

Former Nursery and Track



Partly demolished greenhouse.



Partly demolished shed and former dwelling on level top bench, Lot 521.



Former nursery benched areas.



Farm dam in southern portion of former nursery.



Farm dam in southern portion of former nursery.

Former Quarry



Paddock area on Lot 521.



Bitumen and gravel access road into Nursery through the former quarry extents.



Paddock area on Lot 521.



Disturbed area north of access track from Hakone Road on Lot 54.



Disturbed area south of access track on Hakone Road, Lot 54.



Embankment on southern edge of landfill, Lot 54.



Dumped rubbish at southern edge of Lot 54, northern edge of Lot 51.

Former Landfill



Main benched area of former quarry/landfill.



Partially exposed concrete pipe on edge of drainage swale in main benched area of former quarry/landfill.



Surface rubbish dumped in lower irregular area of former quarry/landfill.



Surface rubbish (roadworks) dumped in lower irregular area of former quarry/landfill.



Piles of rubbish in lower irregular quarry area on track eastern margin.



Example of fill exposed in test pit spoil

Eastern Forested and Track



Gate and access track from Hakone Road.



Stockpiles of former quarry waste on edge of main track from Hakone Road, Lot 55.

Southern Forested



Illegal dumping on eastern edge of southern forested Lot 4.



Illegal dumping on eastern edge of southern forested Lot 4.

Former Rural-Residential



Old driveway and dirt access track into Lot 51. Joins up to landfill.



Old driveway into Lot 52.



Cut pad of former greenhouses on Lot 51, and illegal dumping.



Dam, and fill upslope exposed in ETP75, Lot 51.



Fibro cement sheeting sampled with SS92 near dam, Lot 51.

Eastern Boundary Track



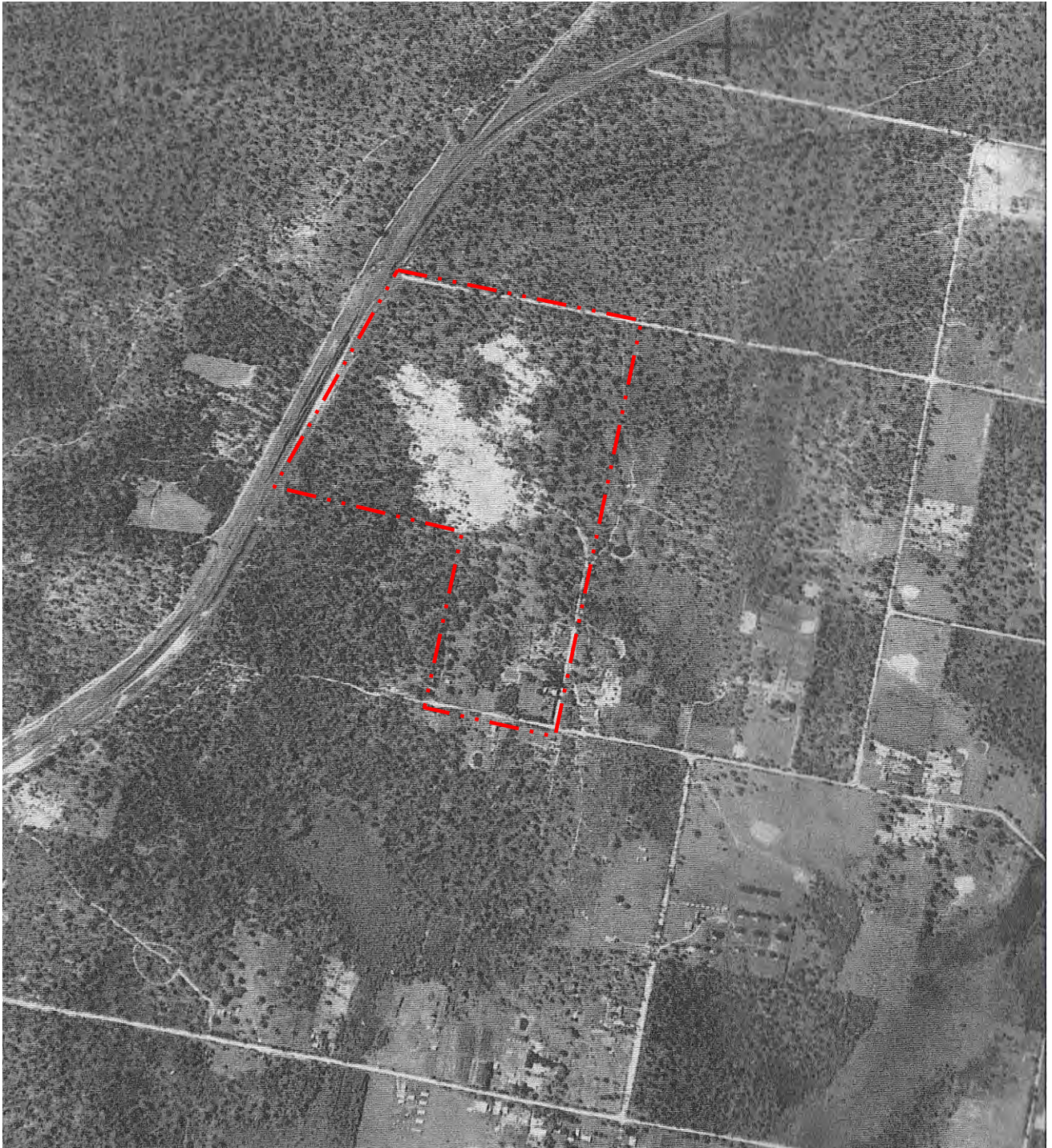
Dirt drive comprising Lot 1 DP375712 and Lot 1 DP371647.




Construction waste being dumped on western side of drive, onto Lot 52.

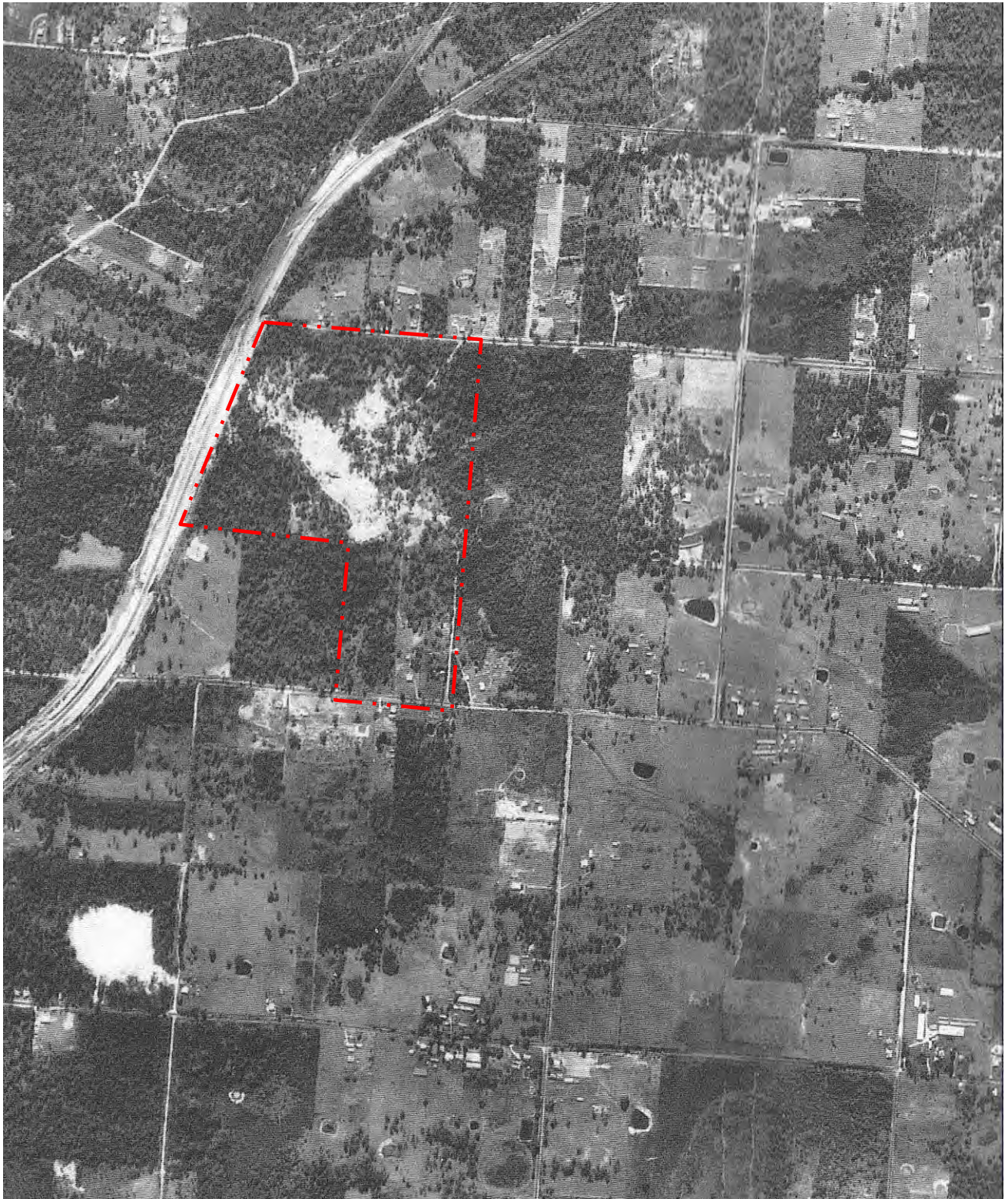
Appendix B

Aerial Photographs




Approximate Extent of Stage 2 ESA Investigation Area

| | | | | |
|---------------|----------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------|
| drawn | SD |  | client: Wyong Shire Council | |
| approved | MD | | project: Proposed Warnervale Town Centre, Sparks Road, Woongarra, NSW Stage 2 Environmental Site Assessment | |
| date | 31/3/08 | | | |
| scale | NTS | | title: Aerial Photograph | |
| original size | A4 | | project no: GEOTKARI02021AA | figure no: 1954 |




Approximate Extent of Stage 2 ESA Investigation Area

| | | | | |
|---------------|----------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------|
| drawn | SD |  | client: Wyong Shire Council | |
| approved | MD | | project: Proposed Warnervale Town Centre, Sparks Road, Woongarra, NSW Stage 2 Environmental Site Assessment | |
| date | 31/03/08 | | | |
| scale | NTS | | title: Aerial Photograph | |
| original size | A4 | | project no: GEOTKARI02021AA | figure no: 1975 |




Approximate Extent of Stage 2 ESA Investigation Area

| | | | | | |
|---------------|-----------------|-------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------|------------------------|
| drawn | SD |  | client: | Wyong Shire Council | |
| approved | MD | | project: | Proposed Warnervale Town Centre, Sparks Road, Woongarra, NSW Stage 2 Environmental Site Assessment | |
| date | 31/03/08 | | title: | Aerial Photograph | |
| scale | NTS | | project no: | GEOTKARI02021AA | figure no: 1984 |
| original size | A4 | | | | |



Approximate Extent of Stage 2 ESA Investigation Area

| | | | | |
|---------------|----------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------|
| drawn | SD |  | client: Wyong Shire Council | |
| approved | | | project: Proposed Warnervale Town Centre, Sparks Road, Woongarra, NSW Stage 2 Environmental Site Assessment | |
| date | 22/11/07 | | | |
| scale | NTS | | title: Aerial Photograph | |
| original size | A4 | | project no: GEOTKARI02021AA | figure no: 1994 |

Appendix C

Borehole Logs

Borehole No. **EBH001**

Engineering Log - Borehole

Client: **WYONG SHIRE COUNCIL**

Principal:

Project: **WARNERVALE TOWN CENTRE**

Borehole Location: **See Figure -**

Sheet 1 of 1

Project No: **GEOTKARI02021AA**Date started: **13.9.2007**Date completed: **13.9.2007**

Logged by: **DH**

Checked by: **SD**

[illegible]

Borehole No. **EBH002**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.9.2007**

Principal:

Date completed: **13.9.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| | | | | |
|----------------------------------------|--|-------------------|-------------|------------------|
| drill model and mounting: MOBILE DRILL | | Easting: 356768 | slope: -90° | R.L. Surface: 41 |
| hole diameter: 125 mm | | Northing: 6321490 | bearing: | datum: AHD |

| drilling information | | | | material substance | | | | | | | | |
|----------------------|----------------------|------------------|---------------------------------|--------------------|-----------------|-------------|--------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------|----------------------------------------------------------------|------------------------------------------|
| method | penetration 1 2 3 | support water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- meter kPa 100 200 300 400 | structure and additional observations |
| ADV | | NIL | E | | | | SM | TOPSOIL; Silty SAND, fine to medium grained sand, black and brown. | M | | | TOPSOIL |
| | | None Observed | | | | | CL | Sandy CLAY; Low to medium plasticity, pale grey, red-brown mottled. | M<PL | | | RESIDUAL |
| | | | E | | 40 | | | | | | | |
| | | | | | 1 | | | | | | | |
| | | | | | | | | Borehole EBH002 terminated at 1m | | | | |
| | | | | | 39 | | | | | | | |
| | | | | | 2 | | | | | | | |
| | | | | | 38 | | | | | | | |
| | | | | | 3 | | | | | | | |
| | | | | | 37 | | | | | | | |
| | | | | | 4 | | | | | | | |
| | | | | | 36 | | | | | | | |
| | | | | | 5 | | | | | | | |
| | | | | | 35 | | | | | | | |
| | | | | | 6 | | | | | | | |

| | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | support M mud C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N _r SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Borehole No. **EBH003**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.9.2007**

Principal:

Date completed: **13.9.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| drill model and mounting: MOBILE DRILL | | Easting: 356774 | | slope: -90° | | R.L. Surface: 44 | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hole diameter: 125 mm | | Northing: 6321466 | | bearing: | | datum: AHD | | |
| drilling information | | | | material substance | | | | |
| method | penetration 1 2 3 | support water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | |
| ADV | | NIL | | | | | CL | |
| | | None Observed | E | | | | | |
| | | | E | | | | | |
| | | | | 43 | 1 | | | |
| Borehole EBH003 terminated at 1m | | | | | | | | |
| | | | | 42 | 2 | | | |
| | | | | 41 | 3 | | | |
| | | | | 40 | 4 | | | |
| | | | | 39 | 5 | | | |
| | | | | 38 | 6 | | | |
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | | | | support M mud N nil C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow | | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N [*] SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | | classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit |
| | | | | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense | | | | |

Borehole No. **EBH004**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.9.2007**

Principal:

Date completed: **13.9.2007**

Project: **WARNERVALE TOWN CENTRE**





Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| | | | | |
|----------------------------------------|--|------------------|-------------|------------------|
| drill model and mounting: MOBILE DRILL | | Easting: 356740 | slope: -90° | R.L. Surface: 43 |
| hole diameter: 125 mm | | Northing 6321453 | bearing: | datum: AHD |

| drilling information | | | | material substance | | | | | | | | |
|----------------------------------|----------------------|------------------|---------------------------------|--------------------|-----------------|-------------|--------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------|----------------------------------------------------------------|------------------------------------------|
| method | penetration 1 2 3 | support water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- meter kPa 100 200 300 400 | structure and additional observations |
| ADV | | NIL | E | | | | CL | Sandy CLAY; Low to medium plasticity, orange-brown. | M=PL | | | RESIDUAL DUP 6 |
| | | None Observed | E | | 42 | | | | | | | |
| | | | | | 41 | | | | | | | |
| | | | | | 40 | | | | | | | |
| | | | | | 39 | | | | | | | |
| | | | | | 38 | | | | | | | |
| | | | | | 37 | | | | | | | |
| Borehole EBH004 terminated at 1m | | | | | | | | | | | | |

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| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | | support M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow | | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N [*] SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | | classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit | | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

Borehole No. **EBH005**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **27.9.2007**

Principal:

Date completed: **27.9.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| | | | | |
|--------------------------------------|--|------------------|-------------|------------------|
| drill model and mounting: HAND AUGER | | Easting: 356856 | slope: -90° | R.L. Surface: 48 |
| hole diameter: 50 mm | | Northing 6321132 | bearing: | datum: AHD |

| drilling information | | | | material substance | | | | | | | | |
|----------------------|----------------------|------------------|---------------------------------|--------------------|-----------------|-------------|--------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------|-------------------------------------------------------|------------------------------------------|
| method | penetration 1 2 3 | support water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- kPa 100 200 300 400 | structure and additional observations |
| HA | | NIL | E | | | | SM | TOPSOIL; Silty SAND, fine to medium grained sand, brown, some fine to medium grained gravel. | D | | | TOPSOIL |
| | | None Observed | E | | | | | SANDSTONE; Orange/brown. | D | | | HIGHLY WEATHERED BEDROCK |
| | | | | | 47 | 1 | | Borehole EBH005 terminated at 0.5m | | | | |
| | | | | | 46 | 2 | | | | | | |
| | | | | | 45 | 3 | | | | | | |
| | | | | | 44 | 4 | | | | | | |
| | | | | | 43 | 5 | | | | | | |
| | | | | | 42 | 6 | | | | | | |

| | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | support M mud N nil C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Borehole No. **EBH006**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.9.2007**

Principal:





Date completed: **13.6.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| drill model and mounting: MOBILE DRILL | | Easting: 356780 | | slope: -90° | | R.L. Surface: 36 | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| hole diameter: 125 mm | | Northing: 6321540 | | bearing: | | datum: AHD | | | | | | | | |
| drilling information | | | | material substance | | | | | | | | | | |
| method | penetration 1 2 3 | support water | notes samples, tests, etc | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- meter kPa | structure and additional observations | | | |
| ADV | | NIL | E | 35 | | SM | TOPSOIL; Sandy Clayey SILT, low plasticity, black, roots and organics. | M=PL | | | TOPSOIL. DUP 5 | | | |
| | | | | | | SC | Clayey SAND; Fine to medium grained sand, brown, pale yellow. | M/W | | | COLLUVIAL | | | |
| | | | E | | | CL | Sandy CLAY; Low to medium plasticity, orange-brown. | M=PL | | | RESIDUAL NO H.C ODOUR | | | |
| | | None Observed | | 34 | | CH | Sandy CLAY; Medium to high plasticity, pale grey and grey - green | M<PL | | | EXTREMELY WEATHERED CLAYSTONE. | | | |
| | | | E | | | | Borehole EBH006 terminated at 2.55m | | | | | | | |
| | | | | 33 | | | | | | | | | | |
| | | | | 32 | | | | | | | | | | |
| | | | | 31 | | | | | | | | | | |
| | | | | 30 | | | | | | | | | | |
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | | | support M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow | | | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N _r SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter B _s bulk sample E environmental sample R refusal | | | classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit | | | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense | | |

Borehole No. **EBH007**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.9.2007**

Principal:

Date completed: **13.9.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| drill model and mounting: MOBILE DRILL | | Easting: 356825 | | slope: -90° | | R.L. Surface: 44 | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hole diameter: 125 mm | | Northing: 6321477 | | bearing: | | datum: AHD | | | |
| drilling information | | | | material substance | | | | | |
| method | penetration 1 2 3 | support water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | | |
| ADV | | Nil | E | | | | SM | | |
| | | None Observed | | | | | CL | | |
| | | | E | | | | CL | | |
| | | | | 43 | 1 | | | | |
| Borehole EBH007 terminated at 1m | | | | | | | | | |
| | | | | 42 | 2 | | | | |
| | | | | 41 | 3 | | | | |
| | | | | 40 | 4 | | | | |
| | | | | 39 | 5 | | | | |
| | | | | 38 | 6 | | | | |
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | | | | support M mud C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow | | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N [*] SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | | classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit W _L liquid limit | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |

Borehole No. **EBH008**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.6.2007**

Principal:

Date completed: **13.9.2007**

Project: **WARNERVALE TOWN CENTRE**





Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| | | | | |
|----------------------------------------|--|-------------------|-------------|------------------|
| drill model and mounting: MOBILE DRILL | | Easting: 356838 | slope: -90° | R.L. Surface: 40 |
| hole diameter: 125 mm | | Northing: 6321526 | bearing: | datum: AHD |

| drilling information | | | | material substance | | | | | | | |
|----------------------|----------------------|------------------|---------------------------------|--------------------|-------------|--------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------|------------------------------------|----------------------------------------------------------|
| method | penetration 1 2 3 | support water | notes samples, tests, etc | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- kPa meter | structure and additional observations |
| ADV | | NIL | E | | | OL | Clayey SAND; Fine to medium grained, dark brown, roots and organics. | | | | TOPSOIL |
| | | | | | | CL | Gravelly Clayey SAND; Fine to coarse grained sand, orange-brown, quartz gravel. | | | | COLLUVIAL/RESIDUAL |
| | | | E | | | CL | Sandy Silty CLAY; Medium to high plasticity, pale grey, some red-brown mottling. | | | | RESIDUAL |
| | | | | 39 | 1 | | | | | | |
| | | | | 38 | 2 | | | | | | |
| | | | | 37 | 3 | | Some Siltsone and Sandstone Gravel. | | | | EXTREMELY WEATHERED BEDROCK NO GROUNDWATER INFLOW. |
| | | | | 36 | 4 | | Borehole EBH008 terminated at 4m | | | | |
| | | | | 35 | 5 | | | | | | |
| | | | | 34 | 6 | | | | | | |

| | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | support M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N _r SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Borehole No. **EBH009**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.9.2007**

Principal:





Date completed: **13.9.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| drill model and mounting: MOBILE DRILL | | Easting: 356794 | | slope: -90° | | R.L. Surface: 51.5 | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| hole diameter: 125 mm | | Northing: 6321411 | | bearing: | | datum: AHD | | | | | | | | |
| drilling information | | | | material substance | | | | | | | | | | |
| method | penetration 1 2 3 | support water | notes samples, tests, etc | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- meter kPa | structure and additional observations | | | |
| ADV | | NIL | | | | CL | BITUMEN; Sandy CLAY; Low to medium plasticity, pale grey and orange-brown mottled. | M<PL | | | BITUMEN PAVEMENT RESIDUAL DUP 7 | | | |
| | | None Observed | E | 51 | | CL | Sandy CLAY to Clayey SAND; Low to medium plasticity, red-brown. | M<PL | | | | | | |
| | | | E | 1 | | | Borehole EBH009 terminated at 1m | | | | | | | |
| | | | | 50 | | | | | | | | | | |
| | | | | 2 | | | | | | | | | | |
| | | | | 49 | | | | | | | | | | |
| | | | | 3 | | | | | | | | | | |
| | | | | 48 | | | | | | | | | | |
| | | | | 4 | | | | | | | | | | |
| | | | | 47 | | | | | | | | | | |
| | | | | 5 | | | | | | | | | | |
| | | | | 46 | | | | | | | | | | |
| | | | | 6 | | | | | | | | | | |
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | | | support M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow | | | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N [*] SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | | | classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit W _L liquid limit | | | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense | | |

Borehole No. **EBH010**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **13.9.2007**

Principal:





Date completed: **13.9.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| drill model and mounting: MOBILE DRILL | | Easting: 356828 | | slope: -90° | | R.L. Surface: 55 | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hole diameter: 125 mm | | Northing: 6321406 | | bearing: | | datum: AHD | | | |
| drilling information | | | | material substance | | | | | |
| method | penetration 1 2 3 | support water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | | |
| ADV | | NIL | E | | | | SM | | |
| | | None Observed | | | | | CL | | |
| | | | E | | | | CL | | |
| | | | E | | | | CL | | |
| | | | | 54 | 1 | | | | |
| Borehole EBH010 terminated at 1.5m | | | | | | | | | |
| | | | | 53 | 2 | | | | |
| | | | | 52 | 3 | | | | |
| | | | | 51 | 4 | | | | |
| | | | | 50 | 5 | | | | |
| | | | | 49 | 6 | | | | |
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | | | | support M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow | | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N _r SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | | classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |

Borehole No. **EBH011**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **14.9.2007**

Principal:





Date completed: **14.9.2007**

Project: **WARNERVALE TOWN CENTRE**

Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| drill model and mounting: MOBILE DRILL | | Easting: 357033 | | slope: -90° | | R.L. Surface: 46 | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| hole diameter: 125 mm | | Northing: 6321388 | | bearing: | | datum: AHD | | | | | | | | |
| drilling information | | | | material substance | | | | | | | | | | |
| method | penetration 1 2 3 | support water | notes samples, tests, etc | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- kPa meter | structure and additional observations | | | |
| ADT | | NIL | E | | | | FILL; Gravelly SAND, fine to medium grained, brown, fine to medium grained gravel. | D | | | FILL/TOPSOIL | | | |
| | | | | | | | | | | | NO H.C ODOUR | | | |
| | | None Observed | E | 45 | 1 | | SANDSTONE; Orange/pale grey. | D | | | EXTREMELY WEATHERED BEDROCK | | | |
| | | | | | | | | | | | | | | |
| | | | | 44 | 2 | | | | | | HIGHLY WEATHERED BEDROCK | | | |
| | | | E | | | | | | | | | | | |
| | | | | | | | Borehole EBH011 terminated at 2.5m | | | | | | | |
| | | | | 43 | 3 | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | 42 | 4 | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | 41 | 5 | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | 40 | 6 | | | | | | | | | |
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | | | support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow | | | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N [*] SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | | | classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit | | | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense | | |

Borehole No. **EBH012**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKARI02021AA**

Client: **WYONG SHIRE COUNCIL**

Date started: **14.9.2007**

Principal:

Date completed: **14.9.2007**


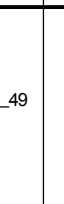

Project: **WARNERVALE TOWN CENTRE**





Logged by: **DH**

Borehole Location: **See Figure -**

Checked by: **SD**

| | | | | |
|----------------------------------------|--|------------------|-------------|--------------------|
| drill model and mounting: MOBILE DRILL | | Easting: 356961 | slope: -90° | R.L. Surface: 49.5 |
| hole diameter: 125 mm | | Northing 6321353 | bearing: | datum: AHD |

| drilling information | | | | material substance | | | | | | | | |
|----------------------|-----------------------------------------------------------------------------------|------------------|---------------------------------|--------------------|-----------------|-----------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------|------------------------------------|--------------------------------------------------------------------------------|
| method | penetration 1 2 3 | support water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro- kPa meter | structure and additional observations |
| ADT |  | NIL | E | | |  | | FILL; Gravelly SAND, fine to medium grained sand, brown, fine to medium grained gravel. | D | | | FILL/TOPSOIL |
| | | None Observed | E | 49 | |  | | SANDSTONE; Orange/pale grey. | D | | | EXTREMELY WEATHERED BEDROCK. HIGHLY WEATHERED BEDROCK. ADT REFUSAL AT 1M |
| | | | | 1 | | | | Borehole EBH012 terminated at 1m | | | | |
| | | | | | 48 | | | | | | | |
| | | | | | 2 | | | | | | | |
| | | | | | 47 | | | | | | | |
| | | | | | 3 | | | | | | | |
| | | | | | 46 | | | | | | | |
| | | | | | 4 | | | | | | | |
| | | | | | 45 | | | | | | | |
| | | | | | 5 | | | | | | | |
| | | | | | 44 | | | | | | | |
| | | | | | 6 | | | | | | | |

| | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT | support M mud N nil C casing penetration 1 2 3 4  water  10/1/98 water level on date shown  water inflow  water outflow | notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N ⁺ SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal | classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit | consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|