

Technical Data Sheet Hunua Quarry

Basecourse Aggregates

Hunua Quarry Source Rock: Greywacke

Source Rock Characteristics	Test Method	Value
Crushing Resistance	NZS4407:1991 test 3.10	@ 130kN < 5% @230kN < 5%
Weathering Resistance	NZS 4407:1991 test 3.11	AA – BB
Solid Density	NZS4407:1991 3.7.1	~2700 kg/m ³
Los Angeles Abrasion (LAA)	ASTM C535-09	<20

Manufactured General All Passing Aggregate (GAP20/40/65)

Test	Test Method	Value
Maximum Dry Density	NZS4402:1986 test 4.1.3	> 2.20 T/m ³
Optimum Water Content		5% -7%
Permeability	Constant Head Permeability	> 1.0e-3
Cement Stabilised UCS (MPa)	AS1289.5.2.1 (2003)	2% CTB > 3MPa

All Passing Aggregate (Hunua 40/65)

Test	Test Method	Value
Max Dry Density	NZS4402:1986 test 4.1.3	> 2.20 T/m ³
Optimum Water Content		5% - 7%
Cement Stabilised UCS (MPa)	AS1289.5.2.1 (2003)	2% CTB > 3MPa

Sub Basecourse Aggregate (Hunua AUS2)

Test	Test Method	Value
Max Dry Density	NZS4402:1986 test 4.1.3	> 2.3 T/m ³
Optimum Water Content		4% - 6%
Permeability	Constant Head Permeability	> 1.0e-3

Basecourse aggregate (TNZ40 M4)

Test	Test Method	Value
Max Dry Density	NZS4402:1986 test 4.1.3	> 2.3 T/m ³
Optimum Water Content		4% - 6%
Clay Index	NZS4407:1991 test 3-5	< 3
Permeability	Constant Head Permeability	> 1.0e-3
Cement Stabilised UCS (MPa)	AS1289.5.2.1 (2003)	2% CTB > 4MPa

Coarse Aggregate

Product	SE	63.0mm	37.5mm	19.0mm	9.5mm	4.75mm	2.36mm	0.075mm
GAP 65	>25	100%	90% - 80%	70% - 50%	55% - 30%	40% - 20%	30% - 15%	< 7%
GAP40	>25		100%	81% - 61%	57% - 38%	43% - 23%	33% - 14%	< 7%
Hunua AUS2	>40	100%	90% - 80%	62% - 52%	48% - 32%	35% - 20%	25% - 12%	< 5%
TNZ 40	>40		100%	66 – 81%	43 – 57%	28 – 43%	19 – 33%	< 7%

Concrete Aggregate

Hunua Quarry Source Rock: Greywacke

Source Rock Characteristics	Test Method	Value
Crushing Resistance	NZS3111 Section 14	>350kN to produce 10% Fines
Weathering Resistance	NZS3111 Section 15	AA

Coarse Aggregate

Test	Test Method	Value
Unit Mass	NZS3111 Section 10	1480 Kg/m ³
Loose Poured - SSD*		1630 Kg/m ³
Compacted -SSD* -voids		40-50%
Absorption	NZS3111 Section 12	1%
Density -Dry		2700 Kg/m ³
-SSD*		~2720 Kg/m ³

* Saturated Surface Dry

Fine aggregate (AP7) Dry

Test	Test Method	Value
Unit Mass	NZS3111 Section 10	1390 Kg/m ³
-voids		47%
Absorption	NZS3111 Section 16	1.6%
Density -Dry		2600 Kg/m ³
-SSD*		2650 Kg/m ³
Chloride Content	ASM C1152	<5 mg/kg or <0.0005% (m/m)

* Saturated Surface Dry

Fine aggregate (AP7) Washed

Test	Test Method	Value
Unit Mass	NZS3111 Section 10	1440Kg/m ³
-voids		45-50%
Absorption	NZS3111 Section 16	1.1%
Density -Dry		2680 Kg/m ³
-SSD*		2700 Kg/m ³

* Saturated Surface Dry

Coarse Aggregate

Product	Cleanliness Value	37.5mm	26.5mm	19.0mm	13.2mm	9.5mm	4.75mm
40mm	>85	100%	100 - 90%	90 - 50%	50 - 10%	0%	
20mm	>85		100%	100% - 85%	25% - 5%	10% - 0%	0%
13mm	>85			100% - 100%	100% - 85%	60% - 40%	10% - 0%
10mm	>85				100% - 100%	100% - 85%	10% - 0%

Fine aggregate

Product	Moisture Content	SE	6.7mm	4.75m m	2.36m m	1.18m m	0.6mm	0.3mm	0.15m m	0.075 mm
AP7 Washed		> 70	100%	100% - 90%	70% - 60%	35% - 25%	20% - 10%	10 %- 5%	5% - 0%	< 3%
AP7 Dry		> 40	100%	100% - 90%	70% - 50%	45% - 30%	30% - 20%	20% - 10%	10% - 5%	< 10%

Asphalt Aggregate

Hunua Quarry Source Rock: Greywacke

Source Rock Characteristics	Test method	Value
Crushing Resistance	NZS4407:1991 test 3.10	<5% - 230kN
Weathering Resistance	NZS 4407:1991 test 3.11	AA
Polished Stone Value	BS EN 1097-8:2009	>53
Weak Particles	AS1141.32:1995	<1%

Coarse Aggregate

Test	Test Method	Value
Absorption	ASTM C127-07	< 1%
Density -Dry		> 2.68 T/m ³
-SSD*		> 2.70 T/m ³

* Saturated Surface Dry

Fine Aggregate

Test	Test Method	Value
Absorption	ASTM C128-07a	< 2%
Density -Dry		>2.55 T/m ³
-SSD*		>2.60 T/m ³
Degradation	AS1141.25.2	>90

* Saturated Surface Dry

Coarse Aggregate

Product	CV	ALD	19.0 mm	13.2mm	9.5mm	6.7mm	4.75mm	2.36mm
Grade 2	>80	9.5–12.0mm	100 %	30% - 15%	< 5%	0%		
Grade 3	>80	8.5 – 10.0mm	100 %	100% - 80%	35% - 25%	<5%	0%	
Grade 4	>80	6.0 – 7.0mm		100%	100% - 80%	<10%	<5%	0%
Grade 5	>80	5.0 – 6.0mm		100%	100% - 95%	75% - 50%	8% - 0%	2% - 0%
Grade 6	>80	4.0 – 5.0mm			100%	100% - 95%	60% - 20%	15% - 0%

Fine Aggregate

Product	Moisture Content	SE	6.7mm	4.75m m	2.36m m	1.18m m	0.6mm	0.3mm	0.15m m	0.075 mm
PAP	< 4%	>35	100%	100% – 90%	70% – 85%	45% – 60%	40% – 30%	30% – 20%	20% – 10%	15% - 10%

All testing carried out at an IANZ accredited laboratory. Test results available upon request. All results correct at time of publication, July 2012.