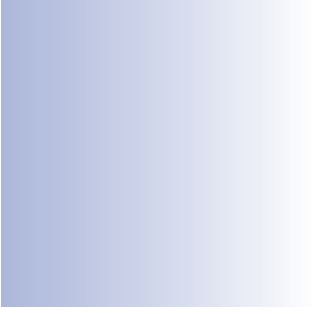
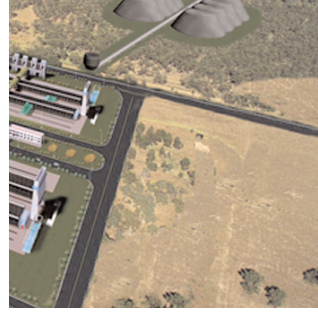
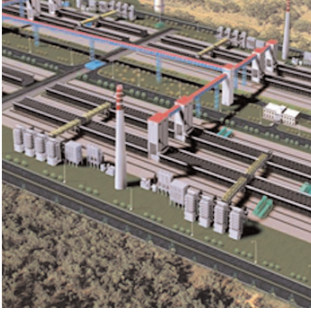
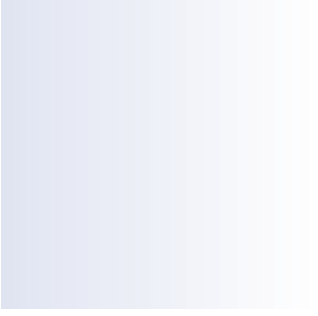


Appendix D Geology



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Appendix D Geology

- D.1 Site and Soil Characterisation**
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Appendix D.1
Site and Soil Characterisation

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Appendix D.1 Site and Soil Characterisation

Site ID/ Depth (m)	Terrain Unit	Soil Horizon	Soil Description	Soil pH (1:5 H ₂ O)	EC (1:5 H ₂ O) (mS/cm)	Dispersion Class No.	Comments/Soil Classification
CP1:-0- 0.15	Ks36	A1	Clay Loam to Light Clay (CL) medium plasticity, dark greyish brown (10YR4/2), weak fine nutty to blocky, crumbly to firm dry consistence (f.d.c.) 30% sub-rounded (s/r) stone to 25mm.	6.8	0.08	3(1)	Hardset surface with small cobbles and stone: Db1 13:- Vertic Subnatric-Mesonatric Brown Sodosol. Moderate strongly dispersive Highly saline Not sampled
0.15-0.3		B1	Clay (CH) high plasticity, brown (10YR4/3), strong medium to coarse blocky to prismatic very strong dry consistence (v.st.d.c), smooth ped fabric	7.6	0.52	2(2)	
0.5-0.7		B2	Clay (CH) high plasticity, yellowish brown (10YR5/8), massive (v.st.d.c), calcareous flecks	8.3	1.46	6	
0.7+		C	HW rock, with dense rock cobbles up to 20cm, underlain by weathered rock	-	-	-	
CP2:-0- 0.2	Ks36	A1/A2 (sporadic)	Fine sandy silt loam (SM-ML) low plasticity yellowish brown (10YR5/4) massive apedal crumbly to powdery	4.8	0.02	3(3)	Hardset loamy surface duplex soil with yellow-brown clay subsoils (Dy3.33-Db2.33); Hypocalcic Mottled-Subnatric or Mesonatric Brown Sodosol Mod. saline and dispersive Strongly alkaline and saline Strongly alkaline and saline
0.2-0.4		B1	Clay (CH) high plasticity yellowish brown (10YR5/8), onod strong medium to coarse blocky to prismatic (v.st.d.c) diffusely mottled grey brown along structure faces	7.5	0.82	2(2)	
0.5-0.7		B2	Clay (CH) high plasticity as above, weak fine to coarse blocky to prismatic tending to massive (v.st.d.c) with soft calcareous inclusions	8.6	1.18	6	
1.2-1.3		B-C	Silty clay (CH) high plasticity, light yellow brown and brown (10YR 6/4-5/3) massive, (v.st.d.c) effervescent	8.8	1.19	6	
CP3:-0- 0.05	Qa2(7- 8)	A1	Silty clay (CH) high plasticity dark grey brown (10YR4/2) thin weak self-mulching to fine blocky to prismatic, crumbly (f-st.d.c.)	7.4	0.35	5	Weak surface crust with fine close hexagonal surface cracks; uniform (cracking) clay (Ug5.15-Uf6.32):- Episodic – Endocalcareous Self-mulching Black Vertosol – Sodic Vertic Black Dermosol
0-0.5- 0.35		B1	Clay (CH) high plasticity, very dark grey brown (10YR3/2) moderate fine to medium blocky to prismatic (v.st.d.c.)	6.6	0.13	3(3)	
0.5-0.6		B21	Clay (CH) high plasticity dark grey brown (10YR4/2), weak, coarse blocky tending to massive (v.st.d.c.)	7.6	0.74	2(1)	

Appendix D.1 Site and Soil Characterisation

Site ID/ Depth (m)	Terrain Unit	Soil Horizon	Soil Description	Soil pH (1:5 H ₂ O)	EC (1:5 H ₂ O) (mS/cm)	Dispersion Class No.	Comments/Soil Classification
1.0-1.1		B22	Clay (CH) high plasticity, brown (10YR4/3) with weak effervescence and some CO ₃ concretions, massive (v.st.d.c.)	8.1	0.94	6	
CP4:- 0-0.2	Qa26	A1	Silt Loam (CL-ML) low plasticity, dark brown (7.5YR3/3) weak fine to medium polyhedral tending to massive (f.d.c.) crumbles easily	5.3	0.02	3(4)	Loamy surface brown duplex soil, (Db1.23); Subnatric or Mesonatric Brown Sodosol
0.2-0.4		A2 (Pale)	Clay Loam to Light Clay (CL) low to medium plasticity, brown (10YR4/3), weak fine to medium blocky to prismatic tending to massive (st.d.c.)	5.3	0.04	3(4)	Strongly acidic and slightly to mod.dispersive
0.6-0.8		B1	Clay (CH) high plasticity, brown (10YR4/3-4/4) weak medium blocky to prismatic tending to massive with depth (v.st.d.c.)	6.6	0.03	3(2)	Representative of 0.4-1.2m layer
1.2-1.4		B2-C	Sandy cCay (CL-CH) medium to high plasticity dark yellowish brown (10YR4/6) massive, (st.d.c.) with some s/r-s/a platy gravel	8.3	0.19	3(3)	
CP5:-0-0.2	Qa26	A11	Fine Sandy Loam (SC) just plastic, dark grey-brown (10YR4/3), massive apedal, crumbly friable to partly cohesive, (f.st.d.c.)	5.3	0.0	3(3)	Intensive small hummocky surface mounds due to biological activity, loose, not hard set sandy to loamy surface, brown duplex soils: (Db1.12):- Subnatric Brown Sodosol
0.2-0.4		A12	Fine Sandy Light Clay Loam (SC-CL) low plasticity, brown (10YR4/3), massive tending to weak medium prismatic, crumbly to friable and partly cohesive (f.d.c.)	5.6	0.01	3(4)	Slightly to mod. dispersive
0.6-0.7		B21	Clay (CH) high plasticity, dark yellowish brown (10YR4/4), weak to moderate medium blocky to prismatic tending to massive with depth (v.st.d.c.)	6.5	0.13	5	
1.3-1.4		B22	Clay (CL-CH) medium-high plasticity brown (7.5YR4/4) massive tending to weak fine prismatic, (v.st.d.c)	7.7	0.13	3(1)	
CP6:-0-0.15	Qa16	A1	Silty Clay Loam (CL-ML) low to medium plasticity, brown (10YR4/2), massive cohesive crumbly (st.d.c.)	5.5	0.06	3(2)	Loamy surface brown duplex soil, Db1.43: Subnatric or Mesonatric Brown Sodosol
0.15-0.25		A2 (Bleached horizon)	ClayLoam (CL) medium plasticity, light brownish grey to light grey (10YR6/2-7/2d), massive cohesive crumbly (v.st.d.c.)	5.2	0.16	2(2)	Strongly acidic and strongly dispersive

Appendix D.1 Site and Soil Characterisation

Site ID/ Depth (m)	Terrain Unit	Soil Horizon	Soil Description	Soil pH (1:5 H ₂ O)	EC (1:5 H ₂ O) (mS/cm)	Dispersion Class No.	Comments/Soil Classification
0.4-0.5		B1	Clay (CH) high plasticity, brown (10YR4/3), moderate fine nutty to medium blocky to prismatic (v.st.d.c.) becoming more massive below 0.5m	7.7	1.11	2(2)	Moderate saline and strongly dispersive
0.9-1.0		B21	Clay (CH) high plasticity, brown (10YR4/3), friable (f-st.m.c.) a few soft CO ₃ segregations.	8.4	1.60	2(1)	Highly saline and dispersive, mod. strongly alkaline
1.4-1.5		B22	Clay (CL-CH) medium to high plasticity, massive (v.st.d.c.) a few flecks of soft carbonate and some s/r CO ₃ concretions	8.3	1.16	2(2)	Highly saline and dispersive, mod. strongly alkaline
CP7:-0-0.1	Qa2(7-8)	A1	Clay (CL-CH) medium to high plasticity, very dark grey (10YR3/1) granular to weak fine blocky to prismatic, crumbly (st.d.c.)	6.5	0.26	3(1)	Thin weak self-mulching surface soil, no obvious surface cracking – (incipient cracking clay) Uf6.32 – Ug5.15: Sodic-Vertic Black Dermosol.
0.3-0.4		B1	Clay (CH) high plasticity very dark grey (10YR3/1), moderate strong, fine to medium blocky to prismatic (v.st.d.c.)	8.0	0.16	3(4)	Mod. dispersive
0.6-0.7		B2	Clay (CH) high plasticity, black (10YR 3/1), weak medium prismatic tending to massive (v.st.d.c.)	8.4	0.25	2(1)	Mod. dispersive, most likely sodic but not calcareous – represents 0.5-0.9m horizon
1.1-1.2 (0.9-1.24)		B-C	Clay (CH) high plasticity, brown (10YR4/3), massive, crumbly to brittle (st.d.c.)	7.8	0.53	3(4)	Mod. dispersive
CP8-0-0.1	Qa26	A	Silty Clay Loam (CL) low to medium plasticity, dark grey-brown (10YR4/2), massive apedal cohesive, crumbly (st.d.c.)	4.5	2.20	5	Very strongly saline and acidic, thin loamy surface brown duplex soil, Db1.13:- Db3.13, Vertic Mesonatric–Hypermatric Brown Sodosol
0.2-0.4		B1	Clay (CH) high plasticity brown (10YR 4/3), coarse blocky to prismatic (v.st.d.c) weak effervescence in soft CO ₃ segregations	8.5	1.07	2(2)	Strongly alkaline, saline and dispersive
0.6-0.8		B21	Clay (CH) high plasticity, brown (10YR4/3), strong fine nutty to fine to medium prismatic, (st.d.c.) tending to friable moist	9.2	1.23	2(2)	Very strongly alkaline, saline and dispersive
1.2-1.3		B22	Clay (CH) high plasticity, strong brown (7.5YR4/4) as above with some CO ₃ concretions (10-20mm), (st.d.c.)	9.2	1.07	2(2)	Very strongly alkaline, mod. saline and dispersive.
CP9:-0-0.25	Jp5(2-5)	A1	Loamy Sand (SM-SP) non-plastic, brown (7.5YR4/3), massive apedal, some weakly cohesive lumps (f.d.c.)	5.8	0.0	5	Sandy yellow-brown molted duplex soil Dy5.81; Bleached Mottled Sodic Yellow-Brown Kurosol

Appendix D.1 Site and Soil Characterisation

Site ID/ Depth (m)	Terrain Unit	Soil Horizon	Soil Description	Soil pH (1:5 H ₂ O)	EC (1:5 H ₂ O) (mS/cm)	Dispersion Class No.	Comments/Soil Classification
0.25-0.5		A2 (Bleached)	Fine to Medium-grained Sand (SM-SP) non plastic, white (7.5YR8/ld), light brown (7.5YR 6/4m), massive apedal, crumbly single-grain loose to partly cohesive (f.d.c)	6.1	0.0	5	
0.5-0.7		B-C	Sandy Light to Medium Clay (CL) medium plasticity, yellowish brown and grey mottled (10YR5/4-6/2), EW ferruginous clayey sandstone	5.1	0.33	2(1)	Strongly acidic and mod. dispersive
0.9-1.0		C	EW Rock-ferruginous clayey sandstone, orange, red and grey mottled (v..st.d.c.)	5.0	0.42	2(1)	Strongly acidic and mod. dispersive
CP10:-0-0.2	Jp45	A1	Loamy Sand (SP-SC) just plastic, dark brown (10YR3/3), apedal massive, crumbly cohesive (f.d.c.)	5.3	0.0	3(1)	Thick sandy surface mottled duplex soil (Dy4.61); Mottled Yellow-Brown Kurosol
0.3-0.5		A2 (Pale)	Silty Sand (SM-SP), non-plastic, dark-yellowish-brown (10YR4/6) diffusely mottled red and light-yellow brown (10YR6/4d)	4.7	0.01	3(2)	Strongly acidic, slightly to mod. dispersive fines
0.7-0.8		B-C	Clayey Gravel (GC) with (30%) somewhat silty fines of medium plasticity, with rounded Fe (laterite) gravel (5-15mm)	5.4	0.0	5	Strongly acidic clayey fines
1.0-1.1		C	EW Rock – Ferruginous clayey sandstone	5.6	0.0	5	
CP11:-0-0.25	Jp45	A1	Loamy Sand (SM-SP) non-plastic, brown (10YR4/3), massive apedal partly cohesive (st.d.c.) tending to crumbly and powdry, some s/r stone (3.8mm)	6.3	0.07	5	Mod. hard-set sandy surface, weak sandy surface brown duplex soil (Dy5.61-Db3.61):- Ferric Brown Kurosol.
0.4-0.6		A2-B	Loamy Sand, (SM-SP) dark yellowish brown (10YR3/4), non-plastic, massive apedal, crumbly friable to single grain and partly cohesive (st.d.c.)	4.4	0.12	5	Very strongly acidic silty fines
0.6-0.9		B-C	Loamy Gravel (GC) with 40% clayey fines of medium plasticity	5.0	0.01	5	Strongly acidic clayey fines

Appendix D.1 Site and Soil Characterisation

Site ID/ Depth (m)	Terrain Unit	Soil Horizon	Soil Description	Soil pH (1:5 H ₂ O)	EC (1:5 H ₂ O) (mS/cm)	Dispersion Class No.	Comments/Soil Classification
1.1-1.2		C	EW Rock – reddish brown ferruginous clayey sandstone,	5.5	0.01	5	Strongly acidic clayey fines
CP12:- 0.3-0.5	“D”	Fill	Fill-Gravelly Clay (GC-CH) with 50-60% clayey fines of high plasticity and (40-50%) weathered rock (sandstone) gravel	8.6	1.55	3(1)	Area disturbed by cutting and filling. Strongly alkaline and saline fill material.
0.8-0.9		C	HW Rock – platy shaley sandstone	8.9	1.15	2(1)	In situ weathered rock beneath the fill layer strongly alkaline and saline.
CP13-0- 02	Qa16	A1/A2 (Sporadic)	FineSsandy Silt Loam (CL-ML) low plasticity, brown (10YR4/3), apedal massive, with cohesive lumps (st.d.c.)	5.8	0.01	3(1)	Thin loamy surface brown duplex soil, (Db1.33); Subnatric OR Mesonatric Brown Sodosol.
0.4-0.5		B1	Clay (CH) high plasticity, dark brown (10YR4/3), weak to moderate fine to medium blocky to prismatic (v.st.d.c.)	7.0	0.50	2(3)	Representative of 0.2-0.5m layer; strongly dispersive
0.7-0.9		B21	Clay (CH) high plasticity, dark yellowish-brown (10YR4/4), weak to moderate, strong fine prismatic (v.st.d.c.) tending to massive.	8.8	1.28	2(2)	Strongly alkaline, saline and dispersive.
1.3-1.4		B22	Clay (CH) high plasticity, dark yellowish brown (10YR4/4), weak fine prismatic to medium blocky to prismatic (st.d.c.) tending to massive with depth.	8.5	1.00	2(2)	Strongly alkaline, saline and dispersive.

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Appendix D.2
Terrain Unit Descriptions and Assessment of
Engineering and Environmental Attributes

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Appendix D.2

Terrain Unit Descriptions and Assessment of Engineering and Environmental Attributes

Terrain Unit	Landform	Soils	Problem Soils	Salinity	ESP	Drainage Condition	Soil Dispersion	Excavation Condition	Permeability	Remarks
Qa2(7-8)	Gently inclined, undulating and locally moderately dissected alluvial plains, floodplains, prior stream levees and intermediate and higher terraces; slopes mostly <2%, locally steeper on slopes to drainage.	Mixed association of uniform (non-cracking) dark-coloured structured medium to heavy clay soils (Uf6.32), and crusty thin weak self-mulching dark-coloured (cracking) clay soils with alkaline mod. saline heavy clay subsoils (Ug51.5)	R1-R3	2-3	2	F3	1-2	1	L	These soils comprise cracking and incipient cracking clays; they are slightly to mod. dispersive and mostly mod. saline in the B1 and B2 horizons.

Appendix D.2

Terrain Unit Descriptions and Assessment of Engineering and Environmental Attributes

Geological Regime:- (Ks) Lower Cretaceous Stanwell Coal Measures; mudstone, arenite, claystone and coal.

Terrain Unit	Landform	Soils	Problem Soils	Salinity	ESP	Drainage Condtn.	Soil Dispersion	Excvtn. Condtn	Perm- eability	Remarks
Ks36	Gently undulating plains and rises with gently inclined planar to concave marginal slopes in the range 2-5%	Medium to deep thin loamy surface duplex soils with brown to yellowish-brown alkaline to strongly alkaline, saline and sodic heavy clay subsoils, (Db1.13-Db2.33 and Dy3.33)	R1	3	1-2	W-I	1-2	2	L	Slightly to mod. dispersive in the A - B1 horizons, strongly alkaline and highly saline in the deeper subsoil horizons
• “Da”	Land disturbed or modified by cutting and filling operations	Compacted cut and fill material	R2	1-3	N-3	W-I	N-1	2	L	Surficial soil conditions may vary within the area.
• “Di”	Land occupied by Stanwell Power Station facilities and associated infra-structure	Reworked and compacted cut and fill material mostly underlain by Stanwell Coal Measures rock types.	R1	3	1-3	W-I	N-1	2	L	Land modified by reworked material and imported fill

Appendix D.2

Terrain Unit Descriptions and Assessment of Engineering and Environmental Attributes

Geological Regime:- (Jp) Jurassic Precipice Sandstone; cross-bedded poorly sorted fine to very coarse-grained pebbly quartzose sandstone and laminated siltstone

Terrain Unit	Landform	Soils	Problem Soils	Salinity	ESP	Drainage Condtn.	Soil Dispersion	Excvtn. Condtn	Perm- eability	Remarks
Jp45	Undulating plains and low rises, and broadly rounded lower dissection slope interfluves with slopes in the range 5-10 %	Medium deep thick sandy surface acidic yellow-red-grey mottled duplex soils underlain by HW rock	L	1		W	1-2	2-3	M-H	Strongly acidic, the clayey B-C horizon are slightly to mod. dispersive
Jp5(2-5)	Irregular planar to shallow concave lower colluvial and erosional slopes (5-15%)	Shallow med. to coarse sand soils over HW rock (Uc2.12, 4.13), some occurrences of soil Type 5, as for unit Jp45	L	1	1-2	W-X	1-2	2-3	M-H	Bleached A2, strongly acidic throughout
Jp6(1-4)	Low irregular rounded low rises and hills with marginal slope within the range 10-25%	Shallow rocky soils in rocky outcrop areas; elsewhere, shallow to medium deep gravelly sandy loam or gradational gravelly loams over HW rock, (K-Um1.41)	L	1	N	W-X	N	3	H	Rapid surface water runoff with locally mod. severe surface sheet erosion where vegetation cleared; local sub-vertical rocky scarps
Jp7(1-4)	Steep irregular planar middle to upper hill and ridge slopes within the range 25-50%	Shallow rocky soils Type 1 and mainly shallow to medium deep gravelly loams, soil Type4 as for unit Jp6(1-4)	L	1	N	X	N	3	H	Rapid surface water runoff and sheet erosion; local subvertical low rocky scarps.

Appendix D.3
Laboratory Analytical Data Summary

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Appendix D.3 Laboratory Analytical Data Summary

	Site No.	S02	S02	S02	S02	S04	S04	S04	S05	S05	S05	S05	
	Depth (m)	0-0.15	0.15-0.3	0.3-0.45	0.5-0.7	0-0.2	0.25-0.40	0.5-0.8	0-0.1	0.25-0.6	0.7-1.2	1.4-1.8	
	Soil Type	Soil Type 5 in Terrain Unit "Da" (Ks45)				Soil Type 6 in Terrain Unit Ks36			Soil Type 6 in Terrain Unit "Da" (Qa16)				
pH (1:5 H₂O)	Unit-	5.3	4.3	4.9	6.7	5.0	5.1	6.6	4.8	6.2	6.8	6.8	
EC (1:5 H₂O)	dS/m	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.0	0.5	0.7	0.6	
Chloride	mg/kg	36	-	-	-	34	-	-	36	-	-	-	
Nitrate Nitrogen	mg/kg	2.5	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.9	0.0	0.0	
Phosphorus (P)	mg/kg	13.0	4.0	3.0	2.0	8.0	5.0	3.0	16.0	3.0	3.0	24.0	
Organic Matter	%	2.1	1.0	0.9	0.7	3.0	0.9	0.8	2.9	0.9	0.9	0.3	
Carbon/Nitrogen	Ratio	11	-	-	-	11	-	-	11	-	-	-	
Sulfur (S)	mg/kg	7	-	-	-	12	-	-	9	-	-	-	
Calcium (Ca)	mg/kg	876	610	2200	3100	996	490	1200	976	2100	2400	1300	
Magnesium Mg)	mg/kg	259	220	740	1000	409	260	1100	439	1300	1400	810	
Sodium (Na)	mg/kg	17	47	220	330	52	110	1100	77	1400	1800	1300	
Potassium (K)	mg/kg	338	120	250	230	198	93	140	268	210	200	180	
CEC - (ECEC)	meq/100g	7.3	5.2	18.4	25.2	8.8	5.1	17.7	9.3	25.1	27.9	14.5	
Ex. Sodium	meq/100g	0.07	0.20	0.96	1.44	0.23	0.48	4.78	0.33	6.09	7.83	5.65	
Ex. Potassium	meq/100g	0.86	0.31	0.64	0.59	0.51	0.24	0.36	0.69	0.54	0.51	0.46	
Ex. Calcium	meq/100g	4.37	3.04	10.98	15.47	4.97	2.45	5.99	4.87	10.48	11.98	6.49	
Ex. Magnesium	meq/100g	2.13	1.81	6.09	8.23	3.37	2.14	9.05	3.61	10.70	11.52	6.67	
ESP	%	1.0	3.8	5.2	5.6	2.5	9.3	23.7	3.5	21.9	24.6	29.5	
Ca/Mg	Ratio	2.05	1.68	1.80	1.88	1.48	1.14	0.66	1.35	0.98	1.04	0.97	
Copper (Cu)	mg/kg	2.4	-	-	-	3.2	-	-	3.5	-	-	-	
Zinc (Zn)	mg/kg	1.9	-	-	-	2.3	-	-	2.5	-	-	-	
Manganese (Mn)	mg/kg	388	-	-	-	258	-	-	488	-	-	-	
Iron (Fe)	mg/kg	240	-	-	-	390	-	-	480	-	-	-	
Boron (B)	mg/kg3	0.4	-	-	-	0.6	-	-	0.4	-	-	-	

Appendix D.3 Laboratory Analytical Data Summary

	Site No.	S06	S06	S06	S12	S12	S12	S13	S13	S13	S13	S13	
	Depth (m)	0-0.1	0.4-0.5	0.5-0.6	0-0.1	0.1-0.5	0.6-0.75	0-0.08	0.08-0.2	0.2-0.4	0.5-0.8	0.9-1.1	
	Soil Type	Soil Type 5 in Teerrain Unit Jp5(2-5)			Soil Type5 in Terrain Unit Jp45			Soil Type 6 in Terrain Unit Ks36					
pH (1:5 H₂O)	Unit-	4.9	5.8	5.8	5.5	4.6	4.3	4.9	4.5	4.8	5.8	7.8	
EC (1:5 H₂O)	dS/m	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.4	
Chloride	mg/kg	12	-	-	16	-	-	15	-	-	-	-	
Nitrate Nitrogen	mg/kg	2.0	0.0	1.2	0.1	0.0	0.0	0.1	1.1	1.6	1.2	0.0	
Phosphorus (P)	mg/kg	6.0	4.0	4.0	16.0	5.0	5.0	13.0	5.0	4.0	3.0	2.0	
Organic Matter	%	1.0	0.2	0.1	1.9	0.6	0.6	2.6	0.7	0.3	0.3	0.1	
Carbon/Nitrogen	Ratio	15	-	-	12	-	-	-18	-	-	-	-	
Sulfur (S)	mg/kg	3	-	-	2	-	-	6	-	-	-	-	
Calcium (Ca)	mg/kg	216	160	480	486	150	72	506	180	230	980	650	
Magnesium Mg)	mg/kg	62	160	760	119	76	150	159	120	130	630	110	
Sodium (Na)	mg/kg	12	100	570	10	0	0	29	20	57	430	0	
Potassium (K)	mg/kg	95	0	120	118	90	87	138	69	0	99	450	
CEC - (ECEC)	meq/100g	1.8	2.4	10.2	3.6	1.5	1.7	4.2	1.5	2.5	11.5	3.0	
Ex. Sodium	meq/100g	0.05	0.43	2.48	0.04	0.00	0.00	0.13	0.09	0.25	1.87	0.00	
Ex. Potassium	meq/100g	0.24	0.00	0.31	0.30	0.23	0.22	0.35	0.18	0.00	0.25	1.15	
Ex. Calcium	meq/100g	1.08	0.80	2.40	2.43	0.75	0.36	2.52	0.90	1.15	4.89	3.24	
Ex. Magnesium	meq/100g	0.51	1.32	6.25	0.98	0.63	1.23	1.31	0.99	1.07	5.18	0.91	
ESP	%	2.7	16.9	21.9	1.2	5.0	3.7	2.9	4.1	9.7	15.5	1.1	
Ca/Mg	Ratio	2.11	0.61	0.38	2.48	1.20	0.29	1.93	0.91	1.07	0.94	3.58	
Copper (Cu)	mg/kg	1.2	-	-	1.2	-	-	3.2	-	-	-	-	
Zinc (Zn)	mg/kg	0.3	-	-	1.9	-	-	2.9	-	-	-	-	
Manganese (Mn)	mg/kg	108	-	-	108	-	-	388	-	-	-	-	
Iron (Fe)	mg/kg	110	-	-	81	-	-	420	-	-	-	-	
Boron (B)	mg/kg ³	0.20	-	-	0.30	-	-	0.30	-	-	-	-	
Boron (B)	mg/kg ³	0.4	-	-	-	0.6	-	-	0.4	-	-	-	

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Appendix D.4
Topsoil Suitability Assessment

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Appendix D.5
Agricultural Land Suitability Class
and Erosion Potential Evaluation

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Appendix D.5 Agricultural Land Suitability Class and Erosion Potential Evaluation

Terrain Unit	Landform	Soils	Area (ha)	Agricultural Land Suitability			Erosion Potential	Remarks
				Ag. Land Class ⁽¹⁾	Cropping Class	Limiting Factors		
Qa2(7-8)	Gently inclined, undulating and locally moderately dissected alluvial plains, floodplains, prior stream levees and intermediate and higher terraces; slopes mostly <2%, locally steeper on slopes to drainage.	Mixed association of uniform (non-cracking) dark-coloured structured medium to heavy clay soils (Uf6.32), and crusty thin weak self-mulching dark-coloured (cracking) clay soils with alkaline mod. saline heavy clay subsoils (Ug51.5)		B	2-3	ps2, e2, pd3, s3, t2	M-H	These soils comprise cracking and incipient cracking clays; they are slightly to mod. dispersive and mostly mod. saline in the B1 and B2 horizons.

Geological Regime:- (Ks) Lower Cretaceous Stanwell Coal Measures; mudstone, arenite, claystone and coal.

Terrain Unit	Landform	Soils	Area (ha)	Agricultural Land Suitability			Erosion Potential	Remarks
				Ag. Land Class ⁽¹⁾	Cropping Class	Limiting Factors		
Ks36	Gently undulating plains and rises with gently inclined planar to concave marginal slopes in the range 2-5%	Medium to deep thin loamy surface duplex soils with brown to yellowish-brown alkaline to strongly alkaline, saline and sodic heavy clay subsoils, (Db1.13-Db2.33 and Dy3.33)		C	4	e4, m4, p3, s4	H	Slightly to mod. strongly dispersive in the A - B1 horizons, strongly alkaline and highly saline in the medium and deeper subsoil horizons

Appendix D.5 Agricultural Land Suitability Class and Erosion Potential Evaluation

Limitation	Land Suitability Class				
	1	2	3	4	5
Wetness (w)	Undulating terrain or elevated plains	Low-lying level plains with gilgai covering <25% of the surface area, <u>or</u> Rigid soils with sodic subsoil (ESP 6-14) within 60cm of the surface, <u>or</u> Non-sodic rigid soils with pale grey and yellow mottles within 75 cm of the surface	Low-lying level plains with gilgai covering 25-50% of the surface area, <u>or</u> Rigid soils with strongly sodic subsoil (ESP \geq 15) within 60cm of the surface, <u>or</u> Non-sodic, rigid soils with coarse pale grey and yellow mottles within 50cm of the surface	Seasonal swamps and low-lying run-on areas	Permanent swamps and lakes
Topography (t)	No gully dissection	Occasional deep gullies impede cultivation slightly	Many deep gullies reduce arable area by <33%, cultivation severely restricted	Many deep gullies make the arable areas too small to cultivate	Abundant deep gullies prevent any practical cultivation
Water Erosion (e)	Slopes <0.5% on non-gilgai cracking clays, <u>or</u> Slopes <1% on gilgaied clays, <u>or</u> Slopes <1% on non-sodic rigid soils, <u>or</u> Slopes <0.5% on sodic rigid soils	Slopes 0.5-1% on non-gilgaied cracking clays; <u>or</u> Slopes 1-3% on gilgaied clays, <u>or</u> Slopes 1-2% on non-sodic rigid soils, <u>or</u> Slopes 0.5-1% on sodic rigid soils	Slopes 1-3% on cracking clays without melonholes <u>or</u> Slopes 2-4% on non-sodic rigid soils, <u>or</u> Slopes 1-2% on sodic rigid soils	Slopes 3-5% on cracking clays <u>or</u> Slopes 4-6% on non-sodic rigid soils, <u>or</u> Slopes 2-3% on sodic rigid soils	Slopes <5% on cracking clays, <u>or</u> Slopes <6% on non-sodic rigid soils, <u>or</u> Slopes <3% on sodic rigid soils
Flooding (f)	No flooding	Rare flooding (only during abnormal (1 in >10 year events))	Infrequent flooding (1 in 2-10 year events)	Periodic flooding (1 in 2 year events)	Frequent and/or erosive flooding

