
Land System	An area, or group of areas, commonly delineated on a map, throughout which there is a recurring pattern of topography, soils, and vegetation
Land Unit	An area of common landform, and frequently with common geology, soils, and vegetation types, occurring repeatedly at similar points in the landscape over a defined region. It is a constituent part of a land system
Landform	Any one of the various features that make up the surface of the earth
Landscape	That part of the land's surface, more or less extensive being viewed or under study, that relates to all aspects of its physical appearance, including various vegetation associations and landforms
Management Plans	Conservation plans which identify short and long term management strategies for all known sites recorded within an impact area

Methodology	The procedures used to undertake an archaeological investigation
Minimum Requirements	The minimum standard for which NPWS will accept the reporting of an archaeological investigation
Mitigation	To address the problem of conflict between land use and site conservation
Open Area Excavation	A method of excavation where large areas of an archaeological site are open at any one time. A horizontal representation of Aboriginal occupation of different archaeological features is considered to be more important than vertical stratigraphic relationships
Open Site	An archaeological site situated within an open space (e.g. archaeological material located on a creek bank, in a forest, on a hill etc)
Research Design	A research strategy for carrying out an intensive archaeological investigation and analysis
Salvage	A method by which an archaeological site or group of sites may be fully investigated before they are totally destroyed by a development
Sample Unit	An area of investigation which is uniform size or density and which can be quantified for analytical reasons
Sampling	The process of selecting part of an area under archaeological investigation as a basis for generalising about the whole
Site Recording	The systematic process of collecting archaeological data for an archaeological investigation
Site	A place where past human activity is identifiable
Spatial Significance	A site which may contain potential sub-surface deposits or in situ material useful in the analysis of human use of land and site formation process
Summary Recording	A process of site recording where archaeological data is collected on a summary level only
Survey Coverage	A graphic and statistical representation of how much of an impact area was actually surveyed and therefore assessed

Technological Significance	Artefactual material which may contain types or items, although not unique, may be included in a sample to demonstrate an aspect of stone artefact variability
Test excavation	A process of exploratory excavation carried out on a small scale and used to determine site extent, site condition and excavation potential

APPENDIX SEVEN. PRELIMINARY CONTAMINATION ASSESSMENT

JM
ENVIRONMENTS
ABN 67 166 341 288

JME4015 Rezoning 30 Swan St Morpeth

Preliminary Contamination Assessment

16 April 2014

James

James McMahon
Principal Environmental Scientist

Revision	Details	Date	Amended By	Issued To
0	Draft	21/03/2014	JMc	MD/AH
0	Final	16/04/2014	JMc	MD/AH

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EXECUTIVE SUMMARY

This report presents the findings of a Preliminary Contamination Assessment (PCA) undertaken by JM Environments (JME) for 30 Swan St, Morpeth NSW (the site). The site is identified as Lot 3 DP 237264. The site location is shown in Figure 1. It is assumed the site is approximately 7,900m^2.

It is understood the site is proposed to be rezoned from the current Rural zone to Residential zoned land. The purpose of this PCA is to support the planning proposal for this rezoning.

The objectives of this PCA are to:

- identify potentially contaminating activities that are currently being performed on the site and that may have been performed on the site in the past;
- assess Areas of Environmental Concern (AEC's) and Chemicals of Concern (COC's) for the site; and
- provide recommendations on further assessment or remediation, if considered necessary.

In order to meet the objectives the following scope of works was undertaken:

- desktop study;
- a site walkover;
- review and collation of the above information and identification of potential Areas of Environmental Concern (AECs) and potential Chemicals of Concern (COCs);
- preparation of this PCA.

Based on the information gained from the desk stop study it is considered that the site has been potentially contaminated from past activities on site. It is recommended that a detailed contamination site assessment which includes soil sampling and analysis is undertaken to further assess the potential contamination of the site. The detailed assessment should be conducted with the development application for the construction of residences on the site. Potential contamination is likely to be minor/moderate, and subject to the detailed assessment, it is considered the rezoning may be supported.

It is assumed that rezoning the site for residential land use will result in single/double storey residential developments. Hence the disturbance of the soil 2m below the surface is considered unlikely into the future. Therefore further assessment of acid sulfate soils is not considered necessary.

Contents

Attachments

1 INTRODUCTION

This report presents the findings of a Preliminary Contamination Assessment (PCA) undertaken by JM Environments (JME) for 30 Swan St, Morpeth NSW (the site). The site is identified as Lot 3 DP 237264. The site location is shown in Figure 1. It is assumed the site is approximately 7,900m^2.

The PCA was commissioned by Pulver Cooper and Blackley (PCB) on behalf of Mr H Lantry in response to a JME proposal (ref: JME4015-Swan St Contamination Assessment Proposal dated 7 February 2014.

It is understood the site is proposed to be rezoned from the current Rural zone to Residential zoned land. The purpose of this PCA is to support the planning proposal for this rezoning.

2 SCOPE OF WORK

The objectives of this assessment are to:

- identify potentially contaminating activities that are currently being performed on the site and that may have been performed on the site in the past;
- assess Areas of Environmental Concern (AEC's) and Chemicals of Concern (COC's) for the site;
- assess the nature and extent of contamination on the site; and
- provide recommendations on further assessment or remediation, if considered necessary.

In order to meet the objectives the following scope of works was undertaken:

- desktop study including;
    - a review of published information related to soils, acid sulfate soils, geology and hydrogeology;
    - a review of previous site ownership (land titles search);
    - a review of historical aerial photography over the past 50 to 60 years;
    - a review of the sites section 149 certificate;
    - a review of NSW Office of Environment and Heritage (NOEH) notices under the Contaminated Land Management Act (1997)
    - a search of NSW Office of Water for records for nearby registered groundwater bores;
- a site walkover;
- review and collation of the above information and identification of potential Areas of Environmental Concern (AECs) and potential Chemicals of Concern (COCs); and
- preparation of this PCA.

3 SITE DESCRIPTION

3.1 Site Location and Identification

General site information is provided in Table 1.

TABLE 1 – SUMMARY OF SITE DETAILS

SITE ADDRESS:	The site is located at 30 Swan Street, Morpeth NSW as shown in Figure 1.
SITE AREA:	Approximately 7,900m^2.
SITE IDENTIFICATION	Lot 3 DP237264 within the Local Government area of Maitland, Parish of Alnwick, County of Northumberland.
CURRENT LANDUSE:	Rural residential.
PROPOSED LANDUSE:	The proposed land use for the site is residential.
ADJOINING SITE USES:	Residential land use south and west of the site; Rural land use north and east of the site
SITE COORDINATES	Easting 372105, Northing 6378481

4 DESKTOP STUDY

4.1 Site Topography and Drainage

A review of the online topographic map (www.maps.six.nsw.gov.au) indicates the site is relatively flat and less than 10m above sea level. Stormwater from site would drain into the paddock immediately north of the site. It is expected that the local stormwater would discharge into the Hunter River approximately 160m north of site.

4.2 Local Geology, Hydrogeology and Groundwater Use

A review of Newcastle 1:250,000 Geological Series Sheet S1 56-2, First Edition, 1966 indicates that the site is underlain by Quaternary soils made up of gravel, sand, silt, clay "waterloo rock" (aka indurated sand or "coffee rock"), marine and freshwater deposits.

The NSW Department of Water and Energy operates a website listed as www.waterinfo.nsw.gov.au with search tools that provide summary reports on registered bores in NSW. JME carried out a search of registered bores on this website on the 21 March 2014. The results of this search indicated that that there were no registered bores within a 1 kilometre radius of the Site. .

It is anticipated that groundwater will be located between 2mbgs and 6mbgs of site and flow north towards the Hunter River.

A review of the online acid sulfate risk map (www.nratlas.nsw.gov.au) indicates that the site is located on the border of Class 4 and Class 5 acid sulfate areas. Class 4 areas require an acid sulfate soil assessment be conducted for works beyond 2 metres below natural ground surface or works by which the watertable is likely to be lowered beyond 2 metres below natural ground surface. Class 5 areas require an acid sulfate soil assessment for works within 500 metres of adjacent Class 1, 2, 3, or 4 land which are likely to lower the watertable below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land.

4.3 Historical Titles Search

A search of historical titles for the site was undertaken by JME. A list of past registered proprietors for the lots was obtained dating back to1823. The results of the search are included in Appendix A. A summary of the site owner's is shown in Table 2.

TABLE 2 – SUMMARY OF SITE HISTORY DOCUMENTS

DATE OF ISSUE	DOC NO	DESCRIPTION	CANCELLATION DATE	NOTE
13/12/1962	Vol 9337 Folio 120	Certificate of Title	22/6/1970	Lots 1-6 DP 237264
22/6/1970	Vol 11343 Folio 169	Certificate of Title	27/1/1972	Lots 1-3 DP 237264
27/1/1972	Vol 11766 Folio 32	Certificate of Title		Lot 3 DP 237264
current	Lot 3 DP 237264	Certificate of Title		Current Owner Hilary Ignatius Lantry
16/12/1970	M105742	Transfer document		Title transfer Railway to Lantry
20/8/1971	M399277	Transfer document		Easement (Hunter Water)
31/12/1971	M565919	Transfer to new CT		Split Lot 3 from Lots 1-3
Current	Lot 3 DP237264	Cadastral Records Enquiry report		Lot location

Lot 3 DP 237264 (the site) was originally part of a larger parcel of land (Vol 9337 Folio 120) that encompassed Lots 1-6 granted to Edward Charles Close in 1823. The site was split and Lots 1-3 (Vol 11343 Folio 169) became property of the Commissioner of Railways circa 1864. Lot 3 (Vol 11766 Fol 32) was split from Lots 1 and 2 on 27/1/1972 with Lot 3 then being transferred to Hilary Ignatius Lantry, farmer, on 16/12/1970 (M105472). An easement for sewer was recorded on 20/8/1971 with transfer of rights to Hunter Water for the easement.

4.4 Aerial Photograph Review

Aerial photographs of the site were purchased from the NSW Land and Property Management Authority and reviewed by a JME Environmental Scientist. The results of the aerial photograph review are summarised below in Table 3. The aerial photographs are presented in Appendix B.

TABLE 3 – AERIAL PHOTOGRAPH REVIEW

YEAR	SITE	SURROUNDING LAND
1958	The photograph is of poor quality. There appears to be a building just west of the centre of the site. There appears to be another building in the north east corner of site.	The street layout and general surrounding land is not dissimilar to the current day. However there are fewer residential building along Swan Street.
1965	Both buildings in the previous photo have been removed	Similar to 1958.
1974	Similar to 1965.	Similar to 1965 with more residential along Swan Street to the west of site.
1987	The residence, tennis court and pool appears to be similar with current layout.	Similar to 1974.
1996	Similar to 1987	Similar to 1987.
2007	Similar to 1996.	Similar to 1996.
2013	Similar to 2007.	Similar to 2007.

4.5 Section 149 Certificate

A Section 149 Planning Certificate was obtained from Council for the site. A copy of the certificate is provided in Appendix C. Table 4 (below) summarises the relevant contamination and acid sulfate soil information contained within the certificate.

TABLE 4 – SECTION 149 CERTIFICATE SUMMARY

Current Zoning	RU1 Primary Production
Objectives of Zone	To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. To encourage diversity in primary industry enterprises and systems appropriate for the area. To minimise fragmentation and alienation of resource lands. To minimise conflict between land uses in this zone and uses in adjoining zones.
Mine Subsidence	Site is NOT within a proclaimed mine subsidence district.
Land Contamination	The land to which the certificate relates is : • not significantly contaminated land; • not subject to a management order; • not the subject of an voluntary management proposal; and • not subject to an ongoing maintenance order

	within the meaning of the Contaminated Land Management Act (1997).
Potential Acid Sulfate Soils	All land within the Maitland Local Government Area has the potential to contain acid sulfate soils.

According to the LEP, the site is on the border of Class 4 and Class 5 Land with respect to acid sulfate soils. This means development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.

However, despite the above, development consent is not required for the carrying out of works if:

- a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works, and
- the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.

Also, development consent is not required under this clause to carry out any works if:

- the works involve the disturbance of less than 1 tonne of soil, such as occurs in carrying out agriculture, the construction or maintenance of drains, extractive industries, dredging, the construction of artificial water bodies (including canals, dams and detention basins), foundations or flood mitigation works, or
- the works are not likely to lower the watertable.

4.6 NSW OEH/EPA Records

A search of the NSW OEH's record under section 58 of the Contaminated Land Management Act 1997 database revealed that there are no sites within Morpeth that are registered with notices.

A copy of the search can be found in Appendix D.

4.7 Internet Search for Publicly Available Information

An internet search was undertaken to gather information relevant to the site. It appears Edward Close gifted his land to the Railway (The Sydney Morning Herald 21 May 1864) to enable the Maitland Morpeth rail line to be built.

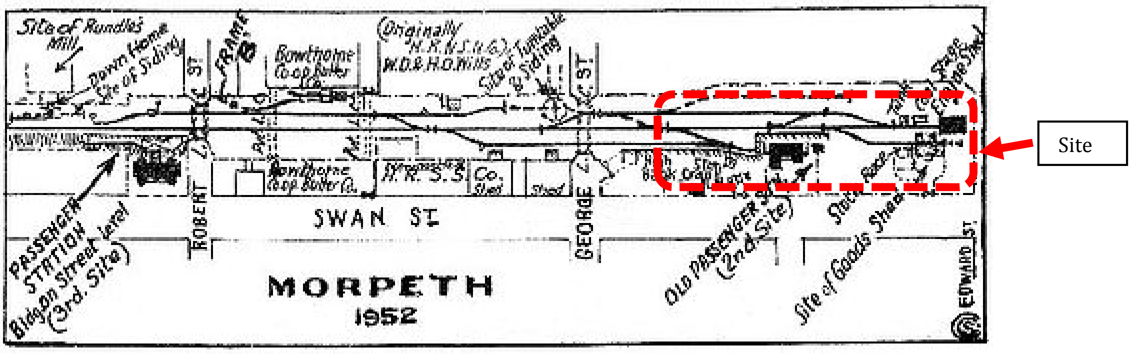


Plate 1: Swan Street 1952 (Source: Wikipedia)

The following excerpt from Wikipedia details the rail development on the site.

“Opened for traffic in May 1870, the new terminal station was located centrally between George and Edward Streets and consisted of a 120 feet brick platform with stone coping, a brick station building and Station Master's residence combined, with a dock siding at the Maitland end. In 1877, an engine shed with water tank was erected at the dead-end of the line beyond the second Morpeth station. In 1878, a 60 feet x 27 feet brick goods shed was erected adjacent to the engine shed, with a goods siding which extended from the dock past a high timber-faced wool bank to beyond the George Street crossing. A stock race was added in 1882. In 1880, a siding was laid in to serve Bundle's Flour-Mill. In 1904, the siding was still in existence but was known as Eales’ Duckenfield siding, the large stone building having been converted into a warehouse. Both building and siding have long since vanished.”

The railway only operated from 1871-1889, although trains still proceeded there for reversing for some years and was officially closed by an act of Parliament in 1953.

4.8 Interview with Mr Hilary Lantry

Mr Lantry is the current owner of the site (since 1970) and has a knowledge of the operation of the site spanning more than sixty years. Mr Lantry was able to provide the following information regarding the sites history:

- the rail was in use until the 1950s;
- Coal trucks delivered coal for steam trains;
- Coal was stored on the eastern portion of the site;
- Railway line ran through the location of the pool in the backyard;
- The train overshot the end of the rail twice;
- A small crane was located in the western portion of site; and
- Front garden was filled with river bank soil.

4.9 Site Walkover

A site walkover was conducted by a JME environmental scientist on 28 March 2014 to conduct a visual assessment of the current site activities, potential sources of contamination, property boundaries, surrounding land uses, topography and nearby sensitive environments.

The site is located on the eastern outskirts of Morpeth. The streets were asphalt sealed and have kerb and guttering. The residence along with a hard-court tennis court and an in-ground pool were located centrally on the site. The residence was constructed of brick with a tile roof. A well maintained garden and lawn surrounded the residence (Photo 1).

Photo 1: Brick and tile residence

The western portion of site appeared to have been benched or cut and filled (Photo 2). There was a concrete slab on the upper bench. (Photo 3)

.

Photo 2: Lower bench/fill area in the western paddock

Photo 3: Concrete slab on the upper bench area in the western paddock

The northern boundary fence of site is on the toe of a battered slope which was approximately 1.5-2m high. Portions of the batter were potentially stabilised with sandstone blocks (Photo 4).

Small exposed soil appeared to be stained dark brown.

Photo 4: Sandstone blocks along the battered slope of the northern boundary

The eastern paddock, which is approximately double the size of the western paddock, also appeared to be benched. There were a number of patches of bare soil or sparsely vegetated within the eastern paddock. These appeared to contain fill material comprising of gravel, coal, charcoal and crushed concrete (Photo 5).

Photo 5: Example of visible fill material.

Brick footings, approximately 15m long were located near the centre of the eastern paddock (Photo 6).

Photo 6: Brick Footings

5 DISCUSSION

Based on the above information, the site was once a terminal for the Morpeth train line. The terminal contained a passenger platform, livestock loading ramp, engine shed water tank and loading crane. The train line use was ceased by an act of government in 1953.

Aerial photography suggest the site lay dormant with some of the buildings remaining, possibly the passenger terminal and engine shed, until sometime before 1965. Between 1974 and 1987 the current residence and ancillary item were constructed. The site appeared to be relatively unchanged from 1987.

Site observations indicate that site was filled along the northern half to level the train corridor.

Based on the site history review and the site walkover, the potential AECs and COCs identified at the site are presented below in Table 5.

TABLE 5 – POTENTIAL AECS AND COCS

AEC	POTENTIAL CONTAMINATING ACTIVITY	POTENTIAL COCS	LIKELIHOOD OF CONTAMINATION *	COMMENT
1. Entire site	Former use as a train terminal. Uncontrolled filling across site.	Metals TPH, PAH, BTEX,OCPs, OPPs, PCBs Metals, and Asbestos	Medium	Contamination, if any, from train use would be from the surface down. Fill of unknown origin and quality used to level the line.

AEC	POTENTIAL CONTAMINATING ACTIVITY	POTENTIAL COCS	LIKELIHOOD OF CONTAMINATION *	COMMENT
2. Former engine shed	Maintenance of steam engine	TPH, PAH, BTEX, Metals, and Asbestos (brakes)	Medium-low	Contamination, if it existed would located in the upper soils.
Passenger station	Weathering and demolition of hazardous building materials	Zinc, lead and asbestos.	low	Asbestos contamination risk is consider low as building were constructed prior to asbestos used in building products.

NOTES:
** = It is important to note that this is not an assessment of the financial risk associated with the AEC in the event contamination is detected, but a qualitative assessment of the probability of contamination being detected at the potential AEC.*
Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc; TPH - Total Petroleum Hydrocarbons; PAH - Polycyclic Aromatic Hydrocarbons; OCP - Organochlorine Pesticides; OPP – Organophosphorus Pesticides

6 CONCLUSION

Based on the information gained from the desk stop study it is considered that the site has been potentially contaminated from past activities on site. It is recommended that a detailed contamination site assessment which includes soil sampling and analysis is undertaken to further assess the potential contamination of the site. The detailed assessment should be conducted with the development application for the construction of residences on the site. Potential contamination is likely to be minor/moderate, and subject to the detailed assessment, it is considered the rezoning may be supported.

It is assumed that rezoning the site for residential land use will result in single/double storey residential developments. Hence the disturbance of the soil 2m below the surface is considered unlikely into the future. Therefore further assessment of acid sulfate soils is not considered necessary.

7 REFERENCES

Column a of Appendix II in the NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme (Second Edition)

Newcastle 1:250,000 Geological Sheet (SI/56-02) produced by the NSW Department of Mineral Resources (1966);

ASSMAC (1998) Acid Sulfate Soil Manual;

www.waterinfo.nsw.gov.au; and

www.nratlas.nsw.gov.au

“Opening of the Morpeth Rail Line” Sydney Morning Herald, 21 May 1864

Maitland To Morpeth Railway (Cessation of Operation) Act. Act No. 38, 1953

LIMITATIONS

In preparing this report, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith in accordance with JM Environments understanding of the client's brief and general accepted practice for environmental consulting.

This report was prepared for Mr H Lantry with the objective of assessing the presence of contamination on the site that could potentially impact on the use of the property for residential use. No warranty, expressed or implied, is made as to the information and professional advice included in this report. The report is not intended for other parties or other uses with the exception of Maitland City Council for the purpose of assessing a DA for rezoning the site. Anyone using this document does so at their own risk and should satisfy themselves concerning its applicability and, where necessary, should seek expert advice in relation to the particular situation.

Information within the report including borehole and test pit logs should not be used for geotechnical investigation purposes.

Figures

Notes:

1) https://six.nsw.gov.au/

2) Subject Site 🟥

CLIENT:

Mr H Lantry

PROJECT TITLE: **Rezoning Project**

30 Swan Street, Morpeth NSW

PROJECT:	JME4015	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	NFC
DATE:	21/03/2014		

FIGURE TITLE:

Site Location Plan

FIGURE NUMBER: **1**

JM ENVIRONMENTS

Appendix A

Title Search

Land and Property Information Division

ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT
Land & Property Information
A division of the Department of **Finance & Services**

HISTORY OF TITLE TRANSACTION

Title Reference: 3/237264

```
     LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH
     -----------------------------------------------------------------

                                         SEARCH DATE
                                         -----------
                                         11/3/2014 2:24PM

FOLIO: 3/237264
------

       First Title(s): SEE PRIOR TITLE(S)
       Prior Title(s): VOL 11766 FOL 32

Recorded     Number     Type of Instrument              C.T. Issue
--------     ------     ------------------              ----------
 5/6/1987               TITLE AUTOMATION PROJECT        LOT RECORDED
                                                        FOLIO NOT CREATED

 9/2/1988               CONVERTED TO COMPUTER FOLIO     FOLIO CREATED
                                                        CT NOT ISSUED


                  ***  END OF SEARCH  ***
```

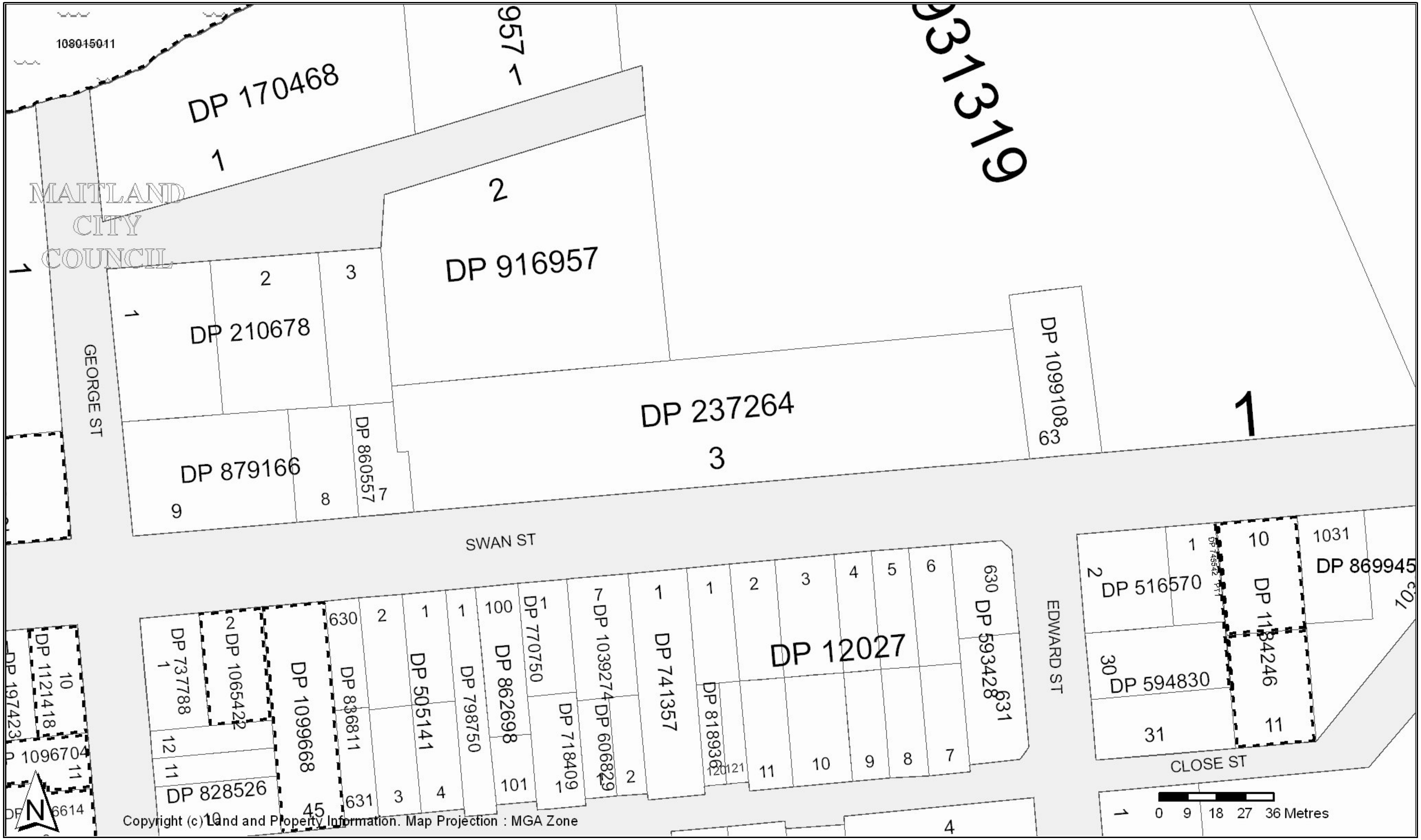
```
                                        PRINTED ON 11/3/2014
```

NSW GOVERNMENT Land & Property Information
A division of the Department of Finance & Services

Cadastral Records Enquiry Report

Requested Parcel : Lot 3 DP 237264 **Identified Parcel :** Lot 3 DP 237264

Locality : MORPETH **LGA :** MAITLAND **Parish :** ALNWICK **County :** NORTHUMBERLAND



Report Generated 12:51:04 PM, 12 March, 2014
Copyright © Land and Property Information ABN: 84 104 377 806

This information is provided as a searching aid only. While every endeavour is made to ensure the current cadastral pattern is accurately reflected, the Registrar General cannot guarantee the information provided. For all ACTIVITY PRIOR to SEPT 2002 you must refer to the RGs Charting and Reference Maps.

Cadastral Records Enquiry Report

Requested Parcel : Lot 3 DP 237264 **Identified Parcel** : Lot 3 DP 237264

Locality : MORPETH **LGA :** MAITLAND **Parish :** ALNWICK **County :** NORTHUMBERLAND

	Status	Surv/Comp	Purpose
DP745542 Lot(s): 1			
DP1184246	REGISTERED	SURVEY	SUBDIVISION
DP1065422 Lot(s): 2			
CA89652 - LOT 2 DP1065422			
DP1076614 Lot(s): 9			
CA90745 - LOT 9 DP1076614			
DP1096704 Lot(s): 11			
CA99275 - LOT 11 DP1096704			
DP1099668 Lot(s): 45			
CA100051 - LOT 45 DP1099668			
DP1113955 Lot(s): 52			
DP584948	HISTORICAL	SURVEY	SUBDIVISION
DP1100526	HISTORICAL	COMPILATION	LIMITED FOLIO CREATION
CA100054 - LOT 1 DP1100526			
DP1121418 Lot(s): 10			
DP199172	HISTORICAL	COMPILATION	DEPARTMENTAL
DP1184246 Lot(s): 10, 11			
DP745542	HISTORICAL	COMPILATION	DEPARTMENTAL
Water Feature Polygon Id(s): 108015011			
DP1192522	UNREGISTERED	SURVEY	EASEMENT

Cadastral Records Enquiry Report

Requested Parcel : Lot 3 DP 237264 **Identified Parcel :** Lot 3 DP 237264

Locality : MORPETH **LGA :** MAITLAND **Parish :** ALNWICK **County :** NORTHUMBERLAND

Plan	Surv/Comp	Purpose
DP12027	SURVEY	UNRESEARCHED
DP28032	SURVEY	UNRESEARCHED
DP104813	SURVEY	UNRESEARCHED
DP170468	COMPILATION	UNRESEARCHED
DP197423	COMPILATION	DEPARTMENTAL
DP210678	SURVEY	SUBDIVISION
DP237264	SURVEY	RESUMPTION OR ACQUISITION
DP322179	SURVEY	UNRESEARCHED
DP505141	SURVEY	SUBDIVISION
DP516570	SURVEY	SUBDIVISION
DP563409	SURVEY	SUBDIVISION
DP593428	SURVEY	SUBDIVISION
DP594830	SURVEY	SUBDIVISION
DP606829	SURVEY	SUBDIVISION
DP708453	SURVEY	SUBDIVISION
DP718409	COMPILATION	DEPARTMENTAL
DP737788	COMPILATION	DEPARTMENTAL
DP741357	COMPILATION	DEPARTMENTAL
DP745542	COMPILATION	DEPARTMENTAL
DP770750	COMPILATION	DEPARTMENTAL
DP798750	COMPILATION	DEPARTMENTAL
DP818936	SURVEY	SUBDIVISION
DP828526	SURVEY	SUBDIVISION
DP836811	SURVEY	SUBDIVISION
DP860557	SURVEY	SUBDIVISION
DP862698	SURVEY	SUBDIVISION
DP869945	SURVEY	SUBDIVISION
DP879166	COMPILATION	SUBDIVISION
DP916957	COMPILATION	UNRESEARCHED
DP931319	COMPILATION	UNRESEARCHED
DP1039274	COMPILATION	LIMITED FOLIO CREATION
DP1065422	COMPILATION	LIMITED FOLIO CREATION
DP1076614	COMPILATION	LIMITED FOLIO CREATION
DP1096704	COMPILATION	LIMITED FOLIO CREATION
DP1099108	COMPILATION	DEPARTMENTAL
DP1099668	COMPILATION	LIMITED FOLIO CREATION
DP1113955	UNRESEARCHED	SUBDIVISION
DP1113955	SURVEY	SUBDIVISION
DP1121418	SURVEY	REDEFINITION
DP1184246	SURVEY	SUBDIVISION

Land and Property Information Division
ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

TITLE SEARCH

Title Reference: 3/237264

```
      LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH
      ------------------------------------------------------------


FOLIO: 3/237264
------

           SEARCH DATE       TIME              EDITION NO    DATE
           -----------       ----              ----------    ----
           12/3/2014        12:55 PM               -           -


VOL 11766 FOL 32 IS THE CURRENT CERTIFICATE OF TITLE

LAND
----
LOT 3 IN DEPOSITED PLAN 237264
   AT MORPETH
   LOCAL GOVERNMENT AREA MAITLAND
   PARISH OF ALNWICK   COUNTY OF NORTHUMBERLAND
   TITLE DIAGRAM DP237264

FIRST SCHEDULE
--------------
HILARY IGNATIUS LANTRY

SECOND SCHEDULE (1 NOTIFICATION)
---------------
1   M399277   EASEMENT FOR SEWER AFFECTING PART OF THE LAND ABOVE
              DESCRIBED SHOWN SO BURDENED IN PLAN WITH M399277

NOTATIONS
---------
UNREGISTERED DEALINGS: NIL

        ***  END OF SEARCH  ***
```

```
                                          PRINTED ON 12/3/2014
```

** ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE.*
WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.

11766032

NEW SOUTH WALES

C[redacted]CATE OF TITLE

PROPERTY ACT, 1900

Appln. No.46949

Prior Title Vol.11343 Fol.169

Vol. 11766 Fol. 32

Edition issued 27-1-1972

M565919

(Page 1) Vol. 11766 Fol. 32

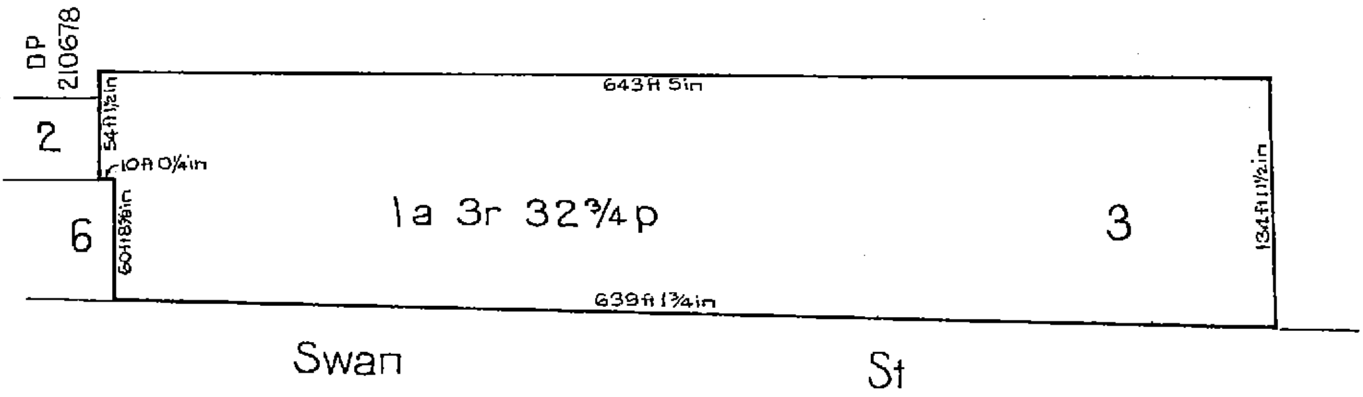
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

CANCELLED

J. Watson
Registrar General.

NO FOLIO

PLAN SHOWING LOCATION OF LAND



M565919 S.W.

Scale: 100 feet to one inch

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 3 in Deposited Plan 237264 at Morpeth in the City of Maitland Parish of Alnwick and County of Northumberland being part of Portion 63 granted to Edward Charles Close on 30-6-1823.

FIRST SCHEDULE

HILARY IGNATIUS LANTRY at Morpeth, Farmer.

SECOND SCHEDULE

GRN EA

1. Easement for Sewer created by Transfer No.M399277 as more fully set out therein affecting part of the land above described.

J. Watson
Registrar General

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TITLES OFFICE.

RG 262

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED.

Vol. 11766 Fol. 32

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT			ENTERED	Signature of Registrar General
	NATURE	NUMBER	DATE		

SECOND SCHEDULE (continued)

INSTRUMENT			PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
NATURE	NUMBER	DATE						

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

11343169

NEW SOUTH WALES

[redacted]

ICATE OF TITLE

PERTY ACT, 1900, as amended.

Applns.Nos.947 and 46949

Prior Title Vol.9337 Fol.129
(as regards part)

Vol. 11343 Fol. 169

Edition issued 22-6-1970

(Page 1) Vol. 11343 Fol. 169

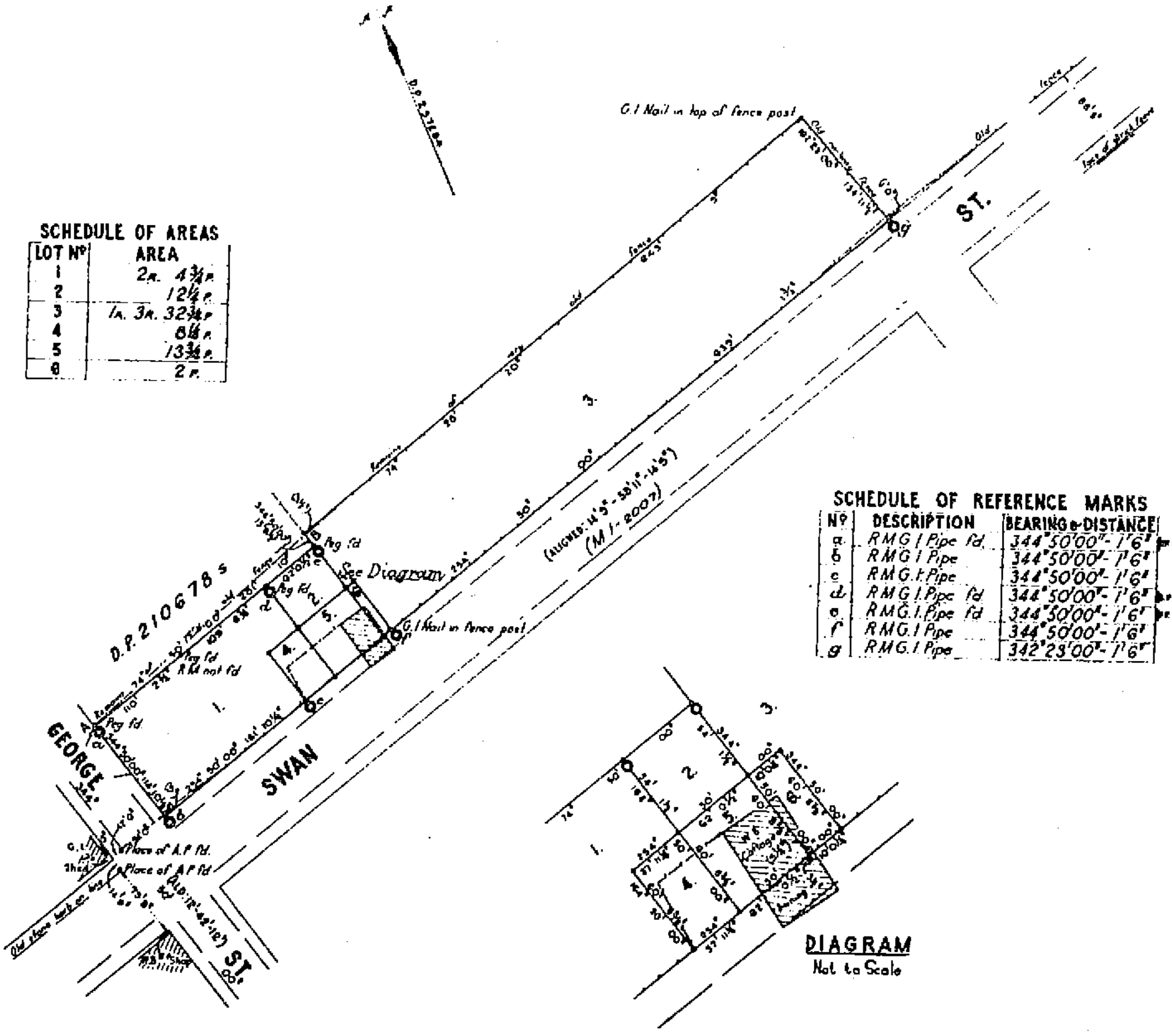
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness GBarnes

JWatson
Registrar General.

CANCELLED

PLAN SHOWING LOCATION OF LAND



SCHEDULE OF AREAS

LOT Nº	AREA
1	2R. 4¾P.
2	12¼P.
3	1A. 3R. 32¾P.
4	6¼P.
5	13¾P.
6	2P.

SCHEDULE OF REFERENCE MARKS

Nº	DESCRIPTION	BEARING & DISTANCE
a	RMG I Pipe fd.	344°50'00"- 1'6"
b	RMG I Pipe	344°50'00"- 1'6"
c	RMG.I.Pipe	344°50'00"- 1'6"
d	RMG I.Pipe fd	344°50'00"- 1'6"
e	RMG.I.Pipe fd	344°50'00"- 1'6"
f	RMG.I Pipe	344°50'00"- 1'6"
g	RMG.I.Pipe	342°23'00"- 1'6"

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lots 1, 2 and 3 in Deposited Plan 237264 at Morpeth in the City of Maitland Parish of Alnwick and County of Northumberland being part of Portion 63 granted to Edward Charles Close on 30-6-1823.

FIRST SCHEDULE

~~THE COMMISSIONER FOR RAILWAYS.~~

SECOND SCHEDULE

NIL.

JWatson
Registrar General

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TITLES OFFICE.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED.

V. C. N. BLIGHT, GOVERNMENT PRINTER

Vol. 11343 Fol 169

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT			ENTERED	Signature of Registrar-General
	NATURE	NUMBER	DATE		
Hilary Ignatius Lantry of Morpeth, Farmer	Transfer	M 105742	2.11.1970	23.12.1970	J Watson

This Deed is cancelled and Certificate of Title issued.
Vol. 11766 Fols 31 & 32 dated 27-1-1972
Vide M565919
J Watson
REGISTRAR GENERAL

SECOND SCHEDULE (continued)

INSTRUMENT			PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION
NATURE	NUMBER	DATE				
Transfer	M 399277	10-8-1971	to The Hunter District Water Board of all the estate interest and right of the registered proprietor in respect of the sewer shown in plan annexed to Transfer no M399277 and as more fully set out therein	7-12-1971	J Watson	

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

09337129

M

NEW SOUTH WALES

(For Grant and title reference prior to first edition see Deposited Plan.)

[redacted]

TIFICATE OF TITLE

PERTY ACT, 1900, as amended.

Vol. 9337 Fol. 129

1st Edition issued 13-12-1962

CANCELLED

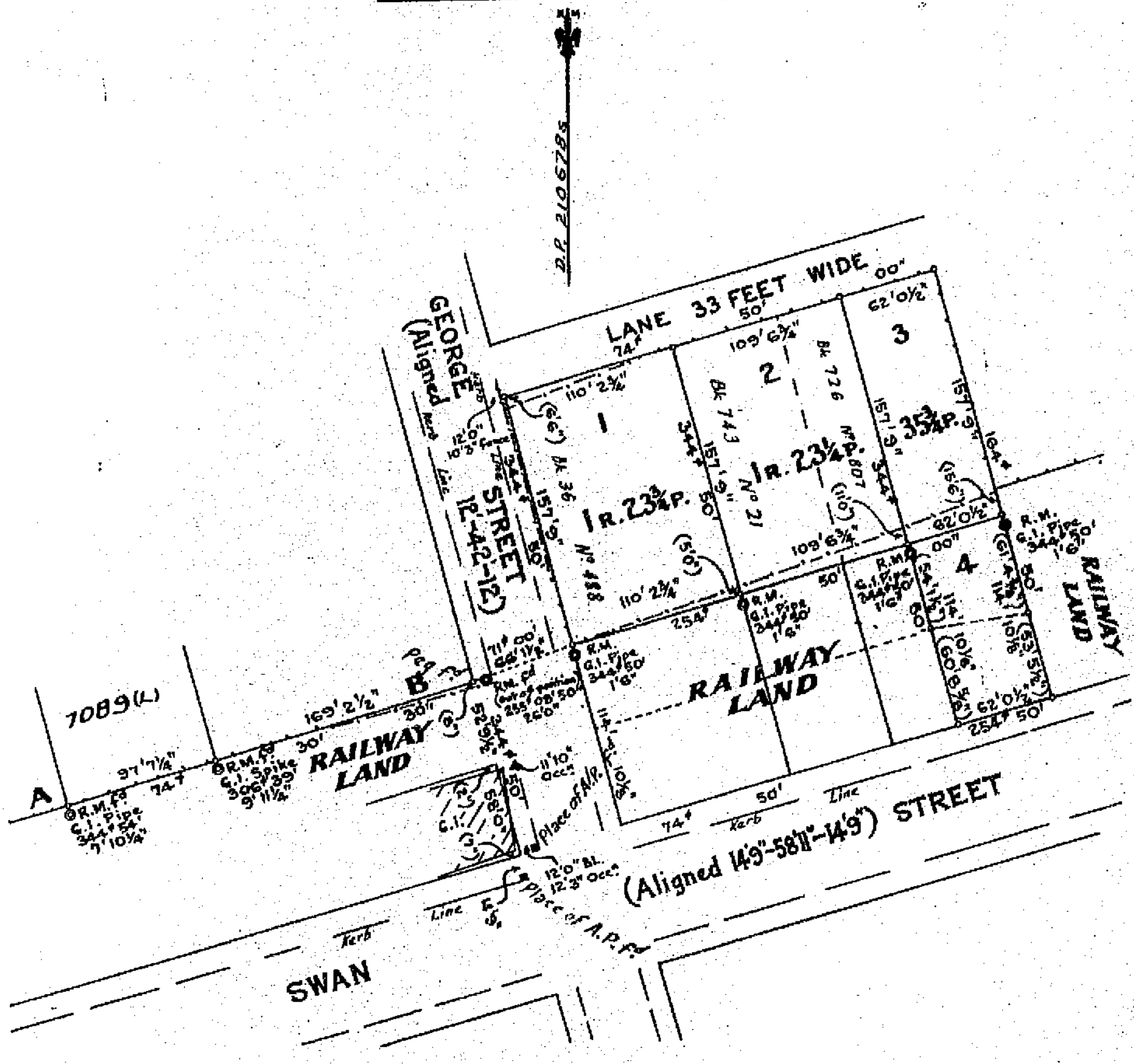
(Page 1) Vol. 9337 Fol. 129

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness

Registrar-General.

PLAN SHOWING LOCATION OF LAND



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 4 in Deposited Plan 210678s at Morpeth in the City of Maitland Parish of Alnwick and County of Northumberland.

FIRST SCHEDULE (Continued overleaf)

~~THE COMMISSIONER FOR RAILWAYS.~~

Registrar General.

SECOND SCHEDULE (Continued overleaf)

1. Reservations and conditions, if any, contained in the Crown Grant(s) referred to in the said Deposited Plan.

Registrar General.

ST 1600 V. C. N. BLIGHT, GOVERNMENT PRINTER

Vol. 9337 Fol 129

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
The Commissioner for Railways freed from all other interests	Resumption	L451405		21-7-1969	J. Watson

This deed is cancelled as to *the whole*

New Certificates of Title have issued on *22-6-1970*

for lots in *Deposited* Plan No. *237264* as follows:-

Lots *1 to 6 (incl)* Vol. *11343* Fols *169+170* respectively.

VIDE R.P.A. 46949 (consolidation)

J. Watson
REGISTRAR GENERAL

DP 2572[illegible]
[illegible]
Railways
Resumption
[illegible]
L451405N

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION

FORM No. 184A **NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED**

M565919

No fee
31-12-71.

ORDER FOR A NEW CERTIFICATE OF TITLE PURSUANT TO SECTION 33(1) ~~110 (1A)~~ OF THE REAL PROPERTY ACT, 1900-~~1956~~

I, the Registrar-General of New South Wales direct, pursuant to Section 33(1) ~~110 (1A)~~ of the Real Property Act, 1900-~~1956~~, that ~~a~~ 2 new Certificate of Title issue for—(I) lots 1 and 2 } in D.P. 237264
(II) lot 3 }

of the land comprised in C.T. Volume 11343 Folium 169

in the name of the present registered proprietor.

Dated this 23rd day of December, 1971

J. H. WATSON,

Registrar-General.

A.T.

D 1583

RG 3/77

No. M565919

APPLICATION FOR NEW CERTIFICATE OF TITLE

Lodged by:
H. M. ALLEN & CO.

Register Books affected

Volume 11343 Folio 169

11766-32 ✓

10/2/72

FOR DEPARTMENTAL USE ONLY

Special Directions

	Date	Initials
Sent to Survey Branch		
Received from Records		
Draft Written	10/1/72	
Draft Examined	20/1/72	
Diagram Complete	20-1-72	
Diagram Examined		
Draft Forwarded		
C.T. Issue Engrossed	27/1/72	
C.T. Issue Cancelled	7/2	

M.P.D.

D

New Certificate of Title issued

Vol. 11766 Fol. 31 & 32

M521321 to follow affects 11766-31

M 399277

17-X

R.P. 13

FEES:—

No.

REGISTRAR-GENERAL NEW SOUTH WALES

'71 AUG 20 PM 12:05

17/8/71.

Lodgment Endorsement

5.24

New South Wales

MEMORANDUM OF TRANSFER

(REAL PROPERTY ACT, 1900)

I, HILARY IGNATIUS LANTRY of Morpeth Farmer

(herein called transferor)

being registered as the proprietor of an estate in *fee simple*ᵃ in the land hereinafter described, subject, however, to such encumbrances, liens and interests as are notified hereunder, ~~in consideration~~ of for the purpose of restoring the Transferee to its former position with (------------) ~~(the receipt whereof is hereby acknowledged) paid to~~ ---------- by respect to the sewer described in the plan annexed hereto and marked "A"

do hereby transfer to

ᶜ THE HUNTER DISTRICT WATER BOARD a body corporate by act of the legislature of the State of New South Wales and having its office at Hunter Street Newcastle (herein called transferee)ᵈ

~~ALL such~~ Out of its Estate and Interest in ALL THE land mentioned in the schedule following:—

County	Parish	Reference to Title			Description of Land (if part only)ᵉ
		Whole or Part	Vol.	Fol.	
Northumberland	Alnwick	Whole	11343	169	

All the estate interest and right of the transferee in respect of the said sewer lying in or under the said land to which the Transferee was entitled under or by virtue of the Hunter District Water Sewerage and Drainage Act 1938 at the date of the resumption of the said land by notification in the Government Gazette No. 101 published the 15th day of September 1967 to the intent that the Transferee shall be restored to all its rights under the said Act in respect of the said sewer notwithstanding such resumption

ENCUMBRANCES, &c., REFERRED TOᶠ

Signed at Maitland the 10th day of August, 1971

ᵍ Signed in my presence by the transferor WHO IS PERSONALLY KNOWN TO ME

Hilary Lantry Transferor*

Solicitor Maitland

ʰ Signed

Signed in my presence by the transferee WHO IS PERSONALLY KNOWN TO ME

† Accepted, and I hereby certify this Transfer to be correct for the purposes of the Real Property Act. And that I am the solicitor for the transferee whose signature cannot be ~~obtained without difficulty and delay~~.

Sol'r to Transferee Transferee(s)

(Jan Koenig)

(Trusts must not be disclosed in the transfer.)

Typing or handwriting in this instrument should not extend into any margin. Handwriting should be clear and legible and in permanent black non-copying ink.

a If a less estate, strike out "in *fee simple*" and interline the required alteration.

b State in full the name of the person who furnished the consideration monies.

c Show in BLOCK LETTERS the full name, postal address and description of the persons taking.

d If more than one person is taking state whether they hold as joint tenants or tenants in common.

e The description may refer to the defined residue of the land in a certificate or grant (e.g., "and being residue after Transfer No. ") or may refer to parcels shown in Town or Parish Maps issued by the Dept. of Lands or shown in plans filed in the Office of the Registrar General (e.g., "and being lot sec. D.P. "). Unless authorised by Reg. 53 of the Conveyancing Act Regulations, 1961, a plan may not be annexed to or endorsed on this transfer form.

f A very short note will suffice.

g Execution in New South Wales may be proved if this instrument is signed or acknowledged before the Registrar General, or Deputy Registrar General, or a Notary Public, a J.P., or Commissioner for Affidavits, to whom the Transferor is known, otherwise the attesting witness should appear before one of the above functionaries who having questioned the witness should sign the certificate on the back of this form.

As to instruments executed elsewhere, see Section 107 of the Real Property Act, 1900, Section 168 of the Conveyancing Act, 1919, and Section 52A of the Evidence Act, 1898.

h Repeat attestation if necessary.

If the Transferor or Transferee signs by a mark, the attestation must state "that the instrument was read over and explained to him, and that he appeared fully to understand the same."

THIS SPACE TO BE LEFT FREE FROM NOTATIONS

NOT TO BE ALTERED BY ERASURE—See Foot Note

---

* If signed by virtue of any power of attorney, the original power must be registered in the Miscellaneous Register, and produced with each dealing, and the memorandum of non-revocation on back of form signed by the attorney before a witness.

† N.B.—Section 117 requires that the above Certificate be signed by each Transferee or his Solicitor or Conveyancer, and renders any person falsely or negligently certifying liable to a penalty; also to damages recoverable by parties injured, Acceptance by the Solicitor or Conveyancer (who must sign his own name, and not that of his firm) is permitted only when the signature of the Transferee cannot be obtained without difficulty, and when the instrument does not impose a liability on the party taking under it. When the instrument contains some special covenant by the Transferee or is subject to a mortgage, encumbrance or lease, the Transferee must accept personally.

No alterations should be made by erasure, The words rejected should be scored through with the pen, and those substituted written over them, the alteration being verified by signature or initials in the margin, or noticed in the attestation.

Sc 437—W K 1165 V. C. N. Blight, Government Printer

M 399277

No.

Lodged by H. H. ALLEN & CO.
LAW STATIONERS
Address: [illegible] SYDNEY 2000
PHONE 25-[illegible]
Phone No.:

PARTIAL DISCHARGE OF MORTGAGE[i]

(N.B.—Before execution read marginal note)

I,

mortgagee under Mortgage No.

release and discharge the land comprised in the within transfer from such mortgage and all claims thereunder but without prejudice to my rights and remedies as regards the balance of the land compised in such mortgage.

Dated at *this* *day of* 19 .

Signed in my presence by

who is personally known to me.

Mortgagee.

MEMORANDUM AS TO NON-REVOCATION OF POWER OF ATTORNEY

(To be signed at the time of executing the within instrument)

Memorandum whereby the undersigned states that he has no notice of the revocation of the Power of Attorney registered No. *Miscellaneous Register under the authority of which he has just executed the within transfer.*[j]

Signed at *the* *day of* , 19 .

Signed in the presence of—

CERTIFICATE OF J.P., &c., TAKING DECLARATION OF ATTESTING WITNESS[k]

Appeared before me at *, the* *day of* *, one thousand nine hundred and* *the attesting witness to this instrument and declared that he personally knew* *the person signing the same, and whose signature thereto he has attested; and that the name purporting to be such signature of the said* *is* *own handwriting, and that* *he was of sound mind and freely and voluntarily signed the same*

[i] This discharge is appropriate to a transfer of part of the land in the Mortgage. The mortgagee should execute a formal discharge where the land transferred is the whole of or the residue of the land in the Certificate of Title or Crown Grant or is the whole of the land in the mortgage.

[j] Strike out unnecessary words. Add any other matter necessary to show that the power is effective.

[k] To be signed by Registrar General, Deputy Registrar General, a Notary Public, J.P., Commissioner for Affidavits, or other functionary before whom the attesting witness appears. Not required if the instrument itself be signed or acknowledged before one of these parties.

D

LEAVE THESE SPACES FOR DEPARTMENTAL USE

INDEXED	MEMORANDUM OF TRANSFER
	M.P.D1975
Checked by AG	Particulars entered in Register Book, 7-12.1977
Passed (in S.D.B.) by	
Signed by	Registrar General

DOCUMENTS LODGED HEREWITH

To be filled in by person lodging dealing

1.
2.
3.
4.
5.
6.
7.

Received Docs.
Nos.
Receiving Clerk

PROGRESS RECORD

	Initials	Date
Sent to Survey Branch		
Received from Records		
Draft written		
Draft examined		
Diagram prepared		
Diagram examined		
Draft forwarded		
Supt. of Engrossers		
Cancellation Clerk		
VOL.	FOL.	

K 1165 St 437—W

City of Maitland THE HUNTER DISTRICT WATER BOARD

Morpeth Sewerage

PLAN

AT MORPETH

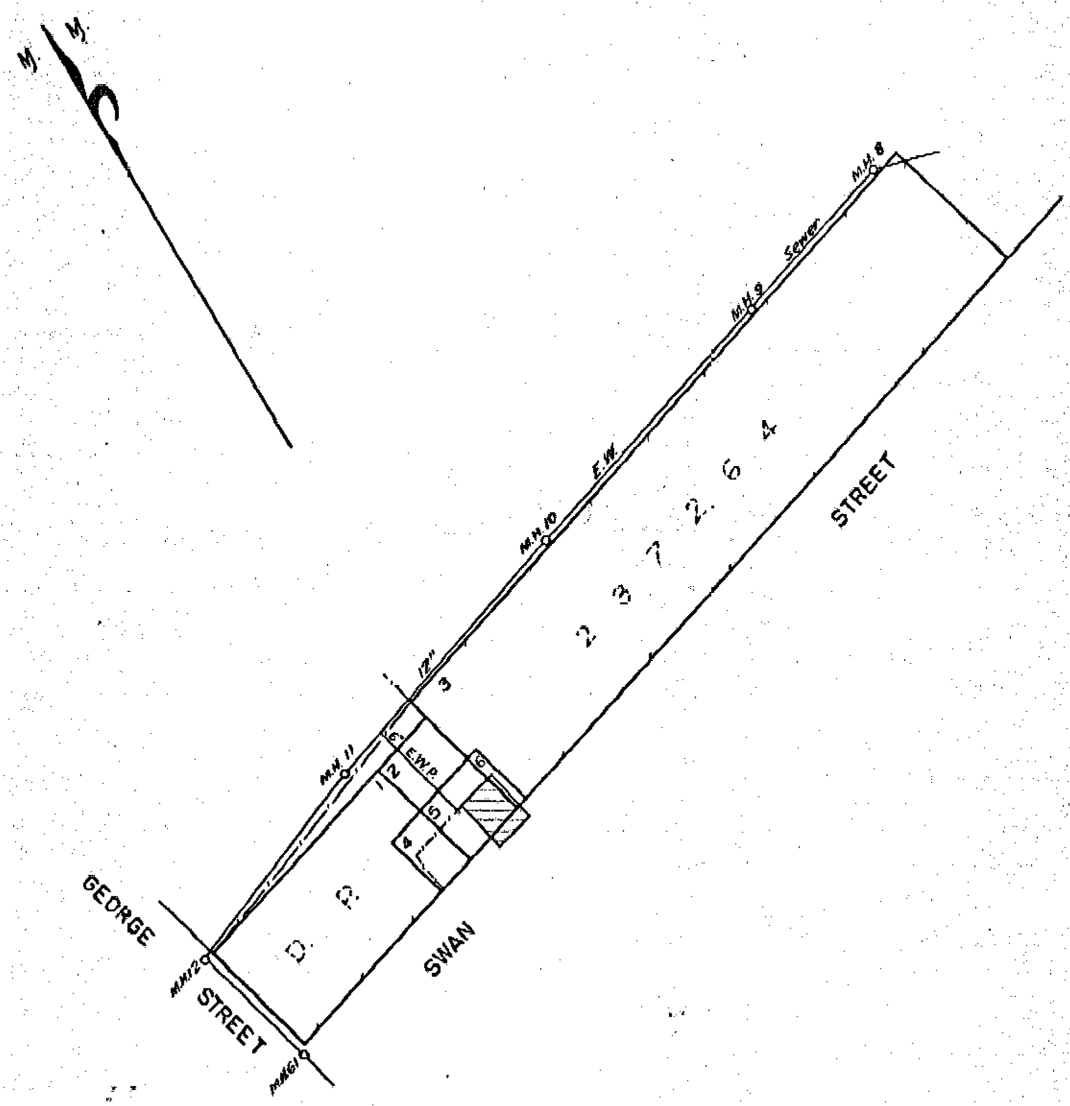
Showing Sewers lying within lots 2 and 3 D.P.237264.

PARISH OF ALNWICK COUNTY OF NORTHUMBERLAND

Scale:120 feet to an inch

This is the plan marked "A" annexed to Memorandum of Transfer Hillary Ignatius Lantry to the Hunter District Water Board dated the 10th day of August 1971

Hilary Lantry



B

M105742

70 DEC 16 PM 1 03

70 DEC 14 AM 11 20

No.________

R.P. 13

Fees:—
$ c

Lodgment — / .
Endorsement — / .
$ 20.00.

N.S.W. STAMP DUTY
DULY STAMPED

75c

New South Wales

MEMORANDUM OF TRANSFER

(REAL PROPERTY ACT, 1900)

~~I~~ THE COMMISSIONER FOR RAILWAYS (a body corporate created under or by virtue of the Transport (Division of Functions) Act 1932)

(herein called transferor)

being registered as the proprietor of an estate in *fee simple*ᵃ in the land hereinafter described, subject, however, to such encumbrances, liens and interests as are notified hereunder, in consideration of ONE THOUSAND SIX HUNDRED DOLLARS ($1,600.00) (the receipt whereof is hereby acknowledged) paid to it by ᵇ HILARY IGNATIUS LANTRY

do hereby transfer to

ᶜ HILARY IGNATIUS LANTRY of Morpeth Farmer

(herein called transferee)ᵈ

ALL such its Estate and Interest in ALL THE land mentioned in the schedule following:—

County	Parish	Reference to Title			Description of Land (if part only)ᵉ
		Whole or Part	Vol.	Fol.	
Northumberland	Alnwick	Whole	11343	169	

ENCUMBRANCES, &c., REFERRED TOᶠ

Signed at Sydney the second day of November, 1970.

THE COMMON SEAL of THE COMMISSIONER ᵍ ~~Signed in my presence by the transferor~~ for Railways hath been hereunto ~~WHO IS PERSONALLY KNOWN TO ME~~ duly affixed in the presence of:

CORRECT

ʰ Signed
~~Assistant~~ Solicitor for Railways

____
Transferorᵉ

Signed in my presence by the transferee
WHO IS PERSONALLY KNOWN TO ME

† Accepted, and I hereby certify this Transfer to be correct for the purposes of the Real Property Act.

(W.A. Enright)
Solicitor for the Transferee whose ~~signature cannot be obtained~~ without difficulty and delay.
Transferee(s)

(Trusts must not be disclosed in the transfer.)

Typing or handwriting in this instrument should not extend into any margin. Handwriting should be clear and legible and in permanent black non-copying ink.

a If a less estate, strike out "in *fee simple*" and interline the required alteration.

b State in full the name of the person who furnished the consideration monies.

c Show in BLOCK LETTERS the full name, postal address and description of the persons taking.

d If more than one person is taking state whether they hold as joint tenants or tenants in common.

e The description may refer to the defined residue of the land in a certificate or grant (e.g., "and being residue after Transfer No. ") or may refer to parcels shown in Town or Parish Maps issued by the Dept of Lands or shown in plans filed in the Office of the Registrar General (e.g., "and being lot sec. D.P. "). Unless authorised by Reg. 53 of the Conveyancing Act Regulations, 1961, a plan may not be annexed to or endorsed on this transfer form.

f A very short note will suffice.

g Execution in New South Wales may be proved if this instrument is signed or acknowledged before the Registrar General, or Deputy Registrar General, or a Notary Public, a J.P., or Commissioner for Affidavits, to whom the Transferor is known, otherwise the attesting witness should appear before one of the above functionaries who having questioned the witness should sign the certificate on the back of this form.

As to instruments executed elsewhere, see Section 107 of the Real Property Act, 1900, Section 168 of the Conveyancing Act, 1919, and Section 52A of the Evidence Act, 1898.

h Repeat attestation if necessary.

If the Transferor or Transferee signs by a mark, the attestation must state "that the instrument was read over and explained to him, and that he appeared fully to understand the same."

THIS SPACE TO BE LEFT FREE FROM NOTATION

NOT TO BE ALTERED BY ERASURE—See Foot Note

ᵉ If signed by virtue of any power of attorney, the original power must be registered in the Miscellaneous Register, and produced with each dealing, and the memorandum of non-revocation on back of form signed by the attorney before a witness.

† N.B.—Section 117 requires that the above Certificate be signed by each Transferee or his Solicitor or Conveyancer, and renders any person falsely or negligently certifying liable to a penalty; also to damages recoverable by parties injured. Acceptance by the Solicitor or Conveyancer (who must sign his own name, and not that of his firm) is permitted only when the signature of the Transferee cannot be obtained without difficulty, and when the instrument does not impose a liability on the party taking under it. When the instrument contains some special covenant by the Transferee or is subject to a mortgage, encumbrance or lease, the Transferee must accept personally.

No alterations should be made by erasure. The words rejected should be scored through with the pen, and those substituted written over them, the alteration being verified by signature or initials in the margin, or noticed in the attestation.

St 437—W K 1165 V. C. N. Blight, Government Printer

Road to be added SDB.

N55846

No. M 105742

Lodged by
Address:
Phone No.:

Thomas Kenyon & Son
BW 7429
CONVEYANCING AGENTS
109 ELIZABETH ST., SYDNEY

PARTIAL DISCHARGE OF MORTGAGE[i]

(N.B.—Before execution read marginal note)

I,

mortgagee under Mortgage No.
release and discharge the land comprised in the within transfer from such mortgage and all claims thereunder but without prejudice to my rights and remedies as regards the balance of the land compised in such mortgage.

Dated at *this* *day of* 19 .

Signed in my presence by

who is personally known to me.

Mortgagee.

MEMORANDUM AS TO NON-REVOCATION OF POWER OF ATTORNEY

(To be signed at the time of executing the within instrument)

Memorandum whereby the undersigned states that he has no notice of the revocation of the Power of Attorney registered No. *Miscellaneous Register under the authority of which he has just executed the within tranfer.*[j]

Signed at *the* *day of* , 19 .

Signed in the presence of—

CERTIFICATE OF J.P., &c., TAKING DECLARATION OF ATTESTING WITNESS[k]

Appeared before me at *, the* *day of* *, one thousand nine hundred and* *the attesting witness to this instrument and declared that he personally knew* *the person signing the same, and whose signature thereto he has attested; and that the name purporting to be such signature of the said* *is* *own handwriting, and that* *he was of sound mind and freely and voluntarily signed the same.*

[i] This discharge is appropriate to a transfer of part of the land in the Mortgage. The mortgagee should execute a formal discharge where the land transferred is the whole of or the residue of the land in the Certificate of Title or Crown Grant or is the whole of the land in the mortgage.

[j] Strike out unnecessary words. Add any other matter necessary to show that the power is effective.

[k] To be signed by Registrar General, Deputy Registrar General, a Notary Public, J.P., Commissioner for Affidavits, or other functionary before whom the attesting witness appears. Not required if the instrument itself be signed or acknowledged before one of these parties.

LEAVE THESE SPACES FOR DEPARTMENTAL USE

INDEXED	MEMORANDUM OF TRANSFER
Checked by	Particulars entered in Register Book, 23·12·1970 at
Passed (in S.D.B.) by	
Signed by	J Watson Registrar General

DOCUMENTS LODGED HEREWITH
To be filled in by person lodging dealing

1. CT
2. Minute Paper
3. Plan Copy
4.
5.
6.
7.

Received Docs
Nos
Receiving Clerk

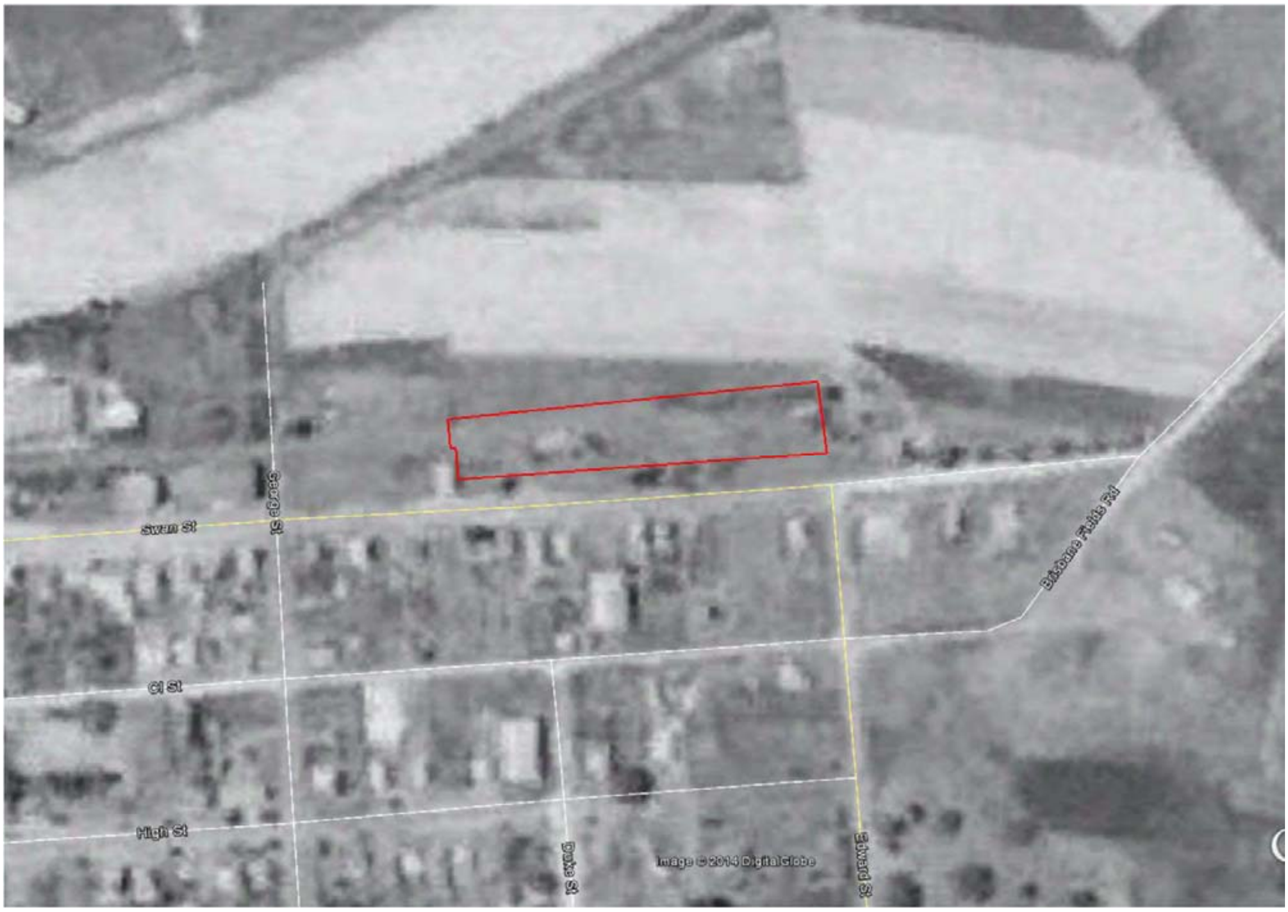
PROGRESS RECORD

	Initials	Date
Sent to Survey Branch		
Received from Records		
Draft written		
Draft examined		
Diagram prepared		
Diagram examined		
Draft forwarded		
Supt. of Engrossers		
Cancellation Clerk		
Vol.	Fol.	

1165 St437—W

Appendix B

Historical Aerial Photographs



CLIENT: **Mr H Lantry**

PROJECT TITLE: **Rezoning Project**
30 Swan Street, Morpeth NSW

PROJECT:	JME4015	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	
DATE:	21/03/2014		

FIGURE TITLE 1958 Aerial Photograph

FIGURE: **1959**

JM ENVIRONMENTS

CLIENT: **Mr H Lantry**

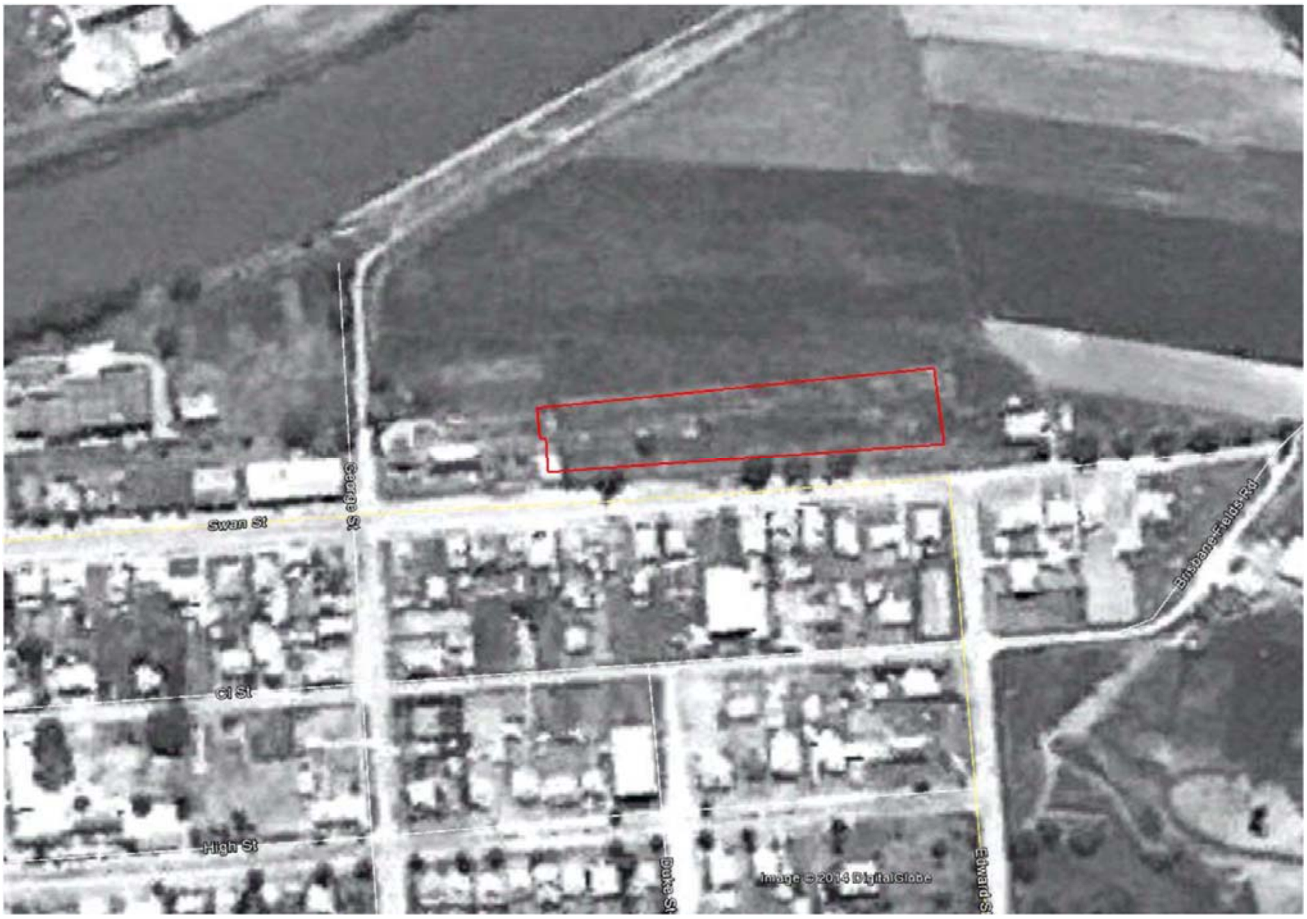
PROJECT TITLE **Rezoning Project**
30 Swan Street, Morpeth NSW

PROJECT:	JME4015	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	
DATE:	21/03/2014		

FIGURE TITLE 1965 Aerial Photograph

FIGURE: **1965**

JM ENVIRONMENTS



CLIENT: **Mr H Lantry**	PROJECT:	JME4015	DESIGNED:	JMc		FIGURE TITLE 1975 Aerial Photograph
	DWG #:	1	DRAWN:	JMc		
	REVISION:	1				
PROJECT TITLE **Rezoning Project**	SCALE:	NTS	STATUS:			
30 Swan Street, Morpeth NSW	DATE:	21/03/2014				FIGURE: **1975**

JM ENVIRONMENTS

CLIENT: **Mr H Lantry**	PROJECT:	JME4015	DESIGNED:	JMc		FIGURE TITLE 1987 Aerial Photogrpah
	DWG #:	1	DRAWN:	JMc		
	REVISION:	1				
PROJECT TITLE **Rezoning Project**	SCALE:	NTS	STATUS:			
30 Swan Street, Morpeth NSW	DATE:	21/03/2014				FIGURE: **1987**

JM ENVIRONMENTS

CLIENT: **Mr H Lantry**

PROJECT TITLE **Rezoning Project**
30 Swan Street, Morpeth NSW

PROJECT:	JME4015	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	
DATE:	21/03/2014		

FIGURE TITLE 1996 Aerial Photograph

FIGURE: **1996**

CLIENT: **Mr H Lantry**

PROJECT TITLE **Rezoning Project**
30 Swan Street, Morpeth NSW

PROJECT:	JME4015	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	
DATE:	21/03/2014		

FIGURE TITLE 2007 Aerial Photograph

FIGURE: **2007**

Appendix C

Section 149 Certificate

PO Box 220
Maitland NSW 2320
Phone: (02) 4934 9700
Fax: (02) 4933 3209
DX 21613 Maitland

S149 Planning Certificate

Environmental Planning & Assessment Act, 1979 (as amended)

MAITLAND
CITY COUNCIL

APPLICANT	**JM ENVIRONMENTS** **37 TOOKE STREET** **COOKS HILL NSW 2300**	Certificate No Certificate Date Fee Paid Receipt No No. of Pages	**14/670** **14/03/2014** **133.00** **40640** **Page 1 of 11**
Your Reference			
PROPERTY	**LOT 3 DP237264** **30 SWAN STREET** **MORPETH**		
PARISH	**Alnwick**		
PROPERTY NO	**25423**		

IMPORTANT: Please read this certificate carefully.

This certificate contains important information about the land described above.

Please check for any item, which could be inconsistent with the proposed use or development of the land. If there is anything you do not understand, please contact the Council by phone on (02) 49349700, or personally at Council's office at 285-287 High Street Maitland.

The information provided in this certificate relates only to the land described above. If you require information about adjoining or nearby land, or about the Council's development policies or codes for the general area, contact Council's Planning & Environment Department.

All information provided is correct as at the date issued on this certificate. However, it is possible for changes to occur at any time after issue of this certificate. We recommend that you only rely upon a very recent certificate.

The following responses are based on the Council's records and / or information from sources outside the Council. The responses are provided with all due care and in good faith, however the Council cannot accept responsibility for any omission or inaccuracy arising from information outside the control of the Council.

Furthermore, while this certificate indicates the general effect of the zoning of the abovementioned land, it is suggested that the applicable planning instruments be further investigated to determine any additional requirements.

Copies of Maitland City Council's Local Environmental Planning Instrument, Development Control Plans and Policies are available for purchase from Council's Customer Service Centre.

PART 1: MATTERS PROVIDED PURSUANT TO SECTION 149 (2)

1. Local Environmental Plans (LEP)

Maitland LEP 2011, notified 16 December 2011, applies to the land.

2. Exhibited draft Local Environmental Plans

Council has placed on exhibition the following draft Local Environmental Plan(s) applying to the land:

Draft Local Environmental Plan - Clause 4.2A Dual Occupancies In Rural Zones

The objectives of this planning proposal are:

1. To amend the wording of Clause 4.2A to clarify that there is no difference between the interpretation of the definitions of Dwelling House and Dual Occupancy in respect of Clause 4.2A, as far as that clause applies to dwelling entitlement.
2. Clause 4.2A identifies Dwelling House but not Dual Occupancy, which is a separately defined term in the MLEP 2011. It should be noted that the MLEP 2011 has been prepared in accordance with the Standard Instrument and Clause 4.2A is a model clause. It is therefore proposed to prohibit Dual Occupancies in the zones that Clause 4.2A applies, being RU1 Primary Production zone, RU2 Rural Landscape zone, E3 Environmental Management zone and E4 Environmental Living zone.

3. Development Control Plan prepared by Council

Maitland Development Control Plan 2011 applies to the land.

4. Development Control Plans prepared by the Director-General

The Council has not been notified of any Development Control Plan applying to the land that has been prepared by the Director-General under section 51A of the Act.

5. State Environmental Planning Policies

The Minister for Planning has notified that the following State Environmental Planning Policies shall be specified on certificates under Section 149 of the Environmental Planning and Assessment Act, 1979.

The land is affected by the following State Environmental Planning Policies:

State Environmental Planning Policy No. 21 - Caravan Parks

Establishes a policy in relation to caravan parks which requires development consent of Council. Development includes the establishment of caravan parks and subdivision for lease purposes.

State Environmental Planning Policy No. 30 - Intensive Agriculture

This policy aims to provide for greater consistency in the assessment of applications for cattle feedlots and piggeries. The policy requires that cattle feedlots of 50 or more head and piggeries having a capacity of 200 or more pigs or 20 or more breeding sows, need development consent. The policy also provides for public participation in such applications and requires the consent authority to take into consideration various environmental matters when assessing such applications.

State Environmental Planning Policy No. 33 - Hazardous And Offensive Development

Provides definitions for hazardous and offensive developments as well as potentially hazardous and offensive developments and specifies the way in which applications for such developments are to be considered.

State Environmental Planning Policy No. 36 - Manufactured Home Estates

Policy facilitates the establishment of manufactured home estates as a contemporary form of medium density residential development by allowing such estates, with development consent, on certain land where caravan parks are permitted, subject to the land meeting locational criteria specified in the SEPP.

State Environmental Planning Policy No. 44 - Koala Habitat Protection

Policy aims to encourage the proper conservation and management of areas of koala habitat.

State Environmental Planning Policy No. 50 - Canal Estate Development

Prohibits canal estate development.

State Environmental Planning Policy No. 55 - Remediation Of Land

Provides a statewide planning approach to the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

State Environmental Planning Policy No. 64 - Advertising And Signage

This policy aims to ensure that signage (including advertising) is compatible with the desired amenity and visual character of an area, and provides effective communication that is of high quality design and finish. This policy includes the regulating of signage through time limited consents but does not regulate the content of signage.

State Environmental Planning Policy No. 65 - Design Quality Of Residential Flat Development

This Policy aims to improve the design quality of residential flat development in New South Wales.

This Policy recognises that the design quality of residential flat development is of significance for environmental planning for the State due to the economic, environmental, cultural and social benefits of high quality design.

State Environmental Planning Policy No. 70 - Affordable Housing (Revised Schemes)

This Policy:

(a) identifies that there is a need for affordable housing in the local government areas within which that land is situated, and

(b) describes the kinds of households for which affordable housing may be provided, and

(c) makes a requirement with respect to the imposition of conditions relating to the provision of affordable housing

The policy applies to all land in the Greater Metropolitan Region.

State Environmental Planning Policy - Major Development 2005

The aims of this Policy are as follows:

(a) (Repealed)

(b) (Repealed)

(c) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State,

(d) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes.

(e) (Repealed)

(f) (Repealed)

State Environmental Planning Policy - State And Regional Development 2011

The aims of this Policy are as follows:

(a) to identify development that is State significant development,

(b) to identify development that is State significant infrastructure and critical State significant infrastructure,

(c) to confer functions on joint regional planning panels to determine development applications.

State Environmental Planning Policy - Affordable Rental Housing 2009

This Policy aims:

(a) to provide a consistent planning regime for the provision of affordable rental housing,

(b) to facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanded zoning permissibility, floor space ratio bonuses and non-discretionary development standards,

(c) to facilitate the retention and mitigate the loss of existing affordable rental housing,

(d) to employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new affordable rental housing,

(e) to facilitate an expanded role for not-for-profit providers of affordable rental housing,

(f) to support local business centres by providing affordable rental housing for workers close to places of work,

(g) to facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

State Environmental Planning Policy - Building Sustainability Index: Basix 2004

1) Regulations under the Act have established a scheme to encourage sustainable residential development (the BASIX scheme) under which:
    a) an application for a development consent, complying development certificate or construction certificate in relation to certain kinds of residential development must be accompanied by a list of commitments by the applicant as to the manner in which the development will be carried out, and
    b) the carrying out of residential development pursuant to the resulting development consent, complying development certificate or construction certificate will be subject to a condition requiring the commitments referred to in paragraph (a) to be fulfilled.
2) The aim of this Policy is to ensure consistency in the implementation of the BASIX scheme throughout the State.
3) This Policy achieves its aim by overriding provisions of other environmental planning instruments and development control plans that would otherwise add to, subtract from or modify any obligations arising under the BASIX scheme.

State Environmental Planning Policy - (Exempt and Complying Development Codes) Amendment (Commercial and Industrial Development and Other Matters) 2013

This Policy aims to provide streamlined assessment procedures for development that complies with specified development standards by:

(a) providing exempt and complying development codes that have State-wide application, and

(b) identifying, in the exempt development codes, types of development that are of minimal environmental impact that may be carried out without the need for development consent, and

(c) identifying, in the complying development codes, types of complying development that may be carried out in accordance with a complying development certificate as defined in the Act, and

(d) enabling the progressive extension of the types of development in this Policy, and

(e) providing transitional arrangements for the introduction of the State-wide codes, including the amendment of other environmental planning instruments.

State Environmental Planning Policy - Infrastructure 2007

The aim of this Policy is to facilitate the effective delivery of infrastructure across the State by:

(a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and

(b) providing greater flexibility in the location of infrastructure and service facilities, and

(c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and

(d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and

(e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and

(f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

State Environmental Planning Policy - Mining, Petroleum Production And Extractive Industries 2007

The aims of this Policy, are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries:

(a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and

(b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and

(c) to establish appropriate planning controls to encourage ecologically sustainable devlelopment through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.

State Environmental Planning Policy - Rural Lands 2008

The aims of this policy are as follows:

(a) to facilitate the orderly and economic use and development of rural lands for rural and related purposes,

(b) to identify the Rural Planning Principles and the Rural Subdivision Principles so as to assist in the proper management, development and protection of rural lands for the purpose of promoting the social, economic and environmental welfare of the State,

(c) to implement measures designed to reduce land use conflicts,

(d) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,

(e) to amend provisions of other environmental planning instruments relating to concessional lots in rural subdivisions.

State Environmental Planning Policy - Temporary Structures 2007

The aims of this Policy are as follows:

a) to ensure that suitable provision is made for ensuring the safety of persons using temporary structures or places of public entertainment,

b) to encourage the protection of the environment at the location, and in the vicinity, of places of public entertainment or temporary structures (among other things) managing noise, parking and traffic impacts and ensuring heritage protection,

c) to specify the circumstances in which the erection and use of temporary structures are complying development or exempt development,

d) to promote opportunities for buildings (including temporary structures) to be used as places of public entertainment by specifying the circumstances in which that use is complying development or exempt development,

e) to promote the creation of jobs in the public entertainment industry,

f) to increase access for members of the public to public entertainment.

6. Draft State Environmental Planning Policies

The following draft State Environmental Planning Policy(s) applying to the land has been publicised as referred to in section 39(2) of the Act.

Draft State Environmental Planning Policy - Competition 2010

The aims of this Policy are: (a) to promote economic growth and competition, and (b) to remove anti-competitive barriers in environmental planning and assessment.

7. Zoning and land use under relevant LEPs

Maitland LEP 2011, notified 16 December 2011, identifies the zone applying to the land as:

RU1 Primary Production

The following development control table(s) give the objectives of the zone, the description of the zone and identify development allowed or prohibited in each zone. Development consent where required, must be obtained from the Council.

RU1 Primary Production

1) **Objectives of zone**

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

2) **Permitted without consent**

Extensive agriculture; Home-based child care; Home occupations; Intensive plant agriculture

3) **Permitted with consent**

Airstrips; Animal boarding or training establishments; Aquaculture; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Cellar door premises; Dual occupancies; Dwelling houses; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Forestry; Helipads; Home businesses; Home industries; Intensive livestock agriculture; Jetties; Landscaping material supplies; Markets; Open cut mining; Plant nurseries; Recreation areas; Roads; Roadside stalls; Rural industries; Rural supplies; Signage; Turf farming; Water supply systems

4) **Prohibited**

Any other development not specified in item 2 or 3

8. Development standards to permit the erection of a dwelling-house on the land

Clause 4.2A in the Maitland Local Environmental Plan 2011 applies to the land. This clause fixes a minimum lot size for the erection of a dwelling-house that is identified on the Maitland Local Environmental Plan 2011 Lot Size Map as 40 hectares.

9. Critical Habitat

No Local Environmental Plan or draft Local Environmental Plan identifies the land as including or comprising critical habitat.

10. Conservation Area/Item of Environmental Heritage

Heritage Conservation

The land is located within a Heritage Conservation Area. Clause 5.10 in the Maitland Local Environmental Plan 2011 applies. The Heritage Conservation Area is listed in Schedule 5 in the Maitland Local Environmental Plan 2011 and identified on the Maitland Local Environmental Plan 2011 Heritage Map.

11. Directions Under Part 3A

There is **no** direction by the Minister under Section 75P(2)(c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 (other than a project of a class prescribed by the regulations) of the Act does not have effect.

12. Coastal Protection

The Council has not received any notification from the Department of Services, Technology and Administration that the land is affected by the operation of section 38 or 39 of the Coastal Protection Act 1979.

13. Mine Subsidence Compensation Act 1961

The land has not been proclaimed to be within a Mine Subsidence District under the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

14. Road widening or realignment

The land is not affected by any road widening or re-alignment under:

(a) Division 2 of Part 3 of the Roads Act 1993: or (b) any environmental planning instrument; (c) any resolution of the council.

15. Council and other public authority policies on hazard risk restrictions

All land within the Maitland Local Government Area has the potential to contain acid sulfate soils. Clause 7.1 in the Maitland Local Environmental Plan 2011 generally applies. Development consent is required where works described in the Table to this clause are proposed on land shown on the Maitland Local Environmental Plan 2011 Acid Sulfate Soils Map as being of the class specified for those works.

16. Bushfire Prone Land

The land is not 'bushfire prone land'.

17. Flood Related Development Controls

Development on this land or part of this land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) **is** subject to flood related development controls contained within cl. 7.3 of the Maitland Local Environmental Plan 2011 and s. B3 of the Maitland Development Control Plan 2011.

Development on this land or part of this land for any other purpose **is** subject to flood related development controls contained within cl. 7.3 of the Maitland Local Environmental Plan 2011 and s. B3 of the Maitland Development Control Plan 2011.

Information given in relation to flooding is based upon Councils adopted 1:100 ARI (Average Recurrent Interval) flood event.

The Maitland Local Environmental Plan 2011 identifies the flood planning level (FPL) as the level of a 1:100 ARI flood event plus 0.5m freeboard.

The subject land **is not** within a Declared Flood Plain within the meaning of the Water Management Act 2000. Development on this land **is not** subject to flood related development controls contained in Section 256 of the Water Management Act 2000.

18. Land reserved for acquisition

No environmental planning instrument, deemed environmental planning instrument or draft environmental planning instrument applying to the land provides for the acquisition of the land by a public authority, as referred to in section 27 of the Act.

19. Contribution Plans

The following contribution plan(s) apply to the land:

- Maitland Section 94 Contributions Plan 1995.

- Maitland S94 Contributions Plan (City wide) 2006

- Maitland S94A Levy Contributions Plan 2006

Contributions plans may be inspected and purchased at Council's Customer Service Centre.

20. Property Vegetation Plans

The Council has not received any notification from the Catchment Management Authority that the land is affected by a property vegetation plan under the Native Vegetation Act 2003.

21. Order under Trees (Disputes Between Neighbours) Act 2006.

Council has not received notification from the Land and Environment Court of New South Wales that the land is affected by an Order Under Trees (Disputes Between Neighbours) Act 2006.

22. Conditions Affecting Seniors Housing

1) Site Compatibility Certificate

Council is unaware of whether a current site compatibility certificate issued under clause 25 of the State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 has been issued for the land.

2) Conditions of Development Consent since 11 October 2007

No development consent has been granted for the development permitted by State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 after 11 October 2007.

23. Site Compatibility Certificates for Infrastucture

Council is unaware of whether a valid site compatibility certificate has been issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 for the land.

24. Complying Development

Complying development under the **General Housing Code** may not be carried out on the land as it is not within an applicable zone and the land is:

> land within a heritage conservation area - unless under the General Housing Code or Rural Housing Code, the development is a detached outbuilding or swimming pool.

Complying development under the **Rural Housing Code** may not be carried out on the land as it is:

> land within a heritage conservation area - unless under the General Housing Code or Rural Housing Code, the development is a detached outbuilding or swimming pool.

Complying development under the **Housing Alterations Code** may be carried out on the land.

Complying development under the **General Development Code** may be carried out on the land.

Complying development under the **Commercial and Industrial Alterations Code** may be carried out on the land.

Complying development under the **Commercial and Industrial (New Buildings and Additions) Code** may not be carried out on the land as it is not wthin an applicable zone and the land is:

> land within a heritage conservation area - unless under the General Housing Code or Rural Housing Code, the development is a detached outbuilding or swimming pool.

Complying development under the **Subdivisions Code** may be carried out on the land.

Complying development under the **Demolition Code** may be carried out on the land.

Complying development under the **Fire Safety Code** may be carried out on the land.

Note: Despite the above provisions, if only part of a lot is subject to an exclusion or exemption under Clause 1.17A or Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) Amendment (Commercial and Industrial Development and Other Matters) 2013, complying development may be carried out on that part of the lot that is not affected by the exclusion or exemption.

25. Contaminated Land

(a) The land to which this certificate relates is not significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.

(b) The land to which this certificate relates is not subject to a management order within the meaning of the Contaminated Land Management Act 1997.

(c) The land to which this certificate relates is not the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.

(d) The land to which this certificate relates is not subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.

(e) Council has not been provided with a site audit statement, within the meaning of the Contaminated Land Management Act 1997, for the land to which this certificate relates.

(f) The land to which this certificate relates is not subject to the Unhealthy Building Land Policy as it is low lying as defined in Schedule 1 of the former Unhealthy Building Land Act 1990.

(g) The land to which this certificate relates is not subject to the Unhealthy Building Land Policy as it is potentially contaminated as defined in Schedule 2 of the former Unhealthy Building Land Act 1990.

26. Site compatibility certificates and conditions for affordable rental housing

(1) Site Compatibility Certificate

Council is unaware if a current site compatibility certificate (affordable rental housing) has been issued in accordance with State Environmental Planning Policy (Affordable Rental Housing) 2009.

(2) Conditions of Development Consent

No development consent has been granted for development permitted by State Environmental Planning Policy (Affordable Rental Housing) 2009 after 31 July 2009.

27. Nation Building and Jobs Plan (State Instructure Delivery) Act 2009

Council is unaware of whether an Order or an Authorisation has been issued under Section 23 and 24 of the Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009, for the carrying out of development on the land.

PART 2: ADDITIONAL MATTERS PROVIDED PURSUANT TO SECTION 149 (5)

The following information is provided in accordance with section 149(5) of the Environmental Planning and Assessment Act 1979. Section 149(6) of the Act states that a Council shall not incur any liability in respect of advice provided in good faith pursuant to sub-section 149(5). If this information is to be relied upon, it should be independently checked.

Maitland LEP 2011 makes the following special provisions in relation to the land

1. Preservation of trees or vegetation

The Native Vegetation Act 2003 applies to the land. This Act is administered by the Hunter-Central Rivers Catchment Management Authority (CMA). Any person intending to clear vegetation of any kind should consult with the CMA to determine if any approvals are required for this work.

2. Development Consent

Council's records indicate that the land has not had any development consent granted within the five (5) years preceding the date of this certificate.

3. Draft DCP's

No Draft Development Control Plan is expressed to apply to the land subject to this certificate.

4. Suspension of covenants

Clause 1.9A in the Maitland Local Environmental Plan 2011 applies to all land within the Maitland Local Government Area. This clause suspends any agreement, covenant or other instrument that restricts the development of land that is permissible under the provisions of the Maitland Local Environmental Plan 2011 to the extent necessary to serve that purpose.

5. Filling of land

Earthworks (excavation and filling of land) require development consent. Clause 7.2 in the Maitland Local Environmental Plan 2011 applies to all land within the Maitland Local Government Area. Earthworks (defined as both excavation and filling of land) require development consent of Council unless the works are exempt development, ancillary to other development for which development consent is required or granted, or considered by Council to be of a minor nature.

6. Development in the vicinity of heritage items

Clause 5.10 in the Maitland Local Environmental Plan 2011 generally applies to all land in the Maitland Local Government Area, where the land is located in the vicinity of a heritage item or heritage conservation area. This clause requires a consent authority to consider the effect of the proposed development on the heritage significance of the item or area concerned, before granting development consent.

David Evans - General Manager

Per:

End of Certificate

Appendix D

NSW OEH and EPA Records

Healthy Environment, Healthy Community, Healthy Business

You are here: Home > Environment protection licences > POEO Public Register > Search for licences, applications and notices

Search results

Your search for: **General Search** with the following criteria

Suburb - morpeth

returned 12 results

Export to excel 1 of 1 Pages Search Again

Number	Name	Location	Type	Status	Issued date
10693	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	POEO licence	Issued	23 May 2000
1772	HUNTER WATER CORPORATION	OFF TANK STREET, MORPETH, NSW 2321	POEO licence	Surrendered	07 Mar 2001
1032506	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	24 Dec 2003
1036216	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	11 Jun 2004
1038864	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	06 Jan 2005
1047580	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	27 Jul 2005
1051134	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	06 Sep 2005
1061996	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	24 Aug 2006
1064954	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	30 Nov 2006
1073721	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	22 May 2007
1087238	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	23 May 2008
1121862	HUNTER WATER CORPORATION	Butcher Lane, MORPETH, NSW 2321	s.58 Licence Variation	Issued	07 Jan 2011

21 March 2014

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APPENDIX EIGHT. DETAILED CONTAMINATION ASSESSMENT

JM
ENVIRONMENTS
ABN 67 166 341 288
0427 893 668
www.jmenvironments.com

DETAILED CONTAMINATION ASSESSMENT (revision 3)

30 Swan St, Morpeth NSW

7 September 2015

Prepared by

James McMahon

Principal Environmental Scientist

EXECUTIVE SUMMARY

This report presents the findings of a Detailed Contamination Assessment (DCA) undertaken by JM Environments (JME) for Detailed Contamination Assessment (the assessment) for the subdivision of 30 Swan St, Morpeth NSW (the site), as shown in Figure 1. The site is identified as Lot 3 DP 237264 and is approximately 7,900m^2.

It was understood that the previous land use of the site was a railway corridor and terminus and is currently used as rural residential land use. It is proposed to rezone the site for residential land use. JME has conducted a Preliminary Contamination Assessment which concluded that the site was potentially contaminated from its previous land use. Based on that conclusion Maitland City Council (MCC) required a Detailed Contamination Assessment from a contaminated land consultant to determine if the site is suitable or can be made suitable with appropriate remediation.

The objectives were to:

- assess Areas of Environmental Concern (AEC's) and Chemicals of Concern (COC's) for the site; and
- provide recommendations on further assessment or remediation, if considered necessary;

In order to achieve the above objectives, the following scope of work was undertaken:

- review of the previous contamination assessment;
- Field Investigations;
- Laboratory Testing; and
- Preparation of this DCA report.

Based on the review of the previous contamination assessment, field observations and laboratory testing, the site is not considered suitable for residential land use do to:

- potential human exposure to arsenic at more 2.5x the human health criterion;
- potential environmental exposure of BaP at more than 2.5 times the ecological criteria; and
- the unsatisfactory aesthetic nature of the fill.

It is JME opinion that the site can be made suitable for residential land use following remediation of the site. The remediation is likely to comprise a combination of excavation and capping of hotspots/aesthetic impacts. It is recommended that a remediation action plan is developed to guide the remedial action.

Further to this, the site is zoned rural land use for which there are no relevant guidelines. The site was well grassed with no visible signs of erosion. There was limited opportunity for surface water run on as up gradient stormwater is collected by kerb and guttering. The site is underlain with alluvial clays making groundwater contamination unlikely. On this basis, JME does not consider that the current site condition triggers the duty to report legislation.

RECORD OF DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Distributed to:	Initials
1	ME4079 -Swan Street Morpeth Detailed Contamination Assessment	Final	4 December 2014	PCB Surveyors	MD
1	ME4079 -Swan Street Morpeth Detailed Contamination Assessment	Revision 1	29 June 2015	PCB Surveyors	MD
1	ME4079 -Swan Street Morpeth Detailed Contamination Assessment	Revision 2	21 July 2015	PCB Surveyors	MD
1	ME4079 -Swan Street Morpeth Detailed Contamination Assessment	Revision 3	7 September 2015	PCB Surveyors	MD

Revision 1: Additional information and interpretation in the following Sections for clarity:

Section 1: Changed the proposal from “subdivision” to “rezone”

Section 4: Comment on PID results.

Section 5.3.2: Additional BaP and Zinc results.

Section 6: Further commentary and discussion.

Figure 4: Delineation Test Pits

Figure 5: Zinc Background Locations

Revision 2: Additional sampling along former railway track footprint to assess arsenic and asbestos contamination.

Revision 3: Comment regarding “Duty to Report” added to Section 7. Proposed Lot boundaries added to Figures 3 and 4. Figure 5 added.

CONTENTS

ATTACHMENTS

1 INTRODUCTION

1.1 General

This report presents the findings of a Detailed Contamination Assessment (DCA) undertaken by JM Environments (JME) for Detailed Contamination Assessment (the assessment) for the subdivision of 30 Swan St, Morpeth NSW (the site), as shown in Figure 1. The site is identified as Lot 3 DP 237264 and is approximately 7,900m^2.

The work was commissioned by Pulver Cooper and Blackley Pty Ltd (PCB) on behalf of Mr Hilary Lantry in response to a JME proposal (Reference JME4079 – Fee Proposal Detailed Contamination Assessment 30 Swan St Morpeth NSW (dated 15 September 2014). It was understood that the previous land use of the site was a railway corridor and terminus and is currently used as rural residential land use.

It is proposed to rezone the site from rural to residential landuse use. JME has conducted a Preliminary Contamination Assessment which concluded that the site was potentially contaminated from its previous land use. Based on that conclusion Maitland City Council (MCC) requires a Detailed Contamination Assessment from a contaminated land consultant to determine if the site is suitable or can be made suitable with appropriate remediation as part of the DA submission.

1.2 Objectives

The objectives were to:

- assess Areas of Environmental Concern (AEC's) and Chemicals of Concern (COC's) for the site; and
- provide recommendations on further assessment or remediation, if considered necessary;

1.3 Scope of Work

In order to achieve the above objectives, the following scope of work was undertaken:

- review of the previous contamination assessment;
- Field Investigations;
- Laboratory Testing; and
- Preparation of this DCA report.

2 SITE DESCRIPTION

2.1 Site Location and Identification

General site information is provided below in Table 1.

TABLE 1 – SUMMARY OF SITE DETAILS

SITE ADDRESS:	The site is located at 30 Swan Street, Morpeth NSW as shown in Figure 1.

SITE AREA:	Approximately 7,900m^2.
SITE IDENTIFICATION	Lot 3 DP237264 within the Local Government area of Maitland, Parish of Alnwick, County of Northumberland.
CURRENT LANDUSE:	Rural residential.
PROPOSED LANDUSE:	The proposed land use for the site is residential.
ADJOINING SITE USES:	Residential land use south and west of the site; Rural land use north and east of the site
SITE COORDINATES	Easting 372105, Northing 6378481

3 Previous Contamination Assessment

3.1 Review of Previous Contamination Assessment

A review of the Preliminary Contamination Assessment (PCA) undertaken by JM Environments (JME) for the site. The objectives of this PCA were to:

- identify potentially contaminating activities that are currently being performed on the site and that may have been performed on the site in the past;
- assess Areas of Environmental Concern (AEC's) and Chemicals of Concern (COC's) for the site; and
- provide recommendations on further assessment or remediation, if considered necessary.

In order to meet the objectives the following scope of works was undertaken:

- desktop study;
- a site walkover;
- review and collation of the above information and identification of potential Areas of Environmental Concern (AECs) and potential Chemicals of Concern (COCs);
- preparation of the PCA report.

Based on the information gained from the desk stop study it was considered that the site has been potentially contaminated from past activities on site. It was recommended that a detailed contamination site assessment which includes soil sampling and analysis is undertaken to further assess the potential contamination of the site.

It was assumed that rezoning the site for residential land use would result in single/double storey residential developments. Hence the disturbance of the soil 2m below the surface was considered unlikely into the future. Therefore further assessment of acid sulfate soils was not considered necessary.

The sites topography, drainage, geology and hydrogeology were also discussed and summarised below.

The site was relatively flat and less than 10m above sea level. Stormwater from site would drain into the paddock immediately north of the site. It is expected that the local stormwater would discharge into the Hunter River approximately 160m north of site.

The site was underlain by the Narrabeen Group (Clifton Sub-Group) from the Triassic period. The Clifton Sub-Group was described as claystone, sandstone and shale.

The site was underlain by Quaternary soils made up of gravel, sand, silt, clay "waterloo rock" (aka indurated sand or "coffee rock"), marine and freshwater deposits. There were no registered bores within a 1 kilometre radius of the Site.

It was anticipated that groundwater will be located between 2mbgs and 6mbgs of site and flow north towards the Hunter River.

The site was located on the border of Class 4 and Class 5 acid sulfate areas. Class 4 areas require an acid sulfate soil assessment be conducted for works beyond 2 metres below natural ground surface or works by which the watertable is likely to be lowered beyond 2 metres below natural ground surface. Class 5 areas require an acid sulfate soil assessment for works within 500 metres of adjacent Class 1, 2, 3, or 4 land which are likely to lower the watertable below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land.

Table 2 Areas of Concern and Chemicals of Concern

AEC	POTENTIAL CONTAMINATING ACTIVITY	POTENTIAL COCS	LIKELIHOOD OF CONTAMINATION *	COMMENT
1. Entire site	Former use as a train terminal. Uncontrolled filling across site.	Metals,TPH, PAH, BTEX,OCPs, OPPs, PCBs Metals, and Asbestos	Medium	Contamination, if any, from train use would be from the surface down. Fill of unknown origin and quality used to level the line.
2. Former engine shed	Maintenance of steam engine	TPH, PAH, BTEX, Metals, and Asbestos (brakes)	Medium-low	Contamination, if it existed would located in the upper soils.
Passenger station	Weathering and demolition of hazardous building materials	Zinc, lead and asbestos.	low	Asbestos contamination risk is considered to be low as buildings were likely to be constructed prior to asbestos use in building products.

NOTES:
** = It is important to note that this is not an assessment of the financial risk associated with the AEC in the event contamination is detected, but a qualitative assessment of the probability of contamination being detected at the potential AEC.*
Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc; TPH - Total Petroleum Hydrocarbons; PAH - Polycyclic Aromatic Hydrocarbons; OCP - Organochlorine Pesticides; OPP – Organophosphorus Pesticides

4 FIELD INVESTIGATION

4.1 Field Investigation

The chemical contamination investigation programme was conducted in accordance with the SAQP (See Appendix A). Investigative sampling was conducted on 2 October and 17 November 2014 and 11 July 2015. Soil sampling was conducted using an excavator on October 2. A hand auger was used to collect zinc background samples along Swan Street on 17 November and delineation samples on July 11. The samples were collected from the centre of the excavator bucket or directly from the hand auger. A clean pair of disposable gloves was used when collecting each sample. Each sample was placed into a laboratory-supplied, acid-rinsed 250mL glass jar, labelled with a unique identification number and placed in an ice-chilled cooler box. A second portion was collected during sampling on 2 October and placed into a ziplock bag. The ziplock was stood for approximately 15 minutes and the headspace was field screened for volatiles using a photoionisation detector (PID). The PID results are included on the logs. The PID ranged from 0-70ppm indicating that there was no significant concentrations of volatile organic compounds present in the samples that were screened. Potential asbestos containing materials (ACM) were collected from TP1 at 0.5m below ground surface (bgs), TP9 at 0.4mbgs and TP10 at 0.3mbgs. The ACM fragments were placed in ziplock bags.

The sample locations on the western portion of site are shown in Figure 3. The sample locations from the eastern portion of site are shown in Figure 4. The testpit logs are located in Appendix B.

4.2 Field Quality Assurance/ Quality Control

During the soil investigations, 58 primary samples were collected. In addition, six field duplicates and two field triplicates were collected and analysed with their respective primary samples to check whether the sampling and laboratory procedures adequately reproduced results. A trip BTEX spike was prepared by the laboratory and was present on site during the sampling process on October 2 and accompanied the collected samples to the laboratory to assess the potential for the loss of volatile contaminants during the trip to the laboratory.

Soil QA/QC results are presented in Summary Table 1.

Samples were kept on ice prior to transport and kept cool using ice brick during transport. One batch of soil was dispatched to the laboratory. The batches were received by the primary laboratory at temperature of 4°C. The batch was received and analysed within relevant analytical holding times.

A review of the QA/QC indicated that the relative percentage differences (RPD) of analytes for soil were within the acceptance criterion for duplicate and triplicate analysis set out in the SAQP with the exception of:

- primary sample TP1 0.0-0.1 and triplicate pair QC1A-Lead - 53%; and
- primary sample HA17 and duplicate pair QC7- arsenic – 73%.

Considering the majority of the %RPD were within the acceptance criteria, the %RPD exceedances are likely to reflect the heterogeneous nature of the contamination.

The trip spike recoveries were within acceptable limits indicating that the loss of volatile contaminants during the transport of the samples was not significant.

The laboratory internal data quality objectives (DQO) of each batch were reviewed. The DQOs were met with the exceptions of:

- 6 individual PAH duplicate's RPD were outside the laboratories acceptance criteria. The laboratory attributed these to heterogeneity of the samples. However notes the RPD were 76%, 26%, 26%, 20%, 20% and 20%. The 76% RPD was for an analyte that was detected just above the limit of reporting. In all, these RPDs are not considered to significantly affect the representative nature of the lab results.
- The matrix spike recovery for lead (sample TP7 0.8-0.9) was 140%. The laboratory attributed this to the relatively high concentration of lead in the sample compared to the spike concentration.
- The matrix spike recovery for arsenic (sample HLHA09) was 28%. The laboratory attributed this to the relatively high concentration of arsenic in the sample compared to the spike concentration.

Based on the review of QA/QC results it is considered that the analytical results are indicative of the contamination status of the site at the time of sampling.

5 RESULTS

5.1 FIELD RESULTS

5.1.1 Testpitting

Eighteen test pits were excavated across the site using an excavator on 2 October 2014. The testpit logs are located in Appendix B. The results of test pitting indicates that the northern half of the site of the site contains a variety of fill. Testpits TP1-TP3 were located in the northern eastern corner of site. The fill in these test pits contained significant amounts of red and grey ash and charcoal with some coal (See Photo 1) with depths ranging from 1-1.6mbgs.

Photo 1: Red and Grey Ash excavated from TP1

Photo 2: Sandstone cobbles in TP5

Testpits TP4-8, located along the northern boundary of site, contained significant amounts of sandstone cobbles and boulders (see Photo2) at depths ranging from 0.5-1.4mbgs. Test pits TP 9-11 and TP14, located on the central eastern portion of site, contained fill comprised primarily of dark grey gravelly sand and sand with trace amounts of brick rubble and metal pieces. Fragments of ACM were also located in testpits TP9 and TP10. Testpits TP12 and TP13, located centrally on the western portion of site, were typified by containing slabs of sandstone (TP12, See Photo3) and concrete (TP13).

Test pits TP15-18 were excavated along the southern boundary of site. These test pits indicate that the southern portion of site has not been filled however some anthropogenic objects e.g. small fragments of broken china indicates the topsoil has been disturbed.

In general the fill/topsoil on site is underlain by a stiff to very stiff dark grey/black alluvial clay.

Photo3: Sandstone slab in TP12.

5.2 LABORATORY ANALYSIS

Laboratory analysis was carried out by SGS Australia, Sydney, and Envirolab Pty ltd, (Envirolab) Sydney, which are National Association of Testing Authorities (NATA) accredited laboratories for the analyses requested. The laboratory analytical reports are presented in Appendix C and summarised in Summary Table 1 (attached).

5.3 CONTAMINATION ASSESSMENT OF SOILS

5.3.1 Soil Investigation Levels

The rationale for the soil investigation levels (ILs) for the proposed residential land uses is set out in Section 10.3.2 of the SAQP. (Appendix A).

5.3.2 Comparison of Soil Analytical Results with Soil Investigation Levels

In the NEPM, the preferred approach is to examine a range of summary statistics including the contaminant range, median, arithmetic/geometric mean, standard deviation and 95% upper confidence limit (UCL).

The NEPM recommends, at the very least, the maximum and the 95% UCL of the arithmetic mean contaminant concentration should be compared to the relevant Tier 1 screening criteria. The implications of localised elevated values (hotspots) should also be considered. The results should also meet the following criteria:

- The standard deviation of the results should be less than 50% of the relevant investigation or screening level; and
- No single value should exceed 250% of the relevant investigation or screening level.

Concentrations of BTEX, OCP, OPP, PCB were not detected above the laboratory reporting limit in the samples analysed. Concentrations of TRH, PAH, cadmium, chromium, nickel and mercury were not detected above the adopted ILs in the samples analysed. Henc these potential contaminants can be removed from the conceptual site model.

BaP was detected above the adopted IL (0.7mg/kg) in the samples collected from TP5 0.1-0.2 (1.2mg/kg), TP11 0.2-0.3 (0.8mg/kg), TP13 0.1-0.2 (1.4mg/kg) TP15 0.1-0.2 (1.8mg/kg), TP10 0.1-0.2 (0.9mg/kg), TP9 0.1-0.2 (1.2mg/kg) and TP18 1.0-0.2 (2.3mg/kg). The UCL was calculated for BaP following the removal of TP15 0.1-0.2 and TP18 1.0-0.2 from the data set as their concentration were greater than 250% of the IL. The UCL for BaP was 0.6mg/kg.

BaP-TEQ was detected above the adopted IL (3mg/kg) in the sample collected from TP18 1.0-0.2 (3.3mg/kg). The UCL was calculated for BaP-TEQ to be 1.2mg/kg.

Arsenic was detected above the adopted IL (100mg/kg) in the sample collected from TP4 0.1-0.2 (340 mg/kg), TP6 0.0-0.1 (120mg/kg), TP7 0.0-0.1 (200mg/kg), TP8 0.1-0.2 (120mg/kg), HLHA9 (330mg/kg), HLHA10 (140mg/kg), HLHA11 (180mg/kg), HLHA13 (220mg/kg) and HLHA14 (110mg/kg). The arsenic detected exceeded both the adopted HIL and EIL at these locations. The UCL was calculated for arsenic following the removal of TP4 0.1-0.2 and HLHA9 from the data set as their concentrations were greater than 250% of the IL. The UCL for arsenic in surface samples was 110mg/kg.

Copper was detected above the adopted IL (60mg/kg) in the sample collected from TP4 0.1-0.2 (120mg/kg), TP6 0.0-0.1 (61mg/kg), TP7 0.0-0.1 (75mg/kg) and TP13 0.1-0.2 (66mg/kg). The UCL for copper was calculated to be 44mg/kg.

Lead was detected above the adopted IL (300mg/kg) in the sample collected from TP13 0.1-0.2 (400mg/kg) and TP18 1.0-0.2 (550mg/kg). The UCL for lead was calculated to be 44mg/kg.

Zinc was detected above the adopted IL (195mg/kg) at locations TP2 0.0-0.1 (350mg/kg), TP15 0.4-0.5 (200mg/kg), TP9 0.1-0.2 (310mg/kg), TP10 0.1-0.2 (200mg/kg), TP13 0.1-0.2 (330mg/kg) and TP18 1.0-0.2 (520mg/kg). The UCL was calculated for zinc following the removal of TP18 0.1-0.2 from the data set as its concentration was greater than 250% of the IL. The UCL for zinc was 150mg/kg.

Five surface samples were collected along Swan Street to assess the zinc background concentration for Swan Street. The zinc concentrations ranged between 99mg/kg-1,100mg/kg with an average concentration of 570 mg/kg.

5.3.3 Asbestos

Potential ACM fragments were collected from three test pits, TP1, TP9 and TP10. Laboratory analysis confirmed the presence of asbestos in each of the fragments. A sample of surface soil was collected from TP2, HLHA9, HLHA10, HLHA13 and HLHA14 and analysed for presence of asbestos. No asbestos was detected.

5.3.4 Soil Aesthetics

Aesthetic issues generally relate to the presence of low-concern or non-hazardous inert foreign material (refuse) in soil or fill resulting from human activity. The NEPM recommends that caution should be used for assessing sensitive land uses, such as residential, when large quantities of various fill types and demolition rubble are present. Test pitting of site indicates that the site is aesthetically impacted by the presence of large quantities of various types of shallow fill in the former railway track footprint.

6 DISCUSSION

Based on the historical review it appears the site was likely to be contaminated from it past land use as a train station/terminal. It understood from the site history that there has been little or no cutting or filling of the site since the train line had be removed.

Test pitting of the site indicated that it had been filled with various materials including but not limited to ash, sandstone cobbles, boulders and slabs, concrete and brick. The grey and red ash located in the north eastern corner of site probably resulted from cleaning out the coal fired furnace of the steam trains that used the line. The grey and red ash presents as a claystone gravelly material and the laboratory testing indicates that the ash is not significantly contaminated. It is possible that the fill along the northern boundary was placed as part of the rail line construction.

The UCL95 for the surface arsenic concentrations was 110mg/kg and arsenic detection Delineation of the arsenic contamination was attempted in fieldwork undertaken on 17 November 2014 (test pitting) and 11 July 2015 (hand auger). Two samples were collected from each test pit. Concentrations of arsenic in samples collected from the upper soil profile (0.1-0.3mbgs) in the test pits ranged from 22mg/kg-1,000mg/kg. Soil samples collected from depth (0.8-1.3mbgs) in the test pits had concentrations between 27mg/kg-94mg/kg. Based on the results is considered the arsenic contamination identified in TP4 is delineated to the west by TP5, to the south by TP11, to the east by HLHA18. The delineation test pits are shown in Figure 4. Hand auger samples collected from the western portion of site indicate that the former railway track footprint is also contaminated with arsenic above HIL.

The UCL for zinc, 150mg/kg, was below the adopted IL of 195mg/kg. One sample collected from TP18 marginally exceeded the 250% IL (490mg/kg) at 520mg/kg. It is important to note that that the EIL for zinc was adopted as the IL without consideration of the background concentration of zinc. Soil samples were collected along Swan Street were collected to assess the background zinc concentration. The zinc background hand auger locations are shown in Figure 5. Section 3.4.2 of the NEPM calls for a pragmatic risk-based approach be taken in applying EILs and ESLs in residential land use settings. Given that the samples collected off site from along Swan Street had an average concentration of 570mg/kg, the exceedance of zinc at TP18 is not considered significant, from a pragmatic view point.

BaP-TEQ had one minor exceedance (by 10%) of the HIL at HLTP18 and as such BaP-TEQ (including the subset of compounds that make up BaP-TEQ e.g. BaP) is considered not cause a significant risk to human health.

Asbestos in soil was not detected in the soil samples collected from locations TP2, HLHA9, HLHA10, HLHA13 and HAHL14 indicating that asbestos fibre contamination, if any, from the wearing of train brake pads is not significant.

It is also noted the contamination exceedances were in samples collected at or near the site surface. Therefore some form of remediation would be required to prevent impact on future residential land users or the surrounding environment.

7 CONCLUSIONS and RECOMMENDATIONS

Based on the review of the previous contamination assessment, field observations and laboratory testing, the site is not considered suitable for residential land use do to:

- potential human exposure to arsenic at more than the human health criterion;
- potential environmental exposure of BaP at more than 2.5 times the ecological criteria; and
- the unsatisfactory aesthetic nature of the fill.

It is JME opinion that the site can be made suitable for residential land use following remediation of the site. The remediation is likely to comprise a combination of excavation and capping of hotspots/aesthetic impacts. It is recommended that a remediation action plan is developed to guide the remedial action.

Further to this, the site is zoned rural land use for which there are no relevant guidelines. The site was well grassed with no visible signs of erosion. There was limited opportunity for surface water run on as up gradient stormwater is collected by kerb and guttering. The site is underlain with alluvial clays making groundwater contamination unlikely. On this basis, JME does not consider that the current site condition triggers the duty to report legislation.

8 LIMITATIONS

The findings within this report are the result of discrete/specific sampling practices used in accordance with normal practices and standards. To the best of our knowledge they represent a reasonable interpretation of the general conditions of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be known completely and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data.

The investigations undertaken were limited by access constraints and are considered to provide an assessment of the likely contamination conditions at the locations sampled.

In preparing this report, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith in accordance with JME understanding of the client’s brief and general accepted practice for environmental consulting.

This report was prepared for Hilary Lantry with the objective of assessing the presence of contamination on the site that could potentially impact on the use of the property for residential use. No warranty, expressed or implied, is made as to the information and professional advice included in this report. The report is not intended for other parties or other uses. Anyone using this document does so at their own risk and should satisfy themselves concerning its applicability and, where necessary, should seek expert advice in relation to the particular situation.

Figures

Notes:

1) https://six.nsw.gov.au/

2) Subject Site 🟥

N

CLIENT:

Mr H Lantry

PROJECT TITLE: **Rezoning Project**

30 Swan Street, Morpeth NSW

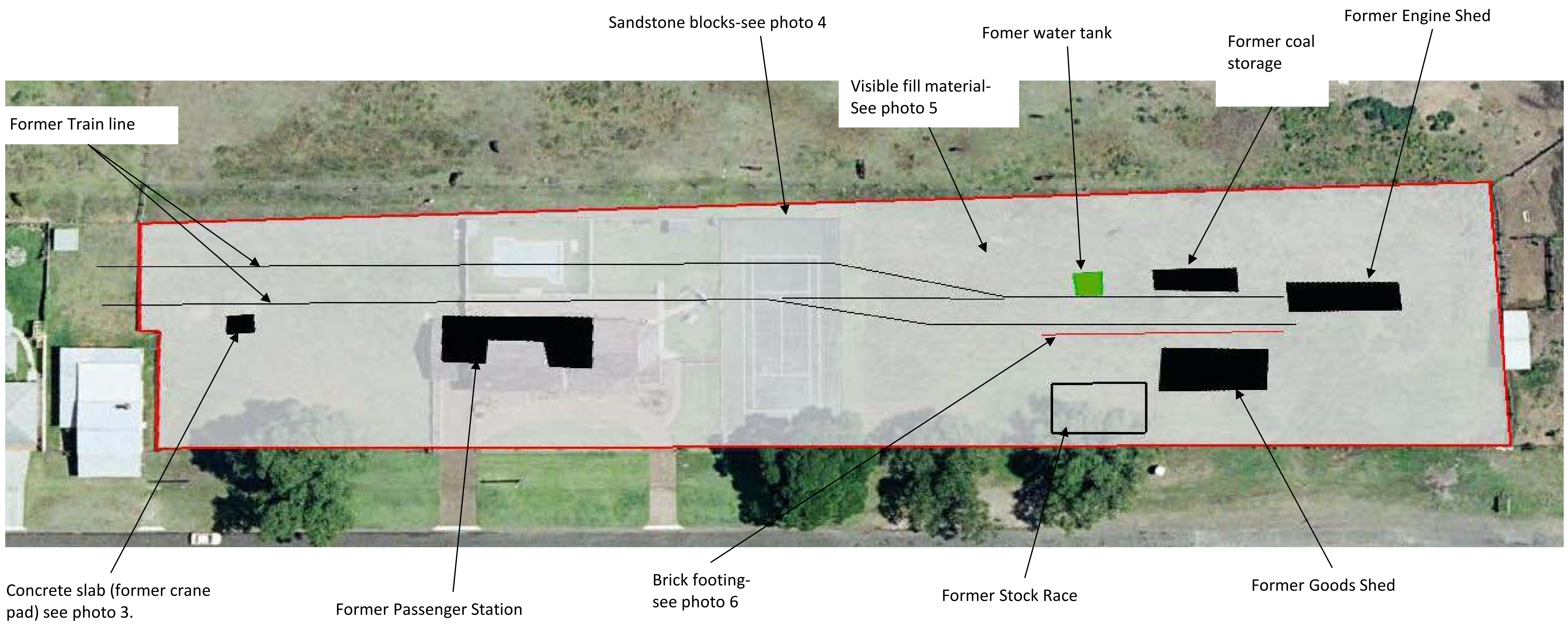
PROJECT:	JME4079	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	NFC
DATE:	21/03/2014		

FIGURE TITLE:

Site Location Plan

JM ENVIRONMENTS

FIGURE NUMBER: **1**



Notes:

1) Google Earth

2) Subject Site 🟥

Client

Mr H Lantry

PROJECT TITLE: **Rezoning Project**

30 Swan Street, Morpeth NSW

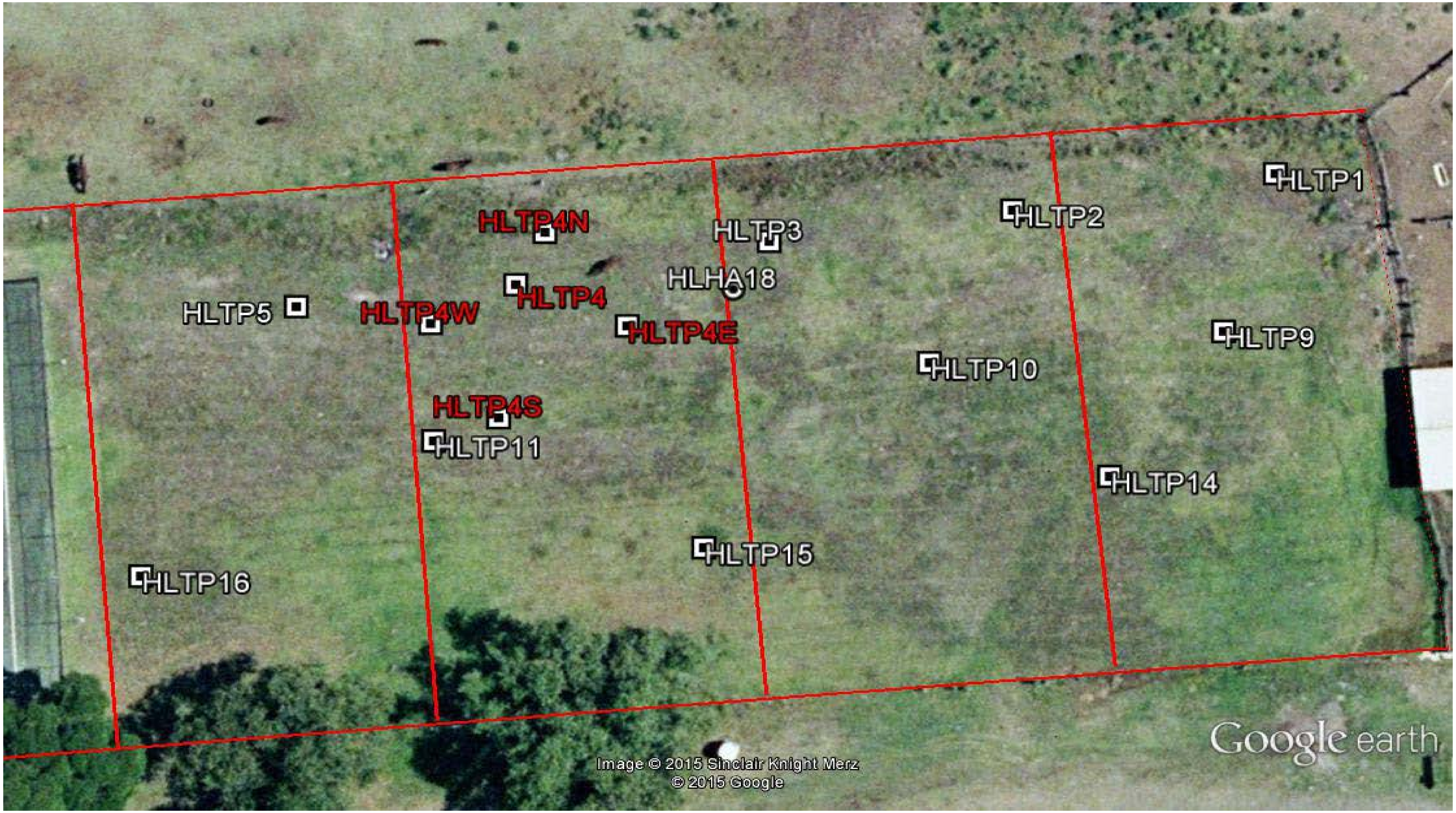
PROJECT:	JME4079	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	NFC
DATE:	20/12/2013		

FIGURE TITLE:

Site Features Plan

FIGURE NUMBER: **2**

JM ENVIRONMENTS



Notes:
1) Google Earth 2006
2) Subject Site 🟥
3) RED TYPE indicates arsenic exceedance of HIL

N

Client:
Mr H Lantry

PROJECT TITLE: **Rezoning Project**
30 Swan Street, Morpeth NSW

PROJECT:	JME4079	DESIGNED:	JMc	
DWG #:	1	DRAWN:	JMc	
REVISION:	1			
SCALE:	NTS	STATUS:	NFC	
DATE:	21/07/2015			

FIGURE TITLE:
Eastern Portion of Site
Sampling Location Plan

FIGURE NUMBER: **3**

JM ENVIRONMENTS

Notes:

1) Google Earth 2006

2) Subject Site 🟥

3) RED TYPE indicates arsenic exceedance of HIL

N

Client:

Mr H Lantry

PROJECT TITLE: **Rezoning Project**

30 Swan Street, Morpeth NSW

PROJECT:	JME4079	DESIGNED:	JMc	
DWG #:	1	DRAWN:	JMc	
REVISION:	1			
SCALE:	NTS	STATUS:	NFC	
DATE:	4/12/2014			

FIGURE TITLE:

Western Portion of Site

Sampling Location Plan

FIGURE NUMBER: **4**

JM ENVIRONMENTS

Notes:

1) Google Earth 2006

2) Subject Site 🟥

N

Client:

Mr H Lantry

PROJECT TITLE: **Rezoning Project**

30 Swan Street, Morpeth NSW

PROJECT:	JME4079	DESIGNED:	JMc	
DWG #:	1	DRAWN:	JMc	
REVISION:	1			
SCALE:	NTS	STATUS:	NFC	
DATE:	4/12/2014			

FIGURE TITLE:

Offsite Zinc Background Sampling Location Plan

JM ENVIRONMENTS

FIGURE NUMBER: **5**

Summary Tables

		Description			TP1 0.0-0.1	QC1	%	QC1A	%	TP1 1.3-1.4	TP1 1.0-1.1	TP2 0.0-0.1	TP2 1.1-1.2	TP4 0.1-0.2	TP4E 0.1-0.2	TP4E 0.8-0.9
		Sample Date			2/10/2014	2/10/2014	RPD	2/10/2014	RPD	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014	17/11/2014	17/11/2014
		Matrix	**HIL**	**EIL**	Soil	Soil		Soil		Soil	Material	Soil	Soil	Soil	Soil	Soil
Analyte Name	**Units**	**Reporting Limit**			**Result**	**Result**		**Result**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Benzene	mg/kg	0.1	-	65	<0.1	<0.1	0%	<0.2	0%	<0.1	-	<0.1	<0.1	<0.1	-	-
Toluene	mg/kg	0.1	160	105	<0.1	<0.1	0%	<0.5	0%	<0.1	-	<0.1	<0.1	<0.1	-	-
Ethylbenzene	mg/kg	0.1	55	-	<0.1	<0.1	0%	<1	0%	<0.1	-	<0.1	<0.1	<0.1	-	-
xylenes	mg/kg	0.2	40	45	<0.3	<0.3	0%	<3	0%	<0.3	-	<0.3	<0.3	<0.3	-	-
TRH C6-C10 (F1)	mg/kg	25	45	180	<25	<25	0%	<25	0%	<25	-	<25	<25	<25	-	-
TRH >C10-C16 (F2)	mg/kg	25	110	120	<25	<25	0%	<50	0%	<25	-	**65**	<25	**37**	-	-
TRH >C16-C34 (F3)	mg/kg	90	-	1,300	<90	<90	0%	<100	0%	<90	-	**330**	<90	**250**	-	-
TRH >C34-C40 (F4)	mg/kg	120	-	5,600	<120	<120	0%	<100	0%	<120	-	<120	<120	<120	-	-
Naphthalene	mg/kg		-	170	<0.1	<0.1	0%	<0.1	0%	<0.1	-	**0.1**	<0.1	<0.1	-	-
Benzo(a)pyrene	mg/kg	0.1	-	0.7	<0.1	<0.1	0%	<0.05	0%	<0.1	-	**0.2**	<0.1	**0.7**	-	-
BaP TEQ	TEQ	0.2	3	-	<0.3	<0.3	0%	<0.5	0%	<0.3	-	**0.4**	<0.3	**1.0**	-	-
Total PAH	mg/kg	0.8	300	-	<0.8	<0.8	0%	0.21	0%	<0.8	-	**3.8**	<0.8	**8.9**	-	-
DDT+DDE+DDD	mg/kg	0.1	240	180	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin and dieldrin	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	mg/kg	0.1	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan	mg/kg	0.1	270	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	mg/kg	0.2	10	-	-	-	-	-	-	-	-	-	-	-		
Heptachlor	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
HCB	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.1	300	-	-	-	-	-	-	-	-	-	-	-	-	-
Mirex	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2	160	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PCBs	mg/kg	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	0	-	-	**4.5**	N.A.				N.A.	-	N.A.	**5.1**	**4.8**	-	-
CEC	meq/100g	0.02	-	-	**5.0**	N.A.				N.A.	-	N.A.	**19**	**11**	-	-
Arsenic, As	mg/kg	3	100	100	**100**	**80**	22%	**120**	18%	<3	-	**45**	**7**	**340**	**280**	**27**
Cadmium, Cd	mg/kg	0.3	20	3	<0.3	<0.3	0%	<0.4	0%	<0.3	-	**0.6**	<0.3	**0.4**	-	-
Chromium, Cr	mg/kg	0.3	100	400	**5.6**	**4.3**	26%	**5.8**	4%	**17**	-	**16**	**16**	**7.8**	-	-
Copper, Cu	mg/kg	0.5	6000	60	**49**	**42**	15%	**56**	13%	**7.8**	-	**59**	**9.7**	**120**	-	-
Lead, Pb	mg/kg	1	300	1100	**110**	**99**	11%	**190**	53%	**17**	-	**120**	**8**	**140**	-	-
Nickel, Ni	mg/kg	0.5	400	30	**29**	**27**	7%	**36**	22%	**16**	-	**30**	**12**	**21**	-	-
Zinc, Zn	mg/kg	0.5	7400	195	**86**	**86**	0%	**123**	35%	**190**	-	**350**	**52**	**86**	-	-
Mercury	mg/kg	0.01	40	1	**0.42**	**0.32**	27%	**0.38**	10%	**0.03**	-	**0.14**	<0.01	**0.14**	-	-
Asbestos	Detected				-	-				-	Yes	No	-	-	-	-

JM ENVIRONMENTS

Laboratory Summary Table 1

Swan Street Contamination Assessment
Hilary Lantry

		Description			TP4N 0.1-0.2	TP4N 1.1-1.2	QC4	%	TP4S 0.1-0.2	TP4S 0.3-0.4	TP4S 1.2-1.3	TP4W 0.1-0.2	TP4W 0.2-0.3	TP5 0.1-0.2	TP5 1.3-1.4	TP16 0.1-0.2
		Sample Date			17/11/2014	17/11/2014	17/11/2014	RPD	17/11/2014	17/11/2014	17/11/2014	17/11/2014	17/11/2014	2/10/2014	2/10/2014	2/10/2014
		Matrix	**HIL**	**EIL**	Soil	Soil	Soil		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte Name	**Units**	**Reporting Limit**			**Result**	**Result**	**Result**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Benzene	mg/kg	0.1	-	65	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	160	105	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	55	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
xylenes	mg/kg	0.2	40	45	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3
TRH C6-C10 (F1)	mg/kg	25	45	180	-	-	-	-	-	-	-	-	-	<25	<25	<25
TRH >C10-C16 (F2)	mg/kg	25	110	120	-	-	-	-	-	-	-	-	-	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	-	1,300	-	-	-	-	-	-	-	-	-	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	-	5,600	-	-	-	-	-	-	-	-	-	<120	<120	<120
Naphthalene	mg/kg		-	170	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	-	0.7	-	-	-	-	-	-	-	-	-	**1.2**	**0.1**	<0.1
BaP TEQ	TEQ	0.2	3	-	-	-	-	-	-	-	-	-	-	**1.9**	<0.3	<0.3
Total PAH	mg/kg	0.8	300	-	-	-	-	-	-	-	-	-	-	**11**	**1.4**	<0.8
DDT+DDE+DDD	mg/kg	0.1	240	180	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin and dieldrin	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	mg/kg	0.1	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan	mg/kg	0.1	270	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	mg/kg	0.2	10	-										-	-	-
Heptachlor	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
HCB	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.1	300	-	-	-	-	-	-	-	-	-	-	-	-	-
Mirex	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2	160	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PCBs	mg/kg	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	0	-	-	-	-	-	-	-	-	-	-	-	N.A.	**4.7**	N.A.
CEC	meq/100g	0.02	-	-	-	-	-	-	-	-	-	-	-	N.A.	**8.7**	N.A.
Arsenic, As	mg/kg	3	100	100	**380**	**91**	**82**	10%	**1000**	**22**	**94**	**160**	**380**	**96**	**28**	<3
Cadmium, Cd	mg/kg	0.3	20	3	-	-	-	-	-	-	-	-	-	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	100	400	-	-	-	-	-	-	-	-	-	**5.8**	**4.1**	**10**
Copper, Cu	mg/kg	0.5	6000	60	-	-	-	-	-	-	-	-	-	**31**	**11**	**5.0**
Lead, Pb	mg/kg	1	300	1100	-	-	-	-	-	-	-	-	-	**190**	**54**	**14**
Nickel, Ni	mg/kg	0.5	400	30	-	-	-	-	-	-	-	-	-	**11**	**4.4**	**1.8**
Zinc, Zn	mg/kg	0.5	7400	195	-	-	-	-	-	-	-	-	-	**51**	**20**	**12**
Mercury	mg/kg	0.01	40	1	-	-	-	-	-	-	-	-	-	**0.12**	**0.08**	<0.01
Asbestos	Detected				-	-	-	-	-	-	-	-	-	-	-	-

Laboratory Summary Table 1

Swan Street Contamination Assessment
Hilary Lantry

		Description			TP11 0.2-0.3	TP11 1.2-1.3	TP15 0.1-0.2	QC2	%	TP15 0.4-0.5	TP10 0.1-0.2	TP14 0.1-0.2	TP9 0.1-0.2	TP9 0.7-0.8	TP6 0.0-0.1	TP7 0.0-0.1	TP7 0.8-0.9
		Sample Date			2/10/2014	2/10/2014	2/10/2014	2/10/2014	RPD	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014
		Matrix	**HIL**	**EIL**	Soil	Soil	Soil	Soil		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte Name	**Units**	**Reporting Limit**			**Result**	**Result**	**Result**	**Result**		**Result**	Result	Result	Result	Result	Result	Result	Result
Benzene	mg/kg	0.1	-	65	0.00	<0.1	0.00	<0.1	0%	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	160	105	0.00	<0.1	0.00	<0.1	0%	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	55	-	0.00	<0.1	0.00	<0.1	0%	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
xylenes	mg/kg	0.2	40	45	0.00	<0.3	0.00	<0.3	0%	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
TRH C6-C10 (F1)	mg/kg	25	45	180	<25	<25	<25	<25	0%	<25	<25	<25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2)	mg/kg	25	110	120	**26**	<25	<25	<25	0%	<25	<25	<25	**75**	<25	<25	**34**	<25
TRH >C16-C34 (F3)	mg/kg	90	-	1,300	**130**	<90	**120**	**130**	0%	<90	**160**	<90	**350**	<90	**130**	**170**	<90
TRH >C34-C40 (F4)	mg/kg	120	-	5,600	<120	<120	<120	<120	0%	<120	<120	<120	<120	<120	<120	<120	<120
Naphthalene	mg/kg		-	170	<0.1	<0.1	<0.1	<0.1	0%	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	-	0.7	**0.8**	<0.1	**1.8**	**2.0**	11%	<0.1	**0.9**	**0.3**	**1.2**	<0.1	**0.7**	<0.1	<0.1
BaP TEQ	TEQ	0.2	3	-	**1.2**	<0.3	**2.6**	**2.9**	11%	<0.3	**1.4**	**0.6**	**1.9**	<0.3	**1.1**	<0.3	<0.3
Total PAH	mg/kg	0.8	300	-	**9.4**	<0.8	**18**	**20**	11%	<0.8	**9.9**	**3.8**	**16**	<0.8	**8.1**	**1.7**	<0.8
DDT+DDE+DDD	mg/kg	0.1	240	180	-	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin and dieldrin	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	mg/kg	0.1	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan	mg/kg	0.1	270	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	mg/kg	0.2	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HCB	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.1	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mirex	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PCBs	mg/kg	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	0	-	-	**4.8**	N.A.	N.A.	N.A.		**4.3**	N.A.	N.A.	N.A.	N.A.	**5.3**	N.A.	**4.8**
CEC	meq/100g	0.02	-	-	**13**	N.A.	N.A.	N.A.		**21**	N.A.	N.A.	N.A.	N.A.	**12**	N.A.	**9.7**
Arsenic, As	mg/kg	3	100	100	**26**	<3	**5**	**6**	18%	<3	**49**	**12**	**14**	<3	**120**	**200**	**7**
Cadmium, Cd	mg/kg	0.3	20	3	<0.3	<0.3	<0.3	<0.3	0%	<0.3	**0.4**	<0.3	**0.6**	<0.3	**0.4**	**0.3**	<0.3
Chromium, Cr	mg/kg	0.3	100	400	**6.0**	**19**	**13**	**15**	14%	**12**	**5.7**	**11**	**8.6**	**11**	**6.8**	**4.8**	**7.7**
Copper, Cu	mg/kg	0.5	6000	60	**39**	**10**	**19**	**24**	23%	**7.8**	**33**	**17**	**26**	**38**	**61**	**75**	**12**
Lead, Pb	mg/kg	1	300	1100	**200**	**14**	**48**	**48**	0%	**8**	**150**	**47**	**170**	**73**	**100**	**150**	**46**
Nickel, Ni	mg/kg	0.5	400	30	**15**	**9.8**	**9.6**	**11**	14%	**5.5**	**14**	**10**	**17**	**15**	**13**	**14**	**4.7**
Zinc, Zn	mg/kg	0.5	7400	195	**110**	**66**	**76**	**76**	0%	**9.1**	**200**	**70**	**310**	**140**	**87**	**66**	**22**
Mercury	mg/kg	0.01	40	1	**0.34**	**0.03**	**0.07**	**0.06**	15%	<0.01	**0.03**	**0.06**	**0.07**	**0.11**	**0.28**	**0.13**	**0.05**
Asbestos	Detected				-	-	-	-	-	-	-	-	-	-	-	-	-

Laboratory Summary Table 1

		Description			TP8 0.1-0.2	TP8 0.9-1.0	QC3	%	QC3A	%	TP13 0.1-0.2	TP12 0.0-0.1	TP17 0.1-0.2	TP18 0.1-0.2	Comp 1	Comp 2	Comp 3
		Sample Date			2/10/2014	2/10/2014	2/10/2014	RPD	2/10/2014	RPD	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014	2/10/2014
		Matrix	**HIL**	**EIL**	Soil	Soil	Soil		Soil		Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte Name	**Units**	**Reporting Limit**			Result	Result	Result		Result		Result	Result	Result	Result	Result	Result	Result
Benzene	mg/kg	0.1	-	65	<0.1	<0.1	<0.1	0%	<0.2	0%	<0.1	<0.1	<0.1	<0.1	-	-	-
Toluene	mg/kg	0.1	160	105	<0.1	<0.1	<0.1	0%	<0.5	0%	<0.1	<0.1	<0.1	<0.1	-	-	-
Ethylbenzene	mg/kg	0.1	55	-	<0.1	<0.1	<0.1	0%	<1	0%	<0.1	<0.1	<0.1	<0.1	-	-	-
xylenes	mg/kg	0.2	40	45	<0.3	<0.3	<0.3	0%	<3	0%	<0.3	<0.3	<0.3	<0.3	-	-	-
TRH C6-C10 (F1)	mg/kg	25	45	180	<25	<25	<25	0%	<25	0%	<25	<25	<25	<25	N.A.	N.A.	N.A.
TRH >C10-C16 (F2)	mg/kg	25	110	120	<25	<25	<25	0%	<50	0%	**27**	<25	<25	<25	N.A.	N.A.	N.A.
TRH >C16-C34 (F3)	mg/kg	90	-	1,300	<90	<90	<90	0%	<100	0%	**160**	<90	<90	**130**	N.A.	N.A.	N.A.
TRH >C34-C40 (F4)	mg/kg	120	-	5,600	<120	<120	<120	0%	<100	0%	<120	<120	<120	<120	N.A.	N.A.	N.A.
Naphthalene	mg/kg		-	170	<0.1	<0.1	<0.1	0%	<0.1	0%	<0.1	<0.1	<0.1	<0.1	N.A.	N.A.	N.A.
Benzo(a)pyrene	mg/kg	0.1	-	0.7	**0.1**	<0.1	<0.1	0%	<0.05	0%	**1.4**	**0.3**	**0.5**	**2.3**	N.A.	N.A.	N.A.
BaP TEQ	TEQ	0.2	3	-	**0.3**	<0.3	<0.3	0%	<0.5	0%	**2.1**	**0.5**	**0.8**	**3.3**	N.A.	N.A.	N.A.
Total PAH	mg/kg	0.8	300	-	**1.7**	<0.8	<0.8	0%	NIL (+)ve	0%	**15**	**3.2**	**6.0**	**23**	N.A.	N.A.	N.A.
DDT+DDE+DDD	mg/kg	0.1	240	180	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Aldrin and dieldrin	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Chlordane	mg/kg	0.1	50	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Endosulfan	mg/kg	0.1	270	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Endrin	mg/kg	0.2	10	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2
Heptachlor	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
HCB	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	300	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	0.2	160	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1
Total PCBs	mg/kg	1	1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1
pH	pH Units	0	-	-	N.A.	N.A.	N.A.	-	-	-	N.A.	**4.8**	N.A.	N.A.	N.A.	N.A.	N.A.
CEC	meq/100g	0.02	-	-	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	**8.9**	N.A.	N.A.	N.A.	N.A.	N.A.
Arsenic, As	mg/kg	3	100	100	**120**	**4**	**4**	0%	**4**	0%	**30**	**5**	**4**	**9**	N.A.	N.A.	N.A.
Cadmium, Cd	mg/kg	0.3	20	3	<0.3	<0.3	<0.3	0%	<0.4	0%	**1.0**	<0.3	<0.3	**0.7**	N.A.	N.A.	N.A.
Chromium, Cr	mg/kg	0.3	100	400	**4.6**	**16**	**13**	21%	**22**	32%	**9.6**	**4.7**	**11**	**9.9**	N.A.	N.A.	N.A.
Copper, Cu	mg/kg	0.5	6000	60	**37**	**10**	**14**	33%	**15**	40%	**66**	**22**	**13**	**41**	N.A.	N.A.	N.A.
Lead, Pb	mg/kg	1	300	1100	**72**	**13**	**49**	116%	**20**	42%	**400**	**56**	**160**	**550**	N.A.	N.A.	N.A.
Nickel, Ni	mg/kg	0.5	400	30	**6.5**	**8.7**	**8.4**	4%	**12.0**	32%	**14**	**4.8**	**6.6**	**11**	N.A.	N.A.	N.A.
Zinc, Zn	mg/kg	0.5	7400	195	**42**	**17**	**21**	21%	**24**	34%	**330**	**63**	**0**	**520**	N.A.	N.A.	N.A.
Mercury	mg/kg	0.01	40	1	**0.05**	**0.02**	**0.06**	100%	**<0.1**	0%	**0.20**	**0.04**	**0.09**	**0.21**	N.A.	N.A.	N.A.
Asbestos	Detected				-	-	-	-	-	-	-	-	-	-	-	-	-

		Description			TP10 0.1-0.2	TP9 0.1-0.2	HLHA1	HLHA2	HLHA3	HLHA4	HLHA5	HLHA6	QC6	%	HLHA7	HLHA8
		Sample Date			2/10/2014	2/10/2014	17/11/2014	17/11/2014	17/11/2014	17/11/2014	17/11/2014	11/07/2015	11/07/2015	RPD	11/07/2015	11/07/2015
		Matrix	**HIL**	**EIL**	Material	Material	Soil	Soil	Soil	Soil	Soil	Soil	Soil		Soil	Soil
Analyte Name	**Units**	**Reporting Limit**			Result	Result	Result	Result	Result	Result	Result	Result	Result		Result	Result
Benzene	mg/kg	0.1	-	65	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	0.1	160	105	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	55	-	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
xylenes	mg/kg	0.2	40	45	<0.3	<0.3	-	-	-	-	-	-	-	-	-	-
TRH C6-C10 (F1)	mg/kg	25	45	180	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
TRH >C10-C16 (F2)	mg/kg	25	110	120	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
TRH >C16-C34 (F3)	mg/kg	90	-	1,300	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
TRH >C34-C40 (F4)	mg/kg	120	-	5,600	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg		-	170	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.1	-	0.7	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
BaP TEQ	TEQ	0.2	3	-	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Total PAH	mg/kg	0.8	300	-	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
DDT+DDE+DDD	mg/kg	0.1	240	180	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin and dieldrin	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	mg/kg	0.1	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan	mg/kg	0.1	270	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	mg/kg	0.2	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
HCB	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.1	300	-	-	-	-	-	-	-	-	-	-	-	-	-
Mirex	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2	160	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PCBs	mg/kg	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	0	-	-	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
CEC	meq/100g	0.02	-	-	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Arsenic, As	mg/kg	3	100	100	N.A.	N.A.	-	-	-	-	-	**11**	**7**	36%	**5**	14
Cadmium, Cd	mg/kg	0.3	20	3	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Chromium, Cr	mg/kg	0.3	100	400	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Copper, Cu	mg/kg	0.5	6000	60	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Lead, Pb	mg/kg	1	300	1100	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Nickel, Ni	mg/kg	0.5	400	30	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Zinc, Zn	mg/kg	0.5	7400	195	N.A.	N.A.	**99**	**660**	**180**	**1100**	**800**	-	-	-	-	-
Mercury	mg/kg	0.01	40	1	N.A.	N.A.	-	-	-	-	-	-	-	-	-	-
Asbestos	Detected				Yes	Yes	-	-	-	-	-	-	-	-	-	-

		Description			HLHA9	HLHA10	HLHA11	HLHA12	HLHA13	HLHA14	HLHA15	HLHA16	HLHA17	QC7	%	HLHA18
		Sample Date			11/07/2015	11/07/2015	11/07/2015	11/07/2015	11/07/2015	11/07/2015	11/07/2015	11/07/2015	11/07/2015	11/07/2015	RPD	11/07/2015
		Matrix	**HIL**	**EIL**	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		Soil
Analyte Name	**Units**	**Reporting Limit**			Result	Result	Result	Result	Result	Result	Result	Result	Result	Result		Result
Benzene	mg/kg	0.1	-	65	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	0.1	160	105	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	55	-	-	-	-	-	-	-	-	-	-	-	-	-
xylenes	mg/kg	0.2	40	45	-	-	-	-	-	-	-	-	-	-	-	-
TRH C6-C10 (F1)	mg/kg	25	45	180	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C10-C16 (F2)	mg/kg	25	110	120	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C16-C34 (F3)	mg/kg	90	-	1,300	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C34-C40 (F4)	mg/kg	120	-	5,600	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg		-	170	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.1	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-
BaP TEQ	TEQ	0.2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PAH	mg/kg	0.8	300	-	-	-	-	-	-	-	-	-	-	-	-	-
DDT+DDE+DDD	mg/kg	0.1	240	180	-	-	-	-	-	-	-	-	-	-	-	-
Aldrin and dieldrin	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	mg/kg	0.1	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan	mg/kg	0.1	270	-	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	mg/kg	0.2	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	mg/kg	0.1	6	-	-	-	-	-	-	-	-	-	-	-	-	-
HCB	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.1	300	-	-	-	-	-	-	-	-	-	-	-	-	-
Mirex	mg/kg	0.1	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2	160	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PCBs	mg/kg	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CEC	meq/100g	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic, As	mg/kg	3	100	100	**330**	**140**	**180**	**93**	**220**	**110**	**50**	**10**	**39**	**21**	73%	**63**
Cadmium, Cd	mg/kg	0.3	20	3	-	-	-	-	-	-	-	-	-	-	-	-
Chromium, Cr	mg/kg	0.3	100	400	-	-	-	-	-	-	-	-	-	-	-	-
Copper, Cu	mg/kg	0.5	6000	60	-	-	-	-	-	-	-	-	-	-	-	-
Lead, Pb	mg/kg	1	300	1100	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, Ni	mg/kg	0.5	400	30	-	-	-	-	-	-	-	-	-	-	-	-
Zinc, Zn	mg/kg	0.5	7400	195	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/kg	0.01	40	1	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos	Detected				No	No	-	No	No	-	-	-	-	-	-	No

Appendix A

Sampling and Analysis Quality Plan

1 Sampling Analysis Quality Plan

1.1 Step 1 State the Problem

L the previous land use of the site was a railway corridor and terminus and is currently used as rural residential land use. The site is not considered to be grossly impacted by the past land uses however there remains a potential that isolated practices on site may have caused localised areas of contamination that may have rendered the site not suitable for the proposed low density residential land use.

The objectives of the SAQP are to:

- Define the vertical and lateral study boundaries of the Detailed Site Contamination Assessment;
- Identify the investigation criteria that the soil and groundwater results will be compared against;
- Define the sampling methodologies to be undertaken in order to assess soil contamination across the site;
- Describe the quality assurance/quality control (QA/QC) procedures to be undertaken while sampling;
- Describe the Data Quality Indicators that will be adopted during the assessment;
- Identify a contingency plan for unexpected conditions.

1.2 Step 2- Identify the Decisions

The decisions that are required to be made are:

- Is there soil on the site that would require remediation for the site to be considered suitable for the proposed land use?
- Is there soil contamination present that may pose a significant risk of harm to human health and the environment?
- Is there soil contamination on, under or emanating from the site that would trigger a statutory clean-up notice or remediation order being placed on the site by a relevant government authority?

1.3 Step 3-Identify the Inputs into the Decision

The primary inputs to the decisions described in Step 2 are:

- The assumption that the site will be used for residential land use and groundwater will not be used on the site;
- Results of the previous environmental investigation;
- Location, distribution, vertical extent and sampling intervals of the sampling locations at the site;
- Field measurements and observations made during the sampling phase part of the works;
- Analytical results of the soil samples collected by JME; and

- Assessment of analytical results against the investigation criteria detailed below.

1.3.1 Vertical and Lateral Boundaries of the Study

1.3.2 Investigation Criteria

Soil investigation levels for residential land uses, which are considered relevant to the proposed land use, were established from the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 (amended 2013) Schedule B1, Guideline on Investigation Levels for Soil and Groundwater[i]

The NEPM provides a framework for the use of investigation and screening levels. The framework is based on a matrix of human health and ecological soil and groundwater investigation and screening levels and guidance for specific contaminants. The selection of the most appropriate investigation levels for use in a range of environmental settings and land use scenarios should consider factors including the protection of human health, ecosystems, groundwater resources and aesthetics. A balance between the use of generic soil, soil vapour and groundwater criteria and site-specific considerations is essential practice in site assessment.

The soil investigation levels (ILs) have been developed from:

- Table 1A(1) Health investigation levels for soil contaminants-Residential A;
- Table 1A(3) Soil HSLs for vapour intrusion (mg/kg)-Clay HSL A and HSL B Low-high density residential;
- Table 1B(1) Soil-specific added contaminants for aged zinc-Urban residential/public open space (dependent on soil pH and CEC);
- Table 1B(2) Soil-specific added contaminant limits for aged copper in soils-Urban residential/public open space (dependent on soil pH or CEC);
- Table 1B(3) Soil-specific added contaminant limits for aged chromium III (dependent on %clay) and nickel in soil (dependent on CEC)-Urban residential/public open space;
- Table 1B(4) Generic added contaminant limits for lead in soils irrespective of their physicochemical properties-Urban residential/public open space;
- Table 1B(5) Generic EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties-Urban residential/public open space;
- Table 1B(6) ESLs for TRH fractions F1 – F4, BTEX and benzo[a]pyrene in soil-Urban residential/public open space with fine soil texture; and
- Table 1 B(7) Management Limits for TPH fractions F1 - F4 in soil-residential .

Ecological investigation levels (EILs) for the protection of terrestrial ecosystems have been derived for common contaminants in soil based on a species sensitivity distribution (SSD) model developed for Australian conditions. EILs have been derived for As, Cu, CrIII, DDT, naphthalene, Ni, Pb and Zn.

The methodology assumes that the ecosystem is adapted to the ambient background concentration (ABC) for the locality and that it is only adding contaminants over and above this background concentration which has an adverse effect on the environment.

The ABC of a contaminant is the soil concentration in a specified locality that is the sum of the naturally occurring background level and the contaminant levels that have been introduced from diffuse or non-point sources by general anthropogenic activity not attributed to industrial, commercial, or agricultural activities, for example, motor vehicle emissions.

ABCs for old and new suburbs and high and low traffic areas for New South Wales, Queensland, South Australia and Victoria for Zn, Cu, Ni, Pb, and CrIII are included in Table 14 of Schedule B5c of the NEPM.

An added contaminant limit (ACL) is the added concentration (above the ABC) of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required. The EIL is derived by summing the ACL and the ABC. By this method a site specific EIL for Zn of 195mg/kg was derived.

No EILs are listed for cadmium or mercury hence the provisional phototoxicity based investigation levels from column 5 of Appendix II of the Guidelines for the NSW Site Auditor Scheme (2nd edition) have been adopted for this assessment.

Where a CoC has an investigation level listed in more than one table the more conservative value was adopted as the ESL. Tables 1B (1-3) requires cation exchange capacity (CEC) and soil pH be calculated in order to select ESL values for zinc, chromium, copper and nickel. CEC and pH was analysed in selected natural surface soils as it is expected these type of soils to dominate the site and where contamination is likely to be mobilised to. Based on laboratory results, pH 4.5 and a CEC of 10meq/100g were used to select the ESLs. Where ESLs and HSLs are dependent on particle size it was assumed that the natural soils were predominantly sand with a clay content of 5% based on field observations. The adopted HILs, ESLs and HSLs are shown in Table 1.

Should the preliminary ACM assessment indicate significant asbestos contamination in soil is likely the >2.36mm fraction of soil will analysed for the presence or absence of asbestos fines to a detection limit of 0.001% w/w (NEPM Table 7. Health screening levels for asbestos contamination in soil-Residential A.

TABLE 1: Adopted HILs, ESLs and HSLs

Analyte Name	Units	HIL	ESL	HSL
Benzene	mg/kg	-	65	0.5
Toluene	mg/kg	-	105	160
Ethylbenzene	mg/kg	-	-	55
Xylenes	mg/kg	-	45	40
TRH C6-C10 (F1)	mg/kg	-	180	45
TRH >C10-C16 (F2)	mg/kg	-	120	110
TRH >C16-C34 (F3)	mg/kg	-	1,300	-
TRH >C34-C40 (F4)	mg/kg	-	5,600	-
Naphthalene		-	-	3
Benzo(a)pyrene	mg/kg	-	0.7	-
BaP TEQ	TEQ	3	-	-
Total PAH	mg/kg	300	-	-
DDT+DDE+DDD	mg/kg	240	180	-
Aldrin and dieldrin	mg/kg	6	-	-
Chlordane	mg/kg	50	-	-

Analyte Name	Units	HIL	ESL	HSL
Endosulfan	mg/kg	270	-	-
Endrin	mg/kg	10	-	-
Heptachlor	mg/kg	6	-	-
HCB	mg/kg	10	-	-
Methoxychlor	mg/kg	300	-	-
Mirex	mg/kg	10	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	160	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-
Total Phenols	mg/kg	3000	-	-
Arsenic, As	mg/kg	100	100	-
Cadmium, Cd	mg/kg	20	3	-
Chromium, Cr	mg/kg	100	320	-
Copper, Cu	mg/kg	6000	60	-
Lead, Pb	mg/kg	300	1,100	-
Nickel, Ni	mg/kg	400	350	-
Zinc, Zn	mg/kg	7400	95	-
Mercury	mg/kg	40	1	-
Asbestos-Bonded ACM	%w/w	0.01	-	-
Asbestos Fines	%w/w	0.001	-	-

1.3.3 Soil Aesthetic Issues

The following characteristics will be considered when assessing the aesthetics of the site:

- malodorous soil;
- anthropogenic waste; and
- stained soils.

1.4 Step 4 – Define the Site Boundaries

The lateral boundary of the study is defined as the site boundaries as designated by fencing. Based on the historical data it is anticipated that contamination if any, will be localised and limited to the upper surface soils and likely to be have a physical marker such ashes/charcoal, soil staining or waste metal building materials. The groundwater on site was not likely to be contaminated from past or present activities on site and is excluded from further assessment.

1.5 Step 5 – Develop a Decision Rule

The decision rule for the investigation area will be as follows:

- If the results of the analytical data validation are acceptable with respect to the data quality indicators, then the data will be deemed suitable for the purposes of this investigation;
- If all concentrations of soil samples collected are below the investigation levels, then no further assessment or remediation will be required with respect to that chemical/soil unit; and

- If concentrations of a particular contaminant in one or more soil samples collected from the investigation area are above the investigation levels, then either further assessment (to assess the extent of contamination) and /or remediation would be required to address that contaminant. For areas/soil units where there is sufficient data, statistical analysis (based on 95% UCL) may be used to assess the significance of the data.

1.6 Step 6 – Specify Limits on Decision Errors

There are two types of decision errors:

- Sampling errors, which occur when the samples collected are not representative of the conditions within the investigation area; and
- Measurement errors, which occur during sample collection, handling, preparation, analysis and data production.

These errors may lead the decision maker to make the following errors:

- Deciding that the investigation area is suitable for residential land use when it is actually not; and
- Deciding that the investigation area is not suitable for residential land use when it actually is.

An assessment will be made as to the likelihood of a decision error being made based on the results of the QA/QC assessment and the closeness of the data to the investigation criteria. Additionally, where a sufficient number of samples are available for a particular contaminant/ unit, the 95% UCL of the arithmetic average of the contaminants will be used to assess the suitability for residential land use.

1.7 Optimise the Design for Obtaining Data

1.7.1 Sampling Pattern Rationale

Chemical Contamination

The site history indicated that chemical contamination, if present, was likely to exist in areas the former train line, train maintenance and buildings existed which incorporates the majority of the site. Therefore a grid sampling regime will be undertaken to assess these areas. Using this rationale it also assumed that contamination, if any, will be limited to the upper soil surface and areas of fill. The proposed sampling locations are shown in Figure 4.

Samples on site will be collected using an excavator. Samples will be collected form the centre of the excavator bucket. In the case of assessing zinc background concentrations a hand auger will be used. The augur will be decontaminated before a sample is collected by scrubbing the augur in a solution of tap water and Decon 90 followed by rinsing in tap water. Samples will be collected from the augur using disposable nitrile gloves. A new pair of gloves will be worn for each sample. Soil samples will be placed in laboratory supplied glass jars with Teflon® lined lids. Each jar will be labelled with a unique identifier. The jars will be placed in 200μm plastic bags. The plastic bags will be sealed and placed an ice filled cooler box awaiting transportation to the laboratory under chain of custody conditions.

1.7.2 Sample Analysis and Analytical Methods

Primary and duplicate samples collected will be forwarded to the SGS laboratory for the analysis required. Laboratory analysis will be in accordance with the requirements of the NEPM

(Schedule B3) and will be referenced to USEPA or APHA methods. A summary of the SGS analytical method references are presented in **Table 2** below.

Triplicate samples collected will be forwarded to the Envirolab Pty Ltd for the analysis required. Laboratory analysis will be in accordance with the requirements of the NEPM (Schedule B3) and will be referenced to USEPA or APHA methods.

Table 2 - Summary of Analytical Method References

Analysis	Medium	SGS	Envirolab
TPH/TRH	Soil	USEPA 3550/8000	USEPA 8260 + 8000
BTEX	Soil	USEPA 8260	USEPA 8260 / 5030 (P/T)
PAH	Soil	USEPA 8270D	USEPA 8270
OPP/OCP/PCB	Soil	USEPA 8080/8081/8270	USEPA 8081/8270
Phenols	Soil	APHA 5530	APHA 5530
Metals	Soil	USEPA 6020	USEPA 6020A (ICP) USEPA 200.8 (PREP)
Mercury	Soil	APHA 3112 B	USEPA 7471A
Asbestos	material	AS4964-2004	AS4964-2004

1.7.3 Quality Assurance / Quality Control Plan

The quality assurance / quality control (QA/QC) plan is designed to achieve predetermined data quality indicators (DQIs) that will demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated.

The quality assurance / quality control (QA/QC) plan is designed to achieve predetermined data quality indicators (DQIs) that will demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated.

Data Quality Indicators for the Project

Data quality indicators (DQIs) for the project will be based on the field and laboratory considerations in the table in Appendix V of NSW DEC (2006). Specific DQIs for field and laboratory QA/QC samples are as shown in the Table 3 (below).

Table 3 - Data Quality Indicators

Type of Quality Control Sample	Control Limit
Duplicate and Triplicate Samples	RPDs within 50% for analyte concentrations greater than 5 x RL

Type of Quality Control Sample	Control Limit
Rinsate Samples (deionised water)	Analytes not detected at concentrations greater than the blank deionised water.
Spikes	Laboratory spike acceptance limits are a "live" range and updated regularly. The laboratory acceptance limits at the time of analysis will used.
Blanks	Analytes not detected

The QA/QC review will include checking of the DQIs against completeness, comparability, representativeness, precision and accuracy of the data.

Sampling Protocols

The following sampling protocols will be undertaken during the project:

- A fresh pair of nitrile gloves will be worn when handling soil samples.
- Soil samples will be placed in laboratory supplied jars with Teflon lined lids for all analysis with the exception of asbestos or food grade ziplock bags for asbestos analysis. Note that heavy metal samples may be collected in either laboratory supplied glass jars with Teflon lined lids or food grade ziplock bags.
- Soils samples in glass jars will be placed on ice awaiting dispatch to the laboratory;
- A Chain of Custody will accompany the samples to the laboratory which will include (but not limited to):
    - the sample identification of each sample;
    - date sampled;
    - date dispatched to the laboratory;
- The samples shall be dispatched within two days of collection to avoid holding time exceedances.

Field Quality Control Samples

The following quality control samples will be collected in the field:

- Intra-laboratory duplicates will be collected at the rate of 1 per 10 primary samples collected;
- Inter-laboratory duplicates will be collected at the rate of 1 per 20 primary samples collected;
- A rinsate sample for every day that non dedicated or non-disposal sampling equipment is utilised;
- Rinsate water will be deionised water purchased from a hardware store;

Laboratory Quality Control

Laboratory Quality Control would include the following:

- The laboratory analysis of samples will be undertaken by a NATA accredited environmental testing laboratory;
- The NATA accredited environmental testing laboratory will implement a quality control plan conforming to the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) Schedule B(3) Guidelines for Analysis of Potentially Contaminated Soils;
- The laboratory will perform reagent blanks, spike samples, duplicate spikes, matrix spikes, and surrogates spikes and duplicates to assess the laboratory quality control.
- The laboratory will extract and/or analyse the samples within the required holding times. A summary of the holding times for extraction and/or analysis for the chemical of concerns in this project is shown in Table 4.

Table 4: Extraction and Analysis Holding Time Summary

Analysis	Medium	Extraction	Analysis
TPH/TRH	Soil	14 days	28 days from extraction
BTEX	Soil	7 days	28 days from extraction
PAH	Soil	14 days	28 days from extraction
OPP/OCP/PCB	Soil	USEPA 8080/8081/8270	USEPA 8081/8270
Phenols	Soil	APHA 5530	APHA 5530
Metals	Soil	6 months	6 months
Mercury	Soil	28 days	28 days
Asbestos	Soil	Not applicable	Not applicable
CEC	Soil	28 days	28 days
pH($CaCl_2$)	Soil	7 days	7 days

1.7.4 Data Quality Indicator Review

A review of the DQIs will be undertaken to assess the usability and representative nature of the data generated from the project. The outcome of the DQIs assessment will either:

- recommend the data is suitable to be used for the project; or
- limit the suitability of the data to be used, or
- recommend further contamination/validation sampling.

Appendix B

Test Pit Logs

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP1
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.5

LONGITUDE: 151.636203
LATITUDE: -32.723813
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	gravel sand grey ash red ash tile			TP1 0.0-0.1 QC1 QC1A	FILL: tile fragment cement sheeting
1	▩					
	▨	CLAY high plasticity dark grey (stained?)		70	TP1 1.3-1.4	FILL/ALLUVIUM?
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: 0.85

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP2
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.2

LONGITUDE: 151.636002
LATITUDE: -32.723838
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	gravel sand grey ash red ash tile brick		**1.3**	**TP2 0.0-0.1**	**FILL**
1	▨	CLAY high plasticity grey with rusty red mottle		**50**	**TP2 1.1-1.2**	**ALLUVIUM**
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP3
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.8

LONGITUDE: 151.635816
LATITUDE: -32.72386
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0 1	▩	concrete slab and rubble brick sandstone coal sand fine grained black		**0**	**TP3 0.1-0.2**	**FILL**
	▨	CLAY high plasticity grey with rusty red mottle				**ALLUVIUM**
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP4
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 0.8

LONGITUDE: 151.635626
LATITUDE: -32.723884
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	silt sand railway ballast charcoal coal		0	TP4 0.1-0.2	FILL
	▨	Boulders of SANDSTONE orange and yellow and white				FILL
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

	Reviewed By: JMc	**FILE**

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP5
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.4

LONGITUDE: 151.635456
LATITUDE: -32.723904
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	clayey SAND dark brown fine-medium grained brick		0	TP5 0.1-0.2	FILL
	▨	boulders of SANDSTONE with sand fine-medium grained white and orange and grey with a trace of gravel		0	TP5 1.3-1.4	FILL
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP6
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 0.5

LONGITUDE: 151.634624
LATITUDE: -32.723968
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	gravelly SAND fine-medium grained grey angular gravel some rounded cobbles		0	TP6 0.1-0.2.	FILL: brick and tile fragments redundant stormwater pipe@0.5m
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079	**TEST PIT LOG: TP7**	**LONGITUDE: 151.634515**
SITE: 30 Swan Street Morpeth	**DATE: 3/10/2014**	**LATITUDE: -32.723972**
CLIENT: Hilary Lantry	**LOGGED BY: JMc**	**ELEVATION: 0**
CONTRACTOR: Lantry Plumbing Pty Ltd	**TOTAL DEPTH: 1.2**	

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	gravelly SAND fine-medium grained grey poorly graded with sandstone cobbles		0	TP7 0.0-0.1	FILL: brick fragments and trace of ash
1	▨	SAND medium-coarse grained orange and black moist		75	TP7 0.8-0.9	FILL
	▒	CLAY very stiff high plasticity grey with orange mottle				ALLUVIUM
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP8
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.1

LONGITUDE: 151.634277
LATITUDE: -32.724001
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	sandy COBBLES angular sandstone orange and red fine grained grey		0	TP8 0.1-0.2	FILL
	▩	SAND orange and red		0		FILL
1	▨	CLAY high plasticity grey with feint orange mottle			TP8 0.9-1.0 QC3 QC3A	ALLUVIUM
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP9
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1

LONGITUDE: 151.636161
LATITUDE: -32.723921
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	gravelly SAND fine-medium grained grey rounded and angular poorly graded		0	TP9 0.1-0.2	FILL: tile fragments, wood ACM fragment moist at clay interface
	▨	CLAY medium-high plasticity grey with orange mottle			TP9 0.7-0.8	ALLUVIUM
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP10
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 0.8

LONGITUDE: 151.635937
LATITUDE: -32.723942
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	gravelly SAND medium grey-dark grey angular poorly graded blue		21	TP10 0.1-0.2	**FILL: ACM fragment, brick rubble, piece of metal**
	▨	CLAY medium plasticity grey with orange mottle				**ALLUVIUM**
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP11
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.3

LONGITUDE: 151.635562
LATITUDE: -32.723995
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	SAND fine-medium grained dark grey/dark brown with clumps of clay and traces of gravel				**FILL: fragments of China, concrete**
				0	**TP11 0.2-0.3**	
1	▨	CLAY low plasticity grey with orange mottle				**ALLUVIUM**
					TP11 1.2-1.3	
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS

ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079

SITE: 30 Swan Street Morpeth

CLIENT: Hilary Lantry

CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP12

DATE: 3/10/2014

LOGGED BY: JMc

TOTAL DEPTH: 0.1

LONGITUDE: 151.634581

LATITUDE: -32.724058

ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	sandy COBBLES angular sandstone light grey and pale orange			**TP12 0.0-0.1**	**FILL: Refusal on sandstone slabs**
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP13
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.1

LONGITUDE: 151.634402
LATITUDE: -32.724076
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	cobbly SAND fine-medium grained grey angular sandstone light grey		0	TP13 0.1-0.2	FILL concrete slabs
1	▨	CLAY medium plasticity grey with orange red mottle				ALLUVIUM
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP14
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 0.6

LONGITUDE: 151.636072
LATITUDE: -32.724019
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	gravelly cobbly SAND fine-medium grained grey rounded coarse blue angular grey			**TP14 0.1-0.2**	**FILL: used coarse river gravel and railway ballast**
	▨	CLAY medium-high plasticity grey with orange mottle				**ALLUVIUM**
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM
ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079	**TEST PIT LOG: TP15**	**LONGITUDE: 151.635766**
SITE: 30 Swan Street Morpeth	**DATE: 3/10/2014**	**LATITUDE: -32.724066**
CLIENT: Hilary Lantry	**LOGGED BY: JMc**	**ELEVATION: 0**
CONTRACTOR: Lantry Plumbing Pty Ltd	**TOTAL DEPTH: 0.5**	

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	CLAY dry low plasticity grey				**TOPSOIL**
	▨	CLAY very stiff low plasticity dark grey/black			**TP15 0.1-0.2 QC2** **TP15 0.4-0.5**	**ALLUVIUM**
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

	Reviewed By: JMc	**FILE**

JM
ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP16
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1

LONGITUDE: 151.635343
LATITUDE: -32.724085
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	CLAY very stiff low plasticity dark grey/black			TP16 0.0-0.1	TOPSOIL/FILL: metal pipe brick
	▨	CLAY very stiff low plasticity dark grey/black				ALLUVIUM
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP17
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 0.7

LONGITUDE: 151.63451
LATITUDE: -32.7242
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▩	silty SAND fine grained brown		0		**TOPSOIL: some pieces of glass and China near the surface**
	▨	sandy CLAY low plasticity dark grey fine grained				**ALLUVIUM**
1						
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

JM ENVIRONMENTS ABN 67 166 341 288

SHEET 1 of 1

PROJECT No: JME4079
SITE: 30 Swan Street Morpeth
CLIENT: Hilary Lantry
CONTRACTOR: Lantry Plumbing Pty Ltd

TEST PIT LOG: TP18
DATE: 3/10/2014
LOGGED BY: JMc
TOTAL DEPTH: 1.1

LONGITUDE: 151.634295
LATITUDE: -32.724182
ELEVATION: 0

DEPTH (m)	LEGEND	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	REMARKS
		Ground Surface				
0	▨	silty SAND fine grained brown		0	TP18 0.1-0.2	**TOPSOIL/FILL: some brick fragments@0.4-0.5m**
1	▨	CLAY very stiff low plasticity dark grey black				**ALLUVIUM**
2						

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater: None encountered

Static Groundwater Level:

Reviewed By: JMc

FILE

Appendix C

Laboratory Documentation

SGS

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

CHAIN OF CUSTODY & ANALYSIS REQUEST

Sample Date2/10/2014
Page 1 of 4

Company Name: JM Environments
Address: 37 Tooke St
COOKS HILL NSW 2300
Contact Name: James McMahon

Project Name/No: JME4079
Purchase Order No: JME4079
Results Required By: **std**
Telephone: 0427 893 668
Facsimile:
Email: james@jmenvironments.com

RECEIVED
03 OCT 2014
SE131890

ID	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	TRH/BTEX/PAH/8metals	TRH/BTEX/PAH/OC/OP /PCB/8metals	TRH/BTEX/PAH/OC/OP /PCB/8metals/Total	pH/CEC CaCl2	Asbestos		
TP1 0.0-0.1	1		X			X			X		Comp1	
TP1 1.3-1.4	2		X			X						PID 70
TP1 1.0-1.1	3		X			X			X	X.		
TP2 0.0-0.1	4		X			X				X		PID 1.3.
TP2 1.1-1.2	5		X			X.			X			PID 50.
TP3 0.1-0.2	6		X.								COMP 2 + TP11 0.2-0.3	PID 0.
TP4 0.1-0.2	7		X			X			X			PID 0.
TP5 0.1-0.2	8		X.			X						
TP5 0.3-1.4.	9		X			X			X			
TP16 0.1-0.2	10					X						

Relinquished By: JMcMahon
Date/Time:2/10/2014 5:00pm
Received By:TNT
Date/Time/02/10/2014 5:00pm

Relinquished By:
Date/Time:
Received By: L. As
Date/Time 3/10/14 9.00

Samples Intact: [✓ Yes]/ No
Temperature: Ambient / [✓ Chilled]
Sample Cooler Sealed: [✓ Yes]/ No
Laboratory Quotation No: ENVI126319

Sample Date:2/10/2014
Comments: Dissolved heavy metals

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

Sample Date2/10/2014
Page 2 of 4

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name: JM Environments
Address: 37 Tooke St
COOKS HILL NSW 2300
Contact Name: James McMahon

Project Name/No: JME4077
Purchase Order No: JME4077
Results Required By: **std**
Telephone: 0427 893 668
Facsimile:
Email: james@jmenvironments.com

ID	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	TRH/BTEX/PAH/8metals	TRH/BTEX/PAH/OC/OP /PCB/8metals	TRH/BTEX/PAH/OC/OP /PCB/8metals/Total	pH/CEC ~~[illegible]~~ CaCl2	Asbestos											
TP11 0.2-0.3	11					X			X												
TP4 1.2-1.3	12					X															
TP15 0.1-0.2	13					X															
TP15 0.4-0.5	14					X			X												
TP10 0.1-0.2	15 ,34					X				X											PID.21
TP14 0.1-0.2	16					X															
TP9 0.1-0.2	17 ,35.					X				X											
TP9 0.7-0.8	18					X															
TB6 0.0-0.1	19					X			X						COMP3						
TP7 0.0-0.1	20					X	*								COMP3						

Relinquished By: JMcMahon
Date/Time:2/10/2014 5:00pm
Received By:TNT
Date/Time/02/10/2014 5:00pm

Relinquished By:
Date/Time:
Received By: L-As
Date/Time 3/10/14 9.00

Samples Intact: [✓ Yes]/ No
Temperature: Ambient/ [✓ Chilled]
Sample Cooler Sealed: [✓ Yes] No
Laboratory Quotation No: ENVI126319

Sample Date:2/10/2014
Comments: Dissolved heavy metals

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

Sample Date2/10/2014
Page 3 of 4

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name: JM Environments
Address: 37 Tooke St
COOKS HILL NSW 2300
Contact Name: James McMahon

Project Name/No: JME4077
Purchase Order No: JME4077
Results Required By: **std**
Telephone: 0427 893 668
Facsimile:
Email: james@jmenvironments.com

ID	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	TRH/BTEX/PAH/8metals	TRH/BTEX/PAH/OC/OP /PCB/8metals	TRH/BTEX/PAH/OC/OP /PCB/8metals/Total	pH/CEC ca cl:	OC/PCB											
TP7 0.8-0.9	21					X	[illegible]		*		COMP3										TP10 75"
TP8 0.1-0.2	22					X	[illegible]				COMP3										
TP8 0.9-1.0	23					X	[illegible]				COMP3										
TP13 0.1-0.2	24					X															
TP12 0.0-0.1	25					X			*												
TP17 0.1-0.2	26					X															
TP18 0.1-0.2	27					X															
COMP1	28 1-5									X											
COMP2	29 6-9,1									X											
COMP3	30 19-23						x			X											

Relinquished By: JMcMahon
Date/Time:2/10/2014 5:00pm
Received By:TNT
Date/Time/02/10/2014 5:00pm

Relinquished By:
Date/Time:
Received By:
Date/Time 3/10/14 9.00

Samples Intact: [✓ Yes]/ No
Temperature: Ambient / [✓ Chilled]
Sample Cooler Sealed: [✓ Yes]/ No
Laboratory Quotation No: ENVI126319

Sample Date:2/10/2014
Comments: Dissolved heavy metals

CHAIN OF CUSTODY & ANALYSIS REQUEST

Sample Date2/10/2014

Page 6 of 6

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name: JM Environments
Address: 37 Tooke St
COOKS HILL NSW 2300
Contact Name: James McMahon

Project Name/No: JME4077
Purchase Order No: JME4077
Results Required By: **std**
Telephone: 0427 893 668
Facsimile:
Email: james@jmenvironments.com

ID	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	TRH/BTEX/PAH/8metals	TRH/BTEX/PAH/OC/OP/PCB/8metals	TRH/BTEX/PAH/OC/OP/PCB/8metals/Total	pH/CEC												
QC1	31					x															
QC1A.						x.					Send to Envirolabs										
QC2.	32					x.															
QC3	33					x															
QC3A						x					Send to Envirolab.										
Trip Spike	36																				
							x														

Relinquished By: JMcMahon
Date/Time:2/10/2014 5:00pm
Received By:TNT
Date/Time/02/10/2014 5:00pm

Relinquished By:
Date/Time:
Received By:
Date/Time 3/10/14 9.00

Samples Intact: [✓ Yes] / No
Temperature: Ambient / [✓ Chilled]
Sample Cooler Sealed: [✓ Yes] / No
Laboratory Quotation No: ENVI126319

Sample Date:2/10/2014

Comments: Dissolved heavy metals

AU.SampleReceipt.Sydney (Sydney)

From: James McMahon [james@jmenvironments.com]
Sent: Friday, 3 October 2014 11:55 AM
To: AU.SampleReceipt.Sydney (Sydney)
Subject: RE: SGS Sample Receipt Advice (Ref: JME2019, Lab Ref: SE131840)

Hi Emily,
TP1 1.0-1.1 Asbestos only
TP9_0.0-0.1 and TP10_0.1-0.2 bagged samples-material. These are marked for asbestos testing??

-----Original Message-----
From: AU.SampleReceipt.Sydney (Sydney)
[mailto:AU.SampleReceipt.Sydney@sgs.com]
Sent: Friday, 3 October 2014 11:20 AM
To: James McMahon
Subject: RE: SGS Sample Receipt Advice (Ref: JME2019, Lab Ref: SE131840)

Dear James,

TP1_1.0-1.1-Bag only supplied-Material. No jar received.
TP9_0.0-0.1 and TP10_0.1-0.2 bagged samples-material.

Kind Regards,

Emily Yin
Environmental Services
Sample Administration Officer

Phone: +61 (0)2 8594 0400
Fax: +61 (0)2 8594 0499

-----Original Message-----
From: James McMahon [mailto:james@jmenvironments.com]
Sent: Friday, 3 October 2014 10:53 AM
To: AU.SampleReceipt.Sydney (Sydney)
Subject: RE: SGS Sample Receipt Advice (Ref: JME2019, Lab Ref: SE131840)

Hi Wonnie,
You should receive a batch of soils from me this morning. Could send me a copy of the COC when they arrive?
Thanks
James McMahon
0427 893 668
james@jmenvironments.com

-----Original Message-----
From: AU.Samplereceipt.Sydney@SGS.com
[mailto:AU.Samplereceipt.Sydney@SGS.com]
Sent: Friday, 3 October 2014 9:05 AM
To: james@jmenvironments.com
Subject: SGS Sample Receipt Advice (Ref: JME2019, Lab Ref: SE131840)

Dear James McMahon,

AU.SampleReceipt.Sydney (Sydney)

From:	James McMahon [james@jmenvironments.com]
Sent:	Friday, 3 October 2014 12:50 PM
To:	AU.SampleReceipt.Sydney (Sydney)
Subject:	RE: SGS Sample Receipt Advice (Ref: JME2019, Lab Ref: SE131840)

Hi Emily
Just to be sure both TP8 samples rae to tested for TPH/BTEX/PAH/8heavy metals Thanks

James McMahon
0427 893 668
james@jmenvironments.com

-----Original Message-----
From: AU.SampleReceipt.Sydney (Sydney)
[mailto:AU.SampleReceipt.Sydney@sgs.com]
Sent: Friday, 3 October 2014 11:20 AM
To: James McMahon
Subject: RE: SGS Sample Receipt Advice (Ref: JME2019, Lab Ref: SE131840)

Dear James,

TP1_1.0-1.1-Bag only supplied-Material. No jar received.
TP9_0.0-0.1 and TP10_0.1-0.2 bagged samples-material.

Kind Regards,

Emily Yin
Environmental Services
Sample Administration Officer

Phone: +61 (0)2 8594 0400
Fax: +61 (0)2 8594 0499

-----Original Message-----
From: James McMahon [mailto:james@jmenvironments.com]
Sent: Friday, 3 October 2014 10:53 AM
To: AU.SampleReceipt.Sydney (Sydney)
Subject: RE: SGS Sample Receipt Advice (Ref: JME2019, Lab Ref: SE131840)

Hi Wonnie,
You should receive a batch of soils from me this morning. Could send me a copy of the COC when they arrive?
Thanks
James McMahon
0427 893 668
james@jmenvironments.com

-----Original Message-----
From: AU.Samplereceipt.Sydney@SGS.com
[mailto:AU.Samplereceipt.Sydney@SGS.com]
Sent: Friday, 3 October 2014 9:05 AM
To: james@jmenvironments.com

SGS

SE131890

Job:	Matrix	250 JAR	125 JAR	BAG			1L UP P	500 UP P	250 ZnAcetate P	250 / 500 NaOH BP	125 / 250 UP P	125 / 250 Metal Total*	125 / 250 Metal Filtered*	125 HCl P	1L UP AG	500 / 1L H_2SO_4 AG	125 / 250 H_2SO_4 P	100 / 200 UP AG	40 [redacted]o GV	250 UP OPAQUE P	500 NaThio STERILE P	200 NaThio STERILE P						Storage Location	Bottles Supplied By	Comment
1,2,5,7-14,16,18-27, 31-33	S	4	1																									S822-3	SGS	Full
3	material			1																								ASB	Client	–
4, 6	S		1	1																								S822-3 ASB	SGS	Full
15, 17	S		1	1																								"	"	Full, a Note bags provided are material samples
34-35	material			1																								ASB		
36	S																			1								S823	SGS.	

Soil on Hold

Cooling Method
CP
Temp
4°C
Good Order
[✓ Y] / N
Clearly Labelled
[✓ Y] / N
Correct Pres.
[✓ Y] / N
No Head-space
[✓ Y] / N / NA
Sufficient Vol
[✓ Y] / N
Doc Date
03/10
Doc Type
CoC
Complete Docs
[✓ Y] / N
Requested TAT
Std

HOLD HERE

TNT Express - A division of TNT Australia Pty. Limited ABN 41 000 495 269

RECEIVER'S COPY - RETAIN THIS COPY FOR YOUR RECORDS

DOMESTIC CONSIGNMENT NOTE

AT004089

TNT

AUSTRALIA WIDE PICK UPS

13 11 50

or visit www.tnt.com.au

Booking reference No

DC V02/11

Con Note No 9800 5549 8216

Sender: JM Environments

Address: 37 Tooke St

Town/City: COOKS HILL State: NSW Postcode: 2300

Contact Name: James Phone: 0427 893 668

Receiver: SGS AUSTRALIA

Address: UNIT 16, 33 MADDOX STREET

Town/City: ALEXANDRIA State: NSW Postcode: 2015

Contact Name: C/C 5258 Phone: 02 8594 0400

Freight Charges to be paid by?

Notwithstanding the box you may have marked, by sending these goods you as the sender are accepting ultimate responsibility to pay the freight charges incurred.

Sender ☐ Receiver ☐ Third Party ☒

Account Number to be charged: TNT 20003191

SELECT SERVICE (please X). WARNING: If no service selected, **Road Express** applies and may result in a delayed delivery. For service availability, check www.tnt.com.au

☐ Sameday ☐ 9:00 Express ☐ 10:00 Express ☐ 12:00 Express ☒ Overnight Express ☐ Road Express

Saturday, weekend or after hours services are only available using "Sameday".

Special Instructions (eg. Saturday delivery):

Third Party Name/Address:

Postcode:

Your Ref. No	Description of Packaging (eg. cartons, pallets, satchels)	No. of Items	Declared Weight Kgs	L(cm)	W(cm)	H(cm)	Qty
Line 1 Details	1 Esky	1	7	×	×		
Line 2 Details				×	×		
Line 3 Details				×	×		
		Total					

Declared Cubic (cm x cm x cm)

EXTENDED WARRANTY:
Automatic Transit Warranty (ATW)
Unless you have previously elected to not have ATW with TNT, an ATW charge is added to the freight charge, and we agree to deliver the goods pursuant to condition 14 of this consignment note (see reverse). The maximum value for ATW is $1,000.
TNT Extended Warranty (TEW)
If you require TEW please state the sum required and the class in the boxes below. (See condition 14 overleaf) Requests for TEW in excess of $10,000 require prior written approval from TNT. The maximum value for which we will extend the warranty is $40,000. Call 13 11 50 for details.

Class	Sum required

NOT FOR DANGEROUS GOODS:
This consignment note can not be used for dangerous goods. By signing below, you confirm that this consignment does not contain dangerous goods.

Agreement: We submit the goods described above for carriage and agree that the Terms and Conditions of Carriage and Other Services available at www.tnt.com.au, see overleaf for details and TNT's Rate Agreement (if applicable) apply to the carriage of these goods.

Sender's Signature: 2/10 Date: 2/10

Driver's use only

Pick up		Delivery	
Time	Date	Time	Date
Run Number		Run Number	

Terms of Trade: 14 Days from Invoice Date

WE ARE NOT COMMON CARRIERS. TNT Australia Pty Limited Trading as TNT Express ABN 41 000 495 269

SAMPLE RECEIPT ADVICE

SE131890

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	(Not specified)
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME4079**
Order Number	**JME4079**
Samples	36

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 3/10/2014
Report Due	Mon 13/10/2014
SGS Reference	**SE131890**

SUBMISSION DETAILS

This is to confirm that 36 samples were received on Friday 3/10/2014. Results are expected to be ready by Monday 13/10/2014. Please quote SGS reference SE131890 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	33 Soils, 3 Materials	Type of documentation received	COC
Date documentation received	3/10/2014	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	4.0°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

As per client's request via telephone, sample TP1 1.0-1.1 will be analysed for asbestos in material only; samples TP10 0.1-0.2 and TP9 0.1-0.2 will be split into two each (soil portion/material portion) and analysed separately for TRH/BTEX/PAH/8metals in soil and asbestos in material, respectively; sample TP7 0.8-0.9 and TP12 0.0-0.1 will be analysed for TRH/BTEX/PAH/8metals/pH(CaCl2)/CEC; sample COMP3 will be analysed for OC/PCB only; and Trip spike will be analysed for BTEX.

SGS

SAMPLE RECEIPT ADVICE

SE131890

CLIENT DETAILS

Client JM ENVIRONMENTS

Project JME4079

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	pH in Soil CaCl2 Extract	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	TP1 0.0-0.1	13	25	1	10	12	8
002	TP1 1.3-1.4	-	25	-	10	12	8
004	TP2 0.0-0.1	-	25	-	10	12	8
005	TP2 1.1-1.2	13	25	1	10	12	8
007	TP4 0.1-0.2	13	25	1	10	12	8
008	TP5 0.1-0.2	-	25	-	10	12	8
009	TP5 1.3-1.4	13	25	1	10	12	8
010	TP16 0.1-0.2	-	25	-	10	12	8
011	TP11 0.2-0.3	13	25	1	10	12	8
012	TP11 1.2-1.3	-	25	-	10	12	8
013	TP15 0.1-0.2	-	25	-	10	12	8
014	TP15 0.4-0.5	13	25	1	10	12	8
015	TP10 0.1-0.2	-	25	-	10	12	8
016	TP14 0.1-0.2	-	25	-	10	12	8
017	TP9 0.1-0.2	-	25	-	10	12	8
018	TP9 0.7-0.8	-	25	-	10	12	8
019	TP6 0.0-0.1	13	25	1	10	12	8
020	TP7 0.0-0.1	-	25	-	10	12	8
021	TP7 0.8-0.9	13	25	1	10	12	8
022	TP8 0.1-0.2	-	25	-	10	12	8
023	TP8 0.9-1.0	-	25	-	10	12	8
024	TP13 0.1-0.2	-	25	-	10	12	8

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

CLIENT DETAILS

Client JM ENVIRONMENTS Project JME4079

SUMMARY OF ANALYSIS

No.	Sample ID	Exchangeable Cations and Cation Exchange Capacity	OC Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	pH in Soil CaCl2 Extract	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
025	TP12 0.0-0.1	13	-	25	-	1	10	12	8
026	TP17 0.1-0.2	-	-	25	-	-	10	12	8
027	TP18 1.0-0.2	-	-	25	-	-	10	12	8
028	Comp 1	-	28	-	11	-	-	-	-
029	Comp 2	-	28	-	11	-	-	-	-
030	Comp 3	-	28	-	11	-	-	-	-
031	QC1	-	-	25	-	-	10	12	8
032	QC2	-	-	25	-	-	10	12	8
033	QC3	-	-	25	-	-	10	12	8
036	Trip Spike	-	-	-	-	-	-	12	-

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

CLIENT DETAILS

Client JM ENVIRONMENTS

Project JME4079

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre ID in bulk materials	Fibre Identification in soil	Mercury in Soil	Moisture Content	Total Recoverable Metals in Soil by ICPOES from
001	TP1 0.0-0.1	-	-	1	1	7
002	TP1 1.3-1.4	-	-	1	1	7
003	TP1 1.0-1.1	1	-	-	-	-
004	TP2 0.0-0.1	-	2	1	1	7
005	TP2 1.1-1.2	-	-	1	1	7
007	TP4 0.1-0.2	-	-	1	1	7
008	TP5 0.1-0.2	-	-	1	1	7
009	TP5 1.3-1.4	-	-	1	1	7
010	TP16 0.1-0.2	-	-	1	1	7
011	TP11 0.2-0.3	-	-	1	1	7
012	TP11 1.2-1.3	-	-	1	1	7
013	TP15 0.1-0.2	-	-	1	1	7
014	TP15 0.4-0.5	-	-	1	1	7
015	TP10 0.1-0.2	-	-	1	1	7
016	TP14 0.1-0.2	-	-	1	1	7
017	TP9 0.1-0.2	-	-	1	1	7
018	TP9 0.7-0.8	-	-	1	1	7
019	TP6 0.0-0.1	-	-	1	1	7
020	TP7 0.0-0.1	-	-	1	1	7
021	TP7 0.8-0.9	-	-	1	1	7
022	TP8 0.1-0.2	-	-	1	1	7
023	TP8 0.9-1.0	-	-	1	1	7
024	TP13 0.1-0.2	-	-	1	1	7

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

CLIENT DETAILS

Client JM ENVIRONMENTS

Project JME4079

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre ID in bulk materials	Mercury in Soil	Moisture Content	Total Recoverable Metals in Soil by ICPOES from
025	TP12 0.0-0.1	-	1	1	7
026	TP17 0.1-0.2	-	1	1	7
027	TP18 1.0-0.2	-	1	1	7
028	Comp 1	-	-	1	-
029	Comp 2	-	-	1	-
030	Comp 3	-	-	1	-
031	QC1	-	1	1	7
032	QC2	-	1	1	7
033	QC3	-	1	1	7
034	TP10 0.1-0.2	1	-	-	-
035	TP9 0.1-0.2	1	-	-	-

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	James McMahon	Manager	Huong Crawford
Client	JM ENVIRONMENTS	Laboratory	SGS Alexandria Environmental
Address	37 TOOKE STREET COOKS HILL NSW 2300	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	(Not specified)	Telephone	+61 2 8594 0400
Facsimile	(Not specified)	Facsimile	+61 2 8594 0499
Email	james@jmenvironments.com	Email	au.environmental.sydney@sgs.com
Project	**JME4079**	SGS Reference	**SE131890 R0**
Order Number	**JME4079**	Report Number	0000092979
Samples	36	Date Reported	13 Oct 2014
Date Started	07 Oct 2014	Date Received	03 Oct 2014

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all samples using trace analysis technique

Asbestos analysed by Approved Identifiesr Yusuf Kuthpudin and Ravee Sivasubramaniam .

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Jaimie Cheung
Metals Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Asbestos Analyst

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.001 Soil 02 Oct 2014 TP1 0.0-0.1	SE131890.002 Soil 02 Oct 2014 TP1 1.3-1.4	SE131890.003 Material 02 Oct 2014 TP1 1.0-1.1	SE131890.004 Soil 02 Oct 2014 TP2 0.0-0.1

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	-	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	-	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	-	<0.1

Polycyclic VOCs

Naphthalene	mg/kg	0.1	<0.1	<0.1	-	<0.1

Surrogates

Dibromofluoromethane (Surrogate)	%	-	**78**	**97**	-	**95**
d4-1,2-dichloroethane (Surrogate)	%	-	**80**	**97**	-	**94**
d8-toluene (Surrogate)	%	-	**75**	**92**	-	**91**
Bromofluorobenzene (Surrogate)	%	-	**93**	**107**	-	**103**

Totals

Total Xylenes*	mg/kg	0.3	<0.3	<0.3	-	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	-	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

TRH C6-C10	mg/kg	25	<25	<25	-	<25
TRH C6-C9	mg/kg	20	<20	<20	-	<20

Surrogates

Dibromofluoromethane (Surrogate)	%	-	**78**	**97**	-	**95**
d4-1,2-dichloroethane (Surrogate)	%	-	**80**	**97**	-	**94**
d8-toluene (Surrogate)	%	-	**75**	**92**	-	**91**
Bromofluorobenzene (Surrogate)	%	-	**93**	**107**	-	**103**

VPH F Bands

Benzene (F0)	mg/kg	0.1	<0.1	<0.1	-	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	-	<25

		Sample Number	SE131890.001	SE131890.002	SE131890.003	SE131890.004
		Sample Matrix	Soil	Soil	Material	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP1 0.0-0.1	TP1 1.3-1.4	TP1 1.0-1.1	TP2 0.0-0.1
Parameter	Units	LOR				

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	<20	<20	-	**47**
TRH C15-C28	mg/kg	45	<45	<45	-	**250**
TRH C29-C36	mg/kg	45	<45	<45	-	**140**
TRH C37-C40	mg/kg	100	<100	<100	-	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	-	**430**
TRH C10-C40 Total	mg/kg	210	<210	<210	-	**430**

TRH F Bands

TRH >C10-C16 (F2)	mg/kg	25	<25	<25	-	**65**
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	<25	-	**65**
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	-	**330**
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	<120

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Naphthalene	mg/kg	0.1	<0.1	<0.1	-	**0.1**
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	**0.1**
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	**0.1**
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	-	**0.6**
Anthracene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Fluoranthene	mg/kg	0.1	**0.1**	<0.1	-	**0.6**
Pyrene	mg/kg	0.1	**0.1**	<0.1	-	**0.6**
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	**0.3**
Chrysene	mg/kg	0.1	<0.1	<0.1	-	**0.3**
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	**0.4**
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	-	**0.2**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	**0.2**
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	**0.1**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	<0.2	<0.2	-	**0.3**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	<0.3	-	**0.4**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	<0.2	-	**0.3**
Total PAH	mg/kg	0.8	<0.8	<0.8	-	**3.8**

Surrogates

d5-nitrobenzene (Surrogate)	%	-	**94**	**100**	-	**108**
2-fluorobiphenyl (Surrogate)	%	-	**90**	**80**	-	**92**
d14-p-terphenyl (Surrogate)	%	-	**100**	**108**	-	**106**

Parameter	Units	LOR	SE131890.001 Soil 02 Oct 2014 TP1 0.0-0.1	SE131890.002 Soil 02 Oct 2014 TP1 1.3-1.4	SE131890.003 Material 02 Oct 2014 TP1 1.0-1.1	SE131890.004 Soil 02 Oct 2014 TP2 0.0-0.1

Sample Number / Sample Matrix / Sample Date / Sample Name

OC Pesticides in Soil Method: AN400/AN420

Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

Parameter	Units	LOR	Sample Number: SE131890.001 Sample Matrix: Soil Sample Date: 02 Oct 2014 Sample Name: TP1 0.0-0.1	SE131890.002 Soil 02 Oct 2014 TP1 1.3-1.4	SE131890.003 Material 02 Oct 2014 TP1 1.0-1.1	SE131890.004 Soil 02 Oct 2014 TP2 0.0-0.1

PCBs in Soil Method: AN400/AN420

Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

pH in Soil CaCl2 Extract Method: AN103

pH Soil CaCl2 Extract	pH Units	-	**4.5**	-	-	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Exchangeable Sodium, Na	mg/kg	2	**18**	-	-	-
Exchangeable Sodium, Na	meq/100g	0.01	**0.08**	-	-	-
Exchangeable Sodium Percentage*	%	0.1	**1.5**	-	-	-
Exchangeable Potassium, K	mg/kg	2	**260**	-	-	-
Exchangeable Potassium, K	meq/100g	0.01	**0.67**	-	-	-
Exchangeable Potassium Percentage*	%	0.1	**13.5**	-	-	-
Exchangeable Calcium, Ca	mg/kg	2	**650**	-	-	-
Exchangeable Calcium, Ca	meq/100g	0.01	**3.3**	-	-	-
Exchangeable Calcium Percentage*	%	0.1	**65.4**	-	-	-
Exchangeable Magnesium, Mg	mg/kg	2	**120**	-	-	-
Exchangeable Magnesium, Mg	meq/100g	0.02	**0.98**	-	-	-
Exchangeable Magnesium Percentage*	%	0.1	**19.6**	-	-	-
Cation Exchange Capacity	meq/100g	0.02	**5.0**	-	-	-

Parameter	Units	LOR	SE131890.001	SE131890.002	SE131890.003	SE131890.004
Sample Matrix			Soil	Soil	Material	Soil
Sample Date			02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
Sample Name			TP1 0.0-0.1	TP1 1.3-1.4	TP1 1.0-1.1	TP2 0.0-0.1

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Parameter	Units	LOR	SE131890.001	SE131890.002	SE131890.003	SE131890.004
Arsenic, As	mg/kg	3	**100**	<3	-	**45**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	-	**0.6**
Chromium, Cr	mg/kg	0.3	**5.6**	**17**	-	**16**
Copper, Cu	mg/kg	0.5	**49**	**7.8**	-	**59**
Lead, Pb	mg/kg	1	**110**	**17**	-	**120**
Nickel, Ni	mg/kg	0.5	**29**	**16**	-	**30**
Zinc, Zn	mg/kg	0.5	**86**	**190**	-	**350**

Mercury in Soil Method: AN312

Parameter	Units	LOR	SE131890.001	SE131890.002	SE131890.003	SE131890.004
Mercury	mg/kg	0.01	**0.42**	**0.03**	-	**0.14**

Fibre Identification in soil Method: AN602

FibreID

Parameter	Units	LOR	SE131890.001	SE131890.002	SE131890.003	SE131890.004
Asbestos Detected	No unit	-	-	-	-	No

SemiQuant

Parameter	Units	LOR	SE131890.001	SE131890.002	SE131890.003	SE131890.004
Estimated Fibres	%w/w	0.01	-	-	-	<0.01

Fibre ID in bulk materials Method: AN602

FibreID

Parameter	Units	LOR	SE131890.001	SE131890.002	SE131890.003	SE131890.004
Asbestos Detected	No unit	-	-	-	Yes	-

Moisture Content Method: AN002

Parameter	Units	LOR	SE131890.001	SE131890.002	SE131890.003	SE131890.004
% Moisture	%	0.5	**6.5**	**23**	-	**14**

		Sample Number	SE131890.005	SE131890.006	SE131890.007	SE131890.008
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP2 1.1-1.2	TP3 0.1-0.2	TP4 0.1-0.2	TP5 0.1-0.2
Parameter	**Units**	**LOR**				

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Benzene	mg/kg	0.1	<0.1	-	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	-	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	-	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	-	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	-	<0.1	<0.1

Polycyclic VOCs

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Naphthalene	mg/kg	0.1	<0.1	-	<0.1	<0.1

Surrogates

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Dibromofluoromethane (Surrogate)	%	-	103	-	97	87
d4-1,2-dichloroethane (Surrogate)	%	-	106	-	98	87
d8-toluene (Surrogate)	%	-	98	-	91	80
Bromofluorobenzene (Surrogate)	%	-	110	-	99	88

Totals

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Total Xylenes*	mg/kg	0.3	<0.3	-	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	-	<0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
TRH C6-C10	mg/kg	25	<25	-	<25	<25
TRH C6-C9	mg/kg	20	<20	-	<20	<20

Surrogates

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Dibromofluoromethane (Surrogate)	%	-	103	-	97	87
d4-1,2-dichloroethane (Surrogate)	%	-	106	-	98	87
d8-toluene (Surrogate)	%	-	98	-	91	80
Bromofluorobenzene (Surrogate)	%	-	110	-	99	88

VPH F Bands

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Benzene (F0)	mg/kg	0.1	<0.1	-	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	-	<25	<25

		Sample Number	SE131890.005	SE131890.006	SE131890.007	SE131890.008
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP2 1.1-1.2	TP3 0.1-0.2	TP4 0.1-0.2	TP5 0.1-0.2
Parameter	Units	LOR				
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403						
TRH C10-C14	mg/kg	20	<20	-	**26**	<20
TRH C15-C28	mg/kg	45	<45	-	**180**	**69**
TRH C29-C36	mg/kg	45	<45	-	**95**	<45
TRH C37-C40	mg/kg	100	<100	-	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	-	**300**	<110
TRH C10-C40 Total	mg/kg	210	<210	-	**300**	<210
TRH F Bands						
TRH >C10-C16 (F2)	mg/kg	25	<25	-	**37**	<25
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	-	**37**	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	-	**250**	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	-	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420						
Naphthalene	mg/kg	0.1	<0.1	-	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	-	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	-	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	-	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	-	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	-	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	-	**0.8**	**0.3**
Anthracene	mg/kg	0.1	<0.1	-	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	-	**1.6**	**1.4**
Pyrene	mg/kg	0.1	<0.1	-	**1.7**	**1.6**
Benzo(a)anthracene	mg/kg	0.1	<0.1	-	**0.8**	**1.3**
Chrysene	mg/kg	0.1	<0.1	-	**0.6**	**0.6**
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	-	**1.2**	**2.1**
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	**0.2**	**0.3**
Benzo(a)pyrene	mg/kg	0.1	<0.1	-	**0.7**	**1.2**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	-	**0.7**	**1.4**
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	-	<0.1	**0.2**
Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	**0.3**	**0.6**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	<0.2	-	**0.9**	**1.9**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	-	**1.0**	**1.9**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	-	**1.0**	**1.9**
Total PAH	mg/kg	0.8	<0.8	-	**8.9**	**11**
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**116**	-	**110**	**112**
2-fluorobiphenyl (Surrogate)	%	-	**82**	-	**92**	**90**
d14-p-terphenyl (Surrogate)	%	-	**110**	-	**108**	**112**

Parameter	Units	LOR	SE131890.005 Soil 02 Oct 2014 TP2 1.1-1.2	SE131890.006 Soil 02 Oct 2014 TP3 0.1-0.2	SE131890.007 Soil 02 Oct 2014 TP4 0.1-0.2	SE131890.008 Soil 02 Oct 2014 TP5 0.1-0.2
		Sample Number Sample Matrix Sample Date Sample Name				

OC Pesticides in Soil Method: AN400/AN420

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-

Surrogates

Parameter	Units	LOR	SE131890.005	SE131890.006	SE131890.007	SE131890.008
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.005 Soil 02 Oct 2014 TP2 1.1-1.2	SE131890.006 Soil 02 Oct 2014 TP3 0.1-0.2	SE131890.007 Soil 02 Oct 2014 TP4 0.1-0.2	SE131890.008 Soil 02 Oct 2014 TP5 0.1-0.2

PCBs in Soil Method: AN400/AN420

Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

pH in Soil CaCl2 Extract Method: AN103

pH Soil CaCl2 Extract	pH Units	-	5.1	-	4.8	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Exchangeable Sodium, Na	mg/kg	2	130	-	40	-
Exchangeable Sodium, Na	meq/100g	0.01	0.58	-	0.17	-
Exchangeable Sodium Percentage*	%	0.1	3.0	-	1.6	-
Exchangeable Potassium, K	mg/kg	2	530	-	160	-
Exchangeable Potassium, K	meq/100g	0.01	1.4	-	0.42	-
Exchangeable Potassium Percentage*	%	0.1	7.0	-	3.8	-
Exchangeable Calcium, Ca	mg/kg	2	2200	-	1800	-
Exchangeable Calcium, Ca	meq/100g	0.01	11	-	8.8	-
Exchangeable Calcium Percentage*	%	0.1	57.1	-	78.6	-
Exchangeable Magnesium, Mg	mg/kg	2	780	-	220	-
Exchangeable Magnesium, Mg	meq/100g	0.02	6.4	-	1.8	-
Exchangeable Magnesium Percentage*	%	0.1	32.9	-	16.1	-
Cation Exchange Capacity	meq/100g	0.02	19	-	11	-

Parameter	Units	LOR	SE131890.005 Soil 02 Oct 2014 TP2 1.1-1.2	SE131890.006 Soil 02 Oct 2014 TP3 0.1-0.2	SE131890.007 Soil 02 Oct 2014 TP4 0.1-0.2	SE131890.008 Soil 02 Oct 2014 TP5 0.1-0.2
Sample Number / Sample Matrix / Sample Date / Sample Name						

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Arsenic, As	mg/kg	3	7	-	340	96
Cadmium, Cd	mg/kg	0.3	<0.3	-	0.4	<0.3
Chromium, Cr	mg/kg	0.3	16	-	7.8	5.8
Copper, Cu	mg/kg	0.5	9.7	-	120	31
Lead, Pb	mg/kg	1	8	-	140	190
Nickel, Ni	mg/kg	0.5	12	-	21	11
Zinc, Zn	mg/kg	0.5	52	-	86	51

Mercury in Soil Method: AN312

Mercury	mg/kg	0.01	<0.01	-	0.14	0.12

Fibre Identification in soil Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

Moisture Content Method: AN002

% Moisture	%	0.5	22	-	14	11

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.009 Soil 02 Oct 2014 TP5 1.3-1.4	SE131890.010 Soil 02 Oct 2014 TP16 0.1-0.2	SE131890.011 Soil 02 Oct 2014 TP11 0.2-0.3	SE131890.012 Soil 02 Oct 2014 TP11 1.2-1.3

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Polycyclic VOCs

Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Surrogates

Dibromofluoromethane (Surrogate)	%	-	100	98	96	119
d4-1,2-dichloroethane (Surrogate)	%	-	103	100	96	122
d8-toluene (Surrogate)	%	-	91	92	89	115
Bromofluorobenzene (Surrogate)	%	-	104	108	97	120

Totals

Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20

Surrogates

Dibromofluoromethane (Surrogate)	%	-	100	98	96	119
d4-1,2-dichloroethane (Surrogate)	%	-	103	100	96	122
d8-toluene (Surrogate)	%	-	91	92	89	115
Bromofluorobenzene (Surrogate)	%	-	104	108	97	120

VPH F Bands

Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

		Sample Number	SE131890.009	SE131890.010	SE131890.011	SE131890.012
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP5 1.3-1.4	TP16 0.1-0.2	TP11 0.2-0.3	TP11 1.2-1.3
Parameter	Units	LOR				

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

Parameter	Units	LOR	SE131890.009	SE131890.010	SE131890.011	SE131890.012
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	**110**	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	**150**	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210

TRH F Bands

Parameter	Units	LOR	SE131890.009	SE131890.010	SE131890.011	SE131890.012
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	**26**	<25
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	<25	**26**	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**130**	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Parameter	Units	LOR	SE131890.009	SE131890.010	SE131890.011	SE131890.012
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	**0.7**	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1
Fluoranthene	mg/kg	0.1	**0.2**	<0.1	**1.6**	<0.1
Pyrene	mg/kg	0.1	**0.2**	<0.1	**1.5**	<0.1
Benzo(a)anthracene	mg/kg	0.1	**0.1**	<0.1	**0.8**	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	**0.6**	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	**0.2**	<0.1	**1.3**	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1
Benzo(a)pyrene	mg/kg	0.1	**0.1**	<0.1	**0.8**	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.2**	<0.1	**1.0**	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**0.1**	<0.1	**0.5**	<0.1
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	<0.2	<0.2	**1.2**	<0.2
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	<0.3	**1.2**	<0.3
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	**0.2**	<0.2	**1.2**	<0.2
Total PAH	mg/kg	0.8	**1.4**	<0.8	**9.4**	<0.8

Surrogates

Parameter	Units	LOR	SE131890.009	SE131890.010	SE131890.011	SE131890.012
d5-nitrobenzene (Surrogate)	%	-	**118**	**124**	**116**	**110**
2-fluorobiphenyl (Surrogate)	%	-	**86**	**86**	**90**	**82**
d14-p-terphenyl (Surrogate)	%	-	**114**	**114**	**110**	**106**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.009 Soil 02 Oct 2014 TP5 1.3-1.4	SE131890.010 Soil 02 Oct 2014 TP16 0.1-0.2	SE131890.011 Soil 02 Oct 2014 TP11 0.2-0.3	SE131890.012 Soil 02 Oct 2014 TP11 1.2-1.3

OC Pesticides in Soil Method: AN400/AN420

Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

		Sample Number	SE131890.009	SE131890.010	SE131890.011	SE131890.012
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP5 1.3-1.4	TP16 0.1-0.2	TP11 0.2-0.3	TP11 1.2-1.3
Parameter	Units	LOR				

PCBs in Soil Method: AN400/AN420

Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

pH in Soil CaCl2 Extract Method: AN103

pH Soil CaCl2 Extract	pH Units	-	4.7	-	4.8	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Exchangeable Sodium, Na	mg/kg	2	32	-	31	-
Exchangeable Sodium, Na	meq/100g	0.01	0.14	-	0.14	-
Exchangeable Sodium Percentage*	%	0.1	1.6	-	1.1	-
Exchangeable Potassium, K	mg/kg	2	360	-	310	-
Exchangeable Potassium, K	meq/100g	0.01	0.92	-	0.80	-
Exchangeable Potassium Percentage*	%	0.1	10.6	-	6.3	-
Exchangeable Calcium, Ca	mg/kg	2	1000	-	1800	-
Exchangeable Calcium, Ca	meq/100g	0.01	5.2	-	8.8	-
Exchangeable Calcium Percentage*	%	0.1	60.0	-	69.7	-
Exchangeable Magnesium, Mg	mg/kg	2	300	-	350	-
Exchangeable Magnesium, Mg	meq/100g	0.02	2.4	-	2.9	-
Exchangeable Magnesium Percentage*	%	0.1	27.8	-	22.9	-
Cation Exchange Capacity	meq/100g	0.02	8.7	-	13	-

Parameter	Units	LOR	SE131890.009	SE131890.010	SE131890.011	SE131890.012
Sample Matrix			Soil	Soil	Soil	Soil
Sample Date			02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
Sample Name			TP5 1.3-1.4	TP16 0.1-0.2	TP11 0.2-0.3	TP11 1.2-1.3

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Arsenic, As	mg/kg	3	**28**	<3	**26**	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**4.1**	**10**	**6.0**	**19**
Copper, Cu	mg/kg	0.5	**11**	**5.0**	**39**	**10**
Lead, Pb	mg/kg	1	**54**	**14**	**200**	**14**
Nickel, Ni	mg/kg	0.5	**4.4**	**1.8**	**15**	**9.8**
Zinc, Zn	mg/kg	0.5	**20**	**12**	**110**	**66**

Mercury in Soil Method: AN312

Mercury	mg/kg	0.01	**0.08**	<0.01	**0.34**	**0.03**

Fibre Identification in soil Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

Moisture Content Method: AN002

% Moisture	%	0.5	**13**	**20**	**13**	**15**

Parameter	Units	LOR	SE131890.013 Soil 02 Oct 2014 TP15 0.1-0.2	SE131890.014 Soil 02 Oct 2014 TP15 0.4-0.5	SE131890.015 Soil 02 Oct 2014 TP10 0.1-0.2	SE131890.016 Soil 02 Oct 2014 TP14 0.1-0.2

Sample Number / Sample Matrix / Sample Date / Sample Name

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Polycyclic VOCs

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Surrogates

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Dibromofluoromethane (Surrogate)	%	-	**98**	**91**	**92**	**89**
d4-1,2-dichloroethane (Surrogate)	%	-	**97**	**91**	**95**	**91**
d8-toluene (Surrogate)	%	-	**89**	**84**	**85**	**83**
Bromofluorobenzene (Surrogate)	%	-	**96**	**90**	**94**	**92**

Totals

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20

Surrogates

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Dibromofluoromethane (Surrogate)	%	-	**98**	**91**	**92**	**89**
d4-1,2-dichloroethane (Surrogate)	%	-	**97**	**91**	**95**	**91**
d8-toluene (Surrogate)	%	-	**89**	**84**	**85**	**83**
Bromofluorobenzene (Surrogate)	%	-	**96**	**90**	**94**	**92**

VPH F Bands

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

		Sample Number	SE131890.013	SE131890.014	SE131890.015	SE131890.016
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP15 0.1-0.2	TP15 0.4-0.5	TP10 0.1-0.2	TP14 0.1-0.2
Parameter	Units	LOR				

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	**83**	<45	**110**	**64**
TRH C29-C36	mg/kg	45	**53**	<45	**66**	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	**140**	<110	**180**	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210

TRH F Bands

TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	**120**	<90	**160**	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	**0.1**	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	**1.0**	<0.1	**0.6**	**0.3**
Anthracene	mg/kg	0.1	**0.2**	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	**2.9**	<0.1	**1.7**	**0.6**
Pyrene	mg/kg	0.1	**3.4**	<0.1	**1.7**	**0.7**
Benzo(a)anthracene	mg/kg	0.1	**1.4**	<0.1	**0.8**	**0.3**
Chrysene	mg/kg	0.1	**0.9**	<0.1	**0.6**	**0.2**
Benzo(b&j)fluoranthene	mg/kg	0.1	**2.4**	<0.1	**1.4**	**0.5**
Benzo(k)fluoranthene	mg/kg	0.1	**0.4**	<0.1	**0.2**	**0.1**
Benzo(a)pyrene	mg/kg	0.1	**1.8**	<0.1	**0.9**	**0.3**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**2.2**	<0.1	**1.1**	**0.4**
Dibenzo(a&h)anthracene	mg/kg	0.1	**0.2**	<0.1	**0.1**	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**1.2**	<0.1	**0.6**	**0.2**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	**2.6**	<0.2	**1.4**	**0.5**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	**2.6**	<0.3	**1.4**	**0.6**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	**2.6**	<0.2	**1.4**	**0.5**
Total PAH	mg/kg	0.8	**18**	<0.8	**9.9**	**3.8**

Surrogates

d5-nitrobenzene (Surrogate)	%	-	**118**	**108**	**118**	**116**
2-fluorobiphenyl (Surrogate)	%	-	**92**	**82**	**88**	**88**
d14-p-terphenyl (Surrogate)	%	-	**114**	**114**	**108**	**110**

Parameter	Units	LOR				
		Sample Number	SE131890.013	SE131890.014	SE131890.015	SE131890.016
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP15 0.1-0.2	TP15 0.4-0.5	TP10 0.1-0.2	TP14 0.1-0.2

OC Pesticides in Soil   Method: AN400/AN420

Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

		Sample Number	SE131890.013	SE131890.014	SE131890.015	SE131890.016
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP15 0.1-0.2	TP15 0.4-0.5	TP10 0.1-0.2	TP14 0.1-0.2
Parameter	Units	LOR				

PCBs in Soil Method: AN400/AN420

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Surrogates

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

pH in Soil CaCl2 Extract Method: AN103

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
pH Soil CaCl2 Extract	pH Units	-	-	**4.3**	-	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Parameter	Units	LOR	SE131890.013	SE131890.014	SE131890.015	SE131890.016
Exchangeable Sodium, Na	mg/kg	2	-	**440**	-	-
Exchangeable Sodium, Na	meq/100g	0.01	-	**1.9**	-	-
Exchangeable Sodium Percentage*	%	0.1	-	**9.2**	-	-
Exchangeable Potassium, K	mg/kg	2	-	**400**	-	-
Exchangeable Potassium, K	meq/100g	0.01	-	**1.0**	-	-
Exchangeable Potassium Percentage*	%	0.1	-	**5.0**	-	-
Exchangeable Calcium, Ca	mg/kg	2	-	**840**	-	-
Exchangeable Calcium, Ca	meq/100g	0.01	-	**4.2**	-	-
Exchangeable Calcium Percentage*	%	0.1	-	**20.3**	-	-
Exchangeable Magnesium, Mg	mg/kg	2	-	**1700**	-	-
Exchangeable Magnesium, Mg	meq/100g	0.02	-	**14**	-	-
Exchangeable Magnesium Percentage*	%	0.1	-	**65.6**	-	-
Cation Exchange Capacity	meq/100g	0.02	-	**21**	-	-

		Sample Number	SE131890.013	SE131890.014	SE131890.015	SE131890.016
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP15 0.1-0.2	TP15 0.4-0.5	TP10 0.1-0.2	TP14 0.1-0.2
Parameter	**Units**	**LOR**				

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Arsenic, As	mg/kg	3	5	<3	49	12
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.4	<0.3
Chromium, Cr	mg/kg	0.3	13	12	5.7	11
Copper, Cu	mg/kg	0.5	19	7.8	33	17
Lead, Pb	mg/kg	1	48	8	150	47
Nickel, Ni	mg/kg	0.5	9.6	5.5	14	10
Zinc, Zn	mg/kg	0.5	76	9.1	200	70

Mercury in Soil Method: AN312

Mercury	mg/kg	0.01	0.07	<0.01	0.03	0.06

Fibre Identification in soil Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

Moisture Content Method: AN002

% Moisture	%	0.5	16	21	11	5.4

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.017 Soil 02 Oct 2014 TP9 0.1-0.2	SE131890.018 Soil 02 Oct 2014 TP9 0.7-0.8	SE131890.019 Soil 02 Oct 2014 TP6 0.0-0.1	SE131890.020 Soil 02 Oct 2014 TP7 0.0-0.1

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Polycyclic VOCs

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Surrogates

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Dibromofluoromethane (Surrogate)	%	-	94	104	100	89
d4-1,2-dichloroethane (Surrogate)	%	-	96	97	100	92
d8-toluene (Surrogate)	%	-	86	80	91	82
Bromofluorobenzene (Surrogate)	%	-	91	98	98	91

Totals

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20

Surrogates

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Dibromofluoromethane (Surrogate)	%	-	94	104	100	89
d4-1,2-dichloroethane (Surrogate)	%	-	96	97	100	92
d8-toluene (Surrogate)	%	-	86	80	91	82
Bromofluorobenzene (Surrogate)	%	-	91	98	98	91

VPH F Bands

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

		Sample Number	SE131890.017	SE131890.018	SE131890.019	SE131890.020
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP9 0.1-0.2	TP9 0.7-0.8	TP6 0.0-0.1	TP7 0.0-0.1
Parameter	Units	LOR				

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	**51**	<20	<20	**23**
TRH C15-C28	mg/kg	45	**290**	<45	**100**	**130**
TRH C29-C36	mg/kg	45	**100**	<45	<45	**51**
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	**440**	<110	<110	**210**
TRH C10-C40 Total	mg/kg	210	**440**	<210	<210	<210

TRH F Bands

TRH >C10-C16 (F2)	mg/kg	25	**75**	<25	<25	**34**
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	**75**	<25	<25	**34**
TRH >C16-C34 (F3)	mg/kg	90	**350**	<90	**130**	**170**
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Naphthalene	mg/kg	0.1	**0.1**	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	**0.2**	<0.1	<0.1	**0.1**
1-methylnaphthalene	mg/kg	0.1	**0.3**	<0.1	<0.1	**0.2**
Acenaphthylene	mg/kg	0.1	**0.1**	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	**1.6**	<0.1	**0.5**	**0.3**
Anthracene	mg/kg	0.1	**0.2**	<0.1	**0.1**	<0.1
Fluoranthene	mg/kg	0.1	**2.6**	<0.1	**1.4**	**0.2**
Pyrene	mg/kg	0.1	**2.7**	<0.1	**1.5**	**0.2**
Benzo(a)anthracene	mg/kg	0.1	**1.8**	<0.1	**1.0**	**0.2**
Chrysene	mg/kg	0.1	**1.1**	<0.1	**0.5**	**0.1**
Benzo(b&j)fluoranthene	mg/kg	0.1	**1.7**	<0.1	**1.1**	**0.1**
Benzo(k)fluoranthene	mg/kg	0.1	**0.4**	<0.1	**0.2**	<0.1
Benzo(a)pyrene	mg/kg	0.1	**1.2**	<0.1	**0.7**	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**1.1**	<0.1	**0.6**	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	**0.2**	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**0.5**	<0.1	**0.3**	<0.1
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	**1.9**	<0.2	**1.0**	<0.2
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	**1.9**	<0.3	**1.1**	<0.3
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	**1.9**	<0.2	**1.0**	<0.2
Total PAH	mg/kg	0.8	**16**	<0.8	**8.1**	**1.7**

Surrogates

d5-nitrobenzene (Surrogate)	%	-	**112**	**120**	**118**	**106**
2-fluorobiphenyl (Surrogate)	%	-	**96**	**90**	**84**	**84**
d14-p-terphenyl (Surrogate)	%	-	**116**	**110**	**106**	**100**

Parameter	Units	LOR	SE131890.017 Soil 02 Oct 2014 TP9 0.1-0.2	SE131890.018 Soil 02 Oct 2014 TP9 0.7-0.8	SE131890.019 Soil 02 Oct 2014 TP6 0.0-0.1	SE131890.020 Soil 02 Oct 2014 TP7 0.0-0.1

Sample Number / Sample Matrix / Sample Date / Sample Name

OC Pesticides in Soil Method: AN400/AN420

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-

Surrogates

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

Parameter	Units	LOR	SE131890.017 Soil 02 Oct 2014 TP9 0.1-0.2	SE131890.018 Soil 02 Oct 2014 TP9 0.7-0.8	SE131890.019 Soil 02 Oct 2014 TP6 0.0-0.1	SE131890.020 Soil 02 Oct 2014 TP7 0.0-0.1
Sample Number / Sample Matrix / Sample Date / Sample Name						

PCBs in Soil Method: AN400/AN420

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Surrogates

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

pH in Soil CaCl2 Extract Method: AN103

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
pH Soil CaCl2 Extract	pH Units	-	-	-	5.3	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Exchangeable Sodium, Na	mg/kg	2	-	-	38	-
Exchangeable Sodium, Na	meq/100g	0.01	-	-	0.16	-
Exchangeable Sodium Percentage*	%	0.1	-	-	1.3	-
Exchangeable Potassium, K	mg/kg	2	-	-	200	-
Exchangeable Potassium, K	meq/100g	0.01	-	-	0.51	-
Exchangeable Potassium Percentage*	%	0.1	-	-	4.2	-
Exchangeable Calcium, Ca	mg/kg	2	-	-	1800	-
Exchangeable Calcium, Ca	meq/100g	0.01	-	-	9.0	-
Exchangeable Calcium Percentage*	%	0.1	-	-	72.9	-
Exchangeable Magnesium, Mg	mg/kg	2	-	-	330	-
Exchangeable Magnesium, Mg	meq/100g	0.02	-	-	2.7	-
Exchangeable Magnesium Percentage*	%	0.1	-	-	21.6	-
Cation Exchange Capacity	meq/100g	0.02	-	-	12	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.017 Soil 02 Oct 2014 TP9 0.1-0.2	SE131890.018 Soil 02 Oct 2014 TP9 0.7-0.8	SE131890.019 Soil 02 Oct 2014 TP6 0.0-0.1	SE131890.020 Soil 02 Oct 2014 TP7 0.0-0.1

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest   Method: AN040/AN320

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Arsenic, As	mg/kg	3	14	<3	120	200
Cadmium, Cd	mg/kg	0.3	0.6	<0.3	0.4	0.3
Chromium, Cr	mg/kg	0.3	8.6	11	6.8	4.8
Copper, Cu	mg/kg	0.5	26	38	61	75
Lead, Pb	mg/kg	1	170	73	100	150
Nickel, Ni	mg/kg	0.5	17	15	13	14
Zinc, Zn	mg/kg	0.5	310	140	87	66

Mercury in Soil   Method: AN312

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Mercury	mg/kg	0.01	0.07	0.11	0.28	0.13

Fibre Identification in soil   Method: AN602

FibreID

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials   Method: AN602

FibreID

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
Asbestos Detected	No unit	-	-	-	-	-

Moisture Content   Method: AN002

Parameter	Units	LOR	SE131890.017	SE131890.018	SE131890.019	SE131890.020
% Moisture	%	0.5	9.8	34	14	9.7

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.021 Soil 02 Oct 2014 TP7 0.8-0.9	SE131890.022 Soil 02 Oct 2014 TP8 0.1-0.2	SE131890.023 Soil 02 Oct 2014 TP8 0.9-1.0	SE131890.024 Soil 02 Oct 2014 TP13 0.1-0.2

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Polycyclic VOCs

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Surrogates

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Dibromofluoromethane (Surrogate)	%	-	89	85	83	94
d4-1,2-dichloroethane (Surrogate)	%	-	91	87	85	94
d8-toluene (Surrogate)	%	-	81	77	78	87
Bromofluorobenzene (Surrogate)	%	-	93	86	92	96

Totals

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20

Surrogates

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Dibromofluoromethane (Surrogate)	%	-	89	85	83	94
d4-1,2-dichloroethane (Surrogate)	%	-	91	87	85	94
d8-toluene (Surrogate)	%	-	81	77	78	87
Bromofluorobenzene (Surrogate)	%	-	93	86	92	96

VPH F Bands

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

		Sample Number	SE131890.021	SE131890.022	SE131890.023	SE131890.024
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP7 0.8-0.9	TP8 0.1-0.2	TP8 0.9-1.0	TP13 0.1-0.2
Parameter	Units	LOR				

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	**50**	<45	**120**
TRH C29-C36	mg/kg	45	<45	<45	<45	**54**
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	**180**
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210

TRH F Bands

TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	**27**
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	<25	<25	**27**
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	**160**
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.1**
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	**0.1**	<0.1	**1.1**
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.2**
Fluoranthene	mg/kg	0.1	<0.1	**0.3**	<0.1	**2.5**
Pyrene	mg/kg	0.1	<0.1	**0.3**	<0.1	**2.4**
Benzo(a)anthracene	mg/kg	0.1	<0.1	**0.2**	<0.1	**1.4**
Chrysene	mg/kg	0.1	<0.1	**0.1**	<0.1	**1.0**
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	**0.2**	<0.1	**2.1**
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.3**
Benzo(a)pyrene	mg/kg	0.1	<0.1	**0.1**	<0.1	**1.4**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	**0.2**	<0.1	**1.5**
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.2**
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.8**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	<0.2	**0.2**	<0.2	**2.1**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	**0.3**	<0.3	**2.1**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	**0.3**	<0.2	**2.1**
Total PAH	mg/kg	0.8	<0.8	**1.7**	<0.8	**15**

Surrogates

d5-nitrobenzene (Surrogate)	%	-	**114**	**116**	**114**	**110**
2-fluorobiphenyl (Surrogate)	%	-	**74**	**88**	**84**	**92**
d14-p-terphenyl (Surrogate)	%	-	**102**	**112**	**114**	**110**

Parameter	Units	LOR	SE131890.021 Soil 02 Oct 2014 TP7 0.8-0.9	SE131890.022 Soil 02 Oct 2014 TP8 0.1-0.2	SE131890.023 Soil 02 Oct 2014 TP8 0.9-1.0	SE131890.024 Soil 02 Oct 2014 TP13 0.1-0.2

Sample Number / Sample Matrix / Sample Date / Sample Name

OC Pesticides in Soil Method: AN400/AN420

Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

Parameter	Units	LOR	SE131890.021 Soil 02 Oct 2014 TP7 0.8-0.9	SE131890.022 Soil 02 Oct 2014 TP8 0.1-0.2	SE131890.023 Soil 02 Oct 2014 TP8 0.9-1.0	SE131890.024 Soil 02 Oct 2014 TP13 0.1-0.2

Sample Number / Sample Matrix / Sample Date / Sample Name

PCBs in Soil Method: AN400/AN420

Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

pH in Soil CaCl2 Extract Method: AN103

pH Soil CaCl2 Extract	pH Units	-	**4.8**	-	-	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Exchangeable Sodium, Na	mg/kg	2	**64**	-	-	-
Exchangeable Sodium, Na	meq/100g	0.01	**0.28**	-	-	-
Exchangeable Sodium Percentage*	%	0.1	**2.9**	-	-	-
Exchangeable Potassium, K	mg/kg	2	**160**	-	-	-
Exchangeable Potassium, K	meq/100g	0.01	**0.42**	-	-	-
Exchangeable Potassium Percentage*	%	0.1	**4.3**	-	-	-
Exchangeable Calcium, Ca	mg/kg	2	**1300**	-	-	-
Exchangeable Calcium, Ca	meq/100g	0.01	**6.7**	-	-	-
Exchangeable Calcium Percentage*	%	0.1	**68.7**	-	-	-
Exchangeable Magnesium, Mg	mg/kg	2	**290**	-	-	-
Exchangeable Magnesium, Mg	meq/100g	0.02	**2.3**	-	-	-
Exchangeable Magnesium Percentage*	%	0.1	**24.1**	-	-	-
Cation Exchange Capacity	meq/100g	0.02	**9.7**	-	-	-

		Sample Number	SE131890.021	SE131890.022	SE131890.023	SE131890.024
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	TP7 0.8-0.9	TP8 0.1-0.2	TP8 0.9-1.0	TP13 0.1-0.2
Parameter	**Units**	**LOR**				

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Arsenic, As	mg/kg	3	7	120	4	30
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	1.0
Chromium, Cr	mg/kg	0.3	7.7	4.6	16	9.6
Copper, Cu	mg/kg	0.5	12	37	10	66
Lead, Pb	mg/kg	1	46	72	13	400
Nickel, Ni	mg/kg	0.5	4.7	6.5	8.7	14
Zinc, Zn	mg/kg	0.5	22	42	17	330

Mercury in Soil Method: AN312

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Mercury	mg/kg	0.01	0.05	0.05	0.02	0.20

Fibre Identification in soil Method: AN602

FibreID

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials Method: AN602

FibreID

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
Asbestos Detected	No unit	-	-	-	-	-

Moisture Content Method: AN002

Parameter	Units	LOR	SE131890.021	SE131890.022	SE131890.023	SE131890.024
% Moisture	%	0.5	19	8.3	24	5.8

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.025 Soil 02 Oct 2014 TP12 0.0-0.1	SE131890.026 Soil 02 Oct 2014 TP17 0.1-0.2	SE131890.027 Soil 02 Oct 2014 TP18 1.0-0.2	SE131890.028 Soil 02 Oct 2014 Comp 1

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	-
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	-
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	-
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	-
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	-

Polycyclic VOCs

Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	-

Surrogates

Dibromofluoromethane (Surrogate)	%	-	94	85	110	-
d4-1,2-dichloroethane (Surrogate)	%	-	93	86	111	-
d8-toluene (Surrogate)	%	-	90	80	106	-
Bromofluorobenzene (Surrogate)	%	-	94	85	93	-

Totals

Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	-
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	-

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

TRH C6-C10	mg/kg	25	<25	<25	<25	-
TRH C6-C9	mg/kg	20	<20	<20	<20	-

Surrogates

Dibromofluoromethane (Surrogate)	%	-	94	85	110	-
d4-1,2-dichloroethane (Surrogate)	%	-	93	86	111	-
d8-toluene (Surrogate)	%	-	90	80	106	-
Bromofluorobenzene (Surrogate)	%	-	94	85	93	-

VPH F Bands

Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	-

Parameter	Units	LOR	SE131890.025 Soil 02 Oct 2014 TP12 0.0-0.1	SE131890.026 Soil 02 Oct 2014 TP17 0.1-0.2	SE131890.027 Soil 02 Oct 2014 TP18 1.0-0.2	SE131890.028 Soil 02 Oct 2014 Comp 1

Sample Number / Sample Matrix / Sample Date / Sample Name

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	<20	<20	<20	-
TRH C15-C28	mg/kg	45	<45	**48**	**68**	-
TRH C29-C36	mg/kg	45	<45	**60**	**100**	-
TRH C37-C40	mg/kg	100	<100	<100	<100	-
TRH C10-C36 Total	mg/kg	110	<110	<110	**170**	-
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	-

TRH F Bands

TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	-
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	<25	<25	-
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**130**	-
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	-

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	-
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	-
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	-
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	**0.1**	-
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	-
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	-
Phenanthrene	mg/kg	0.1	**0.2**	**0.4**	**1.6**	-
Anthracene	mg/kg	0.1	<0.1	<0.1	**0.2**	-
Fluoranthene	mg/kg	0.1	**0.5**	**1.1**	**3.9**	-
Pyrene	mg/kg	0.1	**0.5**	**1.0**	**4.2**	-
Benzo(a)anthracene	mg/kg	0.1	**0.2**	**0.5**	**1.8**	-
Chrysene	mg/kg	0.1	**0.2**	**0.3**	**1.2**	-
Benzo(b&j)fluoranthene	mg/kg	0.1	**0.4**	**0.7**	**3.1**	-
Benzo(k)fluoranthene	mg/kg	0.1	**0.1**	**0.2**	**0.5**	-
Benzo(a)pyrene	mg/kg	0.1	**0.3**	**0.5**	**2.3**	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.4**	**0.7**	**2.6**	-
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	**0.3**	-
Benzo(ghi)perylene	mg/kg	0.1	**0.2**	**0.4**	**1.4**	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	**0.4**	**0.7**	**3.3**	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	**0.5**	**0.8**	**3.3**	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	**0.5**	**0.8**	**3.3**	-
Total PAH	mg/kg	0.8	**3.2**	**6.0**	**23**	-

Surrogates

d5-nitrobenzene (Surrogate)	%	-	**114**	**118**	**118**	-
2-fluorobiphenyl (Surrogate)	%	-	**86**	**86**	**88**	-
d14-p-terphenyl (Surrogate)	%	-	**110**	**108**	**114**	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.025 Soil 02 Oct 2014 TP12 0.0-0.1	SE131890.026 Soil 02 Oct 2014 TP17 0.1-0.2	SE131890.027 Soil 02 Oct 2014 TP18 1.0-0.2	SE131890.028 Soil 02 Oct 2014 Comp 1

OC Pesticides in Soil Method: AN400/AN420

Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	<0.1
Alpha BHC	mg/kg	0.1	-	-	-	<0.1
Lindane	mg/kg	0.1	-	-	-	<0.1
Heptachlor	mg/kg	0.1	-	-	-	<0.1
Aldrin	mg/kg	0.1	-	-	-	<0.1
Beta BHC	mg/kg	0.1	-	-	-	<0.1
Delta BHC	mg/kg	0.1	-	-	-	<0.1
Heptachlor epoxide	mg/kg	0.1	-	-	-	<0.1
o,p'-DDE	mg/kg	0.1	-	-	-	<0.1
Alpha Endosulfan	mg/kg	0.2	-	-	-	<0.2
Gamma Chlordane	mg/kg	0.1	-	-	-	<0.1
Alpha Chlordane	mg/kg	0.1	-	-	-	<0.1
trans-Nonachlor	mg/kg	0.1	-	-	-	<0.1
p,p'-DDE	mg/kg	0.1	-	-	-	<0.1
Dieldrin	mg/kg	0.2	-	-	-	<0.2
Endrin	mg/kg	0.2	-	-	-	<0.2
o,p'-DDD	mg/kg	0.1	-	-	-	<0.1
o,p'-DDT	mg/kg	0.1	-	-	-	<0.1
Beta Endosulfan	mg/kg	0.2	-	-	-	<0.2
p,p'-DDD	mg/kg	0.1	-	-	-	<0.1
p,p'-DDT	mg/kg	0.1	-	-	-	<0.1
Endosulfan sulphate	mg/kg	0.1	-	-	-	<0.1
Endrin Aldehyde	mg/kg	0.1	-	-	-	<0.1
Methoxychlor	mg/kg	0.1	-	-	-	<0.1
Endrin Ketone	mg/kg	0.1	-	-	-	<0.1
Isodrin	mg/kg	0.1	-	-	-	<0.1
Mirex	mg/kg	0.1	-	-	-	<0.1

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	**91**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name: SE131890.025 Soil 02 Oct 2014 TP12 0.0-0.1	SE131890.026 Soil 02 Oct 2014 TP17 0.1-0.2	SE131890.027 Soil 02 Oct 2014 TP18 1.0-0.2	SE131890.028 Soil 02 Oct 2014 Comp 1

PCBs in Soil Method: AN400/AN420

Arochlor 1016	mg/kg	0.2	-	-	-	<0.2
Arochlor 1221	mg/kg	0.2	-	-	-	<0.2
Arochlor 1232	mg/kg	0.2	-	-	-	<0.2
Arochlor 1242	mg/kg	0.2	-	-	-	<0.2
Arochlor 1248	mg/kg	0.2	-	-	-	<0.2
Arochlor 1254	mg/kg	0.2	-	-	-	<0.2
Arochlor 1260	mg/kg	0.2	-	-	-	<0.2
Arochlor 1262	mg/kg	0.2	-	-	-	<0.2
Arochlor 1268	mg/kg	0.2	-	-	-	<0.2
Total PCBs (Arochlors)	mg/kg	1	-	-	-	<1

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	91

pH in Soil CaCl2 Extract Method: AN103

pH Soil CaCl2 Extract	pH Units	-	4.8	-	-	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Exchangeable Sodium, Na	mg/kg	2	19	-	-	-
Exchangeable Sodium, Na	meq/100g	0.01	0.08	-	-	-
Exchangeable Sodium Percentage*	%	0.1	0.9	-	-	-
Exchangeable Potassium, K	mg/kg	2	370	-	-	-
Exchangeable Potassium, K	meq/100g	0.01	0.94	-	-	-
Exchangeable Potassium Percentage*	%	0.1	10.6	-	-	-
Exchangeable Calcium, Ca	mg/kg	2	1100	-	-	-
Exchangeable Calcium, Ca	meq/100g	0.01	5.5	-	-	-
Exchangeable Calcium Percentage*	%	0.1	61.3	-	-	-
Exchangeable Magnesium, Mg	mg/kg	2	290	-	-	-
Exchangeable Magnesium, Mg	meq/100g	0.02	2.4	-	-	-
Exchangeable Magnesium Percentage*	%	0.1	27.2	-	-	-
Cation Exchange Capacity	meq/100g	0.02	8.9	-	-	-

Parameter	Units	LOR	SE131890.025	SE131890.026	SE131890.027	SE131890.028
Sample Matrix			Soil	Soil	Soil	Soil
Sample Date			02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
Sample Name			TP12 0.0-0.1	TP17 0.1-0.2	TP18 1.0-0.2	Comp 1

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Arsenic, As	mg/kg	3	5	4	9	-
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	0.7	-
Chromium, Cr	mg/kg	0.3	4.7	11	9.9	-
Copper, Cu	mg/kg	0.5	22	13	41	-
Lead, Pb	mg/kg	1	56	160	550	-
Nickel, Ni	mg/kg	0.5	4.8	6.6	11	-
Zinc, Zn	mg/kg	0.5	63	120	520	-

Mercury in Soil Method: AN312

Mercury	mg/kg	0.01	0.04	0.09	0.21	-

Fibre Identification in soil Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

Moisture Content Method: AN002

% Moisture	%	0.5	7.1	15	16	21

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE131890.029 Soil 02 Oct 2014 Comp 2	SE131890.030 Soil 02 Oct 2014 Comp 3	SE131890.031 Soil 02 Oct 2014 QC1	SE131890.032 Soil 02 Oct 2014 QC2

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	-	-	<0.1	<0.1
Toluene	mg/kg	0.1	-	-	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	-	-	<0.1	<0.1
m/p-xylene	mg/kg	0.2	-	-	<0.2	<0.2
o-xylene	mg/kg	0.1	-	-	<0.1	<0.1

Polycyclic VOCs

Naphthalene	mg/kg	0.1	-	-	<0.1	<0.1

Surrogates

Dibromofluoromethane (Surrogate)	%	-	-	-	**106**	**95**
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	**106**	**97**
d8-toluene (Surrogate)	%	-	-	-	**98**	**87**
Bromofluorobenzene (Surrogate)	%	-	-	-	**100**	**94**

Totals

Total Xylenes*	mg/kg	0.3	-	-	<0.3	<0.3
Total BTEX*	mg/kg	0.6	-	-	<0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

TRH C6-C10	mg/kg	25	-	-	<25	<25
TRH C6-C9	mg/kg	20	-	-	<20	<20

Surrogates

Dibromofluoromethane (Surrogate)	%	-	-	-	**106**	**95**
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	**106**	**97**
d8-toluene (Surrogate)	%	-	-	-	**98**	**87**
Bromofluorobenzene (Surrogate)	%	-	-	-	**100**	**94**

VPH F Bands

Benzene (F0)	mg/kg	0.1	-	-	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	-	-	<25	<25

		Sample Number	SE131890.029	SE131890.030	SE131890.031	SE131890.032
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	Comp 2	Comp 3	QC1	QC2
Parameter	Units	LOR				

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

TRH C10-C14	mg/kg	20	-	-	<20	<20
TRH C15-C28	mg/kg	45	-	-	<45	**73**
TRH C29-C36	mg/kg	45	-	-	**50**	**76**
TRH C37-C40	mg/kg	100	-	-	<100	<100
TRH C10-C36 Total	mg/kg	110	-	-	<110	**150**
TRH C10-C40 Total	mg/kg	210	-	-	<210	<210

TRH F Bands

TRH >C10-C16 (F2)	mg/kg	25	-	-	<25	<25
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	-	-	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	-	-	<90	**130**
TRH >C34-C40 (F4)	mg/kg	120	-	-	<120	<120

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Naphthalene	mg/kg	0.1	-	-	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	-	-	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	-	-	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	-	-	<0.1	**0.1**
Acenaphthene	mg/kg	0.1	-	-	<0.1	<0.1
Fluorene	mg/kg	0.1	-	-	<0.1	<0.1
Phenanthrene	mg/kg	0.1	-	-	<0.1	**1.0**
Anthracene	mg/kg	0.1	-	-	<0.1	**0.2**
Fluoranthene	mg/kg	0.1	-	-	**0.1**	**3.1**
Pyrene	mg/kg	0.1	-	-	**0.1**	**3.6**
Benzo(a)anthracene	mg/kg	0.1	-	-	<0.1	**1.6**
Chrysene	mg/kg	0.1	-	-	<0.1	**1.1**
Benzo(b&j)fluoranthene	mg/kg	0.1	-	-	<0.1	**2.6**
Benzo(k)fluoranthene	mg/kg	0.1	-	-	<0.1	**0.4**
Benzo(a)pyrene	mg/kg	0.1	-	-	<0.1	**2.0**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	-	-	<0.1	**2.3**
Dibenzo(a&h)anthracene	mg/kg	0.1	-	-	<0.1	**0.2**
Benzo(ghi)perylene	mg/kg	0.1	-	-	<0.1	**1.3**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	-	-	<0.2	**2.9**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	-	-	<0.3	**2.9**
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	-	-	<0.2	**2.9**
Total PAH	mg/kg	0.8	-	-	<0.8	**20**

Surrogates

d5-nitrobenzene (Surrogate)	%	-	-	-	**120**	**116**
2-fluorobiphenyl (Surrogate)	%	-	-	-	**84**	**86**
d14-p-terphenyl (Surrogate)	%	-	-	-	**104**	**106**

		Sample Number Sample Matrix Sample Date Sample Name	SE131890.029 Soil 02 Oct 2014 Comp 2	SE131890.030 Soil 02 Oct 2014 Comp 3	SE131890.031 Soil 02 Oct 2014 QC1	SE131890.032 Soil 02 Oct 2014 QC2
Parameter	**Units**	**LOR**				

OC Pesticides in Soil Method: AN400/AN420

Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
Lindane	mg/kg	0.1	<0.1	<0.1	-	-
Heptachlor	mg/kg	0.1	<0.1	<0.1	-	-
Aldrin	mg/kg	0.1	<0.1	<0.1	-	-
Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
Delta BHC	mg/kg	0.1	<0.1	<0.1	-	-
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
Dieldrin	mg/kg	0.2	<0.2	<0.2	-	-
Endrin	mg/kg	0.2	<0.2	<0.2	-	-
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
Isodrin	mg/kg	0.1	<0.1	<0.1	-	-
Mirex	mg/kg	0.1	<0.1	<0.1	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	87	82	-	-

Parameter	Units	LOR	Sample Number: SE131890.029 Sample Matrix: Soil Sample Date: 02 Oct 2014 Sample Name: Comp 2	SE131890.030 Soil 02 Oct 2014 Comp 3	SE131890.031 Soil 02 Oct 2014 QC1	SE131890.032 Soil 02 Oct 2014 QC2

PCBs in Soil Method: AN400/AN420

Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**87**	**82**	-	-

pH in Soil CaCl2 Extract Method: AN103

pH Soil CaCl2 Extract	pH Units	-	-	-	-	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Exchangeable Sodium, Na	mg/kg	2	-	-	-	-
Exchangeable Sodium, Na	meq/100g	0.01	-	-	-	-
Exchangeable Sodium Percentage*	%	0.1	-	-	-	-
Exchangeable Potassium, K	mg/kg	2	-	-	-	-
Exchangeable Potassium, K	meq/100g	0.01	-	-	-	-
Exchangeable Potassium Percentage*	%	0.1	-	-	-	-
Exchangeable Calcium, Ca	mg/kg	2	-	-	-	-
Exchangeable Calcium, Ca	meq/100g	0.01	-	-	-	-
Exchangeable Calcium Percentage*	%	0.1	-	-	-	-
Exchangeable Magnesium, Mg	mg/kg	2	-	-	-	-
Exchangeable Magnesium, Mg	meq/100g	0.02	-	-	-	-
Exchangeable Magnesium Percentage*	%	0.1	-	-	-	-
Cation Exchange Capacity	meq/100g	0.02	-	-	-	-

Parameter	Units	LOR	SE131890.029 Soil 02 Oct 2014 Comp 2	SE131890.030 Soil 02 Oct 2014 Comp 3	SE131890.031 Soil 02 Oct 2014 QC1	SE131890.032 Soil 02 Oct 2014 QC2

Sample Number / Sample Matrix / Sample Date / Sample Name

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Arsenic, As	mg/kg	3	-	-	80	6
Cadmium, Cd	mg/kg	0.3	-	-	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	-	-	4.3	15
Copper, Cu	mg/kg	0.5	-	-	42	24
Lead, Pb	mg/kg	1	-	-	99	48
Nickel, Ni	mg/kg	0.5	-	-	27	11
Zinc, Zn	mg/kg	0.5	-	-	86	76

Mercury in Soil Method: AN312

Mercury	mg/kg	0.01	-	-	0.32	0.06

Fibre Identification in soil Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

Moisture Content Method: AN002

% Moisture	%	0.5	11	18	7.5	16

		Sample Number	SE131890.033	SE131890.034	SE131890.035	SE131890.036
		Sample Matrix	Soil	Material	Material	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	QC3	TP10 0.1-0.2	TP9 0.1-0.2	Trip Spike
Parameter	Units	LOR				

VOC's in Soil Method: AN433/AN434

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	<0.1	-	-	[81%]
Toluene	mg/kg	0.1	<0.1	-	-	[93%]
Ethylbenzene	mg/kg	0.1	<0.1	-	-	[89%]
m/p-xylene	mg/kg	0.2	<0.2	-	-	[82%]
o-xylene	mg/kg	0.1	<0.1	-	-	[82%]

Polycyclic VOCs

Naphthalene	mg/kg	0.1	<0.1	-	-	<0.1

Surrogates

Dibromofluoromethane (Surrogate)	%	-	**94**	-	-	**88**
d4-1,2-dichloroethane (Surrogate)	%	-	**93**	-	-	**88**
d8-toluene (Surrogate)	%	-	**83**	-	-	**88**
Bromofluorobenzene (Surrogate)	%	-	**90**	-	-	**117**

Totals

Total Xylenes*	mg/kg	0.3	<0.3	-	-	-
Total BTEX*	mg/kg	0.6	<0.6	-	-	-

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434/AN410

TRH C6-C10	mg/kg	25	<25	-	-	-
TRH C6-C9	mg/kg	20	<20	-	-	-

Surrogates

Dibromofluoromethane (Surrogate)	%	-	**94**	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	**93**	-	-	-
d8-toluene (Surrogate)	%	-	**83**	-	-	-
Bromofluorobenzene (Surrogate)	%	-	**90**	-	-	-

VPH F Bands

Benzene (F0)	mg/kg	0.1	<0.1	-	-	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	-	-	-

Parameter	Units	LOR	SE131890.033 Soil 02 Oct 2014 QC3	SE131890.034 Material 02 Oct 2014 TP10 0.1-0.2	SE131890.035 Material 02 Oct 2014 TP9 0.1-0.2	SE131890.036 Soil 02 Oct 2014 Trip Spike
Sample Number			SE131890.033	SE131890.034	SE131890.035	SE131890.036
Sample Matrix			Soil	Material	Material	Soil
Sample Date			02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
Sample Name			QC3	TP10 0.1-0.2	TP9 0.1-0.2	Trip Spike

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
TRH C10-C14	mg/kg	20	<20	-	-	-
TRH C15-C28	mg/kg	45	<45	-	-	-
TRH C29-C36	mg/kg	45	<45	-	-	-
TRH C37-C40	mg/kg	100	<100	-	-	-
TRH C10-C36 Total	mg/kg	110	<110	-	-	-
TRH C10-C40 Total	mg/kg	210	<210	-	-	-

TRH F Bands

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
TRH >C10-C16 (F2)	mg/kg	25	<25	-	-	-
TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	-	-	-
TRH >C16-C34 (F3)	mg/kg	90	<90	-	-	-
TRH >C34-C40 (F4)	mg/kg	120	<120	-	-	-

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
Naphthalene	mg/kg	0.1	<0.1	-	-	-
2-methylnaphthalene	mg/kg	0.1	<0.1	-	-	-
1-methylnaphthalene	mg/kg	0.1	<0.1	-	-	-
Acenaphthylene	mg/kg	0.1	<0.1	-	-	-
Acenaphthene	mg/kg	0.1	<0.1	-	-	-
Fluorene	mg/kg	0.1	<0.1	-	-	-
Phenanthrene	mg/kg	0.1	<0.1	-	-	-
Anthracene	mg/kg	0.1	<0.1	-	-	-
Fluoranthene	mg/kg	0.1	<0.1	-	-	-
Pyrene	mg/kg	0.1	<0.1	-	-	-
Benzo(a)anthracene	mg/kg	0.1	<0.1	-	-	-
Chrysene	mg/kg	0.1	<0.1	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.1	**0.1**	-	-	-
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	-	-
Benzo(a)pyrene	mg/kg	0.1	<0.1	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.2**	-	-	-
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	-	-	-
Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	-	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	TEQ	0.2	<0.2	-	-	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	-	-	-
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	-	-	-
Total PAH	mg/kg	0.8	<0.8	-	-	-

Surrogates

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
d5-nitrobenzene (Surrogate)	%	-	**120**	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	**86**	-	-	-
d14-p-terphenyl (Surrogate)	%	-	**112**	-	-	-

		Sample Number	SE131890.033	SE131890.034	SE131890.035	SE131890.036
		Sample Matrix	Soil	Material	Material	Soil
		Sample Date	02 Oct 2014	02 Oct 2014	02 Oct 2014	02 Oct 2014
		Sample Name	QC3	TP10 0.1-0.2	TP9 0.1-0.2	Trip Spike
Parameter	**Units**	**LOR**				

OC Pesticides in Soil Method: AN400/AN420

Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-
Isodrin	mg/kg	0.1	-	-	-	-
Mirex	mg/kg	0.1	-	-	-	-

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

Parameter	Units	LOR	SE131890.033 Soil 02 Oct 2014 QC3	SE131890.034 Material 02 Oct 2014 TP10 0.1-0.2	SE131890.035 Material 02 Oct 2014 TP9 0.1-0.2	SE131890.036 Soil 02 Oct 2014 Trip Spike

Sample Number / Sample Matrix / Sample Date / Sample Name

PCBs in Soil Method: AN400/AN420

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
Arochlor 1016	mg/kg	0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-

Surrogates

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-

pH in Soil CaCl2 Extract Method: AN103

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
pH Soil CaCl2 Extract	pH Units	-	-	-	-	-

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122

Parameter	Units	LOR	SE131890.033	SE131890.034	SE131890.035	SE131890.036
Exchangeable Sodium, Na	mg/kg	2	-	-	-	-
Exchangeable Sodium, Na	meq/100g	0.01	-	-	-	-
Exchangeable Sodium Percentage*	%	0.1	-	-	-	-
Exchangeable Potassium, K	mg/kg	2	-	-	-	-
Exchangeable Potassium, K	meq/100g	0.01	-	-	-	-
Exchangeable Potassium Percentage*	%	0.1	-	-	-	-
Exchangeable Calcium, Ca	mg/kg	2	-	-	-	-
Exchangeable Calcium, Ca	meq/100g	0.01	-	-	-	-
Exchangeable Calcium Percentage*	%	0.1	-	-	-	-
Exchangeable Magnesium, Mg	mg/kg	2	-	-	-	-
Exchangeable Magnesium, Mg	meq/100g	0.02	-	-	-	-
Exchangeable Magnesium Percentage*	%	0.1	-	-	-	-
Cation Exchange Capacity	meq/100g	0.02	-	-	-	-

		Sample Number Sample Matrix Sample Date Sample Name	SE131890.033 Soil 02 Oct 2014 QC3	SE131890.034 Material 02 Oct 2014 TP10 0.1-0.2	SE131890.035 Material 02 Oct 2014 TP9 0.1-0.2	SE131890.036 Soil 02 Oct 2014 Trip Spike
Parameter	**Units**	**LOR**				

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest   Method: AN040/AN320

Arsenic, As	mg/kg	3	**4**	-	-	-
Cadmium, Cd	mg/kg	0.3	<0.3	-	-	-
Chromium, Cr	mg/kg	0.3	**13**	-	-	-
Copper, Cu	mg/kg	0.5	**14**	-	-	-
Lead, Pb	mg/kg	1	**49**	-	-	-
Nickel, Ni	mg/kg	0.5	**8.4**	-	-	-
Zinc, Zn	mg/kg	0.5	**21**	-	-	-

Mercury in Soil   Method: AN312

Mercury	mg/kg	0.01	**0.06**	-	-	-

Fibre Identification in soil   Method: AN602

FibreID

Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Estimated Fibres	%w/w	0.01	-	-	-	-

Fibre ID in bulk materials   Method: AN602

FibreID

Asbestos Detected	No unit	-	-	Yes	Yes	-

Moisture Content   Method: AN002

% Moisture	%	0.5	**24**	-	-	-

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) **Method: ME-(AU)-[ENV]AN122**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Exchangeable Sodium, Na	LB065251	mg/kg	2		116%
Exchangeable Sodium, Na	LB065251	meq/100g	0.01	<0.01	NA
Exchangeable Sodium Percentage*	LB065251	%	0.1	32.9	NA
Exchangeable Potassium, K	LB065251	mg/kg	2		105%
Exchangeable Potassium, K	LB065251	meq/100g	0.01	<0.01	NA
Exchangeable Potassium Percentage*	LB065251	%	0.1	<0.1	NA
Exchangeable Calcium, Ca	LB065251	mg/kg	2		104%
Exchangeable Calcium, Ca	LB065251	meq/100g	0.01	<0.01	NA
Exchangeable Calcium Percentage*	LB065251	%	0.1	<0.1	NA
Exchangeable Magnesium, Mg	LB065251	mg/kg	2		100%
Exchangeable Magnesium, Mg	LB065251	meq/100g	0.02	<0.02	NA
Exchangeable Magnesium Percentage*	LB065251	%	0.1	176.8	NA
Cation Exchange Capacity	LB065251	meq/100g	0.02	<0.02	NA

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB065258	mg/kg	0.01	<0.01	0 - 7%	99%	84%
	LB065336	mg/kg	0.01	<0.01	0 - 8%	100%	85%

Moisture Content **Method: ME-(AU)-[ENV]AN002**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB065080	%	0.5	0 - 7%

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN400/AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Hexachlorobenzene (HCB)	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Alpha BHC	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Lindane	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Heptachlor	LB065060	mg/kg	0.1	<0.1		97%
	LB065061	mg/kg	0.1	<0.1	0%	78%
Aldrin	LB065060	mg/kg	0.1	<0.1		102%
	LB065061	mg/kg	0.1	<0.1	0%	77%
Beta BHC	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Delta BHC	LB065060	mg/kg	0.1	<0.1		93%
	LB065061	mg/kg	0.1	<0.1	0%	75%
Heptachlor epoxide	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
o,p'-DDE	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Alpha Endosulfan	LB065060	mg/kg	0.2	<0.2		NA
	LB065061	mg/kg	0.2	<0.2	0%	NA
Gamma Chlordane	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Alpha Chlordane	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
trans-Nonachlor	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
p,p'-DDE	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Dieldrin	LB065060	mg/kg	0.2	<0.2		97%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN400/AN420 (continued)**

				MB	DUP %RPD	LCS %Recovery
Dieldrin	LB065061	mg/kg	0.2	<0.2	0%	75%
Endrin	LB065060	mg/kg	0.2	<0.2		103%
	LB065061	mg/kg	0.2	<0.2	0%	77%
o,p'-DDD	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
o,p'-DDT	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Beta Endosulfan	LB065060	mg/kg	0.2	<0.2		NA
	LB065061	mg/kg	0.2	<0.2	0%	NA
p,p'-DDD	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
p,p'-DDT	LB065060	mg/kg	0.1	<0.1		78%
	LB065061	mg/kg	0.1	<0.1	0%	77%
Endosulfan sulphate	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Endrin Aldehyde	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Methoxychlor	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Endrin Ketone	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Isodrin	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA
Mirex	LB065060	mg/kg	0.1	<0.1		NA
	LB065061	mg/kg	0.1	<0.1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB065060	%	-	87%		100%
	LB065061	%	-	84%	3%	87%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil   Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Naphthalene	LB065060	mg/kg	0.1	<0.1	0 - 10%	92%	106%	0%
	LB065061	mg/kg	0.1	<0.1	0%	108%	107%	2%
2-methylnaphthalene	LB065060	mg/kg	0.1	<0.1	0 - 24%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	0%	NA	NA	NA
1-methylnaphthalene	LB065060	mg/kg	0.1	<0.1	14 - 38%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	0%	NA	NA	NA
Acenaphthylene	LB065060	mg/kg	0.1	<0.1	0 - 22%	96%	95%	6%
	LB065061	mg/kg	0.1	<0.1	8%	97%	101%	2%
Acenaphthene	LB065060	mg/kg	0.1	<0.1	0 - 31%	98%	94%	6%
	LB065061	mg/kg	0.1	<0.1	0%	96%	99%	2%
Fluorene	LB065060	mg/kg	0.1	<0.1	0 - 26%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	0%	NA	NA	NA
Phenanthrene	LB065060	mg/kg	0.1	<0.1	28 - 36%	102%	97%	3%
	LB065061	mg/kg	0.1	<0.1	4%	103%	102%	2%
Anthracene	LB065060	mg/kg	0.1	<0.1	11 - 33%	99%	109%	6%
	LB065061	mg/kg	0.1	<0.1	5%	99%	102%	1%
Fluoranthene	LB065060	mg/kg	0.1	<0.1	24 - 25%	106%	106%	26%
	LB065061	mg/kg	0.1	<0.1	3%	104%	102%	1%
Pyrene	LB065060	mg/kg	0.1	<0.1	18 - 21%	101%	95%	27%
	LB065061	mg/kg	0.1	<0.1	11%	105%	98%	4%
Benzo(a)anthracene	LB065060	mg/kg	0.1	<0.1	23 - 32%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	1%	NA	NA	NA
Chrysene	LB065060	mg/kg	0.1	<0.1	15 - 24%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	15%	NA	NA	NA
Benzo(b&j)fluoranthene	LB065060	mg/kg	0.1	<0.1	8 - 24%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	4%	NA	NA	NA
Benzo(k)fluoranthene	LB065060	mg/kg	0.1	<0.1	15 - 76%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	8%	NA	NA	NA
Benzo(a)pyrene	LB065060	mg/kg	0.1	<0.1	19 - 27%	97%	94%	3%
	LB065061	mg/kg	0.1	<0.1	7%	124%	106%	6%
Indeno(1,2,3-cd)pyrene	LB065060	mg/kg	0.1	<0.1	21 - 22%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	5%	NA	NA	NA
Dibenzo(a&h)anthracene	LB065060	mg/kg	0.1	<0.1	22 - 36%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	9%	NA	NA	NA
Benzo(ghi)perylene	LB065060	mg/kg	0.1	<0.1	21 - 22%	NA	NA	NA
	LB065061	mg/kg	0.1	<0.1	7%	NA	NA	NA
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=0*	LB065060	TEQ	0.2	<0.2	20 - 26%	NA	NA	NA
	LB065061	TEQ	0.2	<0.2	6%	NA	NA	NA
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR*	LB065060	TEQ (mg/kg)	0.3	<0.3	20 - 26%	NA	NA	NA
	LB065061	TEQ (mg/kg)	0.3	<0.3	6%	NA	NA	NA
Carcinogenic PAHs (as BaP TEQ)-assume results <LOR=LOR/2*	LB065060	TEQ (mg/kg)	0.2	<0.2	20 - 26%	NA	NA	NA
	LB065061	TEQ (mg/kg)	0.2	<0.2	6%	NA	NA	NA
Total PAH	LB065060	mg/kg	0.8	<0.8	22 - 24%	NA	NA	NA
	LB065061	mg/kg	0.8	<0.8	6%	NA	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
d5-nitrobenzene (Surrogate)	LB065060	%	-	96%	7 - 9%	84%	116%	2%
	LB065061	%	-	104%	5%	110%	118%	7%
2-fluorobiphenyl (Surrogate)	LB065060	%	-	98%	5 - 7%	88%	90%	2%
	LB065061	%	-	78%	2%	82%	88%	12%
d14-p-terphenyl (Surrogate)	LB065060	%	-	110%	2 - 6%	104%	108%	2%
	LB065061	%	-	98%	2%	100%	108%	12%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Arochlor 1016	LB065061	mg/kg	0.2	<0.2	0%	NA
Arochlor 1221	LB065061	mg/kg	0.2	<0.2	0%	NA
Arochlor 1232	LB065061	mg/kg	0.2	<0.2	0%	NA
Arochlor 1242	LB065061	mg/kg	0.2	<0.2	0%	NA
Arochlor 1248	LB065061	mg/kg	0.2	<0.2	0%	NA
Arochlor 1254	LB065061	mg/kg	0.2	<0.2	0%	NA
Arochlor 1260	LB065061	mg/kg	0.2	<0.2	0%	80%
Arochlor 1262	LB065061	mg/kg	0.2	<0.2	0%	NA
Arochlor 1268	LB065061	mg/kg	0.2	<0.2	0%	NA
Total PCBs (Arochlors)	LB065061	mg/kg	1	<1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB065061	%	-	84%	3%	83%

pH in Soil CaCl2 Extract Method: ME-(AU)-[ENV]AN103

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery
pH Soil CaCl2 Extract	LB065212	pH Units	-	4%	NA

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB065256	mg/kg	3	<3	2 - 28%	97%	98%
	LB065335	mg/kg	3	<3	2 - 14%	99%	96%
Cadmium, Cd	LB065256	mg/kg	0.3	<0.3	0 - 1%	99%	102%
	LB065335	mg/kg	0.3	<0.3	0%	100%	95%
Chromium, Cr	LB065256	mg/kg	0.3	<0.3	0 - 24%	101%	106%
	LB065335	mg/kg	0.3	<0.3	1 - 2%	99%	96%
Copper, Cu	LB065256	mg/kg	0.5	<0.5	0 - 3%	96%	94%
	LB065335	mg/kg	0.5	<0.5	3%	100%	91%
Lead, Pb	LB065256	mg/kg	1	<1	1 - 7%	99%	105%
	LB065335	mg/kg	1	<1	2 - 4%	101%	140%
Nickel, Ni	LB065256	mg/kg	0.5	<0.5	3 - 6%	99%	110%
	LB065335	mg/kg	0.5	<0.5	2 - 12%	100%	94%
Zinc, Zn	LB065256	mg/kg	0.5	<0.5	2%	99%	97%
	LB065335	mg/kg	0.5	<0.5	5%	102%	96%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

TRH (Total Recoverable Hydrocarbons) in Soil **Method: ME-(AU)-[ENV]AN403**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH C10-C14	LB065060	mg/kg	20	<20	0%	78%	90%	3%
	LB065061	mg/kg	20	<20	0%	90%		NA
TRH C15-C28	LB065060	mg/kg	45	<45	10 - 23%	85%	95%	3%
	LB065061	mg/kg	45	<45	9%	93%		NA
TRH C29-C36	LB065060	mg/kg	45	<45	9 - 10%	78%	78%	3%
	LB065061	mg/kg	45	<45	14%	80%		NA
TRH C37-C40	LB065060	mg/kg	100	<100	0%	NA	NA	NA
	LB065061	mg/kg	100	<100	0%	NA		NA
TRH C10-C36 Total	LB065060	mg/kg	110	<110	10 - 21%	NA	NA	NA
	LB065061	mg/kg	110	<110	11%	NA		NA
TRH C10-C40 Total	LB065060	mg/kg	210	<210	0 - 10%	NA	NA	NA
	LB065061	mg/kg	210	<210	0%	NA		NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
TRH >C10-C16 (F2)	LB065060	mg/kg	25	<25	0%	80%	90%	3%
	LB065061	mg/kg	25	<25	0%	90%		NA
TRH >C10-C16 (F2) minus Naphthalene	LB065060	mg/kg	25	<25	0%	NA	NA	NA
	LB065061	mg/kg	25	<25	0%	NA		NA
TRH >C16-C34 (F3)	LB065060	mg/kg	90	<90	10 - 23%	85%	93%	0%
	LB065061	mg/kg	90	<90	11%	93%		NA
TRH >C34-C40 (F4)	LB065060	mg/kg	120	<120	0%	80%	NA	NA
	LB065061	mg/kg	120	<120	0%	75%		NA

VOC's in Soil **Method: ME-(AU)-[ENV]AN433/AN434**

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB065057	mg/kg	0.1	<0.1	0%	77%	81%
	LB065058	mg/kg	0.1	<0.1	0%	73%	77%
Toluene	LB065057	mg/kg	0.1	<0.1	0%	76%	79%
	LB065058	mg/kg	0.1	<0.1	0%	79%	76%
Ethylbenzene	LB065057	mg/kg	0.1	<0.1	0%	80%	77%
	LB065058	mg/kg	0.1	<0.1	0%	81%	74%
m/p-xylene	LB065057	mg/kg	0.2	<0.2	0%	87%	74%
	LB065058	mg/kg	0.2	<0.2	0%	80%	76%
o-xylene	LB065057	mg/kg	0.1	<0.1	0%	86%	74%
	LB065058	mg/kg	0.1	<0.1	0%	78%	76%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB065057	mg/kg	0.1	<0.1	0%	NA	NA
	LB065058	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB065057	%	-	95%	4 - 12%	107%	113%
	LB065058	%	-	96%	13%	95%	107%
d4-1,2-dichloroethane (Surrogate)	LB065057	%	-	96%	4 - 12%	106%	112%
	LB065058	%	-	97%	11%	94%	109%
d8-toluene (Surrogate)	LB065057	%	-	92%	6 - 14%	106%	113%
	LB065058	%	-	91%	10%	93%	102%
Bromofluorobenzene (Surrogate)	LB065057	%	-	94%	8 - 14%	119%	98%
	LB065058	%	-	93%	5%	107%	102%

Totals

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOC's in Soil Method: ME-(AU)-[ENV]AN433/AN434 (continued)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes*	LB065057	mg/kg	0.3	<0.3	0%	NA	NA
	LB065058	mg/kg	0.3	<0.3	0%	NA	NA
Total BTEX*	LB065057	mg/kg	0.6	<0.6	0%	NA	NA
	LB065058	mg/kg	0.6	<0.6	0%	NA	NA

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB065057	mg/kg	25	<25	0%	91%	93%
	LB065058	mg/kg	25	<25	0%	92%	93%
TRH C6-C9	LB065057	mg/kg	20	<20	0%	86%	93%
	LB065058	mg/kg	20	<20	0%	87%	89%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB065057	%	-	95%	4 - 12%	107%	113%
	LB065058	%	-	96%	13%	95%	107%
d4-1,2-dichloroethane (Surrogate)	LB065057	%	-	96%	4 - 12%	106%	112%
	LB065058	%	-	97%	11%	94%	109%
d8-toluene (Surrogate)	LB065057	%	-	92%	6 - 14%	106%	113%
	LB065058	%	-	91%	10%	93%	102%
Bromofluorobenzene (Surrogate)	LB065057	%	-	94%	8 - 14%	119%	98%
	LB065058	%	-	93%	5%	107%	102%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB065057	mg/kg	0.1	<0.1	0%	NA	NA
	LB065058	mg/kg	0.1	<0.1	0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB065057	mg/kg	25	<25	0%	112%	133%
	LB065058	mg/kg	25	<25	0%	125%	135%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
AN103	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pretreated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is refernced to Rayment and Higginson, 1992, sections 15D3 and 15N1.-
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN433/AN434/AN410	VOCs and C6-C9/C6-C10 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	This analysis is not covered by the scope of accreditation.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.	NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE131890 R0

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	(Not specified)
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME4079**
Order Number	**JME4079**
Samples	36

LABORATORY DETAILS

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SGS Reference	SE131890 R0
Report Number	0000092981
Date Reported	13 Oct 2014

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Duplicate	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	6 items
LCS	OC Pesticides in Soil	1 item
Matrix Spike	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item

SAMPLE SUMMARY

Sample counts by matrix	33 Soils, 3 Materials	Type of documentation received	COC
Date documentation received	3/10/2014	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	4.0°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065251	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	13 Oct 2014

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP2 0.0-0.1	SE131890.004	LB065231	02 Oct 2014	03 Oct 2014	02 Oct 2015	09 Oct 2014	02 Oct 2015	13 Oct 2014

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065258	02 Oct 2014	03 Oct 2014	30 Oct 2014	09 Oct 2014	30 Oct 2014	10 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
QC1	SE131890.031	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
QC2	SE131890.032	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014
QC3	SE131890.033	LB065336	02 Oct 2014	03 Oct 2014	30 Oct 2014	13 Oct 2014	30 Oct 2014	13 Oct 2014

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP3 0.1-0.2	SE131890.006	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	09 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Moisture Content (continued)

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP10 0.1-0.2	SE131890.015	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
Comp 1	SE131890.028	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
Comp 2	SE131890.029	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
Comp 3	SE131890.030	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
QC1	SE131890.031	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
QC2	SE131890.032	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014
QC3	SE131890.033	LB065080	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	12 Oct 2014	08 Oct 2014

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Comp 1	SE131890.028	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Comp 2	SE131890.029	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Comp 3	SE131890.030	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC1	SE131890.031	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC2	SE131890.032	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC3	SE131890.033	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP5 0.1-0.2	SE131890.008	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Comp 1	SE131890.028	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
Comp 2	SE131890.029	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
Comp 3	SE131890.030	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
QC1	SE131890.031	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC2	SE131890.032	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC3	SE131890.033	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Comp 1	SE131890.028	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Comp 2	SE131890.029	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Comp 3	SE131890.030	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC1	SE131890.031	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC2	SE131890.032	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC3	SE131890.033	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

pH in Soil CaCl2 Extract

Method: ME-(AU)-[ENV]AN103

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065212	02 Oct 2014	03 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014	09 Oct 2014

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065256	02 Oct 2014	03 Oct 2014	31 Mar 2015	09 Oct 2014	31 Mar 2015	13 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
QC1	SE131890.031	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
QC2	SE131890.032	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014
QC3	SE131890.033	LB065335	02 Oct 2014	03 Oct 2014	31 Mar 2015	13 Oct 2014	31 Mar 2015	13 Oct 2014

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065060	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP7 0.8-0.9	SE131890.021	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
Comp 1	SE131890.028	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
Comp 2	SE131890.029	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
Comp 3	SE131890.030	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
QC1	SE131890.031	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
QC2	SE131890.032	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014
QC3	SE131890.033	LB065061	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	13 Oct 2014

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP14 0.1-0.2	SE131890.016	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC1	SE131890.031	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC2	SE131890.032	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC3	SE131890.033	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Trip Spike	SE131890.036	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP1 0.0-0.1	SE131890.001	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP1 1.3-1.4	SE131890.002	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 0.0-0.1	SE131890.004	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP2 1.1-1.2	SE131890.005	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP4 0.1-0.2	SE131890.007	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 0.1-0.2	SE131890.008	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP5 1.3-1.4	SE131890.009	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP16 0.1-0.2	SE131890.010	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 0.2-0.3	SE131890.011	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP11 1.2-1.3	SE131890.012	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.1-0.2	SE131890.013	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP15 0.4-0.5	SE131890.014	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP10 0.1-0.2	SE131890.015	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP14 0.1-0.2	SE131890.016	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.1-0.2	SE131890.017	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP9 0.7-0.8	SE131890.018	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP6 0.0-0.1	SE131890.019	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.0-0.1	SE131890.020	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP7 0.8-0.9	SE131890.021	LB065057	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.1-0.2	SE131890.022	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP8 0.9-1.0	SE131890.023	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP13 0.1-0.2	SE131890.024	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP12 0.0-0.1	SE131890.025	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP17 0.1-0.2	SE131890.026	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
TP18 1.0-0.2	SE131890.027	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC1	SE131890.031	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC2	SE131890.032	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
QC3	SE131890.033	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014
Trip Spike	SE131890.036	LB065058	02 Oct 2014	03 Oct 2014	16 Oct 2014	07 Oct 2014	16 Nov 2014	10 Oct 2014

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	Comp 1	SE131890.028	%	60 - 130%	91
	Comp 2	SE131890.029	%	60 - 130%	87
	Comp 3	SE131890.030	%	60 - 130%	82

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	TP1 0.0-0.1	SE131890.001	%	70 - 130%	90
	TP1 1.3-1.4	SE131890.002	%	70 - 130%	80
	TP2 0.0-0.1	SE131890.004	%	70 - 130%	92
	TP2 1.1-1.2	SE131890.005	%	70 - 130%	82
	TP4 0.1-0.2	SE131890.007	%	70 - 130%	92
	TP5 0.1-0.2	SE131890.008	%	70 - 130%	90
	TP5 1.3-1.4	SE131890.009	%	70 - 130%	86
	TP16 0.1-0.2	SE131890.010	%	70 - 130%	86
	TP11 0.2-0.3	SE131890.011	%	70 - 130%	90
	TP11 1.2-1.3	SE131890.012	%	70 - 130%	82
	TP15 0.1-0.2	SE131890.013	%	70 - 130%	92
	TP15 0.4-0.5	SE131890.014	%	70 - 130%	82
	TP10 0.1-0.2	SE131890.015	%	70 - 130%	88
	TP14 0.1-0.2	SE131890.016	%	70 - 130%	88
	TP9 0.1-0.2	SE131890.017	%	70 - 130%	96
	TP9 0.7-0.8	SE131890.018	%	70 - 130%	90
	TP6 0.0-0.1	SE131890.019	%	70 - 130%	84
	TP7 0.0-0.1	SE131890.020	%	70 - 130%	84
	TP7 0.8-0.9	SE131890.021	%	70 - 130%	74
	TP8 0.1-0.2	SE131890.022	%	70 - 130%	88
	TP8 0.9-1.0	SE131890.023	%	70 - 130%	84
	TP13 0.1-0.2	SE131890.024	%	70 - 130%	92
	TP12 0.0-0.1	SE131890.025	%	70 - 130%	86
	TP17 0.1-0.2	SE131890.026	%	70 - 130%	86
	TP18 1.0-0.2	SE131890.027	%	70 - 130%	88
	QC1	SE131890.031	%	70 - 130%	84
	QC2	SE131890.032	%	70 - 130%	86
	QC3	SE131890.033	%	70 - 130%	86
d14-p-terphenyl (Surrogate)	TP1 0.0-0.1	SE131890.001	%	70 - 130%	100
	TP1 1.3-1.4	SE131890.002	%	70 - 130%	108
	TP2 0.0-0.1	SE131890.004	%	70 - 130%	106
	TP2 1.1-1.2	SE131890.005	%	70 - 130%	110
	TP4 0.1-0.2	SE131890.007	%	70 - 130%	108
	TP5 0.1-0.2	SE131890.008	%	70 - 130%	112
	TP5 1.3-1.4	SE131890.009	%	70 - 130%	114
	TP16 0.1-0.2	SE131890.010	%	70 - 130%	114
	TP11 0.2-0.3	SE131890.011	%	70 - 130%	110
	TP11 1.2-1.3	SE131890.012	%	70 - 130%	106
	TP15 0.1-0.2	SE131890.013	%	70 - 130%	114
	TP15 0.4-0.5	SE131890.014	%	70 - 130%	114
	TP10 0.1-0.2	SE131890.015	%	70 - 130%	108
	TP14 0.1-0.2	SE131890.016	%	70 - 130%	110
	TP9 0.1-0.2	SE131890.017	%	70 - 130%	116
	TP9 0.7-0.8	SE131890.018	%	70 - 130%	110
	TP6 0.0-0.1	SE131890.019	%	70 - 130%	106
	TP7 0.0-0.1	SE131890.020	%	70 - 130%	100
	TP7 0.8-0.9	SE131890.021	%	70 - 130%	102
	TP8 0.1-0.2	SE131890.022	%	70 - 130%	112
	TP8 0.9-1.0	SE131890.023	%	70 - 130%	114
	TP13 0.1-0.2	SE131890.024	%	70 - 130%	110
	TP12 0.0-0.1	SE131890.025	%	70 - 130%	110
	TP17 0.1-0.2	SE131890.026	%	70 - 130%	108
	TP18 1.0-0.2	SE131890.027	%	70 - 130%	114
	QC1	SE131890.031	%	70 - 130%	104
	QC2	SE131890.032	%	70 - 130%	106

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d14-p-terphenyl (Surrogate)	QC3	SE131890.033	%	70 - 130%	112
d5-nitrobenzene (Surrogate)	TP1 0.0-0.1	SE131890.001	%	70 - 130%	94
	TP1 1.3-1.4	SE131890.002	%	70 - 130%	100
	TP2 0.0-0.1	SE131890.004	%	70 - 130%	108
	TP2 1.1-1.2	SE131890.005	%	70 - 130%	116
	TP4 0.1-0.2	SE131890.007	%	70 - 130%	110
	TP5 0.1-0.2	SE131890.008	%	70 - 130%	112
	TP5 1.3-1.4	SE131890.009	%	70 - 130%	118
	TP16 0.1-0.2	SE131890.010	%	70 - 130%	124
	TP11 0.2-0.3	SE131890.011	%	70 - 130%	116
	TP11 1.2-1.3	SE131890.012	%	70 - 130%	110
	TP15 0.1-0.2	SE131890.013	%	70 - 130%	118
	TP15 0.4-0.5	SE131890.014	%	70 - 130%	108
	TP10 0.1-0.2	SE131890.015	%	70 - 130%	118
	TP14 0.1-0.2	SE131890.016	%	70 - 130%	116
	TP9 0.1-0.2	SE131890.017	%	70 - 130%	112
	TP9 0.7-0.8	SE131890.018	%	70 - 130%	120
	TP6 0.0-0.1	SE131890.019	%	70 - 130%	118
	TP7 0.0-0.1	SE131890.020	%	70 - 130%	106
	TP7 0.8-0.9	SE131890.021	%	70 - 130%	114
	TP8 0.1-0.2	SE131890.022	%	70 - 130%	116
	TP8 0.9-1.0	SE131890.023	%	70 - 130%	114
	TP13 0.1-0.2	SE131890.024	%	70 - 130%	110
	TP12 0.0-0.1	SE131890.025	%	70 - 130%	114
	TP17 0.1-0.2	SE131890.026	%	70 - 130%	118
	TP18 1.0-0.2	SE131890.027	%	70 - 130%	118
	QC1	SE131890.031	%	70 - 130%	120
	QC2	SE131890.032	%	70 - 130%	116
	QC3	SE131890.033	%	70 - 130%	120

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	Comp 1	SE131890.028	%	60 - 130%	91
	Comp 2	SE131890.029	%	60 - 130%	87
	Comp 3	SE131890.030	%	60 - 130%	82

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	93
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	107
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	103
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	110
	TP4 0.1-0.2	SE131890.007	%	60 - 130%	99
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	88
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	104
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	108
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	97
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	120
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	96
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	90
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	94
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	92
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	91
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	98
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	98
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	91
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	93
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	86
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	92
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	96
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	94
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	85

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TP18 1.0-0.2	SE131890.027	%	60 - 130%	93
	QC1	SE131890.031	%	60 - 130%	100
	QC2	SE131890.032	%	60 - 130%	94
	QC3	SE131890.033	%	60 - 130%	90
	Trip Spike	SE131890.036	%	60 - 130%	117
d4-1,2-dichloroethane (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	80
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	97
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	94
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	106
	TP4 0.1-0.2	SE131890.007	%	60 - 130%	98
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	87
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	103
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	100
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	96
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	122
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	97
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	91
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	95
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	91
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	96
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	97
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	100
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	92
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	91
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	87
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	85
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	94
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	93
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	86
	TP18 1.0-0.2	SE131890.027	%	60 - 130%	111
	QC1	SE131890.031	%	60 - 130%	106
	QC2	SE131890.032	%	60 - 130%	97
	QC3	SE131890.033	%	60 - 130%	93
	Trip Spike	SE131890.036	%	60 - 130%	88
d8-toluene (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	75
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	92
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	91
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	98
	TP4 0.1-0.2	SE131890.007	%	60 - 130%	91
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	80
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	91
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	92
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	89
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	115
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	89
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	84
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	85
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	83
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	86
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	80
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	91
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	82
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	81
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	77
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	78
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	87
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	90
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	80
	TP18 1.0-0.2	SE131890.027	%	60 - 130%	106
	QC1	SE131890.031	%	60 - 130%	98
	QC2	SE131890.032	%	60 - 130%	87

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	QC3	SE131890.033	%	60 - 130%	83
	Trip Spike	SE131890.036	%	60 - 130%	88
Dibromofluoromethane (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	78
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	97
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	95
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	103
	TP4 0.1-0.2	SE131890.007	%	60 - 130%	97
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	87
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	100
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	98
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	96
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	119
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	98
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	91
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	92
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	89
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	94
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	104
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	100
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	89
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	89
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	85
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	83
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	94
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	94
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	85
	TP18 1.0-0.2	SE131890.027	%	60 - 130%	110
	QC1	SE131890.031	%	60 - 130%	106
	QC2	SE131890.032	%	60 - 130%	95
	QC3	SE131890.033	%	60 - 130%	94
	Trip Spike	SE131890.036	%	60 - 130%	88

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	93
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	107
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	103
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	110
	TP4 0.1-0.2	SE131890.007	%	60 - 130%	99
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	88
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	104
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	108
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	97
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	120
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	96
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	90
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	94
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	92
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	91
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	98
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	98
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	91
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	93
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	86
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	92
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	96
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	94
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	85
	TP18 1.0-0.2	SE131890.027	%	60 - 130%	93
	QC1	SE131890.031	%	60 - 130%	100
	QC2	SE131890.032	%	60 - 130%	94

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QC3	SE131890.033	%	60 - 130%	90
d4-1,2-dichloroethane (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	80
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	97
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	94
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	106
	TP4 0.1-0.2	SE131890.007	%	60 - 130%	98
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	87
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	103
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	100
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	96
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	122
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	97
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	91
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	95
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	91
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	96
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	97
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	100
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	92
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	91
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	87
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	85
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	94
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	93
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	86
	TP18 1.0-0.2	SE131890.027	%	60 - 130%	111
	QC1	SE131890.031	%	60 - 130%	106
	QC2	SE131890.032	%	60 - 130%	97
	QC3	SE131890.033	%	60 - 130%	93
d8-toluene (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	75
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	92
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	91
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	98
	TP4 0.1-0.2	SE131890.007	%	60 - 130%	91
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	80
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	91
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	92
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	89
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	115
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	89
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	84
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	85
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	83
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	86
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	80
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	91
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	82
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	81
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	77
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	78
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	87
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	90
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	80
	TP18 1.0-0.2	SE131890.027	%	60 - 130%	106
	QC1	SE131890.031	%	60 - 130%	98
	QC2	SE131890.032	%	60 - 130%	87
	QC3	SE131890.033	%	60 - 130%	83
Dibromofluoromethane (Surrogate)	TP1 0.0-0.1	SE131890.001	%	60 - 130%	78
	TP1 1.3-1.4	SE131890.002	%	60 - 130%	97
	TP2 0.0-0.1	SE131890.004	%	60 - 130%	95
	TP2 1.1-1.2	SE131890.005	%	60 - 130%	103

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Dibromofluoromethane (Surrogate)	TP4 0.1-0.2	SE131890.007	%	60 - 130%	97
	TP5 0.1-0.2	SE131890.008	%	60 - 130%	87
	TP5 1.3-1.4	SE131890.009	%	60 - 130%	100
	TP16 0.1-0.2	SE131890.010	%	60 - 130%	98
	TP11 0.2-0.3	SE131890.011	%	60 - 130%	96
	TP11 1.2-1.3	SE131890.012	%	60 - 130%	119
	TP15 0.1-0.2	SE131890.013	%	60 - 130%	98
	TP15 0.4-0.5	SE131890.014	%	60 - 130%	91
	TP10 0.1-0.2	SE131890.015	%	60 - 130%	92
	TP14 0.1-0.2	SE131890.016	%	60 - 130%	89
	TP9 0.1-0.2	SE131890.017	%	60 - 130%	94
	TP9 0.7-0.8	SE131890.018	%	60 - 130%	104
	TP6 0.0-0.1	SE131890.019	%	60 - 130%	100
	TP7 0.0-0.1	SE131890.020	%	60 - 130%	89
	TP7 0.8-0.9	SE131890.021	%	60 - 130%	89
	TP8 0.1-0.2	SE131890.022	%	60 - 130%	85
	TP8 0.9-1.0	SE131890.023	%	60 - 130%	83
	TP13 0.1-0.2	SE131890.024	%	60 - 130%	94
	TP12 0.0-0.1	SE131890.025	%	60 - 130%	94
	TP17 0.1-0.2	SE131890.026	%	60 - 130%	85
	TP18 1.0-0.2	SE131890.027	%	60 - 130%	110
	QC1	SE131890.031	%	60 - 130%	106
	QC2	SE131890.032	%	60 - 130%	95
	QC3	SE131890.033	%	60 - 130%	94

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

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Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB065258.001	Mercury	mg/kg	0.01	<0.01
LB065336.001	Mercury	mg/kg	0.01	<0.01

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB065061.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	84

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB065060.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	96
		2-fluorobiphenyl (Surrogate)	%	-	98
		d14-p-terphenyl (Surrogate)	%	-	110
LB065061.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB065061.001		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	104
		2-fluorobiphenyl (Surrogate)	%	-	78
		d14-p-terphenyl (Surrogate)	%	-	98

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB065061.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	84

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB065256.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5
LB065335.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB065060.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110
LB065061.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB065057.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	95
		d4-1,2-dichloroethane (Surrogate)	%	-	96
		d8-toluene (Surrogate)	%	-	92
		Bromofluorobenzene (Surrogate)	%	-	94
	Totals	Total BTEX*	mg/kg	0.6	<0.6
LB065058.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	96
		d4-1,2-dichloroethane (Surrogate)	%	-	97
		d8-toluene (Surrogate)	%	-	91
		Bromofluorobenzene (Surrogate)	%	-	93
	Totals	Total BTEX*	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result
LB065057.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	95
		d4-1,2-dichloroethane (Surrogate)	%	-	96
		d8-toluene (Surrogate)	%	-	92
LB065058.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	96
		d4-1,2-dichloroethane (Surrogate)	%	-	97
		d8-toluene (Surrogate)	%	-	91

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.012	LB065258.014	Mercury	mg/kg	0.01	0.03	0.03	188	0
SE131890.020	LB065258.023	Mercury	mg/kg	0.01	0.13	0.12	71	7
SE131890.033	LB065336.014	Mercury	mg/kg	0.01	0.06	0.05	119	8
SE132071.013	LB065336.021	Mercury	mg/kg	0.01	<0.01	<0.01	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.011	LB065080.011	% Moisture	%w/w	0.5	13	12	38	5
SE131890.021	LB065080.022	% Moisture	%	0.5	19	21	35	7
SE131890.031	LB065080.033	% Moisture	%	0.5	7.5	7.8	43	4
SE131890.033	LB065080.036	% Moisture	%	0.5	24	24	34	0

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.029	LB065061.014	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
		Lindane	mg/kg	0.1	<0.1	<0.1	200	0
		Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
		Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
		Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
		Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
		Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
		o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
		Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
		trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
		p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
		Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
		Endrin	mg/kg	0.2	<0.2	<0.2	200	0
		o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
		o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
		Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
		p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
		p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
		Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
		Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
		Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
		Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
		Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
		Mirex	mg/kg	0.1	<0.1	<0.1	200	0
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	3

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.011	LB065060.018	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	155	0
		1-methylnaphthalene	mg/kg	0.1	0.1	0.2	101	14
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	163	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	0.7	0.9	43	36
		Anthracene	mg/kg	0.1	0.1	0.1	113	33
		Fluoranthene	mg/kg	0.1	1.6	2.0	36	25
		Pyrene	mg/kg	0.1	1.5	1.9	36	21
		Benzo(a)anthracene	mg/kg	0.1	0.8	1.1	41	32
		Chrysene	mg/kg	0.1	0.6	0.7	46	24
		Benzo(b&j)fluoranthene	mg/kg	0.1	1.3	1.4	37	8
		Benzo(k)fluoranthene	mg/kg	0.1	0.2	0.4	64	76 ③
		Benzo(a)pyrene	mg/kg	0.1	0.8	1.0	41	27
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1.0	1.2	39	22
		Dibenzo(a&h)anthracene	mg/kg	0.1	0.1	0.2	104	22

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.011	LB065060.018		Benzo(ghi)perylene	mg/kg	0.1	0.5	0.6	49	21
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	1.2	1.6	24	26 ②
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	1.2	1.6	31	26
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	1.2	1.6	24	26 ②
			Total PAH	mg/kg	0.8	9.4	12	37	24
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.5	30	7
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	5
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	0.5	30	6
SE131890.032	LB065061.020		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	0.1	0.1	110	8
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	1.0	1.0	40	4
			Anthracene	mg/kg	0.1	0.2	0.2	84	5
			Fluoranthene	mg/kg	0.1	3.1	3.0	33	3
			Pyrene	mg/kg	0.1	3.6	3.2	33	11
			Benzo(a)anthracene	mg/kg	0.1	1.6	1.6	36	1
			Chrysene	mg/kg	0.1	1.1	0.9	40	15
			Benzo(b&j)fluoranthene	mg/kg	0.1	2.6	2.5	34	4
			Benzo(k)fluoranthene	mg/kg	0.1	0.4	0.4	57	8
			Benzo(a)pyrene	mg/kg	0.1	2.0	1.8	35	7
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	2.3	2.2	34	5
			Dibenzo(a&h)anthracene	mg/kg	0.1	0.2	0.2	73	9
			Benzo(ghi)perylene	mg/kg	0.1	1.3	1.2	38	7
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	2.9	2.7	17	6
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	2.9	2.7	21	6
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	2.9	2.7	17	6
			Total PAH	mg/kg	0.8	20	18	34	6
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE131895.001	LB065060.028		Naphthalene	mg/kg	0.1	0.3	0.3	63	10
			2-methylnaphthalene	mg/kg	0.1	0.2	0.2	89	24
			1-methylnaphthalene	mg/kg	0.1	0.1	0.2	93	38
			Acenaphthylene	mg/kg	0.1	0.5	0.6	48	22
			Acenaphthene	mg/kg	0.1	0.5	0.7	47	31
			Fluorene	mg/kg	0.1	0.6	0.8	45	26
			Phenanthrene	mg/kg	0.1	4.8	6.4	32	28
			Anthracene	mg/kg	0.1	1.0	1.1	39	11
			Fluoranthene	mg/kg	0.1	9.3	12	31	24
			Pyrene	mg/kg	0.1	8.6	10	31	18
			Benzo(a)anthracene	mg/kg	0.1	4.6	5.8	32	23
			Chrysene	mg/kg	0.1	3.6	4.1	33	15
			Benzo(b&j)fluoranthene	mg/kg	0.1	5.8	7.4	32	24
			Benzo(k)fluoranthene	mg/kg	0.1	2.0	2.3	35	15
			Benzo(a)pyrene	mg/kg	0.1	5.2	6.3	32	19
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	4.7	5.8	32	21
			Dibenzo(a&h)anthracene	mg/kg	0.1	0.3	0.4	63	36
			Benzo(ghi)perylene	mg/kg	0.1	3.2	4.0	33	22
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	7.2	8.9	12	20 ②
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	7.2	8.9	14	20 ②
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	7.2	8.9	12	20 ②
			Total PAH	mg/kg	0.8	55	69	31	22
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	30	9
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	30	7
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	2

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate	Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.029	LB065061.014		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	3

pH in Soil CaCl2 Extract

Method: ME-(AU)-[ENV]AN103

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.025	LB065212.012		pH Soil CaCl2 Extract	pH Units	-	4.8	5.0	32	4

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.012	LB065256.014		Arsenic, As	mg/kg	3	<3	<3	71	28
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	197	0
			Chromium, Cr	mg/kg	0.3	19	19	33	0
			Copper, Cu	mg/kg	0.5	10	10	35	3
			Lead, Pb	mg/kg	1	14	14	37	1
			Nickel, Ni	mg/kg	0.5	9.8	10	35	3
			Zinc, Zn	mg/kg	0.5	66	67	33	2
SE131890.020	LB065256.023		Arsenic, As	mg/kg	3	200	200	30	2
			Cadmium, Cd	mg/kg	0.3	0.3	<0.3	131	1
			Chromium, Cr	mg/kg	0.3	4.8	6.2	39	24
			Copper, Cu	mg/kg	0.5	75	75	31	0
			Lead, Pb	mg/kg	1	150	160	31	7
			Nickel, Ni	mg/kg	0.5	14	15	33	6
			Zinc, Zn	mg/kg	0.5	66	64	33	2
SE131890.033	LB065335.014		Arsenic, As	mg/kg	3	4	4	55	2
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.3	13	12	34	1
			Copper, Cu	mg/kg	0.5	14	13	34	3
			Lead, Pb	mg/kg	1	49	47	32	4
			Nickel, Ni	mg/kg	0.5	8.4	8.3	36	2
			Zinc, Zn	mg/kg	0.5	21	20	40	5
SE132071.013	LB065335.023		Arsenic, As	mg/kg	3	7	9	43	14
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	156	0
			Chromium, Cr	mg/kg	0.3	8.3	8.5	36	2
			Copper, Cu	mg/kg	0.5	16	16	33	3
			Lead, Pb	mg/kg	1	25	26	34	2
			Nickel, Ni	mg/kg	0.5	1.2	1.4	68	12
			Zinc, Zn	mg/kg	0.5	15	16	43	5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.011	LB065060.018		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	110	130	68	23
			TRH C29-C36	mg/kg	45	<45	49	130	9
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	150	180	97	21
			TRH C10-C40 Total	mg/kg	210	<210	<210	158	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	26	26	126	0
			TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	26	26	126	0
			TRH >C16-C34 (F3)	mg/kg	90	130	170	90	23
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE131890.032	LB065061.019		TRH C10-C14	mg/kg	20	<20	<20	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.032	LB065061.019		TRH C15-C28	mg/kg	45	73	67	94	9
			TRH C29-C36	mg/kg	45	76	66	93	14
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	150	130	108	11
			TRH C10-C40 Total	mg/kg	210	<210	<210	179	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	130	120	103	11
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE131895.001	LB065060.028		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	140	150	61	10
			TRH C29-C36	mg/kg	45	84	93	81	10
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	220	250	77	10
			TRH C10-C40 Total	mg/kg	210	220	250	120	10
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	200	220	73	10
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.012	LB065057.014	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	6.0	5.3	50	12
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	6.1	5.4	50	12
			d8-toluene (Surrogate)	mg/kg	-	5.7	5.0	50	14
			Bromofluorobenzene (Surrogate)	mg/kg	-	6.0	5.2	50	14
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX*	mg/kg	0.6	<0.6	<0.6	200	0
SE131890.021	LB065057.024	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.3	50	4
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.4	50	4
			d8-toluene (Surrogate)	mg/kg	-	4.1	3.8	50	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	4.3	50	8
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX*	mg/kg	0.6	<0.6	<0.6	200	0
SE131890.033	LB065058.013	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	4.1	50	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.1	50	11
			d8-toluene (Surrogate)	mg/kg	-	4.1	3.7	50	10
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.3	50	5
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX*	mg/kg	0.6	<0.6	<0.6	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Original	Duplicate		Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.012	LB065057.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	6.0	5.3	30	12
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	6.1	5.4	30	12
			d8-toluene (Surrogate)	mg/kg	-	5.7	5.0	30	14
			Bromofluorobenzene (Surrogate)	mg/kg	-	6.0	5.2	30	14
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE131890.021	LB065057.024		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.3	30	4
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.4	30	4
			d8-toluene (Surrogate)	mg/kg	-	4.1	3.8	30	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	4.3	30	8
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE131890.033	LB065058.013		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.7	4.1	30	13
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.1	30	11
			d8-toluene (Surrogate)	mg/kg	-	4.1	3.7	30	10
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.3	30	5
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR)

Method: ME-(AU)-[ENV]AN122

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065251.002	Exchangeable Sodium, Na	mg/kg	2	NA	160	80 - 120	116
	Exchangeable Potassium, K	mg/kg	2	NA	330	80 - 120	105
	Exchangeable Calcium, Ca	mg/kg	2	NA	4347	80 - 120	104
	Exchangeable Magnesium, Mg	mg/kg	2	NA	1578	80 - 120	100

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065258.002	Mercury	mg/kg	0.01	0.20	0.2	70 - 130	99
LB065336.002	Mercury	mg/kg	0.01	0.20	0.2	70 - 130	100

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065061.002	Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	78
	Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	77
	Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	75
	Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	75
	Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	77
	p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	77
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0.15	40 - 130	87†

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065060.002	Naphthalene	mg/kg	0.1	3.7	4	60 - 140	92
	Acenaphthylene	mg/kg	0.1	3.8	4	60 - 140	96
	Acenaphthene	mg/kg	0.1	3.9	4	60 - 140	98
	Phenanthrene	mg/kg	0.1	4.1	4	60 - 140	102
	Anthracene	mg/kg	0.1	4.0	4	60 - 140	99
	Fluoranthene	mg/kg	0.1	4.2	4	60 - 140	106
	Pyrene	mg/kg	0.1	4.1	4	60 - 140	101
	Benzo(a)pyrene	mg/kg	0.1	3.9	4	60 - 140	97
Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84
	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	88
	d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	104
LB065061.002	Naphthalene	mg/kg	0.1	4.3	4	60 - 140	108
	Acenaphthylene	mg/kg	0.1	3.9	4	60 - 140	97
	Acenaphthene	mg/kg	0.1	3.9	4	60 - 140	96
	Phenanthrene	mg/kg	0.1	4.1	4	60 - 140	103
	Anthracene	mg/kg	0.1	4.0	4	60 - 140	99
	Fluoranthene	mg/kg	0.1	4.2	4	60 - 140	104
	Pyrene	mg/kg	0.1	4.2	4	60 - 140	105
	Benzo(a)pyrene	mg/kg	0.1	5.0	4	60 - 140	124
Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.5	40 - 130	110
	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	82
	d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065061.002	Arochlor 1260	mg/kg	0.2	0.3	0.4	60 - 140	80

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065256.002	Arsenic, As	mg/kg	3	49	50	80 - 120	97
	Cadmium, Cd	mg/kg	0.3	50	50	80 - 120	99
	Chromium, Cr	mg/kg	0.3	51	50	80 - 120	101
	Copper, Cu	mg/kg	0.5	48	50	80 - 120	96
	Lead, Pb	mg/kg	1	50	50	80 - 120	99
	Nickel, Ni	mg/kg	0.5	50	50	80 - 120	99
	Zinc, Zn	mg/kg	0.5	50	50	80 - 120	99
LB065335.002	Arsenic, As	mg/kg	3	49	50	80 - 120	99
	Cadmium, Cd	mg/kg	0.3	50	50	80 - 120	100

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065335.002		Chromium, Cr	mg/kg	0.3	50	50	80 - 120	99
		Copper, Cu	mg/kg	0.5	50	50	80 - 120	100
		Lead, Pb	mg/kg	1	51	50	80 - 120	101
		Nickel, Ni	mg/kg	0.5	50	50	80 - 120	100
		Zinc, Zn	mg/kg	0.5	51	50	80 - 120	102

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065060.002		TRH C10-C14	mg/kg	20	31	40	60 - 140	78
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	85
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	78
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	32	40	60 - 140	80
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	85
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	80
LB065061.002		TRH C10-C14	mg/kg	20	36	40	60 - 140	90
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	93
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	80
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	36	40	60 - 140	90
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	93
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	75

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065057.002	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.2	2.9	60 - 140	77
		Toluene	mg/kg	0.1	2.2	2.9	60 - 140	76
		Ethylbenzene	mg/kg	0.1	2.3	2.9	60 - 140	80
		m/p-xylene	mg/kg	0.2	5.1	5.8	60 - 140	87
		o-xylene	mg/kg	0.1	2.5	2.9	60 - 140	86
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.3	5	60 - 140	107
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	5	60 - 140	106
		d8-toluene (Surrogate)	mg/kg	-	5.3	5	60 - 140	106
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.9	5	60 - 140	119
LB065058.002	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.1	2.9	60 - 140	73
		Toluene	mg/kg	0.1	2.3	2.9	60 - 140	79
		Ethylbenzene	mg/kg	0.1	2.4	2.9	60 - 140	81
		m/p-xylene	mg/kg	0.2	4.6	5.8	60 - 140	80
		o-xylene	mg/kg	0.1	2.3	2.9	60 - 140	78
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.8	5	60 - 140	95
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	94
		d8-toluene (Surrogate)	mg/kg	-	4.7	5	60 - 140	93
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.4	5	60 - 140	107

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB065057.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	91
		TRH C6-C9	mg/kg	20	20	23.2	60 - 140	86
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.3	5	60 - 140	107
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	5	60 - 140	106
		d8-toluene (Surrogate)	mg/kg	-	5.3	5	60 - 140	106
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.9	5	60 - 140	119
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	112
LB065058.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	92
		TRH C6-C9	mg/kg	20	20	23.2	60 - 140	87
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.8	5	60 - 140	95
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	94
		d8-toluene (Surrogate)	mg/kg	-	4.7	5	60 - 140	93
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.4	5	60 - 140	107
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	125

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE131890.001	LB065258.004	Mercury	mg/kg	0.01	0.59	0.42	0.2	84
SE131890.021	LB065336.004	Mercury	mg/kg	0.01	0.22	0.05	0.2	85

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE131890.007	LB065060.011		Naphthalene	mg/kg	0.1	4.3	<0.1	4	106
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	3.9	<0.1	4	95
			Acenaphthene	mg/kg	0.1	3.8	<0.1	4	94
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.7	0.8	4	97
			Anthracene	mg/kg	0.1	4.5	<0.1	4	109
			Fluoranthene	mg/kg	0.1	5.8	1.6	4	106
			Pyrene	mg/kg	0.1	5.5	1.7	4	95
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0.8	-	-
			Chrysene	mg/kg	0.1	<0.1	0.6	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	1.2	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.2	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.4	0.7	4	94
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.7	-	-
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.3	-	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	4.4	0.9	-	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	4.5	1.0	-	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	4.5	1.0	-	-
			Total PAH	mg/kg	0.8	37	8.9	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	-	116
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	90
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	108
SE131890.022	LB065061.007		Naphthalene	mg/kg	0.1	4.3	<0.1	4	107
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.1	<0.1	4	101
			Acenaphthene	mg/kg	0.1	4.0	<0.1	4	99
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.2	0.1	4	102
			Anthracene	mg/kg	0.1	4.1	<0.1	4	102
			Fluoranthene	mg/kg	0.1	4.3	0.3	4	102
			Pyrene	mg/kg	0.1	4.2	0.3	4	98
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0.2	-	-
			Chrysene	mg/kg	0.1	<0.1	0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0.2	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.4	0.1	4	106
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.2	-	-
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	4.4	0.2	-	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	4.5	0.3	-	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	4.4	0.3	-	-
			Total PAH	mg/kg	0.8	33	1.7	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	-	118
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	-	88
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.6	-	108

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR

MATRIX SPIKES

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (continued)

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE131890.001	LB065256.004		Arsenic, As	mg/kg	3	150	100	50	98
			Cadmium, Cd	mg/kg	0.3	51	<0.3	50	102
			Chromium, Cr	mg/kg	0.3	58	5.6	50	106
			Copper, Cu	mg/kg	0.5	96	49	50	94
			Lead, Pb	mg/kg	1	170	110	50	105
			Nickel, Ni	mg/kg	0.5	84	29	50	110
			Zinc, Zn	mg/kg	0.5	130	86	50	97
SE131890.021	LB065335.004		Arsenic, As	mg/kg	3	55	7	50	96
			Cadmium, Cd	mg/kg	0.3	48	<0.3	50	95
			Chromium, Cr	mg/kg	0.3	56	7.7	50	96
			Copper, Cu	mg/kg	0.5	58	12	50	91
			Lead, Pb	mg/kg	1	120	46	50	140 ⑨
			Nickel, Ni	mg/kg	0.5	52	4.7	50	94
			Zinc, Zn	mg/kg	0.5	69	22	50	96

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE131890.002	LB065060.008		TRH C10-C14	mg/kg	20	36	<20	40	90
			TRH C15-C28	mg/kg	45	<45	<45	40	95
			TRH C29-C36	mg/kg	45	<45	<45	40	78
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH C10-C40 Total	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	36	<25	40	90
			TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	36	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	93
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE131890.001	LB065057.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.4	<0.1	2.9	81
			Toluene	mg/kg	0.1	2.3	<0.1	2.9	79
			Ethylbenzene	mg/kg	0.1	2.2	<0.1	2.9	77
			m/p-xylene	mg/kg	0.2	4.3	<0.2	5.8	74
			o-xylene	mg/kg	0.1	2.2	<0.1	2.9	74
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.7	3.9	5	113
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.6	4.0	5	112
			d8-toluene (Surrogate)	mg/kg	-	5.6	3.8	5	113
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	4.6	5	98
		Totals	Total Xylenes*	mg/kg	0.3	6.5	<0.3	-	-
			Total BTEX*	mg/kg	0.6	13	<0.6	-	-
SE131890.022	LB065058.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.2	<0.1	2.9	77
			Toluene	mg/kg	0.1	2.2	<0.1	2.9	76
			Ethylbenzene	mg/kg	0.1	2.2	<0.1	2.9	74
			m/p-xylene	mg/kg	0.2	4.4	<0.2	5.8	76
			o-xylene	mg/kg	0.1	2.2	<0.1	2.9	76
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.4	4.3	5	107
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.5	4.3	5	109
			d8-toluene (Surrogate)	mg/kg	-	5.1	3.9	5	102
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.1	4.3	5	102
		Totals	Total Xylenes*	mg/kg	0.3	6.6	<0.3	-	-
			Total BTEX*	mg/kg	0.6	13	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434/AN410

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE131890.001	LB065057.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	93
			TRH C6-C9	mg/kg	20	22	<20	23.2	93
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.7	3.9	5	113
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.6	4.0	5	112
			d8-toluene (Surrogate)	mg/kg	-	5.6	3.8	5	113

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434/AN410

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE131890.001	LB065057.004	Surrogates	Bromofluorobenzene (Surrogate)	mg/kg	-	4.9	4.6	5	98
		VPH F Bands	Benzene (F0)	mg/kg	0.1	2.4	<0.1	-	-
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	133
SE131890.022	LB065058.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	93
			TRH C6-C9	mg/kg	20	21	<20	23.2	89
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.4	4.3	5	107
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.5	4.3	5	109
			d8-toluene (Surrogate)	mg/kg	-	5.1	3.9	5	102
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.1	4.3	5	102
		VPH F Bands	Benzene (F0)	mg/kg	0.1	2.2	<0.1	-	-
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	135

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.007	LB065060.012		Naphthalene	mg/kg	0.1	4.3	4.3	32	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	-
			Acenaphthylene	mg/kg	0.1	3.9	4.1	33	6
			Acenaphthene	mg/kg	0.1	3.8	4.0	33	6
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	-
			Phenanthrene	mg/kg	0.1	4.7	4.5	32	3
			Anthracene	mg/kg	0.1	4.5	4.2	32	6
			Fluoranthene	mg/kg	0.1	5.8	4.9	32	26
			Pyrene	mg/kg	0.1	5.5	4.6	32	27
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(a)pyrene	mg/kg	0.1	4.4	4.3	32	3
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	-
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	4.4	4.3	15	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	4.5	4.4	17	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	4.5	4.4	15	-
			Total PAH	mg/kg	0.8	37	35	32	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE131890.022	LB065061.008		Naphthalene	mg/kg	0.1	4.3	4.2	32	2
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	-
			Acenaphthylene	mg/kg	0.1	4.1	4.0	32	2
			Acenaphthene	mg/kg	0.1	4.0	4.0	33	2
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	-
			Phenanthrene	mg/kg	0.1	4.2	4.1	32	2
			Anthracene	mg/kg	0.1	4.1	4.1	32	1
			Fluoranthene	mg/kg	0.1	4.3	4.4	32	1
			Pyrene	mg/kg	0.1	4.2	4.1	32	4
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(a)pyrene	mg/kg	0.1	4.4	4.7	32	6
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	-
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ	0.2	4.4	4.7	14	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.3	4.5	4.8	16	-
			Carcinogenic PAHs (as BaP TEQ)-assume results	TEQ (mg/kg)	0.2	4.4	4.7	14	-
			Total PAH	mg/kg	0.8	33	33	32	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	30	7
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	12
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	12

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number	Parameter	Units	LOR

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE131890.002	LB065060.009		TRH C10-C14	mg/kg	20	36	37	85	3
			TRH C15-C28	mg/kg	45	<45	<45	147	3
			TRH C29-C36	mg/kg	45	<45	<45	173	3
			TRH C37-C40	mg/kg	100	<100	<100	200	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	133	-
			TRH C10-C40 Total	mg/kg	210	<210	<210	200	-
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	36	37	98	3
			TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25	36	37	98	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	-
SE131890.020	LB065061.005		TRH C10-C14	mg/kg	20		55		
			TRH C15-C28	mg/kg	45		150		
			TRH C29-C36	mg/kg	45		74		
			TRH C37-C40	mg/kg	100		<100		
			TRH C10-C36 Total	mg/kg	110		270		
			TRH C10-C40 Total	mg/kg	210		270		
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25		64		
			TRH >C10-C16 (F2) minus Naphthalene	mg/kg	25		64		
			TRH >C16-C34 (F3)	mg/kg	90		170		
			TRH >C34-C40 (F4)	mg/kg	120		<120		

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

*	Non-accredited analysis.
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

ANALYTICAL REPORT

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	(Not specified)
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME4079**
Order Number	**JME4079**
Samples	36

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE131890 R0
Report Number	0000092980
Date Reported	13 Oct 2014
Date Received	03 Oct 2014

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all samples using trace analysis technique

Asbestos analysed by Approved Identifiesr Yusuf Kuthpudin and Ravee Sivasubramaniam .

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Jaimie Cheung
Metals Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Asbestos Analyst

ANALYTICAL REPORT

RESULTS

Fibre Identification in soil

Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w
SE131890.004	TP2 0.0-0.1	Soil	94g Soil,rocks	02 Oct 2014	No Asbestos Found Organic Fibres Detected	<0.01

ANALYTICAL REPORT

RESULTS

Fibre ID in bulk materials

Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w
SE131890.003	TP1 1.0-1.1	Other	50x30x4mm Cement sheet fragments	02 Oct 2014	Chrysotile Asbestos Detected	
SE131890.034	TP10 0.1-0.2	Other	50x40x5mm Cement sheet fragments	02 Oct 2014	Amosite & Chrysotile Asbestos Detected	
SE131890.035	TP9 0.1-0.2	Other	50x25x4mm Cement sheet fragments	02 Oct 2014	Chrysotile Asbestos Detected	

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic \`clues\`, which provide a reasonable degree of certainty, dispersion staining is a mandatory \`clue\` for positive identification. If sufficient \`clues\` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	Not Accredited
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarized light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarized light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarized light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

CHAIN OF CUSTODY & ANALYSIS REQUEST

Sample Date 17/11/2014

Page _1___ of __2__

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name: JM Environments
Address: 37 Tooke St
COOKS HILL NSW 2300
Contact Name: James McMahon

Project Name/No: JME4079
Purchase Order No: JME4079
Results Required By: **std**
Telephone: 0427 893 668
Facsimile:
Email: james@jmenvironments.com

ID	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	As	Zn
TP4E 0.1-0.2	1		X			X	
TP4E 0.8-0.9	2		X			X	
TP4N 0.1-0.2	3		X			X	
TP4N 1.1-1.2	4		X			X	
TP4S 0.1-0.2	5		x			X	
TP4S 0.3-0.4	6		X			X	
TP4S 1.2-1.3	7		X			X	
TP4W 0.1-0.2	8		X			X	
TP4W 0.2-0.3	9		X			X	
HLHA1	10		X				x
HLHA2	11		X				x

RECEIVED
18 NOV 2014
SE133376

Relinquished By: J.McMahon
Date/Time: **17/11/2014** 4:00pm
Received By:TNT
Date/Time **17/11/2014** 4:00pm

Relinquished By:
Date/Time:
Received By:
Date/Time 18/11/14 12.00

Samples Intact: [✓ Yes]/ No
Temperature: Ambient / [✓ Chilled]
Sample Cooler Sealed: [✓ Yes]/ No
Laboratory Quotation No: ENVI126319

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

Sample Date 17/11/2014

Page _2___ of __2__

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name: JM Environments
Address: 37 Tooke St
COOKS HILL NSW 2300
Contact Name: James McMahon

Project Name/No: JME4079
Purchase Order No: JME4079
Results Required By: **std**
Telephone: 0427 893 668
Facsimile:
Email: james@jmenvironments.com

ID	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	As	Zn
HLHA3	12		X				x
HLHA4	13		X				x
HLHA5	14		X				x
QC4	15		X			X	

Relinquished By: J.McMahon
Date/Time: **17/11/2014** 4:00pm
Received By:TNT
Date/Time **17/11/2014** 4:00pm

Relinquished By:
Date/Time:
Received By:
Date/Time 18/11/14 12:00

Samples Intact: [✓ Yes]/ No
Temperature: [✓ Ambient] / [✓ Chilled]
Sample Cooler Sealed: [✓ Yes]/No
Laboratory Quotation No: ENVI126319

SGS

SE133376

Job:	Matrix	250 JAR	125 JAR	BAG			1L UP P	500 UP P	250 ZnAcetate P	250 / 500 NaOH BP	125 / 250 UP P	125 / 250 Metal Total*	125 / 250 Metal Filtered*	125 HCl P	1L UP AG	500 / 1L H_2SO_4 AG	125 / 250 H_2SO_4 P	100 / 200 UP AG	40 NaThio GV	250 UP OPAQUE P	500 NaThio STERILE P	200 NaThio STERILE P						Storage Location	Bottles Supplied By	Comment
1-13, 15	S	1																										SD984	SGS	Soil
14	S		1																									"	"	"

Cooling Method
CP
Temp
9°C
Good Order
[✓ Y] / N
Clearly Labelled
[✓ Y] / N
Correct Pres.
[✓ Y] / N
No Head-space
[✓ Y] / N / NA
Sufficient Vol
[✓ Y] / N
Doc Date
18111
Doc Type
COC
Complete Docs
[✓ Y] / N
Requested TAT
Std

SAMPLE RECEIPT ADVICE

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	(Not specified)
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME4079**
Order Number	**JME4079**
Samples	15

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Tue 18/11/2014
Report Due	Tue 25/11/2014
SGS Reference	**SE133376**

SUBMISSION DETAILS

This is to confirm that 15 samples were received on Tuesday 18/11/2014. Results are expected to be ready by Tuesday 25/11/2014. Please quote SGS reference SE133376 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	15 Soils	Type of documentation received	COC
Date documentation received	18/11/2014	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	4.0°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

SAMPLE RECEIPT ADVICE

SE133376

CLIENT DETAILS

Client JM ENVIRONMENTS

Project JME4079

SUMMARY OF ANALYSIS

No.	Sample ID	Moisture Content	Total Recoverable Metals in Soil by ICPOES from
001	TP4E 0.1-0.2	1	1
002	TP4E 0.8-0.9	1	1
003	TP4N 0.1-0.2	1	1
004	TP4N 1.1-1.2	1	1
005	TP4S 0.1-0.2	1	1
006	TP4S 0.3-0.4	1	1
007	TP4S 1.2-1.3	1	1
008	TP4W 0.1-0.2	1	1
009	TP4W 0.2-0.3	1	1
010	HLHA1	1	1
011	HLHA2	1	1
012	HLHA3	1	1
013	HLHA4	1	1
014	HLHA5	1	1
015	QC4	1	1

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	(Not specified)
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME4079**
Order Number	**JME4079**
Samples	15
Date Started	24 Nov 2014

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE133376 R0**
Report Number	0000096509
Date Reported	25 Nov 2014
Date Received	18 Nov 2014

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Metals/Inorganics Team Leader

Ly Kim Ha
Organic Section Head

Parameter	Units	LOR	Sample Number	SE133376.001	SE133376.002	SE133376.003	SE133376.004
			Sample Matrix	Soil	Soil	Soil	Soil
			Sample Date	17 Nov 2014	17 Nov 2014	17 Nov 2014	17 Nov 2014
			Sample Name	TP4E 0.1-0.2	TP4E 0.8-0.9	TP4N 0.1-0.2	TP4N 1.1-1.2

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Arsenic, As	mg/kg	1	280	27	380	91
Zinc, Zn	mg/kg	2	-	-	-	-

Moisture Content Method: AN002

% Moisture	%	0.5	6.0	11.1	8.9	9.1

Parameter	Units	LOR	SE133376.005	SE133376.006	SE133376.007	SE133376.008
Sample Matrix			Soil	Soil	Soil	Soil
Sample Date			17 Nov 2014	17 Nov 2014	17 Nov 2014	17 Nov 2014
Sample Name			TP4S 0.1-0.2	TP4S 0.3-0.4	TP4S 1.2-1.3	TP4W 0.1-0.2

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Parameter	Units	LOR	SE133376.005	SE133376.006	SE133376.007	SE133376.008
Arsenic, As	mg/kg	1	1000	22	94	160
Zinc, Zn	mg/kg	2	-	-	-	-

Moisture Content Method: AN002

Parameter	Units	LOR	SE133376.005	SE133376.006	SE133376.007	SE133376.008
% Moisture	%	0.5	10.3	1.4	21.4	5.5

Parameter	Units	LOR	SE133376.009	SE133376.010	SE133376.011	SE133376.012
Sample Matrix			Soil	Soil	Soil	Soil
Sample Date			17 Nov 2014	17 Nov 2014	17 Nov 2014	17 Nov 2014
Sample Name			TP4W 0.2-0.3	HLHA1	HLHA2	HLHA3

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest   Method: AN040/AN320

Parameter	Units	LOR	SE133376.009	SE133376.010	SE133376.011	SE133376.012
Arsenic, As	mg/kg	1	**380**	-	-	-
Zinc, Zn	mg/kg	2	-	**99**	**660**	**180**

Moisture Content   Method: AN002

Parameter	Units	LOR	SE133376.009	SE133376.010	SE133376.011	SE133376.012
% Moisture	%	0.5	**7.0**	**8.3**	**16.9**	**11.5**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name: SE133376.013 Soil 17 Nov 2014 HLHA4	SE133376.014 Soil 17 Nov 2014 HLHA5	SE133376.015 Soil 17 Nov 2014 QC4
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320					
Arsenic, As	mg/kg	1	-	-	82
Zinc, Zn	mg/kg	2	1100	800	-
Moisture Content Method: AN002					
% Moisture	%	0.5	12.3	5.6	11.9

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Moisture Content Method: ME-(AU)-[ENV]AN002

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB067952	%	0.5	4 - 11%

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB067960	mg/kg	1	<1	0%	100%	138%
Zinc, Zn	LB067960	mg/kg	2	<2	1 - 3%	96%	

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	This analysis is not covered by the scope of accreditation.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.	NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE133376 R0

CLIENT DETAILS

Contact	James McMahon	Manager	Huong Crawford
Client	JM ENVIRONMENTS	Laboratory	SGS Alexandria Environmental
Address	37 TOOKE STREET COOKS HILL NSW 2300	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	(Not specified)	Telephone	+61 2 8594 0400
Facsimile	(Not specified)	Facsimile	+61 2 8594 0499
Email	james@jmenvironments.com	Email	au.environmental.sydney@sgs.com
Project	**JME4079**	SGS Reference	SE133376 R0
Order Number	**JME4079**	Report Number	0000096510
Samples	15	Date Reported	25 Nov 2014

LABORATORY DETAILS

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item

SAMPLE SUMMARY

Sample counts by matrix	15 Soils	Type of documentation received	COC
Date documentation received	18/11/2014	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	4.0°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP4E 0.1-0.2	SE133376.001	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4E 0.8-0.9	SE133376.002	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4N 0.1-0.2	SE133376.003	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4N 1.1-1.2	SE133376.004	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4S 0.1-0.2	SE133376.005	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4S 0.3-0.4	SE133376.006	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4S 1.2-1.3	SE133376.007	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4W 0.1-0.2	SE133376.008	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
TP4W 0.2-0.3	SE133376.009	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
HLHA1	SE133376.010	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
HLHA2	SE133376.011	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
HLHA3	SE133376.012	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
HLHA4	SE133376.013	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
HLHA5	SE133376.014	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014
QC4	SE133376.015	LB067952	17 Nov 2014	18 Nov 2014	01 Dec 2014	24 Nov 2014	29 Nov 2014	25 Nov 2014

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP4E 0.1-0.2	SE133376.001	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4E 0.8-0.9	SE133376.002	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4N 0.1-0.2	SE133376.003	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4N 1.1-1.2	SE133376.004	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4S 0.1-0.2	SE133376.005	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4S 0.3-0.4	SE133376.006	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4S 1.2-1.3	SE133376.007	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4W 0.1-0.2	SE133376.008	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
TP4W 0.2-0.3	SE133376.009	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
HLHA1	SE133376.010	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
HLHA2	SE133376.011	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
HLHA3	SE133376.012	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
HLHA4	SE133376.013	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
HLHA5	SE133376.014	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014
QC4	SE133376.015	LB067960	17 Nov 2014	18 Nov 2014	16 May 2015	24 Nov 2014	16 May 2015	25 Nov 2014

SURROGATES

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB067960.001	Arsenic, As	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2

DUPLICATES

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE133376.010	LB067952.011	% Moisture	%w/w	0.5	8.3	7.4	43	11
SE133377.005	LB067952.022	% Moisture	%	0.5	13.054187192	13.399503722	38	3
SE133377.009	LB067952.027	% Moisture	%	0.5	13.457076566	14.0077821011	37	4

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE133376.010	LB067960.014	Zinc, Zn	mg/kg	2	99	97	32	3
SE133377.004	LB067960.024	Arsenic, As	mg/kg	1	-0.1290700838	0.1164916272	200	0
		Zinc, Zn	mg/kg	2	6.6871817835	6.6009341176	60	1

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB067960.002	Arsenic, As	mg/kg	1	50	50	80 - 120	100
	Zinc, Zn	mg/kg	2	48	50	80 - 120	96

MATRIX SPIKES

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE133376.001	LB067960.004	Arsenic, As	mg/kg	1	350	280	50	138 ⑤

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

*	Non-accredited analysis.
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

STATEMENT OF QA/QC PERFORMANCE

SE141422 R0

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	(Not specified)
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME4079**
Order Number	**JME4079**
Samples	15

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE141422 R0
Report Number	0000116026
Date Reported	21 Jul 2015

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item

SAMPLE SUMMARY

Sample counts by matrix	15 Soils	Type of documentation received	COC
Date documentation received	14/7/2015	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	2.8°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	Samples clearly labelled	Yes
Complete documentation received	Yes		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HLHA9	SE141422.004	LB081344	11 Jul 2015	14 Jul 2015	10 Jul 2016	20 Jul 2015	10 Jul 2016	21 Jul 2015
HLHA10	SE141422.005	LB081344	11 Jul 2015	14 Jul 2015	10 Jul 2016	20 Jul 2015	10 Jul 2016	21 Jul 2015
HLHA12	SE141422.007	LB081344	11 Jul 2015	14 Jul 2015	10 Jul 2016	20 Jul 2015	10 Jul 2016	21 Jul 2015
HLHA13	SE141422.008	LB081344	11 Jul 2015	14 Jul 2015	10 Jul 2016	20 Jul 2015	10 Jul 2016	21 Jul 2015
HLHA18	SE141422.015	LB081344	11 Jul 2015	14 Jul 2015	10 Jul 2016	20 Jul 2015	10 Jul 2016	21 Jul 2015

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HLHA6	SE141422.001	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA7	SE141422.002	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA8	SE141422.003	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA9	SE141422.004	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA10	SE141422.005	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA11	SE141422.006	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA12	SE141422.007	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA13	SE141422.008	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA14	SE141422.009	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA15	SE141422.010	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA16	SE141422.011	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA17	SE141422.012	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
QC6	SE141422.013	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
QC7	SE141422.014	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015
HLHA18	SE141422.015	LB081140	11 Jul 2015	14 Jul 2015	25 Jul 2015	16 Jul 2015	21 Jul 2015	20 Jul 2015

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
HLHA6	SE141422.001	LB081274	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA7	SE141422.002	LB081274	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA8	SE141422.003	LB081274	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA9	SE141422.004	LB081274	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA10	SE141422.005	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA11	SE141422.006	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA12	SE141422.007	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA13	SE141422.008	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA14	SE141422.009	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA15	SE141422.010	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA16	SE141422.011	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA17	SE141422.012	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
QC6	SE141422.013	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
QC7	SE141422.014	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015
HLHA18	SE141422.015	LB081276	11 Jul 2015	14 Jul 2015	07 Jan 2016	20 Jul 2015	07 Jan 2016	21 Jul 2015

SURROGATES

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

METHOD BLANKS

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB081274.001	Arsenic, As	mg/kg	1	<1
LB081276.001	Arsenic, As	mg/kg	1	<1

DUPLICATES

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141406.010	LB081140.011	% Moisture	%w/w	1	17.8712871287	16.889632107	36	6
SE141421.007	LB081140.022	% Moisture	%w/w	1	12	11	39	9
SE141422.007	LB081140.033	% Moisture	%w/w	1	23.4	25.5	34	9
SE141422.015	LB081140.042	% Moisture	%w/w	1	13.3	15.3	37	14

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE141421.005	LB081274.014	Arsenic, As	mg/kg	1	4	5	53	20
SE141422.004	LB081274.024	Arsenic, As	mg/kg	1	330	320	30	4
SE141422.014	LB081276.014	Arsenic, As	mg/kg	1	21	20	35	3
SE141513.004	LB081276.023	Arsenic, As	mg/kg	1	<3	<3	103	5

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB081274.002	Arsenic, As	mg/kg	1	48	50	80 - 120	97
LB081276.002	Arsenic, As	mg/kg	1	50	50	80 - 120	100

MATRIX SPIKES

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE141086A.02	LB081274.004	Arsenic, As	mg/kg	1	45	9.47543943889	50	71
SE141422.005	LB081276.004	Arsenic, As	mg/kg	1	160	140	50	28 ④

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

*	NATA accreditation does not cover tthe performance of this service .
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS / LABORATORY DETAILS

Contact	James McMahon	Manager	Huong Crawford
Client	JM ENVIRONMENTS	Laboratory	SGS Alexandria Environmental
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Project	**JME4079**	SGS Reference	**SE141422 R0**
Order Number	**JME4079**	Report Number	0000116024
Samples	15	Date Reported	21 Jul 2015
Date Started	17 Jul 2015	Date Received	14 Jul 2015

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin .

SIGNATORIES

Andy Sutton

Andy Sutton	Dong Liang	Ravee Sivasubramaniam
Senior Organic Chemist	Metals/Inorganics Team Leader	Asbestos Analyst / Hygiene Team Lead

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE141422.001 Soil 11 Jul 2015 HLHA6	SE141422.002 Soil 11 Jul 2015 HLHA7	SE141422.003 Soil 11 Jul 2015 HLHA8	SE141422.004 Soil 11 Jul 2015 HLHA9

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320 Tested: 20/7/2015

Parameter	Units	LOR	HLHA6	HLHA7	HLHA8	HLHA9
Arsenic, As	mg/kg	1	11	5	14	330

Fibre Identification in soil Method: AN602 Tested: -

FibreID

Parameter	Units	LOR	HLHA6	HLHA7	HLHA8	HLHA9
Asbestos Detected	No unit	-	-	-	-	No

SemiQuant

Parameter	Units	LOR	HLHA6	HLHA7	HLHA8	HLHA9
Estimated Fibres*	%w/w	0.01	-	-	-	<0.01

Moisture Content Method: AN002 Tested: 16/7/2015

Parameter	Units	LOR	HLHA6	HLHA7	HLHA8	HLHA9
% Moisture	%w/w	1	21.6	34.6	34.1	25.6
% Total Solids	%w/w	1	78.4	65.4	65.9	74.4

Parameter	Units	LOR	SE141422.005 Soil 11 Jul 2015 HLHA10	SE141422.006 Soil 11 Jul 2015 HLHA11	SE141422.007 Soil 11 Jul 2015 HLHA12	SE141422.008 Soil 11 Jul 2015 HLHA13
Sample Number / Sample Matrix / Sample Date / Sample Name						

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320 Tested: 20/7/2015

Arsenic, As	mg/kg	1	140	180	93	220

Fibre Identification in soil Method: AN602 Tested: 20/7/2015

FibreID

Asbestos Detected	No unit	-	No	-	No	No

SemiQuant

Estimated Fibres*	%w/w	0.01	<0.01	-	<0.01	<0.01

Moisture Content Method: AN002 Tested: 16/7/2015

% Moisture	%w/w	1	30.2	26.1	23.4	21.8
% Total Solids	%w/w	1	69.8	73.9	76.6	78.2

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE141422.009 Soil 11 Jul 2015 HLHA14	SE141422.010 Soil 11 Jul 2015 HLHA15	SE141422.011 Soil 11 Jul 2015 HLHA16	SE141422.012 Soil 11 Jul 2015 HLHA17

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320 Tested: 20/7/2015

Parameter	Units	LOR	SE141422.009	SE141422.010	SE141422.011	SE141422.012
Arsenic, As	mg/kg	1	110	50	10	39

Fibre Identification in soil Method: AN602 Tested: -

FibreID

Parameter	Units	LOR	SE141422.009	SE141422.010	SE141422.011	SE141422.012
Asbestos Detected	No unit	-	-	-	-	-

SemiQuant

Parameter	Units	LOR	SE141422.009	SE141422.010	SE141422.011	SE141422.012
Estimated Fibres*	%w/w	0.01	-	-	-	-

Moisture Content Method: AN002 Tested: 16/7/2015

Parameter	Units	LOR	SE141422.009	SE141422.010	SE141422.011	SE141422.012
% Moisture	%w/w	1	26.9	13.9	21.1	15.9
% Total Solids	%w/w	1	73.1	86.1	78.9	84.1

		Sample Number	SE141422.013	SE141422.014	SE141422.015
		Sample Matrix	Soil	Soil	Soil
		Sample Date	11 Jul 2015	11 Jul 2015	11 Jul 2015
		Sample Name	QC6	QC7	HLHA18
Parameter	**Units**	**LOR**			
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320 Tested: 20/7/2015					
Arsenic, As	mg/kg	1	7	21	63
Fibre Identification in soil Method: AN602 Tested: -					
FibreID					
Asbestos Detected	No unit	-	-	-	No
SemiQuant					
Estimated Fibres*	%w/w	0.01	-	-	<0.01
Moisture Content Method: AN002 Tested: 16/7/2015					
% Moisture	%w/w	1	18.6	16.9	13.3
% Total Solids	%w/w	1	81.4	83.1	86.7

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Moisture Content Method: ME-(AU)-[ENV]AN002

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB081140	%w/w	1	9 - 14%

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB081274	mg/kg	1	<1	4 - 20%	97%	71%
	LB081276	mg/kg	1	<1	3 - 5%	100%	28%

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned. Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf). AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg." The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.	NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

ANALYTICAL REPORT

CLIENT DETAILS

Contact	James McMahon
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Project	**JME4079**
Order Number	**JME4079**
Samples	5

LABORATORY DETAILS

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SGS Reference	SE141422 R0
Report Number	0000116025
Date Reported	21 Jul 2015
Date Received	14 Jul 2015

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin .

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Ravee Sivasubramaniam
Asbestos Analyst / Hygiene Team Lead

ANALYTICAL REPORT

RESULTS

Fibre Identification in soil

Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE141422.004	HLHA9	Soil	197g Sand,Soil,Rocks	11 Jul 2015	No Asbestos Found Organic Fibres Detected	<0.01
SE141422.005	HLHA10	Soil	244g Sand,Soil,Rocks	11 Jul 2015	No Asbestos Found Organic Fibres Detected	<0.01
SE141422.007	HLHA12	Soil	143g Sand,Soil,Rocks	11 Jul 2015	No Asbestos Found Organic Fibres Detected	<0.01
SE141422.008	HLHA13	Soil	148g Sand,Soil,Rocks	11 Jul 2015	No Asbestos Found Organic Fibres Detected	<0.01
SE141422.015	HLHA18	Soil	436g Sand,Soil,Rocks	11 Jul 2015	No Asbestos Found Organic Fibres Detected	<0.01

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned. Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf). AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg." The sample can be reported "no asbestos found at the reporting limit of 0.1 g/kg" (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no 'respirable' fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service.
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

APPENDIX NINE. REMEDIATION ACTION PLAN

JM
ENVIRONMENTS ABN 67 166 341 288
0427 893 668
www.jmenvironments.com

REMEDIATION ACTION PLAN (Revision 3)

30 Swan St Morpeth NSW

7 September 2015

Prepared by

James Mc

James McMahon

Principal Environmental Scientist

EXECUTIVE SUMMARY

This report presents the preparation of a Remediation Action Plan (RAP) undertaken by JM Environments (JME) for a portion of 30 Swan Street, Morpeth NSW (the site) as shown in Figure 1.

The work was commissioned by Mr Brad Lantry.

The previous land use of the site was a railway corridor and terminus and the site is currently used as rural residential land use. It is proposed to rezone the site for residential land use. JME has conducted a Preliminary Contamination Assessment which concluded that the site was potentially contaminated from its previous land use. A Detailed Contamination Assessment by JME concluded the site was considered unsuitable for rezoning in its current state from a contamination point of view. A more detailed summary of these reports are presented in Section 3 of the RAP. Based on that conclusion Maitland City Council (MCC) requires a Remediation Action Plan from a contaminated land consultant to describe how the site can be made suitable with appropriate remediation.

The objectives of this RAP are to provide a remediation strategy for the site.

In order to achieve the above objectives, the following scope of work was undertaken:

- A review of previous contamination assessments;
- Preparation of this RAP report.

JME recommends the removal of contaminated soil to an approved waste facility and replacing the soil with validated “clean” soil as the most appropriate remedial technique to render the site suitable for residential land use.

ACM concentration in remediation area 2 is likely to be low. Hence, tilling the soil and hand picking ACM from the surface is considered a cost effective remediation strategy for this area.

Upon completion of the remedial works, a validation report will be produced summarising the results of the remediation and final validation of the site. The report will be written to comply with industry standards and relevant guidelines and will provide a statement as to the suitability of the site for the proposed future land use.

The validation report will be prepared in accordance with the NSW OEH (2011) *Guidelines on Consultants Reporting on Contaminated Site*

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1 x pdf	JME15051 – Swan Street Morpeth Remediation Action Plan	Rev 3	7 September 2015	PCB	MD

CONTENTS

ATTACHMENTS

1 INTRODUCTION

1.1 General

This report presents the preparation of a Remediation Action Plan (RAP) undertaken by JM Environments (JME) for a portion of 30 Swan Street, Morpeth NSW (the site) as shown in Figure 1.

The work was commissioned by Mr Brad Lantry.

The previous land use of the site was a railway corridor and terminus and the site is currently used as rural residential land use. It is proposed to rezone the site for residential land use. JME has conducted a Preliminary Contamination Assessment which concluded that the site was potentially contaminated from its previous land use. A Detailed Contamination Assessment by JME concluded the site was considered unsuitable for rezoning in its current state from a contamination point of view. A more detailed summary of these reports are presented in Section 3 of the RAP. Based on that conclusion Maitland City Council (MCC) requires a Remediation Action Plan from a contaminated land consultant to describe how the site can be made suitable with appropriate remediation.

1.2 Objectives

The objectives of this RAP are to provide a remediation strategy for the site.

1.3 Scope of Work

In order to achieve the above objectives, the following scope of work was undertaken:

- A review of previous contamination assessments;
- Preparation of this RAP report.

2 SITE DESCRIPTION

2.1 Site Location and Identification

General site information is provided below in Table 1.

TABLE 1 – Summary of Site Details

SITE ADDRESS:	30 Swan, Morpeth NSW shown in Figure 1.
SITE AREA:	Approximately 7,900m^2
CURRENT ZONING	RU1 Primary Production
SITE IDENTIFICATION:	Lot 3 DP237264 within the Local Government area of Maitland, Parish of Alnwick, County of Northumberland.
PREVIOUS LANDUSE:	Historical evidence indicates that the site has been used as a • Railway line and terminus; • Rural residential.

CURRENT LANDUSE:	Rural residential
PROPOSED LANDUSE:	Residential
ADJOINING SITE USES:	Residential land use south and west of the site; Rural land use north and east of the site
SITE COORDINATES	Easting 383950, Northing 6356784

2.2 Site Topography and Drainage

A review of the online topographic map (www.maps.six.nsw.gov.au) indicates the site is relatively flat and less than 10m above sea level. Stormwater from site would drain into the paddock immediately north of the site. It is expected that the local stormwater would discharge into the Hunter River approximately 160m north of site.

2.3 Local Geology, Hydrogeology and Groundwater Use

A review of Newcastle 1:250,000 Geological Series Sheet S1 56-2, First Edition, 1966 indicates that the site is underlain by Quaternary soils made up of gravel, sand, silt, clay "waterloo rock" (aka indurated sand or "coffee rock"), marine and freshwater deposits.

The NSW Department of Water and Energy operates a website listed as www.waterinfo.nsw.gov.au with search tools that provide summary reports on registered bores in NSW. JME carried out a search of registered bores on this website on the 21 March 2014. The results of this search indicated that that there were no registered bores within a 1 kilometre radius of the Site. .

It is anticipated that groundwater will be located between 2mbgs and 6mbgs of site and flow north towards the Hunter River.

A review of the online acid sulfate risk map (www.nratlas.nsw.gov.au) indicated that the site is located on the border of Class 4 and Class 5 acid sulfate areas. Class 4 areas require an acid sulfate soil assessment be conducted for works beyond 2 metres below natural ground surface or works by which the watertable is likely to be lowered beyond 2 metres below natural ground surface. Class 5 areas require an acid sulfate soil assessment for works within 500 metres of adjacent Class 1, 2, 3, or 4 land which are likely to lower the watertable below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land.

2.4 PREVIOUS CONTAMINATION ASSESSMENTS

As mentioned earlier JME has conducted a PCA, *JME4015 Preliminary Contamination Assessment 30 Swan Street Morpeth 16 April 2014* (JME2014) and a DCA, *JME4079 Swan Street Morpeth Detailed Contamination Assessment* (JME2014a).

2.4.1 JME2014

A review of the JME2014 was undertaken. The objectives of JME2014 were to:

- identify potentially contaminating activities that are currently being performed on the site and that may have been performed on the site in the past;

- assess Areas of Environmental Concern (AEC's) and Chemicals of Concern (COC's) for the site; and
- provide recommendations on further assessment or remediation, if considered necessary.

In order to meet the objectives the following scope of works was undertaken:

- desktop study;
- a site walkover;
- review and collation of the above information and identification of potential Areas of Environmental Concern (AECs) and potential Chemicals of Concern (COCs);
- preparation of the PCA report.

The desk stop study indicated the site had been potentially contaminated from its past use as railway station and rail terminus. It was recommended that a detailed contamination site assessment which includes soil sampling and analysis is undertaken to further assess the potential contamination of the site. The areas of environmental concern (AEC) and the potential chemicals of concern (PCoC) from the PCA are summarised in Table 2.

Table 2 Areas of Concern and Chemicals of Concern

AEC	POTENTIAL CONTAMINATING ACTIVITY	POTENTIAL COCS	LIKELIHOOD OF CONTAMINATION *	COMMENT
1. Entire site	Former use as a train terminal. Uncontrolled filling across site.	Metals,TPH, PAH, BTEX,OCPs, OPPs, PCBs Metals, and Asbestos	Medium	Contamination, if any, from train use would be from the surface down. Fill of unknown origin and quality used to level the line.
2. Former engine shed	Maintenance of steam engine	TPH, PAH, BTEX, Metals, and Asbestos (brakes)	Medium-low	Contamination, if it existed would be located in the upper soils.
Passenger station	Weathering and demolition of hazardous building materials	Zinc, lead and asbestos.	low	Asbestos contamination risk is considered low as buildings were likely to be constructed prior to asbestos being used in building products.

NOTES:
** = It is important to note that this is not an assessment of the financial risk associated with the AEC in the event contamination is detected, but a qualitative assessment of the probability of contamination being detected at the potential AEC.*
Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc; TPH - Total Petroleum Hydrocarbons; PAH - Polycyclic Aromatic Hydrocarbons; OCP - Organochlorine Pesticides; OPP – Organophosphorus Pesticides

It was assumed that rezoning the site for residential land use would result in single/double storey residential developments. Hence the disturbance of the soil 2m below the surface was considered unlikely into the future. Therefore further assessment of acid sulfate soils was not considered necessary.

2.4.2 JME2014a

JME2014a described the assessment of soil samples collected using an excavator on 2 October 2014 from eighteen test pits located in a grid pattern across the site. Four further test pits were excavated around test pit TP4 on 17 November 2014 to delineate arsenic contamination identified in test pit TP4. Four hand auger samples were collected along Swan Street to assess the ambient background concentrations of metals in the urban area around the site. Thirteen hand auger samples were collected on 11 July 2015 to further assess the arsenic contamination on site. The sampling methodology included:

- The use of new disposable gloves for each sampling event;
- Transfer of samples into laboratory-prepared glass jars, and capping immediately;
- Collection of 10% replicate samples for Quality Assurance / Quality Control (QA/QC) purposes;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of the sample jars, bottles and. replicate sample bags into a cooled, insulated and sealed container for transport to the laboratory; and
- Use of COC documentation ensuring that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory.

The results of test pitting indicated that the northern half of the site contains a variety of fill. Test pits TP1-TP3 were located in the northern eastern corner of site. The fill in these test pits contained significant amounts of red and grey ash and charcoal with some coal with depths ranging from 1-1.6mbgs.

Test pits TP4-8, located along the northern boundary of site, contained significant amounts of sandstone cobbles and boulders at depths ranging from 0.5-1.4mbgs. Test pits TP 9-11 and TP14, located on the central eastern portion of site, contained fill comprised primarily of dark grey gravelly sand and sand with trace amounts of brick rubble and metal pieces. Fragments of asbestos containing materials (ACM) were also located in test pits TP9 and TP10. Test pits TP12 and TP13, located centrally on the western portion of site, were typified by containing slabs of sandstone (TP12, See Photo3) and concrete (TP13).

Test pits TP15-18 were excavated along the southern boundary of site. These test pits indicate that the southern portion of site has not been filled however some anthropogenic objects e.g. small fragments of broken china indicates the topsoil has been disturbed.

In general the fill/topsoil on site is underlain by a stiff to very stiff dark grey/black alluvial clay.

Laboratory analysis of selected samples indicated that concentrations of BTEX, OCP, OPP, PCB were not detected above the laboratory reporting limit in the samples analysed. Concentrations of TRH, PAH, cadmium, chromium, nickel and mercury were not detected above the adopted ILs in the samples analysed.

BaP was detected above the adopted IL (0.7mg/kg) in the samples collected from TP5 0.1-0.2 (1.2mg/kg), TP11 0.2-0.3 (0.8mg/kg), TP13 0.1-0.2 (1.4mg/kg), TP15 0.1-0.2 (1.8mg/kg), TP10 0.1-0.2 (0.9mg/kg), TP9 0.1-0.2 (1.2mg/kg) and TP18 1.0-0.2 (2.3mg/kg). The UCL was calculated for BaP following the removal of TP15 0.1-0.2 and TP18 1.0-0.2 from the data set as their concentration were greater than 250% of the IL. The UCL for BaP was 0.6mg/kg.

BaP-TEQ was detected above the adopted IL (3mg/kg) in the sample collected from TP18 1.0-0.2 (3.3mg/kg). The UCL was calculated for BaP-TEQ to be 1.2mg/kg.

Arsenic was detected above the adopted IL (100mg/kg) in the sample collected from TP4 0.1-0.2 (340 mg/kg), TP6 0.0-0.1 (120mg/kg), TP7 0.0-0.1 (200mg/kg), TP8 0.1-0.2 (120mg/kg), HLHA9 (330mg/kg), HLHA10 (140mg/kg), HLHA11 (180mg/kg), HLHA13 (220mg/kg) and HLHA14 (110mg/kg). The arsenic detected exceeded both the adopted HIL and EIL at these locations. The UCL was calculated for arsenic following the removal of TP4 0.1-0.2 and HLHA9 from the data set as their concentrations were greater than 250% of the IL. The UCL for arsenic in surface samples was 110mg/kg.

Copper was detected above the adopted IL (60mg/kg) in the sample collected from TP4 0.1-0.2 (120mg/kg), TP6 0.0-0.1 (61mg/kg), TP7 0.0-0.1 (75mg/kg) and TP13 0.1-0.2 (66mg/kg). The UCL for copper was calculated to be 44mg/kg.

Lead was detected above the adopted IL (300mg/kg) in the sample collected from TP13 0.1-0.2 (400mg/kg) and TP18 1.0-0.2 (550mg/kg). The UCL for lead was calculated to be 44mg/kg.

Zinc was detected above the adopted IL (195mg/kg) at locations TP2 0.0-0.1 (350mg/kg), TP15 0.4-0.5 (200mg/kg), TP9 0.1-0.2 (310mg/kg), TP13 0.1-0.2 (330mg/kg) and TP18 1.0-0.2 (520mg/kg). The UCL was calculated for zinc following the removal of TP18 0.1-0.2 from the data set as its concentration was greater than 250% of the IL. The UCL for zinc was 150mg/kg.

Potential ACM fragments were collected from three test pits, TP1, TP9 and TP10. Laboratory analysis confirmed the presence of asbestos in each of the fragments. A sample of surface soil was collected from TP2 and analysed for presence of asbestos. No asbestos was detected.

Test pitting of site indicates that the site is aesthetically impacted by the presence of large quantities of various types of shallow fill.

The UCL95 for the surface arsenic concentrations was 110mg/kg and arsenic detection Delineation of the arsenic contamination was attempted in fieldwork undertaken on 17 November 2014 (test pitting) and 11 July 2015 (hand auger). Two samples were collected from each test pit. Concentrations of arsenic in samples collected from the upper soil profile (0.1-0.3mbgs) in the test pits ranged from 22mg/kg-1,000mg/kg. Soil samples collected from depth (0.8-1.3mbgs) in the test pits had concentrations between 27mg/kg-94mg/kg. Based on the results is considered the arsenic contamination identified in TP4 is delineated to the west by TP5, to the south by TP11, to the east by HLHA18. The delineation test pits are shown in Figure 4. Hand auger samples collected from the western portion of site indicate that the former railway track footprint is also contaminated with arsenic above HIL.

The UCL for zinc, 150mg/kg, was below the adopted IL of 195mg/kg. One sample collected from TP18 marginally exceeded the 250% IL (490mg/kg) at 520mg/kg. Given that the samples collected off site from along Swan Street had an average concentration of 570mg/kg, the exceedance of zinc at TP18 was not considered significant.

The sampling locations are shown on Figure 2.

3 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) has been prepared for the site with reference to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amendment 2013)

Schedule B2. The CSM identifies potential contaminant sources and contaminants of concern, contaminant release mechanisms, exposure pathways and potential receptors. In this case the fieldwork and laboratory analysis undertaken by JME has reduced the chemicals of concern to arsenic and asbestos. The CSM is presented in Table 3 below.

Table 3: Conceptual Site Model for 30 Swan St Morpeth.

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathways	Potential Receptors
Maintenance/Demolition of former railway	Termite prevention treatment of wooden rail way sleepers. Dumping of coal ash	Movement of contaminated surface soils via runoff. Leaching of contamination via storm water infiltration/ percolation	Soil, groundwater, surface water	Arsenic	Dermal contact, inhalation (dust), ingestion	Current: Site owners, site visitors, surface water bodies, groundwater and neighbouring properties. Future: Residents, construction workers, site visitors, surface water bodies, groundwater, neighbouring properties.
Demolition of former rail buildings	Poor demolition practices of hazardous building materials.	Movement of contaminated surface soils via runoff. Leaching of contamination via storm water infiltration/ percolation	Air, soil, surface water	Asbestos	Dermal contact, inhalation (dust), ingestion	
Potential storage of coal or spent coal	Contaminated soils did not appear visibly contaminated.	Movement of contaminated surface soils via runoff. Leaching of contamination via storm water infiltration/ percolation	Soil, groundwater, surface water	BaP	Dermal contact, inhalation (dust), ingestion	

4 REMEDIAL ACTION PLAN

4.1 Remedial Objective

The remediation objective, where contamination poses unacceptable risks to human health or the environment, is to determine the most technically appropriate methodology that addresses the financial, timing and logistical constraints of the client to ensure that the site is suitable for the proposed uses and protection of the environment.

4.2 Discussion of the Extent of the Remediation Required

Based on the results of the previous contamination assessments it appears that the arsenic impact lies within 0.5m of the surface in the area of site bounded by TP5 to the west, TP11 to the south, TPE4 to the east and the site boundary to the north (remediation area 1). The former railway footprint on the lower bench of the western portion of site is also impacted by arsenic contamination (remediation area 2). It is estimated that there is approximately 126m^3 of impacted soil.

Asbestos containing materials (ACM) were found at TP1, TP9 and TP10 and as such some remediation of this area (remediation area 3) for ACM contamination is required. Based on the observations from JME2014a it assumed that less 10m^2 of ACM is present in the soil on site.

BaP contamination at locations TP18 and TP 5 exceeded the IL by more 250% it is assumed that approximately 56m^3 (6m radius) has been impacted at remediation areas 4 and 5.

The areas requiring remediation are shown in Figure 3.

4.3 Discussion of Possible Remedial Options

DEC, 2006 provides a preferred hierarchy of options for site clean-up and/or management, which was originally developed in NEPC 1999. The hierarchy is outlined as follows:

1. **On site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level**. This is not considered technically feasible for the contaminants of concern.
2. **Off site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site.** This option is not considered technically feasible for the chemicals of concern.
3. **Removal of contaminated soil to an approved treatment site or waste facility followed, where necessary, by replacement with clean fill.** This option is considered technically feasible and not cost prohibitive due to the relatively small volume of soil requiring disposal.
4. **Consolidation and isolation of the soil on site by containment with a properly designed barrier.** This option is considered technically feasible on the site. The potential exposure between surface human and environmental populations to the fill material would be removed. However legacy issues including ongoing monitoring may not be appealing to future purchasers.

JME has not considered a ‘do nothing’ strategy because of the proposal to develop the site.

4.4 Recommended Remedial Option

JME recommends the removal of contaminated soil to an approved waste facility and replacing the soil with validated “clean” soil as the most appropriate remedial technique to render the site suitable for residential land use for remediation areas 1, 2, 4 and 5.

ACM concentration in remediation area 3 is likely to be low. Hence, tilling the soil and hand picking ACM from the surface is consider a more cost effective remediation strategy for this area.

Removal of near surface slabs and boulders.

These options have been chosen:

- to allow removal of arsenic contamination that exceeded the adopted HILs;
- due to the relatively small volume of contaminated soil to be removed from remediation areas 1, 2, 4 and 5; and
- due to the lack of contamination legacies with this method; and
- the cost of hand picking of ACM is significantly lower than removing and dumping soil;

Specifically the remedial strategy will comprise the following:

- Remediation area 1, 2, 4 and 5:
  - The presence of an appropriately qualified and RAP inducted project manager to oversee the remediation strategy and to ensure that all records are kept for future validation of the site.
  - The excavation and temporary stockpiling of the surface soils from remediation areas 1, 2, 4 and 5;
  - Validation/Waste classification of temporary stockpiles:
  - Re - emplacement or removal from site of the temporary stockpiles.
  - Validation of excavated area.
  - Importation and placement of “clean” soil.
- Remediation area 3
  - Tilling the upper 300mm of the surface of remediation area 2;
  - Hand picking of ACM from tilled soil;
  - Validation of ACM removal.
- Site aesthetics in general. Most aesthetic issues will be dealt with coincidentally with the above strategy. Other slabs and or boulders near the surface in other areas of site will be removed and disposed of offsite as general solid waste (pre-classified)

It is envisaged that the remediation will be conducted over two-three stages depending on the availability of plant and equipment. This will be done to allow the assessment of stockpiles.

4.4.1 Excavations of Site Soils

Remediation area 1, 2, 4 and 5 will be excavated to a target depth of 0.2m. Soils that are excavated will be checked visually for the potential presence of asbestos containing materials or other waste. Excavated soils will be stockpiled on plastic sheeting, in order to minimise the risk of cross-contamination to other site soils.

The excavations will be supervised by an appropriately trained and experienced environmental scientist, who will guide the excavations and undertake the visual screening. The excavations will be extended until visual evidence indicates that the extent of contaminated soil has been removed.

Validation sampling of the excavations will be undertaken to confirm that contaminated soil has been effectively removed. The site validation programme will be carried out in accordance with the NSW EPA (1994) *Guidelines for Assessing Service Station Sites*. Further details on the validation programme are included in Section 8.5.

During the excavation and stockpiling there is a natural tendency for contaminated soils and non-contaminated soils to be inadvertently blended thereby averaging the concentration of contaminants. Caution will be taken not to over excavate the soils to reduce the mixing of soils. The stockpiles of excavated material will be sampled after being created in order to provide an assessment of contamination within the stockpiles. Those stockpiles not suitable for on-site re-use following the initial sampling event will be disposed of off-site at a suitably licensed landfill. Stockpiles that are validated as suitable will be reinstated.

If an 8.5mx8.5m area does not pass the remediation acceptance criteria (see below), a further 200mm will be excavated until the area passes the validation criteria.

Materials will be tracked from excavation to stockpile creation so that the location of soils origin is known.

4.4.2 Remediation of Surface Asbestos Contamination

ACM observed on the surface of remediation area 3 will be handpicked. Following the handpicking, the surface of remediation area 2 will be ripped using the tynes of an excavator bucket (or similar) to a depth of approximately 15-30cm. The ripped area will be divided into 10mx10m squares. Each square will raked in two direction at right angles to each other. Further observed ACM will handpicked throughout this process.

4.4.3 Validation of Remediation Area 1, 2, 4 and 5

The remediation acceptance criteria (RAC) for the soil validation of arsenic and BaP were established based on the National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 1999 – amended 2013) Guideline on Investigation Levels for Soil and Groundwater. Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools, HIL A / HSL A & HSL B and the National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 1999 – amended 2013) Guideline on Investigation Levels for Soil and Groundwater – Urban residential / public open space. Where a CoC has an investigation level listed in more than one table the more conservative value was adopted as the RAC.

Although the NEPM guidelines indicate that site specific risk based remediation criteria should be developed as remediation criteria in preference to use of investigation levels (ILs) (as they may be more conservative than required) the guidelines referenced above are considered appropriately conservative to be used for site remediation criteria based on the proposed land use and proximity of neighbouring sensitive receptors. The RAC is summarised in Table 4.

TABLE 4: Site Remediation Acceptance Criteria (RAC)

Analyte Name	Units	RAC
Arsenic	mg/kg	100
BaP	mg/kg	0.7
Bonded Asbestos at surface	-	None visible
Bonded ACM	% w/w	0.01
Asbestos Fines	% w/w	0.001

4.4.4 Validation of Excavations in Remediation Area 1, 2, 4 and 5

In order to validate the excavations, the following works will be undertaken:

- The excavations will be visually assessed to confirm that potentially contaminated soil has been removed to the extent practical.
- Validation soil samples will be taken at a ratio of 1 sample per 64m^2. Where applicable, soils samples will be collected from the batter of the excavation at a rate of 1 sample per 10 lineal metres.
- Samples will be collected by using hand tools.
- A clean pair of disposable gloves will be worn when collecting each sample.
- Samples will be kept chilled while in the field and in transit to the laboratory.
- An excavation in remediation area 1 and 2 will be considered remediated if all validation analytical data for arsenic is less than 250mg/mg and the UCL95% of arsenic is less than 100mg/kg.
- An excavation in remediation area 4 and 5 will be considered remediated if all validation analytical data for BaP is less than 1.75mg/mg, the UCL95% of arsenic is less than 0.7mg/kg and the UCL95% of lead is less than.

4.4.5 Validation of Stockpiles in Remediation Area 1, 2, 4 and 5

In order to validate stockpiles of excavated material, the following works will be undertaken:

- Stockpile samples will be taken at a rate as per Table 5.

Table 5: Sampling of Stockpiled Material*

Quantity (m^3)	Number of Samples
<75	3
75 - <100	4
100 - <125	5
125 - <150	6
150 - <175	7
175 - <200	8

*From Section 7.5.2 NEPM Schedule B2

- Samples will be taken using hand tools such as a trowel or hand auger. Excavator may also be used to collect stockpile samples;
- Samples will be collected at different depths within the stockpile in order to provide adequate representation of the stockpile contamination status.

- Where hand tools are used, these will be decontaminated between samples by rinsing with phosphate-free detergent and potable water.
- Where an excavator is used to collect stockpile samples, the samples will be taken from the centre of the excavator bucket in order to minimise the potential for cross-contamination.
- A clean pair of disposable gloves will be worn when collecting each sample.
- Samples will be kept chilled while in the field and in transit to the laboratory.

4.4.6 Validation of Remediation Area 3.

Following the handpicking of ACM from remediation area 3 a test pit will be excavated at the centre of each 10mx10m square. Each test will extend to the base of fill. A 10 litre soil sample will be collected at 0.5 below ground surface (mbgs) and each metre thereafter. Each 10 litre sample will be weighed and separated using a 7mm sieve. The +7mm fraction will be inspected for ACM fragments. If ACM is observed then the ACM will be collected and weighed and a representative portion of <7mm fraction will sent to a laboratory and analysed for the presence/absence of asbestos fines. A sample will be collected from each test pit analysed for BaP.

Collected ACM will be double bagged and disposed of at a landfill licenced to accept asbestos waste. Refer to Section 5.7 for the appropriate guidance of working with soils potentially contaminated with asbestos.

4.5 Validation Laboratory Analysis

4.5.1 Excavations and Stockpiled Soils

The validation samples collected from the excavations will be analysed for arsenic, BaP and lead as required. If suspected asbestos containing materials are observed during the excavation the concentration of asbestos in soils will also be assessed.

4.5.2 Data Quality Assurance/Quality Control

The data quality assurance and quality control samples are listed in Table 6.

Table 6 - Data Quality Indicators (DQI)

Type of Quality Control Sample	Control Limit
Duplicate and Triplicate Samples	RPDs within 50% for analyte concentrations greater than 5 x Limit of reporting
Rinsate Samples (deionised water)	Analytes not detected at concentrations greater than the blank deionised water.
Spikes	Laboratory spike acceptance limits are a “live” range and updated regularly. The laboratory acceptance limits at the time of analysis will used.
Blanks	Analytes not detected

The QA/QC review will include checking of the DQIs against completeness, comparability, representativeness, precision and accuracy of the data.

4.6 Importation of Soils

Following the validation of the excavations and emplacement of validated stockpiles remaining voids will be backfilled with either virgin excavated natural material (VENM) or excavated natural material (ENM). Imported material must be classified at the point of origin and delivered to site directly from the point of origin. A copy of the validation letter must be reviewed and approved by an appropriately qualified and RAP inducted project manager prior to delivery of the material.

4.7 Validation Data Assessment and Reporting

The laboratory data will be reviewed by JME to assess data usability by applying the generally utilised data validation guidelines. Statistical interpretation of validation data may be used to assess whether the remediation goals have been met. Based on the assessment, areas that have been satisfactorily remediated will be identified and will be designated by JME as 'No Further Action Required.' Where data assessment has indicated that the remediation criteria have not been met, JME will discuss with Mr Lantry the areas requiring further remediation. Further remediation may include the excavation of additional material, sampling of excavated material and validation sampling of the excavation.

Upon completion of the remedial works, a validation report will be produced summarising the results of the remediation and final validation of the site. The report will be written to comply with industry standards and relevant guidelines and will provide a statement as to the suitability of the site for the proposed future land use.

The report will be prepared in accordance with the NSW OEH (2011) *Guidelines on Consultants Reporting on Contaminated Sites.*

5 SITE MANAGEMENT PLAN DURING REMEDIATION

The remediation works have the potential to cause environmental or human health issues during excavation and stockpiling of contaminated soils. This section of the RAP discusses measures to lower these risks.

The Plan will address:

- Site Access;
- Hours of operation;
- Stormwater and soil management;
- Noise control;
- Dust Control and Monitoring;
- Odour control;
- Occupational health and safety;
- Remediation Schedule
- Other issues required to be addressed.

Each of the issues to be addressed in the site management plan is briefly discussed below.

5.1 Site Access

The site is fenced and adequate fences or barriers will be placed around the excavations and stockpiles to prevent access of unauthorised personnel to areas where contaminated material is exposed, and also to prevent the public from the hazards of excavations. Adequate warning signs will also be placed around the area.

5.2 Hours of Operations

Remediation hours of operations will be limited to the hours of general site works as stipulated in the DA consent.

5.3 Stormwater and Soil Management

Adequate stormwater runoff, run-on and sediment control measures will be put in place for the remedial works.

- The stockpiles should be managed in a way to prevent harm to the environment and general public from potentially contaminated soils within the stockpiles.

The following recommendations provide guidance on managing stockpiled material:

- Access to the stockpiles of potentially contaminated material should be limited by keeping stockpiles within site fences;
- Stockpiles should be placed on level ground. If this is not possible stockpiles should not be placed on slopes greater than 5°;
- Material should be placed on strong impermeable plastic sheeting to prevent the contamination of the underlying soils. Material should not be stockpiled more than 2m high;
- Once the soils have been stockpiled, the stockpiles should be covered by weighted polythene sheets or tarpaulins to prevent erosion of stockpiled materials. Heavy objects not containing sharp edges should be placed on the sheets to prevent them from being blown by wind;
- Adequate straw bales and/or silt fences should be placed around the perimeter of the stockpile area to filter runoff from the stockpiles and prevent overland storm water flow from affecting the base of the stockpile;
- A diversion trench should be excavated, or tightly packed sand bags placed, up-gradient of the stockpile to prevent storm water running into the stockpile.

5.4 Noise

To mitigate noise impacts which may arise as a result of remedial works, the civil contractor will undertake the works in accordance with state and local noise regulations applicable to the site.

5.5 Dust Control

Dust control is required to prevent airborne dust being inhaled by human receptors. Airborne dust may be generated by wind action from loose earth left on the ground. This could cause migration of contaminated dust, as well as cause a nuisance for the surrounding area and must be controlled.

Therefore, the following dust control measures are proposed:

- Dust levels will be monitored visually during site work; and
- Soil will be kept adequately moist to reduce the generation of dust.

Air monitoring for air borne fibres will be undertaken during remediation and validation of asbestos impacted areas.

5.6 Odour

The remediation works are not expected to generate any significant odours.

5.7 Occupational Health and Safety

A Health, Safety, Security and Environmental (HSSE) Plan should be prepared by the remediation contractor, in accordance with relevant NSW legislation.

The HSSE Plan should include, but not be limited to, the following.

- Hazard Identification and Control;
- Dust and odour monitoring during excavation and stockpiling works;
- Chemical Hazard Control;
- Handling Procedures;
- Personal Protective Equipment;
- Work Zones;
- Decontamination procedures;
- Contingency Plans; and
- Incident Reporting.

The HSSE Plan should be periodically reviewed and updated prior to various project tasks being conducted.

The contractor, supporting sub-contractors and third party observers to the site will be required to work strictly to this plan. During site activities, only approved personnel should be allowed access to the remediation work area.

The HSSE Plan will identify hazards, assess the risks posed by the hazards and recommend measures to control the hazards.

5.7.1 Summary of Contamination and Exposure Pathways

Exposure of site users to contaminants could occur through:

- Dermal contact with contaminated soil;
- Ingestion of contaminated soil;
- Inhalation of hydrocarbon vapours; and
- Inhalation of contaminated dust.

5.7.2 Health and Safety Control Measures for Contamination Hazards

The following section presents some control measures that should be adopted to manage health and safety hazards posed by contamination during the remediation. These control measures include:

- Site Access;
- Personal Protective Equipment;
- Safe Work Practices.

It is important to note that this section only covers contamination issues associated with contaminated soil. It is also important to note that these procedures will need to be evaluated for effectiveness and where necessary revised and/or improved during site work.

Personal Protective Equipment (PPE)

To minimise short and long term health risks associated with the potential exposure to contaminants, the minimum level of PPE required for persons undertaking the excavations include:

- Hard hats;
- High visibility clothing;
- Long sleeve shirts and trousers;
- Steel capped workers boots;
- Safety glasses;
- Chemical resistant rubber gloves for persons coming in contact with the soil; and
- Dust resistant disposable overalls and P1 (minimum) dust masks when handling potentially asbestos contaminated soil.

Safe Working Practices

Chemical resistant gloves should be changed after handling each sample and disposed of appropriately.

The contractor should ensure that adequate signage is present across the remediation area to warn unauthorised persons from entering the area.

Eating, drinking, chewing gum or tobacco, smoking or practices that involve hand to mouth transfer increases the probability of ingestion of contaminated soil or dust into the body. With respect to remediation activities, hands must be thoroughly washed after coming into contact with soil or groundwater on the site before eating, drinking or smoking.

Smoking will be prohibited in the remediation areas.

5.8 Remediation Schedule

The remediation will take approximately four weeks to complete. The schedule is summarised in Table 7. The schedule represents the remediation going ahead to plan without the need to invoke contingency plans and without inclement weather etc.

Table 7: Remediation Schedule

Week	Actions
Week 1	Site establishment, excavation of 0.2m soils from remediation areas 1, 2, 4 and 5. Stockpiling of top 0.2m exposed soils. Validation soil sampling of excavations and stockpiles from remediation area 1. Hand picking of asbestos containing material from remediation area 3. Test pitting and asbestos validation of remediation area 3 Collection and laboratory analysis of validation samples.
Week 2	Data analysis and recommendations.
Week 3	Re-instatement of validated stockpiles from week 1. Disposal of non-validated stockpiles from week 1. Importation and emplacement of imported soils.
Week 4	Preparation of Validation Report

6 LEGISLATIVE AND REGULATORY FRAMEWORK

This section provides a summary of current legislation and regulations applicable to the RAP.

6.1 Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 ('EP&A Act') regulates development in NSW and incorporates the principles of Ecologically Sustainable Development through the EP&A Regulation 2000.

6.1.1 Changes to the Act

Part 3A of the EP&A Act was repealed and replaced by the Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011. The complementary planning policy has also been revised to the State Environmental Planning Policy (State and Regional Development) 2011.

In accordance with Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011, Remediation of Contaminated Land is considered State Significant Development if it is classified as Category 1 Remediation Work on 'significantly contaminated land' and remediation is required under the Contaminated Land Management Act.

6.1.2 State Environmental Protection Policy (SEPP) 55 – Remediation of Land

State Environmental Planning Policy – Remediation of Land (SEPP 55) under the EP&A Act provides a framework for contaminated land remediation. Remediation work which requires development consent is known as category 1 work. Category 1 refers to work:

- designated development, or
- carried out or to be carried out on land declared to be a critical habitat, or

- likely to have a significant effect on a critical habitat or a threatened species, population or ecological community, or
- development for which another State environmental planning policy or a regional environmental plan requires development consent, or
- carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:

  (i) coastal protection,

  (ii) conservation or heritage conservation,

  (iii) habitat area, habitat protection area, habitat or wildlife corridor,

  (iv) environment protection,

  (v) escarpment, escarpment protection or escarpment preservation,

  (vi) floodway,

  (vii) littoral rainforest,

  (viii) nature reserve,

  (ix) scenic area or scenic protection,

  (x) wetland, or

  (xi) carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner).

All other remediation work is classified as Category 2 work and may be carried out without development consent. The local council must be notified at least 30 days prior to the commencement of Category 2 remedial works.

The remediation is considered to be Category 1.

6.2 Protection of the Environment Operations Act 1997

Under Section 48 of the Protection of the Environment Operations Act 1997 ('POEO Act'), an Environment Protection Licence is required if the activity undertaken is listed in Schedule 1. The POEO Act also defines 'waste' for regulatory purposes.

6.2.1 Contaminated Soil Treatment

Contaminated soil treatment is declared to be a scheduled activity requiring a licence if:

- in any case, it has the capacity to treat more than 1,000 cubic metres per year of contaminated soil received from off-site, or
- where it treats contaminated soil originating exclusively on-site, it has a capacity:

(i) to incinerate more than 1,000 cubic metres per year of contaminated soil, or

(ii) to treat (otherwise than by incineration) and store more than 30,000 cubic metres of contaminated soil, or

(iii) to disturb more than an aggregate area of 3 hectares of contaminated soil.

As no contaminated soil is proposed to be received from off-site; less than 30,000 m^3 of contaminated soil is proposed to be stored at the Site; and less than 3 hectares of contaminated soil will be disturbed, the remedial works are not considered to be a scheduled activity under the Act and do not require a licence.

Impacted soil requiring off-site disposal (should this be required) will be classified, transported and disposed of to a licensed landfill.

A Class A asbestos removal licence will be required if friable asbestos is encountered on site.

A Class B asbestos removal license will be required if bonded asbestos is encountered on site.

Material entering/leaving the site will be tracked, documented and included in the site validation report.

6.3 Contaminated Land Management Act 1997

The Contaminated Land Management Act 1997 ('CLM Act') establishes a process for the investigation and remediation of land that is contaminated where the contamination is considered significant enough to warrant regulation.

Under Section 60 of the CLM Act, a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify the NSW EPA when they become aware of the contamination. Notification is required when soil concentration triggers are exceeded and a person either has been, or foreseeably will be exposed to the contaminant or any by-product of the contaminant.

JME considers that there is no duty to report the site to the NSW EPA.

6.4 Waste Classification Guidelines

It is understood that the legislation, regulations and guidelines are due to be updated in July 2015. Following considerations should be reviewed prior to any remediation take place:

- Is the waste a trackable waste (particularly asbestos and arsenic contaminated waste)?
- Is the waste being disposed of at a landfill whose location satisfies the proximity rule?(in this case the two likely disposal landfills are Mt Vincent Landfill in East Maitland or the Sita Landfill at Newline Road Raymond Terrace).

7 CONTACTS

The following provisional contact numbers for project personnel are given for the duration of the project. The contact names will be displayed on a sign on a sign during the remediation process.

In the event that project personnel change, relevant parties will be notified.

PROJECT PERSONNEL CONTACT NUMBERS

PERSONNEL CONTACT NUMBER

Environmental Consultant

James McMahon, JM Environments Pty Ltd

Mobile: 0427 893 668

Client Contact

Brad Lantry

Phone: 0416 069 517

8 CONTINGENCY PLAN

A contingency plan is outlined in Table 8, listing potential events that may arise during the field work and actions that will be undertaken if unexpected conditions occur.

Table 8 - Contingency Plan

Unexpected Condition	Action
Contaminated soil extends further than expected.	The client would be called to discuss options. Options could include excavating soils further.
Identification of unexpected contaminated materials during excavations.	Stop work in that area. Additional validation samples and analytes may be required to be collected and analysed for (depending on the nature of the material).
ACM uncovered during earthworks	Stop work in that area. Keep soil moist. Contact JME for further guidance.

9 LIMITATIONS

The findings within this report are the result of discrete/specific sampling practices used in accordance with normal practices and standards. To the best of our knowledge they represent a reasonable interpretation of the general conditions of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be known completely and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data.

In preparing this report, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith in accordance with JME understanding of the client's brief and general accepted practice for environmental consulting.

This report was prepared for Mr Brad Lantry with the objective of remediating the presence of contamination on the site that could potentially impact on the use of the property for residential use following subdivision. No warranty, expressed or implied, is made as to the information and professional advice included in this report. The report is not intended for other parties or other uses with the exception of Maitland Council for the purpose of assessing the DA. Anyone using this document does so at their own risk and should satisfy themselves concerning its applicability and, where necessary, should seek expert advice in relation to the particular situation.

Figures

Notes:

1) https://six.nsw.gov.au/

2) Subject Site 🟥

CLIENT:

Mr H Lantry

PROJECT TITLE: **Rezoning Project**

30 Swan Street, Morpeth NSW

PROJECT:	JME15051	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	NFC
DATE:	1/06/2015		

FIGURE TITLE:

Site Location Plan

JM ENVIRONMENTS

FIGURE NUMBER: **1**

Notes:

1) Google Earth

2) Subject Site □

Client

Mr H Lantry

PROJECT TITLE: **Rezoning Project**

30 Swan Street, Morpeth NSW

PROJECT:	JME15051	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	NFC
DATE:	22/07/2015		

FIGURE TITLE:

Sampling Locations

FIGURE NUMBER: **2**

Notes:
1) Subject Site 🟥
2) Remediation Area 1 and 2 🟦
3) Remediation Area 3 🟨
4) Remediation Area 4 and 5 🟫

N

Client:
Mr H Lantry

PROJECT TITLE: **Rezoning Project**
30 Swan Street, Morpeth NSW

PROJECT:	JME15051	DESIGNED:	JMc
DWG #:	1	DRAWN:	JMc
REVISION:	1		
SCALE:	NTS	STATUS:	NFC
DATE:	22/7/2015		

FIGURE TITLE:
Remediation Areas

FIGURE NUMBER: **3**

JM ENVIRONMENTS

APPENDIX TEN. OFFICE OF ENVIRONMENT AND HERITAGE: HERTIAGE COUNCIL RESPONSE

Heritage Council of New South Wales

3 Marist Place
Parramatta NSW 2150

Locked Bag 5020
Parramatta NSW 2124
DX 8225 PARRAMATTA

Telephone: 61 2 9873 8500
Facsimile: 61 2 9873 8599

heritage@heritage.nsw.gov.au
www.heritage.nsw.gov.au

Our File No: SF15/51803
Our Ref: DOC15/507676

Mr Rob Corken
Strategic Town Planner
Maitland City Council
PO Box 220
Maitland NSW 2320

Dear Mr Corken

Planning Proposal to Rezone Land at 30 Swan Street, Morpeth Described as Lot 3 DP237264 from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation

I refer to your correspondence to the Heritage Division, Office of Environment and Heritage (OEH) dated 7 December 2015 inviting comments on the Planning Proposal mentioned above.

The Planning Proposal seeks to amend zoning at 30 Swan Street, Morpeth from RU1 Primary Production to part R1 General Residential and part E2 Environmental Conservation. The Planning Proposal also seeks to amend the minimum lot size map so that a minimum lot size of 450m^2 applies to the R1 General Residential area of the site.

As delegate of the Heritage Council of NSW, I have considered the information submitted and provide the following comments:

Heritage significance
The site and building do not compose a heritage item in Maitland Local Environmental Plan 2011, but is within the Morpeth Heritage Conservation Area. The site is not in the proximity of the state heritage items, but there are items of local heritage significance in the proximity of the site. The subject land is associated with the former terminus of the Morpeth branch railway that included passenger station, general goods and stock facilities and also infrastructure necessary for the operation of the steam locomotives. The terminus was important in the wool trade at a period when a large percentage of Northern and New England wool was exported through the port of Morpeth. The railway was closed in 1953, followed by demolition of all the associated structures. Only things to have survived in this location is the pad of the 5-ton capacity jib crane and the footings of the brick goods shed which provide limited evidence of historical associations of the place (SIH prepared by EJE heritage). SIH prepared by EJE heritage assessed the site of having moderate significance in a local context.

Impacts to Heritage Items
Proposed rezoning will not have detrimental impacts on the items of local heritage items as there are no items of heritage significance located within or directly adjoining the subject site. Part of the subject land has been used for residential purposes for long with the existing building constructed in the 1970s. SIH prepared by EJE heritage concludes that the proposed rezoning will not negatively affect the heritage significance of the Morpeth Heritage Conservation Area.

Impacts to the Morpeth Heritage Conservation Area
The subject land is currently within the Rural Outskirts Precinct of the Morpeth Heritage Conservation Area. Specific characteristics of this precinct include the rural land surrounds, open

farming plains that provide clear views to the township of Morpeth from surrounding areas. Maitland City Wide Development Control Plan identifies views along streets, gaps between buildings and open land at the axis of streets to be of particular significance to this precinct. Maitland City Wide DCP aims to retain the significant view corridors from within Township to Rural Surrounds and requires the views identified on the View Corridors of *Map A* (Maitland City Wide DCP), which includes view through the subject site, protected as view corridors within which there 'should be no new development'.

Visual Impact Statement Peer Review provided by Richard Lamb Associates (RLA) to the Maitland City Council suggests that the view corridor which covers the subject site exists as the site has remained largely undeveloped due to its existing zoning that only allows low scale and low density built forms on the site. RLA suggests that these incidental views across the subject site appear to have 'assumed greater importance as shown in the MDCP than is warranted'. RLA concludes that the views to the north and north east from the intersection of Swan and Edward Street are important. The proposed E2 Environmental Conservation zoning along the eastern boundary of the subject site would provide an alternative view cone and would act to prohibit built structures in the view cone as it crosses the subject site.

Heritage Office raises no objection to the re-zoning of the subject site from RU1 Primary Production to part R1 General Residential and part E2 Environmental Conservation as the rezoning will have minimal adverse impact to the historic setting of Morpeth Heritage Conservation Area and to the items of local heritage significance in the vicinity. It is recommended that consideration be given to:

- The significance of the Morpeth Conservation Area and measures to maintain and enhance its character.
- Developing a subdivision pattern and development guidelines that reflect the character of the Precinct, Conservation Area and adjacent residential properties.
- The potential for any significant historic archaeology or relics that may be uncovered by future excavation or ground disturbance.
- Larger lot sizes to allow views through the subject site in order to retain visual relationship with the farmland and the river.

If you wish to discuss the proposal further, please contact Vibha Bhattarai Upadhyay, Heritage Assessment Officer, at the Heritage Division, on (02) 9873 8500 or by email at vibha.upadhyay@environment.nsw.gov.au.

Yours sincerely

RAJEEV MAINI
Manager, Conservation
Heritage Division
Office of Environment & Heritage
AS DELEGATE OF THE NSW HERITAGE COUNCIL
12 February 2016

APPENDIX ELEVEN. INDICATIVE TIMEFRAME OF PROPOSAL

Project Timeline	Date
Anticipated commencement date (date of Gateway determination)	November 2015
Anticipated timeframe for the completion of required studies	NIL
Timeframe for government agency consultation (pre and post exhibition as required by Gateway determination)	February 2016
Commencement and completion dates for public exhibition period	February 2016
Dates for public hearing (if required)	N/A
Timeframe for consideration of submissions	April 2016
Timeframe for the consideration of a proposal post exhibition	May 2016
Anticipated date RPA will forward the plan to the department to be made (if not delegated)	June 2016
Anticipated date RPA will make the plan (if delegated)	N/a
Anticipated date RPA will forward to the department for notification (if delegated)	N/a