



Rock Description Explanation Sheet (1 of 2)

The descriptive terms used by Coffey are given below. They are broadly consistent with Australian Standard AS1726-1993.

DEFINITIONS: Rock substance, defect and mass are defined as follows:

Rock Substance In engineering terms rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Other material is described using soil descriptive terms. Effectively homogenous material, may be isotropic or anisotropic.

Defect	Discontinuity or break in the continuity of a substance or substances.
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Mass	Any body of material which is not effectively homogeneous. It can consist of two or more substances without defects, or one or more substances with one or more defects.
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SUBSTANCE DESCRIPTIVE TERMS:

ROCK NAME	Simple rock names are used rather than precise geological classification.
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ROCK SUBSTANCE STRENGTH TERMS

Term	Abbreviation	Point Load Index, $I_{s(50)}$ (MPa)	Field Guide
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PARTICLE SIZE	
Coarse grained	Mainly 0.6mm to 2mm
Medium grained	Mainly 0.2mm to 0.6mm
Fine grained	Mainly 0.06mm (just visible) to 0.2mm

Very Low	VL	Less than 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with a knife; pieces up to 30mm thick can be broken by finger pressure.
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FABRIC

Terms for layering of penetrative fabric (eg. bedding, cleavage etc.) are:

Massive	No layering or penetrative fabric.
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Low	L	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show with firm bows of a pick point; has a dull sound under hammer. Pieces of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
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Indistinct	Layering or fabric just visible. Little effect on properties.
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Distinct	Layering or fabric is easily visible. Rock breaks more easily parallel to layering of fabric.
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CLASSIFICATION OF WEATHERING PRODUCTS

Term	Abbreviation	Definition
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Residual Soil	RS	Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
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Medium	M	0.3 to 1.0	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
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Extremely Weathered Material	XW	Material is weathered to such an extent that it has soil properties, ie, it either disintegrates or can be remoulded in water. Original rock fabric still visible.
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High	H	1 to 3	A piece of core 150mm long by 50mm can not be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
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Highly Weathered Rock	HW	Rock strength is changed by weathering. The whole of the rock substance is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Some minerals are decomposed to clay minerals. Porosity may be increased by leaching or may be decreased due to the deposition of minerals in pores.
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Very High VH	3 to 10	Hand specimen breaks after more than one blow of a pick; rock rings under hammer.
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Moderately Weathered Rock	MW	The whole of the rock substance is discoloured, usually by iron staining or bleaching , to the extent that the colour of the fresh rock is no longer recognisable.
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Extremely High	More than 10	Specimen requires many blows with geological pick to break; rock rings under hammer.
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Slightly Weathered Rock	SW	Rock substance affected by weathering to the extent that partial staining or partial discolouration of the rock substance (usually by limonite) has taken place. The colour and texture of the fresh rock is recognisable; strength properties are essentially those of the fresh rock substance.
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Fresh Rock	FR	Rock substance unaffected by weathering.
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Notes on Weathering:

1. AS1726 suggests the term "Distinctly Weathered" (DW) to cover the range of substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction, DW may be used with the definition given in AS1726.
2. Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "altered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.

Notes on Rock Substance Strength:

1. In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.
2. The term "extremely low" is not used as a rock substance strength term. While the term is used in AS1726-1993, the field guide therein makes it clear that materials in that strength range are soils in engineering terms.
3. The unconfined compressive strength for isotropic rocks (and anisotropic rocks which fall across the planar anisotropy) is typically 10 to 25 times the point load index $l_p(50)$. The ratio may vary for different rock types. Lower strength rocks often have lower ratios than higher strength rocks.

Appendix A

Engineering Logs and Explanation Sheets



Rock Description Explanation Sheet (2 of 2)

COMMON DEFECTS IN ROCK MASSES		Diagram	Map Symbol	Graphic Log (Note 1)	DEFECT SHAPE	TERMS
Term	Definition				Planar	The defect does not vary in orientation
Parting	A surface or crack across which the rock has little or no tensile strength. Parallel or sub parallel to layering (eg bedding) or a planar anisotropy in the rock substance (eg, cleavage). May be open or closed.				Curved	The defect has a gradual change in orientation
					Undulating	The defect has a wavy surface
					Stepped	The defect has one or more well defined steps
Joint	A surface or crack across which the rock has little or no tensile strength, but which is not parallel or sub parallel to layering or planar anisotropy in the rock substance. May be open or closed.				Irregular	The defect has many sharp changes of orientation
					Note: The assessment of defect shape is partly influenced by the scale of the observation.	
					ROUGHNESS TERMS	
Sheared Zone (Note 3)	Zone of rock substance with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks.				Slickensided	Grooved or striated surface, usually polished
					Polished	Shiny smooth surface
					Smooth	Smooth to touch. Few or no surface irregularities
Sheared Surface (Note 3)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.				Rough	Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper.
					Very Rough	Many large surface irregularities (amplitude generally more than 1mm). Feels like, or coarser than very coarse sand paper.
					COATING TERMS	
Crushed Seam (Note 3)	Seam with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock substance which may be more weathered than the host rock. The seam has soil properties.				Clean	No visible coating
					Stained	No visible coating but surfaces are discoloured
					Veneer	A visible coating of soil or mineral, too thin to measure; may be patchy
Infilled Seam	Seam of soil substance usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1mm thick may be described as veneer or coating on joint surface.				Coating	A visible coating up to 1mm thick. Thicker soil material is usually described using appropriate defect terms (eg, infilled seam). Thicker rock strength material is usually described as a vein.
					BLOCK SHAPE TERMS	
					Blocky	Approximately equidimensional
Extremely Weathered Seam	Seam of soil substance, often with gradational boundaries. Formad by weathering of the rock substance in place.				Tabular	Thickness much less than length or width
					Columnar	Height much greate than cross section
					Notes on Defects: 1. Usually borehole logs show the true dip of defects and face sketches and sections the apparent dip. 2. Partings and joints are not usually shown on the graphic log unless considered significant. 3. Sheared zones, sheared surfaces and crushed seams are faults in geological terms.	

72710 / 07-06



Soil Description Explanation Sheet (1 of 2)

DEFINITION:
In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME
Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS		
NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 µm to 2.36 mm
	medium	200 µm to 600 µm
	fine	75 µm to 200 µm

MOISTURE CONDITION
Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.
Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS		
TERM	UNDRAINED STRENGTH S_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS	
TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS		
TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5%
		Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE			
ZONING		CEMENTING	
Layers	Continuous across exposure or sample.	Weakly cemented	Easily broken up by hand in air or water.
Lenses	Discontinuous layers of lenticular shape.	Moderately cemented	Effort is required to break up the soil by hand in air or water.
Pockets	Irregular inclusions of different material.		

GEOLOGICAL ORIGIN
WEATHERED IN PLACE SOILS
Extremely weathered material Structure and fabric of parent rock visible.
Residual soil Structure and fabric of parent rock not visible.

TRANSPORTED SOILS
Aeolian soil Deposited by wind.
Alluvial soil Deposited by streams and rivers.
Colluvial soil Deposited on slopes (transported downslope by gravity).
Fill Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil Deposited by lakes.
Marine soil Deposited in ocean basins, bays, beaches and estuaries.



Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)				USC	PRIMARY NAME	
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	GRAVELS More than half of coarse fraction is larger than 2.0 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	GRAVEL	
			Predominantly one size or a range of sizes with more intermediate sizes missing.	GP	GRAVEL	
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)	GM	SILTY GRAVEL	
			Plastic fines (for identification procedures see CL below)	GC	CLAYEY GRAVEL	
	SANDS More than half of coarse fraction is smaller than 2.0 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes	SW	SAND	
			Predominantly one size or a range of sizes with some intermediate sizes missing.	SP	SAND	
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).	SM	SILTY SAND	
			Plastic fines (for identification procedures see CL below).	SC	CLAYEY SAND	
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm (A 0.075 mm particle is about the smallest particle visible to the naked eye)	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.					
	SILTS & CLAYS Liquid limit less than 50	DRY STRENGTH	DILATANCY	TOUGHNESS		
		None to Low	Quick to slow	None	ML	SILT
		Medium to High	None	Medium	CL	CLAY
	SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low	OL	ORGANIC SILT
		Low to medium	Slow to very slow	Low to medium	MH	SILT
		High	None	High	CH	CLAY
	Medium to High	None	Low to medium	OH	ORGANIC CLAY	
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture.			Pt	PEAT	
• Low plasticity – Liquid Limit W _L less than 35%. • Medium plasticity – W _L between 35% and 50%.						

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM	TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.		SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.		TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.		TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.		INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

BOREHOLE GINT LOGS DATABASE.GPJ COFFEY.GDT 8.3.13



Engineering Log - Borehole

Client: HEALTH INFRASTRUCTURE NSW
Principal: ENSTRUCT
Project: KEMPSEY DISTRICT HOSPITAL
Borehole Location: REFER TO FIGURE 3

Borehole No. BH1
Sheet 1 of 2
Project No: GEOTCOFH03037AA
Date started: 27.11.2012
Date completed: 27.11.2012
Logged by: MH
Checked by: TGN

drill model and mounting: MD20				Easting: 482872		slope: -90°		R.L. Surface: 27.0											
hole diameter: mm				Northing: 6562953		bearing:		datum: Ground Surface											
drilling information				material substance															
method	penetration			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 penetrometer			structure and additional observations		
	1	2	3											100 kPa	200 kPa	300 kPa		400 kPa	
ADV				Nil							FILL:CLAY, Low plasticity, brown, some sand and fine gravel, sub angular to subrounded. Tree roots 20-30mm diameter.	D/ $\lt$ Wp					FILL		
ADT																			
method				support		notes, samples, tests		classification symbols and soil description based on unified classification system				consistency/density index							
AS auger screwing*				M mud		U ₅₀ undisturbed sample 50mm diameter		VS very soft											
AD auger drilling*				C casing		U ₆₃ undisturbed sample 63mm diameter		S soft											
RR roller/fricone				penetration		D disturbed sample		F firm											
W washbore				1 2 3 4		N standard penetration test (SPT)		St stiff											
CT cable tool				no resistance ranging to refusal		N* SPT - sample recovered		VSt very stiff											
HA hand auger						Nc SPT with solid cone		H hard											
DT diatube				water		V vane shear (kPa)		Fb friable											
B blank bit						P pressuremeter		VL very loose											
V V bit				10/1/98 water level on date shown		Bs bulk sample		L loose											
T TC bit						E environmental sample		MD medium dense											
*bit shown by suffix e.g. ADT						R refusal		D dense											
								VD very dense											

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**
Principal: **ENSTRUCT**
Project: **KEMPSEY DISTRICT HOSPITAL**
Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH1**
Sheet 2 of 2
Project No: **GEOTCOFH03037AA**
Date started: **27.11.2012**
Date completed: **27.11.2012**
Logged by: **MH**
Checked by: **TGN**

drill model and mounting: MD20				Easting: 482872		slope: -90°		R.L. Surface: 27.0							
hole diameter: mm				Northing 6562953		bearing:		datum: Ground Surface							
drilling information					material substance										
method	penetration			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 100 200 300 400 kPa	structure and additional observations
	1	2	3												
ADT				Nil						CL	CLAY: Low plasticity, pale grey mottled orange. (continued)	<Wp	H/Fb		
							18	9			SILTSTONE: Dark grey with some orange fissures, indistinct fabric, very low to low rock strength.	D			HIGHLY WEATHERED TO MODERATELY WEATHERED SILTSTONE
					SPT 25/70 N*=R						Borehole BH1 terminated at 9.07m				
							17	10							
							16	11							
							15	12							
							14	13							
							13	14							
							12	15							
							11	16							
method						support		notes, samples, tests				classification symbols and soil description based on unified classification system		consistency/density index	
AS auger screwing*						M mud N nil		U ₅₀ undisturbed sample 50mm diameter						VS very soft	
AD auger drilling*						C casing		U ₆₃ undisturbed sample 63mm diameter						S soft	
RR roller/tricone						penetration		D disturbed sample						F firm	
W washbore						1 2 3 4		N standard penetration test (SPT)						St stiff	
CT cable tool								N* SPT - sample recovered						VSt very stiff	
HA hand auger						water		Nc SPT with solid cone						H hard	
DT diatube						10/1/98 water level		V vane shear (kPa)						Fb friable	
B blank bit						on date shown		P pressuremeter						VL very loose	
V V bit								Bs bulk sample						L loose	
T TC bit								E environmental sample						MD medium dense	
*bit shown by suffix e.g. ADT								R refusal						D dense	
														VD very dense	

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**
Principal: **ENSTRUCT**
Project: **KEMPSEY DISTRICT HOSPITAL**
Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH2**
Sheet 1 of 3
Project No: **GEOTCOFH03037AA**
Date started: **26.11.2012**
Date completed: **26.11.2012**
Logged by: **MH**
Checked by: **TGN**

drill model and mounting: MD20				Easting: 482898		slope: -90°		R.L. Surface: 26.8								
hole diameter: mm				Northing: 6562964		bearing:		datum: Ground Surface								
drilling information					material substance											
method	penetration			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	structure and additional observations	
	1	2	3													
ADT				N							FILL:CLAY, Low plasticity, brown, some sand.	D/<Wp			FILL/TOPSOIL?	
						Ex2				CH	CLAY: High plasticity, dark red-brown, trace gravel.	<Wp	H		RESIDUAL SOIL	
						U50	26								* U50 tube pushed 350mm to refusal	
						Ex2		1							* 100mm sample recovered	
						U50				CH	CLAY: Medium to high plasticity, mottled red and grey, moisture approx plastic limit.		VSt		U50 tube pushed 380mm to refusal	
						Ex2						Wp			150mm sample recovered	
						SPT 2,4,5 N*=9	25	2			gravelly layer from 1.8m-2.0m, angular/subangular, fine to coarse, weathered Siltstone.					
										CH	CLAY: Medium plasticity, pale grey mottled red and orange, trace weathered Siltstone gravel.	<Wp	H		EXTREMELY WEATHERED	
						SPT 4,8,11 N*=19	24	3							SILTSTONE indistinct fabric, dark brown and iron stained fissures	
													VSt			
													H			
							23	4								
						SPT 7,12,23 N*=35	22	5								
							21	6								
						SPT 4,8,12 N*=20										
							20	7								
										CL	CLAY: Low plasticity, grey with orange fissures.	D/<Wp			Approaching highly weathered siltstone very low rock strength	
						SPT 17,25/90 N*=R	19	8								
method					support		notes, samples, tests					classification symbols and soil description based on unified classification system			consistency/density index	
AS auger screwing*					M mud N nil		U ₅₀ undisturbed sample 50mm diameter								VS very soft	
AD auger drilling*					C casing		U ₆₃ undisturbed sample 63mm diameter								S soft	
RR roller/tricone							D disturbed sample								F firm	
W washbore							N standard penetration test (SPT)								St stiff	
CT cable tool							N* SPT - sample recovered								VSt very stiff	
HA hand auger							Nc SPT with solid cone								H hard	
DT diatube							V vane shear (kPa)								Fb friable	
B blank bit							P pressuremeter								VL very loose	
V V bit							Bs bulk sample								L loose	
T TC bit							E environmental sample								MD medium dense	
*bit shown by suffix e.g. ADT							R refusal								D dense	
															VD very dense	

Engineering Log - Borehole

Client: HEALTH INFRASTRUCTURE NSW

Principal: ENSTRUCT

Project: KEMPSEY DISTRICT HOSPITAL

Borehole Location: REFER TO FIGURE 3

Borehole No. BH2

Sheet 2 of 3

Project No: GEOTCOFH03037AA

Date started: 26.11.2012

Date completed: 26.11.2012

Logged by: MH

Checked by: TGN

drill model and mounting: MD20 Easting: 482898 slope: -90° R.L. Surface: 26.8
hole diameter: mm Northing: 6562964 bearing: datum: Ground Surface

drilling information				material substance									
method	penetration	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	structure and additional observations
ADT	1 2 3	N				18		CL	CLAY: Low plasticity, grey with orange fissures. (continued)	D/Wp	H		
				SPT 13.25/100 N*=R		9							
						17			Borehole BH2 continued as cored hole				
						10							
						16							
						11							
						12							
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						99							
						100							

method	support	notes, samples, tests	classification symbols and soil description based on unified classification system	consistency/density index
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT	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	U ₆₀ undisturbed sample 50mm diameter U ₃₀ 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	moisture D dry M moist Wp plastic limit W _L liquid limit	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

Engineering Log - Cored Borehole

Client: HEALTH INFRASTRUCTURE NSW

Principal: ENSTRUCT

Project: KEMPSEY DISTRICT HOSPITAL

Borehole Location: REFER TO FIGURE 3

Borehole No. BH2

Sheet 3 of 3

Project No: GEOTCOFH03037AA

Date started: 26.11.2012

Date completed: 26.11.2012

Logged by: MH

Checked by: TGN

drill model & mounting: MD20 Easting: 482898 slope: -90° R.L. Surface: 26.8
hole diameter: mm Drilling fluid: Northing: 6562964 bearing: datum: Ground Surface

drilling information				material substance						rock mass defects									
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength				Is ₅₀ MPa	defect spacing mm	defect description					
						Continued from non-cored borehole		VL	L	M	H	VH		EH	D- diam- etral A- axial	RQD %	particular	general	
				17		SILTSTONE: dark grey with some sections (5-10%) of orange bleaching, iron stained lines throughout indistinct fabric.	MW										— JT, 60°, PL, SO, VN clay		
				10			HW											— XW SM, clay 40mm	
							MW											— XW, SM, clay & fragmented rock 190mm	
							HW												
				16			MW												
				11														— JT, 30°, PL, SO, CO clay	
																		— JT, 60°, PL, SO, CO clay	
																		— JT, 70°, PL, SO, VN	
																		— JT, 50°, ST, SO, CO clay	
																		— JT, 50°, PL, SO, VN	
				15													— JT, 60°, ST, SO, VN		
				12													— JT, 10°, IR, SO, VN		
																	— JT, 20°, IR, SO, UN		
																	— JT, 20°, IR, SO, VN		
																	— JT, 35°, ST, SO, VN		
				14													— JT, 80°, UN, SO, CO clay		
																	— JT, 60°, UN, SO, CO clay		
																	— JT, 15°, UN, SO, VN clay		
				13													— JT, 70°, UN, SO, VN clay		
																	— XW, SM, clay 2mm		
																	— JT, 20°, IR, SO, VN		
																	— JT, 50°, PL, SO, VN		
				13													— JT, 60°, PL, SO, VN		
				14		BH2 terminated at 13.75m													
				12															
				15															
				11															
				16															
				10															
				17															

method	core-lift	water	weathering	defect type	roughness
DT AS AD RR CB NMLC NQ, HQ, PQ	diatube auger screwing auger drilling roller/tricone claw or blade bit NMLC core wireline core	10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss	FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW)	JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam	VR very rough RO rough SO smooth SL slickensided
	graphic log/core recovery		strength	planarity	coating
	core recovered - graphic symbols indicate material no core recovered		VL very low L low M medium H high VH very high EH extremely high	PL planar CU curved UN undulating ST stepped IR irregular	CN clean SN stained VN veneer CO coating

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH3**

Sheet 1 of 3

Project No: **GEOTCOFH03037AA**

Date started: 21.11.2012

Date completed: **22.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:				MD20		Easting: 482886		slope: -90°		R.L. Surface: 27.5													
hole diameter:				mm		Northing 6562932		bearing:		datum: Ground Surface													
drilling information						material substance																	
method	penetration			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	structure and additional observations								
	1	2	3																				
ADT				Nil							FILL: SANDY CLAY, low plasticity, dark brown. FILL: CLAY, low plasticity, brown, some silt, some sand.	<Wp			FILL (TOP SOIL) FILL								
						E	27			CH	CLAY: Medium plasticity, red mottled grey, some silt. Moisture approaching plastic limit.	Wp	H/Vst		RESIDUAL SOIL								
						U50		1							320mm U50 sample recovered								
						Ex2																	
							26			CH	CLAY: medium plasticity, mottled orange, grey and red, trace weathered Siltstone gravel.				EXTREMELY WEATHERED SILTSTONE								
						SPT 4,9,11 N*=20		2															
							25																
						SPT 4,10,14 N*=24		3															
							24																
							23																
						SPT 11,24,25/100 N*=R		5															
							22								gradual increase in penetration resistance								
						SPT 12,25/100 N*=R		6							approaching highly weathered siltstone sections of very low rock strength								
							21				Borehole BH3 continued as cored hole												
							20																
							19																
							18																
							17																
							16																
							15																
							14																
							13																
							12																
							11																
							10																
							9																
							8																
method						support						notes, samples, tests				classification symbols and soil description based on unified classification system		consistency/density index					
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT						auger screwing* auger drilling* roller/icone washbore cable tool hand auger diatube blank bit V bit TC bit						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						U ₆₀ 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				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	
												D dry M moist W wet Wp plastic limit WL liquid limit											

Engineering Log - Cored Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH3**

Sheet 2 of 3

Project No: **GEOTCOFH03037AA**Date started: **21.11.2012**Date completed: **22.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model & mounting: MD20

Easting: 482886

slope: -90°

R.L. Surface: 27.5

hole diameter: mm

Drilling fluid:

Northing: 6562932

bearing:

datum: Ground Surface

drilling information

material substance

rock mass defects

method

core-lift

water

RL

depth metres

graphic log
core recovery

material

rock type; grain characteristics, colour, structure, minor components

weathering alteration

estimated strength

Is₍₅₀₎ MPa
D- diam-
etral
A- axial

RQD %

defect spacing mm

defect description

type, inclination, planarity, roughness, coating, thickness

particular

general

<

Engineering Log - Cored Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**

Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH3**

Sheet 3 of 3

Project No: **GEOTCOFH03037AA**Date started: **21.11.2012**Date completed: **22.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model & mounting: MD20				Easting: 482886				slope: -90°				R.L. Surface: 27.5								
hole diameter: mm				Drilling fluid:				Northing: 6562932				bearing: datum: Ground Surface								
drilling information					material substance								rock mass defects							
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					Is ₍₅₀₎ MPa D- diam- etral A- axial	defect spacing mm	defect description					
								VL	L	M	H	VH			EH	particular	general			
NMLC		Water not observed	19	9		SILTSTONE: Dark grey and pale grey with red and orange staining, indistinct fabric. (continued)	HW						D 0.3 A 0.8	47		SZ, Clay and Rock Fragments, 90mm —SZ, Clay and Rock Fragments, 400mm				
			18	10		SILTSTONE: Dark grey with some orange staining, indistinct fabric.	MW						D 0.6 A 1.3	0		—JT, 50°, IR, RO, VN/SN —SZ, Clay and Rock Fragments 190mm —XW, SM, clay, 10mm				
			17	11									D 1.2 A 2.3	88		—JT, 15°, CU, SO, VN —JT, 10°, CU, SO, VN —JT, 20°, IR, SO, SN —CS, 20mm —JT, 70°, PL, SO, CO Clay —JT, 5°, UN, SO, VN Clay —JT, 60°, CU, SO, SN —JT, 10°, UN, SO, CN —JT, 70°, ST, SO, SN —CS, 30mm				
			16													—JT, 60°, UN, SO, SN				
			12	12		BH3 terminated at 11.6m														
			15	13																
			14	14																
			13	15																
			12	16																

method

DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

core-lift

casing used

barrel withdrawn

graphic log/core recovery

core recovered

no graphic symbols

indicate material

no core recovered

water

10/1/98 water level on date shown

water inflow

partial drill fluid loss

complete drill fluid loss

water pressure test result (lugesons) for depth interval shown

weathering

FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

strength

VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type

JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

planarity

PL planar
CU curved
UN undulating
ST stepped
IR irregular

roughness

VR very rough
RO rough
SO smooth
SL slickensided

coating

CN clean
SN stained
VN veneer
CO coating

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH4**

Sheet 1 of 3

Project No: **GEOTCOFH03037AA**Date started: **20.11.2012**Date completed: **20.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:MD20

hole diameter: mm

Eastings: 482925

Northing: 6562932

slope: -90°

bearing:

R.L. Surface: 25.3

datum: Ground Surface

drilling information

material substance

method	penetration	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	structure and additional observations	
														1
ADT		N	Water not observed		-25				FILL:CLAY, low plasticity, dark brown to black, some sand.	<Wp			FILL	
				Ex2			FILL: CLAY low plasticity, dark brown with some red, trace fine to medium subangular gravel.	FILL (DISTURBED RESIDUAL?)/RESIDUAL SOIL						
				SPT 6,7,8 N*=15	1		FILL: CLAY, high plasticity, red, brown and grey, trace sand. Moisture approaching plastic limit.	*						
				Ex2										
					-24	CH	CLAY: High plasticity, dark red mottled grey and brown, trace gravel (weathered Siltstone), moisture approaching plastic limit.	H					RESIDUAL SOIL	
				Ex2										
				SPT 6,9,12 N*=21	2	CH	CLAY: High plasticity, mottled red, grey, and yellow, some silt, some highly weathered gravel.	VSt/H					EXTREMELY WEATHERED SILTSTONE	
					-23									
				SPT 3,9,10 N*=19	3		mottled grey and orange, some red mottled sections of highly weathered gravel.		X				X	
					-22				X				X	
					-21	CH	CLAY: medium plasticity, grey mottled orange, fissured fabric.	VSt			X	X		
					-20				H					
					-19			approx 30% iron stained weathered Siltstone gravel				X	X	
					-18							X	X	approaching very low rock strength
					-18							X	X	

method

AS auger screwing*

AD auger drilling*

RR roller/cone

W washbore

CT cable tool

HA hand auger

DT dialtube

B blank bit

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

U₅₀ undisturbed sample 50mm diameter

U₆₃ 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

Engineering Log - Borehole

Client: HEALTH INFRASTRUCTURE NSW

Principal: ENSTRUCT

Project: KEMPSEY DISTRICT HOSPITAL

Borehole Location: REFER TO FIGURE 3

Borehole No. BH4

Sheet 2 of 3

Project No: GEOTCOFH03037AA

Date started: 20.11.2012

Date completed: 20.11.2012

Logged by: MH

Checked by: TGN

drill model and mounting: MD20 Easting: 482925 slope: -90° R.L. Surface: 25.3
hole diameter: mm Northing: 6562932 bearing: datum: Ground Surface

drilling information				material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/ density index	pocket penetrometer kPa	structure and additional observations
ADT	1 2 3	N			17			CH	CLAY: medium plasticity, grey mottled orange, fissured fabric. (continued)	<Wp	H		
					9				SILTSTONE: grey with orange-brown fissures, indistinct fabric friable.		Fb		HIGHLY WEATHERED SILTSTONE
				SPT 14/50 N*=R	16				Borehole BH4 continued as cored hole				SPT hammer bouncing
					10								
					15								
					11								
					14								
					12								
					13								
					13								
					12								
					14								
					11								
					15								
					10								
					16								

method	support	notes, samples, tests	classification symbols and soil description based on unified classification system	consistency/density index
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	M mud C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/198 water level on date shown water inflow water outflow	U ₃₀ 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	moisture D dry M moist Wp plastic limit W _L liquid limit	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

Engineering Log - Cored Borehole

Client: HEALTH INFRASTRUCTURE NSW

Principal: ENSTRUCT

Project: KEMPSEY DISTRICT HOSPITAL

Borehole Location: REFER TO FIGURE 3

Borehole No. BH4

Sheet 3 of 3

Project No: GEOTCOFH03037AA

Date started: 20.11.2012

Date completed: 20.11.2012

Logged by: MH

Checked by: TGN

drill model & mounting: MD20 Easting: 482925 slope: -90° R.L. Surface: 25.3
hole diameter: mm Drilling fluid: Northing: 6562932 bearing: datum: Ground Surface

drilling information					material substance						rock mass defects							
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					Is ₅₀ MPa D- diam- eter A- axial	RQD %	defect spacing mm	defect description		
								VL	L	M	H	VH				DB	particular	general
			17															
				9		Continued from non-cored borehole					D	A						
		Water not observed	16			SILTSTONE: Dark grey mottled orange-brown, indistinct fabric.	MW				0.8	1.3				XW, SM, CLAY 3mm XW SM, CLAY 5mm JT	JT, 10-50°, UN, SO, SN/VN Iron	
							MW									XW SM, CLAY 3mm XW SM, CLAY 4mm XW SM, CLAY 25mm JT, 50°, IR, SO, CO CLAY XW SM, Clay and Rock Fragments 110mm JT, 60°, ST, SO, CO CLAY JT, 85°, UN, SO, SN IRON XW SM, Clay and Rock Fragments 130mm		
			10															
			15															
			11			NO CORE 10.83-11.60					D	A						
			14								0.4	1.4						
			12			SILTSTONE: Dark grey with some orange-brown fissures, indistinct fabric.	HW				D	A				XW SM, 50°, CLAY 40mm JT JT		
			13								D	A				XW SM, CLAY 5mm		
			13					MW										
			12					HW								JT XW SM, Clay and Fragmented Rock 30mm		
		14					MW								JT XW SM, CLAY 3mm JT, 85°, CU, SO, SN Iron			
		11					HW								JT XW SM, CLAY 10mm XW SM, CLAY 15mm JT, 20°, ST, SO, CO CLAY			
						BH4 terminated at 14.6m												
			15															
			10															
			16															

method	core-lift	water	weathering	defect type	roughness
DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	casing used barrel withdrawn graphic log/core recovery core recovered - graphic symbols indicate material no core recovered	10/198 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctively weathered (covers MW and HW) strength VL very low L low M medium H high VH very high EH extremely high	JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam planarity PL planar CU curved UN undulating ST stepped IR irregular	VR very rough RO rough SO smooth SL slickensided coating CN clean SN stained VN veneer CO coating

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH5**

Sheet 1 of 1

Project No: **GEOTCOFH03037AA**

Date started: 23.11.2012

Date completed: **23.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:				M20		Easting: 482916		slope: -90°		R.L. Surface: 25.0								
hole diameter:				mm		Northing 6562883		bearing:		datum: Ground Surface								
drilling information						material substance												
method	penetration			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 penetrometer kPa	structure and additional observations			
	1	2	3															
ADV				N	Water not observed						FILL: CLAY low plasticity, brown and dark red, some sand, trace gravel.	M<Wp			FILL			
										</								

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH6**

Sheet 1 of 4

Project No: **GEOTCOFH03037AA**

Date started: 9.11.2012

Date completed: **19.11.2012**

Logged by: **MH**

Checked by: **TGN**

Form GEO 5.3 Issue 3 Rev.2

drill model and mounting:				MD20		Easting: 482954		slope: -90°		R.L. Surface: 22.8					
hole diameter:				mm		Northing: 6562882		bearing:		datum: Ground Surface					
drilling information				material substance											
method	penetration	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	structure and additional observations		
														1 2 3	100 200 300 400
ADT		N							FILL: SANDY CLAY, low plasticity, pale brown/dark brown, some gravel.	D/<Wp			FILL		
				Ex2	22	1			FILL:SILTY SAND fine to coarse grained, dark brown to black, some fine to coarse gravel, pale grey.				Suspected fly ash		
				Ex2 SPT 3,3,3 N*=6 E	21	2			FILL:CLAY, high plasticity, mottled grey/red/orange, some silt.	M/>Wp					
				E SPT 3,6,7 N*=13	20	3		CH	CLAY: high plasticity, dark red mottled grey, trace sand.	<Wp	H	X X	* RESIDUAL SOIL		
				SPT 4,11,15 N*=26	19	4		CH	CLAY: Medium plasticity, pale grey mottled orange and red, some silt. Bordering plastic limit.	Wp	H/Fb	X	EXTREMELY WEATHERED SILTSTONE		
				E SPT 5,10,11 N*=21	17	6					VS/H	X X X X			
				E SPT 6,12,15 N*=27	16	7			some sections approaching rock strength			X			
					15	8									
method				support				notes, samples, tests				classification symbols and soil description		consistency/density index	
AS auger screwing*				M mud N nil				U ₅₀ undisturbed sample 50mm diameter						VS very soft	
AD auger drilling*				C casing				U ₆₃ undisturbed sample 63mm diameter						S soft	
RR roller/tricone				penetration				D disturbed sample						F firm	
W washbore				1 2 3 4				N standard penetration test (SPT)						St stiff	
CT cable tool				no resistance ranging to refusal				N* SPT - sample recovered						VSt very stiff	
HA hand auger				water				Nc SPT with solid cone						H hard	
DT diatube				10/1/98 water level on date shown				V vane shear (kPa)						Fb friable	
B blank bit				water inflow				P pressuremeter						VL very loose	
V V bit				water outflow				Bs bulk sample						L loose	
T TC bit								E environmental sample						MD medium dense	
*bit shown by suffix e.g. ADT								R refusal						D dense	
														VD very dense	

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**
Principal: **ENSTRUCT**
Project: **KEMPSEY DISTRICT HOSPITAL**
Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH6**
Sheet 2 of 4
Project No: **GEOTCOFH03037AA**
Date started: **9.11.2012**
Date completed: **19.11.2012**
Logged by: **MH**
Checked by: **TGN**

drill model and mounting: MD20				Easting: 482954		slope: -90°		R.L. Surface: 22.8							
hole diameter: mm				Northing: 6562882		bearing:		datum: Ground Surface							
drilling information					material substance										
method	penetration			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
	1	2	3												
ADT				N						CH	CLAY: Medium plasticity, pale grey mottled orange and red, some silt. Bordering plastic limit. (continued)	Wp	VS/H		
						SPT 4,8,9 N*=17	14	9							*
						E SPT 4,17,25/100 N=R	10	13							
							12	11							
						SPT 25/120 N*=R	11				HIGHLY WEATHERED SILTSTONE: Dark grey mottled orange brown, distinct layered and fissured fabric. Approx 30% as silty clay. Very low to low rock strength.	D			HIGHLY WEATHERED SILTSTONE
							12				Borehole BH6 continued as cored hole				
							13								
							14								
							15								
							16								
method					support		notes, samples, tests					classification symbols and soil description based on unified classification system		consistency/density index	
AS auger screwing*					M mud N nil		U ₂₀ undisturbed sample 50mm diameter					moisture D dry M moist W wet W _p plastic limit W _L liquid limit		VS very soft	
AD auger drilling*					C casing		U ₆₃ undisturbed sample 63mm diameter							VS soft	
RR roller/tricone					penetration		D disturbed sample							F firm	
W washbore					1 2 3 4		N standard penetration test (SPT)							St stiff	
CT cable tool					no resistance ranging to refusal		N* SPT - sample recovered							VSt very stiff	
HA hand auger					water		Nc SPT with solid cone							H hard	
DT dialtube					10/1/98 water level on date shown		V vane shear (kPa)							Fb friable	
B blank bit					water inflow		P pressuremeter							VL very loose	
V V bit					water outflow		Bs bulk sample							L loose	
T TC bit							E environmental sample							MD medium dense	
*bit shown by suffix e.g. ADT							R refusal							D dense	
														VD very dense	

Engineering Log - Cored Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH6**

Sheet 4 of 4

Project No: **GEOTCOFH03037AA**

Date started: 9.11.2012

Date completed: **19.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model & mounting: MD20				Easting: 482954		slope: -90°		R.L. Surface: 22.8									
hole diameter: mm		Drilling fluid:		Northing: 6562882		bearing:		datum: Ground Surface									
drilling information				material substance				rock mass defects									
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					Is ₅₀₀ MPa D- diam- etral A- axial	defect spacing mm	defect description		
								VL	L	M	H	VH			EH	RQD %	particular
NMLC		Water not observed	6	17		SILTSTONE: Dark grey, orange-brown stained defects. (continued)	HW										
			5	18		BH6 terminated at 17.6m											
			4	19													
			3	20													
			2	21													
			1	22													
			0	23													
			-1	24													

method

DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

core-lift

casing used
barrel withdrawn

graphic log/core recovery

core recovered
- graphic symbols
indicate material
no core recovered

water

10/1/98 water level
on date shown
water inflow
partial drill fluid loss
complete drill fluid loss

water pressure test result
(lugesons) for depth
interval shown

weathering

FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered
(covers MW and HW)

strength

VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type

JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

planarity

PL planar
CU curved
UN undulating
ST stepped
IR irregular

roughness

VR very rough
RO rough
SO smooth
SL slickensided

coating

CN clean
SN stained
VN veneer
CO coating

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH7**

Sheet 1 of 3

Project No: **GEOTCOFH03037AA**

Date started: 22.11.2012

Date completed: 23.11.2012

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:MD20

hole diameter:mm

Easting:482910

Northing:6562833

slope:-90°

bearing:

R.L. Surface:23.0

datum:Ground Surface

drilling information

material substance

method	penetration	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 penetrometer kPa	structure and additional observations
1	2	3											
ADT									FILL: CLAY, high plasticity, red and brown, some white and orange. Some sand, trace gravel.	M>Wp			FILL
				Ex2									
				U50									230mm U50 sample recovered
				Ex2	22	1							
								CH	CLAY: High plasticity, mottled red, grey and brown, trace weathered Siltstone as gravel.	>Wp	H		RESIDUAL SOIL
				Ex2									
				SPT 4,8,12 N*=20	21	2							
								CH	CLAY: Medium plasticity, pale grey mottled orange and brown. Friable.	<Wp	H/Fb		EXTREMELY WEATHERED SILTSTONE
				SPT 4,7,9 N*=16	20	3							material cracking during PP tests
					19	4							
				SPT 4,8,11 N*=19	18	5							material craking under PP tests
					17	6							
				SPT 17,25/100 N*=R									approaching highly weathered siltstone/ very low rock strength.
					16	7							
				SPT 21,25/130 N*=R									
					15	8			Borehole BH7 continued as cored hole				

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

U₅₀ undisturbed sample 50mm diameter

U₆₃ 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

Engineering Log - Cored Borehole

Client: HEALTH INFRASTRUCTURE NSW

Principal: ENSTRUCT

Project: KEMPSEY DISTRICT HOSPITAL

Borehole Location: REFER TO FIGURE 3

Borehole No. BH7

Sheet 2 of 3

Project No: GEOTCOFH03037AA

Date started: 22.11.2012

Date completed: 23.11.2012

Logged by: MH

Checked by: TGN

drill model & mounting: MD20 Easting: 482910 slope: -90° R.L. Surface: 23.0
hole diameter: mm Drilling fluid: Northing: 6562833 bearing: datum: Ground Surface

drilling information				material substance				rock mass defects			
method	core-lift	water	RL	depth metres	graphic log	material	weathering	estimated strength	IS ₅₀ MPa	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components	VL J M H VH EH				type, inclination, planarity, roughness, coating, thickness
											particular general
				22	1						
				21	2						
				20	3						
				19	4						
				18	5						
				17	6						
				16	7						
				15	8						

method DT AS AD RR CB NMLC NQ, HQ, PQ	diatube auger screwing auger drilling roller/tricone claw or blade bit NMLC core wireline core	core-lift casing used barrel withdrawn graphic log/core recovery core recovered - graphic symbols indicate material no core recovered	water 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	weathering FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) strength VL very low L low M medium H high VH very high EH extremely high	defect type JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam planarity PL planar CU curved UN undulating ST stepped IR irregular	roughness VR very rough RO rough SO smooth SL slickensided coating CN clean SN stained VN veneer CO coating
--	--	--	--	--	--	--

Engineering Log - Cored Borehole

Client: HEALTH INFRASTRUCTURE NSW

Principal: ENSTRUCT

Project: KEMPSEY DISTRICT HOSPITAL

Borehole Location: REFER TO FIGURE 3

Borehole No. BH7

Sheet 3 of 3

Project No: GEOTCOFH03037AA

Date started: 22.11.2012

Date completed: 23.11.2012

Logged by: MH

Checked by: TGN

drill model & mounting: MD20 Easting: 482910 slope: -90° R.L. Surface: 23.0
hole diameter: mm Drilling fluid: Northing: 6562833 bearing: datum: Ground Surface

drilling information				material substance				rock mass defects			
method	core-lift	water	RL	depth metres	graphic log	material	weathering	estimated strength	IS ₅₀ MPa	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components	VL J M H VH EH				type, inclination, planarity, roughness, coating, thickness
											particular general
				14	9	SILTSTONE: Pale and dark grey extensively stained orange, indistinct fabric. (continued)					XV SM, clay 15mm XV SM, 70°, clay 2mm XV SM, clay 30mm XV SM, clay 5mm XV SM, clay 10mm JT, 80°, UN, SO, CO clay XV SM, clay 90mm XV SM, clay 30mm JT, 85°, CU, SO, VN clay XV SM, clay and fragmented rock, 50mm XV SM, clay & highly weathered rock, 290mm JT, 70°, UN, SO, CO clay JT, 40°, PL, RO, VN JT, 30°, IR, SO, VN
				13	10						
				12	11						
				11	12						
				10	13						
				9	14						
				8	15						
				7	16						

method DT AS AD RR CB NMLC NQ, HQ, PQ	diatube auger screwing auger drilling roller/tricone claw or blade bit NMLC core wireline core	core-lift casing used barrel withdrawn graphic log/core recovery core recovered - graphic symbols indicate material no core recovered	water 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	weathering FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) strength VL very low L low M medium H high VH very high EH extremely high	defect type JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam planarity PL planar CU curved UN undulating ST stepped IR irregular	roughness VR very rough RO rough SO smooth SL slickensided coating CN clean SN stained VN veneer CO coating
--	--	--	--	--	--	--

Engineering Log - Borehole

Client: HEALTH INFRASTRUCTURE NSW
Principal: ENSTRUCT
Project: KEMPSEY DISTRICT HOSPITAL
Borehole Location: REFER TO FIGURE 3

Borehole No. BH8
Sheet 1 of 1
Project No: GEOTCOFH03037AA
Date started: 27.11.2012
Date completed: 27.11.2012
Logged by: MH
Checked by: TGN

drill model and mounting: MD20		Easting: 482945		slope: -90°		R.L. Surface: 19.0							
hole diameter: mm		Northing 6562822		bearing:		datum: Ground Surface							
drilling information				material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer kPa	structure and additional observations
ADV	1 2 3	Nil	Water not observed					CL	CLAY: Low plasticity, brown, some sand.	D			TOPSOIL
				CBR				CH	CLAY: Medium to high plasticity, red-brown.	<Wp/Wp			RESIDUAL SOIL
						18	1		Borehole BH8 terminated at 0.8m				
						17	2						
						16	3						
						15	4						
						14	5						
						13	6						
						12	7						
						11	8						
method				support		notes, samples, tests		classification symbols and soil description based on unified classification system		consistency/density index			
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT dialube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT				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		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		moisture D dry M moist Wp plastic limit W _L liquid limit		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			

Engineering Log - Borehole

Client: HEALTH INFRASTRUCTURE NSW
Principal: ENSTRUCT
Project: KEMPSEY DISTRICT HOSPITAL
Borehole Location: REFER TO FIGURE 3

Borehole No. BH9
Sheet 1 of 1
Project No: GEOTCOFH03037AA
Date started: 27.11.2012
Date completed: 27.11.2012
Logged by: MH
Checked by: TGN

drill model and mounting: MD20		Easting: 482965		slope: -90°		R.L. Surface: 21.8							
hole diameter: mm		Northing 6562924		bearing:		datum: Ground Surface							
drilling information				material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer kPa	structure and additional observations
ADV	1 2 3	Nil	Water not observed						FILL: CLAYEY GRAVEL, generally medium to coarse, sub angular to angular, medium plasticity clay.	D			FILL
				CBR				CH	CLAY: High plasticity, red and brown.	>Wp			RESIDUAL SOIL
				CBR	21	1			Borehole BH9 terminated at 1m				
						20	2						
						19	3						
						18	4						
						17	5						
						16	6						
						15	7						
						14	8						
method				support		notes, samples, tests		classification symbols and soil description based on unified classification system		consistency/density index			
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT dialube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT				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		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		moisture D dry M moist Wp plastic limit W _L liquid limit		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			

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**

Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH10**

Sheet 1 of 1

Project No: **GEOTCOFH03037AA**

Date started: 27.11.2012

Date completed: **27.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:		MD20		Easting: 482934		slope: -90°		R.L. Surface: 24.5							
hole diameter:		mm		Northing 6562995		bearing:		datum: Ground Surface							
drilling information					material substance										
method	penetration			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	structure and additional observations
ADV	1	2	3	Nil							FILL: GRAVEL, generally medium to coarse, sub angular to angular, some clay and sand.	D			FILL: ROADBASE
						CBR	24			CH CH	CLAY: Medium plasticity, red, grey and brown. CLAY: High plasticity, red and grey.	>Wp			TOPSOIL/RESIDUAL SOIL. RESIDUAL SOIL
								1			Borehole BH10 terminated at 0.8m				
								23							
								2							
								22							
								3							
								21							
								4							
								20							
								5							
								19							
								6							
								18							
								7							
								17							
								8							
method						support		notes, samples, tests			classification symbols and soil description based on unified classification system			consistency/density index	
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT dialtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						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		U ₆₀ 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			moisture D dry M moist W wet Wp plastic limit WL liquid limit			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	

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH11**

Sheet 1 of 1

Project No: **GEOTCOFH03037AA**

Date started: 27.11.2012

Date completed: **27.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model and mounting: MD20				Eastings: 482792		slope: -90°		R.L. Surface: 27.0							
hole diameter: mm				Northing: 6562924		bearing:		datum: Ground Surface							
drilling information				material substance											
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer kPa	structure and additional observations
ADV	1	2	3	Nil							soil type: plasticity or particle characteristics, colour, secondary and minor components.			100 200 300 400	
				Water not observed							FILL: CLAY, low plasticity, brown, some sand and gravel.	D			FILL
					CBR		26	1		CH	CLAY: High plasticity, dark red and brown	M>Wp			RESIDUAL SOIL
											Borehole BH11 terminated at 1m				
							25	2							
							24	3							
							23	4							
							22	5							
							21	6							
							20	7							
							19	8							
method				support		notes, samples, tests		classification symbols and soil description based on unified classification system		consistency/density index					
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				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		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		moisture D dry M moist W wet Wp plastic limit W _L liquid limit		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					

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH12**

Sheet 1 of 1

Project No: **GEOTCOFH03037AA**Date started: **27.11.2012**

Date completed: 27.11.2012

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:				MD20		Easting:		482821		slope:		-90°		R.L. Surface:		28.5	
hole diameter:				mm		Northing		6562858		bearing:				datum:		Ground Surface	
drilling information						material substance											
method	penetration			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	structure and additional observations		
	1	2	3														
ADV				NIL						CL	CLAY: Low plasticity, brown, some sand 10-30mm diameter, tree roots.	D/<Wp				TOPSOIL	
					CBR		28			CH	CLAY: High plasticity, red and brown.	>Wp				RESIDUAL SOIL	
							1				Borehole BH12 terminated at 1m						
							27										
							2										
							26										
							3										
							25										
							4										
							24										
							5										
							23										
							6										
							22										
							7										
							21										
							8										
method						support		notes, samples, tests				classification symbols and soil description based on unified classification system			consistency/density index		
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT dialtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						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		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				moisture D dry M moist W wet Wp plastic limit WL liquid limit			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		

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**Principal: **ENSTRUCT**Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH13**

Sheet 1 of 1

Project No: **GEOTCOFH03037AA**

Date started: 27.11.2012

Date completed: **27.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:MD20

hole diameter:mm

Easting:482904

Northing:6562801

slope:-90°

bearing:

R.L. Surface:22.5

datum:Ground Surface

drilling information

method

penetration

support

water

notes
samples,
tests, etc

RL

depth
metres

graphic log

classification
symbol

material

moisture
condition

consistency/
density index

pocket
penetro-
meter

kPa

structure and
additional observations

123

NIL

22

FILL:GRAVELLY CLAY High plasticity, brown.
Gravel is fine to coarse, rounded to angular. Brick
and pottery peices.

D

FILL

Water not observed

CBR

22

FILL: CLAY High plasticity, brown, some gravel.
Gravel is generally coarse, varied shape.

D/M

1

Borehole BH13 terminated at 1m

21

<

Engineering Log - Borehole

Client: **HEALTH INFRASTRUCTURE NSW**

Principal: **ENSTRUCT**

Project: **KEMPSEY DISTRICT HOSPITAL**

Borehole Location: **REFER TO FIGURE 3**

Borehole No. **BH14**

Sheet 1 of 1

Project No: **GEOTCOFH03037AA**

Date started: **19.11.2012**

Date completed: **19.11.2012**

Logged by: **MH**

Checked by: **TGN**

drill model and mounting:		MD20		Easting: 482951		slope: -90°		R.L. Surface: 21.8									
hole diameter:		mm		Northing: 6562872		bearing:		datum: Ground Surface									
drilling information				material substance													
method	penetration			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 kPa	penetro- meter	structure and additional observations	
	1	2	3														
ADT				N							FILL: SANDY CLAY, low plasticity, dark brown to black, some gravel.	D/<Wp				FILL	
						E					colour change to pale brown/yellow						
							21	1			FILL: SANDY CLAY, low plasticity, dark brown to black, some orange/grey gravel, pale grey to dark grey friable material (fly ash)					suspected fly ash	
						E											
										CL	CLAY: Low plasticity, dark brown to black, trace sand/ fine gravel, trace fine roots.	M/>Wp	F/St?			TOPSOIL?	
							20			CH	CLAY: High plasticity, orange-brown to brown, trace orange gravel, fine to coarse grained, subangular.	>Wp	St?			SLOPE WASH/RESIDUAL SOIL	
						E		2		CH	CLAY: High plasticity, dark orange mottled pale brown.		VSt?			RESIDUAL SOIL	
						E											
							19	3			Borehole BH14 terminated at 2.5m						
							18	4									
							17	5									
							16	6									
							15	7									
							14	8									
method						support		notes, samples, tests				classification symbols and soil description based on unified classification system			consistency/density index		
AS auger screwing*						M mud N nil		U ₅₀ undisturbed sample 50mm diameter				D dry M moist W wet Wp plastic limit WL liquid limit			VS very soft		
AD auger drilling*						C casing		U ₆₃ undisturbed sample 63mm diameter							S soft		
RR roller/tricone						penetration		D disturbed sample				N standard penetration test (SPT)			F firm		
W washbore						1 2 3 4		N* SPT - sample recovered							St stiff		
CT cable tool						no resistance ranging to refusal		Nc SPT with solid cone				P pressuremeter			VSt very stiff		
HA hand auger						water		V vane shear (kPa)							H hard		
DT diatube						10/1/98 water level on date shown		Bs bulk sample				E environmental sample			Fb friable		
B blank bit						water inflow		R refusal							VL very loose		
V V bit						water outflow						VD very dense			L loose		
T TC bit															MD medium dense		
*bit shown by suffix e.g. ADT															D dense		

Appendix B

Laboratory Test Result Sheets

Report No: COFH12S-04771-1

Issue No: 1

Material Test Report

Client:

Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.: INFOCOFH00380AA
Project Name: GEOTCOFH03037AA - Kempsey District Hospital Stage 1
Lot No.: TRN:



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.


Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 11/12/2012

Sample Details

Sample ID:

COFH12S-04771

Client Sample:

1

Date Sampled:

Source:

Not Specified

Material:

Not Specified

Specification:

No Specification

Sampling Method:

Submitted by client

Project Location:

Kempsey

Sample Location:

BH3, 0.5-0.95

Other Test Results

Description	Method	Result	Limits
Shrink Swell Index - Iss (%)	AS 1289.7.1.1	2.0	
Initial Swell Moisture Content (%)		29.3	
Final Swell Moisture Content (%)		39.3	
Shrinkage Moisture Content (%)		24.3	
Inert Inclusions (%)		0.0	
Extent of Soil Crumbling		Minor	
Extent of Soil Cracking		Minor	
Borehole Number		BH3	
Borehole Depth (m)		0.50-0.95	
Date Tested		3/12/2012	

Particle Size Distribution

Method:

Drying by:

Date Tested:

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Comments

N/A

Material Test Report

Client: Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.: INFOCOFH00380AA

Project Name: GEOTCOFH03037AA - Kempsey District Hospital Stage 1

Lot No.: TRN:

Report No: COFH12S-04772-1

Issue No: 1



Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 11/12/2012

Sample Details

Sample ID: COFH12S-04772
Client Sample: 2
Date Sampled:
Source: Not Specified
Material: Not Specified
Specification: No Specification
Sampling Method: Submitted by client
Project Location: Kempsey
Sample Location: BH7, 0.5-0.95

Other Test Results

Description	Method	Result	Limits
Shrink Swell Index - Iss (%)	AS 1289.7.1.1	1.6	
Initial Swell Moisture Content (%)		27.6	
Final Swell Moisture Content (%)		32.1	
Shrinkage Moisture Content (%)		21.2	
Inert Inclusions (%)		0.0	
Extent of Soil Crumbling		Low-Med	
Extent of Soil Cracking		Medium	
Borehole Number		BH7	
Borehole Depth (m)		0.50-0.95	
Date Tested		3/12/2012	

Particle Size Distribution

Method:
Drying by:
Date Tested:

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Comments

N/A

Material Test Report

Client: Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.: INFOCOFH00380AA

Project Name: GEOTCOFH03037AA - Kempsey District Hospital Stage 1

Lot No.: TRN:

Report No: COFH12S-04773-1

Issue No: 1



Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 11/12/2012

Sample Details

Sample ID: COFH12S-04773
Client Sample: 3
Date Sampled:
Source: Not Specified
Material: Not Specified
Specification: No Specification
Sampling Method: Submitted by client
Project Location: Kempsey
Sample Location: BH5, 1.0-1.28

Other Test Results

Description	Method	Result	Limits
Shrink Swell Index - Iss (%)	AS 1289.7.1.1	2.3	
Initial Swell Moisture Content (%)		26.0	
Final Swell Moisture Content (%)		29.9	
Shrinkage Moisture Content (%)		24.4	
Inert Inclusions (%)		0.0	
Extent of Soil Crumbling		Very Low	
Extent of Soil Cracking		Low	
Borehole Number		BH5	
Borehole Depth (m)		1.0-1.28	
Date Tested		3/12/2012	

Particle Size Distribution

Method:
Drying by:
Date Tested:

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Comments

N/A

Material Test Report

Client: Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.: INFOCOFH00380AA

Project Name: GEOTCOFH03037AA - Kempsey District Hospital Stage 1

Lot No.: TRN:

Report No: COFH12S-04774-1
Issue No: 1

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA

WORLD RECOGNISED
ACCREDITATION

Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 11/12/2012

Sample Details

Sample ID: COFH12S-04774
Client Sample: 4
Date Sampled:
Source: Not Specified
Material: Not Specified
Specification: No Specification
Sampling Method: Submitted by client
Project Location: Kempsey
Sample Location: BH8, 0.4-0.8

Other Test Results

Description	Method	Result	Limits
Standard Maximum Dry Density (t/m ³)	AS 1289.5.1.1	1.44	
Standard Optimum Moisture Content (%)		28.0	
Retained Sieve 19mm (%)		0	
CBR At 5.0mm (%)	AS 1289.6.1.1	3.5	
Maximum Dry Density (t/m ³)		1.44	
Optimum Moisture Content (%)		27.8	
Dry Density before Soaking (t/m ³)		1.44	
Density Ratio before Soaking (%)		100	
Moisture Content before Soaking (%)		27.3	
Moisture Ratio before Soaking (%)		98	
Dry Density after Soaking (t/m ³)		1.41	
Density Ratio after Soaking (%)		98	
Swell (%)		2.0	
Moisture Content of Top 30mm (%)		33.4	
Moisture Content of Remaining Depth (%)		32.0	
Compactive Effort		Standard	
Surcharge Mass (kg)		4.50	
Period of Soaking (Days)		4	
Oversize Material (%)		0.0	
Date Tested		3/12/2012	

Particle Size Distribution

Method:
Drying by:
Date Tested:

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Comments

N/A

Material Test Report

Client: Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.: INFOCOFH00380AA

Project Name: GEOTCOFH03037AA - Kempsey District Hospital Stage 1

Lot No.: TRN:

Report No: COFH12S-04775-1
Issue No: 1

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA

WORLD RECOGNISED
ACCREDITATION

Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 11/12/2012

Sample Details

Sample ID: COFH12S-04775
Client Sample: 5
Date Sampled:
Source: Not Specified
Material: Not Specified
Specification: No Specification
Sampling Method: Submitted by client
Project Location: Kempsey
Sample Location: BH10, 0.4-0.8

Other Test Results

Description	Method	Result	Limits
Standard Maximum Dry Density (t/m ³)	AS 1289.5.1.1	1.45	
Standard Optimum Moisture Content (%)		27.0	
Retained Sieve 19mm (%)		0	
Date Tested		30/11/2012	
CBR At 5.0mm (%)	AS 1289.6.1.1	2.0	
Maximum Dry Density (t/m ³)		1.45	
Optimum Moisture Content (%)		27.2	
Dry Density before Soaking (t/m ³)		1.45	
Density Ratio before Soaking (%)		100	
Moisture Content before Soaking (%)		26.7	
Moisture Ratio before Soaking (%)		98	
Dry Density after Soaking (t/m ³)		1.44	
Density Ratio after Soaking (%)		100	
Swell (%)		0.5	
Moisture Content of Top 30mm (%)		35.5	
Moisture Content of Remaining Depth (%)		32.4	
Compactive Effort		Standard	
Surcharge Mass (kg)		4.50	
Period of Soaking (Days)		4	
Oversize Material (%)		0.0	
Date Tested		3/12/2012	

Particle Size Distribution

Method:
Drying by:
Date Tested:

Sieve Size	% Passing	Limits
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Chart

Comments

N/A

Material Test Report

Client: Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.: INFOCOFH00380AA

Project Name: GEOTCOFH03037AA - Kempsey District Hospital Stage 1

Lot No.: TRN:

Report No: COFH12S-04776-1
Issue No: 1

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA

WORLD RECOGNISED
ACCREDITATION

Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 11/12/2012

Sample Details

Sample ID: COFH12S-04776

Client Sample: 6

Date Sampled:

Source: Not Specified

Material: Not Specified

Specification: No Specification

Sampling Method: Submitted by client

Project Location: Kempsey

Sample Location: BH12, 0.5-1.0

Other Test Results

Description	Method	Result	Limits
Standard Maximum Dry Density (t/m ³)	AS 1289.5.1.1	1.48	
Standard Optimum Moisture Content (%)		23.5	
Retained Sieve 19mm (%)		0	
Date Tested		30/11/2012	
CBR At 5.0mm (%)	AS 1289.6.1.1	1.0	
Maximum Dry Density (t/m ³)		1.48	
Optimum Moisture Content (%)		22.5	
Dry Density before Soaking (t/m ³)		1.48	
Density Ratio before Soaking (%)		100	
Moisture Content before Soaking (%)		22.4	
Moisture Ratio before Soaking (%)		99	
Dry Density after Soaking (t/m ³)		1.40	
Density Ratio after Soaking (%)		95	
Swell (%)		5.5	
Moisture Content of Top 30mm (%)		38.3	
Moisture Content of Remaining Depth (%)		33.5	
Compactive Effort		Standard	
Surcharge Mass (kg)		4.50	
Period of Soaking (Days)		4	
Oversize Material (%)		0.0	
Date Tested		3/12/2012	

Particle Size Distribution

Method:

Drying by:

Date Tested:

Sieve Size	% Passing	Limits
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Chart

Comments

N/A

Material Test Report

Client: Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.: INFOCOFH00380AA

Project Name: GEOTCOFH03037AA - Kempsey District Hospital Stage 1

Lot No.: TRN:

Report No: COFH12S-04777-1
Issue No: 1

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA

WORLD RECOGNISED
ACCREDITATION

Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 11/12/2012

Sample Details

Sample ID: COFH12S-04777

Client Sample: 7

Date Sampled:

Source: Not Specified

Material: Not Specified

Specification: No Specification

Sampling Method: Submitted by client

Project Location: Kempsey

Sample Location: BH1, 1.5-1.95

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	N/A	
Mould Length (mm)		0	
Crumbling		No	
Curling		No	
Liquid Limit (%)	AS 1289.3.1.2	54	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	24	
Plasticity Index (%)	AS 1289.3.3.1	30	
Date Tested		4/12/2012	

Particle Size Distribution

Method:

Drying by:

Date Tested:

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Comments

N/A

Material Test Report

Client:	Coffey Geotechnics Pty Ltd 1/18 Hurley Drive Coffs Harbour NSW 2450
Principal:	
Project No.:	INFOCOFH00380AA
Project Name:	GEOTCOFH03037AA - Kempsey District Hospital Stage 1
Lot No.:	TRN:

Report No: COFH12S-04778-1
Issue No: 1

	Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.  Approved Signatory: Adam Crawford (Laboratory Manager) NATA Accredited Laboratory Number: 431 Date of Issue: 11/12/2012
--	--

Sample Details

Sample ID:	COFH12S-04778
Client Sample:	8
Date Sampled:	
Source:	Not Specified
Material:	Not Specified
Specification:	No Specification
Sampling Method:	Submitted by client
Project Location:	Kempsey
Sample Location:	BH 1, 3.0-3.45

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	N/A	
Mould Length (mm)		0	
Crumbling		No	
Curling		No	
Liquid Limit (%)	AS 1289.3.1.2	37	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	23	
Plasticity Index (%)	AS 1289.3.3.1	14	
Date Tested		4/12/2012	

Particle Size Distribution

Method:	
Drying by:	
Date Tested:	

Sieve Size	% Passing	Limits
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Chart

Comments

N/A

Material Test Report

Client:	Coffey Geotechnics Pty Ltd 1/18 Hurley Drive Coffs Harbour NSW 2450
Principal:	
Project No.:	INFOCOFH00380AA
Project Name:	GEOTCOFH03037AA - Kempsey District Hospital Stage 1
Lot No.:	TRN:

Report No: COFH12S-04779-1
Issue No: 1

	Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.  Approved Signatory: Adam Crawford (Laboratory Manager) NATA Accredited Laboratory Number: 431 Date of Issue: 11/12/2012
---	--

Sample Details

Sample ID:	COFH12S-04779
Client Sample:	9
Date Sampled:	
Source:	Not Specified
Material:	Not Specified
Specification:	No Specification
Sampling Method:	Submitted by client
Project Location:	Kempsey
Sample Location:	BH 1, 5.7-6.15

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	N/A	
Mould Length (mm)		0	
Crumbling		No	
Curling		No	
Liquid Limit (%)	AS 1289.3.1.2	45	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	24	
Plasticity Index (%)	AS 1289.3.3.1	21	
Date Tested		4/12/2012	

Particle Size Distribution

Method:	
Drying by:	
Date Tested:	

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Comments

N/A

Material Test Report

Client:	Coffey Geotechnics Pty Ltd 1/18 Hurley Drive Coffs Harbour NSW 2450
Principal:	
Project No.:	INFOCOFH00380AA
Project Name:	GEOTCOFH03037AA - Kempsey District Hospital Stage 1
Lot No.:	TRN:

Report No: COFH12S-04780-1

Issue No: 1

	Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Approved Signatory: Adam Crawford (Laboratory Manager) NATA Accredited Laboratory Number: 431 Date of Issue: 11/12/2012
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Sample Details

Sample ID:	COFH12S-04780
Client Sample:	10
Date Sampled:	
Source:	Not Specified
Material:	Not Specified
Specification:	No Specification
Sampling Method:	Submitted by client
Project Location:	Kempsey
Sample Location:	BH4, 1.5-1.95

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	N/A	
Mould Length (mm)		0	
Crumbling		No	
Curling		No	
Liquid Limit (%)	AS 1289.3.1.2	53	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	23	
Plasticity Index (%)	AS 1289.3.3.1	30	
Date Tested		4/12/2012	

Particle Size Distribution

Method:
Drying by:
Date Tested:

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Comments

N/A

Material Test Report

Client:	Coffey Geotechnics Pty Ltd 1/18 Hurley Drive Coffs Harbour NSW 2450
Principal:	
Project No.:	INFOCOFH00380AA
Project Name:	GEOTCOFH03037AA - Kempsey District Hospital Stage 1
Lot No.:	TRN:

Report No: COFH12S-04781-1

Issue No: 1

	Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Approved Signatory: Adam Crawford (Laboratory Manager) NATA Accredited Laboratory Number: 431 Date of Issue: 11/12/2012
---	---

Sample Details

Sample ID:	COFH12S-04781
Client Sample:	11
Date Sampled:	
Source:	Not Specified
Material:	Not Specified
Specification:	No Specification
Sampling Method:	Submitted by client
Project Location:	Kempsey
Sample Location:	BH7, 1.5-1.95

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	N/A	
Mould Length (mm)		0	
Crumbling		No	
Curling		No	
Liquid Limit (%)	AS 1289.3.1.2	61	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	26	
Plasticity Index (%)	AS 1289.3.3.1	35	
Date Tested		4/12/2012	

Particle Size Distribution

Method:
Drying by:
Date Tested:

Sieve Size	% Passing	Limits
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Chart

Comments

N/A

Material Test Report

Client:

Coffey Geotechnics Pty Ltd
1/18 Hurley Drive
Coffs Harbour NSW 2450

Principal:

Project No.:

INFOCOFH00380AA

Project Name:

GEOTCOFH03037AA - Kempsey District Hospital Stage 1

Lot No.:

TRN:

Report No: COFH12S-04782-1

Issue No: 1



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Approved Signatory: Adam Crawford
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 11/12/2012

Sample Details

Sample ID:

COFH12S-04782

Client Sample:

12

Date Sampled:

Source:

Not Specified

Material:

Not Specified

Specification:

No Specification

Sampling Method:

Submitted by client

Project Location:

Kempsey

Sample Location:

BH7, 7.5-7.78

Particle Size Distribution

Method:

Drying by:

Date Tested:

Sieve Size	% Passing	Limits
------------	-----------	--------

Chart

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	N/A	
Mould Length (mm)		0	
Crumbling		No	
Curling		No	
Liquid Limit (%)	AS 1289.3.1.2	32	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	21	
Plasticity Index (%)	AS 1289.3.3.1	11	
Date Tested		4/12/2012	

Comments

N/A

Appendix C

Pavement Design Summary

client :	ENSTRUCT	job no :	GEOTCOFH03037AA-AG
principal :	HEALTH INFRASTRUCTURE NSW	laboratory :	COFFS HARBOUR
project:	KEMPSEY DISTRICT HOSPITAL	report date :	18/12/2012
location :	REFER TO FIGURE 3	designed by :	G Tippet
council :	KEMPSEY SHIRE COUNCIL	checked by :	A Love

road name or type:	Service Road		Light Vehicle Access/Carpark	
chainage interval: (m)				
design traffic loading: (ESA)	8×10^4		2×10^4	
wearing course thickness: (mm)	30		30	
basecourse thickness: (mm)	120		120	
sub-base thickness: (mm)	150		100	
select thickness: (mm)	300		250	
total thickness: (mm)	600		500	
CBR used for design: (%)	<2		<2	

<u>material quality:</u>	
wearing course:	<i>Conforming to Kempsey Shire Council requirements AC10 Type A or Type B</i>
basecourse:	<i>Conforming to RTA QA Specification 3051</i>
sub-base:	<i>Conforming to RTA QA Specification 3051</i>
select:	<i>Well graded gravel CBR > 15%, PI <15% or stabilised with 4% lime by weight</i>
Note:	Recommended materials types may vary from those of job specification or statutory authority. Refer covering letter/report.

Density Index: Minimum required Density Index AS1289 5.6.1-1998, calculated using field dry density determined by AS1289 5.3.1-2004 or equivalent and laboratory values of maximum and minimum density obtained by AS1289 5.5.1-1998 or equivalent.

Drainage: The design assumes the provision of adequate surface and subsurface drainage of the pavement and adjacent areas. Refer covering letter/report.

Appendix D1-C – Phase 1 Environmental Site Assessment

(REFER TO APPENDIX N, VOLUME 2 OF THE ENVIRONMENTAL IMPACT STATEMENT)

Appendix D1-D – Phase 2 Environmental Site Assessment

(REFER TO APPENDIX N, VOLUME 2 OF THE ENVIRONMENTAL IMPACT STATEMENT)

Appendix D1-E – Pile Foundation Sketch

REV. D - SCAB ON GRADE AT LG ONLY

TYPICAL PILE LENGTHS

ZONE	INTERNAL PILE		PERIMETER PILE	
	D [mm]	L [m]	D [mm]	L [m]
1 - LG - L3	1050	13	750	12.5
2 - L0 - L3	1050	13	750	12
3 - LG - L2	1050	12	750	11.5
4 - L0 - L2	1050	12	600	13
5 - L0 - L1	900	11	600	11
6 - LG - L0	750	10.5	600	10.5
7 - L0	600	13	600	10

enstruct

Status PRELIMINARY

Job Title KEMPSEY HOSPITAL

Drawing Title **TYPICAL PILES**

Scales *N/A*

File Ref.

Drn. JB

Date. 31/01/13

Chd.

Job No 4463

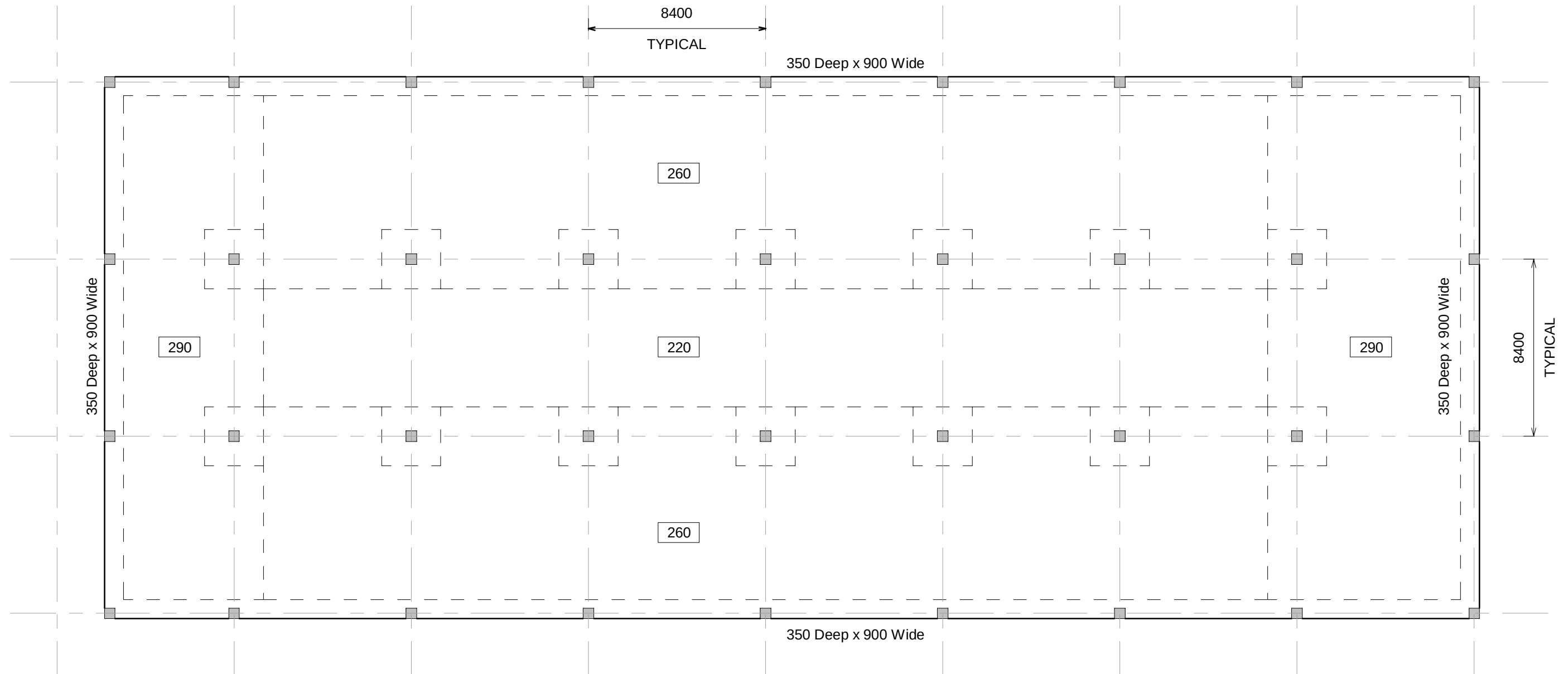
Dwg No. SK-06

RA

Overall Floor Plan - Main Building - Level 00
1:200

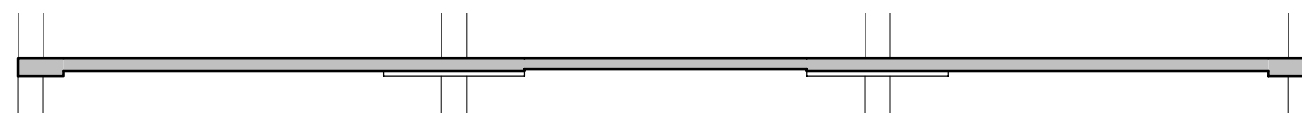
2 Overall Floor Plan - Link - Level 00
1:200

Appendix D1-F – Floor Plate Options

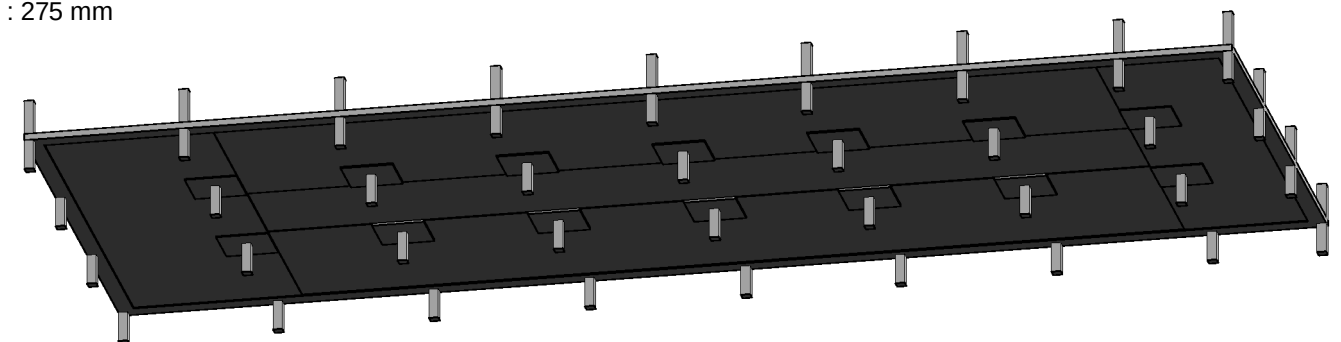


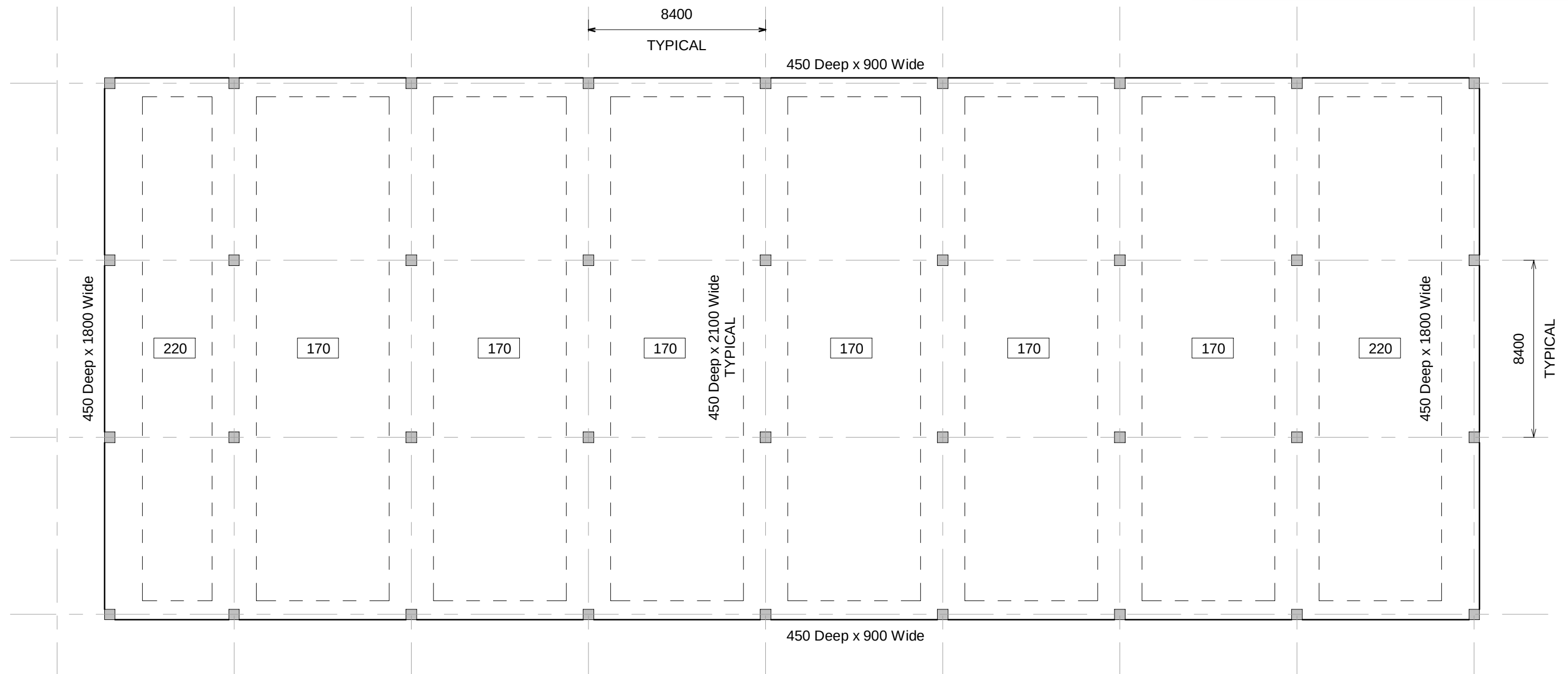
8.4m x 8.4m GRID - POST TENSIONED FLOOR PLATE
(STRUCTURAL DEPTHS SHOWN EXCLUDES 50mm TOPPING)

AREA : 1675 m²
 VOLUME : 460 m³
 AVERAGE THICKNESS : 275 mm



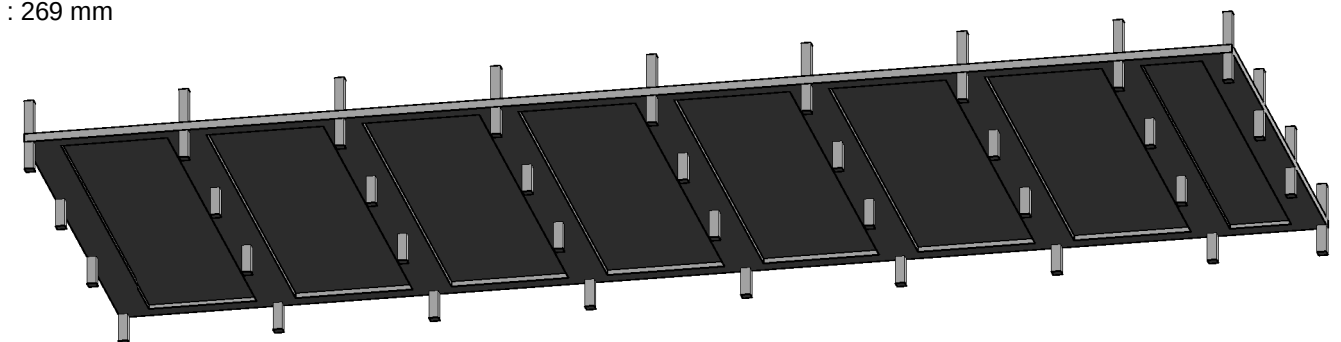
TYPICAL SECTION

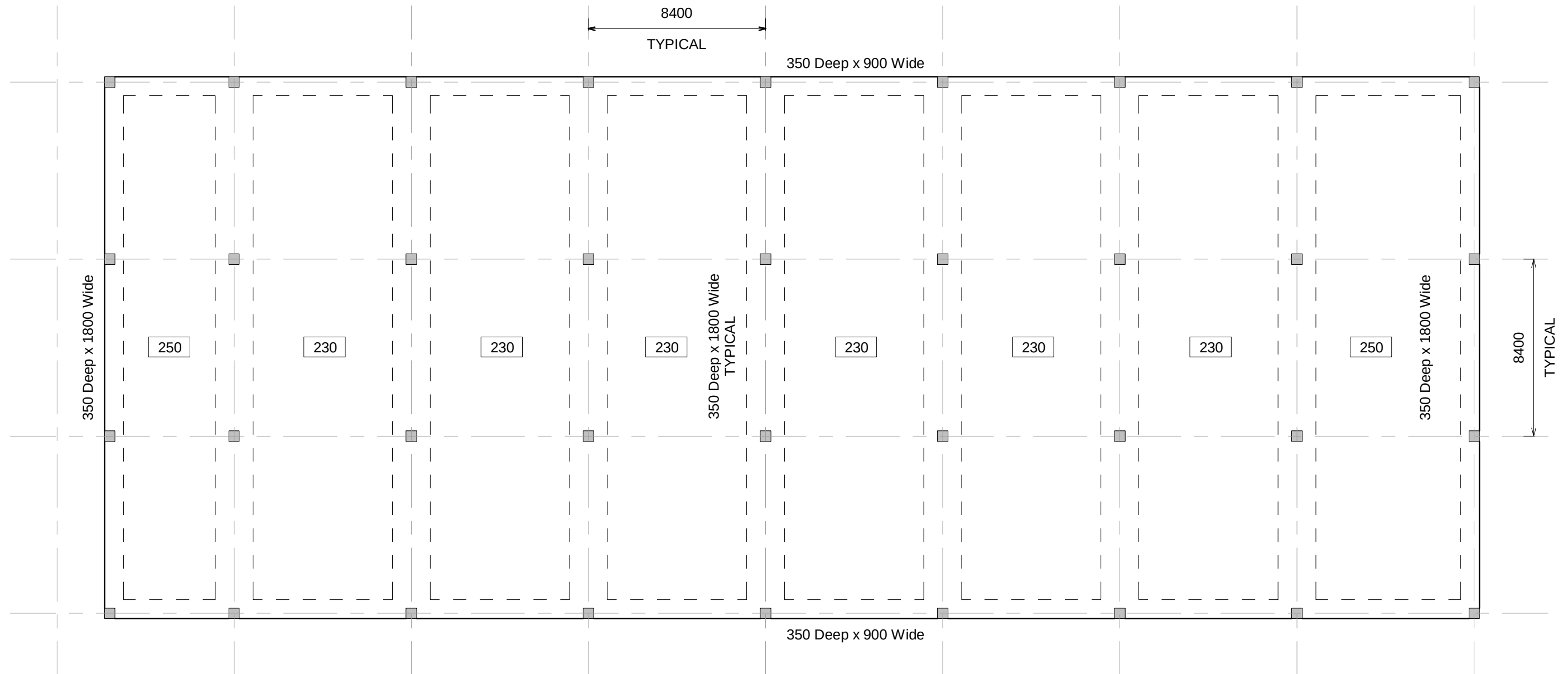




8.4m x 8.4m GRID - POST TENSIONED FLOOR PLATE
(STRUCTURAL DEPTHS SHOWN EXCLUDES 50mm TOPPING)

AREA : 1675 m²
 VOLUME : 451 m³
 AVERAGE THICKNESS : 269 mm



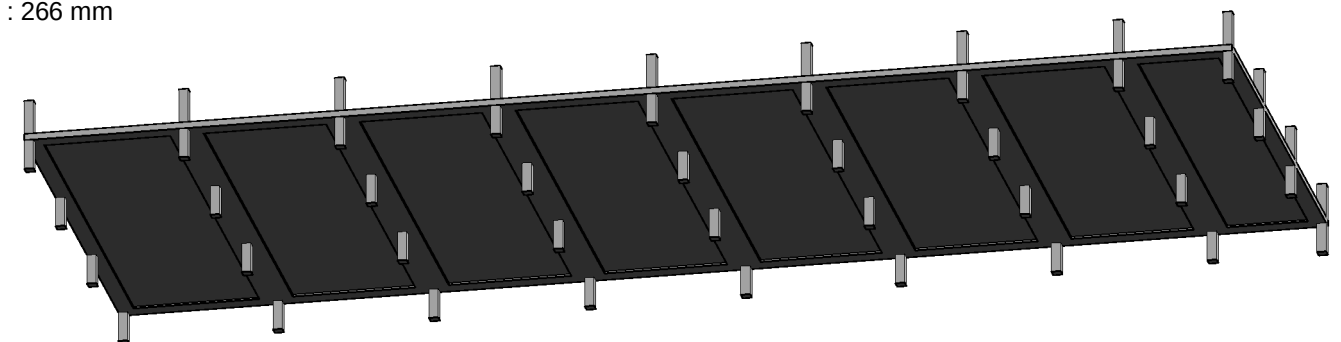


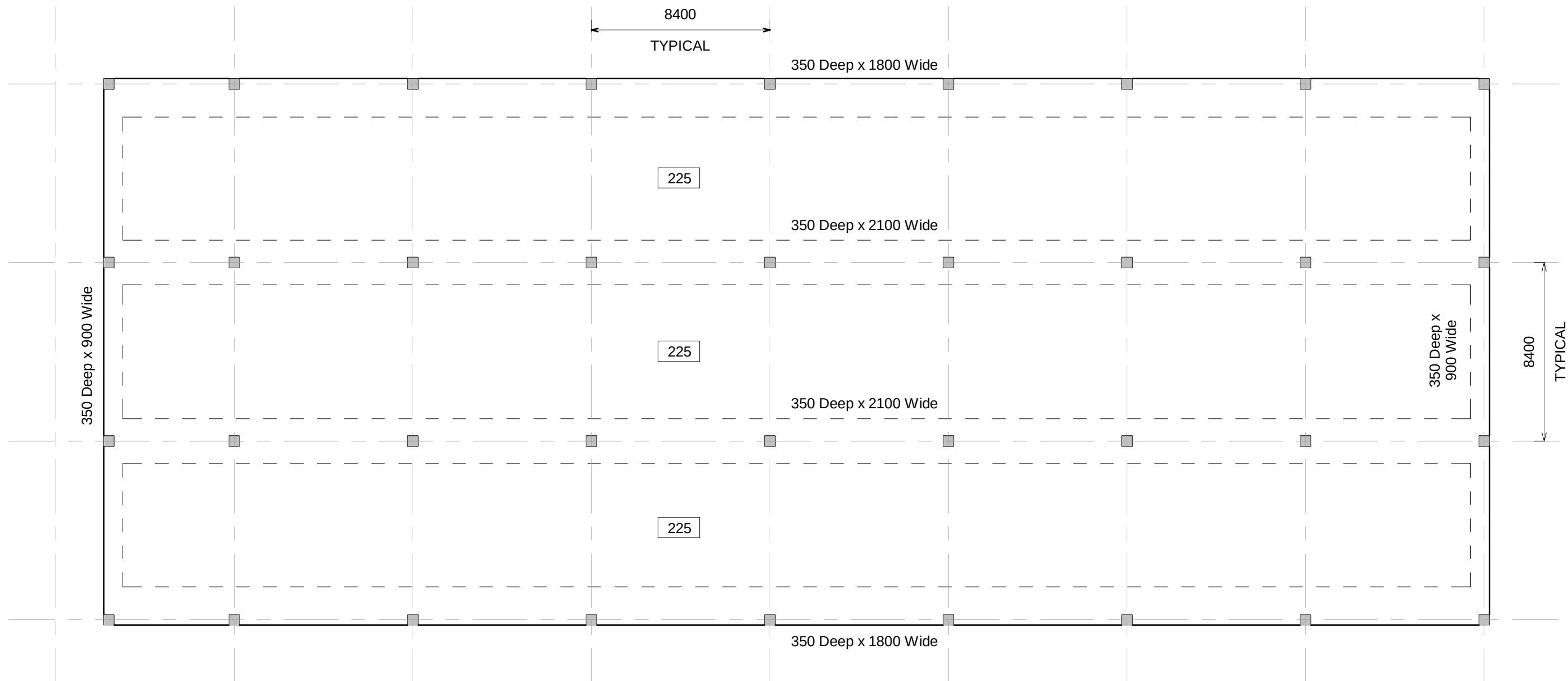
8.4m x 8.4m GRID - POST TENSIONED FLOOR PLATE
(STRUCTURAL DEPTHS SHOWN EXCLUDES 50mm TOPPING)

AREA : 1675 m²
 VOLUME : 446 m³
 AVERAGE THICKNESS : 266 mm



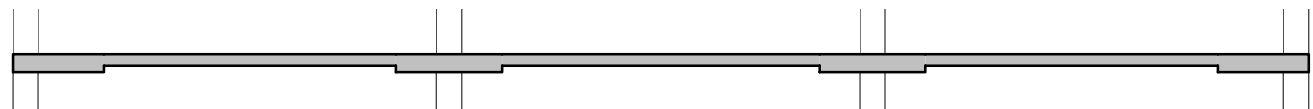
TYPICAL SECTION



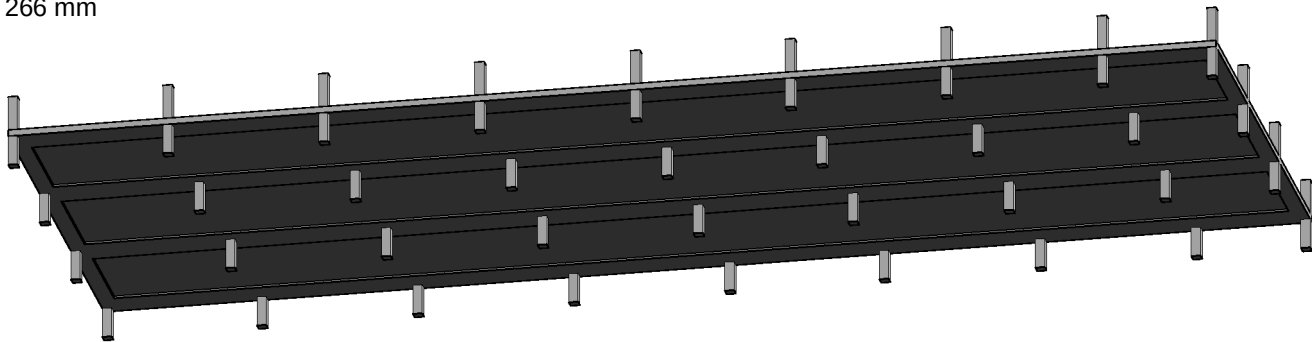


8.4m x 8.4m GRID - POST TENSIONED FLOOR PLATE
(STRUCTURAL DEPTHS SHOWN EXCLUDES 50mm TOPPING)

AREA : 1675 m²
VOLUME : 445 m³
AVERAGE THICKNESS : 266 mm



TYPICAL SECTION



Appendix D1-G –Schematic Design Structural Drawings

Structural Drawing List	
Sheet Number	Sheet Name
1-000-00	COVER SHEET
1-001-00	GENERAL NOTES SHEET 1
1-001-01	GENERAL NOTES SHEET 2
1-002-00	PILE GENERAL ARRANGEMENT
1-002-01	PILE GENERAL ARRANGEMENT PART PLAN SHEET 1
1-002-02	PILE GENERAL ARRANGEMENT PART PLAN SHEET 2
1-005-11	R.C. COLUMN SCHEDULE
1-098-00	FOUNDATION GENERAL ARRANGEMENT
1-098-01	FOUNDATION PART PLAN SHEET 1
1-098-02	FOUNDATION PART PLAN SHEET 2
1-099-00	LOWER GROUND GENERAL ARRANGEMENT
1-099-01	LOWER GROUND FLOOR PART PLAN SHEET 1
1-099-02	LOWER GROUND FLOOR PART PLAN SHEET 2
1-100-00	GROUND FLOOR GENERAL ARRANGEMENT
1-100-01	GROUND FLOOR PART PLAN SHEET 1
1-100-02	GROUND FLOOR PART PLAN SHEET 2
1-101-00	LEVEL 01 GENERAL ARRANGEMENT
1-101-01	LEVEL 01 PART PLAN SHEET 1
1-101-02	LEVEL 01 PART PLAN SHEET 2
1-102-00	LEVEL 02 GENERAL ARRANGEMENT
1-102-01	LEVEL 02 PART PLAN SHEET 1
1-102-02	LEVEL 02 PART PLAN SHEET 2
1-103-00	LEVEL 03 GENERAL ARRANGEMENT
1-103-01	LEVEL 03 PART PLAN SHEET 1
1-103-02	LEVEL 03 PART PLAN SHEET 2
1-105-00	STEEL ROOF GENERAL ARRANGEMENT
1-105-01	STEEL ROOF PART PLAN SHEET 1
1-105-02	STEEL ROOF PART PLAN SHEET 2

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CLIENT

 **NSW Health Infrastructure**

PROJECT MANAGER

 **JOHNSTAFF**

PROJECT

KEMPSEY DISTRICT HOSPITAL

INSTRUCT PROJECT NUMBER
4463

DRAWING KEY

The drawing key shows a site plan with various areas labeled A through H. Area A is a small rectangular area. Area B is a larger rectangular area. Area C is a small rectangular area. Area D is a small rectangular area. Area E is a small rectangular area. Area F is a large, irregularly shaped area. Area G is a small rectangular area. Area H is a small rectangular area.

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE (mm)

0 500 2000 4000

1:100mm

SCALE

1:1 @ A1 DO NOT SCALE

FOR INFORMATION

DRAWING

COVER SHEET

DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-000-00	01

1. The contractor shall be fully responsible for the design of all formwork, unless a product is specified on the drawings as being the responsibility of the engineer e.g. a profiled steel decking acting compositely with the concrete, such as Bondex, Condek or Kingflor.
2. All formwork shall be designed in accordance with AS 3600 and AS 3610.
3. Formwork shall remain in place undisturbed for the following minimum periods:
 - Slab edges - 2 days
 - Beams and slabs - 7 days
 - Backstops to beams and slabs - 28 days
4. In multi-level construction, the contractor shall take into account the age of the floors previously cast, necessary to support the weight of the wet concrete along with any applied load due to be placed on the freshly cast concrete, before the slab achieves sufficient strength to contribute to carry load.
5. The contractor shall submit for review by the engineer, full details of the propping system proposed to be used. This shall include the weight of the formwork system to be used and any heavy loading such as reinforcement bundles or bins to be placed on the slab. Review by the engineer does not diminish the contractors full responsibility for the design of the formwork system.
6. Details submitted shall indicate the means by which formwork is to be raised to the required position and transported across the freshly cast slab, including the weight of equipment proposed to be used for that purpose.
7. The contractor shall be liable for the engineers costs associated with assessing the impact of any construction loading on the structure, including inspection of works required by the engineer arising from the review. These costs will be charged at current hourly rates.
8. All exposed formed edges shall have 20mm x 20mm timber fillets or chamfers added to formed or cast edges, unless noted on the architectural drawings.
9. All drip grooves required as noted on the architectural drawings shall be constructed with reinforcement added to ensure correct minimum cover is maintained across the drip groove. Refer to concrete notes for cover requirements.

1. Piles and piling to be in accordance with AS 2159 and are to be designed by the specialist sub-contractor, engineer and approved by the contractor.
2. The contractor shall investigate the presence of any existing services in the ground likely to be affected by the piling operations. Confirmation of the investigation and the final design drawings shall be forwarded to the engineer, in CAD form, prior to commencement of any piling on site.
3. The contractor is responsible for the set out of all piles. Maximum acceptable deviation from correct position of piles is 75mm. Maximum acceptable deviation form vertical alignment is 1 in 100.
4. Piles are to be designed for the loads indicated on the engineer's drawings and shall incorporate the maximum out of position eccentricity of 75mm in addition to a lateral stability load of 2.5% of the maximum vertical load in the pile, applied at the top of the pile.
5. All piles are to be bored cast in place.
6. All piles are to be inspected by a qualified geotechnical engineer to verify design bearing pressures.
7. All pile borings are to be inspected to ensure they are cleaned and free of loose material and water prior to pouring concrete, which should be with minimal delay and on the same day as boring.
8. The inspection should ensure adequate roughness is achieved in the pile shaft to guarantee shaft adhesion, the use of a roughening tool is recommended.
9. Some pre-water seepage into piles can be expected. Water should be pumped from the piles immediately prior to pouring concrete. Tremie methods should be used if depth of water exceeds 1000mm.
10. Obstructions may be expected when drilling through existing fill.
11. Concrete cover to piles to be 75mm.
12. Concrete strength to be 40 MPa.
13. Information relating to ground conditions has been based on the geotechnical engineer's report.
14. The contractor should make all necessary site investigations to confirm the accuracy or otherwise of the geotechnical report. Tender to nominate unit rates for variation in pile lengths from estimated values.
15. On completion of piling, a drawing prepared by a registered surveyor shall be prepared giving the position of the piles relative to their nominated position and the level of the top of the piles. The drawing shall be forwarded to the engineer for approval before any further work associated with the piles commences.

25. Refer to architectural drawings for location of all joints in masonry. Control joints to be at 6 metre centres maximum.

26. Vertical control joints are to be as described in AS 4773.1 or as indicated on the drawings. Joints shall be maintained to be free of all non-compressible material.

27. Vertical control joints shall be 20mm wide and be provided with flexible masonry anchors across the joint, placed in accordance with manufacturer's recommendations. Joints are to be treated at the outside using an approved flexible polyurethane base caulking sealant jointing material placed against a 25mm diameter closed cellulose polythene foam backing rod.

28. The following conditions must also be satisfied:

- Fire rating
- Sound insulation
- Waterproofing

29. Non-loadbearing masonry shall be constructed to within 20mm of the underside of the structure or shelf angles over gaps.

30. Gaps are to be built to a tolerance of -0mm, +3mm.

31. Mortar and other material shall not be allowed to fall into cavities or remain in control joints.

32. Place polystyrene foam in all vertical joints during construction to ensure mortar droppings do not fall into the joints.

33. The contractor shall submit the names of all proprietary products proposed to be used in masonry construction before commencement of the works.

34. Where masonry abuts to the underside of any member, sloping or horizontal, provide flexible perpendicular fixings at 3 masonry units spacing. Perpend fixings shall be equivalent to M.E.T. 4-3 and shall be secured to the structure over using 2 x 2mm diameter Ramsel head drive pins (or approved equivalent).

35. Fixing of masonry ties to steelwork shall be designed by the contractor and shall have load capacity not less than that specified by the manufacturer of the ties.

36. In cavity construction, ties between skins of the masonry shall be rated for the width of the cavity. Spacing of ties shall be designed by the contractor for the wind pressure to which the wall will be subjected. Cavity ties shall be medium duty, spaced at 600mm x 600mm centres maximum. At control joints, door and window openings the spacing shall be at 300mm centres maximum.

37. In solid masonry construction, ties between contiguous leaves shall be medium duty spaced at 400mm x 400mm centres.

38. In hollow block construction, grout fill end blocks (or use solid blocks) at control joints, door or window opening.

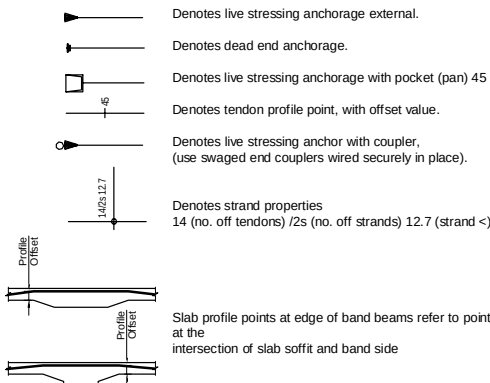
39. All fixings, drive pins, nails, screws, bolts, nuts and washers into masonry shall be galvanised to R2 level in accordance with AS 3700 and AS 2699.

40. All steelwork built into or abutting masonry shall be hot dip galvanised.

41. Where needed and propping of openings is required, the builder shall provide all details to the engineer for review before the work commences.

42. In reinforced masonry all reinforcement is to be continuous, fully lapped and anchored. Minimum lap/anchor length to be 40 x bar diameter. Provide continuous horizontal reinforcement at all 'T' and 'L' junctions as required.

2. All strands to be either:
 - 12.7mm diameter, super grade strand, stress relieved with a minimum breaking load of 184 kN. Relaxation 2.5% maximum after 1000 hours at 70% of breaking load unless noted otherwise or
 - 15.2mm diameter, super grade strand, stress relieved with a minimum breaking load of 250 kN. Relaxation 2.5% maximum after 1000 hours at 70% of breaking load unless noted otherwise.
3. Duct: flat duct 70mm x 19mm, $\mu = 0.2 \pm 0.020$.
4. Dead ends to be onion heads with metal spacers.
5. Procedure:
 - a. Stress all tendons to 25% ultimate tensile stress at approximately 24 hours after completion of pour.
 - b. Fully stress tendons when concrete attains:
 - $f_c = 22$ MPa for 12.7mm diameter strand and
 - $f_c = 25$ MPa for 15.2mm diameter strand
 - c. Jack tendons to 85% minimum breaking load
 - 156.4 kN for 12.7mm diameter strand and lock off
 - 212.6 kN for 15.2mm diameter strand and lock off
 - d. Tendon profile points are from the slab soffit to underside of duct. Offset points are indicated over supports and at midspan unless noted otherwise. At the end points profile offsets are from the slab soffit to the center of the anchor. Tendon profiles shall be parabolic between high and low points.
 - e. Jack central tendons first and work progressively outwards on each side of structural elements (alternating).
 - f. Tendon positions shall be marked on slab soffits by the use of embedded plastic buttons at grid and mid-grid locations; proposed arrangement to be submitted for approval.
 - g. Stressing equipment calibration records, including jack and gauge numbers, shall be forwarded to the engineer prior to stressing operations commencing.
 - h. Cables shall be positioned and secured in accordance with the design documents produced by the specialist sub-contractor and profiled to a vertical tolerance of plus or minus 4mm. Cables shall be supported on suitable chairs at 1000mm maximum centres along the full length to prevent the cable from being displaced laterally or vertically during concreting.
 - i. The specialist contractor shall ensure that experienced workers shall be on site ensuring the proper treatment of post tensioning ducts during all relevant concrete pours.
 - j. Ducts shall be rigid enough to withstand treatment during concreting and shall be securely taped at joints to ensure slurry does not enter the ducts.
 - k. Duct profiles shall take precedence over any reinforcement or conduit within the concrete. Any interference with reinforcement positioning shall be brought to the attention of the engineer for review during placing operations.
 - l. Top reinforcement shall not be laid until after tendons have been placed.
 - m. Typical anchor reinforcement details shown on the drawings are for pricing purposes only and the final anchor reinforcement details shall be the responsibility of the pre-stressing sub-contractor. Distribution reinforcement shall not displace post tensioning ducts from achieving the required depth.
 - n. Particular care shall be taken during placement and compaction of concrete, especially around post tensioning anchor locations. All concrete shall be vibrated using insertion vibrators. The use of reduced aggregate size, as well as the inclusion of supersulphatizer additives in the concrete to assist placement may be appropriate.
 - o. Care shall be taken to ensure all grout tubes and cable ducts are not damaged during concreting.
 - p. Concrete cylinder compressive strength values taken during placement of concrete shall be provided to the engineer before stressing of the strands commences. Concrete test cylinders shall be representative of the area where strands are to be loaded are situated.
 - q. The sequencing of applying load to the post tensioning strands shall be determined by the post tensioning sub-contractor, taking into account the loads that are to be transferred to the formwork system. The formwork designer and post tensioning sub-contractor shall coordinate to ensure the formwork is sufficient to withstand the applied loads from post tensioning operations.
 - r. Strand extensions, demanded during stressing shall be forwarded to the engineer for review within 24 hours of stressing. No strand shall be cut without the approval of the engineer. The engineer may direct additional stressing of strands, or other actions, if the recorded extensions are acceptable.
 - s. Cables shall not be trimmed without written approval from the design engineer. Grouting of ducts shall be completed within 48 hours of written acceptance of strand extensions. Written confirmation of satisfactory completion of grouting to ducts shall be forwarded to the engineer.



1. All suspended floors shall be $f_c = 40$ MPa unless noted otherwise.
2. All concrete test cylinders shall be site cured under conditions consistent with the concrete pour.
3. Maximum shrinkage strain at 56 days, measured in accordance with AS 1012 part 13, shall be 650 microstrains.
4. To prevent damage to stressing tendons and reinforcement, concrete pump lines shall be adequately restrained and supported on stools or timber blocks independent of the reinforcement. Pump lines shall not be restrained from lateral movement by tying reinforcement due to be covered during the pour.
5. Slurry used to lubricate the pump lines shall not be used in any structural member.

DRAWING NUMBER	ISSUE
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1-002-00	02



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CLIENT

 **Health**
Infrastructure

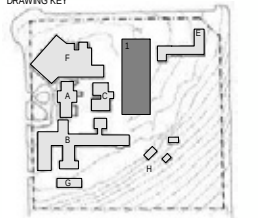
PROJECT MANAGER

PROJECT
KEMPSEY DISTRICT HOSPITAL

ENSTRUCT PROJECT NUMBER

4463

DRAWING KEY



TRUE NORTH PROJECT NORTH

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SCALE _____

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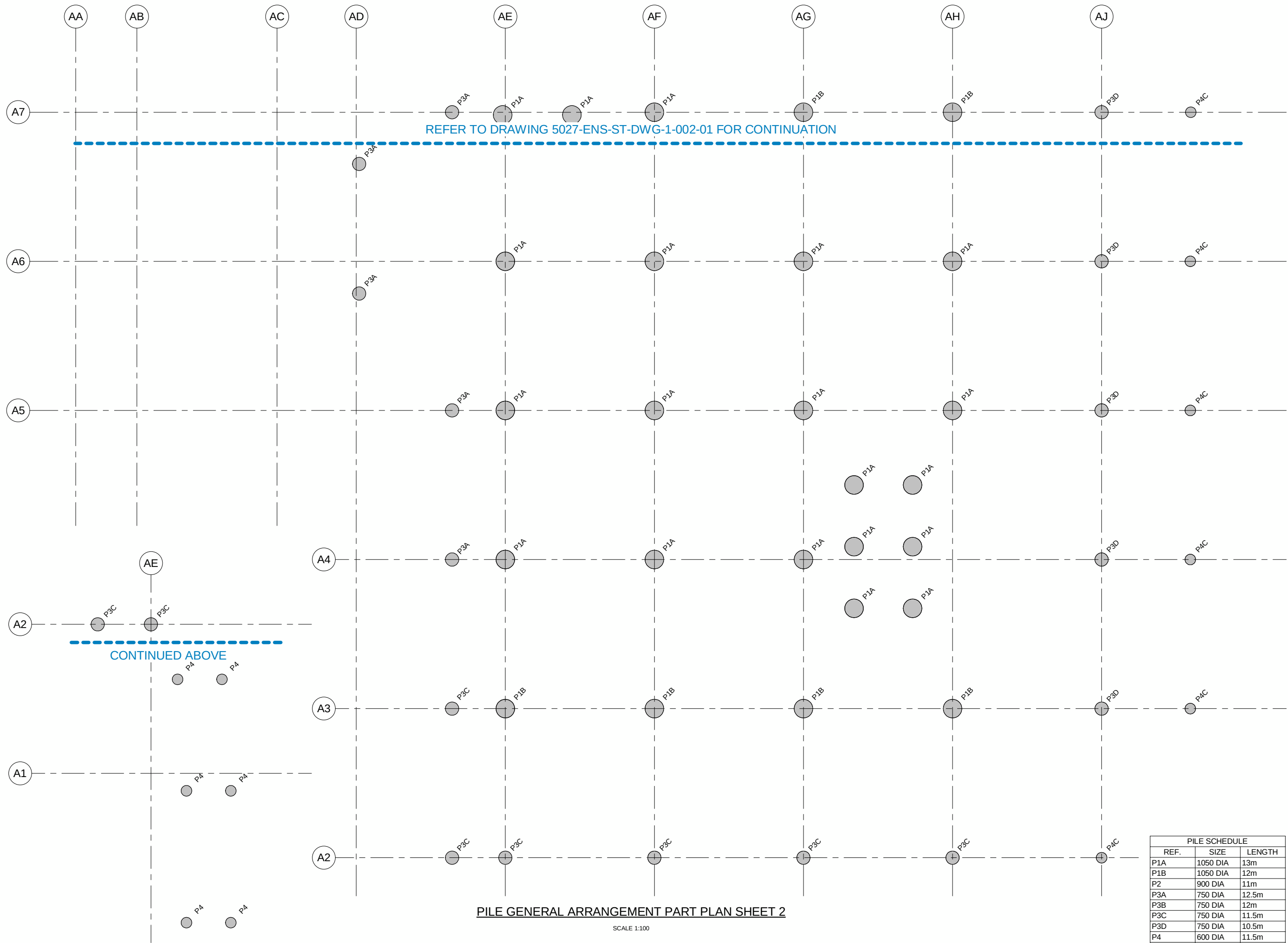
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FOR INFORMATION

DRAWING

PILE GENERAL
ARRANGEMENT PART
PLAN SHEET 2

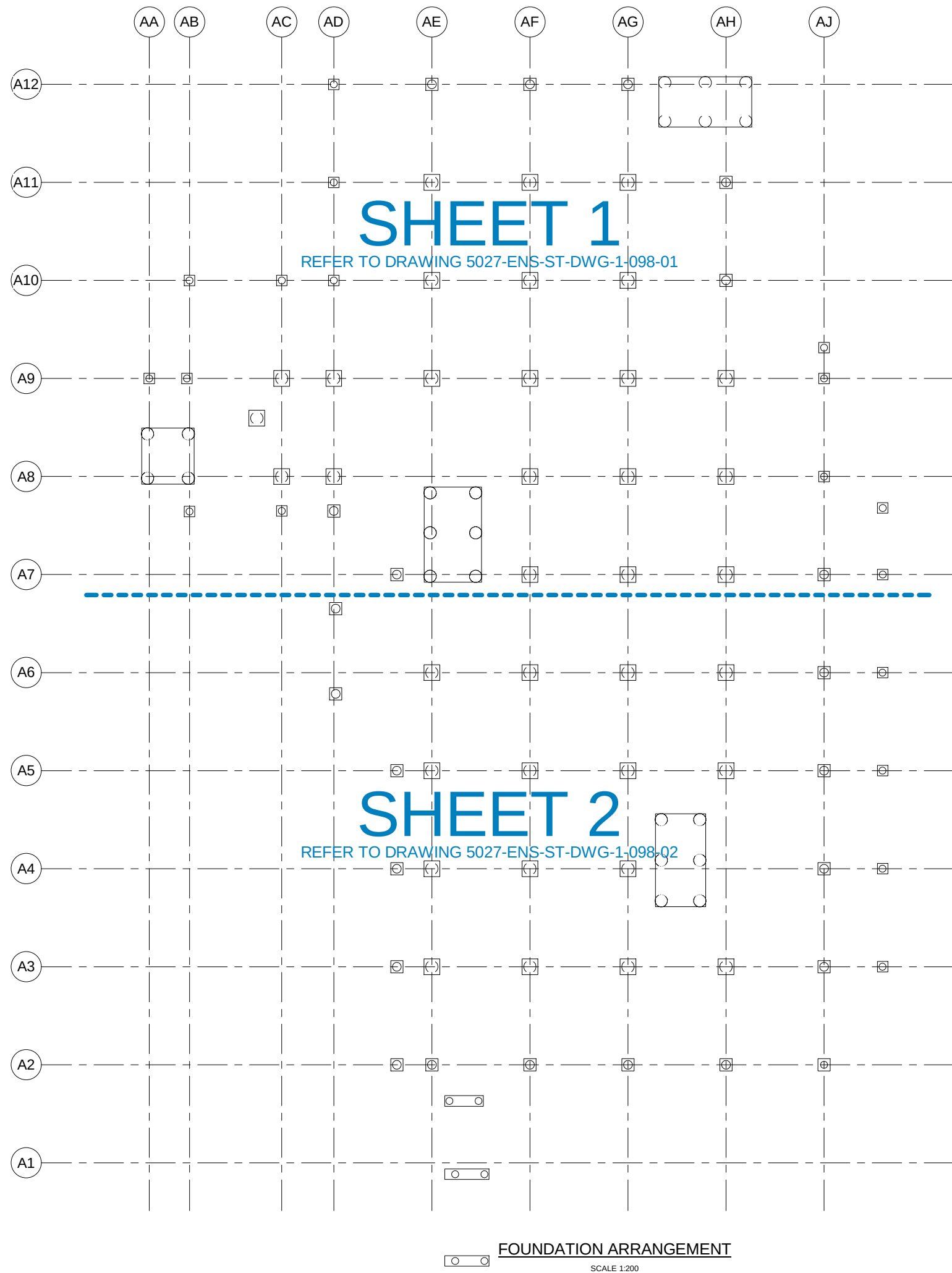
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1-002-02	01



PILE SCHEDULE		
REF.	SIZE	LENGTH
P1A	1050 DIA	13m
P1B	1050 DIA	12m
P2	900 DIA	11m
P3A	750 DIA	12.5m
P3B	750 DIA	12m
P3C	750 DIA	11.5m
P3D	750 DIA	10.5m
P4	600 DIA	11.5m
P4A	600 DIA	13m
P4B	600 DIA	11m
P4C	600 DIA	10.5m
P4D	600 DIA	10m

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NOTES:

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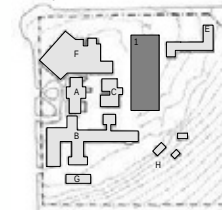


PROJECT
KEMPSEY DISTRICT HOSPITAL

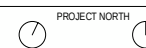
ENSTRUCT PROJECT NUMBER

4463

DRAWING KEY



TRUE NORTH



GRAPHIC SCALE (mm)

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SCALE

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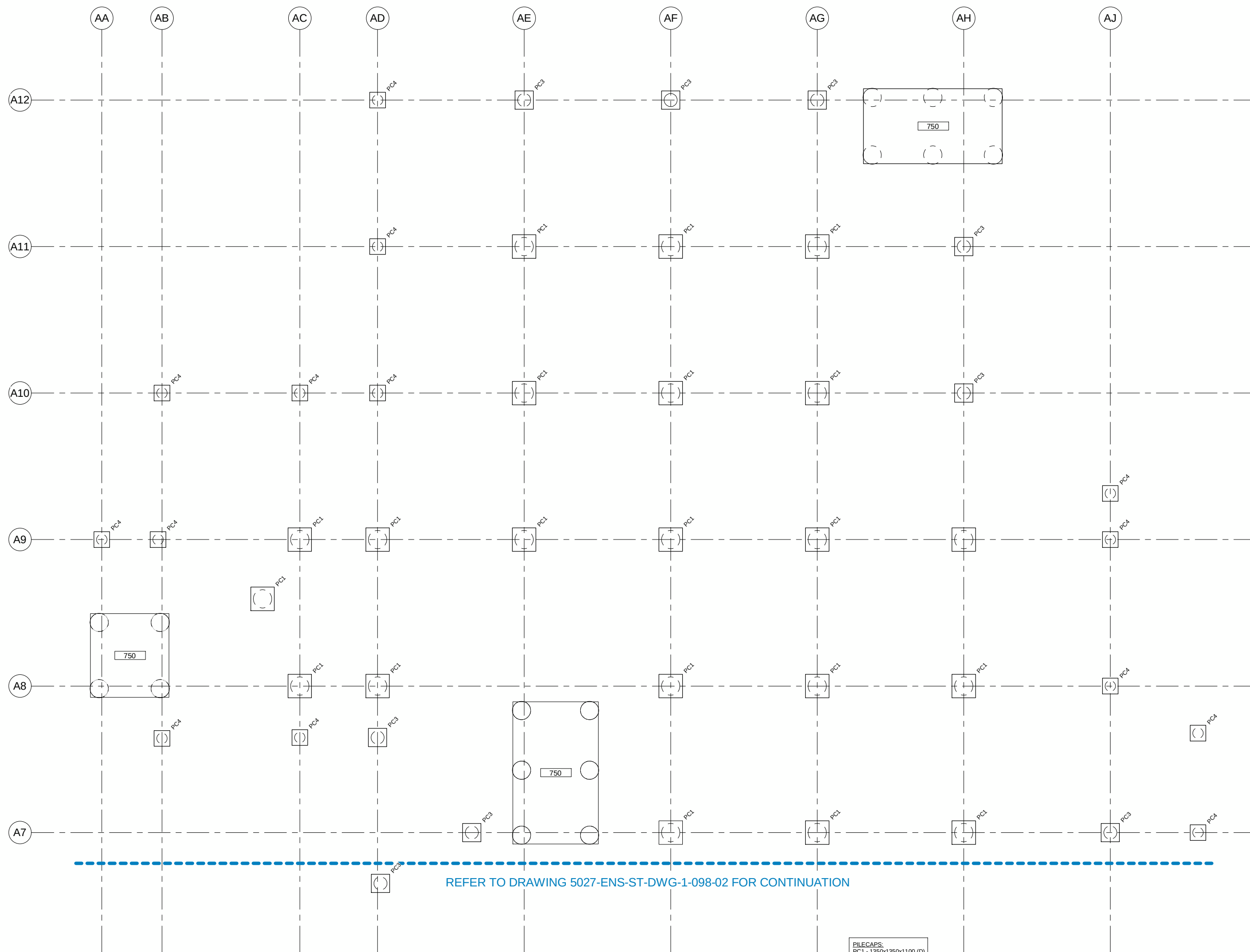
FOR INFORMATION

DRAWING
FOUNDATION PART PLAN
SHEET 1

DRAWING NUMBER
5027-ENS-ST-DWG-
1-098-01

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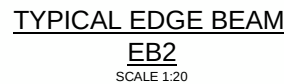
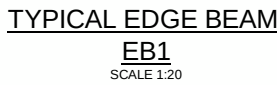


FOUNDATION GENERAL ARRANGEMENT PART PLAN SHEET 1

SCALE 1:100

PILECAPS:
PC1 - 1350x1350x1100 (D)
PC2 - 1200x1200x1100 (D)
PC3 - 1050x1050x1100 (D)
PC4 - 900x900x1100 (D)

LINK
SCALE 1:100



DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-099-00	02

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KEMPSEY DISTRICT HOSPITAL

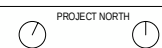
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TRUE NORTH



GRAPHIC SCALE (mm)

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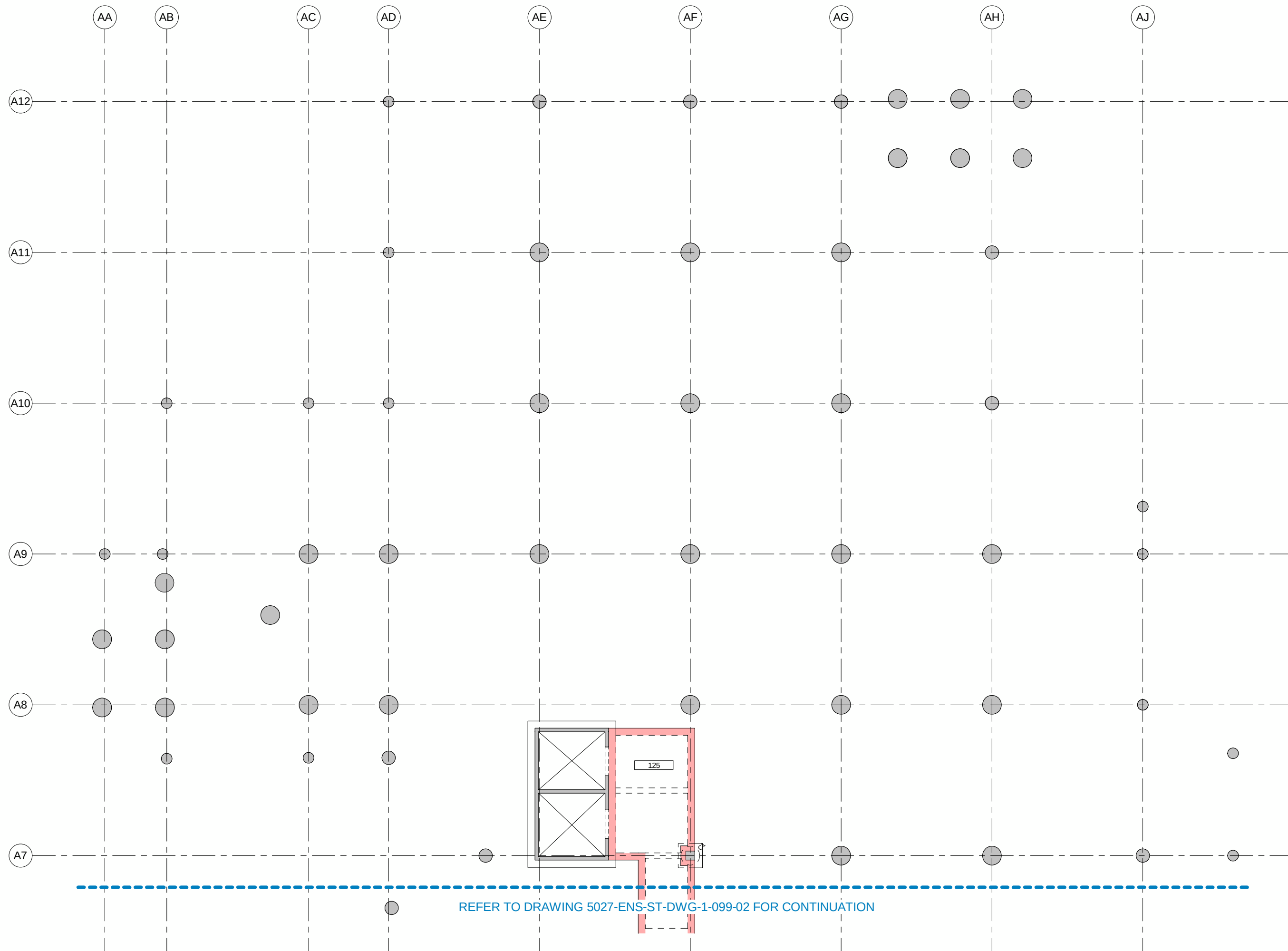
FOR INFORMATION

DRAWING
LOWER GROUND FLOOR
PART PLAN SHEET 1

DRAWING NUMBER
5027-ENS-ST-DWG-
1-099-01

ISSUE
01

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REFER TO DRAWING 5027-ENS-ST-DWG-1-099-02 FOR CONTINUATION

LOWER GROUND FLOOR PART PLAN SHEET 1

SCALE 1:100

NOTE:

- SLAB TO BE 125mm THICK TYPICAL U.N.O.
- ALL R.C. WALLS 200mm THICK U.N.O.

NOTE:

NOTE:
INTERNAL SLAB AND BEAM SIZES SHOWN INCLUDE 50mm NON-STRUCTURAL TOPPING ZONE.
NO TOPPING ZONE ON EXTERNAL OR PLANT ROOM SLABS. 50mm NON-STRUCTURAL TOPPING
TO BE POURED INTEGRAL WITH STRUCTURAL ELEMENTS. REFER TO ARCHITECTS DRAWINGS
FOR SETDOUPS IN NON-STRUCTURAL ZONE, PLINTH AND HOB SETOUT, SIZES AND LOCATIONS.

COLUMNS:
C1 - 500x500
C2 - 450x450
C3 - 600x600

-  DENOTES SLAB EDGE THICKENING TYPE EB1. 400 D (min.) x 400W REFER TO DETAIL
 DENOTES SLAB EDGE THICKENING TYPE EB2. 400 D x 400W REFER TO DETAIL
 DENOTES SLAB INTERNAL THICKENING TYPE IB1. 400 D x 300W REFER TO DETAIL

LINK
SCALE 1:100

DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-100-00	02



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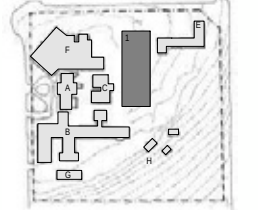


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PROJECT
KEMPSEY DISTRICT HOSPITAL

ENSTRUCT PROJECT NUMBER

4463

DRAWING KEY



TRUE NORTH PROJECT NORTH

GRAPHIC SCALE (mm)

0 500 2000 4000

1:100mm

SCALE _____

As indicated @ A1 DO NOT SCALE

STATUS

FOR INFORMATION

DRAWING

GROUND FLOOR PART

PLAN SHEET 1

DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-100-01	01



NOTE:
INTERNAL SLAB AND BEAM SIZES SHOWN INCLUDE 50mm NON-STRUCTURAL TOPPING ZONE.
NO TOPPING ZONE ON EXTERNAL OR PLANT ROOM SLABS. 50mm NON-STRUCTURAL TOPPING
TO BE POURED INTEGRAL WITH STRUCTURAL ELEMENTS. REFER TO ARCHITECTS DRAWINGS
FOR SETDOUNES IN NON-STRUCTURAL ZONE, PLINTH AND HOB SETOUT, SIZES AND LOCATIONS.

GROUND FLOOR PART PLAN SHEET 1

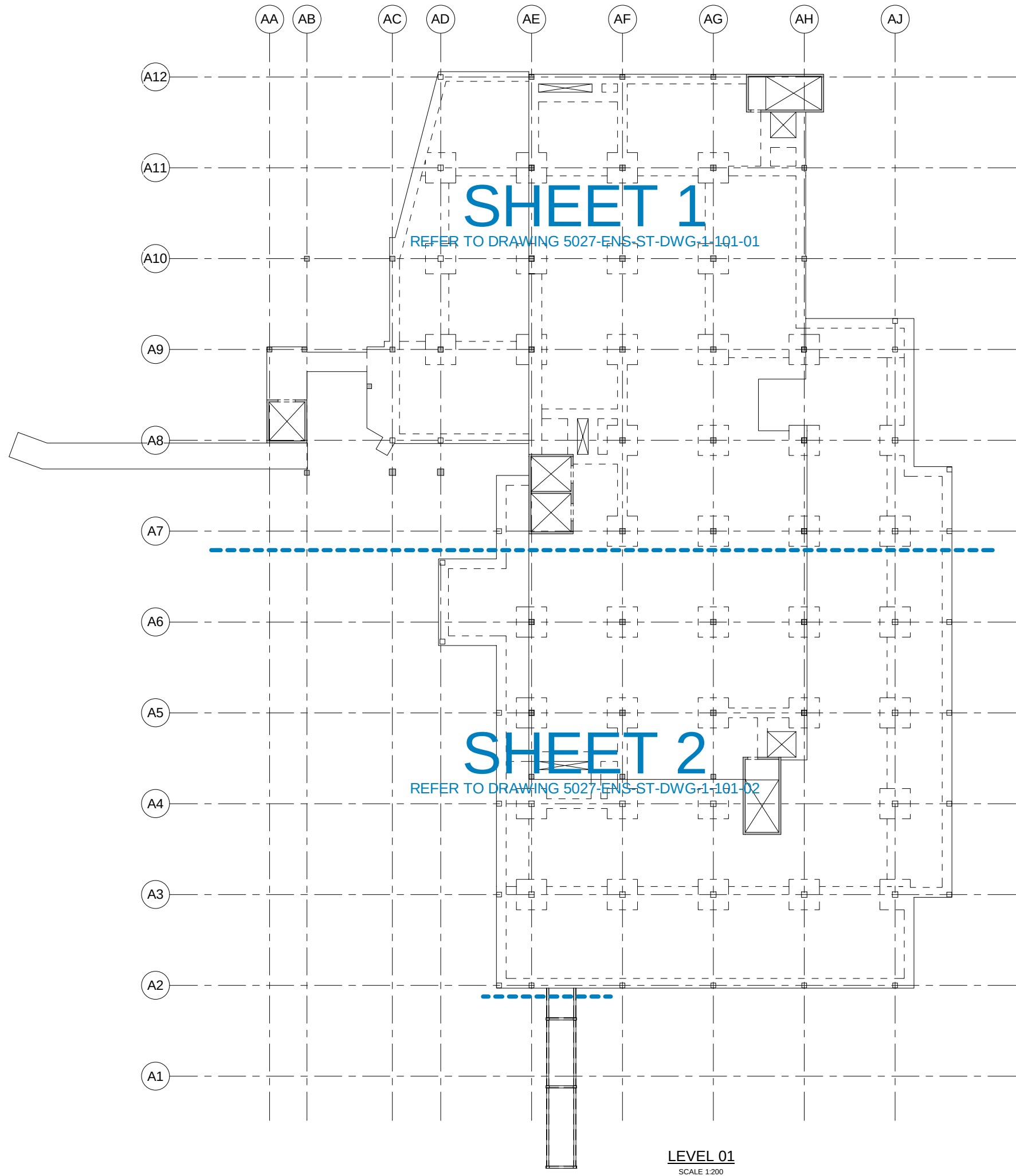
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NOTE:
- ALL R.C. WALLS 200 THK U.N.O.

COLUMNS:
C1 - 500x500
C2 - 450x450
C3 - 600x600

DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-100-02	01





SHEET 1

REFER TO DRAWING 5027-ENS-ST-DWG-1-101-01

SHEET 2

REFER TO DRAWING 5027-ENS-ST-DWG-1-101-02

LEVEL 01
SCALE 1:200

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<http://www.enstruct.com.au>

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ISSUE	DATE	FOR
01	31.01.13	SCHEMATIC DESIGN
02	01.03.13	SCHEMATIC DESIGN

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PROJECT
KEMPSEY DISTRICT HOSPITAL

ENSTRUCT PROJECT NUMBER
4463

DRAWING KEY



TRUE NORTH PROJECT NORTH

GRAPHIC SCALE (mm)
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1:200mm

SCALE

1:200 @ A1 DO NOT SCALE
STATUS

FOR INFORMATION

DRAWING
LEVEL 01 GENERAL
ARRANGEMENT

DRAWING NUMBER
5027-ENS-ST-DWG-
1-101-00

ISSUE
02

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CLIENT

 **NSW**
Government

 **Health**
Infrastructure

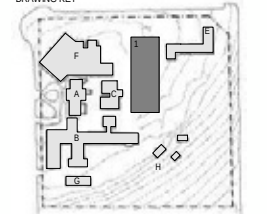
PROJECT MANAGER



PROJECT
KEMPSEY DISTRICT HOSPITAL

ENSTRUCT PROJECT NUMBER
4463

DRAWING KEY



TRUE NORTH PROJECT NORTH

GRAPHIC SCALE (mm)

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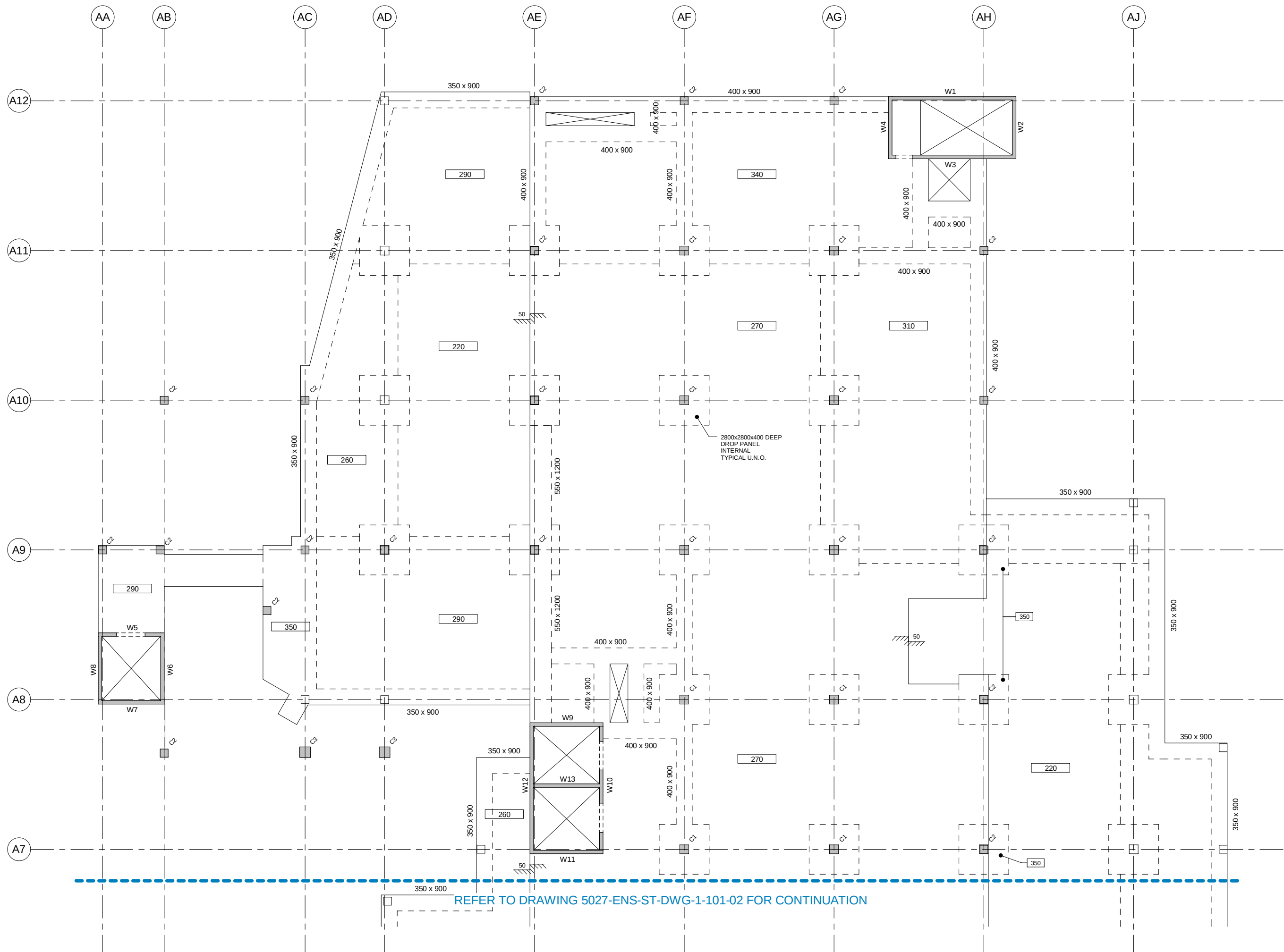
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STATUS

FOR INFORMATION

DRAWING
LEVEL 01 PART PLAN
SHEET 1

DRAWING NUMBER	ISSUE
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1-101-01	01

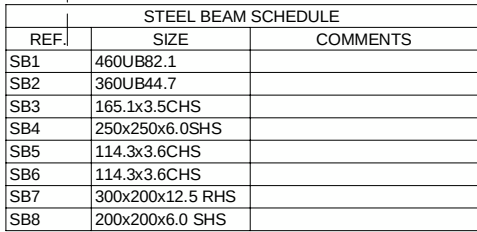


SCALE 1:100

NOTE:
- ALL R.C. WALLS 200 THK U.N.O.

NOTE:
INTERNAL SLAB AND BEAM SIZES SHOWN INCLUDE 50mm NON-STRUCTURAL TOPPING ZONE.
NO TOPPING ZONE ON EXTERNAL OR PLANT ROOM SLABS. 50mm NON-STRUCTURAL TOPPING
TO BE POURED INTEGRAL WITH STRUCTURAL ELEMENTS. REFER TO ARCHITECTS DRAWINGS
FOR SETDOUES IN NON-STRUCTURAL ZONE, PLINTH AND HOB SETOUT, SIZES AND LOCATIONS.

DRAWING NUMBER	ISSUE
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1-101-02	01



DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-1-102-00	02



DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-102-01	01

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KEMPSEY DISTRICT HOSPITAL

ENSTRUCT PROJECT NUMBER

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DRAWING KEY

The drawing key shows a site plan with various features labeled A through H. The features are represented by different shapes and patterns:

- A**: A small, irregularly shaped building with a cross-hatch pattern.
- B**: A larger, irregularly shaped building with a cross-hatch pattern.
- C**: A small, rectangular building with a cross-hatch pattern.
- D**: A small, rectangular building with a cross-hatch pattern.
- E**: A small, rectangular building with a cross-hatch pattern.
- F**: A large, irregularly shaped building with a cross-hatch pattern.
- G**: A small, rectangular building with a cross-hatch pattern.
- H**: A small, rectangular building with a cross-hatch pattern.

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE (mm)

0 500 2000 4000

1:100mm

SCALE _____

As indicated @ A1	DO NOT SCALE
STATUS	

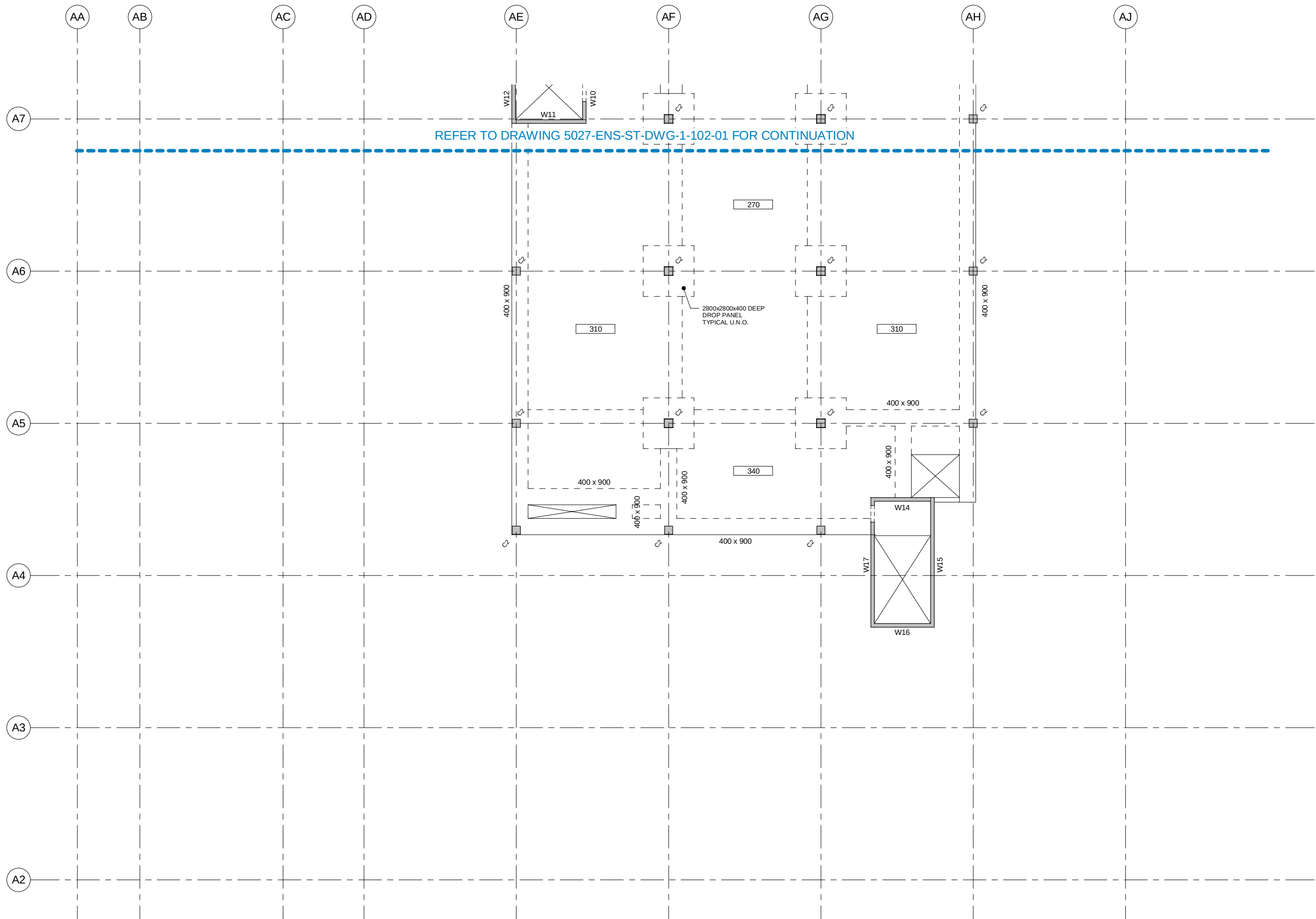
FOR INFORMATION

DRAWING

LEVEL 02 PART PLAN

SHEET 2

DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-1-102-02	01



SCALE 1:100

NOTE:
- ALL R.C. WALLS 200 THK U.N.O.

NOTE:
INTERNAL SLAB AND BEAM SIZES SHOWN INCLUDE 50mm NON-STRUCTURAL TOPPING ZONE.
NO TOPPING ZONE ON EXTERNAL OR PLANT ROOM SLABS. 50mm NON-STRUCTURAL TOPPING
TO BE POURED INTEGRAL WITH STRUCTURAL ELEMENTS. REFER TO ARCHITECTS DRAWINGS
FOR SETDOUNES IN NON-STRUCTURAL ZONE, PLINTH AND HOB SETOUT, SIZES AND LOCATIONS.

LEVEL 03
SCALE 1:200



SCALE 1:100

DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-103-02	01



NOTE:
- ALL R.C. WALLS 200 THK U.N.O.

NOTES:

1. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK. ENSTRUCT SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS AND DRAWINGS.

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[illegible]

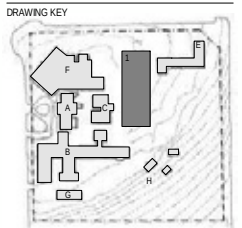
CLIENT

 **Health**
Infrastructure

PROJECT MANAGER



PROJECT
KEMPSEY DISTRICT HOSPITAL

ENSTRUCT PROJECT NUMBER
4463

GRAPHIC SCALE (mm)



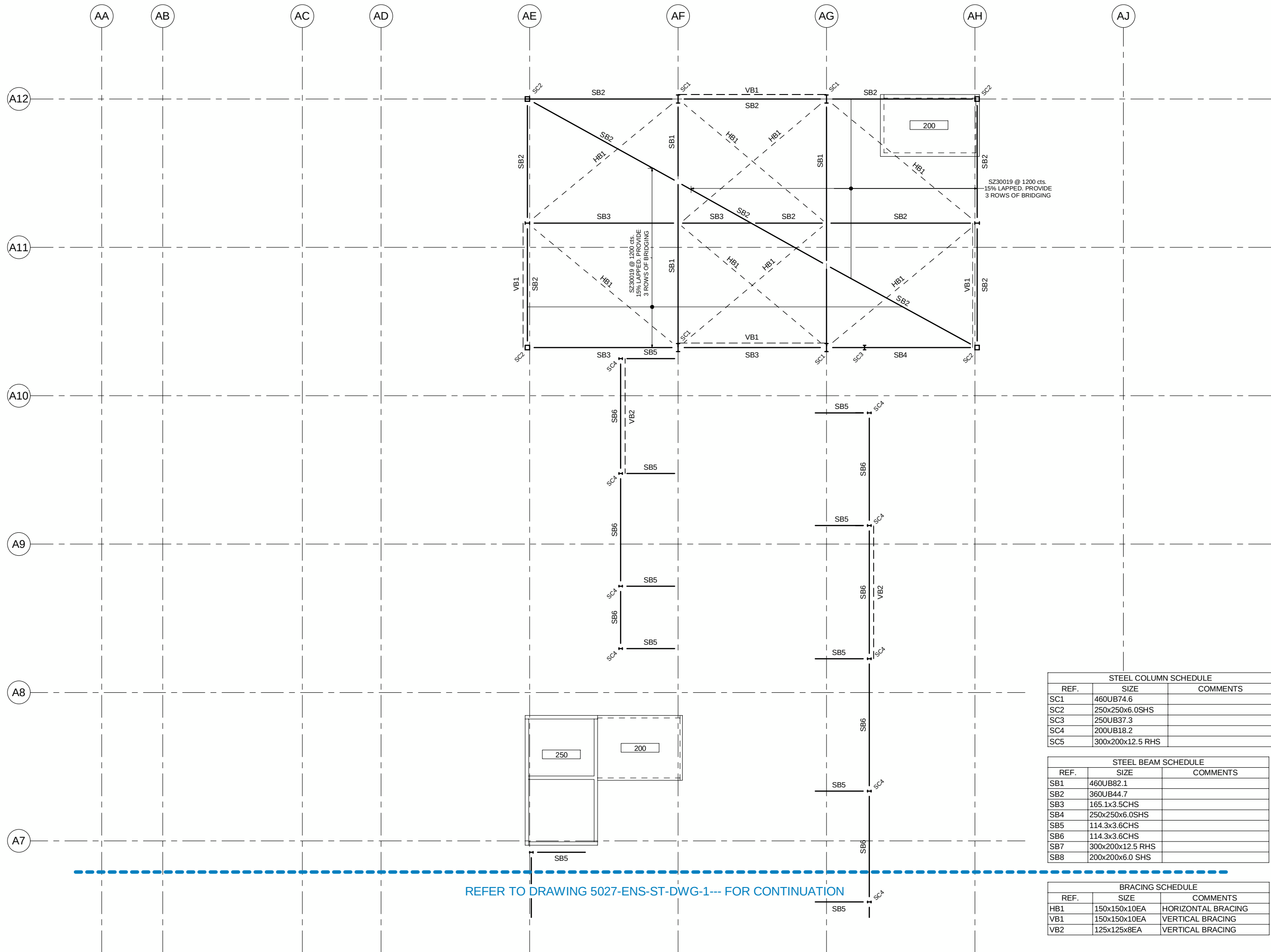
1:100mm

SCALE		
1:100	② A1	DO NOT SCALE
STATUS		

FOR INFORMATION

DRAWING
STEEL ROOF PART PLAN
SHEET 1

DRAWING NUMBER	ISSUE
5027-ENS-ST-DWG-	
1-105-01	01



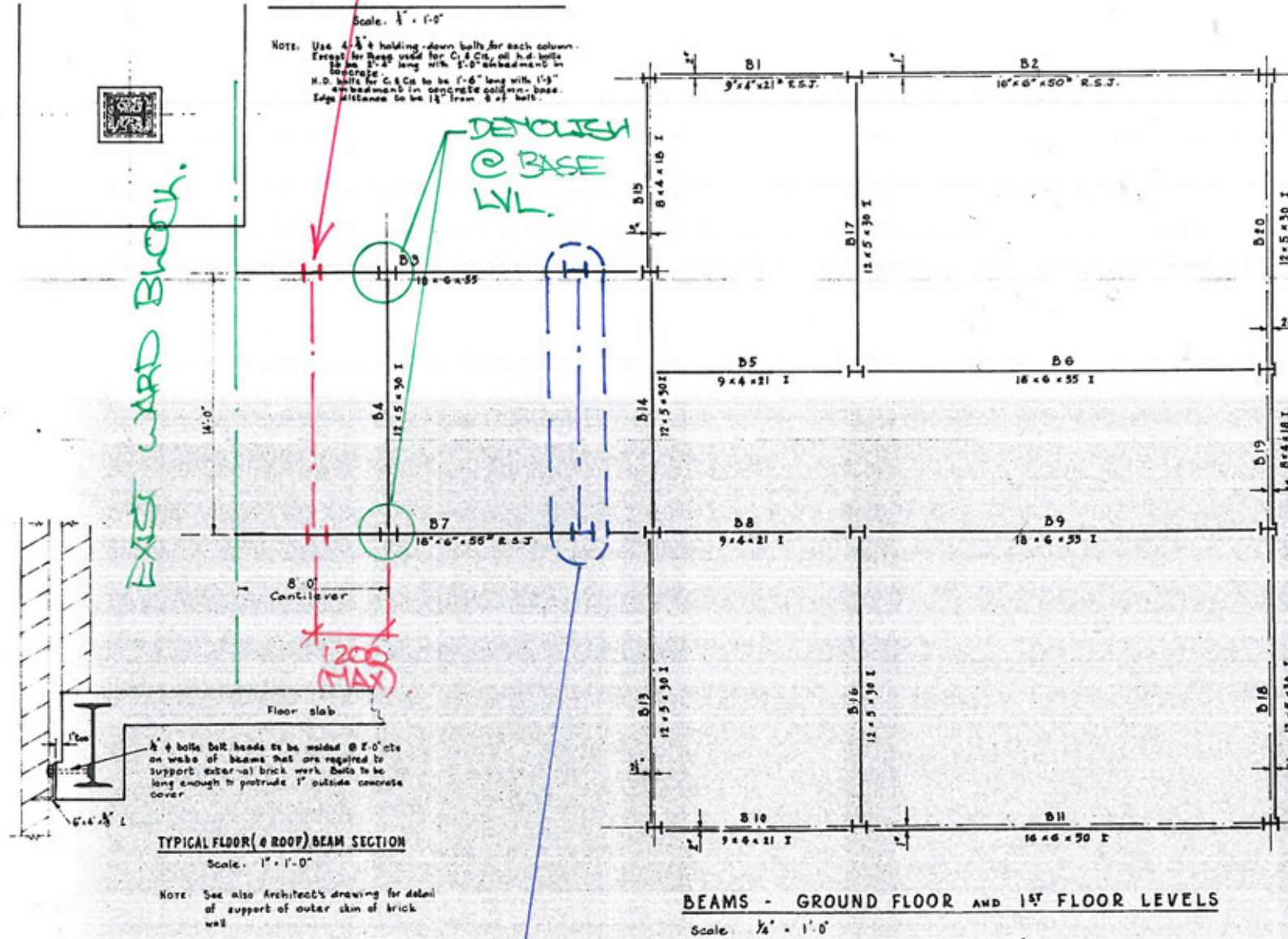
STEEL ROOF PART PLAN SHEET 1

SCALE 1:100

BRACING SCHEDULE		
REF.	SIZE	COMMENTS
HB1	150x150x10EA	HORIZONTAL BRACING
VB1	150x150x10EA	VERTICAL BRACING
VB2	125x125x8EA	VERTICAL BRACING

**Appendix D1-H – Existing Ward Block Link Structure Column
Relocation Sketch**

250 UC 89.5 COLUMN BOTH SIDES
WITH 310 UB 46 BEAM BTW AT
EACH LVL. SUPPORTED ON Ø1450
PIER APPROX 9m LONG.



NOTE!
SEE DRAWING NO 14 FOR GENERAL NOTES

COLUMN-BASE SCHEDULE		
Column marked	size	Reinforcement
C1, C12	5'-0" x 5'-0" x 6'-0" deep	—
C2, C3, C5, C13, C14	6'-0" x 6'-0" x 6'-0" deep	—
C6, C7, C9, C10, C11	6'-6" x 6'-6" x 6'-0" deep	—
C4, C8	12'-0" x 5'-6" x 6'-0" deep	—

	COLUMN					
	C1	C2	C3	C4	C5	C6
Roof level						
1st floor level						
2nd floor level						
Lower grd floor level						
Column base plates	14" x 14" x 1/2"	16" x 16" x 1/2"	16" x 16" x 1/2"	17" x 15" x 1/2"	16" x 16" x 1/2"	16" x 16" x 1/2"
	C1	C2	C3	C4	C5	C6

FRAMING & FOUNDATIONS TO MATCH
NEW ADJACENT STEELWORK MAY
BE REQD SUBJECT TO FURTHER
REVIEW OF EXIST STRUCTURE.

enstruct

Status	PRELIMINARY		
Job Title	KENSLEY DISTRICT HOSPITAL REDEVELOPMENT		
Drawing Title	PROPOSED RELOCATION OF WARD BLOCK LINK COLUMN		
Scales	W/A	File Ref.	
Drm.	TBB	Date.	6/12/12
Job No.	4463	Dwg No.	SK-001
		Rev.	A

**Appendix D1-I – Forestry Corporation of NSW Timber Inspection
Report**



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(PO Box 100 Beecroft NSW 2119)

www.forests.nsw.gov.au T 02 9872 0179 F 02 9872 9093

Ref: 5548a-36800

16 January 2013

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Dear Sir

Timber Inspection Kempsey Hospital

As requested by Mr Blaha Timber Inspectors Mr R Forrester and Mr R Allen carried out an inspection at the above hospital on 9 and 10 January 2013.

1. Building description

- 1.1. There were three buildings inspected. One large building named The Community Health Building and two smaller buildings named The Drug and Alcohol Building and the Aboriginal Health Building.
- 1.2. The Community Health Building consisted of mainly Masonry external and internal walls. The walls supported a hardwood pitched roof. The roof sheeting over the two storey section was galvanised and the rest appeared to be aluminium. The ground floor was supported on hardwood bearers and joists and level one on Oregon joists.
- 1.3. The Drug and Alcohol Building had softwood wall and roof frames supporting colour bond roof sheeting and fibrous cement cladding. The bearers and joists were hardwood.
- 1.4. The Aboriginal Health Building had Radiata Pine wall and roof frames supporting colour bond roof sheeting and fibrous cement cladding. The joists were hardwood and the bearers were either hardwood or steel.

2. Basis of the Inspection

- 2.1. Carry out a visual inspection and grading of the roof and floor framing where access is available.

- 2.2. The timber was graded to AS 2082 (Hardwoods) or AS2858 (softwoods).
- 2.3. A grade based on the majority of the population was given for each component type (E.G rafters F17, ceiling joists F22). Those timber members that do not make the nominated grade were recorded. The reason for a lower grade or a reject was given.
- 2.4. Wall frame material, where it was observed in the roof void, was given. There was limited inspection of the joists supporting the first floor in the community Health Building.
- 2.5. No making of access holes, removal of furniture, insulation or equipment was carried out by Forests NSW. Two small 10mm holes were made to facilitate a borescope inspection.
- 2.6. Typical timber sizes, spacing's and spans were provided on plans. Isolated piers were shown in the subfloor to assist in calculating spans where needed. Engaged piers under the community centre are spaced similar to isolated piers as the bearers above do not carry roof loads
- 2.7. Timber joint groups were provided.

3. Limitations

- 3.1. Not all the timber surfaces were able to be seen (top of joists and bearers etc).
- 3.2. Any access limitations were recorded. Other than for the joists supporting level 1 in the Community Health building and a section of the subfloor used for storage access was good.
- 3.3. Research by Timber QLD has indicated timber may lose some strength over time.

4. Inspection

- 4.1. Plans have been used to detail the timbers nominated dimensions and grade. They also detail the approximate location and direction of each timber component. Photos were also taken. These photos were numbered 1 through to 68. The photo number direction and location of the photo is recoded on the plans.

4.2. Community Health Building

- 4.2.1. The bearers and joists in the subfloor where mixed hardwood of strength group 2 or better. There Joint group would by JD2 or better. The predominant species was Blackbutt.

There were access limitations in storage areas (see plans). After consultation onsite, holes were knocked in the plaster to facilitate some inspection of this area. This area had larger joists supported by steel beams. There were two rows of herringbone blocking.

There were some areas that had suspended concrete but most were bearer and joist construction. Most rooms had 7 joists and were 7 joists occurred room sizes were similar which was different then shown on the plans.

The bearers and joists had been coated with creosote.

The storage area smelt damp and there may be some water penetration in this area during rain.

Timber strip flooring had been used. It appeared to be predominantly Tallowwood.

- 4.2.2. The joists supporting the first floor could not be grade. There was one access hole and we inspected two areas with a borescope. The joists where seen were Oregon. There were loose floor boards fitted between the joists and a lightweight concrete mix poured onto the loose floor boards for insulation and/or noise transmission. It is likely that most of these joists would meet F11. They were 50mm wide and their depth could not be measured.

There appeared to be suspended concrete under the wet areas.

- 4.2.3. The roof was mixed hardwood and the same strength and joint group of the bearers and joists.

The roof sheeting over the two storey section had some corrosion and holes where rain had penetrated.

The roof sheeting over the other sections appeared to be aluminium. There were some dents in the aluminium and in some of these dents the aluminium is split allowing water penetration.

4.3. Drug and Alcohol Building

- 4.3.1. The bearers and joists in the subfloor where mixed hardwood of strength group 2 or better. There Joint group would by JD2 or better. The predominant species was Blackbutt.
- 4.3.2. No wall framing was graded as it was lined on both sides. The top plate could be seen from the roof void. It was Radiata Pine. It is likely that the wall frames are Radiata.
- 4.3.3. Softwood roof trusses supported roof sheeting. The top and bottom chords were Radiata which was JD4.

The webs were Hem-fir. No joint group could be found.

4.4. Aboriginal Health Building

- 4.4.1. The bearers and joists in the subfloor where mixed hardwood of strength group 2 or better. There Joint group would by JD2 or better. The predominant species was Blackbutt. Some bearers were steel. The joist span was large similar to a transportable building.
- 4.4.2. No wall framing was graded as it was lined on both sides. The top plate could be seen from the roof void. It was Radiata Pine. It is likely that the wall frames are Radiata.
- 4.4.3. There were Radiata pine roof trusses. The Radiata was JD4.

5. Comments

- 5.1. The structural timber was good quality and no real degrade since building was found.
- 5.2. There were termite barriers placed on isolated piers (ant caps) which offered good protection. They were loosely fitted on engaged piers which offer little protection as they do not extend through the brick walls. As the two smaller buildings only have isolated piers there termite barrier would comply with current building requirements.

The timber used in the Community Health Building with the exception of the Oregon is reasonably termite resistant and the bearers and joists have the added protection of having creosote applied.

- 5.3. Termite in-ground monitoring stations were observed outside the Community Health Centre. The lid was removed off one and it appears they have not been serviced for some time.
- 5.4. Australian Standard 3660 recommends yearly Termite inspections.
- 5.5. The damp smell indicates that ventilation could be improved in the subfloor at the end used for storage. Extraction fans could be installed. Staff indicated it is no longer used. This being so ventilation could be provided by installing a mesh door, leaving the windows fixed in a slightly opened position. Installing mesh vents in the masonry wall.

Yours sincerely



R FORRESTER
MANAGER TIMBER INSPECTION

Notes
Most room voids appeared to be the same size with 7 joists unless detailed. Room sizes not necessarily same on plans.
Bearers and joists that were not lined had been coated with creosote.
Timber in subfloor was in good condition where it could be seen.

- Isolated 230x23 brick piers
- Engaged piers located similar span on walls
- Bearer 95x75 Bolted 1200 Centres HWD F17
- Bearers 120x75 HWD F22
- Joists 120x75 HWD F22 450 centres
- Joists 195x50 HWD F22 450 Centres
- Joists 100x50 HWD F22 600 Centres
- 12 Photo Number and direction taken
- Steel beam

