LEGEND

Figure Location Reference Map

DLA environmental

Sydney
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Tel: 02-94761765
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Maitland
42B Church Street
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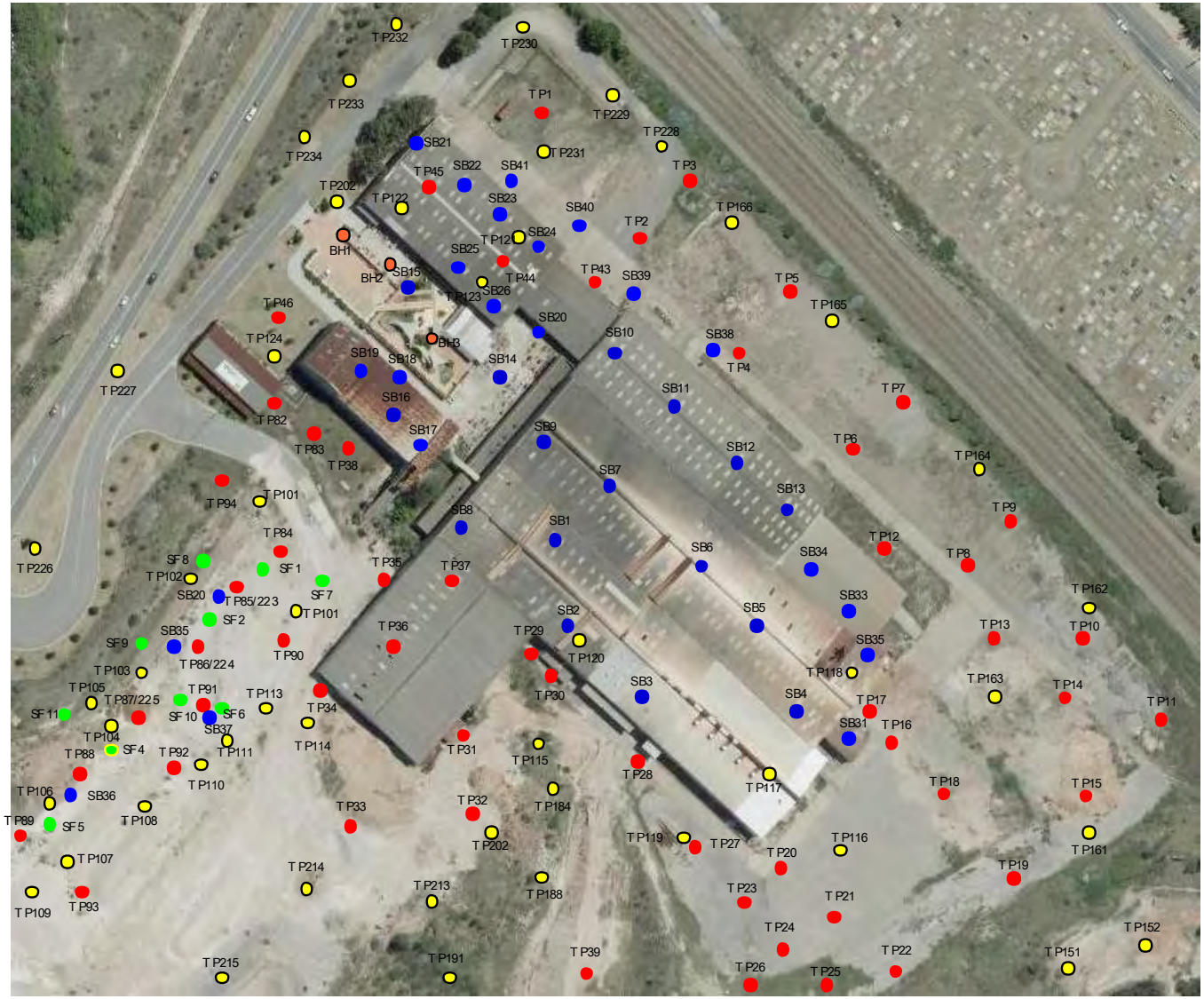
Title: CSR/PGH Metford NSW – Figure Reference Map	
Figure: 2	Project no:: DLH1036
Date: 29.11.2013	Revision: 1



LEGEND

- Bore Hole Location 2013
- Test Pit Location 2013
- Test Pit Location 2011-2012
- Soil Bore Location
- Surface Sample Location

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Title: CSR/PGH Metford NSW – 2011 – 2013 Soil Sample Locations Including Below Slab Investigation.	
Figure: 3	Project no:: DLH1036
Date: 11.11.2013	Revision: 1

LEGEND

- Pit 2 Excavation Area
- Sample Location
- Stockpile Location

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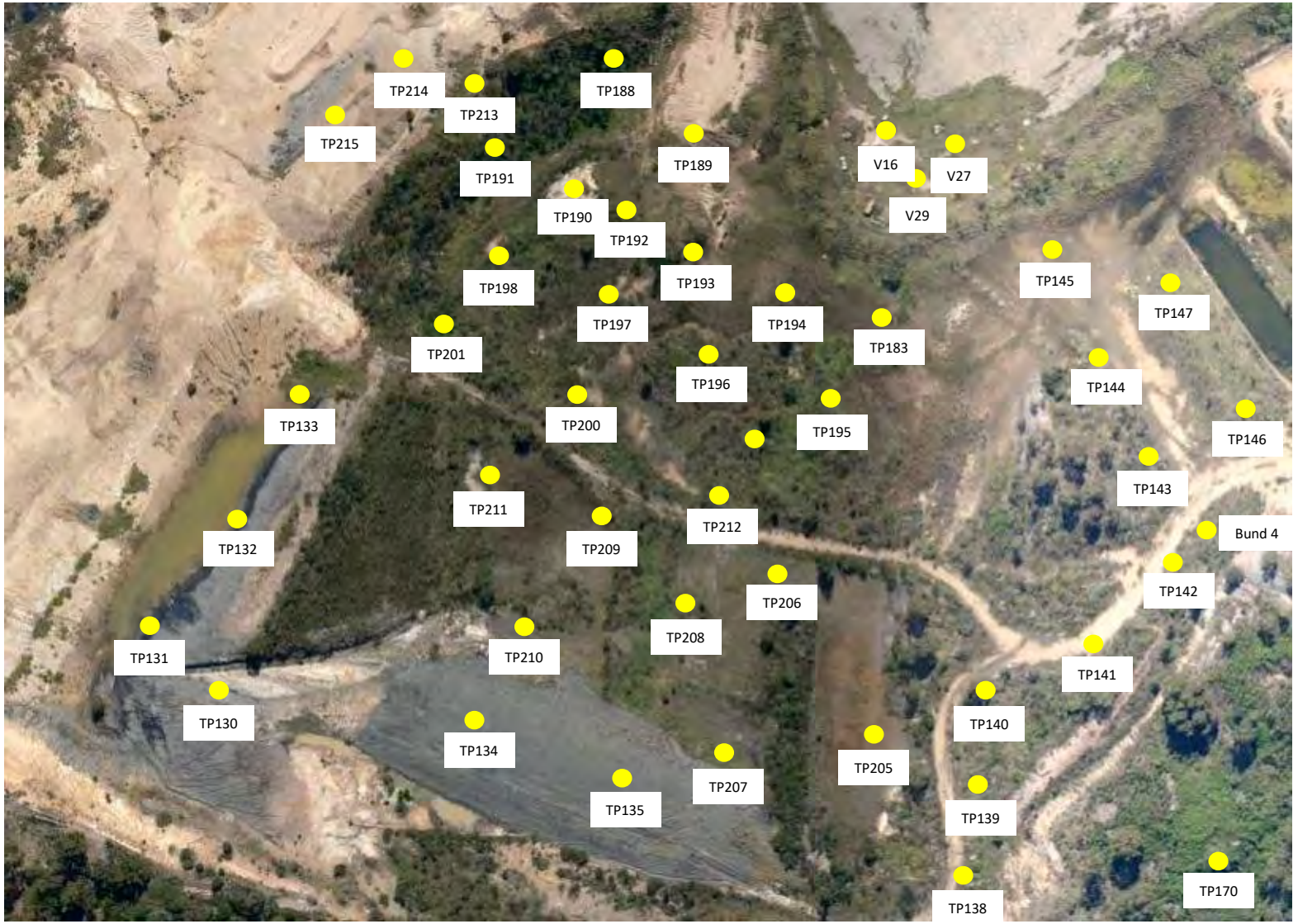
Title: CSR/PGH Metford NSW – Adjacent to Factory Area Soil Sampling Locations 2013

Figure:	Project no::
4	DLH1036
Date: 11.11.2013	Revision: 1



LEGEND

- Sample Location

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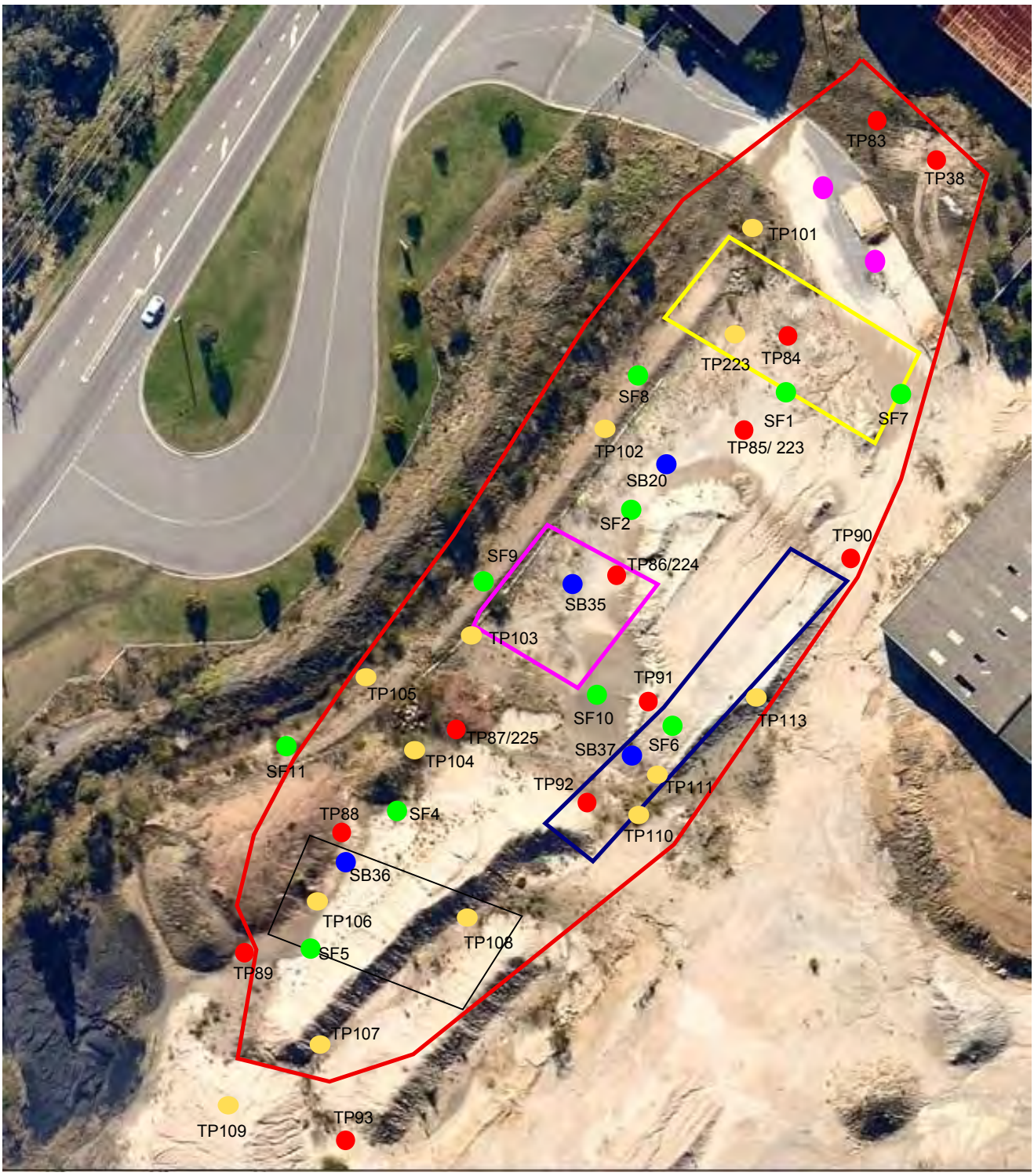
Title: CSR/PGH Metford NSW – Swamp Grass Area Sample Locations

Figure:	Project no::
8	DLH1036
Date:	Revision:
11.11.2013	1



Legend

- Proposed Test Pits
- Test Pit Location 2013
- Test Pit Location 2011-2012
- Soil Bore Location
- Surface Sample Location
- Overall Extent of Pit 2
- Existing Pit 2-1
- Proposed Pit 2-2
- Proposed Pit 2-3
- Proposed Pit 2-4

Approximate Scale

0m 20m 40m

DLA environmental

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Title: CSR/PGH Metford Soil Sample Locations - Pit 2

Client	Figure No	Date
CSR Ltd	Figure 1	29/08/2014

Project No.	Scale	Compiled	Revision
DLH1036	Approx	AS	R00

Legend

- Meets Open Space Criteria
- Meets Industrial Commercial Criteria
- Exceeds Industrial Commercial Criteria remediation or offsite disposal required

DLA environmental

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Maitland Office
Phone (02) 4933 0001

Title: Metford former brickworks Stockpile Locations

Client	Project No.	Figure No	Date
CSR- Catalyst Project Consulting	DLH 1136	1	7/11/2014
	Scale: N/A	Compiled: SC	Revision: R00

Legend

- Well Location

N

Approximate Scale

0m 100 m 200 m

DLA Environmental Services
A Pacific Environment company

Sydney Office
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Maitland Office
Phone (02) 4933 0001

Title: Groundwater Monitoring Well Locations

Client	Project No.	Figure No	Date
CSR CPC	DLH1178	1	10/12/2015
	Scale: As Shown	Compiled: BF	Revision: R01

239262-GRID-001-C

MGA Grid on Aerial Photo

Metford Road, Metford 1 of 1

VER.	DATE	COMMENT	DRAFTER
A	20/11/2014	PRELIMINARY AERIAL PHOTO & GRID PLAN	RC
B	24/11/2014	ADD NEW PHOTO TO GRID PLAN	RC
C	01/12/2014	ADD NEW WARPED PHOTO TO GRID PLAN	RC

CO-ORDINATE INFORMATION	
CO-ORDINATE SYSTEM:	MGA 56
ORIGIN OF CO-ORDINATES:	SSM 45995 FD.

Bar Scale 1: 2000 (A1), 1: 4000 (A3)

NOTES:-

1. BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY AND HAVE NOT BEEN SURVEYED.
2. AERIAL PHOTO DATED 04/10/2014. PHOTO SUPPLIED BY CSR AND IS NOT ORTHORECTIFIED.

PLAN PURPOSE: Site Grid

PROPERTY DESCRIPTION: Lot 401 DP.755237, Lot 266 DP.755237, Lot 7314 DP.1162607 and Lot 3 DP.1091727 Metford Road, Metford

COUNCIL: Maitland

DWG REF: 239262-GRID-001-C PM: TC

CLIENT: CSR

adw johnson

central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
www.adwjohnson.com.au

SURVEY

Plotted By: rabertz Plot Date: 01/12/14 - 12:01 Cad File N:\239262\DWG\239262-GRID-001-C.dwg

Legend

- Field Sample Location
- Gas Well Location

N

DLA Environmental Services
A Pacific Environment company

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Maitland Office
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Title: Groundwater Monitoring Well Locations

Client	Project No.	Figure No	Date
CSR- Catalyst Project Consulting	DLH 1178	1	19/10/2015
	Scale: N/A	Compiled: JM	Revision: R01

Appendix B – Validation Methodology and Quality Assurance (QA) procedures

Validation methodology

If validation of materials is required at the site, the procedures described in this appendix will be used, in conjunction with the DQOs described in Section 8.1 and the criteria discussed in Section 4.

Decision process

Aesthetic issues

The aesthetic criteria and visual observations will be used to guide excavations in the nominated remediation areas of the site as deemed necessary by the Environmental Consultant.

The aesthetic criteria as per Section 4 will also be used to guide the extent of excavations of the areas of aesthetic impact subject to further consultation with HI Project Manager and the Auditor during the remediation works.

Health and environmental risk

The health-based and ecological assessment criteria for the identified contaminants on the site are discussed in Section 4. The site will be deemed to be successfully remediated if:

- The 95% UCLAVG concentration for contamination in soils remaining at the surface after remediation is less than the relevant criteria for area being remediated.
- No single sample concentration is greater than 2.5 times the relevant criteria.
- The standard deviation is less than half of the selected criteria.

These criteria will be applied to each remediation area as a whole.

Off-site disposal

Excavated material shall be stockpiled in designated areas of the site for characterisation and waste classification if off-site disposal of the material is required. Criteria for classification of material for disposal will be as per the *Waste Classification Guidelines* (EPA 2014).

Following stockpiling, representative samples shall be collected from each “batch” of material destined for disposal. (A batch being defined for the purposes of this RAP as a volume of material of similar physical and chemical characteristics, generally excavated from a particular area of the site). The material will be deemed to be suitable for disposal if the 95% $_{UCLAVG}$ concentration for each contaminant of concern is less than the relevant waste classification criteria.

Imported fill

Imported fill will be as specified in Section 6.9. VENM fill shall be verified by a VENM certificate prepared by an appropriately qualified and experienced consultant, and the source and material as delivered shall be inspected by the Environmental Consultant to verify consistency with the VENM certificate. Where no supporting analytical results are available, a minimum of 3 samples from any particular fill source shall be analysed for the parameters below.

Non-VENM imported materials will be validated for suitability for use as fill material at an equivalent density to the requirements of *The excavated natural material order 2014*, and at least 3 samples from any particular fill source. In order to avoid importation of contamination to the site, fill judged suitable for use will have TPH, BTEX, heavy metals, OCP/PCBs and PAHs concentrations below the criteria in *The excavated natural material order 2014* (or Australian Standard relevant to the material) and shall contain no detectable asbestos. Physical characteristics of imported soil shall be consistent with the surrounding material, or specific to intended end use as approved by the HI project manager.

Validation methodology

Sample identification

Validation and characterisation soil samples will be identified using a “V” prefix for validation, or a “C” prefix for characterisation. A detailed sample register will be kept, recording the sample number, date sampled, location, depth interval and field observations (including soil description). Duplicate samples will be recorded in the register, as will subsequent validation samples where these are needed to re-validate an area that has not met the assessment criteria and has had further remediation.

Validation following asbestos removal

The validation of areas of the site where ACM materials have been removed will be undertaken visually (by a combination of inspection and raking) by a competent person who is experienced in in visual identification of asbestos (occupational hygienist).

In accordance with the NEPM 1999, if a pass across the area results in no asbestos containing materials (ACM) being found, then the soil will be considered effectively free of ACM. Confirmatory sampling of asbestos in soils will be undertaken in accordance with the NEPM 1999 (Amendment 2013) Schedule B2 Section 11 and WA DOH 2009 Section 4.3. Sampling rates for where ACM has been removed from a large area/excavation will be based on a rate of twice the minimum grid sampling guidelines from Table A (NSW EPA 1995).

Validation of excavations

Validation sampling of excavations will only be required where excavated surfaces may be subject to exposure following completion of the development, or where validation of unexpected finds is required.

Validation sampling from excavations will generally involve collecting one sample per 25 m^2 from the base of each excavation, with at least one base sample from any single excavation and one sample per 5 m of wall, with at least one sample for each excavation wall. Samples of surface soils (0.0-0.2 m) will be taken from each side of the excavation to validate the horizontal extent of remediation, with samples also taken from mid-depth (or any visually impacted soil strata) if the excavation depth exceeds 0.5 m. Aesthetic issues (re odours, debris) will be taken into account in the validation.

In the areas of aesthetically impacted soils, validation will be undertaken by visual assessment of the resultant excavations.

Soil samples collected for validation purposes will be analysed for the particular contaminants previously identified as exceeding (or potentially exceeding) assessment criteria in the area of the excavation.

Validation for materials prior to re-use on site

If required, validation sampling for ACM will be undertaken by the Environmental Consultant to demonstrate that materials have been appropriately screened of asbestos contamination and anthropogenic inclusions to a standard that is suitable for proposed placement either at the surface or in sensitive areas of the site. Sampling and analysis for other potential contaminants will also be undertaken if required.

Validation sampling for asbestos from screened stockpile materials or other similar materials will involve a final detailed visual inspection of the screened materials that should not detect ACM. Where ACM is encountered, percentage contamination will be calculated using the weight of ACM found for a particular area or volume. The recommended sampling rate for known volumes of screened materials is one sample per 250 m^3 with a minimum of three samples collected from any one portion of the stockpile (equivalent to the stockpile sampling density from the ENM exemption 2012). Analysis will be for both ACM quantification and asbestos in soils (AF/FA) in accordance with the NEPM 1999. Exceedence of HSL A or HSL C criteria will not necessarily preclude placement of the materials, but may entail more stringent management requirements (including during movement/handling) if significant asbestos is encountered.

Validation of Excavated Material/Stockpiles for waste classification

Waste classification samples will be collected from any soil requiring off-site disposal to landfill at a rate of one sample per 25 m^3 of material with a minimum of three samples per batch. For larger volumes of soil (>100 m^3) sampling frequency may be reduced provided statistically representative classification can be achieved. Samples collected for waste classification purpose will be analysed for heavy metals (arsenic, cadmium, chromium, lead, mercury and nickel), TRH, PAH and asbestos.

If required for classification purposes, representative soil samples will also be submitted for Toxicity Characteristic Leaching Procedure (TCLP) and the resultant leachate analysed for the relevant contaminants governing the waste classification.

In accordance with the NSW EPA 2014 Step 2, any liquids within the excavations during the remediation works that require offsite disposal would be classified as liquid waste, and as such “there is no need to undertake any further assessment”. GHD notes that the liquid waste should be disposed of to a facility licensed to accept / treat the liquid under the POEO Act 1997.

Validation of cap

Verification of capping shall be undertaken in accordance with Section 6.6.3.

Analytical test methods and detection limits

In general, laboratory analysis will be conducted in accordance with the standard test methods outlined in Schedule B(3) of the NEPM (1999) for soils.

Where possible, the project laboratories will be NATA accredited for the analysis and will utilise their own internal procedures and their test methods (for which they are NATA, or equivalent, accredited) in accordance with their own quality assurance system that forms part of their accreditation.

Quality assurance/quality control

Quality assurance/quality control plan

Field and laboratory quality assurance program

QA and QC practices will be applied to all stages of data gathering and subsequent sample handling procedures. These are designed to provide control over both field and laboratory operations. Additionally, the analytical laboratories will complete their own internal QA procedures (as required by NATA registration) during the analysis of samples. Details of the QA/QC program are described below.

Quality assurance

All fieldwork will be conducted in general accordance with the Environmental Consultants Standard Field Operating Procedures. The procedures promote the collection of environmental samples by a set of uniform and systematic methods as required by the QA system.

The Standard Field Operating Procedures shall include the following:

- Decontamination procedures
- Sample identification procedures
- Requirements for soil bore logs
- Chain of custody requirements
- Sample duplicate frequency
- Field equipment calibration requirements

Subsurface characteristics and field observations will be fully documented in accordance with the approved sampling and analysis plan. Chain-of-Custody documentation will be prepared for sample transfer from the site to the laboratory. Quality control checks will be conducted both in the field and the laboratory.

All sampling equipment will be thoroughly decontaminated (in accordance with written procedures) to ensure that no carry-over of contaminants occurs between sampling events, thereby ensuring that an accurate indication of concentrations of contaminants will be obtained. All samples will be labelled in the field with a unique sample identification code (in accordance with the documented system described previously), with a sample label affixed to the side of the container, and all writing on the label in waterproof indelible ink.

Soil sampling methodology

Validation and characterisation samples (where required) will generally be taken directly from the sides and base of excavations (where safe and practical to do so), or by hand auger or from within relatively undisturbed soil recovered by the excavator bucket from the excavation.

Validation samples will be screened using a PID where hydrocarbon contamination is expected.

Field sampling quality control

Field QC samples for this study will comprise duplicate samples and blanks. Duplicate field samples consist of two samples collected at the same place and time and are intended to represent the same entity as closely as possible. Blank samples are artificial samples designed to monitor for the introduction of artefacts into equipment cleaning and sample handling process.

A combination of the following duplicates and blanks will be utilised:

- Field Split Duplicates: Individual samples are split in two in the field by the sampling crew and are placed in two separate containers. One sample is sent to the project laboratory and one sample is sent to an independent check laboratory. Field split duplicate samples provide an indication of the analytical accuracy of the project laboratory, but may be affected by other factors such as sampling methodology and the inherent heterogeneity of the sample medium.
- Blind duplicates: Both samples are sent anonymously to the project laboratory. Blind duplicates provide an indication of the analytical precision of the laboratory, but may be affected by other factors such as sampling methodology and the inherent heterogeneity of the sample medium.
- Trip blanks: These are samples of organic free water normally prepared by the analytical laboratory which is providing the bottles to be used for sampling. They remain with the sample bottles while in transit to the site, during the sampling and during the return trip to the laboratory. At no time during these procedures are they opened. Upon return to the laboratory, they are analysed for all analytical parameters as if they were a field sample. Trip blanks are a check on sample contamination originating from sample transport, handling, shipping and site conditions.
- Trip spikes: The samples of either soil or water prepared by the analytical laboratory which is providing the bottles to be used for sampling. A known quantity of volatiles (usually BTEX) is added to the samples by the lab. They remain with the sample bottles while in transit to the site, during the sampling and during the return trip to the laboratory. Upon return to the laboratory, they are analysed for all analytical parameters as if they were a field sample. Checks for degradation of analyte during collection, storage and handling.
- Equipment blanks: These are prepared in the field (at the sampling site) using empty bottles and the distilled water used during the final rinse of sampling equipment. After completion of the decontamination process fresh distilled water is poured over the sampling equipment and collected. The distilled water is exposed to the air for approximately the same time the sample would be exposed. The collected water is then transferred to an appropriate sample bottle and the proper preservative added, if required. Equipment blanks are a check on equipment decontamination procedures.
- Field blanks: These are similar to trip blanks except the water is transferred to sample containers on site. Field blanks are a check on sample contamination originating from sample transport, handling, shipping, site conditions or sample containers.

Procedures for duplicate sampling will be identical to those used for routine sampling, and samples will be dispatched for analysis for the same parameters using the same methods as the routine sample. Samples collected for volatile analysis are not mixed or quartered in the field. Separate discrete samples are collected for each of the original and duplicate samples to minimise volatile loss. These samples are collected to match each other as closely as possible and provide a representative sample of the material being sampled.

Field sampling quality control for any validation sampling required will consist of split and blind duplicate samples for all contaminants of concern. Split duplicate samples will be collected and analysed at a rate of not less than 5% of total samples analysed. Blind duplicate samples will be collected and analysed at a rate of not less than 5% of total samples analysed. Trip blanks and trip spikes are not proposed for validation sampling as volatile contaminants are not expected.

Where the results of duplicate samples differ between the primary and duplicate laboratory, the higher of the two values will initially be adopted for all analytes. Further assessment of anomalous results (eg. by re-analysis of samples, or resampling if required) may be undertaken where the results affect the outcome of the assessment.

Laboratory quality control

Laboratory quality control procedures typically include analysis of the following:

- Laboratory duplicate samples: The analytical laboratory collects duplicate subsamples from one sample submitted for analytical testing at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch. A laboratory duplicate provides data on analytical batch and the analytical precision (repeatability) of the test result.
- Spiked Samples: An authentic field sample is spiked by adding a aliquot of known concentration of the target analyte(s) prior to sample extraction and analysis. A spike documents the effect of the sample matrix on the extraction and analytical techniques.
- Certified Reference Standards: A reference standard of known (certified) concentration is analysed along with a batch of samples. The Certified Reference Standard provides an indication of the analytical accuracy of the test method.
- Surrogate Standard/Spikes: These are organic compounds which are similar to the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. These surrogate compounds are spiked into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. They provide a means of checking that no gross errors have occurred during any stage of the test method leading to significant analyte loss.
- Laboratory Blank: Usually an organic or aqueous solution that is as free as possible of analyte of interest to which is added all the reagents, in the same volume, as used in the preparation and subsequent analysis of the samples. The reagent blank is carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample.

Methodology used to assess quality control results

The results of the field and laboratory quality control samples will be assessed to determine:

- The quality of the data generated
- If the data meets the objectives of the study
- If the data is acceptable for the intended use

Field QC

Assessment of field quality control duplicate samples will be undertaken by calculating the Relative Percent Difference (RPD) of duplicate samples. The table below presents guidelines for assessment of QC results. These guidelines are the same as those provided in the NEPM as endorsed by the NSW EPA. A result exceeding these guidelines does not necessarily mean the data is invalid, but rather the impact on the data may need to be assessed.

Test	Acceptable RPD(%)[1]
Inorganics	30
Organics	50
[1] Can be expected to be higher for low concentrations	

Completeness

The completeness of the analytical program may be calculated as follows, using the assessment of data acceptability resulting from the quality assurance program:

$$\text{Completene ss } (\%) = \frac{\text{Number of samples with acceptable data}}{\text{Number of samples analysed x } 100}$$

Completeness parameters are generally required to exceed 95%.

Laboratory QC

Assessment of laboratory QC is undertaken internally by the individual laboratories. Duplicates are assessed by calculating the Relative Percent Difference (RPD) and blanks should return analyte concentrations as not detected. Percent Recovery (PR) is used to assess spiked samples and surrogate standards. Acceptable values for RPD and PR can vary depending on the type of analyte tested, concentrations of analytes, and sample matrix.

Certified Reference Standards and Materials are analysed by comparing the test result to the certified concentration plus or minus a certified tolerance. Certified tolerances vary depending on the type of analyte tested and the certified concentration of the analyte.

Reporting

On completion of the remediation operations the environmental consultant will prepare a remediation/validation report which will be submitted to HI. The report will summarise the works performed and the validation results, in order to demonstrate compliance with the objectives of the RAP. Relevant data from previous investigations will be included as a basis of the overall assessment of the site, including assessment of the reliability and integrity of the dataset based on comparability with the remediation and validation works.

Appendix C – Preliminary Unexpected Finds Protocol

Unexpected Finds Protocol (UFP)

During the remediation works there is a potential for previously undetected contaminated or hazardous soils, materials or wastes to be uncovered.

The objective of this UFP is to provide guidance to workers as to the actions and procedures required should unexpected contaminated soils and/or hazardous materials be identified during the demolition/remediation/redevelopment works.

Indications of potential contamination or hazardous materials that may be present on this Site include:

- Construction/demolition wastes such as concrete, bricks, timber, tiles, fibrous asbestos cement sheeting, fragments
- Stained or discoloured fill, soils or seepage water, including oily sheens
- Odorous fill, soils or seepage waters
- General rubbish such as plastic, glass, packaging
- Imported materials such as ash or slag or coal chitter

Should unexpected potentially contaminated or hazardous materials be uncovered during the proposed site works, the following procedures should be followed:

- Immediately stop work in the area of concern
- Contact the Site Manager or their designated authority (Principal Contractor)
- Provide the required controls - may include temporary barricading to prevent access, warning signs, covering of odorous materials, erosion and sediment controls
- Document (including photographs) the exposed materials, the controls established and report to the Site Manager and the Byron Shire Council Project Manager
- If required, contact experienced environmental consultant and/or appropriate organisations to provide specialist advice/support
- No potentially contaminated or hazardous materials are to be disturbed further without approval/confirmation from the experienced environmental consultant and/or appropriate organisation

The Site Emergency Response Plan (ERP) will take precedence over the UFP should any unexpected contamination or materials be identified that present an immediate hazard.

Contacts

Contact	Name	Contact Details
HI Project Manager		
Principal Remediation Contractor		
Site Manager		
Environmental Consultant		
Emergency		
EPA		

GHD

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2219923-93527/C:\Users\jsimkus\Documents\Temp\NMH\2219923-REP-New Maitland Hospital_RAP-SMP.pdf.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	J Simkus	I Gregson		I Gregson		27/09/2019
1	J Simkus	I Gregson		I Gregson		30/09/2019

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