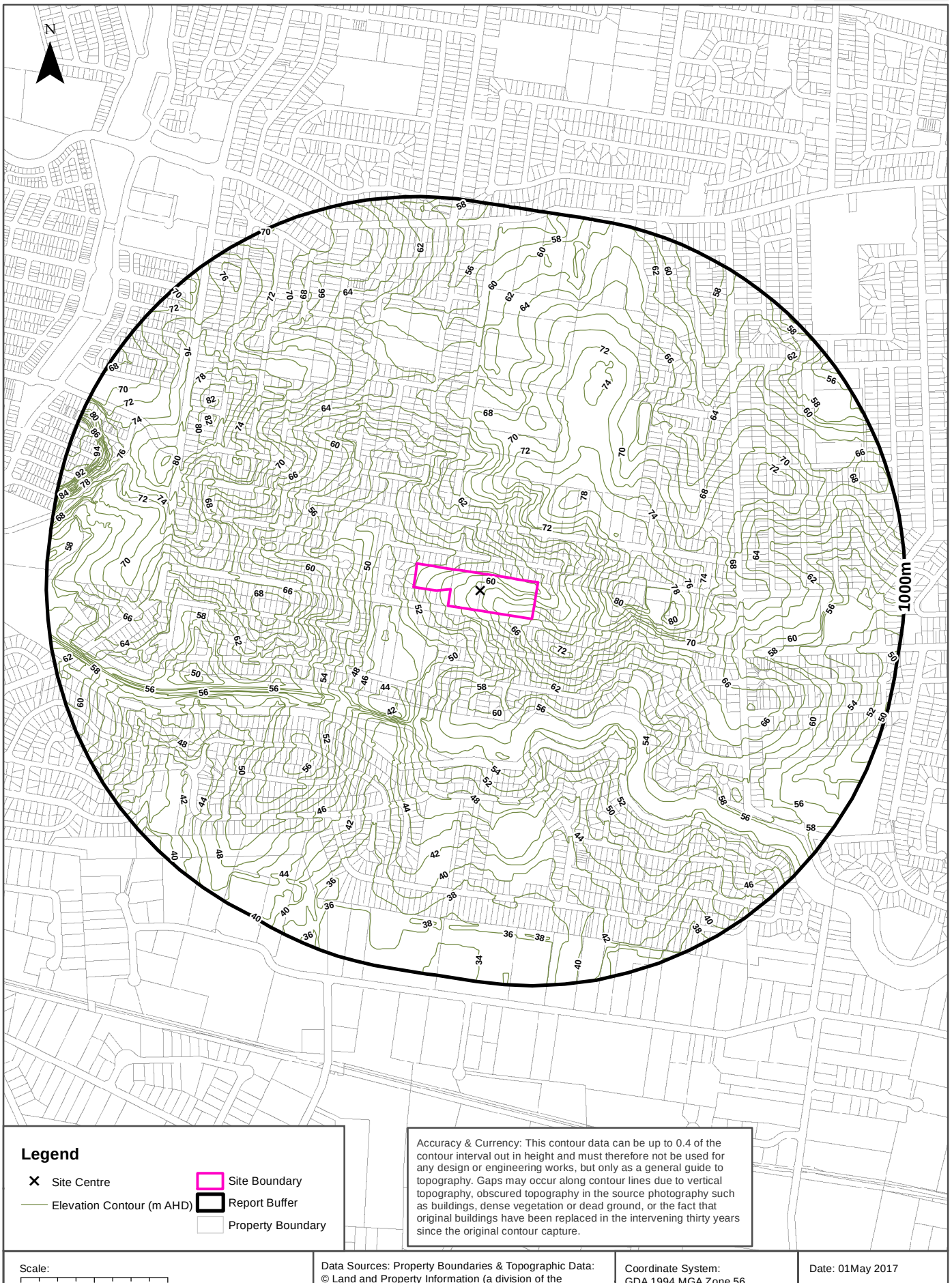
Elevation Contours (m AHD)

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145



Legend

- Site Centre
- Elevation Contour (m AHD)
- Site Boundary
- Report Buffer
- Property Boundary

Accuracy & Currency: This contour data can be up to 0.4 of the contour interval out in height and must therefore not be used for any design or engineering works, but only as a general guide to topography. Gaps may occur along contour lines due to vertical topography, obscured topography in the source photography such as buildings, dense vegetation or dead ground, or the fact that original buildings have been replaced in the intervening thirty years since the original contour capture.

Scale: 0 100 200 400 Meters

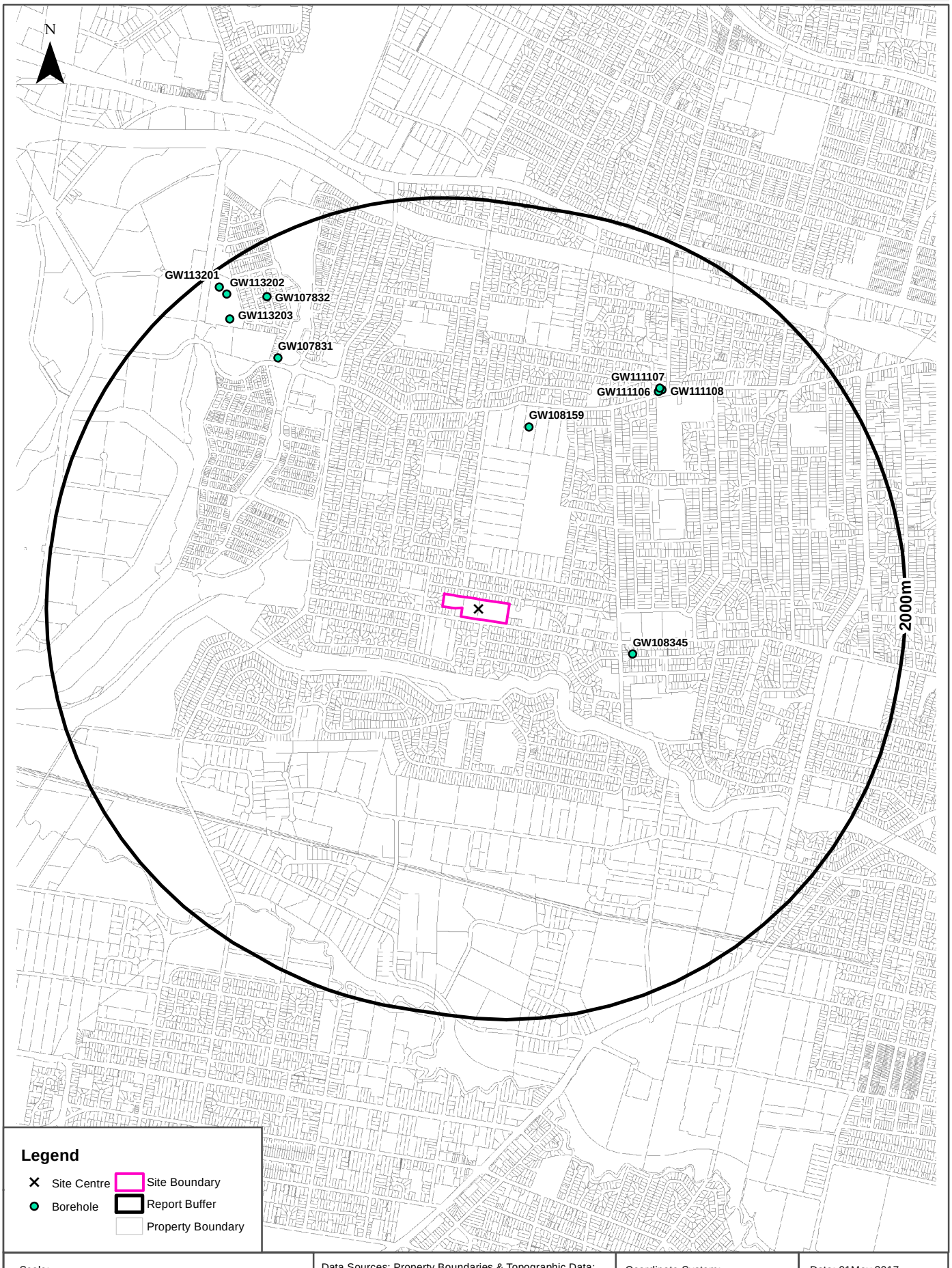
Data Sources: Property Boundaries & Topographic Data: © Land and Property Information (a division of the Department of Finance and Services) 2017

Coordinate System: GDA 1994 MGA Zone 56

Date: 01May 2017

Groundwater Boreholes

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145



Hydrogeology & Groundwater

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Hydrogeology

Description of aquifers on-site:

Description
Porous, extensive aquifers of low to moderate productivity

Description of aquifers within the report buffer:

Description
Porous, extensive aquifers of low to moderate productivity

Groundwater Boreholes

Boreholes within 2km of the site:

GW No.	Licence No	Work Type	Owner Type	Purpose	Contractor	Complete Date	Final Depth	Drilled Depth	Salinity	SWL	Yield	Elev	Dist	Dir
GW108345	10BL165869	Bore	Private	Domestic	Ultra Drilling	10/04/2006	252.00	252.00			2.200		657m	East
GW108159	10BL164883	Bore		Test Bore	Ultra Drilling	23/02/2005	324.00	324.00	10100	66.00	1.120		898m	North
GW111106	10BL603985	Bore	Private	Monitoring	Numac Drilling Services Pty Ltd	25/05/2010	7.50	7.50		4.50			1309m	North East
GW111108	10BL603985	Bore	Private	Monitoring	Numac Drilling Services Pty Ltd	25/05/2010	10.00	10.00		5.00			1328m	North East
GW111107	10BL603985	Bore	Private	Monitoring	Numac Drilling Services Pty Ltd	25/05/2010	7.50	7.50		4.50			1328m	North East
GW107831	10BL165697	Bore		Monitoring		03/11/2005	7.40	7.40					1456m	North West
GW107832	10BL165697	Bore		Monitoring		03/11/2005	4.00	4.00					1747m	North West
GW113203	10BL600583	Bore	Private	Monitoring	Macquarie Drilling	27/02/2007	19.20	19.20		14.98			1760m	North West
GW113202	10BL600583	Bore	Private	Monitoring	Macquarie Drilling	27/02/2007	21.50	21.50		16.30			1870m	North West
GW113201	10BL600583	Bore	Private	Monitoring	Macquarie Drilling	27/02/2007	21.30	21.30		13.84			1921m	North West

Hydrogeology & Groundwater

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

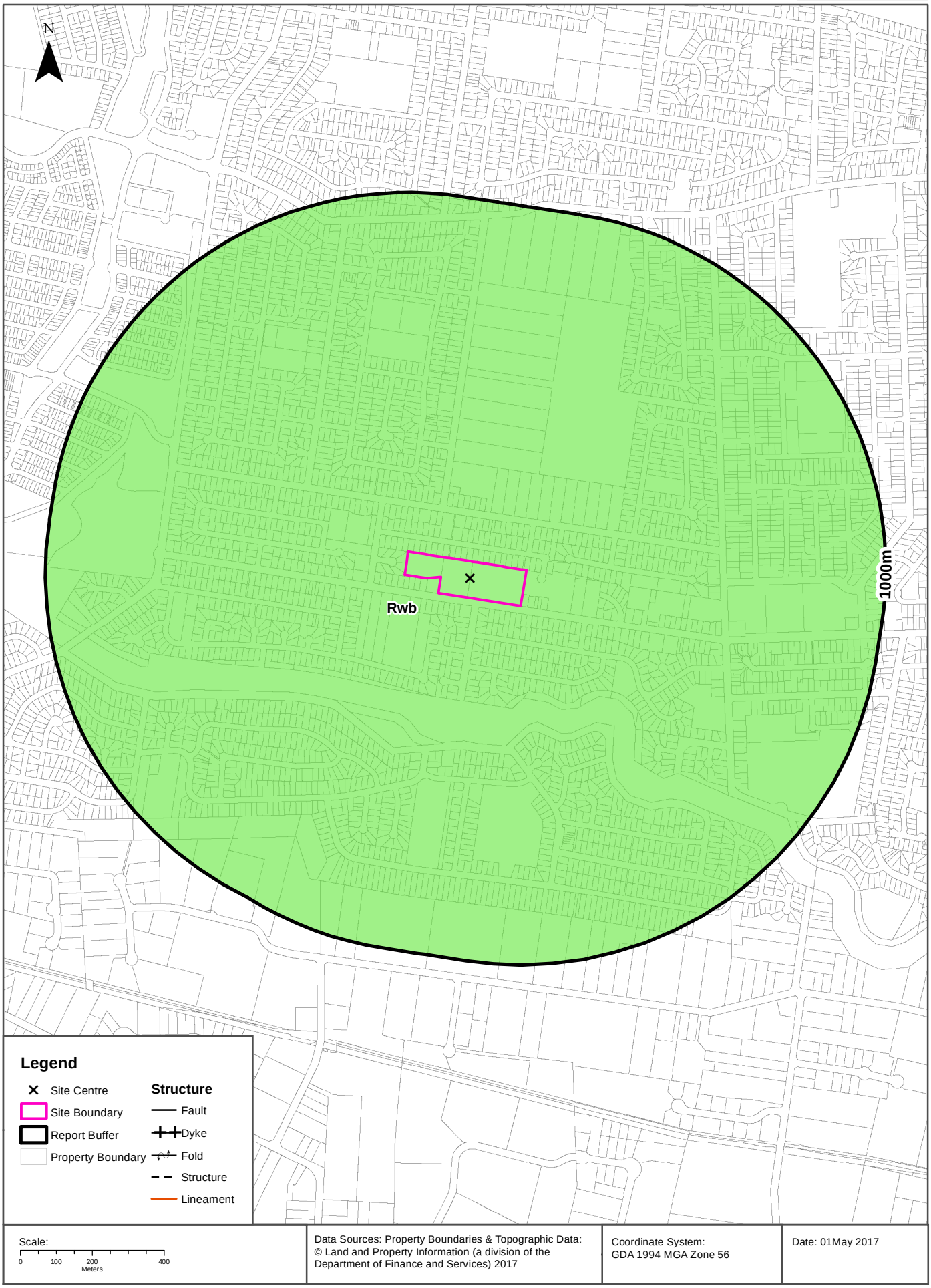
Driller's Logs

Drill log data relevant to the boreholes within 2km of the site:

Groundwater No	Drillers Log	Distance	Direction
GW108345	0.00m-96.00m shale 96.00m-108.00m shale, sandstone 108.00m-126.00m sandstone, 126.00m-130.00m sandstone, shale 130.00m-150.00m sandstone, 150.00m-156.00m shale 156.00m-190.00m sandstone, quartz 190.00m-200.00m sandstone, quartz shale bands 200.00m-230.00m sandstone, shale bands 230.00m-244.00m sandstone, quartz 244.00m-252.00m sandstone, shale bands	657m	East
GW108159	0.00m-5.00m CLAY/ BROWN SHALE 5.00m-87.00m SHALE 87.00m-145.00m SANDSTONE 145.00m-188.00m SANDSTONE/SHALE 188.00m-231.00m SANDSTONE 231.00m-242.00m SANDSTONE/QUARTZITE 242.00m-253.00m SANDSTONE/SHALE 253.00m-259.00m SANDSTONE 259.00m-272.00m SANDSTONE/QUARTZITE 272.00m-276.00m SANDSTONE/SHALE 276.00m-302.00m SANDSTONE/QUARTZITE 302.00m-324.00m SANDSTONE	898m	North
GW111106	0.00m-1.50m FILL 1.50m-5.00m CLAY DARK SOFT 5.00m-7.50m CLAY FIRM BROWN	1309m	North East
GW111107	0.00m-1.50m FILL 1.50m-5.00m CLAY DARK SOFT 5.00m-7.50m CLAY BROWN FIRM	1328m	North East
GW111108	0.00m-1.50m FILL 1.50m-5.00m CLAY DARK SOFT 5.00m-7.00m CLAY DARK 7.00m-10.00m CLAY FIRM DARK BROWN	1328m	North East
GW107831	0.00m-1.60m FILL BROWN/CLAY 1.60m-2.90m CLAY GRAVEL BROWN 2.90m-4.70m CLAY BROWN 4.70m-6.00m BLACK WEATHERED SHALE 6.00m-7.40m HARD BROWN CLAY	1456m	North West
GW107832	0.00m-0.20m BROWN SOIL 0.20m-1.30m RED BROWN CLAY 1.30m-3.00m BROWN SHALE 3.00m-4.00m GREY SHALE	1747m	North West

Geology 1:100,000

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145



Geology

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Rwb	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

What are the Geological Units within the report buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Rwb	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:100,000

What are the Geological Structures within the report buffer?

Feature	Name	Description	Map Sheet	Dataset
No features				1:100,000

Geological Data Source : NSW Department of Industry, Resources & Energy

Naturally Occurring Asbestos Potential

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Naturally Occurring Asbestos Potential

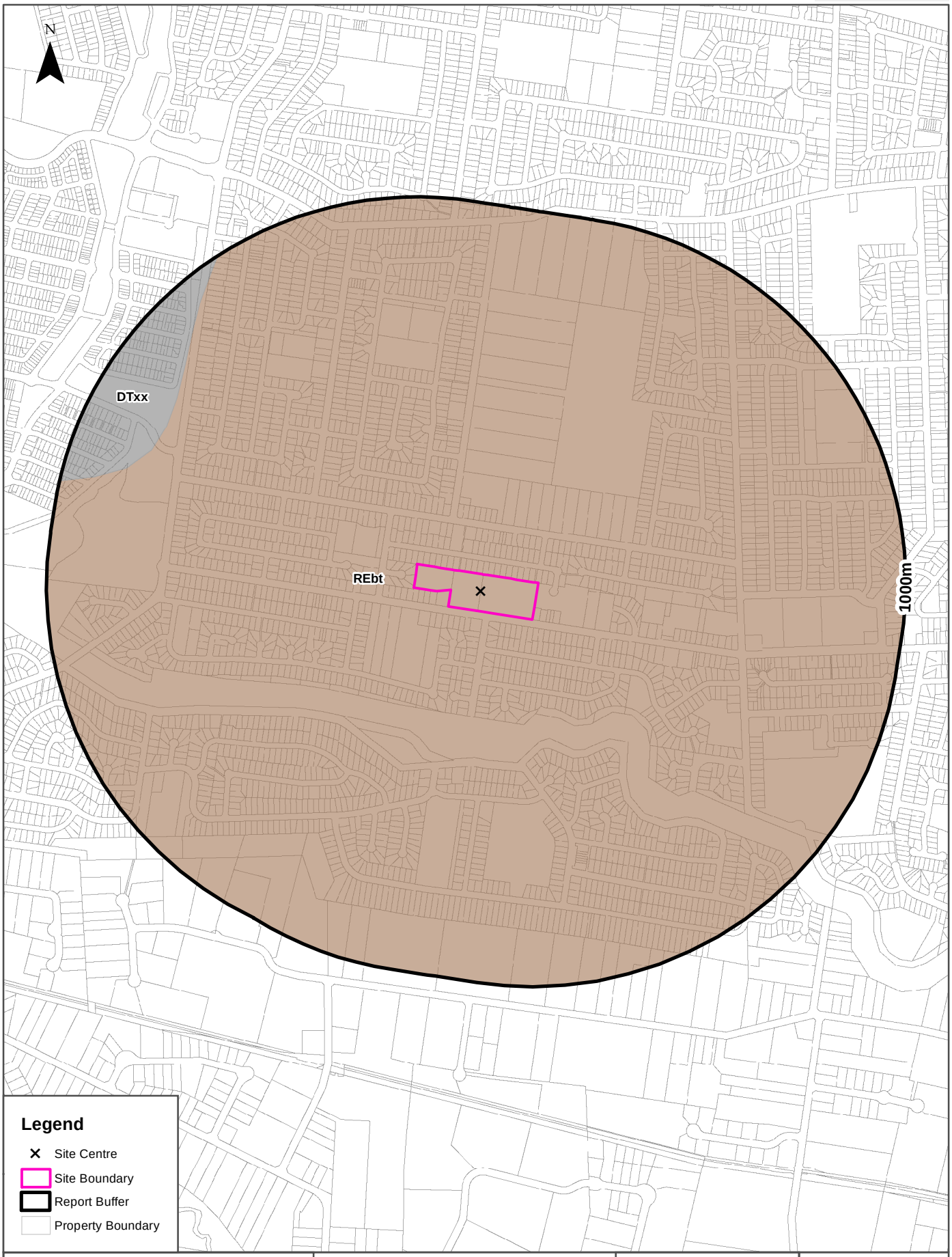
Naturally Occurring Asbestos Potential within the report buffer?

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Mining Subsidence District Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Soil Landscapes

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145



Soils

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
REbt	BLACKTOWN		RESIDUAL	Penrith	1:100,000

What are the Soil Landscapes within the report buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
DTxx	DISTURBED TERRAIN		DISTURBED TERRAIN	Penrith	1:100,000
REbt	BLACKTOWN		RESIDUAL	Penrith	1:100,000

Standard Local Environmental Plan Acid Sulfate Soils

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Standard Local Environmental Plan Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	LEP
N/A		

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	LEP	Distance	Direction
N/A				

Dryland Salinity

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Dryland Salinity

Is there Dryland Salinity data onsite?

No

Is there Dryland Salinity data within the report buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A	N/A	N/A

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Mining Subsidence Districts

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Mining Subsidence Districts

Mining Subsidence Districts within the report buffer?

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Environmental Zoning

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

State Environmental Planning Policy Protected Areas

Are there any State Environmental Planning Policy Protected Areas onsite or within the report buffer?

Dataset	Onsite	Within Site Buffer	Distance
SEPP14 - Coastal Wetlands	No	No	N/A
SEPP26 - Littoral Rainforests	No	No	N/A
SEPP71 - Coastal Protection Zone	No	No	N/A

SEPP Protected Areas Data Source: NSW Department of Planning & Environment

State Environmental Planning Policy Major Developments (2005)

State Environmental Planning Policy Major Developments within the report buffer?

Map Id	Feature	Effective Date	Distance	Direction
N/A	No records within buffer			

SEPP Major Development Data Source: NSW Department of Planning & Environment

State Environmental Planning Policy Strategic Land Use Areas

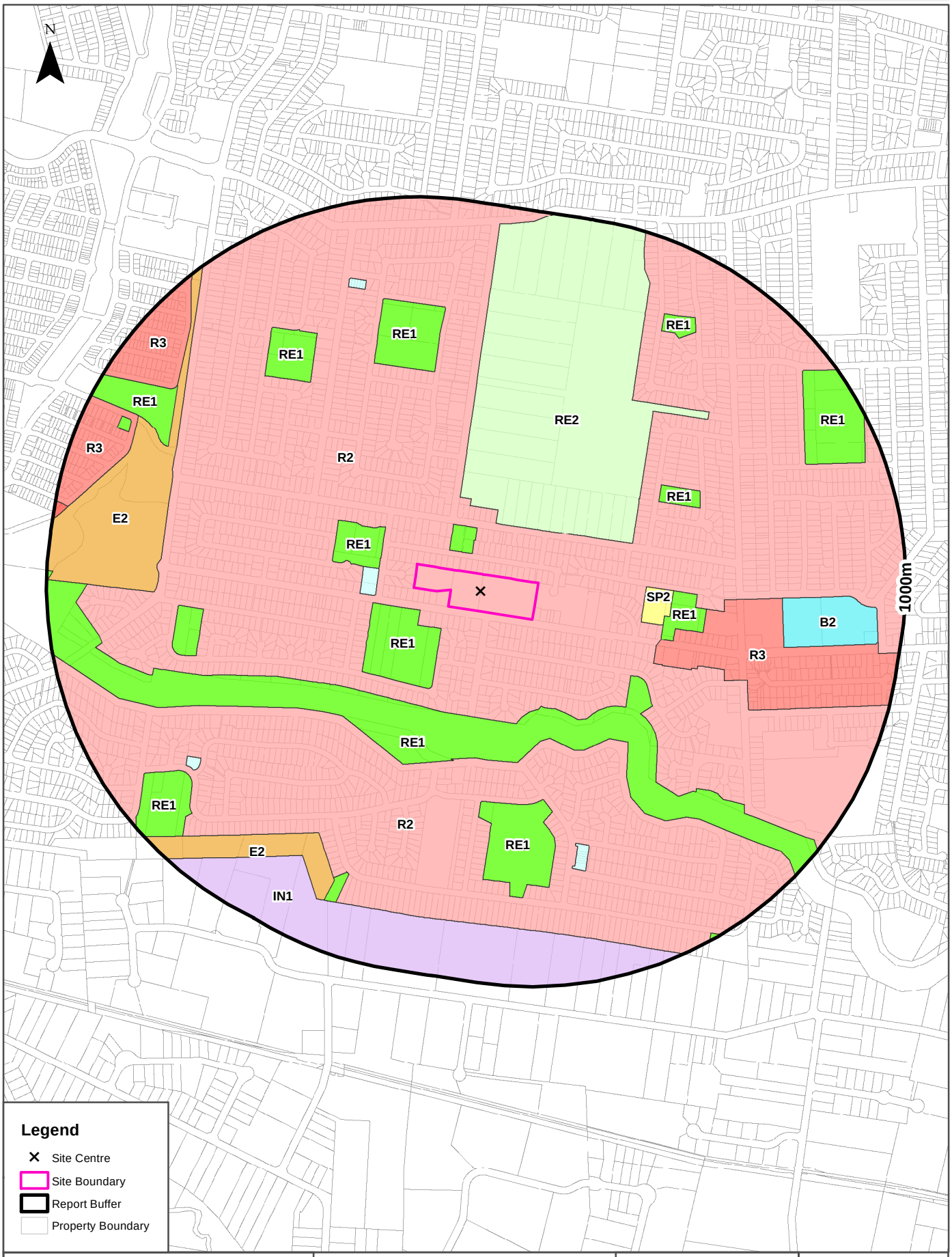
State Environmental Planning Policy Strategic Land Use Areas onsite or within the report buffer?

Strategic Land Use	SEPPNo	Effective Date	Amendment	Amendment Year	Distance	Direction
No records within buffer						

SEPP Strategic Land Use Data Source: NSW Department of Planning & Environment

LEP Planning Zones

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145



Local Environmental Plan

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Land Zoning

What Local Environmental Plan Land Zones exist within the report buffer?

Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R2	Low Density Residential		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		0m	Onsite
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		51m	North
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		57m	South West
B1	Neighbourhood Centre		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		102m	West
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		102m	West
RE2	Private Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		144m	North
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		237m	South West
SP2	Infrastructure	Water Supply System	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		291m	East
R2	Low Density Residential		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		326m	South West
R3	Medium Density Residential		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		343m	East
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		352m	East
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		395m	North East
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		491m	South
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		526m	North
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		576m	North West
B1	Neighbourhood Centre		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		620m	South
B2	Local Centre		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		663m	East
E2	Environmental Conservation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		693m	West
E2	Environmental Conservation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		710m	South West
B1	Neighbourhood Centre		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		743m	South West
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		751m	North West
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		762m	North East
B1	Neighbourhood Centre		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		763m	North
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		773m	South West
IN1	General Industrial		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		785m	South
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		795m	North East
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		798m	South West
R3	Medium Density Residential		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		816m	North West
R3	Medium Density Residential		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		843m	North West
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		865m	North West

Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R4	High Density Residential		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		964m	West
RE1	Public Recreation		Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		981m	South East

Local Environmental Plan

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Minimum Subdivision Lot Size

What are the onsite Local Environmental Plan Minimum Subdivision Lot Sizes?

Symbol	Minimum Lot Size	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
G	450 m²	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	09/10/2015		100

Maximum Height of Building

What are the onsite Local Environmental Plan Maximum Height of Buildings?

Symbol	Maximum Height of Building	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
10	9.00 m	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	24/03/2017		100

Floor Space Ratio

What are the onsite Local Environmental Plan Floor Space Ratios?

Symbol	Floor Space Ratio	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
4	0.50	LEP	29/05/2015	29/05/2015	24/03/2017	Amendment No 3	100

Land Application

What are the onsite Local Environmental Plan Land Applications?

Application Type	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
Included	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	05/08/2013		100

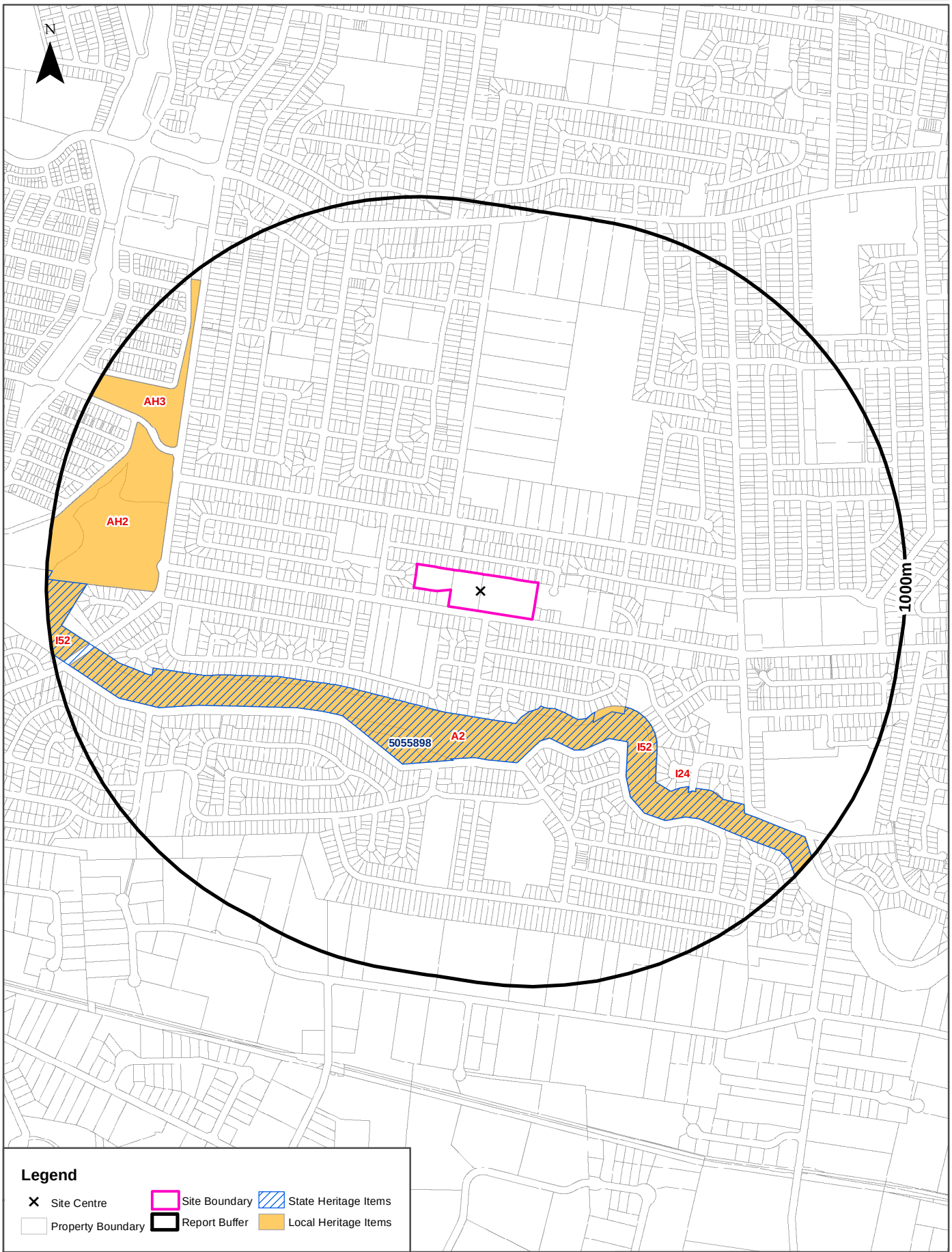
Land Reservation Acquisition

What are the onsite Local Environmental Plan Land Reservation Acquisitions?

Reservation	LEP	Published Date	Commenced Date	Currency Date	Amendment	Comments	Percentage of Site Area
No Data							

Heritage Items

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145



Heritage

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

State Heritage Items

What are the State Heritage Items located within the report buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
5055898	Lower Prospect Canal Reserve	Greystanes	Holroyd	30/06/2015	1945	2636	237m	South

Local Heritage Items

What are the Local Heritage Items located within the report buffer?

Map Id	Name	Classification	Significance	LEP or Act	Published Date	Commenced Date	Currency Date	Distance	Direction
A2	Boothtown Aqueduct	Item - Archaeological	Local	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	09/10/2015	237m	South East
I52	'Boothtown Aqueduct' (previously Greystanes Aqueduct), Aqueduct Valve House No 1, Aqueduct Valve Ho*	Item - General	Local	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	09/10/2015	237m	South East
I24	Late Victorian/Federation cottage	Item - General	Local	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	09/10/2015	567m	South East
AH2	Aboriginal scarred tree	Conservation Area - Aboriginal	Local	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	09/10/2015	693m	West
AH3	Aboriginal scarred tree	Conservation Area - Aboriginal	Local	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	09/10/2015	730m	North West
I52	'Boothtown Aqueduct' (previously Greystanes Aqueduct), Aqueduct Valve House No 1, Aqueduct Valve Ho*	Item - General	Local	Holroyd Local Environmental Plan 2013	05/04/2013	05/08/2013	09/10/2015	890m	West

Natural Hazards

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

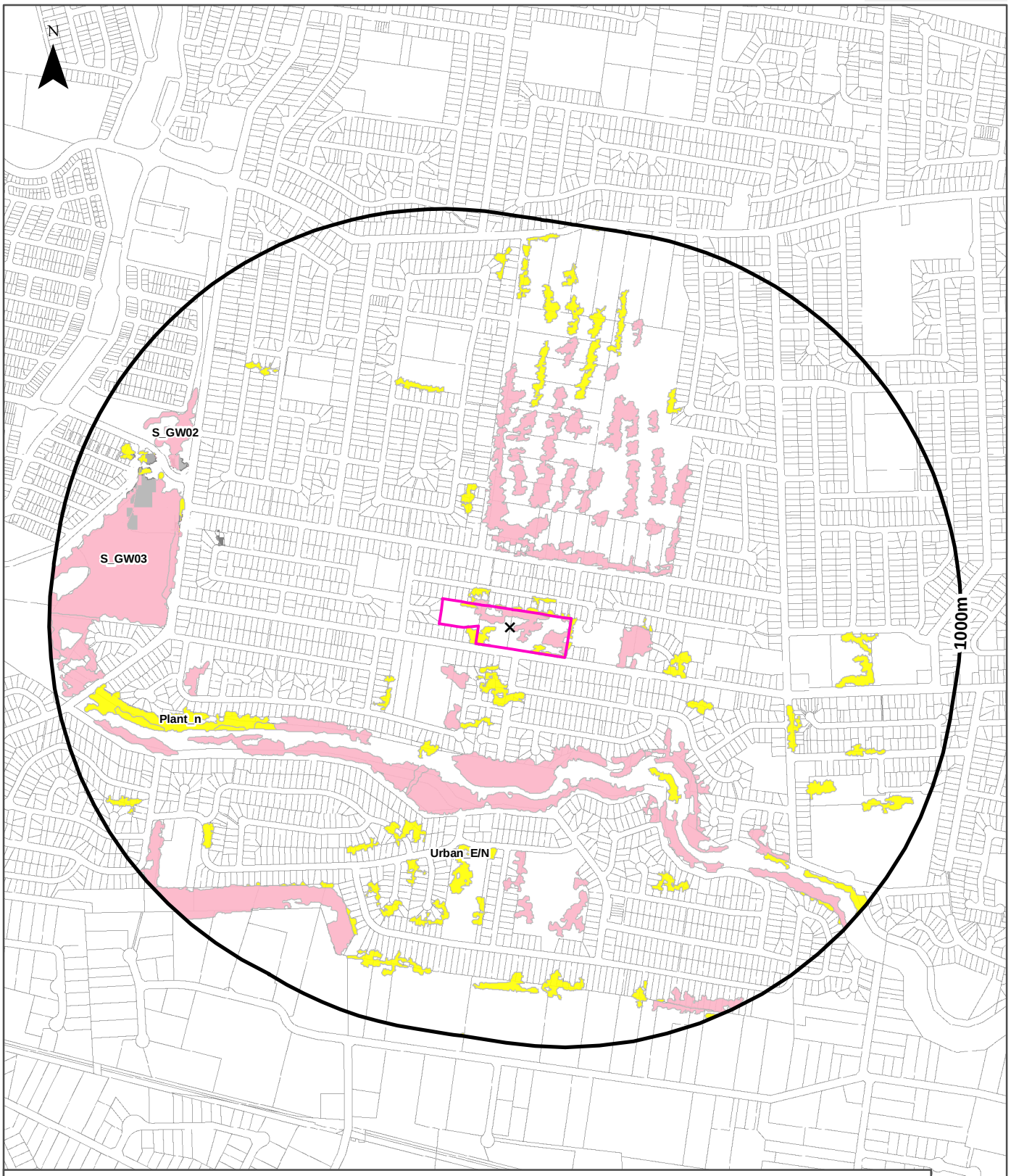
Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the report buffer?

Bush Fire Prone Land Category	Distance	Direction
No records within buffer		

Ecological Constraints - Native Vegetation & RAMSAR Wetlands

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145



Legend

- Site Centre
- Site Boundary
- Report Buffer
- Property Boundary
- Rainforest
- Wet Sclerophyll Forests
- Dry Sclerophyll Forests
- Forested Wetlands
- Grassy Woodlands
- Heathlands
- Grasslands
- Freshwater Wetlands
- Saline Wetlands
- Artificial Wetlands
- Water
- Other
- RAMSAR Wetlands

Scale: 0 100 200 400 Meters

Data Sources: Property Boundaries & Topographic Data: © Land and Property Information (a division of the Department of Finance and Services) 2017

Coordinate System: GDA 1994 MGA Zone 56

Date: 01May 2017

Ecological Constraints

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

Native Vegetation

What native vegetation exists within the report buffer?

Map ID	Map Unit Name	Threatened Ecological Community NSW	Threatened Ecological Community EPBC Act	Understorey	Disturbance	Disturbance Index	Dominant Species	Dist	Direction
S_GW03	S_GW03: Cumberland Shale Plains Woodland	Cumberland Plain Woodland	Cumberland Plain Woodland/ Shale Gravel Forest (possible)	15: Grassy natives and exotics	31: Parkland open understorey	4: Very high	E.tereticornis/E.moluccannaE.crebra/E.eugeinioides	0m	Onsite
Urban_E/N	Urban_E/N: Urban Exotic/Native			00: Not assessed	00: Not assessed	0: Not assessed	Urban Exotic/Native	0m	Onsite
S_GW02	S_GW02: Cumberland Shale Hills Woodland	Cumberland Plain Woodland	Cumberland Plain Woodland/ Shale Gravel Forest (possible)	15: Grassy natives and exotics	31: Parkland open understorey	4: Very high	E.tereticornis/E.moluccannaE.crebra/E.eugeinioides	129m	East
Plant_n	Plant_n: Plantation (native and/or exotic)			00: Not assessed	00: Not assessed	0: Not assessed	Native or Exotic Plantations	495m	West

RAMSAR Wetlands

What RAMSAR Wetland areas exist within the report buffer?

Map Id	RAMSAR Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ecological Constraints

Greystanes Public School, 781 Merrylands Road, Greystanes, NSW 2145

ATLAS of NSW Wildlife

Endangered &Vulnerable Species on the ATLAS of NSW Wildlife database, within 10km of the site?

Class	Family	Scientific	Common	Exotic	NSW Status	Commonwealth Status
Amphibia	Hylidae	Litoria aurea	Green and Golden Bell Frog	No	Endangered, Protected	Vulnerable
Aves	Accipitridae	Haliaeetus leucogaster	White-bellied Sea-Eagle	No	Vulnerable, Protected	CAMBA
Aves	Accipitridae	Hieraaetus morphnoides	Little Eagle	No	Vulnerable, Protected	
Aves	Accipitridae	Lophoictinia isura	Square-tailed Kite	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Artamidae	Artamus cyanopterus cyanopterus	Dusky Woodswallow	No	Vulnerable, Protected	
Aves	Cacatuidae	Callocephalon fimbriatum	Gang-gang Cockatoo	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Falconidae	Falco subniger	Black Falcon	No	Vulnerable, Protected	
Aves	Meliphagidae	Anthochaera phrygia	Regent Honeyeater	No	Critically Endangered Species, Protected	Critically Endangered
Aves	Meliphagidae	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	No	Vulnerable, Protected	
Aves	Neosittidae	Daphoenositta chrysoptera	Varied Sittella	No	Vulnerable, Protected	
Aves	Petroicidae	Petroica boodang	Scarlet Robin	No	Vulnerable, Protected	
Aves	Petroicidae	Petroica phoenicea	Flame Robin	No	Vulnerable, Protected	
Aves	Psittacidae	Glossopsitta pusilla	Little Lorikeet	No	Vulnerable, Protected	
Aves	Psittacidae	Lathamus discolor	Swift Parrot	No	Endangered, Protected, Category 3 Sensitive Species	Critically Endangered
Aves	Psittacidae	Polytelis swainsonii	Superb Parrot	No	Vulnerable, Protected, Category 3 Sensitive Species	Vulnerable
Aves	Strigidae	Ninox connivens	Barking Owl	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Strigidae	Ninox strenua	Powerful Owl	No	Vulnerable, Protected, Category 3 Sensitive Species	
Aves	Tytonidae	Tyto novaehollandiae	Masked Owl	No	Vulnerable, Protected, Category 3 Sensitive Species	
Gastropoda	Camaenidae	Meridolum corneovirens	Cumberland Plain Land Snail	No	Endangered	
Mammalia	Burramyidae	Cercartetus nanus	Eastern Pygmy-possum	No	Vulnerable, Protected	
Mammalia	Dasyuridae	Dasyurus maculatus	Spotted-tailed Quoll	No	Vulnerable, Protected	Endangered
Mammalia	Emballonuridae	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	No	Vulnerable, Protected	
Mammalia	Molossidae	Mormopterus norfolkensis	Eastern Freetail-bat	No	Vulnerable, Protected	
Mammalia	Pteropodidae	Pteropus poliocephalus	Grey-headed Flying-fox	No	Vulnerable, Protected	Vulnerable
Mammalia	Vespertilionidae	Chalinolobus dwyeri	Large-eared Pied Bat	No	Vulnerable, Protected	Vulnerable
Mammalia	Vespertilionidae	Falsistrellus tasmaniensis	Eastern False Pipistrelle	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Miniopterus australis	Little Bentwing-bat	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	No	Vulnerable, Protected	
Mammalia	Vespertilionidae	Myotis macropus	Southern Myotis	No	Vulnerable, Protected	

Class	Family	Scientific	Common	Exotic	NSW Status	Commonwealth Status
Mammalia	Vespertilionidae	Scoteanax rueppellii	Greater Broad-nosed Bat	No	Vulnerable, Protected	
Flora	Apocynaceae	Cynanchum elegans	White-flowered Wax Plant	No	Endangered, Protected	Endangered
Flora	Apocynaceae	Marsdenia viridiflora subsp. viridiflora	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	No	Endangered Population	
Flora	Campanulaceae	Wahlenbergia multicaulis	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	No	Endangered Population	
Flora	Convolvulaceae	Wilsonia backhousei	Narrow-leafed Wilsonia	No	Vulnerable, Protected	
Flora	Dilleniaceae	Hibbertia superans		No	Endangered, Protected	
Flora	Elaeocarpaceae	Tetratheca glandulosa		No	Vulnerable, Protected	
Flora	Ericaceae	Epacris purpurascens var. purpurascens		No	Vulnerable, Protected	
Flora	Fabaceae (Faboideae)	Pultenaea parviflora		No	Endangered, Protected	Vulnerable
Flora	Fabaceae (Faboideae)	Pultenaea pedunculata	Matted Bush-pea	No	Endangered, Protected	
Flora	Fabaceae (Mimosoideae)	Acacia pubescens	Downy Wattle	No	Vulnerable, Protected	Vulnerable
Flora	Grammitidaceae	Grammitis stenophylla	Narrow-leaf Finger Fern	No	Endangered, Protected, Category 3 Sensitive Species	
Flora	Marsileaceae	Pilularia novae-hollandiae	Austral Pillwort	No	Endangered, Protected, Category 3 Sensitive Species	
Flora	Myrtaceae	Callistemon linearifolius	Netted Bottle Brush	No	Vulnerable, Protected, Category 3 Sensitive Species	
Flora	Myrtaceae	Eucalyptus nicholii	Narrow-leaved Black Peppermint	No	Vulnerable, Protected	Vulnerable
Flora	Myrtaceae	Syzygium paniculatum	Magenta Lilly Pilly	No	Endangered, Protected	Vulnerable
Flora	Myrtaceae	Triplarina imbricata	Creek Triplarina	No	Endangered, Protected	Endangered
Flora	Orchidaceae	Pterostylis saxicola	Sydney Plains Greenhood	No	Endangered, Protected, Category 2 Sensitive Species	Endangered
Flora	Proteaceae	Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	No	Vulnerable, Protected	
Flora	Proteaceae	Persoonia nutans	Nodding Geebung	No	Endangered, Protected	Endangered
Flora	Rhamnaceae	Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	No	Endangered Population	
Flora	Thymelaeaceae	Pimelea curviflora var. curviflora		No	Vulnerable, Protected	Vulnerable
Flora	Thymelaeaceae	Pimelea spicata	Spiked Rice-flower	No	Endangered, Protected	Endangered

Data does not include records not defined as either endangered or vulnerable, and category 1 sensitive species are also excluded. NSW Office of Environment and Heritage's Atlas of NSW Wildlife, which holds data from a number of custodians. Data obtained 01/05/2017

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   (f) the Report does not include any information relating to the actual state or condition of the Property;
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10. These terms are subject to New South Wales law.

s149 Certificate

CUMBERLAND COUNCIL

PLANNING CERTIFICATE UNDER SECTION 149(2) & (5) ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Certificate No: 1367/2017
Date: 17/05/2017
Applicant Reference: E30427KP & E30431KP
Receipt Number: 1732927

Applicant	**Owner** (as recorded by Council)
Michele Richard EIS PO Box 976 North Ryde BC 1670	Department of Education & Training GPO Box 33 SYDNEY NSW 2001

Property Details	
Property:	781 Merrylands Road GREYSTANES NSW 2145
Description:	Lot: 1 DP: 76683
Parcel No:	40225

INFORMATION PROVIDED PURSUANT TO SECTION 149(2) OF THE ACT

As at the date of this Certificate the abovementioned land is land to which an Environmental Planning Instrument applies. Details are set out as follows:-

1. RELEVANT PLANNING INSTRUMENTS AND DCPS APPLYING TO THE LAND

State Environmental Planning Policies (SEPPs)
State Environmental Planning Policy No. 19 - Bushland in Urban Areas
State Environmental Planning Policy No. 21 - Caravan Parks
State Environmental Planning Policy No. 33 - Hazardous & Offensive Development
State Environmental Planning Policy No. 55 - Remediation of Land
State Environmental Planning Policy No. 64 - Advertising & Signage
State Environmental Planning Policy No. 65 - Design Quality of Residential Flat Development
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007
State Environmental Planning Policy (Infrastructure) 2007
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

State Environmental Planning Policy (Affordable Rental Housing) 2009

Deemed Statement Environmental Planning Policies
Sydney Regional Environmental Plan No. 9 – Extractive Industry (No. 2 – 1995)
GREATER METROPOLITAN REGIONAL ENVIRONMENTAL PLAN NO. 2 - Georges River Catchment - 5/2/1999

Proposed State Environmental Planning Policies (SEPPs)
No proposed SEPPs apply to the land.

Local Environmental Plans
Holroyd Local Environmental Plan 2013

Proposed Local Environmental Plans
No Proposed Local Environmental Plans apply to the land.

Development Control Plans
Holroyd Development Control Plan 2013

2. Zoning and land uses under relevant LEPs:

1. ZONE

R2 Low Density Residential

2. DEVELOPMENT PERMITTED WITHOUT CONSENT

Home occupations.

3. DEVELOPMENT PERMITTED ONLY WITH CONSENT

Bed and breakfast accommodation; Boarding houses; Building identification signs; Business identification signs; Child care centres; Community facilities; Dual occupancies; Dwelling houses; Environmental protection works; Exhibition homes; Exhibition villages; Group homes; Health consulting rooms; Home businesses; Home industries; Hostels; Places of public worship; Recreation areas; Respite day care centres; Roads; Semi-detached dwellings.

4. PROHIBITED DEVELOPMENT

Any other development not specified in item 2 or 3.

Whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling house on the land and, if so, the minimum land dimensions so fixed

NO

Whether the land includes or comprises critical habitat

NO

Whether the land is in a conservation area (however described)

NO

Whether an item of environmental heritage (however described) is situated on the land

NO

3. Complying Development under SEPP (Exempt and Complying Development Codes) 2008

General Housing Code
The extent to which complying development may or may not be carried out on this land under the General Housing Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land

Rural Housing Code
The extent to which complying development may or may not be carried out on this land under the Rural Housing Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land

Commercial and Industrial (New Buildings and Additions) Code
The extent to which complying development may or may not be carried out on this land under the Commercial and Industrial (New Buildings and Additions) Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land.

Housing Alterations Code
The extent to which complying development may or may not be carried out on this land under the Housing Alterations Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land.

General Development Code
The extent to which complying development may or may not be carried out on this land under the General Development Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land.

Commercial and Industrial Alterations Code
The extent to which complying development may or may not be carried out on this land under the Commercial and Industrial Alterations Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land.

Subdivisions Code
The extent to which complying development may or may not be carried out on this land under the Subdivisions Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land.

Demolition Code
The extent to which complying development may or may not be carried out on this land under the Demolition Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land.

Fire Safety Code
The extent to which complying development may or may not be carried out on this land under the Fire Safety Code because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of the SEPP:

Complying development may be carried out on the full extent of the land.

4. Coastal Protection

Whether or not the land is affected by the operation of Section 38 or 39 of the *Coastal Protection Act 1979* but only to the extent that the Council has been so notified by the Department of Services Technology & Administration:	NO

5. Mine Subsidence

Whether or not the land is proclaimed to be a mine subsidence district within the meaning of Section 15 of the *Mine Subsidence Compensation Act 1961:*	NO

6. Road widening & road realignment

Whether or not the land is affected by any road widening or road realignment under:

Division 2 of Part 3 of the Roads Act 1992	NO
Any Environmental Planning Instrument	NO
Any resolution of Council	NO

7. Council and other Public Authority policies on hazard risk restrictions

Whether or not the land is affected by a policy adopted by the Council or adopted by any other public authority and notified to the Council, which restricts the development of the land because of the likelihood of:

Bush fire:	NO
Tidal Inundation:	NO
Subsidence:	NO
Acid Sulfate Soils:	NO
Any other risk (other than flooding):	Council has adopted a policy on contaminated land. This policy is implemented when zoning or land use changes are proposed on lands which have previously been used for certain purposes. Consideration of Council's adopted policy and the application of provisions under relevant State Legislation is warranted. Further information in relation to the land is contained in s149 (5).

7A. Flood related development controls

Whether or not development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls:	YES
Whether or not development on the land or part of the land for any other purposes is subject to flood related development controls:	YES

8. Land reserved for acquisition

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in item 1 makes provision in relation to the acquisition of the land by a public authority as referred to in section 27 of the *Environmental Planning & Assessment Act 1979:*	NO

9. Contributions Plans applying to the land

Holroyd Section 94 Development Contributions Plan 2013

9A. Biodiversity certified land

NOT APPLICABLE

10. Biobanking Agreements

NOT APPLICABLE

11. Bush fire prone land

The land is NOT bush fire prone land as defined in the *Environmental Planning & Assessment Act 1979.*

12. Property Vegetation Plans

NOT APPLICABLE

13. Orders Under Trees (Disputes Between Neighbours) Act 2006

Whether an order has been made under the *Trees (Disputes Between Neighbours) Act 2006* to carry out work in relation to a tree on the land (but only if the Council has been notified of the order):	NO

14. Directions under Part 3A

NOT APPLICABLE

15. Site Compatibility Certificates and conditions for seniors housing

There is no current Site Compatibility Certificate (of which Council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

There are no terms of a kind referred to in clause 18 (2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 that have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.

16. Site Compatibility Certificates for infrastructure

There is no valid Site Compatibility Certificate (of which Council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

17. Site Compatibility Certificates and conditions for affordable rental housing

There is no current Site Compatibility Certificate (Affordable Rental Housing), of which the Council is aware, in respect of proposed development on the land.

There are no terms of a kind referred to in clause 17 (1) or 38 (1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as a condition of consent to a development application in respect of the land.

18. Matters arising under Section 59(2) of the Contaminated Land Management Act 1997

No matters apply to the land to which the certificate relates.

19. Site Verification Certificates

Whether there is a current site verification certificate, of which the council is aware, in respect of the land:	NO

Malcolm Ryan
Interim General Manager
Cumberland Council

per _____

Tree Management

Whether or not the land is affected by any Tree Management provisions requiring consent for the removal or lopping of trees upon the land:	YES

County or Designated Road

Whether or not the land has frontage to a County or designated road:	NO

Interim Heritage Order

Whether or not the land is affected by an Interim Heritage Order under the provisions of the *Heritage Act 1997:*	NO

Acid Sulfate Soils

Is the land affected by an Acid Sulfate Soils classification under *Holroyd Local Environmental Plan 2013*? If yes, what is the classification of the land?	NO

Contamination

Council records do not have sufficient information about previous use of this land to determine whether the land is contaminated.

Any other matters?

STORMWATER FLOODING

Council's records suggest that the subject land may be liable to overland stormwater overflow based on information from a study in the area. On written request, Council will supply the designated stormwater overflow levels for the area, which should be used with an appropriate survey plan to better interpret the stormwater overflow affectation of the land.

General Information

When information pursuant to section 149(5) is requested the Council is under no obligation to provide that information. Council draws your attention to section 149(6) which states that a council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this certificate.

Malcolm Ryan
Interim General Manager
Cumberland Council

per _____

Historical Land Titles

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

18/36 Osborne Road,
Manly NSW 2095

Telephone: +612 9977 6713
Mobile: 0412 169 809
Email: search@alsearchers.com.au

02nd May 2017

ENVIRONMENTAL INVESTIGATION SERVICES
PO BOX 976,
NORTH RYDE BC NSW 1670

Attention: Brendan Page,

RE: **Greystanes Public School,**
781 Merrylands Road,
Greystanes
Job No. E30431KP

Current Search

Folio Identifier 1/76683 (title attached)
DP 76683 (plan attached)
Dated 01st May 2017
Registered Proprietor:
THE MININSTER FOR EDUCATION

Title Tree
Lot 1 DP 76683

Folio Identifier 1/76683

Certificate of Title Volume 3779 Folio 96

PA 26683

Conveyance Book 1045 No. 100

****

Summary of proprietor(s)
Lot 1 DP 76683

Year	Proprietor(s)
	(Lot 1 DP 76683)
1990 – todate	The Minister for Education
	(Lot 1 DP 76683 – Area 3 Acres 3 Roods 7 Perches – CTVol 3779 Fol 96)
1954 – 1990	Her Most Gracious Majesty Queen Elizabeth the Second *(behalf The Minister of Public Instruction)*
1951 – 1954	Robert Harry William Brown, dairy farmer
1941 – 1951	Hilda Mary Tebay, wife of Percy Herbert Tebay, poultry farmer
1925 – 1941	Walter Hunt, poultry farmer
	(Part Portion 198 Parish Prospect – Are 3 Acres 3 Roods 5 ½ Perches – Conv Bk 1045 No. 100)
1914 – 1925	Walter Hunt, labourer

****

Land & Property Information

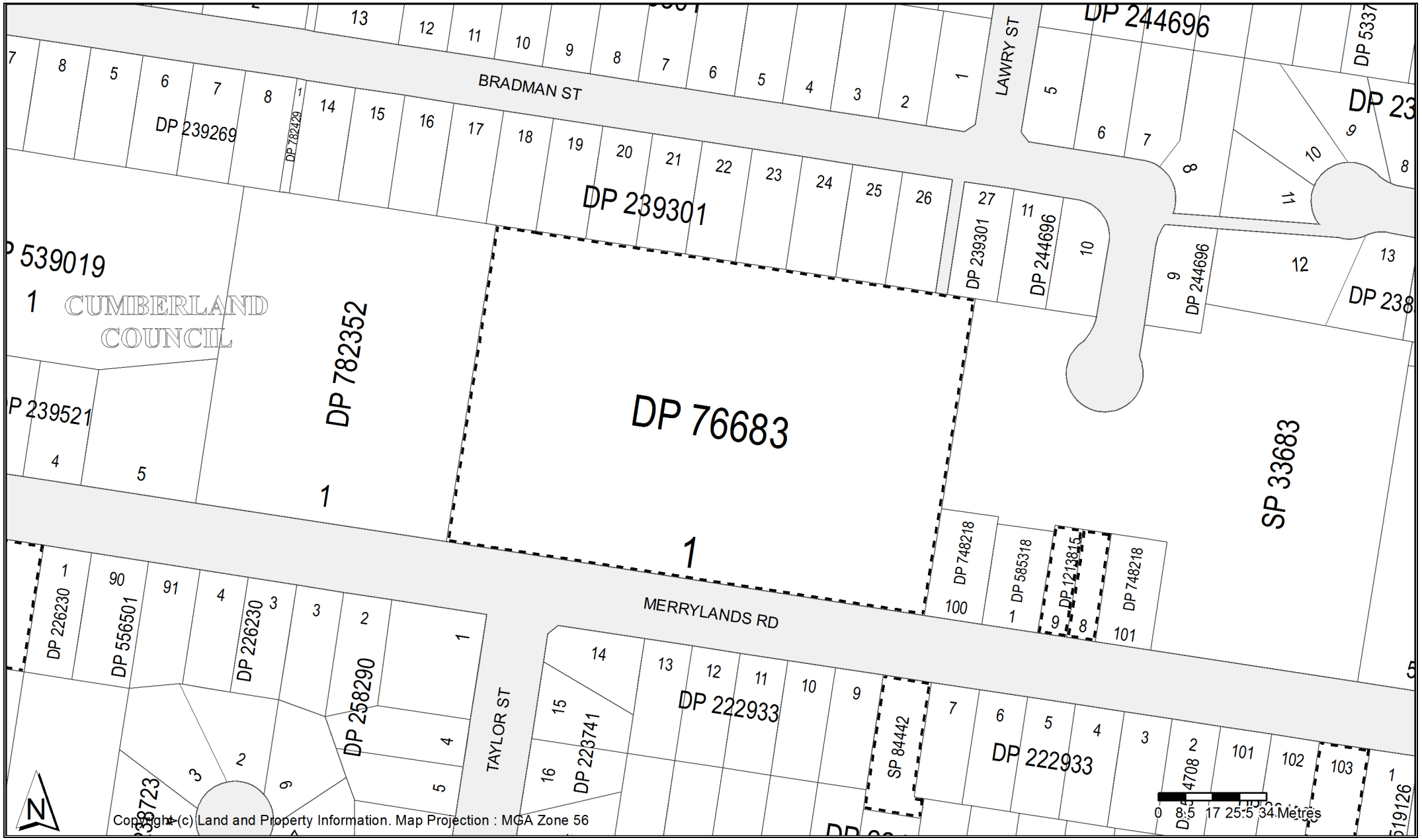
Cadastral Records Enquiry Report

Ref : eis - greystanes

Requested Parcel : Lot 1 DP 76683

Identified Parcel : Lot 1 DP 76683

Locality : GREYSTANES **LGA :** CUMBERLAND **Parish :** PROSPECT **County :** CUMBERLAND



Requested Parcel : Lot 1 DP 76683 **Identified Parcel :** Lot 1 DP 76683

Locality : GREYSTANES **LGA :** CUMBERLAND **Parish :** PROSPECT **County :** CUMBERLAND

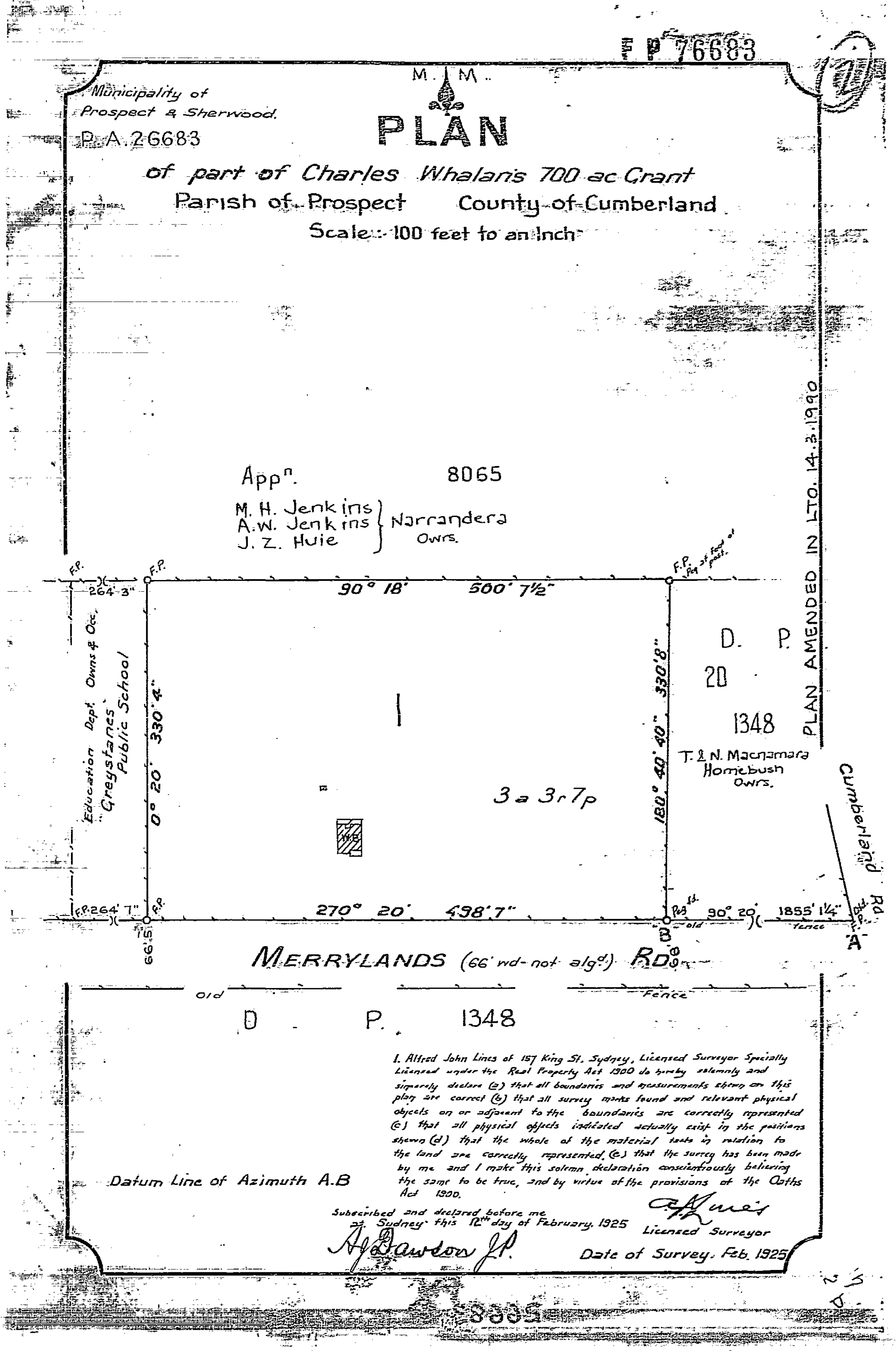
	Status	Surv/Comp	Purpose
DP76683			
Lot(s): 1			
DP1159177	REGISTERED	SURVEY	EASEMENT
DP234505			
Lot(s): 103			
DP1219924	PRE-ALLOCATED	UNAVAILABLE	SUBDIVISION
DP1213815			
Lot(s): 8, 9			
DP629923	HISTORICAL	COMPILATION	SUBDIVISION
SP66854			
DP545941	HISTORICAL	COMPILATION	SUBDIVISION
DP1035537	REGISTERED	SURVEY	REDEFINITION
SP84442			
DP222933	HISTORICAL	SURVEY	SUBDIVISION
DP1157053	REGISTERED	SURVEY	REDEFINITION

Caution: For all **ACTIVITY PRIOR to SEPT 2002** you must refer to the RGs Charting and Reference Maps.

Requested Parcel : Lot 1 DP 76683 **Identified Parcel :** Lot 1 DP 76683

Locality : GREYSTANES **LGA :** CUMBERLAND **Parish :** PROSPECT **County :** CUMBERLAND

Plan	Surv/Comp	Purpose
DP20650	SURVEY	UNRESEARCHED
DP76683	SURVEY	UNRESEARCHED
DP222933	SURVEY	SUBDIVISION
DP223741	SURVEY	SUBDIVISION
DP224952	SURVEY	SUBDIVISION
DP226230	SURVEY	SUBDIVISION
DP234505	COMPILATION	SUBDIVISION
DP238362	SURVEY	SUBDIVISION
DP238372	SURVEY	SUBDIVISION
DP238415	SURVEY	SUBDIVISION
DP238723	SURVEY	SUBDIVISION
DP238856	SURVEY	SUBDIVISION
DP239269	SURVEY	SUBDIVISION
DP239301	SURVEY	SUBDIVISION
DP239521	SURVEY	SUBDIVISION
DP244696	SURVEY	SUBDIVISION
DP258290	SURVEY	SUBDIVISION
DP514708	COMPILATION	SUBDIVISION
DP519126	COMPILATION	SUBDIVISION
DP533775	COMPILATION	SUBDIVISION
DP533898	COMPILATION	SUBDIVISION
DP539019	SURVEY	RESUMPTION OR ACQUISITION
DP545941	COMPILATION	SUBDIVISION
DP556501	COMPILATION	SUBDIVISION
DP585318	COMPILATION	SUBDIVISION
DP746431	SURVEY	SUBDIVISION
DP748218	SURVEY	SUBDIVISION
DP782352	COMPILATION	DEPARTMENTAL
DP782429	COMPILATION	DEPARTMENTAL
DP1213815	SURVEY	SUBDIVISION
DP1213815	UNRESEARCHED	SUBDIVISION
SP33683	COMPILATION	STRATA PLAN
SP66854	COMPILATION	STRATA PLAN
SP84442	COMPILATION	STRATA PLAN



CONVERSION TABLE ADDED IN REGISTRAR GENERAL'S DEPARTMENT

DP 76683

FEET	INCHES	METRES
66	-	20.117
66	5	20.244
264	3	80.543
264	7	80.645
330	4	100.686
330	8	100.787
498	7	151.968
500	7 1/2	152.591
1855	1 1/4	565.436

AC	RD	P	HA.
3	3	.07	1.518
3	3	7	1.535
700	-	-	283.3

AMENDMENTS AND/OR ADDITIONS MADE ON PLAN IN THE LAND TITLES OFFICE

10	20	30	40	50	60	70 Table of mm	110	120	130	140

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

1/5/2017 11:22AM

FOLIO: 1/76683

First Title(s): OLD SYSTEM
Prior Title(s): VOL 3779 FOL 96

Recorded	Number	Type of Instrument	C.T. Issue
2/9/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
31/5/1990	DP76683	DEPOSITED PLAN	FOLIO CREATED CT NOT ISSUED
14/6/1990	Y490388	DEPARTMENTAL DEALING	EDITION 1
6/7/2011	DP1159177	DEPOSITED PLAN	EDITION 2
15/6/2016	AK509587	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

No. 26683

New South Wales.

APPLICATION TO BRING LANDS UNDER THE PROVISIONS OF REAL PROPERTY ACT, 1900.

FEE SIMPLE.[a]

a This form may be modified to suit the case of a leasehold title.

FEES :— £ s. d.
Assurance 1 11 3
Certificate 1 0 0
Advertising 1 5 0
Office Copy 1 10 0
Plan...
£ 5 6 1

NOTICE.—Applicants are reminded that by virtue of the provisions of the Crimes Act, 1900, the penalties of perjury are attached to any wilfully false declaration concerning any matter or procedure under the Act, and that the utmost care is therefore necessary in framing (or reading) declarations. If the form be filled up by an Attorney, every particular statement herein.
It is further provided by Section 126 of the Real Property Act, 1900, that any applicant procuring a Certificate through fraud, omission, misrepresentation, or misdescription will, notwithstanding the issue of such Certificate, remain liable for damages to any person thereby prejudiced. And any person who fraudulently procures, assists in fraudulently procuring, or is privy to the fraudulent procurement of any Certificate of Title, is declared guilty of a misdemeanor, and liable to a penalty not exceeding £500, or imprisonment not exceeding three years; and any Certificate thereby procured is rendered void as between all parties or privies to the fraud.

A 475 B

REGISTRAR-GENERAL NEW SOUTH WALES

I WALTER HUNT of Wentworthville in the State of New South Wales, Poultry Farmer,

do solemnly and sincerely declare, that I am ------ seized for an Estate in fee simple of

ALL THAT piece or parcel of land containing by admeasurement three acres three roods five and a half perches situate in the Municipality of Prospect and Sherwood Parish of Prospect and County of Cumberland being part of Charles Whalen's 700 acres Grant Commencing on the Northern side of Harper Street at the south eastern corner of the Merrylands Public School site and bounded thence on the West by the Eastern boundary of said School site being a line bearing twenty minutes five hundred and a half links thence on the north by a line bearing ninety degrees seventeen minutes seven hundred and fifty seven and seven tenths links thence on the East by a line bearing one hundred and eighty degrees forty five minutes five hundred and one and two tenths links to Harper Street aforesaid and thence on the South by that Street bearing Two hundred and seventy degrees twenty minutes seven hundred and fifty four and one tenth links to the point of commencement and being part of the land described in Indenture of Conveyance dated 8th August 1879 Registered No.722 Book 193

which land (including all improvements) is of the value of SEVEN HUNDRED AND FIFTY POUNDS(£750) and no more, and is part ----- of Seven hundred acres -------- originally granted to Charles Whalen by Crown grant, under the hand of the Governor of the Colony, dated the 13th day of January 1818

And I further declare, that I verily believe there does not exist any lease or agreement for lease of the said land, for any term exceeding a tenancy for one year, or from year to year, ~~[except as follows—]~~

Also, that there does not exist any mortgage, lien, writ of execution, charge or encumbrance, will or settlement, or any deed or writing, contract, or dealing (other than such lease or tenancy as aforesaid), giving any right, claim, or interest in or to the said land, or any part thereof, to any other person than myself [except as follows—]

Contract for sale dated 23rd January 1925 Myself to Hilda Mary Tebay regd Bk 1374 No 654 (doc 2)

And I further declare, that there is no person in possession or occupation of the said land or any part thereof adversely to my Estate or Interest therein, and that the said land is now Unoccupied.

and that the owners and occupiers of adjacent lands are as follows:—

State whether on North, South, East, or West.	Name.	State whether owner or occupier.	Address.
North	M.H.Jenkins, A.W.Jenkins and J. Z. Huie	Owners	Narrandera, N.S.W.
South	Merrylands Road		
East	T. & N. Macnamara	Owners	Homebush
West	"Greystanes" Public School Education Department Sydney N.S.W.	Owners and Occupiers.	

Cert of Title issued Vol 3779 Fol 96

Margin notes:
a This form may be modified to suit the case of a leasehold title.
b Here state Christian and surname (or names) in full with residence and occupation.
c "I am" or if the declaration is made by an attorney "Grantor".
d Insert the case may be.
e Here give description of the property in full. If the land is shown on a plan lodged with the application or is fully described in a deed, it will be sufficient to insert a reference to the area, town, parish, and county and words indicating that the land is shown on the plan or described in the deed in question. Unless the Registrar General has previously dispensed with a plan of survey, an accurate plan, prepared and certified by a surveyor specially licensed under the Act, must accompany the application. If there be any rights of way or other rights or easements affecting the premises the particulars should be stated. If the space for description be insufficient, it may be completed by annexure, which must however be identified as part of the declaration, by memorandum signed by the declarant and attesting officer.
Attention is called to the "Valuation of Land Act, 1916." Where the value has been determined by the Valuer General that value should be stated, and the words "as determined by the Valuer General" should be added. The Shire or Municipal assessment notice for the current year should be lodged.
f State whether "the whole" or "part".
g Insert allotment with reference to number and section on plan, if any, or if not, number of acres granted.
h Name of Grantee.
k If there be any Lease, here state particulars; if none, strike out the words within brackets. Witness should initial.
l If any exception, here state particulars; if none, strike out the words of reference within brackets. Witness should initial.
m Insert "unoccupied," or "in the occupation of," adding names and addresses of tenants in full. State also nature of tenancy, if not under some lease before mentioned.
n Here insert names and residences of adjacent owners and occupiers on all sides.

5

J.J.P.S. And I further declare, that the annexed Schedule, to which my signature is affixed, and which is to be taken as part of this Declaration, contains a full and correct list of all settlements, deeds, documents, or instruments, maps, plans and papers relating to the land comprised in this application, so far as I have any means of ascertaining the same, distinguishing such as being in my possession or under my control, are herewith lodged and indicating where or with whom, so far as known to me any others thereof are deposited; Also, that there does not exist any fact or circumstance whatever material to the title, which is not hereby fully and fairly disclosed to the utmost extent of my knowledge, information, and belief; and that there is not, to my knowledge and belief, any action or suit pending affecting the said land, nor any person who has or claims any estate, right, title or interest therein, or in any part thereof, otherwise than by virtue and to the extent of some lease or tenancy hereby fully disclosed [~~except as follows~~ p :—]

p If any exception state particulars; if none strike out the words within brackets.

J.J.P.S. And I make this solemn Declaration, conscientiously believing the same to be true.

DATED at Merrylands this 26th day of March 1925

(RULE UP ALL BLANKS BEFORE SIGNING.)

Made and subscribed by the abovenamed WALTER HUNT this 26th day of March 1925. in the presence of r

J.J.P. Smith J.P.

Signature of Applicant: Walter Hunt

r The declaration must be attested by the Registrar-General or Deputy, or by a Notary Public, or by a Justice of the Peace, or Commissioner for Affidavits. If the signature be by mark, the attestation must state that it was read over to the declarant, and that he appeared fully to understand the contents. This applies also to the subjoined direction, particularly if a different person be nominated to receive certificate.

To the Registrar General,—

J.J.P.S. I Walter Hunt the above declarant, do hereby apply to have the land described in the above declaration brought under the provisions of the Real Property Act, and request you to issue the Certificate of Title in the name of s myself.

DATED at SYDNEY this 26th day of March 1925.

Witness to Signature— J.J.P. Smith J.P.

(Signature of Applicant) Walter Hunt

s If to Applicant, say "myself"; if to other person, write name at full length, with address and occupation. If to two or more, state whether as joint tenants or tenants in common. If to an infant, the age should be stated, and verified by Certificate of Birth, or by Statutory Declaration. If to a married woman, the name of the husband, together with his residence and occupation, should be stated.

*N.B.—The Schedule below and Certificate indorsed on fourth page should be also signed.

In no case can any alterations, however trifling, be allowed to be made after the application has been once declared, unless all the parties re-sign and re-declare the same. If it is discovered that any alterations are necessary, the applicant may make a statutory declaration setting out in what manner he desires the application to be altered, which declaration will then (unless the Registrar General considers that a fresh application ought to be made) be read as one with the application.

(RULE UP ALL BLANKS BEFORE SIGNING.)

SCHEDULE REFERRED TO.*

(TO BE SIGNED BY APPLICANT IMMEDIATELY BELOW THE LAST DOCUMENT SCHEDULED.)

To include not only Title Deeds, &c., but also Plan, if any, and Surveyor's Declaration verifying same.

Recd plan 6.4.25 3a.3r.7p.

(1) 20th November 1914 Conveyance Henry Benjamin Hughes to Walter Hunt registered No.100 Book 1045.

(2) 23rd January 1925 Contract Walter Hunt to Hilda Mary Tebay registered No. 654 Book 1374.

(3) 12th February 1925 Survey Plan - Alfred John Lines, Surveyor.

Walter Hunt

* For the particulars which this Schedule must comprise, see concluding part of Declaration, to which particular attention is directed, as any omission or misstatement will render applicant liable to the penalties of false Declaration. Such of the Deeds and Documents as are in applicant's possession or control, must be deposited with the application. Counterpart leases must be included, but these will be returned, if required.

After issue of the Certificate of Title, should delivery be desired of any of the documents to which the person lodging them is entitled, attested copies of such documents may be required. This does not apply to partially cancelled registered documents.

Recd 1 & 2 [illegible]

Should any transaction affecting the land in this application be entered into subsequent to the date of the application, but prior to the issue of the Certificate of Title, the Registrar General should be informed immediately, and all documents evidencing such transaction should be lodged.

SCHEDULE REFERRED TO—(*continued*).*

(TO BE SIGNED BY APPLICANT, IF UTILISED, IMMEDIATELY BELOW THE LAST DOCUMENT SCHEDULED.)

*See marginal notes under asterisk on page 2.

Hrs 29979 (4) 16.5.1925. Stat. Decln. of W Hunt.

Hrs 29975 (5) 19.5.1925 " " " W Hunt re adj. owner & occupier

Lc 25/37018. 6. 26-6-25 " — " " re correct address

Gr. Shep. & York 13/8/25. 7. 8-8-1879. Conveyance R. Harper to C. B. Hughs. No 122 Bk 193.

Hrs 25 1538. 8. 17.9.1925 Stat. Decln. of W Hunt

Doc 2 may be delivered to Messrs. W. A. Gilder, McMaster, Holland & Gilder.
Doc 7 may be delivered to Messrs Greenwell Shep. & York
E H [illegible] 1.10.25

Received Document No 2
W A Gilder McMaster Holland & Gilder
per [illegible] Crawford

Received document No 7
Greenwell Shepherd York
[illegible] 6/10/25

☞ See Indorsement overleaf.

I certify that the within application is correct for the purposes of the Real Property Act, 1900†.

† Section 117 requires that this Certificate be signed by Applicant or his Solicitor and renders liable any person falsely or negligently certifying, to a penalty of £50; also, to damages recoverable by parties injured.
If by Solicitor, he should insert :—" And that I am the Solicitor of the within-named Applicant," and should add his own address to his signature. The signature should be that of the Solicitor himself, and not of his firm.

(Signature) Walter Hunt

(RULE UP ALL BLANKS BEFORE SIGNING, EXCEPT SPACE IN SCHEDULE BELOW APPLICANT'S SIGNATURE.)

FEES.

PAYMENT OF THESE MUST ACCOMPANY THE APPLICATION.

1st.—*Where the Applicant is the Original Grantee from the Crown, and no transactions have been registered.*

New Certificate	£1 0 0
Add Assurance, ½d. in the £ on declared value	....
Office Copy of Plan	0 5 0

2nd.—*Where the Applicant is not the Grantee from the Crown, or being the Grantee, the property has been dealt with by any Registered Instrument.*

FEES :—

Advertisement	£1 10 0
New Certificate	1 0 0
Office Copy of Plan	0 5 0
TOTAL	£2 15 0

In addition to the Assurance Fee of ½d. in the £ on the value.

☞ State to whom all correspondence relating to this Application should be sent, with address, as under, viz.—

Name W. A. Gilder McEnroe Holland Gilder

Occupation Solicitors

Post Town 89 Pitt Street

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 1/76683

SEARCH DATE	TIME	EDITION NO	DATE
1/5/2017	11:21 AM	2	6/7/2011

LAND

LOT 1 IN DEPOSITED PLAN 76683
AT GREYSTANES
LOCAL GOVERNMENT AREA CUMBERLAND
PARISH OF PROSPECT COUNTY OF CUMBERLAND
TITLE DIAGRAM DP76683

FIRST SCHEDULE

THE MINISTER FOR EDUCATION

SECOND SCHEDULE (2 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 DP1159177 EASEMENT FOR WATER SUPPLY PURPOSES 1 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1159177

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Appendix C: Borehole Logs

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 1
1/1

Client: JDH ARCHITECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: GREYSTANES PUBLIC SCHOOL, 781 MERRYLANDS ROAD, GREYSTANES, NSW

Job No. 30431S
Date: 3/6/17

Method: SPIRAL AUGER
JK205

Logged/Checked by: K.S./P.S.

R.L. Surface: ≈ 57.9m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			FILL: Silty sand, fine to coarse grained, dark brown, with roots and root fibres.	D			
					N = 18 6,8,10	1		CH	SILTY CLAY: high plasticity, light grey and red brown, with fine to coarse grained gravel.	MC<PL	H	>600 >600	RESIDUAL
					N = 26 7,9,17	2		-	SHALE: grey, with iron indurated bands.	DW	VL	>600 >600 580	VERY LOW TO LOW 'TC' BIT RESISTANCE
						3					VL-L		LOW TO MODERATE RESISTANCE
						4					L-M		MODERATE RESISTANCE
						5							
						6			END OF BOREHOLE AT 6.0m				
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 2
1/1

Client: JDH ARCHITECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: GREYSTANES PUBLIC SCHOOL, 781 MERRYLANDS ROAD, GREYSTANES, NSW

Job No. 30431S
Date: 3/6/17
Method: SPIRAL AUGER JK205
Logged/Checked by: K.S./P.S.
R.L. Surface: ≈ 60.0m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■					0		-	ASPHALTIC CONCRETE: 50mm.t	M			ROADBASE
								CH	FILL: Gravelly sand, fine to coarse grained, brown and grey.	MC<PL	H		RESIDUAL
	■			■	N = 21 7,9,12				SILTY CLAY: high plasticity, light grey and orange brown, with fine to coarse gained ironstone and shale gravel.			>600 >600	
						1		-	SHALE: grey, with iron indurated bands.	XW-DW	EL-VL		VERY LOW TO LOW 'TC' BIT RESISTANCE
										DW	L-M		LOW TO MODERATE RESISTANCE
						2							
						3							
						4							
				■							M-H		HIGH RESISTANCE
						5			END OF BOREHOLE AT 5.0m				'TC' BIT REFUSAL
						6							
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 3
1/1

Client: JDH ARCHITECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: GREYSTANES PUBLIC SCHOOL, 781 MERRYLANDS ROAD, GREYSTANES, NSW

Job No. 30431S
Date: 3/6/17
Method: SPIRAL AUGER JK205
Logged/Checked by: K.S./P.S.
R.L. Surface: ≈ 60.1m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION						0			FILL: Silty sandy clay, low to medium plasticity, brown, with roots and root fibres, trace of ash.	MC≈PL			GRASS COVER APPEARS POORLY COMPACTED
					N = 5 2,2,3	1							
					N = 7 2,3,4	2		CL-CH	SILTY CLAY: medium to high plasticity, light grey and orange brown.	MC≈PL	VSt	260 220 270	RESIDUAL
						3		-	SHALE: grey, with iron indurated bands.	XW	EL		
										DW	VL-L		LOW 'TC' BIT RESISTANCE
						4							
						5							
											L-M		MODERATE RESISTANCE
						6			END OF BOREHOLE AT 6.0m				
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 4
1/1

Client: JDH ARCHITECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: GREYSTANES PUBLIC SCHOOL, 781 MERRYLANDS ROAD, GREYSTANES, NSW

Job No. 30431S
Date: 3/6/17

Method: SPIRAL AUGER
JK205

Logged/Checked by: K.S./P.S.

R.L. Surface: ≈ 58.0m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■					0			FILL: Silty clayey sand, fine to medium grained, dark brown, with fine to coarse grained gravel.	M			GRASS COVER
	■			■	N = 13 4,7,6				FILL: Silty clay, low to medium plasticity, dark brown, with fine to coarse grained shale gravel.	MC≈PL			APPEARS WELL COMPACTED
						1							
	■			■	N = 15 5,6,9			CL-CH	SILTY CLAY: medium to high plasticity, light grey and orange brown, with fine to coarse grained ironstone gravel.	MC≈PL	VSt		RESIDUAL
						2							
				■	N > 15 11,15/ 100mm REFUSAL	3		-	SHALE: grey.	XW	EL		
									as above, but with XW seams.	DW	VL		VERY LOW TO LOW 'TC' BIT RESISTANCE
						4							
						5					L		MODERATE RESISTANCE
						6					M-H		HIGH RESISTANCE
									END OF BOREHOLE AT 6.0m				
						7							

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No. 5
1/1

Client: JDH ARCHITECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: GREYSTANES PUBLIC SCHOOL, 781 MERRYLANDS ROAD, GREYSTANES, NSW

Job No. 30431S
Date: 3/6/17
Method: SPIRAL AUGER JK205
Logged/Checked by: K.S./P.S.
R.L. Surface: ≈ 65.5m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0		-	ASPHALTIC CONCRETE: 50mm.t FILL: Gravelly sand, fine to coarse grained, brown.	M			ROADBASE
					N = 17 4,8,9	1		CH	SILTY CLAY: high plasticity, orange brown, with fine to coarse grained ironstone and shale gravel.	MC<PL	H	>600 >600	RESIDUAL
					N = 30 9,14,16	2		-	SILTY CLAY: medium to high plasticity, grey, with fine to coarse grained ironstone gravel. SHALE: grey, with iron indurated bands.	XW	EL	>600 530 560	
						3				DW	VL-L		VERY LOW TO LOW 'TC' BIT RESISTANCE
						4							
						5					L-M		MODERATE RESISTANCE
						6			END OF BOREHOLE AT 6.0m				
						7							

EXPLANATORY NOTES – ENVIRONMENTAL LOGS

INTRODUCTION

These notes have been provided to supplement the environmental report with regards to drilling and field logging. Not all notes are necessarily relevant to all reports. Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and manmade processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies involve gathering and assimilating limited facts about these characteristics and properties in order to understand the ground on a particular site under certain conditions. These conditions are directly relevant only to the ground at the place where, and time when, the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (e.g. sandy clay) as set out below (note that unless stated in the report, the soil classification is based on a qualitative field assessment, not laboratory testing):

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as shown in the following table:

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'Shale' is used to describe thinly bedded to laminated siltstone.

DRILLING OR EXCAVATION METHODS

The following is a brief summary of drilling and excavation methods currently adopted by the Company, and some comments on their use and application. All except test pits and hand auger drilling require the use of a mechanical drilling rig.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descend into the pit. The depth of penetration is limited to approximately 3m for a backhoe and up to 6m for an excavator. Limitations of test pits include problems associated with disturbance and difficulty of reinstatement; and the consequent effects on nearby structures. Care must be taken if construction is to be carried out near test pit locations to either properly re-compact the backfill during construction, or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as fill, hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (e.g. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The locations of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" – Test F3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as: N = 13 (4, 6, 7)
- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as: N>30 (15, 30/40mm)

The results of the test can be related empirically to the engineering properties of the soil. Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60 tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as "Nc" on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line"

variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open;
- A localised perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after stabilising at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (e.g. bricks, concrete, plastic, slag/ash, steel etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classifications and rocks strengths indicated on the environmental logs unless noted in the report.

SITE ANOMALIES

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, EIS should be notified immediately.

GRAPHIC LOG SYMBOLS FOR SOIL AND ROCKS

SOIL


FILL


TOPSOIL


CLAY (CL, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CH)


SILTY CLAY (CL, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML)


PEAT AND ORGANIC SOILS

ROCK


CONGLOMERATE


SANDSTONE


SHALE


SILTSTONE, MUDSTONE, CLAYSTONE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

DEFECTS AND INCLUSIONS


CLAY SEAM


SHEARED OR CRUSHED SEAM


BRECCIATED OR SHATTERED SEAM/ZONE


IRONSTONE GRAVEL


ORGANIC MATERIAL

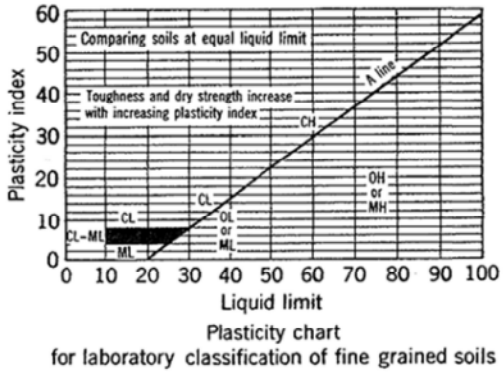
OTHER MATERIALS


CONCRETE


BITUMINOUS CONCRETE, COAL


COLLUVIUM

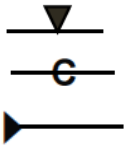
Field Identification Procedures (Excluding particles larger than 75 μm and basing fractions on estimated weights)						Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger* than 75 μm sieve size[b] (The 75 μm sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes			*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification Determine percentages of gravel and sand from grain size curve Depending on percentage of fines (fraction smaller than 75 μm sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP* More than 12% *GM, GC, SM, SC* 5% to 12% *Borderline* cases requiring use of dual symbols $C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW* Atterberg limits below "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits above "A" line, with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)			*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes			*SW*	Well graded sands, gravelly sands, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW* Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits below "A" line with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)			*SM*	Silty sands, poorly graded sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*SC*	Clayey sands, poorly graded sand-clay mixtures		
Fine-grained soils More than half of material is *smaller* than 75 μm sieve size	Identification Procedures on Fraction Smaller than 380 μm Sieve Size		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)				
	Silts and clays liquid limit less than 50		None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)	
			Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity		
	Silts and clays liquid limit greater than 50		Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays		
			Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity		
Highly Organic Soils			Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils		



Plasticity chart
for laboratory classification of fine grained soils

Note: 1 Soils possessing characteristics of two groups are designated by combinations of group symbols (eg. GW-GC, well graded gravel-sand mixture with clay fines).
2 Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.

LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record		Standing water level. Time delay following completion of drilling may be shown. Extent of borehole collapse shortly after drilling. Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES U50 DB DS ASB ASS SAL	Soil sample taken over depth indicated, for environmental analysis. Undisturbed 50mm diameter tube sample taken over depth indicated. Bulk disturbed sample taken over depth indicated. Small disturbed bag sample taken over depth indicated. Soil sample taken over depth indicated, for asbestos screening. Soil sample taken over depth indicated, for acid sulfate soil analysis. Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual show blows per 150mm penetration. 'R' as noted below.
	N_c = 5 7 3 R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of Undrained Shear Strength. Photoionisation detector reading in ppm (Soil sample heads pace test).
Moisture (Cohesive Soils) (Cohesionless)	MC > PL MC ≈ PL MC < PL D M W	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. DRY – Runs freely through fingers. MOIST – Does not run freely but no free water visible on soil surface. WET – Free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt H ( )	VERY SOFT – Unconfined compressive strength less than 25kPa SOFT – Unconfined compressive strength 25-5 0kPa FIRM – Unconfined compressive strength 50-1 00kPa STIFF – Unconfined compressive strength 100- 200kPa VERY STIFF – Unconfined compressive strength 200- 400kPa HARD – Unconfined compressive strength greater than 400kPa Bracketed symbol indicates estimated consistency based o n tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (ID) Range (%)** / **SPT ' N' Value Range (Blows/300mm)** Very Loose <15 / 0-4 Loose 15-35 / 4-10 Medium Dense 35-65 / 10-30 Dense 65-85 / 30-50 Very Dense >85 / >50 Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300 250	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise
Remarks	'V' bit 'TC' bit T_{60}	Hardened steel 'V' shaped bit. Tungsten carbide wing bit. Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

LOG SYMBOLS CONTINUED

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining and Geomechanics Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	Is (50) MPa	FIELD GUIDE
Extremely Low:	EL	0.03	Easily remoulded by hand to a material with soil properties.
Very Low:	VL	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.
Low:	L	0.3	A piece of core 150 mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
Medium Strength:	M	1	A piece of core 150 mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
High:	H	3	A piece of core 150 mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
Very High:	VH	10	A piece of core 150 mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
Extremely High:	EH		A piece of core 150 mm long x 50mm dia. is very difficult to break with h and-held hammer . Rings when struck with a hammer.

ROCK STRENGTH

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to (i.e. relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Iron stained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	

Appendix D: Laboratory Reports & COC Documents

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Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 168694

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Brendan Page

Sample log in details:

Your Reference:	**E30431KP, Greystanes**
No. of samples:	20 Soils
Date samples received / completed instructions received	06/06/2017 / 06/06/2017

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	15/06/17 / 15/06/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168694-1	168694-3	168694-5	168694-7	168694-9
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0-0.1	0.05-0.2	0-0.1	0.5-0.95	0.05-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	100	116	114	113	115

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168694-1	168694-3	168694-5	168694-7	168694-9
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0-0.1	0.05-0.2	0-0.1	0.5-0.95	0.05-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	09/06/2017	09/06/2017	09/06/2017	09/06/2017	09/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	140	<100	<100	300
TRHC$_{29}$ - C$_{36}$	mg/kg	150	440	<100	<100	630
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	150	440	110	<100	730
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	440	<100	<100	660
Total +ve TRH (>C10-C40)	mg/kg	150	870	110	<50	1,400
Surrogate o-Terphenyl	%	85	78	83	75	86

PAHs in Soil Our Reference: Your Reference	UNITS ----------	168694-1 BH1	168694-3 BH2	168694-5 BH3	168694-7 BH4	168694-9 BH5
Depth	- ----------	0-0.1	0.05-0.2	0-0.1	0.5-0.95	0.05-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	09/06/2017	09/06/2017	09/06/2017	09/06/2017	09/06/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	<0.1	0.2
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.5
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.5
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.4
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	0.1	<0.05	<0.05	2.6
Surrogate p-Terphenyl-d14	%	96	114	98	101	100

Organochlorine Pesticides in soil				
Our Reference:	UNITS	168694-1	168694-5	168694-7
Your Reference	----------	BH1	BH3	BH4
	-			
Depth	----------	0-0.1	0-0.1	0.5-0.95
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	109	98	99

Organophosphorus Pesticides				
Our Reference:	UNITS	168694-1	168694-5	168694-7
Your Reference	----------	BH1	BH3	BH4
Depth	- ----------	0-0.1	0-0.1	0.5-0.95
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	109	98	99

PCBs in Soil				
Our Reference:	UNITS	168694-1	168694-5	168694-7
Your Reference	----------	BH1	BH3	BH4
	-			
Depth	----------	0-0.1	0-0.1	0.5-0.95
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	109	98	99

Acid Extractable metals in soil						
Our Reference:	UNITS	168694-1	168694-3	168694-5	168694-7	168694-9
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	- ----------	0-0.1	0.05-0.2	0-0.1	0.5-0.95	0.05-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	42	52	15	110	12
Copper	mg/kg	18	24	22	54	57
Lead	mg/kg	22	10	13	3	22
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	49	47	14	90	34
Zinc	mg/kg	84	45	59	36	49

Acid Extractable metals in soil		
Our Reference:	UNITS	168694-11
Your Reference	----------	DupJDC1
Depth	- ----------	-
Date Sampled		3/06/2017
Type of sample		Soil
Date prepared	-	08/06/2017
Date analysed	-	08/06/2017
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	38
Copper	mg/kg	17
Lead	mg/kg	21
Mercury	mg/kg	<0.1
Nickel	mg/kg	44
Zinc	mg/kg	90

Misc Inorg - Soil						
Our Reference:	UNITS	168694-12	168694-13	168694-16	168694-17	168694-18
Your Reference	---------- -	BH1	BH1	BH3	BH3	BH4
Depth	----------	0-0.1	0.5-1	0.8-1.0	1.8-2	0-0.1
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/06/2017	09/06/2017	09/06/2017	09/06/2017	09/06/2017
Date analysed	-	09/06/2017	09/06/2017	09/06/2017	09/06/2017	09/06/2017
pH 1:5 soil:water	pH Units	6.5	5.1	7.1	5.8	6.3
Chloride, Cl 1:5 soil:water	mg/kg	20	380	<10	130	10
Sulphate, SO4 1:5 soil:water	mg/kg	10	390	20	270	20
Resistivity in soil*	ohm m	140	17	150	35	130

Misc Inorg - Soil		
Our Reference:	UNITS	168694-19
Your Reference	---------- -	BH4
Depth	----------	0.8-1
Date Sampled		3/06/2017
Type of sample		Soil
Date prepared	-	09/06/2017
Date analysed	-	09/06/2017
pH 1:5 soil:water	pH Units	6.9
Chloride, Cl 1:5 soil:water	mg/kg	10
Sulphate, SO4 1:5 soil:water	mg/kg	30
Resistivity in soil*	ohm m	200

CEC Our Reference: Your Reference	UNITS ---------- -	168694-13 BH1	168694-18 BH4
Depth	----------	0.5-1	0-0.1
Date Sampled		3/06/2017	3/06/2017
Type of sample		Soil	Soil
Date prepared	-	09/06/2017	09/06/2017
Date analysed	-	09/06/2017	09/06/2017
Exchangeable Ca	meq/100g	0.7	8.1
Exchangeable K	meq/100g	0.1	0.6
Exchangeable Mg	meq/100g	4.3	4.0
Exchangeable Na	meq/100g	0.76	0.16
Cation Exchange Capacity	meq/100g	5.9	13

Texture and Salinity*						
Our Reference:	UNITS	168694-12	168694-13	168694-16	168694-17	168694-18
Your Reference	---------- -	BH1	BH1	BH3	BH3	BH4
Depth	----------	0-0.1	0.5-1	0.8-1.0	1.8-2	0-0.1
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Electrical Conductivity 1:5 soil:water	µS/cm	70	580	66	290	78
Texture Value	-	9.0	7.0	8.0	8.0	9.0
TEXTURE	-	Clay Loam	Medium Clay	Light Medium Clay	Light Medium Clay	Clay Loam
ECe	dS/m	<2	4	<2	2	<2
Class	-	NON SALINE	MODERATELY SALINE	NON SALINE	SLIGHTLY SALINE	NON SALINE

Texture and Salinity*		
Our Reference:	UNITS	168694-19
Your Reference	---------- -	BH4
Depth	----------	0.8-1
Date Sampled		3/06/2017
Type of sample		Soil
Date prepared	-	08/06/2017
Date analysed	-	08/06/2017
Electrical Conductivity 1:5 soil:water	µS/cm	49
Texture Value	-	9.0
TEXTURE	-	Clay Loam
ECe	dS/m	<2
Class	-	NON SALINE

Moisture Our Reference: Your Reference	UNITS ---------- -	168694-1 BH1	168694-3 BH2	168694-5 BH3	168694-7 BH4	168694-9 BH5
Depth	----------	0-0.1	0.05-0.2	0-0.1	0.5-0.95	0.05-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Date analysed	-	09/06/2017	09/06/2017	09/06/2017	09/06/2017	09/06/2017
Moisture	%	9.1	5.3	14	15	11

Moisture Our Reference: Your Reference	UNITS ---------- -	168694-11 DupJDC1
Depth	----------	-
Date Sampled		3/06/2017
Type of sample		Soil
Date prepared	-	08/06/2017
Date analysed	-	09/06/2017
Moisture	%	8.4

Asbestos ID - soils						
Our Reference:	UNITS	168694-1	168694-3	168694-5	168694-7	168694-9
Your Reference	---------- -	BH1	BH2	BH3	BH4	BH5
Depth	----------	0-0.1	0.05-0.2	0-0.1	0.5-0.95	0.05-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	14/06/2017	14/06/2017	14/06/2017	14/06/2017	14/06/2017
Sample mass tested	g	Approx. 35g	Approx. 55g	Approx. 45g	Approx. 65g	Approx. 65g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Alternatively determined by colourimetry/turbidity using Discrete Analyer.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA 22nd ED 2510 and Rayment & Lyons. Resistivity is calculated from Conductivity.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
INORG-123	Determined using a "Texture by Feel" method.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Date analysed	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	168694-1	<25 || <25	LCS-2	106%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	168694-1	<25 || <25	LCS-2	106%
Benzene	mg/kg	0.2	Org-016	<0.2	168694-1	<0.2 || <0.2	LCS-2	84%
Toluene	mg/kg	0.5	Org-016	<0.5	168694-1	<0.5 || <0.5	LCS-2	106%
Ethylbenzene	mg/kg	1	Org-016	<1	168694-1	<1 || <1	LCS-2	112%
m+p-xylene	mg/kg	2	Org-016	<2	168694-1	<2 || <2	LCS-2	115%
o-Xylene	mg/kg	1	Org-016	<1	168694-1	<1 || <1	LCS-2	115%
naphthalene	mg/kg	1	Org-014	<1	168694-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	108	168694-1	100 || 105 || RPD: 5	LCS-2	118%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Date analysed	-			09/06/2017	168694-1	09/06/2017 || 09/06/2017	LCS-2	09/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	168694-1	<50 || <50	LCS-2	97%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	168694-1	<100 || <100	LCS-2	97%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	168694-1	150 || 160 || RPD: 6	LCS-2	91%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	168694-1	<50 || <50	LCS-2	97%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	168694-1	150 || 150 || RPD: 0	LCS-2	97%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	168694-1	<100 || <100	LCS-2	91%
Surrogate o-Terphenyl	%		Org-003	81	168694-1	85 || 84 || RPD: 1	LCS-2	89%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Date analysed	-			09/06/2017	168694-1	09/06/2017 || 09/06/2017	LCS-2	09/06/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	LCS-2	100%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	LCS-2	98%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	LCS-2	106%
Anthracene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	LCS-2	125%
Pyrene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	LCS-2	126%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	LCS-2	111%
Benzo(b,j +k)fluoranthene	mg/kg	0.2	Org-012	<0.2	168694-1	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	168694-1	<0.05 || <0.05	LCS-2	113%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	105	168694-1	96 || 105 || RPD: 9	LCS-2	118%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Date analysed	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
HCB	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	81%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	93%
Heptachlor	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	99%
delta-BHC	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	93%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	96%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	93%
Dieldrin	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	105%
Endrin	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	98%
pp-DDD	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	99%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	LCS-2	79%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	100	168694-1	109 || 78 || RPD: 33	LCS-2	120%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Date analysed	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	LCS-2	85%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	LCS-2	80%
Dimethoate	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	LCS-2	88%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	LCS-2	99%
Malathion	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	LCS-2	77%
Parathion	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	LCS-2	107%
Ronnel	mg/kg	0.1	Org-008	<0.1	168694-1	<0.1 || <0.1	LCS-2	94%
Surrogate TCMX	%		Org-008	100	168694-1	109 || 78 || RPD: 33	LCS-2	99%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Date analysed	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	168694-1	<0.1 || <0.1	LCS-2	105%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	168694-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	100	168694-1	109 || 78 || RPD: 33	LCS-2	99%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-7	08/06/2017
Date analysed	-			08/06/2017	168694-1	08/06/2017 || 08/06/2017	LCS-7	08/06/2017
Arsenic	mg/kg	4	Metals-020	<4	168694-1	<4 || <4	LCS-7	104%
Cadmium	mg/kg	0.4	Metals-020	<0.4	168694-1	<0.4 || <0.4	LCS-7	95%
Chromium	mg/kg	1	Metals-020	<1	168694-1	42 || 32 || RPD: 27	LCS-7	100%
Copper	mg/kg	1	Metals-020	<1	168694-1	18 || 17 || RPD: 6	LCS-7	102%
Lead	mg/kg	1	Metals-020	<1	168694-1	22 || 22 || RPD: 0	LCS-7	92%
Mercury	mg/kg	0.1	Metals-021	<0.1	168694-1	<0.1 || <0.1	LCS-7	103%
Nickel	mg/kg	1	Metals-020	<1	168694-1	49 || 41 || RPD: 18	LCS-7	93%
Zinc	mg/kg	1	Metals-020	<1	168694-1	84 || 85 || RPD: 1	LCS-7	94%
QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/06/2017	[NT]	[NT]	LCS-7	09/06/2017
Date analysed	-			09/06/2017	[NT]	[NT]	LCS-7	09/06/2017
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-7	102%
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	LCS-7	101%
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	LCS-7	111%
Resistivity in soil*	ohm m	1	Inorg-002	<1.0	[NT]	[NT]	[NR]	[NR]
QUALITY CONTROL CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/06/2017	[NT]	[NT]	LCS-7	09/06/2017
Date analysed	-			09/06/2017	[NT]	[NT]	LCS-7	09/06/2017
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-7	102%
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-7	102%
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-7	99%
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-7	99%

QUALITY CONTROL Texture and Salinity*	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/06/2017	[NT]	[NT]	LCS-7	09/06/2017
Date analysed	-			09/06/2017	[NT]	[NT]	LCS-7	09/06/2017
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	LCS-7	100%
Texture Value	-		INORG-123	[NT]	[NT]	[NT]	[NR]	[NR]
Class	-		INORG-123	[NT]	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Misc Inorg - Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	168694-12	09/06/2017 || 09/06/2017
Date analysed	-	168694-12	09/06/2017 || 09/06/2017
pH 1:5 soil:water	pH Units	168694-12	6.5 || 6.4 || RPD: 2
Chloride, Cl 1:5 soil:water	mg/kg	168694-12	20 || 10 || RPD: 67
Sulphate, SO4 1:5 soil:water	mg/kg	168694-12	10 || 10 || RPD: 0
Resistivity in soil*	ohm m	168694-12	140 || 110 || RPD: 24

Report Comments:

MISC_INORG_DRY:
Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample.
Envirolab recommends supplying
40-50g of sample in its own container.
Note: Samples 168694-3, 5, 7 & 9 were sub-sampled from jars and Sample 168694-1 were sub-sampled from bag provided by the client.

Asbestos ID was analysed by Approved Identifier: Lucy Zhu
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Brendan Page

Sample Login Details	
Your Reference	E30431KP, Greystanes
Envirolab Reference	**168694**
Date Sample Received	06/06/2017
Date Instructions Received	06/06/2017
Date Results Expected to be Reported	**15/06/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	20 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	12.7
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Chloride, Cl 1:5 soil:water*	*pH 1:5 soil:water*	*Resistivity in soil**	*Sulphate, SO4 1:5 soil:water*	*CEC*	*Texture and Salinity**	*Asbestos ID - soils*	*On Hold*
BH1-0-0.1	✓	✓	✓	✓	✓	✓	✓							✓	
BH1-0.5-0.95															✓
BH2-0.05-0.2	✓	✓	✓				✓							✓	
BH2-0.5-0.95															✓
BH3-0-0.1	✓	✓	✓	✓	✓	✓	✓							✓	
BH3-1.5-1.95															✓
BH4-0.5-0.95	✓	✓	✓	✓	✓	✓	✓							✓	
BH4-1.5-1.95															✓
BH5-0.05-0.3	✓	✓	✓				✓							✓	
BH5-0.5-0.95															✓
DupJDC1							✓								
BH1-0-0.1								✓	✓	✓	✓		✓		
BH1-0.5-1								✓	✓	✓	✓	✓	✓		
BH1-1.8-2															✓
BH3-0-0.1															✓
BH3-0.8-1.0								✓	✓	✓	✓		✓		
BH3-1.8-2								✓	✓	✓	✓		✓		
BH4-0-0.1								✓	✓	✓	✓	✓	✓		
BH4-0.8-1								✓	✓	✓	✓		✓		
BH4-1.8-2															✓

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E30431KP	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067	Date Results Required: STANDARD	MACQUARIE PARK, NSW 2113
P: (02) 99106200		P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201	Page: 1 of 1	Attention: Brendan Page
Attention: Aileen		

Location: Greystanes

Sampler: KS

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6a	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos	Aggressivity Suite	ECe (Kuhe)	CEC
3/6/2017	1	BH1	0-0.1	G, A	0	Fill				X								
	2	↓	0.5-0.95			S. Silty Clay												
* See Note	3	BH2	0-0.1			Fill		X										
	4	↓	0.5-0.95			S. Silty Clay												
	5	BH3	0-0.1			Fill				X								
	6	↓	1.5-1.95			S. Silty Clay												
	7	BH4	0.5-0.95			Fill				X								
	8	↓	1.5-1.95			S. Silty Clay												
* See Note	9	BH5	0-0.1			Fill		X										
	10	↓	0.5-0.95			S. Silty Clay												
-	11	DUP1001	-	-	-	-					X							
3/6/2017	12	BH1	0-0.1	P	-	Fill										X	X	
	13		0.5-1			S. Silty Clay										X	X	X
	14	↓	1.8-2			↓												
	15	BH3	0-0.1			Fill												
	16		0.8-1			↓										X	X	
	17	↓	1.8-2			S. Silty Clay										X	X	
	18	BH4	0-0.1			Fill										X	X	X
	19		0.8-1			↓										X	X	
	20	↓	1.8-2			S. Silty Clay.												

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 165604

Date Received: 6/6

Time Received: 17:00

Received by: VAC1

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Remarks (comments/detection limits required):
EIS Job no. is E30431KP.

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
Jake Cashman	6/6/2017	2.45pm	James	6/6

* Note: Depths on sample jars + bags were mislabelled. Please report depths as 0.05-0.2 for BH2, and 0.05-0.3 for BH5.

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 168694-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Brendan Page

Sample log in details:

Your Reference:	**E30431KP, Greystanes**
No. of samples:	Additional Testing on 1 Soil
Date samples received / completed instructions received	06/06/2017 / 23/06/17

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	23/06/17 / 23/06/17
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Misc Soil - Inorg		
Our Reference:	UNITS	168694-A-7
Your Reference	---------- -	BH4
Depth	----------	0.5-0.95
Date Sampled		3/06/2017
Type of sample		Soil
Date prepared	-	23/06/2017
Date analysed	-	23/06/2017
Hexavalent Chromium, Cr^{6+}	mg/kg	<1

Method ID	Methodology Summary
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically.

QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			23/06/2017	[NT]	[NT]	LCS-1	23/06/2017
Date analysed	-			23/06/2017	[NT]	[NT]	LCS-1	23/06/2017
Hexavalent Chromium, Cr^{6+}	mg/kg	1	Inorg-024	<1	[NT]	[NT]	LCS-1	91%

Report Comments:

Asbestos ID was analysed by Approved Identifier: Lucy Zhu
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

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Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: Katrina Taylor <KTaylor@jkgroup.net.au>
Sent: Friday, 23 June 2017 11:26 AM
To: Simon Song; Aileen Hie
Cc: Brendan Page
Subject: Same day Hexavalent Chromium analysis on soil
Attachments: 168694.Excel.xlsx

Simon / Aileen,

-7

Could you please undertake a hexavalent chromium analysis on the sample BH4 0.5-0.95 on a same day turnaround. Envirolab report ref: 168694.

Please let me know if this is outside the holding time for this analysis, however we will still go ahead with it.

Thank you.

Envirolab Ref: 168694A
Due: 23/6/17
Same day T/A.

Regards,

Katrina Taylor
Environmental Scientist

T: +612 9888 5000
F: +612 9888 5001
KTaylor@jkgroup.net.au
www.jkgroup.net.au

ENVIRONMENTAL INVESTIGATION SERVICES
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113

Appendix E: Report Explanatory Notes

STANDARD SAMPLING PROCEDURE (SSP)

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by EIS. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the EIS job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-1993[14].
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
  - Phosphate free detergent (Decon 90);
  - Potable water;
  - Stiff brushes; and
  - Plastic sheets.
- Ensure the decontamination materials are clean prior to proceeding with the decontamination.
- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.

[14] Standards Australia, (1993), *Geotechnical Site Investigations.* (AS1726-1993)

- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.
- Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
  - Stericup single-use filters (for heavy metals samples);
  - Bucket with volume increments;
  - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
  - Bucket with volume increments;
  - Flow cell;
  - pH/EC/Eh/Temperature meters;
  - Plastic drums used for transportation of purged water;
  - Esky and ice;
  - Nitrile gloves;
  - Distilled water (for cleaning);
  - Electronic dip meter;
  - Low flow peristaltic pump and associated tubing; and
  - Groundwater sampling forms.

- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements specified by the laboratory and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice.
- At the end of each water sampling complete a chain of custody form for samples being sent to the laboratory.

Decontamination Procedures for Groundwater Sampling Equipment

- All equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[15] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[16].

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;

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[15] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[16] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide.*

- All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

SCREENING CRITERIA DEFINITIONS

The following definitions have been adopted based on Schedule B(1) of NEPM (2013) and are relevant to Tier 1 screening criteria adopted for contamination assessments.

Health investigation levels (HILs) have been developed for a broad range of metals and organic substances. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use. Site-specific conditions should determine the depth to which HILs apply for other land uses.

Health screening levels (HSLs) have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures. They apply to different soil types, and depths below surface to >4 m.

Ecological investigation levels (EILs) have been developed for selected metals and organic substances and are applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and land use scenarios and generally apply to the top 2 m of soil.

Ecological screening levels (ESLs) have been developed for selected petroleum hydrocarbon compounds and total petroleum/recoverable hydrocarbon (TPH/TRH) fractions and are applicable for assessing risk to terrestrial ecosystems. ESLs broadly apply to coarse- and fine-grained soils and various land uses. They are generally applicable to the top 2 m of soil.

Groundwater investigation levels (GILs) are the concentrations of a contaminant in groundwater above which further investigation (point of extraction) or a response (point of use) is required. GILs are based on Australian water quality guidelines and drinking water guidelines and are applicable for assessing human health risk and ecological risk from direct contact (including consumption) with groundwater.

Management Limits for Petroleum hydrocarbons are applicable to petroleum hydrocarbon compounds only. They are applicable as screening levels following evaluation of human health and ecological risks and risks to groundwater resources. They are relevant for operating sites where significant sub-surface leakage of petroleum compounds has occurred and when decommissioning industrial and commercial sites.

Interim soil vapour health investigation levels (interim HILs) have been developed for selected volatile organic chlorinated compounds (VOCCs) and are applicable to assessing human health risk by the inhalational pathway. They have interim status pending further scientific work on volatile gas modelling from the sub-surface to building interiors for chlorinated compounds.

Appendix F: Data (QA/QC) Evaluation

DATA (QA/QC) EVALUATION

INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 6.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this assessment is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	DUPJDC1 (primary sample BH1, 0-0.1m)	Approximately 20% of primary samples	Heavy metals

The results for the field QA/QC samples are detailed in the laboratory summary Table D attached to the assessment report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

Data Assessment Criteria

EIS adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be less than 50% RPD for concentrations greater than 10 times the PQL, less than 75% RPD for concentrations between five and 10 times the PQL and less than 100% RPD for concentrations that are less than five times the PQL. RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

DATA EVALUATION

Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance with the EIS SSP. The SSP was developed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997. Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

Laboratory PQLs

Appropriate PQLs were adopted for the analysis. All PQLs were above the SAC to enable a direct assessment against the Tier 1 criteria.

Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. All RPDs were within the acceptable range.

Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) and the results were considered to be acceptable for the purpose of this assessment.

There was one non-conformances reported for inorganic dry percent recovery in a sample. This were attributed to interference from high concentrations of analytes in the sample. EIS consider that these results do not affect the reliability of the dataset.

DATA QUALITY SUMMARY

EIS are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the assessment objectives.

Appendix G: Guidelines and Reference Documents

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

CRC Care, (2017). Technical Report No. 39 – Risk-based management and guidance for benzo(a)pyrene

Contaminated Land Management Act 1997 (NSW)

NSW EPA / Department of Urban Affairs and Planning, (1998). Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land

NSW EPA, (2006). Guidelines for the NSW Site Auditor Scheme, 2nd Edition

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997

National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)