CLIENT	**Twynam Property Group**	**COMMENCED**	10.01.2013	**COMPLETED**	10.01.2013	**REF**	**BH410**
PROJECT	**Stage 2 Contamination Assessment**	**LOGGED**	GT	**CHECKED**	AN	**Sheet**	**1 of 1**
SITE	**Mundamia Release Lands**	**GEOLOGY**	Sandstone	**VEGETATION**	Grasses	**PROJECT NO.**	P0802193
EQUIPMENT	Hydraulic Auger	**EASTING**	NA	**RL SURFACE**	NA		
EXCAVATION DIMENSIONS	0.1mØ X 1.0m depth	**NORTHING**	NA	**ASPECT**	North	**SLOPE**	1-2%

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING			
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE (L M H R)	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS	
V	Nil	N	D	0.05			ML	SILT - Grey/light brown, fine grained sand, minor gravels.			E	0.05	2193/410/ 0.05	
V	Nil	N	D	0.3			SM	SILTY SAND - Light brown, brown.			E	0.25	2193/410/ 0.25	
V	Nil	N	D	0.5 0.7			SP	SAND - Yellow/gold, minor sandstone gravels (1-10mm, ≈10%).						0.5
V	Nil	N	M	1.0			SC	CLAYEY SAND/EXTREMELY WEATHERED SANDSTONE - Orange/gold/brown/red.			E	1.0	2193/410/ 1.0	1.0
				1.5 2.0 2.25				Borehole terminated at 1.0m on extremely weathered sandstone.						1.5 2.0 2.25

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
HA Hand auger
E Excavator
CC Concrete Corer
V V-Bit
TC Tungsten Carbide Bit
S Spade

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
E Environmental sample (JAR)
pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample
PID Photo Ionization Detector

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

Quality Sheet No. 4

martens

MARTENS & ASSOCIATES PTY LTD
6/37 Leighton Place
Hornsby, NSW 2077 Australia
Phone: (02) 9476 9999 Fax: (02) 9476 8767
mail@martens.com.au WEB: http://www.martens.com.au

Engineering Log - Borehole

CLIENT	**Twynam Property Group**	**COMMENCED**	10.01.2013	**COMPLETED**	10.01.2013	**REF**	**TP411**
PROJECT	**Stage 2 Contamination Assessment**	**LOGGED**	GT	**CHECKED**	AN	**Sheet**	**1 of 1**
SITE	**Mundamia Release Lands**	**GEOLOGY**	Sandstone	**VEGETATION**	Grasses	**PROJECT NO.**	P0802193
EQUIPMENT	Spade	**EASTING**	NA	**RL SURFACE**	NA		
EXCAVATION DIMENSIONS	0.2 X 0.2 X 0.25m depth	**NORTHING**	NA	**ASPECT**	South East	**SLOPE**	1-2%

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE (L M H R)	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
S	Nil	N	D	0.25			SM	SILTY SAND - Orange/gold, fine grained sand.			E E	0.05 0.25	2193/411/ 0.05 2193/411/ 0.25
				0.5				Test pit terminated at 0.25m on silty sand.					
				1.0									
				1.5									
				2.0									
				2.25									

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
HA Hand auger
E Excavator
CC Concrete Corer
V V-Bit
TC Tungsten Carbide Bit
S Spade

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
E Environmental sample (JAR)

pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample
PID Photo Ionization Detector

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

Quality Sheet No. 4

martens

MARTENS & ASSOCIATES PTY LTD
6/37 Leighton Place
Hornsby, NSW 2077 Australia
Phone: (02) 9476 9999 Fax: (02) 9476 8767
mail@martens.com.au WEB: http://www.martens.com.au

Engineering Log - Excavation

CLIENT	Twynam Property Group	**COMMENCED**	10.01.2013	**COMPLETED**	10.01.2013	**REF**	**TP412**
PROJECT	Stage 2 Contamination Assessment	**LOGGED**	GT	**CHECKED**	AN	**Sheet**	1 of 1
SITE	Mundamia Release Lands	**GEOLOGY**	Sandstone	**VEGETATION**	Grasses	**PROJECT NO.**	P0802193
EQUIPMENT	Spade	**EASTING**	NA	**RL SURFACE**	NA		
EXCAVATION DIMENSIONS	0.2 X 0.2 X 0.3m depth	**NORTHING**	NA	**ASPECT**	South	**SLOPE**	1-2%

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE (L M H R)	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
S	Nil	N	D	0.1			ML	SILT - Brown/light brown, minor gravels (1-5mm, ≈5%).			E	0.05	2193/412/ 0.05
S	Nil	N	D	0.3			SM	SILTY SAND - Orange/gold, fine grained sand.			E	0.25	2193/412/ 0.25
				0.5				Test pit terminated at 0.3m on silty sand.					
				1.0									
				1.5									
				2.0									
				2.25									

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
HA Hand auger
E Excavator
CC Concrete Corer
V V-Bit
TC Tungsten Carbide Bit
S Spade

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
E Environmental sample (JAR)
pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample
PID Photo Ionization Detector

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

martens

MARTENS & ASSOCIATES PTY LTD
6/37 Leighton Place
Hornsby, NSW 2077 Australia
Phone: (02) 9476 9999 Fax: (02) 9476 8767
mail@martens.com.au WEB: http://www.martens.com.au

Engineering Log - Excavation

13 Attachment D – Data Validation Report

DATA VALIDATION REPORT - STAGE 2- Mundamia Lands Release

1. Sample Handling

	Yes	No (Comments below)
a. Were sample holding times met?	✓	
b. Were samples in proper custody between the field and reaching the laboratory?	✓	
c. Were the samples properly and adequately preserved?	✓	
d. Were the samples received by the laboratory in good condition?	✓	

COMMENTS

Sample handling is:

- ✓ **Satisfactory**
- **Partially Satisfactory**
- **Unsatisfactory**

DATA VALIDATION REPORT - STAGE 2- Mundamia Lands Release

2. Precision / Accuracy Statement

	Yes	No (Comments below)
a. Was a NATA registered laboratory used?	✓	
b. Did the laboratory perform the requested tests?	✓	
c. Were laboratory methods adopted NATA endorsed?	✓	
d. Were appropriate test procedures followed?	✓	
e. Were reporting limits satisfactory?	✓	
f. Was the NATA Seal on the reports?	✓	
g. Were reports signed by an authorised person?	✓	

COMMENTS

Precision / Accuracy of the Laboratory Report:	✓	**Satisfactory**
		Partially Satisfactory
		Unsatisfactory

DATA VALIDATION REPORT - STAGE 2- Mundamia Lands Release

3. Field Quality Assurance / Quality Control (QA/QC)

	Media	Number
a. Number of Primary Samples analysed	Soil:	48
(does not include duplicates)	Water:	-
b. Number of days of sampling		2

c. Number and Type of QA/QC Samples analysed	Soil	Water
Intra-Laboratory Field Duplicates	2	
Inter-Laboratory Field triplicates		
Trip Blanks	1	
Wash Blanks		
Other (Field Blanks, Spikes,Trip Blanks, etc.)	1	

Field Duplicates

	Yes	No (Comments below)
Adequate Numbers of intra-laboratory field duplicates analysed?	✓	
Adequate Numbers of inter-laboratory field duplicates analysed?	✓	
Were RPDs within Control Limits?		
i. Organics (+ 50%)	✓	
ii. Metals / Inorganics (+ 50%)		✓
iii. Nutrients (+ 50%)	N/A	

COMMENTS

.

RPD for Cadmium is greater than 50% for 2193/Dup2 (91%) however the concentration levels are less than 5 times the LOR and is therefore considered an acceptable result.

RPD for Nickel is greater than 50% for 2193/Dup2 (67%) however the concentration levels are less than 5 times the LOR and is therefore considered an acceptable result.

DATA VALIDATION REPORT - STAGE 2- Mundamia Lands Release

Trip Blank / Wash Blanks

	Yes	No (Comments below)
Were Adequate Numbers of trip blanks analysed?	✓	
Were Adequate Numbers of wash blanks analysed?	✓	
Were the Trip Blanks free of contaminants?	✓	
Were the Wash Blanks free of contaminants?	✓	
(If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals.)		

COMMENTS

Trip Spikes

	Yes	No (Comments below)
Were adequate numbers of Trip Spikes analysed?	✓	
Were the Trip Spike results within control limits?	✓	

COMMENTS

Field QA/QC: ✓ **Satisfactory**

Partially Satisfactory

Unsatisfactory

DATA VALIDATION REPORT - STAGE 2- Mundamia Lands Release

3. Laboratory Internal Quality Assurance / Quality Control (QA/QC) Procedures

a. Type and Number of QA/QC Samples

QA/QC Type	Yes	No
Laboratory Blanks/Reagent Blanks (at least 1 per batch)	✓	
Matrix Spikes/Matrix Spike Duplicates (1 for each soil type)	✓	
Laboratory Control Samples	✓	
Laboratory Duplicates (at least one per batch or 1 per 10 samples, whichever is smaller)	✓	
Surrogates (where appropriate)[1]	✓	

[1] Number of surrogate spikes carried out on each sample

	Yes	No (Comments below)
b. Were the laboratory blanks/reagents blanks free of contamination?	✓	
c. Were the spike recoveries within control limits?	✓	
d. Were the RPDs of the laboratory duplicates within control limits?		
i. Organics (0 - 50%)	✓	
ii. Metals / Inorganics (0 - 50 %)		✓
e. Were the surrogate recoveries within control limits?	✓	

COMMENTS

RPD was exceeded in laboratory referenced sample: 84007-46 for lead. A triplicate results was subsequently issued as laboratory sample number 84007 – 68. Concentrations for lead were below adopted HIL for all three samples and results are considered acceptable for use.

Laboratory internal QA / QC is:

✓ **Satisfactory**

Partially Satisfactory

Unsatisfactory

DATA VALIDATION REPORT - STAGE 2- Mundamia Lands Release

4. Summary of Quality Assurance / Quality Control (QA/QC)

QA/QC Type	Satisfactory	Partially Satisfactory	Unsatisfactory
Sample handling	✓		
Precision / Accuracy of the Laboratory Report	✓		
Field QA / QC	✓		
Laboratory Internal QA / QC	✓		

5. Data Usability

1. Data directly usable ✓

2. Data usable with the following corrections/modifications
   (see comment below)

3. Data not usable.

COMMENTS