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Crown Project Services Pty Ltd
Level 15, 3 Spring Street
SYDNEY NSW 2000

Attention: Mr Brodie McHutchison, Senior Project Manager

KNAUF INSULATION STEEL RIVER
OWNERS ENVIRONMENTAL MANAGEMENT PLAN (KI-EMP)

1 INTRODUCTION

This Knauf Insulation (KI) Steel River Environmental Management Plan (KI-EMP) has been prepared by RCA Australia Pty Ltd (RCA) at the request of Mr Brodie McHutchison of Crown Project Services Pty Ltd (CPS). The KI-EMP is based on the:

- Steel River Construction Guidelines (Ref [1]); and
- Environmental Management Plan Stage 9 and 10, Steel River Site, RCA ref 6586b-608/3, prepared for Domaine Steel River Pty Ltd in July 2008 (Ref [11]); and
- Relevant requirements of the Steel River Community Management Statement (SRCMS) (Ref [12]).

It thus, is an EMP consistent with that specified in the remedial action plan/environmental impact statement (RAP/EIS Ref [3]) for Steel River. This EMP contains and replaces the above mentioned documents for the proposed KI development site (in this document referred to as the KI site). This KI-EMP is the precedent EMP for the KI site.

It is understood that this EMP will be issued as an appendix to the Knauf Preferred Project Report and issued to the Consent Authority (NSW Department of Planning) for approval.

2 KI-EMP STRUCTURE

The KI-EMP presently contains the following elements:-

- A contamination management document that meets the requirements of an EMP under the Steel River Construction Guidelines (Ref [1]).

- An environmental emissions management document satisfying the requirements of an Owners Environmental Management Plan (OEMP) under the SRCMS (Ref [12]) for site *construction*.

In regard to the second bullet point above (OEMP), only preliminary details are presently available to inform compilation of the environmental management techniques applying to the KI facility during construction, and less for post construction. Site contractors will be required to make their own environmental management decisions based on the provided documentation.

Towards the end of the site construction this document will be revised[1] to include:-

- an environmental emissions management document satisfying the requirements of an Owners Environmental Management Plan under the SRCMS (Ref [12]) for site *operations*; and

- a revised operational and long-term environmental management plan for the proposed tertiary containment cell (TCC) on the KI site.

Other environmental management processes (eg certification) are relevant to the KI development. These are described in further detail later in the document.

3 OBJECTIVES

This KI-EMP aims to ensure that:-

- both industrially developed and unpaved areas of the KI site remain suitable for use during and after site development; and

- site workers are not exposed to un-acceptable contaminant concentrations during or after construction.

This will be achieved in part by ensuring that the remediation undertaken by BHP Billiton (BHPB) as 'BHP' is not compromised, as outlined in this document.[2]

The KI-EMP is to be available to all construction staff working on the site to allow for understanding of the potential risks to site workers.

[1] in one or more tranches

[2] In this document BHPB and BHP refer to the same company.

4 BACKGROUND

4.1 SITE DESCRIPTION

The KI site is located at the western end of the Steel River Estate, north of the Pacific Highway, Mayfield West, NSW. It consumes approximately half of the Steel River Stage 8 development, and all of the formerly proposed Stage 9 and 10 development sites (approximately 24Ha).

The Hunter River South Arm forms the northern boundary. It is bound by the Kooragang Goods Rail Line on the western side. The Pacific Highway and privately owned land form the southern boundary. Part of Stage 8 of the Steel River Estate forms the eastern boundary. The land is zoned 4(c) Steel River zone under Newcastle Local Environmental Plan (LEP) 2003. The site location is depicted in **Drawing 1**. The preliminary site layout is depicted in **Drawing 2**. The KI site is identified as Lot, 79, 80, 81, 82, 89, 90, 91, 95, and 98 in DP 270249.

Greater site detail regarding topography, geology, surface and groundwater, and other subjects are detailed in the *Draft Volatile Organic Compounds (VOC) and Limited Validation Assessment, Stages 9 and 10 Steel River, RCA, 6 June 2008, RCA ref 6586b-602/0*, (Ref [2]).

4.2 KI SITE KEY STAKEHOLDERS

Stakeholder	Nature of Interest
BHP Billiton Ltd (BHPB)	Original 'polluter', original site owner and initiator of the Steel River Project. Responsible for groundwater monitoring in designated bores. Responsible for remediation of groundwater in Environmental Buffer Zone 's' (refer Drawings 1 and 3) on the north boundary of the KI site.
Knauf Insulation Pty Ltd	Developer of the western portion of Steel River
Steel River Community Association (SRCA)	Responsible for the management of environmental emissions entitlements and interested in the currency of this KI-EMP
NSW Department of Planning	Consent Authority for the KI development
Newcastle City Council	Holder of s149 Certificates

4.3 SITE HISTORY

The KI site was created by infilling the western section of Platts Channel and nearby low lying land. It therefore has a similar history to the remainder of the Steel River estate. The infilling was undertaken by BHPB and utilised waste materials associated with the production of iron and steel. These include slags, coal washery rejects, ashes, metallic dusts, hydrocarbons (such as oils and tar), and other materials including general (non-putrescible) refuse.

4.3.1 ENVIRONMENTAL INVESTIGATIONS – 1990S

An environmental site investigation was undertaken by BHPB in the mid 1990s and included a Human Health and Environmental Risk Assessment (Ref (4i]). That investigation determined that the site posed an unacceptable risk to human health due to the presence of PAHs (usually associated with coal tar), in some areas. The investigation concluded that remediation was necessary to make the site suitable for industrial development. That requirement was outlined in a Remedial Action Plan Environmental Impact Statement (RAP/EIS) (Ref [3]).

The site specific human health risk assessment conducted in 1995 (Ref [4i]) and revised (Ref [4ii]) determined that the following criteria would apply to the Steel River site:-

- There must be no free tar in the top 2m of the finished site surface.
- The total PAH concentration in the top 2m of the finished site surface must not exceed 400 mg/kg.
- The total benzo(a)pyrene concentration in the top 2m of the finished site surface must not exceed 15 mg/kg.

Excavated materials that did not satisfy this criteria required emplacement in an on-site containment cell.

4.3.2 REMEDIATION AND RECONTOURING

Capping with a minimum of 2m of coal washery reject rock (CWR)[3] was subsequently undertaken in the areas where PAH had been identified within 2m of the then surface[4]. The capping layer was installed to provide a foundation material that satisfied the site specific remediation criteria and separated the underlying potentially contaminated fill from the surface. It was compacted to 98% standard density and provided with a 1% slope to shed surface water.

In areas where PAHs had been identified at depths > 2m, general recontouring to shed stormwater was undertaken during remedial works. On the KI site this involved placement of additional capping in most areas. Toward the Hunter River site boundary, minimal additional site cover material was placed. This comprised the first stage of remediation.

The second stage of site remediation was to be the site development itself. Construction (involving impervious hard surfaces such as roads, hard stand areas and buildings) is the final soil remediation phase. It provides an additional barrier to human contact and prevents surface water infiltration into the underlying groundwater.

[3] Or geotechnically similar material.

[4] The referred to capping in fact had a minimum of 1.3m of compacted coal washery reject in one limited area. However, it is likely that tar materials at this location of minimum cap thickness are now at a depth of > 2m from the August 2009 surface level.

The final element of site remediation is yet to be completed, but it does not affect the ongoing industrial development of the Steel River site. This is the remediation of contaminated groundwater, which is being undertaken by BHPB under the Contaminated Land Management Act 1997. BHPB are proposing to undertake remediation of groundwater in the environmental buffer zone 'KI' illustrated on **Drawings 1** and **3**.

4.3.3 PRIMARY AND TERTIARY CONTAINMENT CELLS

The Newcastle City Council (NCC) approved RAP/EIS for the Steel River site (Ref [3]) specified that contaminants sourced from the Steel River site would remain on site as part of the remediation/site redevelopment. During the remediation works a primary containment cell was created for the concentration and long-term disposal of 'arisings'[5] encountered in excavations. The primary cell is now full and closed. Nearby areas were reserved for construction of future secondary and tertiary 'arisings' containment areas. There is no present proposal to use the secondary cell. It is proposed to use the tertiary cell. The location of the existing containment area and proposed future containment area is shown on **Drawing 2**. The proposed tertiary containment cell location is different from that proposed in 2008 by Domaine Steel River Pty Ltd (DSR), but the cell will be constructed to the same integrity.

4.3.4 ENVIRONMENTAL INVESTIGATIONS, 2008

4.3.4.1 VOLATILE ORGANIC COMPOUNDS (VOC)

Site characterisation undertaken in 2008 (Ref [2]) indicates that fill and groundwater contaminated with volatile hydrocarbons are present in locations across the KI site. Detected concentrations of VOC in sampled soil gas are generally low. Detected VOC concentrations within tar contaminated material indicate the source hazard is also low. As such, VOC migration is not considered to be a significant consideration prior to site development.

If site development is conducted in accordance with the requirements of this KI-EMP it is considered that there will be minimal risk presented to site users from the presence of underground VOC sources on the site.

No further VOC investigation works are considered necessary unless site observations during development works indicate a specific need at a particular location.

4.3.4.2 2008 LOT 1017 SITE ASSESSMENT

The north western corner of the KI site was formerly referred to as Lot 1017 (refer Drawing 3). The characterisation of Lot 1017 undertaken in 2008 (Ref [6]) indicated that like the remainder of the KI site, contaminated fill and groundwater occur on the 'Lot 1017' portion. Detected concentrations of VOC in sampled soil gas were low. As such, VOC migration is not considered to be a significant consideration prior to site development.

[5] Originally defined as material failing the Section 4.3.1 criteria. Since mid 2008 this also defines material that does not satisfy HIL 'F' guidelines.

Soil/fill contamination is acceptable for an industrial site use. Like elsewhere on the KI site, groundwater extraction is not permitted.

4.3.5 STOCKPILED MATERIAL

At the time of this OEMP there are many stockpiles of soil/fill material on the KI site, as follows and illustrated on **Drawing 4**:

- A contaminated material 'arisings' stockpile (on the southern boundary) originating from pre-KI works on Steel River, which will be disposed of in the proposed tertiary cell. This material has been in the indicated location for approximately one year. This material will be relocated by DSR to a long-term secure above ground holding facility before the KI site is purchased by KI.

- Numerous stockpiles originating from the site that were validated for different 'end uses' by RCA either in mid 2008 (Stockpile B), or in mid 2009 (Ref [6a] and [6b]).

This KI-EMP describes how these stockpiles are to be used during the site development in Section 6.4.

4.4 NEED FOR KI-EMP

Complete clean-up of contamination within the Steel River estate is not practicable. However, the KI site (excluding the proposed tertiary containment cell site) is suitable for the proposed industrial development under the current conditions.

Contaminated materials are stockpiled on site that require appropriate long term on-site containment. The proposed tertiary containment cell area *will be made suitable* for industrial development if it is constructed and used as defined by this KI-EMP[6]. The tertiary containment cell EMP presented as part of the KI-EMP package is that prepared for DSR in mid 2008. It will only be revised once the quantity of arisings to be disposed of is known.

Under the Steel River Community Management Statement (Ref [12]), land owners are required to compile an Owners Environmental Management Plan with set inclusions. A plan is required to guide construction activities and protect environmental values. Another will be prepared later to protect environmental values during the operation of the KI facility.

By conforming with the KI-EMP:-

- users of the site would not be exposed to PAH and other contaminants in soil and groundwater beneath the site capping;

- the site would remain suitable for the specified usage;

- environmental emissions during and after construction would be minimised; and

[6] Which will later encompass the Tertiary Containment Cell EMP (Ref [7]).

- KI would be in compliance with the requirements of the RAP/EIS [Ref(3)], Site Construction Guidelines [Ref(1)], and Steel River Community Management Statement.

4.5 DEFINITIONS FOR CONTAMINANT EVALUATION GUIDELINES

This document refers to Ecological Investigation levels (EILs). These refer to the Provisional Phytotoxicity Investigation Levels (PPILs) contained in (Ref [8]). This document also refers to Health Investigation levels (HILs). These refer to the Soil Investigation Levels (SILs) for commercial industrial land use also contained in (Ref [8]).

5 APPLICABILITY

The KI-EMP applies to the KI site from the date of publication of the final (non-draft) version of this document. Where the document becomes superseded in any material aspect it can be updated as necessary during or after site development. The maintenance of the KI-EMP is the responsibility of KI and is required (at a minimum) by the Steel River Community Association (SRCA).

6 CAP MANAGEMENT

One of the foremost management requirements of this KI-EMP is maintenance of the integrity of the site capping.

6.1 EXISTING SITE CAPPING PRIOR TO KI DEVELOPMENT

In accordance with the RAP/EIS (Ref [3]), areas suspected or known to be contaminated above the then site criteria[7] within the top 2m of the original (pre capping) site surface[8], were capped with coal washery reject (CWR) or similar material as discussed in Section 4.3.2. This material was used to supplement existing material to achieve the site 'capping layer'.

In other areas of the Steel River Estate, where previous investigations indicated a lower potential for contamination to be present within the top 2m of the original (pre capping) surface, a capping layer of less than 2m may be present. In some parts of the KI site (eg, former Lot 1017 area – Drawing 3) no cap was placed if the upper 2m of existing fill was considered to meet the cap requirements. Due to the nature of the site filling it can be difficult to distinguish cap material from underlying fill in some locations.

The objectives of the capping layer are:-

[7] Refer to Section 4.3.1.

[8] See areas shaded brown (primary Cell location) and blue (Boundary of Banana area) on Drawing No.3.

- to provide a physical barrier between the underlying potentially contaminated materials, thereby minimising the potential for human contact with the contaminants; and

- to minimise the infiltration of rain water to the underlying groundwater, thereby reducing the volume of groundwater with potential to discharge from the Steel River Estate to the adjoining South Arm of the Hunter River.

Development works undertaken on the KI site must not compromise these two objectives, though alternate engineering methods that satisfy those objectives are permissible.

Where site development requires intrusion/penetration of the capping layer, the requirements described in the following sections must be adhered to.

Specific capping requirements of the primary and tertiary containment cells is discussed in Section 7.

6.2 ADJUSTMENTS TO THE CAPPING LAYER

KI will add presently stockpiled material to the site surface to adjust ground levels to suit the intended development. This material must be placed in accordance with the schedule described in Section 6.4.

6.3 GUIDELINES FOR PRESERVING THE INTEGRITY OF THE CAPPING LAYER

Main Considerations

The main consideration for the Steel River site is the depth to which construction will take place. The overall requirements of a development involving penetration / intrusion into the capping layer are twofold, namely:-

- Demonstration that the development will not compromise the integrity of the capping layer with respect to the objectives summarised in Section 6.1 of this KI-EMP and described in the RAP/EIS; and

- that excavated materials are handled and, if required, disposed of in accordance with the requirements of this KI-EMP.

These two requirements are managed under the Steel River certification scheme discussed in Section 9.1.

Alternate Cap Arrangements

Following the completion of site development, if the integrity of the capping layer has been demonstrated it is not necessary to maintain the capping layer in all locations at the thickness present prior to development taking place. The integrity of the capping layer relies on:-

- the ability to maintain a robust physical barrier between potentially contaminated materials and occupiers of the site following development;

- the ability to provide robust separation from volatiles that allows volatile concentrations to attenuate, or have no permeability through the thickness of the cap; and

- the maintenance of a low permeability free draining cap surface.

Partial substitution of the capping layer with other materials of low permeability (ie, bitumen or concrete) or buildings could achieve the same or better result as the presence of the current compacted capping materials. Such materials and structures would provide an effective barrier to potential human contact with underlying potentially contaminated materials.

Such developments will however, require approval subject to the provisions of the Steel River certification scheme.

Potential for Arisings to be Encountered

There is potential for contaminated arisings to be encountered during excavation works beneath the capping layer anywhere on the KI site. These materials will need to be handled appropriately and disposed of in the tertiary containment cell.

Earthworks situations

There are generally four different situations where consideration of the function and integrity of the capping layer is required, namely earthworks required for:-

- general re-grading;

- buildings, driveways, roads and car parks, including dynamic compaction and piling;

- services, especially stormwater drainage and sewage infrastructure; and

- landscaping.

6.3.1 GENERAL REGRADING

Due to the principle[9] of re-using stockpiled former cap materials within the Steel River estate, it is likely that at least some parts of the KI development will be elevated by the placement of additional site capping. Suitable fill material exists on the KI site and has been characterised into five (5) classes[10] satisfying HIL 'F' guidelines, and one class that does not[11].

[9] Under Development Consent 97/251 for site remediation

[10] Classes 1 to 5 – re-usable material

[11] Class 6 - arisings

Some land on the KI site will be cut to below present surface levels during general regrading works. In any event the site landform will not be lowered from the present remediated level without appropriate environmental assessment under the Steel River certification scheme.

Certificate C is to be prepared in conjunction with the detailed design of site earthworks, basements and foundations so that design modifications (where necessary) to ensure conformance with the site construction guidelines (Ref [1]) can be incorporated.

6.3.2 BUILDINGS, DRIVEWAYS, ROADS AND CARPARKS

The preliminary KI site layout is indicated on **Drawing 2**. The construction of buildings on site will involve concrete slabs constructed over either piles, dynamically compacted fill, or both, and on regraded surfaces. Smaller areas will be cut to depths of approximately 5m from the finished floor slab level for the placement of underground basements. Based on information provided to RCA by CPS[12], it is understood that such excavations will not be required over the primary containment cell.

Roads, carparks and driveways will be constructed at near the present surface level. On the KI site, there will be no publicly owned roads.

Care should be taken where excavations are to be undertaken. Where excavation through the capping layer is required, under the Steel River certification scheme the following steps will be required:-

- Develop a project specific health and safety plan and construction environmental control plan[13] to be developed or approved by appropriately qualified environmental professionals.

- Place the excavated CWR (or other cap material) in a separate stockpile to underlying material. Provide appropriate sediment control devices and consider the need for dust suppression.

- Ensure material excavated from beneath the capping layer is stockpiled separately with all necessary bunding in place in accordance with the job specific environmental control plan.

- Employ appropriately qualified consultants to characterise the stockpiled material against the appropriate guidelines for use at Steel River.

- Excavated materials whose analysis exceeds the acceptable re-use criteria are to be disposed of in the Steel River tertiary containment cell. Until this cell is constructed, such material (frequently termed 'arisings') is to be stored in the temporary storage location indicated on **Drawing 5**.

[12] Personal communication, Frank Hack, CPS 15-09-09.

[13] Although minimal firm detail is presently available, and the project status is currently 'pre-approval', a basic construction environmental control plan is included as an attachment to this document.

- Backfill suitable for construction and meeting HIL 'F' and preferably the General Solid Waste concentrations, is to be used as excavation backfill (later described as Class 3 and 4 material). If such material is not available, at a minimum, material is to meet HIL 'F' (later described as Class 5 material).

- In exceptional circumstances, materials exceeding HIL 'F' guidelines can be used as replacement fill in excavations at depths ≥ 2m from the design surface level, before replacement of the original capping material, or equivalent approved[14] engineered cap. The placement of backfill should be as controlled fill and compaction to 98% standard density is to be undertaken.

  Exceptional circumstances may be where:-

  - an excavation is 'over-excavated' beyond the size of the installed structure; and

  - contaminated fill is encountered, that exceeds HIL 'F' but satisfies General Solid Waste thresholds; and

  - the contaminated fill can be re-used in the excavation without deleterious effects to underground structures; and

  - the excavation will not be re-opened for maintenance during the foreseeable life of the KI development; and

  - groundwater is considerably deeper than the base of the excavation and is expected to remain so; and

  - the excavation cannot act as a preferential flow path by which existing site contaminant migration may be exacerbated.

  Material in such situations could be used as replacement fill at ≥ 2m depth in those excavations.

  Disposal of Steel River arisings is only possible until the tertiary containment cell is completed. All efforts should be made to minimize the risk of generating arisings after the cell is complete.

- Site material meeting HIL 'F' guidelines, generally meeting the aesthetic requirements of the NSWDEC Guidelines for the Site Auditor Scheme, second edition, 2006 (Ref [8]) and being of a compactable nature may be used as capping material.

- Site materials stockpiled by DSR have been classified for re-use on site. Details are provided on **Drawing 4** and Section 6.4 below (Ref [6a] and [6b]).

[14] Approved by a suitably qualified and experienced environmental consultant.

- If it is necessary to reduce the thickness of the cap during site development, it will be necessary to demonstrate through design detail that the cap integrity has not been compromised. For example, at present, the cap provides separation from deeper contaminants, prevents water ingress, and allows volatile concentrations to attenuate. If constructing basements, the basement design must be waterproof, VOC proof, and provide a physical separation from contaminated fill. The demonstration of cap integrity is required for Steel River Certificate C. This must include specific verification that preferred pathways for flow of volatile soil vapours into buildings, and groundwater borne contaminant migration has been considered and adequately addressed. This requirement applies across the KI site.

In any situation where groundwater is encountered during development, the conditions specified in Section 6.3.2.1 will apply.

6.3.2.1 GROUNDWATER

Services such as electricity, gas, telecommunications, potable water (and occasionally sewage) are installed underground usually at or at less than 1m depth, and above groundwater. Other services, namely stormwater and sewage infrastructure may be installed at greater depth and may intersect groundwater. There are four primary requirements in regard to groundwater.

- To the extent practicable, groundwater that is not contaminated with hydrocarbons should not be permitted to contact hydrocarbon contaminated materials (eg, tar contaminated fill, or contaminated groundwater in excavations).

- Hydrocarbon contaminated groundwater removed of necessity from excavations (or from any other source) to allow site work cannot be returned to excavations. Such water will require either appropriate treatment on site so that the water can then be irrigated on site, or the hydrocarbon contaminated groundwater must be appropriately disposed of by a suitably licensed environmental waste disposal contractor. An assessment of site specific exposure pathways from the presence of contaminated groundwater under developments will be required in these cases. Onsite groundwater treatment may involve oil and water separation, and activated carbon (or equivalent) hydrocarbon stripping.

- Contaminated groundwater must not be allowed to migrate along stormwater or other services, or service trenches (Refer to **Drawing 8**).

- It is prohibited make productive use of KI site groundwater for any purpose other than irrigation/dust suppression, after treatment to remove contaminants, and only during construction works.

These groundwater management requirements will require the assistance of a suitably qualified environmental professional.

6.3.3 STORMWATER, AND SEWAGE SERVICES

On the KI site, there will be no publicly owned roads or stormwater services. The KI owned stormwater services will not connect to publicly owned stormwater services on adjoining portions of land.

Further to Section 6.3, Newcastle City Council require a particular protocol for construction of publicly owned stormwater services on Steel River, as detailed in the ROMP (Ref [5]). KI will not need to adhere to that protocol on site, but will need to ensure that contaminated groundwater (where present at the same depth as stormwater trenches) cannot migrate along the service trenches into the water quality (catchment) ponds numbered WQP1 and WQP2; (refer to **Drawing 3**. WQP2 is on the Lot marked as '1018' and 'u').

Class 3 material (described below in Section 6.4) is optimal for use as clean backfill in underground service trenches, since it is pre-classified. Class 4 material may be used once Class 3 material has been exhausted by that use.

It is known that contaminated groundwater is present at the same depth as stormwater trenches near WQP 2. Other locations may also exist. **Drawing 8** presents some concept schemes for the prevention of contaminant migration along stormwater services. Such a scheme should be employed anywhere on the KI site where groundwater may be reasonably expected at service depth. These schemes would be employed at intervals to be determined at the Certificate C stage (depending on the details available), but more usually at the construction phase where perched contaminated groundwater lenses may be encountered in addition to the true groundwater table.

In the immediate vicinity of WQP1 and WQP2, additional engineering control measures will be required. This may include a small permanent 'pre-pond' and should be noted at the detailed design phase. Final arrangements may best be determined at the construction phase under the supervision of a suitably qualified and experienced environmental professional.

In regard to sewage services, the same general excavation protocol specified in earlier subsections of Section 6.3 apply. In any cases of sewage service trenches and stormwater trenches joining (or crossing near to each other), potential contamination migration into stormwater trenches will need consideration at the design phase. If cross contamination could occur, specialist advice should be sought as to how to prevent this from occurring.

In general terms, over the primary or tertiary containment cells, any necessary services (such as stormwater and sewage) must be installed to leave a minimum of 1m of existing (primary cell) or to be installed (tertiary cell) compacted coal washery reject (CWR) over the contained arisings. Hence, the surveyed RLs of the top of the arisings are significant and must be considered during detailed design. Special exemptions to this principle (applicable to the primary containment cell) are discussed in Section 7.1.1.4.

6.3.4 LANDSCAPING

Landscaping will be required in certain areas of the KI development. The primary requirement for landscaped areas is that they cannot be used for drainage purposes. This will require maintenance of the low permeability compacted CWR layer (or equivalent alternative) beneath the landscaping.

Where imported material is used to create landscaping beds and vegetation areas, the material must be validated as satisfying HIL 'F' guidelines, aesthetic considerations and preferably the Ecological Investigation Levels (EILs) (Ref [8]). Should this material not comply with the EILs then advice should be sought from an appropriately qualified environmental/horticultural professional as to the suitability of the material for landscaping purposes. As described in Section 6.4, various classifications of material are currently on site and suitable for site use. Material Class 1 is most suitable for this purpose.

6.3.5 GENERAL NOTES

The assistance of a suitably qualified environmental professional will likely be required to provide advice on handling suspected or actual contaminated material encountered during site works.

Validation of construction works and any required remediation is required for compilation of Certificate D for the KI development works.

6.4 STOCKPILED MATERIAL MANAGEMENT

There are many stockpiles presently on the KI site. **Drawing 4** indicates the arrangement of the stockpiles and indicates that the materials fall into one or more of 6 material classifications. Classes 1 to 5 are suitable for on site re-use. Class 6 material requires disposal in the arisings cell. The following text indicates the re-use options appropriate to each material type.

Although Class 1 to 5 materials are suitable for re-use on an industrial development such as KI, it will be noted that many stockpiles have more than one re-use option. In general terms, the lower the Classification number (eg, 1) the cleaner the material. All such material is to either remain at Steel River or be disposed of to landfill off site. To make productive use of the material at an off site location (eg, as clean fill) would require further professional assessment and certain statutory approvals.

Material classifications are described below:-

Class 1 Material: Lower than HIL 'E' (public open space), Interim Urban Ecological Investigation Levels and satisfying Aesthetic Requirements.

Where material satisfies these guidelines it is clean enough to be used for landscaping in public open space areas (ie if needed, it could be offered to NCC. Where there is no such need, Class 1 material, can be used in landscaped areas with accessible soil on the KI site. It can also be used at Steel River on commercial industrial portions of land.

Class 2 Material: Lower than HIL 'E' (public open space), satisfying Aesthetic Requirements, but NOT Interim Urban Ecological Investigation Levels.

This material is clean enough to be offered to NCC for landscaping in road reserves (once Class 1 material is exhausted). It can also be used on commercial industrial portions of land such as the KI site.

Class 3 Material: Satisfying HIL 'F' guidelines (commercial industrial use), Aesthetic Requirements, preferably the Ecological Investigation Levels (EILs), and meeting solid waste guidelines.

Class 3 material should be preferentially used to surround underground stormwater and other service assets as 'clean backfill'.

While not optimal usage, this material is also suitable for use on commercial industrial portions of the site and may be used to create landscaping beds on individual development Lots. In the case where Class 3 material not complying with EILs be available for landscaping use, advice should be sought from an appropriately qualified environmental/horticultural professional as to the suitability of the material for landscaping purposes.

Class 4 Material: Satisfying HIL 'F' guidelines (commercial industrial use), Aesthetic Requirements, preferably the Ecological Investigation Levels (EILs), but NOT the solid waste guidelines.

This material is suitable to surround underground stormwater assets as 'clean backfill' once Class 3 material is exhausted. It is also suitable for use on commercial industrial portions of the KI site and may be used to create landscaping beds.

Should this material be needed for landscaping, but not comply with the EILs then advice should be sought from an appropriately qualified environmental/horticultural professional as to the suitability of the material for landscaping purposes.

Class 5 Material: Satisfying HIL 'F' guidelines (commercial industrial use), but NOT necessarily the Aesthetic Requirements, Ecological Investigation Levels (EILs) or the solid waste guidelines. This material is only suitable for use on commercial industrial portions of the site.

Class 6 Material: Exceeding HIL 'F'

Class 6 material requires disposal in the (to be constructed) tertiary containment cell (TCC).

6.5 GROUNDWATER MONITORING

There is potential for off site contaminant migration from the Steel River estate. However, under the Contaminated Land Management Act, 1997 (CLM Act) groundwater contamination within the estate is being considered (and monitored) so that it does not present an unacceptable risk to either the on site or off site environments. BHPB undertake groundwater monitoring at Steel River under their voluntary (groundwater) remediation agreement (VRA) with NSW DECC. Refer DECC notice 26098 and DECC remediation site declaration number 21040/area UB 3368.

BHP undertake monitoring of:-

- chemistry and water level in northern boundary bores (in area 'KI' on **Drawings 1** and **3**) on an annual basis;

- water level in three lines of transect bores inland on Steel River, on an annual basis;

- chemistry and water level in four boundary bores around the primary, and four proposed tertiary containment cell bores (once constructed) on an annual long-term basis;

The four tertiary containment cell monitoring bores are to be installed and sampled twice within a one year period *prior* to construction of the cell. Depending on the KI construction schedule, bores should be installed as soon as the tertiary cell location is finalised.

The monitoring points are illustrated on **Drawing 6**.

BHPB has an easement over all Steel River land to allow them access for compliance with any clean-up orders issued by NSW DECC (or the equivalent NSW environmental regulator).

The proposed use of dynamic compaction ground improvement techniques gives rise to potential for impacts to groundwater bores in use by BHPB. Bores may be destroyed and may experience relatively short term chemistry variations from existing conditions. It is recommended that Knauf consider installation of its own bores in suitable locations near BHPB on site wells, including around the proposed tertiary containment cell.

Should any BHPB wells be destroyed during site development, a suitably qualified environmental professional should nominate an appropriate long term monitoring location for BHPB.

7 CONTAINMENT CELLS

7.1 DEVELOPMENT PRINCIPLES – LOTS CONTAINING CONTAINMENT CELLS

The location of the primary containment cell and proposed tertiary containment cell is illustrated on **Drawing 3**.

The proposed KI development will occur over a portion of the primary containment cell. This document describes certain protocols for development over the primary containment cell designed to mitigate risks to site users.

At the present time, the proposed tertiary containment cell (sometimes referred to as the T-cell) is to be located partially under a proposed carpark[15]. It will be utilised to contain potentially contaminated arisings presently stored on the KI site, and arisings from the KI site works. Operation of the tertiary containment cell will be undertaken in accordance with the environmental requirements of the tertiary containment cell EMP (Ref [7]). Following closure of the cell, management of the tertiary containment cell will be under this KI-EMP. The tertiary containment cell EMP will be revised by RCA once the volume of arisings requiring disposal of arisings is known (ie, after KI plant construction is complete).

7.1.1 SPECIAL CONSTRUCTION ACTIVITIES

It is understood that some of the KI building footprint will be subjected to dynamic compaction using heavy drop weights. CPS advised that KI intend to achieve useful ground consolidation to a depth of 8 to 10m from the existing ground level in those areas.

It is understood that KI intend to use approximately 130 bored piles in Area 1 of the KI development. Area 1 comprises the furnace (western) end of the site. Up to 30 bored piles may also be inserted into the primary containment cell. Driven steel piles may also be considered.

Dynamic compaction of the primary containment cell should be avoided. In this area piling is considered a more suitable activity to improve load bearing capacity. Piling in accordance with the conceptual pile arrangement indicated in **Drawing 7** (or better) would:-

- minimise disturbance to the primary cell; and
- maintain low 'ingress' risks for soil volatiles into site buildings.

Special construction activities are further discussed in the following subsections.

7.1.1.1 ENVIRONMENTAL CONSIDERATIONS - DYNAMIC COMPACTION

The groundwater table at the KI site is generally dropping over time in accordance with the RAP/EIS (Ref [3]). At present groundwater is expected at depths of between 6 and 7m from the present site surface. The proposed dynamic compaction is not expected to have a significant effect on the true groundwater table, due to the anticipated minor decrease in fill porosity at the present groundwater depth. The possibility of exacerbating existing groundwater contamination cannot be eliminated, however exacerbation is not anticipated from the dynamic compaction works. Since the extent of contamination at depth at Steel River has not been defined, any exacerbation would also be difficult to identify. Groundwater monitoring is recommended in a subsequent Section.

[15] This location to be confirmed.

While effects on the true groundwater table are not expected to be significant, effects on perched groundwater lenses[16] at shallower depth are likely. Such groundwater is expected to spring at the site surface, or move laterally to more porous zones during dynamic compaction works. In the initial case, management would require bunding for containment, prior to evaporation or collection for treatment or disposal. In the latter case, no environmental management precautions are required unless such perched waters are encountered during construction excavations. Precautions to be employed in such situations are described earlier in this document (Section 6.3.2.1).

It may be advantageous to assist perched groundwater to spring to the surface for capture and treatment. Following dynamic compaction the surface would need to be re-levelled and re-compacted.

Longer Term

The decrease in the absolute level of the groundwater table is expected to continue as the site is covered with impermeable hardstand and floor slab area. The ultimate effect of the dynamically compacted area will be to leave the site filling beneath that part of the development less permeable. The site capping in those areas would also be reduced in thickness, while experiencing a minor permeability reduction. This is consistent with the RAP/EIS requirements and is expected to limit ongoing groundwater contamination from underground sources in the long-term.

7.1.1.2 ENVIRONMENTAL CONSIDERATIONS – INSTALLING PILES THROUGH CONTAMINATED MATERIAL

The basic requirements for piling through the primary containment cell[17] are as follows:-

- A vapour seal is to be created at the top of the pile; and
- Installation of the piles cannot create a preferential flow path for groundwater borne contaminants.

VOC VAPOUR

Drawing 7 provides a suitable concept vapour seal scheme in the form of a bentonite cement sealing collar that can be installed around the top of bored piles. The bentonite cement sealing collar indicated is at least 0.4m thick. Prior to casting the pile cap in situ, the sealing collar would be topped by a bentonite pellet layer 0.1m thick that would set when the pile cap concrete was poured. If cast piles are to be installed, the design of the pile cap is to be agreed with the Site Auditor prior to proceeding (this would be done during the Certificate C process.)

Other engineering alternatives could also be considered at the Certificate C stage.

[16] Which may be contaminated.

[17] See note at end of this subsection.

PREFERENTIAL GROUNDWATER FLOW PATHS

The presence of hydrocarbon/tar contaminated materials at depths below the PCC is unquantified. Where bored piles are utilised it will be necessary to demonstrate that these do not provide a preferential flowpath for groundwater borne contaminants along their full length. This required validation at the Certificate C stage.

Drawing 2 locates Platts Channel relative to the KI plant. It is noted that the proposed building location sits south of the former Platts Channel location. It is expected that the subsurface conditions comprise fill over residual strata (rock aquifer, see below). The estuarine aquifer known to exist further north is not expected under the proposed building location. While not anticipated, if any of the estuarine aquifer is affected by the piling works additional consideration will be required during construction.

In cases where driven piles are preferred, insertion of those piles through such material is not considered to represent an unacceptable additional risk to the environment (via groundwater) since:-

- groundwater is at least in part already contaminated and site groundwater cannot be extracted for surface use post construction;

- To varying degrees, the piles have a beneficial compacted fill zone around their periphery. Hence driven piles under groundwater would be unlikely to create a conduit for enhanced contaminant migration; and

- bedrock underlies the site fill and natural materials and this basement aquifer is of relatively low permeability.

Over the primary containment cell, should hollow steel piles be used, to the extent practicable piles should be driven with an end cap for the first 7m[18]. The pile cap could then be removed if necessary.

OTHER AREAS

In areas outside the primary containment cell, piles will require a vapour sealing collar under the pile cap if volatile contaminated materials (including tar) are identified during pile construction. The 160,000m^3 volume of the main production building, and presence of considerable roof ventilation and wall ventilation (anticipated to be nominally 1.5% of the developed floor space) is considered to provide adequate dissipation volume for VOC should any enter the main production building.

CONTINGENCY

Should the insertion of vapour sealing pile caps prove impractical, or it is specifically required by the site auditor, vapour barriers could be considered under building slabs over the primary containment cell. This would be evaluated at the Certificate C stage. Vapour barriers can comprise sealed plastic layers (such as HDPE) fitted with a sub-slab gas drainage system.

[18] To allow approximately 2m of compacted fill around the pile beneath the estimated base of the Primary Cell.

7.1.1.3 UNDERGROUND INHABITABLE STRUCTURES – OH & S CONSIDERATIONS OF VOC

Should underground inhabitable[19] structures be created over the primary containment cell or other site areas at depths greater than 1m through the site capping:

- a specific assessment of volatile soil vapour (VOC) risks is required by an appropriate professional;
- engineering precautions will be needed to protect air quality. Such precautions will involve a 'VOC and water proof' seal on the concrete structure. Additional measures such as air quality monitoring and forced ventilation, among others, may be required);
- mention will be required in a later form of this document;
- it will likely need to be mentioned in site inductions.

An example of such a structure could be the concrete lined Facing Pit inhabited for operational purposes. It is understood that the proposed Facing Pit is 24m long, 10m wide and 4m deep[20].

7.1.1.4 ENVIRONMENTAL CONSIDERATIONS – INSTALLING SERVICES AT DEPTHS GREATER THAN 1M OVER THE PRIMARY CONTAINMENT CELL

It may be necessary to install services over the primary containment cell at depths greater than 1m from the 'as-capped' remediated surface. In such situations it will be necessary to ensure that service trenches do not accumulate VOC. Several methods are available to achieve this as detailed in the following table.

Method	Advantages	Disadvantages
Over excavate service trench. Ensure that the service trench is surrounded by 1m of compacted CWR[21] underneath and on both sides.	Uses materials freely available on site.	Additional 'arisings' generation for containment in tertiary cell. Considerable over excavation required. Permeability of compacted backfill to be validated.

[19] Structures that human beings can enter.

[20] Email communication, Frank Hack, CPS, 15-09-09.

[21] Of minimum permeability 10-7 m/s

Install 0.5m of bentonite gel beneath services to produce a vapour barrier.	Minimises 'over excavation'	May generate a moderate amount of arisings requiring containment in tertiary cell.
Install welded HDPE[22] around entire exposed face of excavated trench to produce a vapour barrier.	Minimises 'over excavation' Relatively low cost approach	
Install sealed bentonite 'blanket' liner around entire exposed face of excavated trench to produce a vapour barrier.	Minimises 'over excavation'	More expensive than HDPE liner.

Irrespective of the construction methodology employed, such service trenches will qualify as a 'confined space' and appropriate notifications, both;

- on site; and
- in site inductions;

will be required to ensure the safety of those engaged in construction and maintenance in such situations.

7.1.2 GENERAL CONSTRUCTION ACTIVITIES – CONTAINMENT CELL AREAS

The protocols outlined in Section 7.1.1 (and subsections) apply to situations that cannot be practically avoided during major site development. The content of this Section (7.1.2) applies to more general situations where more conservative construction methodology can be tolerated.

The specific protocols designed to minimise risks to site users above the existing primary cell (outside the major construction portion of the primary cell) and for proposed tertiary containment cell (once complete) is as follows:

- Over the containment cell areas, the site landform must not be lowered without appropriate environmental assessment through use of the Steel River certification scheme. This includes minimising excavation into the cap to the extent practicable and only in consultation with a suitably qualified and experienced environmental professional.

[22] High density polyethylene. Appropriate taping may be substituted for welding to ensure a vapour proof seal.

- Reduction in cap thickness is not generally permitted, since cap thickness attenuates volatile soil vapour concentrations. Service sumps and pits can be constructed below the July 2009 pre-construction surface level to a maximum depth of 1m. Specific consideration of preferred pathways for volatile flow into buildings is required under the Steel River certification scheme.

- The entry of hydrocarbon vapours into site developments is to be prevented. If there is a development imperative to install facilities at deeper than 1m from the pre-construction surface level, consideration by an appropriately qualified and experienced environmental professional will be required.

- Highly volatile materials (ie exceeding the W8/13 soil concentrations used in the VOC assessment (Ref [2]) should not be placed 'as is' in the tertiary containment cell. If requiring disposal, highly volatile contaminated materials will require treatment (eg. aeration on site) to decrease the volatile content prior to disposal in the cell.

- For example any necessary services (such as stormwater and sewage) must be installed no deeper than 1m from the cell cap surface level. Hence, this ground level is significant and must be considered during detailed design.

- At the completion of KI site works the tertiary cell will be closed. Following successful validation of the tertiary cell closure and sign off by a site auditor, the site will be suitable for commercial or industrial development in accordance with this KI-EMP.

- Where practical, construction over the containment cells should include high level footings suitable for lightly loaded and settlement tolerant structures. Lightly loaded structures would include those requiring an allowable bearing pressure up to 100kPa on pad and strip footings and 5kPa over slabs on ground. Settlements can be expected to be limited to the order of 5-15mm. Heavier loads are not generally suitable for the containment cell affected areas, noting Section 7.1.1.2 above.

- Previous investigations by URS (Ref [9]) and RCA (Ref [2]) have indicated a uniform depth of 2m capping over the primary containment cell. The design for the proposed tertiary cell similarly involves 2m of capping. The KI development Certificate C is to state that excavations must not exceed 1m depth over containment cells.

The long-term management methodology specific to the tertiary containment cell is contained within the tertiary containment cell EMP. It will be revised by RCA prior to construction of the tertiary cell when disposal volumes are known.

Implementation of the restrictions outlined above will minimise human health and environmental risks associated with the development of the containment cell areas.

Where specific questions arise regarding containment cells, specialist advice is to be sought from an appropriately qualified environmental professional.

Groundwater monitoring is to be undertaken from existing and proposed groundwater monitoring boreholes around the containment cell(s). This is an obligation of BHPB.

KI should undertake groundwater monitoring for its own due diligence purposes, especially so where dynamic compaction is employed.

In any situation where development activity encounters tar contaminated material or vapours/odours, a site specific assessment should be made by an appropriately qualified environmental professional of whether VOC could directly enter nearby buildings.

7.1.3 RESTRICTION ON GROUNDWATER USE

Like other parts of the KI site, it is necessary to prevent direct contact with groundwater within the KI site. For this reason, apart from during construction, extraction of groundwater must not occur for any purpose, including irrigation.

7.1.4 RESTRICTION ON LANDFORM CHANGE

The site landform must not be changed (where this involves excavation) without appropriate environmental assessment, and potentially remediation, because a reduction in the depth of fill cover may increase the risk to human health. Environmental assessment would be managed under the Steel River certification scheme and using detailed design information.

Such excavation is only to be undertaken with the guidance of a suitably qualified environmental professional who is familiar with this KI-EMP.

Landscaping is proposed for the site and should not include any excavation of fill material. Landscaping is considered to provide a suitable additional barrier to contaminated material at depth.

8 INDIVIDUAL ENVIRONMENTAL MANAGEMENT PLANS RELEVANT TO THE KI-EMP

While this document contains and replaces the Site Construction Guidelines (Ref [1]) for the KI site and is the primary KI site EMP, the following guidelines represent technical appendices to this document.

Document	Description	Applies to
Operational and Long-term Environmental Management Plan, Proposed Tertiary Containment Cell (TCC) Steel River Site	A specific design and operational guide to the construction and filling of the proposed tertiary containment cell.	KI
Owners Environmental Management Plan – Construction Phase.	A specific document required for compliance with the Steel River Community Management Statement.	KI

9 ENFORCEMENT OF THE KI-EMP

There are four mechanisms by which the requirements of this KI-EMP are enforceable. These are through DA conditions, Council notification on the Section 149 certificate, Community Title Legislation, and the BHP Development Deed. Through these mechanisms it is considered that there is appropriate public notification of restrictions applying to the land to ensure that KI is aware of the necessary protocols.

The mechanisms are described below.

9.1 DA CONDITIONS AND CERTIFICATE PROCESS

As consent authority for the KI development, NSW Department of Planning can enforce the requirements of this KI-EMP, either:-

- directly as a consent condition; and/or
- through ongoing use of the Steel River development certification process[23].

The certificate process verifies that the site has been developed in accordance with the RAP/EIS (Ref [3]), Validation Report (Ref [9]) and this KI EMP, and therefore that the site remediation earlier undertaken by BHPB has not been compromised. The certificate process achieves this in four steps and satisfies certain requirements of the Environmental Planning and Assessment Act 1979.

Certificate A is generic to the whole site. **Certificates B, C and** D are produced for individual Lot developments. Certificate C is accompanied by a Site Management Plan (SMP), specific to the subject Lot. Such a SMP considers the requirement of this KI-EMP and provides guidance specific to particular development tasks, including collection of the validation information necessary to prepare Certificate D.

DSR provide the Lot purchaser with a certificate B for each Lot at the time of sale. The consent authority usually requires a Certificate C and SMP prior to issuing a construction certificate to Lot owners. The consent authority usually requires a Certificate D before providing an occupancy certificate.

The certification process is accepted by consent authorities, NSW DECC, BHP Billiton, and lot owners for appropriate documentary validation of the remediation status on the land before and after any development has occurred.

9.2 COUNCIL NOTIFICATIONS, EG, S149 CERTIFICATES

Under s149 of the EP&A Act, Newcastle City Council indicates on each Lot title that the Steel River site is a remediated site and contamination remains on site.

Following approval of the KI development DA by Planning NSW, it is anticipated that NCC will amend the s149 certificates for the KI Lot to require compliance with the KI-EMP.

[23] A normal condition of consent for Steel River developments.

9.3 COMMUNITY PLANS AND INSTRUMENTS

Steel River has been subdivided under Community Title legislation. The SRCA holds:-

- a copy of the registered plan of subdivision for the community title Lots; and
- the Conveyancing Act 1919 s88B instrument establishing various easements and covenants.

These include various restrictions on the use of the land, which, among other matters:-

- restrict owners using their Lots for any purposes inconsistent with Zone 4(c) Steel River Zone, under Newcastle Local Environmental Plan 2003; and
- restrict owners carrying out any development on their Lot which breaches or contravenes the Construction Guidelines (Ref [1]);
- registers a covenant on the title to land under s88B to comply with the Development Deed (or on rare occasions, an approved variation to the Deed).

9.4 STEEL RIVER DEVELOPMENT DEED

Accompanying each Contract of Sale is a Development Deed. This deed is entered into at the same time as the contract. In essence the Development Deed sets out the various obligations of BHPB, DSR (the "developer") and the purchaser of the Lot under contract (KI).

BHPB, the original owner of the site, accepts in perpetuity, any contamination liability arising out of its past activities on the site or materials it has deposited on the site, that results in an investigation order or clean-up order from the Environmental Protection Authority (EPA, now NSW DECC).

The BHPB contamination liability protection only applies to contamination within the Steel River site at the time of sale to the Lot owner. The Lot owner is required to act in an environmentally responsible manner, and in accordance with current legislation, to ensure that their Lot is not contaminated by their own activities, and their activities do not exacerbate existing contamination.

Among other things, the standard Deed:-

- places an obligation on the landowner to follow the Construction Guidelines (Ref [1]) when carrying out development;
- places an obligation on the landowner to provide verification that the Steel River Construction Guidelines (Ref [1]) have been complied with when carrying out development[24];

[24] Utilising the Certificate scheme.

- contains an indemnity by the landowner in favour of BHPB for any liability arising out of breach of the Steel River Construction Guidelines (Ref [1]).

The Steel River Construction Guidelines (Ref [1]) are annexed to the Deed and are reflected in this KI-EMP.

10 REQUIREMENT FOR MAINTENANCE OF THE KI-EMP

It is not intended that changes to individual documents referred to herein will necessarily require a revision of this KI-EMP. The KI-EMP should be updated if:-

- new documents are created that have relevance to the KI site; and/or
- significant unexpected contamination is encountered on the site relative to the previous site assessments that requires modification of the conditions herein; and/or
- construction of the tertiary containment cell varies from the present design[25] (in which case the new design should be included in a revision of this KI-EMP), or there are new as built restrictions;
- developments of the certificate scheme occur.

At the completion of the tertiary containment cell this KI-EMP is to be updated to contain the as-built drawings of the cell and specify any new as built restrictions.

The requirements specified in the KI-EMP apply indefinitely.

Any alteration to this KI-EMP that has the effect of reducing the degree of protection offered to human health or the environment must be approved (at minimum) by an appropriately qualified and experienced environmental professional.

It is the responsibility of Lot owners to provide their main ongoing EMP to the SRCA. The Lot owner is then to supply Council with the main ongoing EMP so that the s149 Certificate for the Lot may be amended to register its existence.

Following site construction this KI-EMP should be updated to reflect the prevailing site and development status and remain an ongoing reference document that informs OH&S procedures for KI.

11 VERIFICATION OF COMPLIANCE WITH THE KI-EMP

For site developments undertaken under development consent, consent authorities can request:-

- an environmental professional's report;

[25] Which is anticipated.

- Certificates C and D;
- a site audit statement (SAS).

For site developments not undertaken under development consent verification of compliance with the KI-EMP can be undertaken via consultation with the SRCA.

12 LIMITATIONS

This report has been prepared for Crown Project Services Pty Ltd in accordance with an agreement with RCA dated August 2009. The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the purposes outlined in Section 3. The report may not contain sufficient information other than for those specific purposes. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA.

CPS may provide this EMP to Knauf Insulation Pty Ltd, the Steel River Community Association, Newcastle City Council, and the NSW Department of Planning for their purposes as it relates to the present Knauf Insulation development at Steel River.

The information in this KI-EMP is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.

Environmental conditions including contaminant concentrations can change in a limited period of time. This should be considered if the KI-EMP is used following a significant period of time after the date of issue.

Yours faithfully
RCA AUSTRALIA

Paul Noonan
Principal Environmental Engineer

Geoff Mason
Environmental Manager

REFERENCES

[1] Steel River Site Construction Guidelines, URS, 5 March 2002.

[2] Draft Volatile Organic Compounds (VOC) and Limited Validation Assessment, Stages 9 and 10 Steel River, RCA, 6 June 2008, RCA ref 6586b-602/0.

[3] Steel River Project Remedial Action Plan Environmental Impact Statement (RAP/EIS), May 1997, Project No. A8600246, Document R001-C.DOC.

[4i] Human Health and Environmental Risk Assessment, West of Tourle Street Site, Newcastle, NSW, August 1995, Project No. 3695, Document No OD0-14B.DOC.

[4ii] Draft Environmental Review, West of Tourle Street Site, 23 July 1995, CMPS&F, Job No. SE6781.001.

[5] Road Opening Management Plan, Revised Draft (unpublished work in progress), RCA ref 6586-401/2.

[6] Draft Environmental Site Assessment, Lot 1017 Steel River, 27 May 2008, RCA ref 6586b-601/0.

[6a] RCA 1st stockpile validation data July 2009.

[6b] RCA 2nd stockpile validation data August 2009.

[7] Operational and Long-term Environmental Management Plan, Proposed Tertiary Containment Cell, Steel River Site, 16 July 2008, RCA ref 6586b-605/1.

[8] Guidelines for the NSW Site Auditor Scheme (2nd edition), Department of Environment and Conservation NSW, Second Edition, April 2006.

[9] Remediation Validation Report, Steel River Site, 30 November 2004. 39933-020, Final Report November 2004.DOC.

[10] Strategic Impact Assessment Study Concerning Land at Tourle Street and Industrial Drive, Mayfield – The "Steel River" Project, February 1998, Compiled for Newcastle Council by APT Peddle Thorp.

[11] Environmental Management Plan, Stage 9 and 10, Steel River Site, RCA ref 6586b-608/3, July 2008.

[12] Steel River Community Management Statement, Teys McMahon, registered 23.02.01.

Contents

KNAUF INSULATION OWNERS ENVIRONMENTAL MANAGEMENT PLAN (KI-EMP)

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

- Geotechnical Engineering
- Engineering Geology
- Hydrogeology
- Contaminated Site Assessment
- Construction Materials Testing
- Environmental Monitoring

STEEL RIVER SITE

Prepared for

Crown Project Services Pty Ltd

Prepared by

RCA AUSTRALIA

RCA ref 7467b-401/1

SEPTEMBER 2009

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/1	1	Electronic	Crown Project Services – Frank Hack	15.09.09
/1	1	Electronic	JBA Planning. S. Ballango	15.09.09

NCS INTERNATIONAL
CERTIFIED QUALITY MANAGEMENT SYSTEM
ISO9001

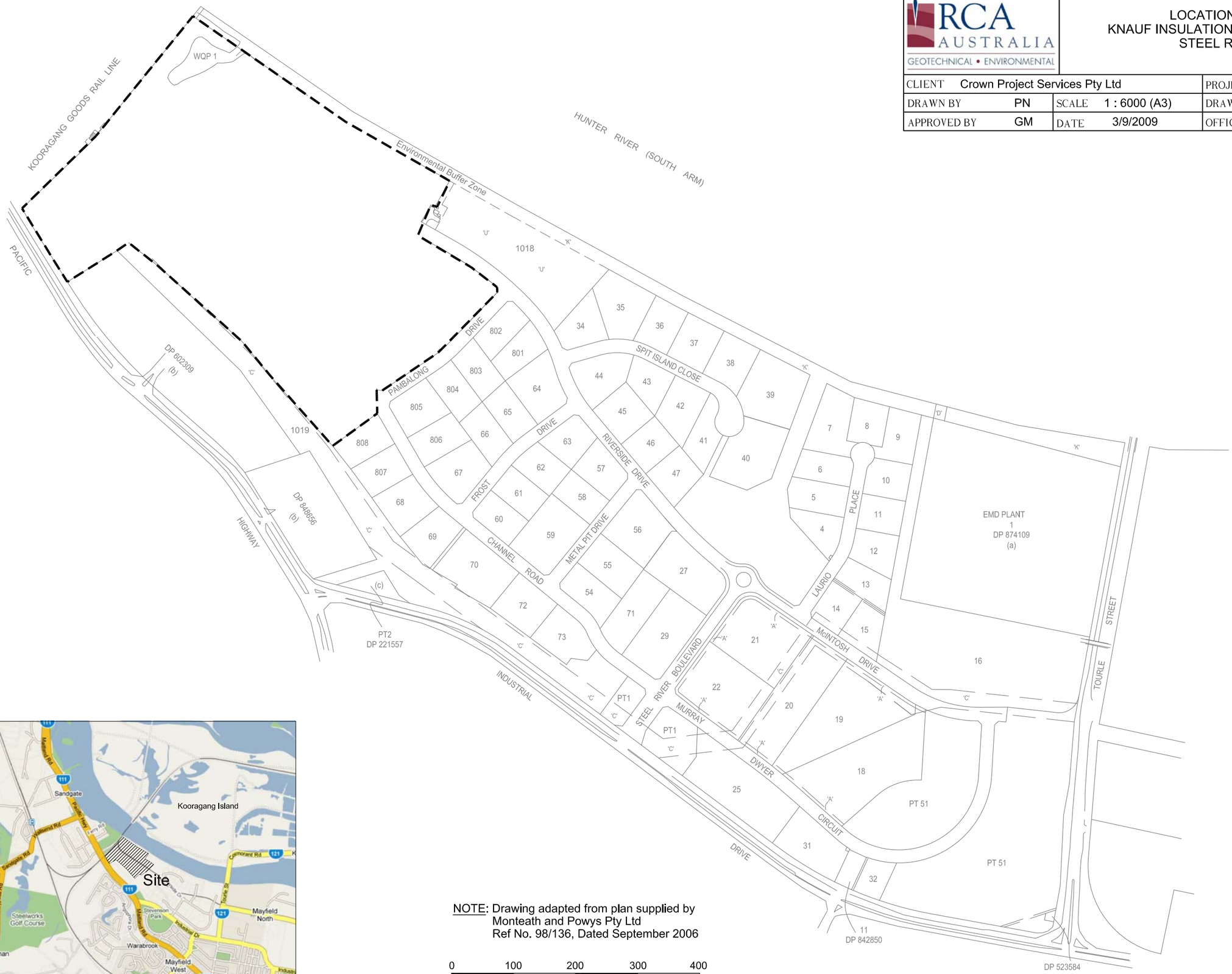
Appendix A

Drawings

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

LOCATION PLAN
KNAUF INSULATION DEVELOPMENT
STEEL RIVER

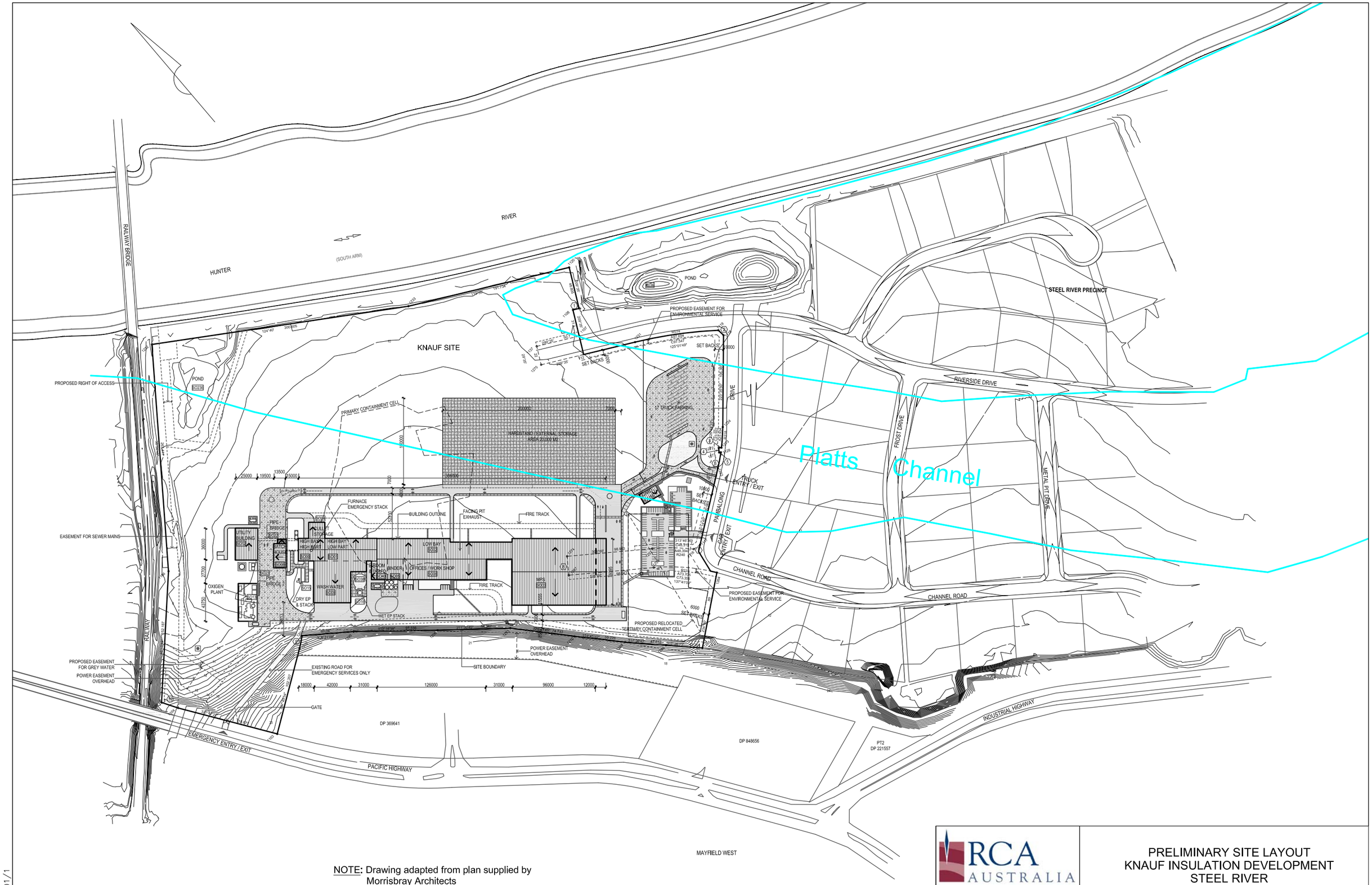
CLIENT	Crown Project Services Pty Ltd			PROJECT No	7467b-401
DRAWN BY	PN	SCALE	1 : 6000 (A3)	DRAWING No 1	REV 0
APPROVED BY	GM	DATE	3/9/2009	OFFICE	NEWCASTLE



Locality Plan
N.T.S.

NOTE: Drawing adapted from plan supplied by
Monteath and Powys Pty Ltd
Ref No. 98/136, Dated September 2006

0 100 200 300 400
metres



NOTE: Drawing adapted from plan supplied by
Morrisbray Architects
Dwg No H59400 Rev D
Dated 19/8/2009

0 50 100 150 200
metres

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

PRELIMINARY SITE LAYOUT
KNAUF INSULATION DEVELOPMENT
STEEL RIVER

CLIENT	Crown Project Services Pty Ltd			PROJECT No	7467b-401
DRAWN BY	PN	SCALE	1 : 4000 (A3)	DRAWING No 2	REV 0
APPROVED BY	GM	DATE	3/9/2009	OFFICE	NEWCASTLE

CDT-DWG-A3H-001/1

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

LOCATION OF CONTAINMENT CELLS
KNAUF INSULATION DEVELOPMENT
STEEL RIVER

CLIENT	Crown Project Services Pty Ltd			PROJECT No	7467b-401
DRAWN BY	PN	SCALE	1 : 3000 (A3)	DRAWING No 3	REV 0
APPROVED BY	GM	DATE	3/9/2009	OFFICE	NEWCASTLE

WQP 1

KOORAGANG GOODS RAIL LINE

PACIFIC HIGHWAY

HUNTER RIVER (SOUTH ARM)

Environmental Buffer Zone

'K'

'U'

'U'

1018

1019

'C'

'C'

DP 602309 (b)

DP 848656 (b)

PAMBALONG DRIVE

FROST DRIVE

RIVERSIDE DRIVE

SPIT ISLAND CLOSE

CHANNEL PIT DRIVE

34 35 36 37 38

802 801 803 804 805 806 807 808

64 65 66 67 68 69

44 43 42 41 45 46 47

63 62 61 60 59 58 57 56

LEGEND

- Former Proposed Lot 1017 Area
- Environmental Buffer Zone 'K'
- Primary Containment Cell location
- Proposed Tertiary Containment Cell location
- Boundary of 'Banana' area
- Boundary of Knauf Insulation Development Site

NOTE Drawing adapted from plan supplied by
Monteath and Powys Pty Ltd
Ref No. 98/136, Dated September 2006

0 50 100 150 200
metres

STOCKPILE SAMPLE LOCATIONS
KNAUF INSULATION DEVELOPMENT
STEEL RIVER

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

CLIENT	Crown Project Services Pty Ltd			PROJECT No	7467b-401
DRAWN BY	MC	SCALE	1 : 2500 (A3)	DRAWING No 4	REV 0
APPROVED BY	PN	DATE	3/9/2009	OFFICE	NEWCASTLE

0 25 50 75 100 125 150
metres

KOORAGANG GOODS RAIL LINE

1017

Environmental Buffer Zone

HUNTER RIVER (SOUTH ARM)

Knauf Site Boundary

PACIFIC

Former Power Tower Foundation

Stockpile B

Stockpile C

Main Arisings Pile

A6 validation

DP 602309

'C'

'U'

'K'

1018

RIVERSIDE DRIVE

PAMBALONG DRIVE

34

802

801

803

804

805

64

65

44

66

LEGEND

- Stockpile sample location
- Arisings material
- Classified material

NOTES

- Samples A5c-a and SPC3 were removed from data sets prior to running UCL calculations. Those sample results reflected the presence of coal
- Area 6 was already moved to main arisings pile
- Sample A10a4 was removed from the data set due to anomolous Lead result
- Drawing adapted from plan supplied by Monteath and Powys Pty Ltd Ref No. 98/136, Dated September 2006

Site Reuse Classifications

Area	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
A1	■			■	■	
A2		■		■	■	
A3	■			■		
A3b	■			■	■	
A4b				■	■	
A5		■		■	■	
A5b		■		■	■	
A5c	■			■	■	
A6						■
A7						■
A8				■	■	
A9		■		■	■	
A9a	■			■	■	
A10	■			■	■	
A10a				■	■	
A11	■			■	■	
A12		■		■	■	
A13	■			■	■	
A14						■
A15					■	
A16	■			■	■	
Stockpile B	■			■	■	
Stockpile C		■		■	■	

HUNTER RIVER

EXISTING POND No.1

R.L.8.9

MAINTAIN ACCESS TO EASEMENT

PROPOSED LOCATION OF CONTAMINATED ARISING STOCKPILE

PROVIDE BUNDING AROUND CONTAMINATED ARISINGS STOCKPILE.

PROPOSED 4WD ACCESS TRACK

CH 0.0
CH 5.0
CH 20.0
CH 40.0
CH 60.0
CH 80.0
CH 97.6

RIVERSIDE DR

STAGE 8

PAMBALONG DR

CHANNEL RD

REMOVE PROTRUDING OUTCROP IN EMBANKMENT

DP 602309

MAITLAND ROAD

NOTE: Drawing adapted from plan supplied by
Worley Parsons
Dwg No 301017-00239-03 Issue E
Dated 1/9/2009

0 50 100 150 200
metres

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PROPOSED LOCATON OF CONTAMINATED ARISINGS STOCKPILE KNAUF INSULATION DEVELOPMENT STEEL RIVER

CLIENT	Crown Project Services Pty Ltd			PROJECT No	7467b-401
DRAWN BY	PN	SCALE	1 : 4000 (A3)	DRAWING No 5	REV 0
APPROVED BY	GM	DATE	3/9/2009	OFFICE	NEWCASTLE

CDT-DWG-A3H-001/1

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

EXISTING MONITORING WELLS
KNAUF INSULATION DEVELOPMENT
STEEL RIVER

CLIENT	Crown Project Services Pty Ltd			PROJECT No	7467b-401
DRAWN BY	PN	SCALE	1 : 3000 (A3)	DRAWING No 6	REV 0
APPROVED BY	GM	DATE	3/9/2009	OFFICE	NEWCASTLE

BH11
WQP 1
BH101
BH10W
BH10E
BH12
BH13
BH24
BH9
BH8W
BH8E
BH23
BH25
BH26
KOORAGANG GOODS RAIL LINE
Environmental Buffer Zone
HUNTER RIVER (SOUTH ARM)
PACIFIC
DP 602309 (b)
DP 848656 (b)
HIGHWAY
'C'
'U'
'K'
1018
1019
PAMBALONG DRIVE
FROST DRIVE
SPIT ISLAND CLOSE
RIVERSIDE DRIVE
CHANNEL PIT DRIVE
34
35
36
37
38
802
801
803
804
805
806
807
808
64
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66
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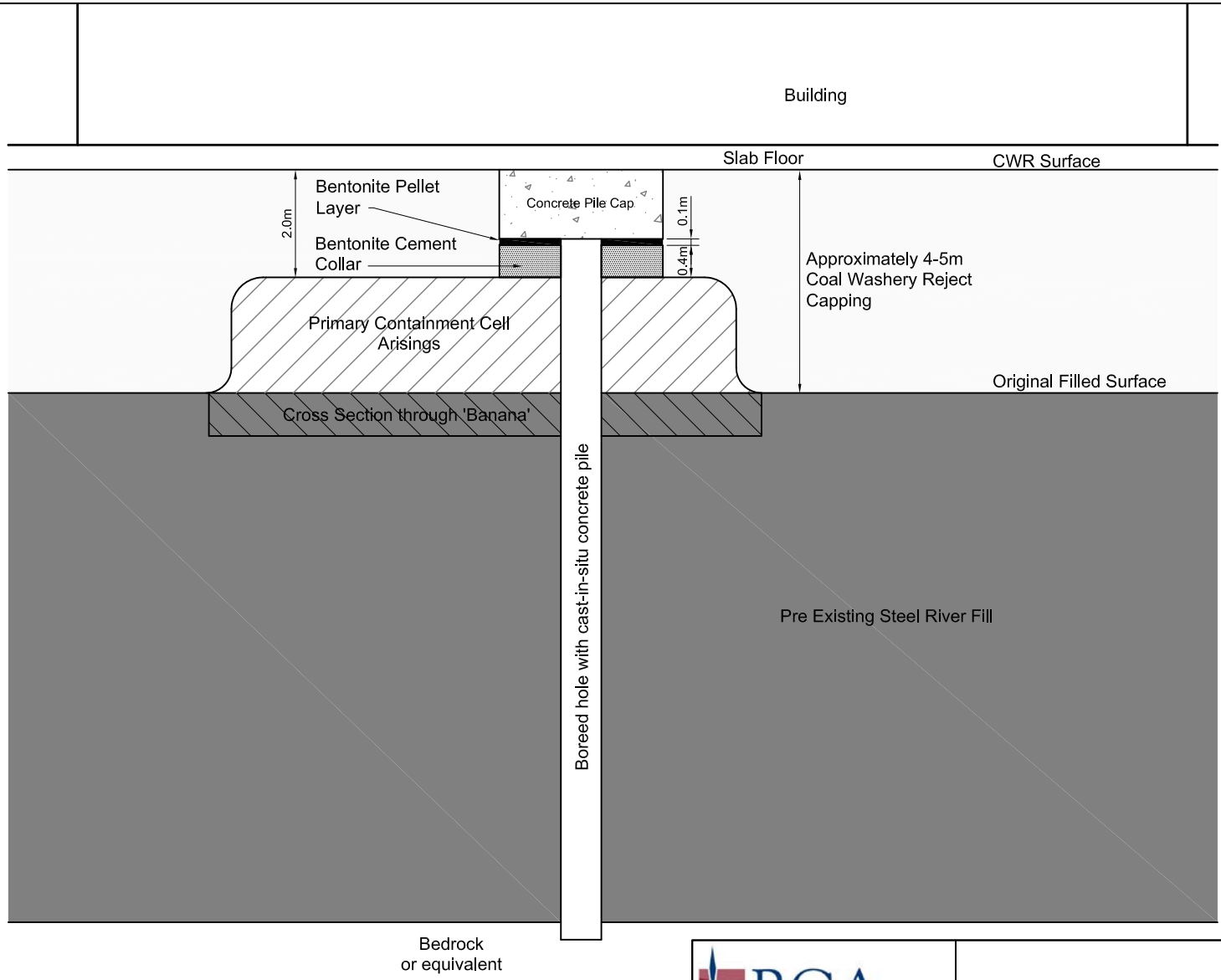
58
56

LEGEND

- Existing URS Monitoring Well, 2006
- URS Monitoring well January 07

NOTE Drawing adapted from plan supplied by
Monteath and Powys Pty Ltd
Ref No. 98/136, Dated September 2006

0 50 100 150 200
metres

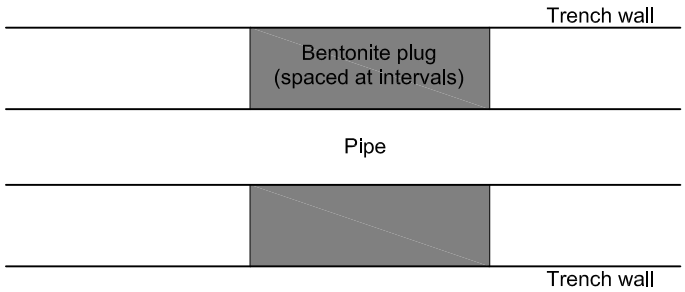


RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

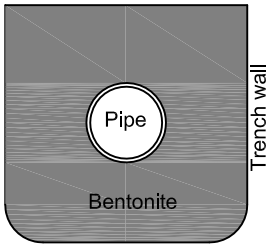
CONCEPTUAL DESIGN PILE CAP VOC SEAL KNAUF INSULATION DEVELOPMENT STEEL RIVER

CLIENT	Crown Project Services Pty Ltd			PROJECT No	7467b-401
DRAWN BY	PN	SCALE	N.T.S.	DRAWING No 7	REV 0
APPROVED BY	GM	DATE	15/9/2009	OFFICE	NEWCASTLE

CDT–DWG–A4H–001/1

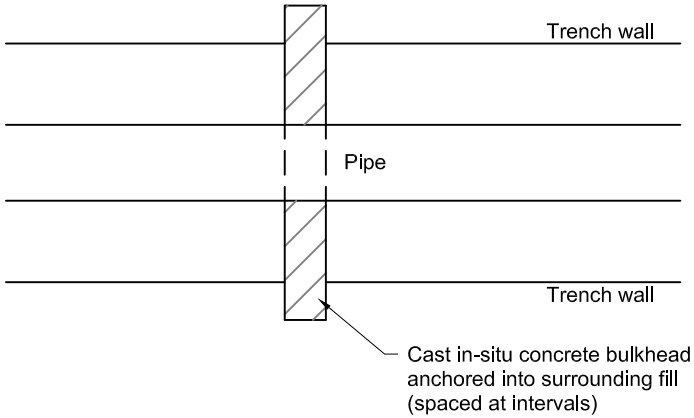


PLAN

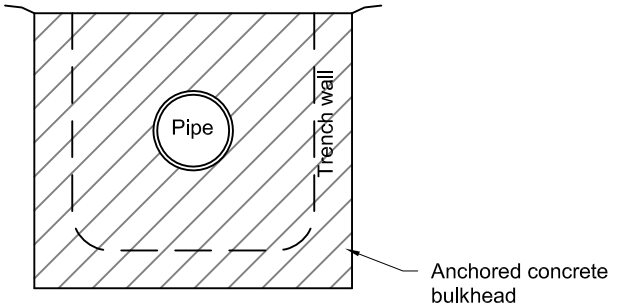


END ELEVATION

OPTION A



PLAN



END ELEVATION

OPTION B

NOTES

- The above concepts are considered suitable schemes for the majority of site stormwater drainage in situations where contaminated groundwater at comparable depth could reasonably be expected
- In the vicinity of Water Quality Ponds 1 and 2, additional groundwater contaminant migration prevention measures will be required. These to be detailed at the design stage to the satisfaction of the environmental consultant

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CONCEPT STORMWATER PIPE
GROUNDWATER FLOW RESTRICTORS
KNAUF INSULATION DEVELOPMENT
STEEL RIVER

CLIENT	Crown Project Services Ptd Ltd			PROJECT No	7467b-401
DRAWN BY	PN	SCALE	N.T.S.	DRAWING No 8	REV 0
APPROVED BY	GM	DATE	3/9/2009	OFFICE	NEWCASTLE

CDT–DWG–A4H–001/1

Appendix B

OEMP

Knauf Insulation

Lot 98
Steel River

Owners Environmental Management Plan

Prepared by
RCA Australia

1. Introduction

The Steel River Community Association has prepared a Community Environmental Management Plan, which forms part of the Community Management Statement. Each person who is an Owner, tenant, Occupier or Mortgagee of a Community Development Lot is bound by the terms of this Community Environmental Plan.

This plan requires that a party must not:

- carry out or permit to be carried out any Development on any Lot;
- carry out or permit to be carried out any activity on any Lot, or
- use or occupy any Lot, or permit any use or occupation on any Lot,

unless:

- there is in place for the Lot an Owners Environmental Management Plan (OEMP) approved by the Community Association;
- there is an Environmental Entitlements Certificate for the Lot recorded in the Environmental Register;

if the use or activity requires development consent, and consent has been given -

- a copy of which has been given to the Community Association accompanied by the documents required by clause 2.2(a) of the Community Environmental Management Plan, and
- which has been submitted to the Council accompanied by the documents required by clause 2.2(b) of the Community Environmental Management Plan.

This plan has been written to meet these requirements.

2. Owners

Knauf Insulation, Lot 98 Steel River Industrial Estate, Mayfield West (Knauf).

3. Lot Description

The site is located in Lot 98, Steel River. The site is located at the western end of the Steel River Industrial Estate. The Hunter River South Arm forms the northern boundary. It is bound by the Kooragang Goods Rail Line on the western side. The Pacific Highway and privately owned land form the southern boundary. Part of Stage 8 of the Steel River Estate forms the eastern boundary.

4. Activities

Knauf proposes establishing a glass wool manufacturing plant on Lot 98 of the Steel River Industrial Estate. The plant will employ approximately 135 people and the design output is predicted to be 200T/day, based on full-time operation (24 hours / 7 days).

As part of the development of the facility, Knauf will commission works to prepare the site and construct the required plant. At this stage plans for the plant are at concept stage only and many details of construction activities are yet to be finalised.

Presented below is a summary of likely activities associated with the plant construction works and for which an environmental management plan will be required.

1. Earthworks, including; cut and fill across the site to provide the design levels and grades specified for the manufacturing plant. This will also include site foundation conditioning involving dynamic compaction using a 50T drop weight.
2. Foundation works involving the installation of 127 driven steel piles to depth (typically to rock, located from a few metres depth in the southern area to in excess of 20m at the northern margins of the site). Up to 30 piles may be required to be driven into/through the existing primary containment cell.
3. Handling and storage of contaminated "Arisings" encountered during construction works and also including movement of existing contaminated stockpiles currently located on the site. It is proposed to place such Arisings into a temporary storage site (appropriately constructed to ensure that the potential for contamination mobilization/migration and worker exposure is minimised). Ultimately all Arisings will be permanently emplaced in a new containment cell (the "Tertiary Containment Cell") to be constructed on Lot 98, following development of the facility. A separate environmental management plan will cover the construction of the cell and emplacement of the Arisings).

The construction activities described above have the potential to generate emissions which may impact the environment, including:

- Noise/Vibration;
- Dust;
- Waste water;
- Odour;
- Sediment (from soil erosion); and
- Contaminated soil and water (groundwater).

In order to manage the potential impacts, a detailed Construction Environmental Management Plan (CEMP) will be prepared and ultimately appended the OEMP.

5. Context Of The EMP

This OEMP outlines the framework of environmental management principles and major environmental controls to be implemented during the works which are common

to any development on the Steel River Industrial Estate and also specific to the issues associated with the Lot 98 area.

A Construction EMP (CEMP) will be prepared within the context of the OEMP and will detail the specific local management measures and monitoring programs for Lot 98 and Steel River, generally, and will need to be read in conjunction with the OEMP and its associated plans and protocols.

The purpose of the CEMP will be as follows:-

- To provide a systems approach to the management of environmental issues associated with the site construction works.

- To establish specific strategies and protocols for the management of environmental systems components associated with the works. The environmental components relate to the management of:-

- air quality (including dust and odour);

- surface water (including soil erosion and sedimentation);

- groundwater (impacts to and from contaminated groundwater below the Steel River Site);

- noise and vibration (related to construction plant, particularly noise and vibration arising from the use of dynamic compaction methods);

- traffic;

- To outline specific plans for the monitoring and effectiveness of environmental mitigation measures to be put in place during construction.

- To identify contingency procedures to be followed where identified outcomes are not achieved.

The CEMP should be consistent with Guidelines for the Preparation of Environmental Management Plans (DIPNR 2004).

6. Components of the CEMP

The following presents a summary of anticipated requirements for separate components of the CEMP.

Air Quality Management Plan

During site construction works there are potentials for impacts on air quality as a result of:-

- dust generation from exposure of soils as part of site preparation works which involve earthmoving plant exposing, excavating, moving and depositing soil in dry and or windy conditions;

- during site excavation works exposure of odourous contaminated soils or groundwater which impact on the amenity of neighbouring properties (particularly residential properties); and

- accumulation of potentially toxic vapours in (deeper) excavations into contaminated soil/fill profiles and/or exposure of contaminated groundwater.

It is anticipated that the most significant potential impacts will be from dust generation. Impacts from odour and potentially toxic odour are not expected to be significant or, with respect to potentially toxic vapours, will be isolated to specific localized occurrences within the site.

All potential exposures to vapours will be managed through the OHS Plan and under the Steel River Construction Guidelines addressed within the OEMP.

In order to monitor and manage potential impacts on Air Quality from construction works, a detailed air quality management plan and monitoring program (AQMP&MP) may be required.

The AQP&MP will contain the following information:-

- The location of the proposed works.

- Describes the nature of the works to be undertaken and their intended duration.

- Outlines the specific program to monitor the air quality generated by the works at locations particular to the site and type of works being undertaken.

- Provides the specific mitigation and management measures to be implemented during the works to ensure they are undertaken in a manner that minimises or prevents dust and odour emissions from the site.

- Describes various responsive actions and contingency measures for measured exceedences of monitored dust levels above certain trigger levels and contingency measures where odours are noted e.g. complaints from neighbouring properties/businesses.

Monitoring programs would typically include the regular sampling of dust gauges as per the appropriate Australian Standard located at strategic points around the site (based on the location and nature of works, prevailing local wind conditions etc). This would also determine the selection of appropriate sampling/analytical methods and monitoring intervals for the monitoring program.

Responsive actions and contingency measures may include:-

- the use of water carts (or other methods) to suppress dust during works;
- cessation of operations in windy and high temperatures conditions;
- use of temporary covering materials (soils) over exposed odourous contaminated soils and/or planning for limited exposure of such soils where possible.

Surface Water Quality Management Plan

The primary source of impacts on surface water quality is considered to be:-

- The mobilization of sediment to surface water by the action of stormwater on exposed soil.

The activities considered to have the greatest potential for impacts on surface water quality include:-

- Stormwater flow across earthworks (including preparation works) where vegetation has been stripped, and soil has been excavated and moved.
- Stormwater action on soil stockpiles;
- Exposure of contaminated soils (including an assessment of acid sulphate soils if applicable) and interaction with stormwater; and
- Exposure of contaminated groundwater and flow into surface water.

These impacts should be anticipated and managed through the preparation of a Surface Water Quality Management and Monitoring Plan (SWQM&MP).

Components of the plan should include:-

- A description of the works and specific anticipated impacts;
- management methodologies to address potential impacts;
- an appropriate monitoring program to detect and monitor potential impacts; and
- contingencies and action plan to address detected impacts on surface water.

Management methods to prevent/minimise surface water impact should include:-

Erosion and Sediment Control

- The scheduling of any earthworks to minimise periods of exposure of large areas of bare soils, and

- The planning and provision of appropriate erosion and sediment controls for exposed soils including silt fencing and sedimentation dams, in accordance with recognised guidelines e.g. the "Blue Book" (*Soils and Construction: Managing Urban Stormwater*, Landcom, 4th Edition. New South Wales Government, March 2004),

Interaction with Contaminated Soils/Groundwater

- Methods to designate contaminated and clean areas with marker fencing and clearly identify the stage of remediation.

- Arrangements for the diversion of clean water and stormwater through the site using clean transport routes for ultimate disposal off site into the stormwater system;

- Whenever practical, there is to be separate water management system for clean water (run-on stormwater) and dirty water when identified within the project area;

- Water collected from clean areas may be collected in a designated clean water system. The clean water system must be clearly designated as being for clean water only. Clean water can be re-used on any area of the site or, if of suitable quality, discharged to the stormwater system. It can also be diverted into the dirty water system if required;

- Dirty water may not be used on clean areas.

The WQM&MP will identify an appropriate monitoring program outlining the scope of measured parameters and frequencies of monitoring to assess impact on surface water quality. This should be based on:-

- The scale of the works;

- Predicted weather conditions over the term of the project;

- Contamination history of the site and expected contamination profile of soil and groundwater in the Lot 98 area;

- Legislative requirements for the discharge of stormwater.

Noise and Vibration Management Plan

The following significant sources of noise and vibration are anticipated as part of the site construction works:-

- Plant used in general earthworks/construction works; and

- Specialist plant including dynamic compaction rig (50 tonne drop weight falling on to surface) and piling rig for estimated 127 driven piles.

A Noise and Vibration Management and Monitoring Plan (NVM&MP) should be prepared by a qualified expert and include the following components:-

- Nature/scope of works to be undertaken and potential impact generated including magnitude and duration of events;

- Identify the sensitive receptors potentially affected by the noise and or vibration of the works;

- Estimate the severity of impacts at the location of the sensitive receptors and outline the project performance criteria to be complied with (based on existing legislation/guidelines and any project specific approvals);

- Outline the management / mitigation procedures to ensure criteria are not exceeded;

- Outline the monitoring program appropriate to measure compliance against the adopted criteria; and

- Outline the contingencies / responses to any exceedences of the noise/vibration criteria.

Management options may include the construction of acoustic barriers and or the provision of restricted hours of operation for specific items of machinery.

All site plant must be required to comply with best practice for minimising noise emissions and the manufacturers design criteria.

Traffic Management Plan

An appropriate traffic management plan (TMP) should be prepared by a qualified specialist for the works on site to minimise impacts on the immediate neighbouring Steel River Precinct and in the wider West Mayfield/Industrial Drive area.

Reporting

Monitoring results of the works will be collected progressively throughout the works in accordance with the specific programmes for each component of this EMP. These results will be reported following the completion of the works.

Environmental Training

All personnel involved in the works will be required to attend a Site Induction Programme facilitated by the environmental representative or site manager to promote environmental awareness with respect to proposed works. Once completed, personnel will be required to sign a declaration form indicating that they have been given and understand the environmental procedures to be used during the remediation works.

7. Environmental Entitlements

Attached as Appendix 1 of this plan [to be provided] is a copy of the Environmental Entitlements for Steel River Lot 98. A copy of these entitlements is recorded in the Steel River Environmental Register.

8. Additional Environmental Requirements

It is not known at this time what additional environmental requirements will be required, however as the design develops this will be addressed in the second evolution of this document.

9. Predicted Air Emissions

There will be air emissions from the plant but the volume and type are unknown at this time as the plant is still in the design phase. All appropriate approvals and licences will be obtained at the appropriate time.

10. Predicted Noise Emissions

The business will be in operation 24 hours per day 7 days per week.

Noise modelling will be undertaken for the site once the plant layout and design have been finalised to ensure there is minimal impact on the surrounding developments and the greater community.

11. Stormwater

The stormwater from the site will be as proscribed in the Development Application consent conditions for the facility.

12. Waste Management

The normal garbage disposal from staff and amenity areas will handled by the Council collection service. Any other major waste stream will be identified during

the design phase and appropriate reuse, recycle disposal options will be evaluated and implemented during construction and commissioning.

13. Energy Efficiency Initiatives

Energy efficient initiatives will be incorporated at the design phase of the project and carried through during the construction phase. Other energy efficiency initiatives have been installed as identified in the Development Application of the total facility.

14. Contact details

In the event of failure requiring corrective action, the owner of the facility can be contacted on ##### #### ####.

15. Author

This plan was prepared by RCA Australia on behalf of Knauf Insulation the owner/operator of the facility.

16. Approved by

_____
Signature

Name
Name

Owner / Operator
Position

_____
Date

_____
Community Association Secretary