

C.S.I.R.O. Deep Blue Minerals Workshop

April 2005

**Sydney's construction sand market
&
the potential role of marine aggregate**

Quaternary Resources P/L

Talk Outline

- Construction materials and marine aggregate
- The market, the demand, the options (Sydney)
- Marine aggregate - the legislative context (Federal & State)
- The Sydney Marine Sand P/L experience (2000 to 2004)
- Summary

Construction Materials

- Construction materials such as gravel, sand, clay are a fundamental (if somewhat unglamorous) component of the mineral resource base of any developing/developed economy
- Construction materials are typically a high bulk low unit cost commodity sourced close to market so as to minimise transport costs
- Internationally and nationally, construction materials are/have been sourced from a range of terrestrial, river, estuarine and marine environments adjacent to main population centres
- Increasingly, competition for land around major cities forces suppliers of further a-field, effectively increasing the “footprint” of a city’s resource base
- This reality has been the driver for a number of resource companies exploring the “marine aggregate option” for Sydney

Marine Aggregate - Construction Materials

- Extraction of construction materials from marine environments (marine aggregate) is commonplace overseas. In Europe...

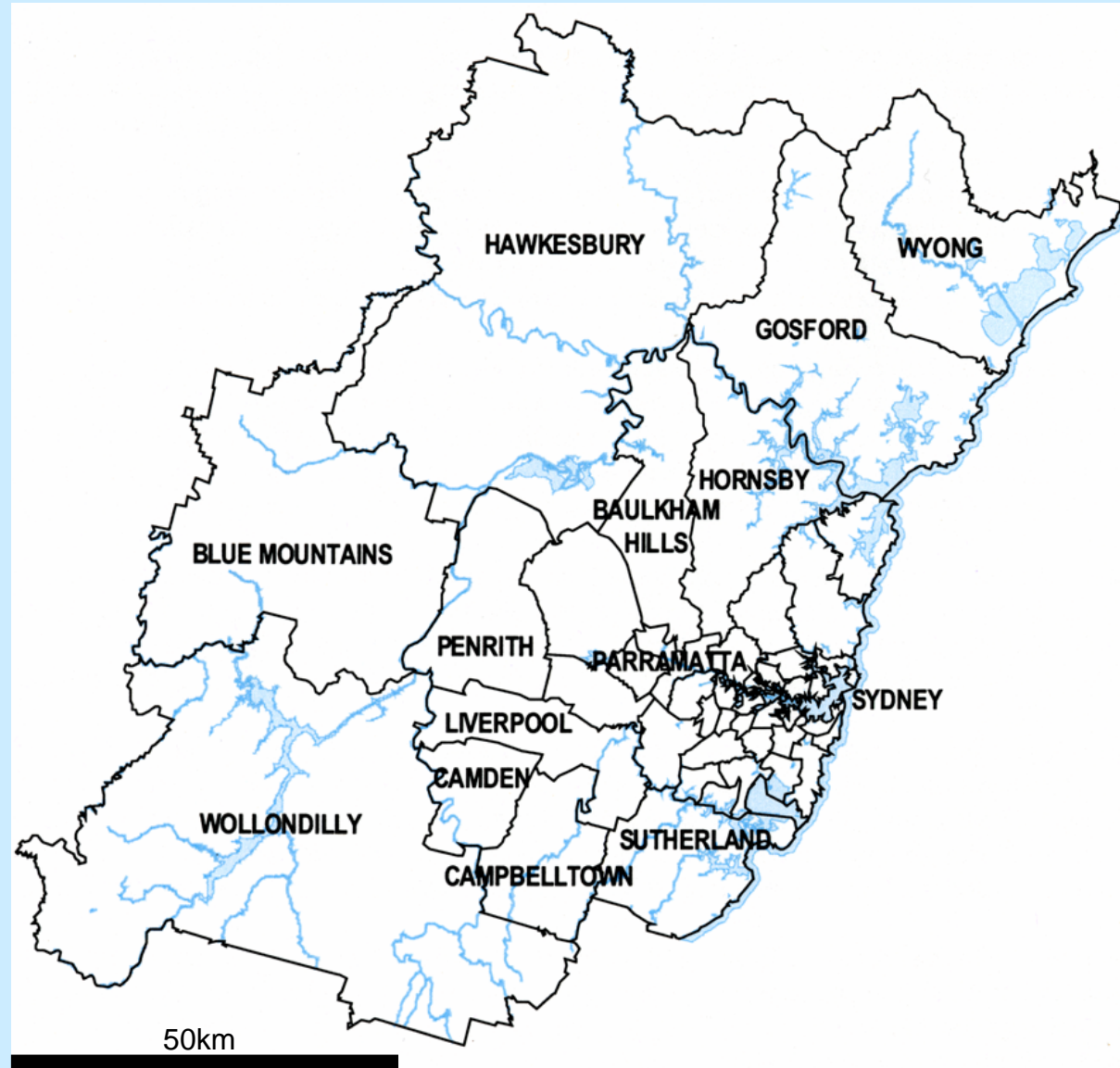
Country	1999(Mt)	2000(Mt)	2001(Mt)
Netherlands	35.8	40.6	58.2
UK	23.7	23.1	22.7
Denmark	18.4	11.9	?
Germany	7.2	9.2	?
France	3.0	3.9	3.8
Belgium	2.7	3.0	3.0

(Harrison 2003)

- In Australia, there are few commercial operations sourcing large volumes of construction materials from marine environments
- In New South Wales there are none.
- There have been several (unsuccessful) attempts to establish marine aggregate as a source of construction sand for the Sydney market, notably Consolidated Goldfields (1980's) and Metromix (1990's)

Sydney Construction Sand “Market”

(The Sydney Planning Region)



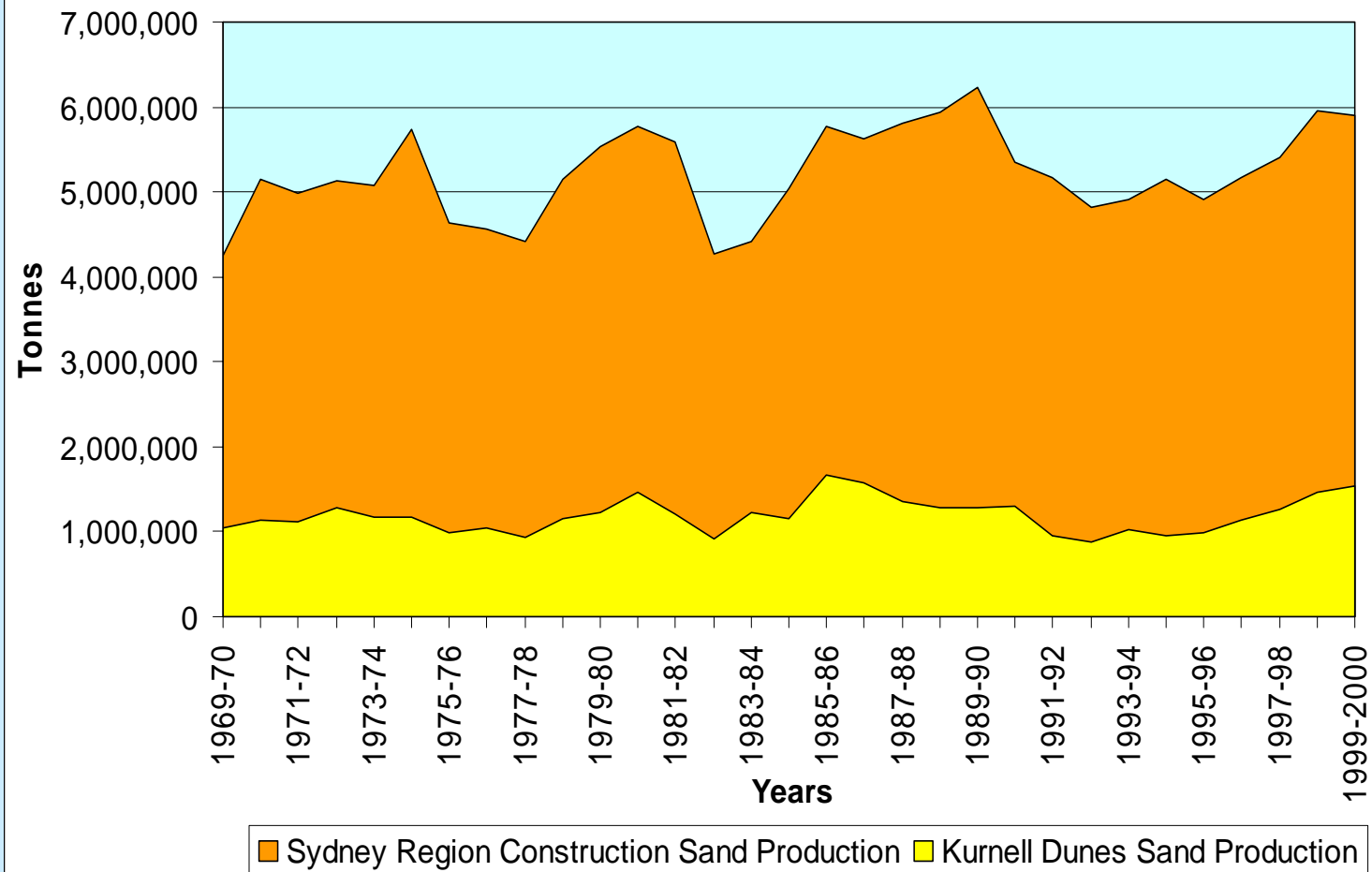
Sydney Construction Sand Demand*

- The Sydney Planning Region (SPR) currently consumes up to 7Mt of construction sand annually.
- 48% is fine to medium grained sand, 36% is medium to coarse grained and 15% is clayey/mortar sand.
- Currently 85% of SPR construction sand demand is obtained from deposits in the Hawkesbury-Napean River, Georges River (medium to coarse sand), Kurnell sand dunes (fine to medium sand) and from friable Hawkesbury Sandstone (clayey/mortar sand)
- The SPR imports c. 900,000 tonnes of construction sand from outside of the region. This is set to rise as traditional sources are exhausted, notably Kurnell and Penrith Lakes

*Unless stated otherwise, majority of figures/diagrams used in this presentation are from NSW Geological Survey Report GS2001/086 – “Supply and demand for construction sand in the Sydney Planning Region”

Sydney Region Construction Sand Production 1969 to 2000

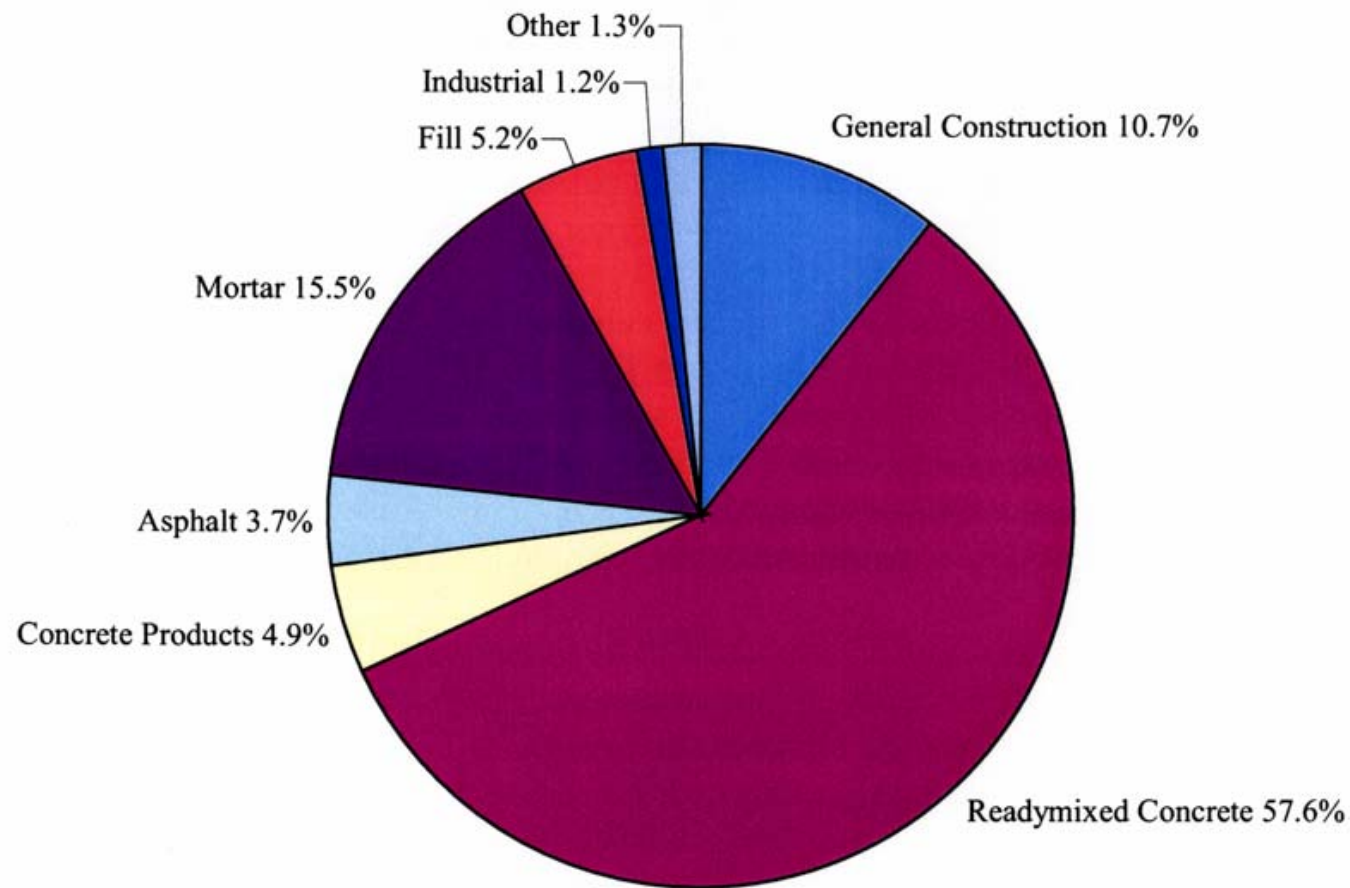
(Source NSW DPI)



Sydney Construction Sand Uses

- Main uses for construction sand are concrete manufacture, mortar and fill.

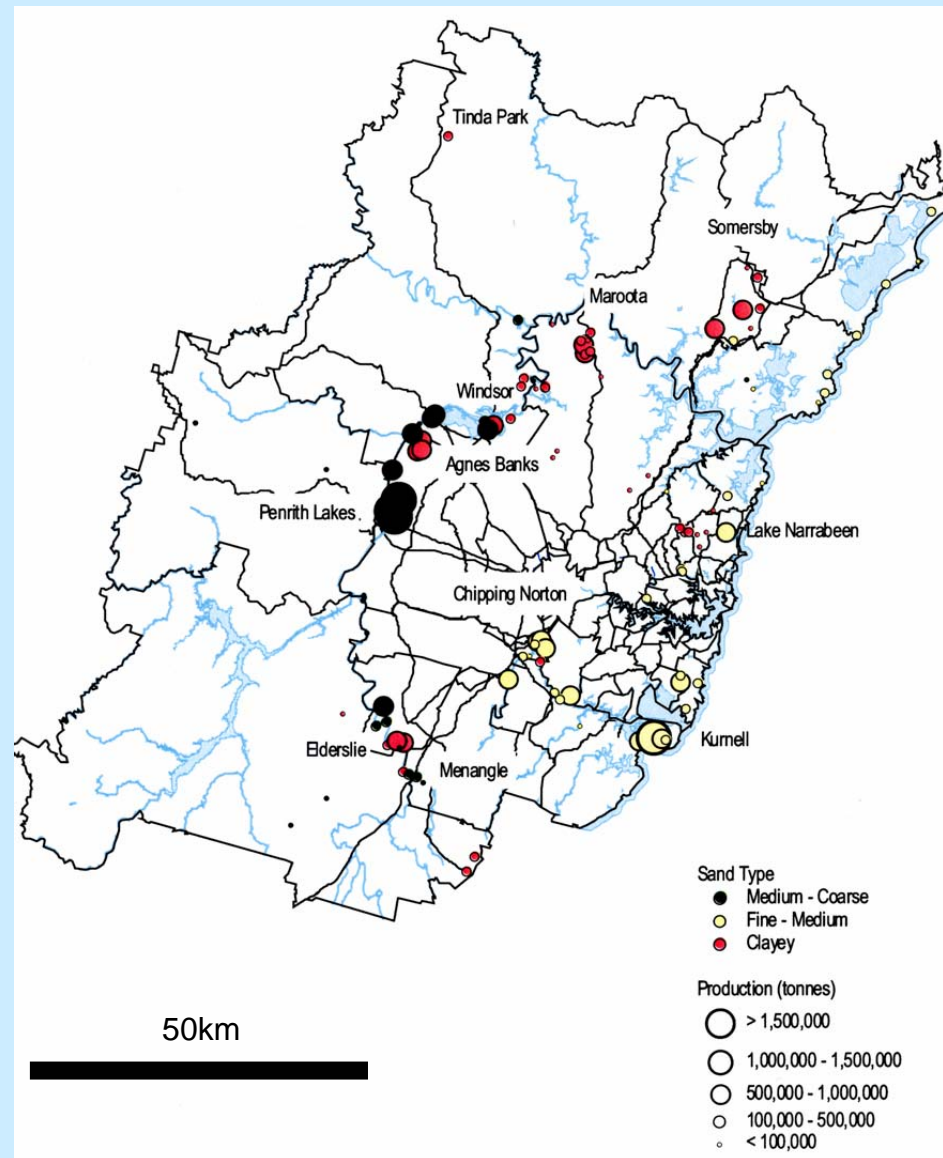
Figure 7: End Use by Sand Type 1999/2000



*Source NSW Geological Survey Report GS2001/086

Sydney Construction Sand Market Supply

(to year 2000)



Ref. NSW GS2001/086

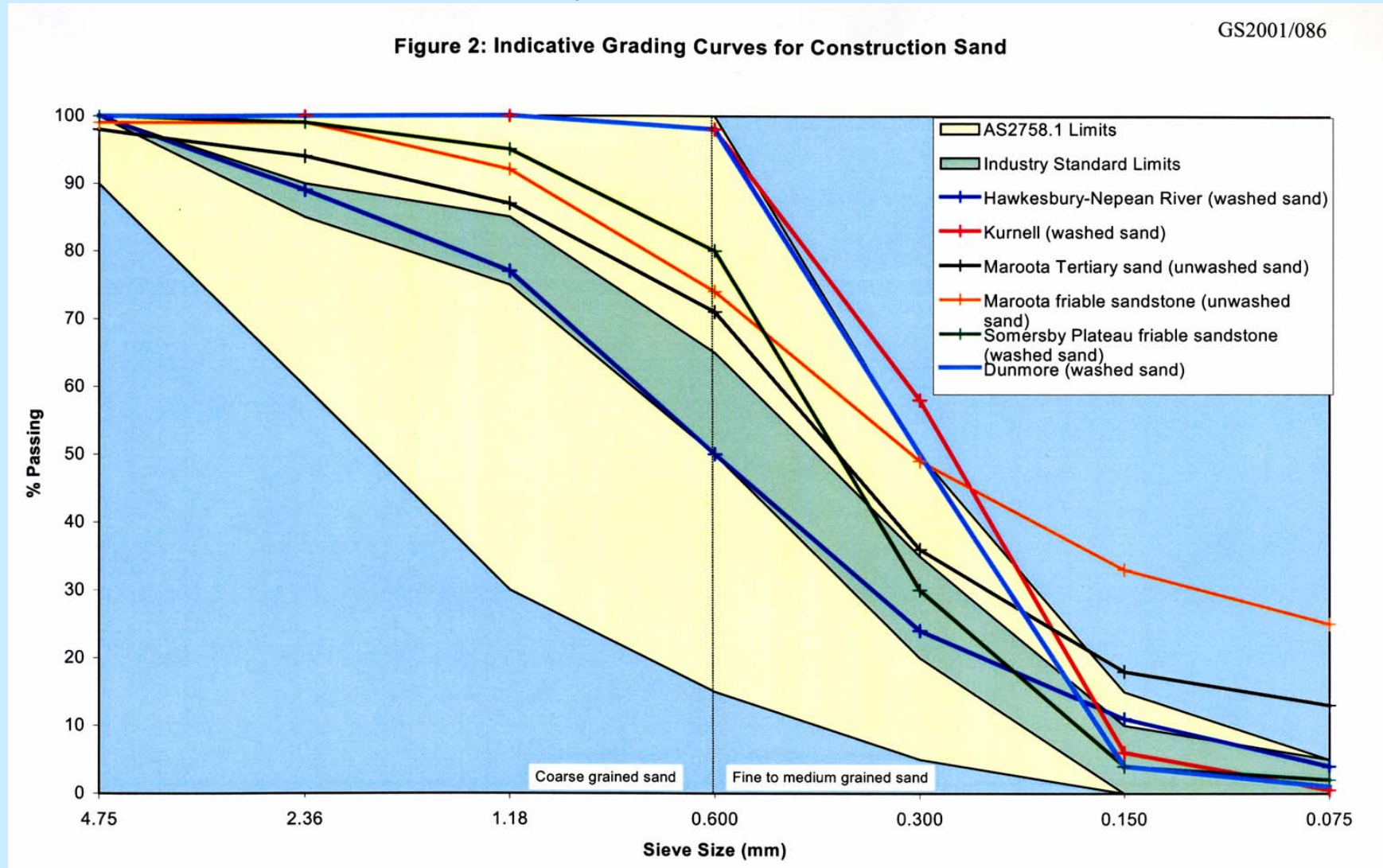
Construction Sands - Characteristics

- Construction sands have a particle size range from 0.06 to 2.00mm, particles display varying degrees of roundness and are primarily composed of quartz with varying amounts of rock and shell fragments
- Sand size grading as well as compositional and textural maturity reflects source materials
- In Sydney construction sands traditionally are sourced from beach/dune, river/river terrace, friable sandstone/sandstone environments



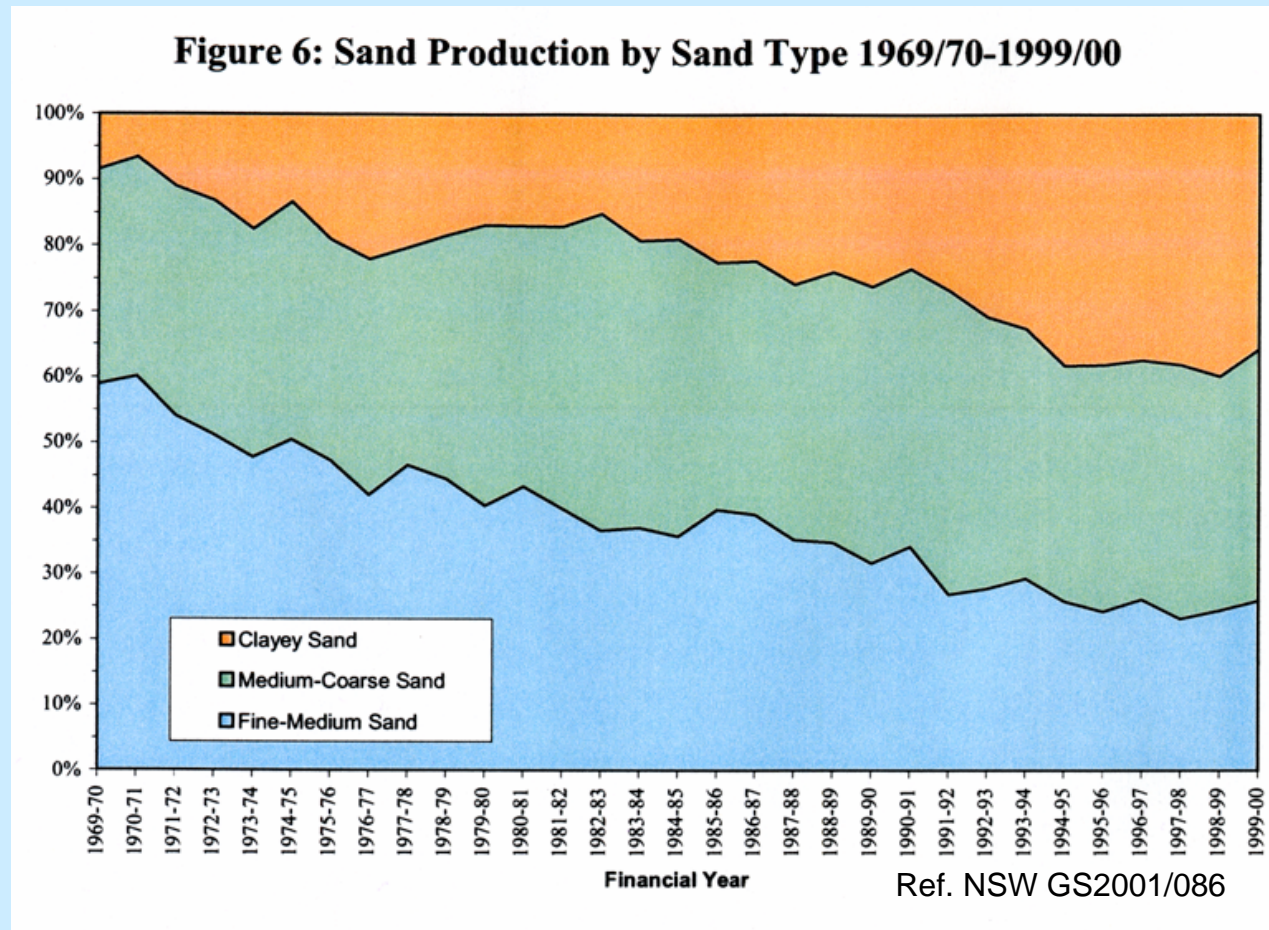
Construction Sands – Industry requirements

- Blending of grainsizes (sand sources) is required to meet industry standards for *inter alia* readymixed concrete and concrete products



Construction Sand Types – Production Trends

- Long-term trend in sand type production reflects reducing fine sand production from coastal dunes, increased production from sandstone areas.



- Marine aggregate potentially fills this “gap” in fine-medium sand resource

Sydney Construction Sand Market Supply

(Projected supply / demand) Millions of Tonnes*

Sand Type	2000-2010 (Short term)	2000-2020 (Medium term)	2000-2040 (Long term)
Medium to Coarse	25.08	50.08	106.32
Fine to Medium	33.11	66.13	140.41
Clayey/mortar	10.51	20.99	44.57
Totals	68.7	137.20	291.30

Source: GS2001/086

- Cessation of Kurnell (fine-medium sand) and Penrith Lakes (medium to coarse sand) extraction are expected to create significant shortfalls in sand production in the short term
- Shortfalls will have to be met by increased production from friable sandstone areas within planning region and/or imports from outside of planning region

Sydney Construction Sand Resources

@2001 @ post 2010)

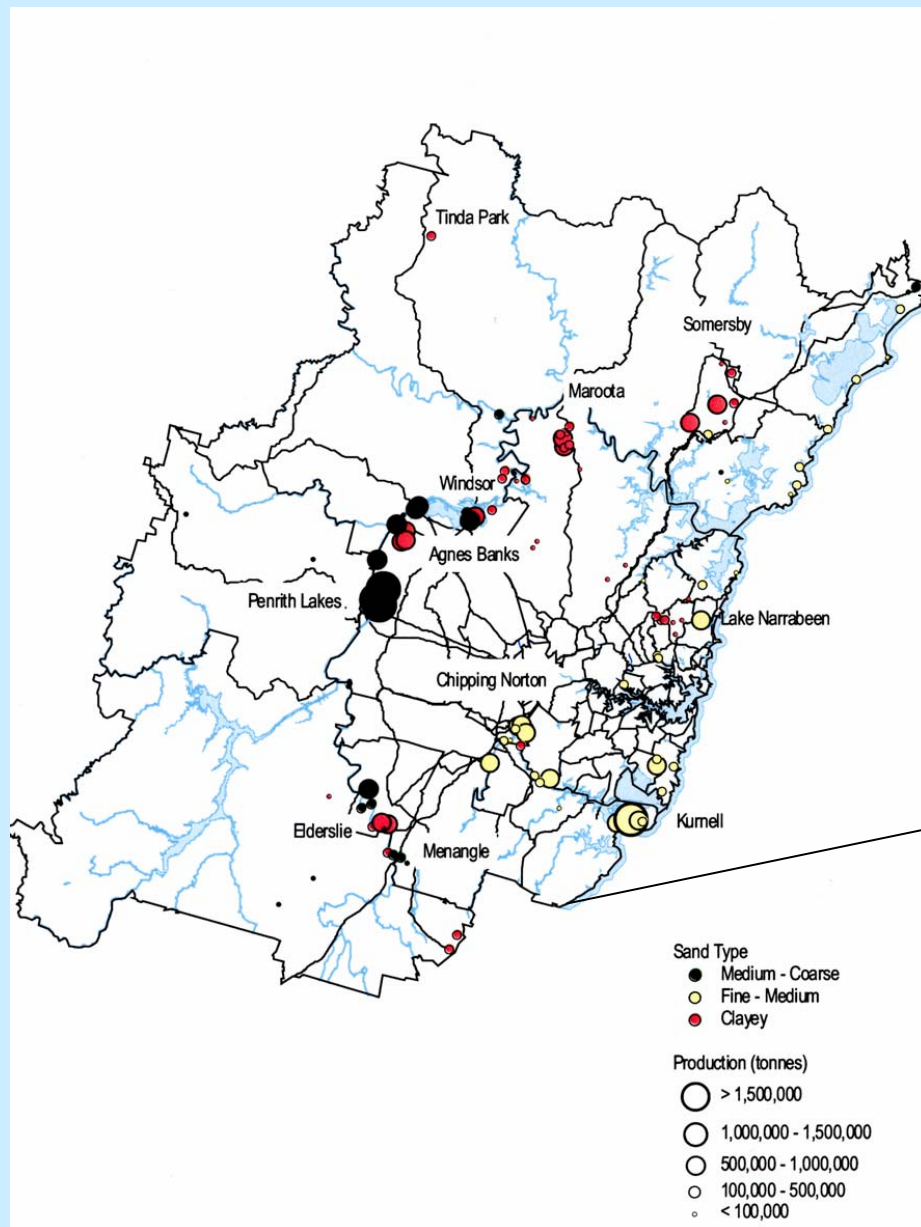
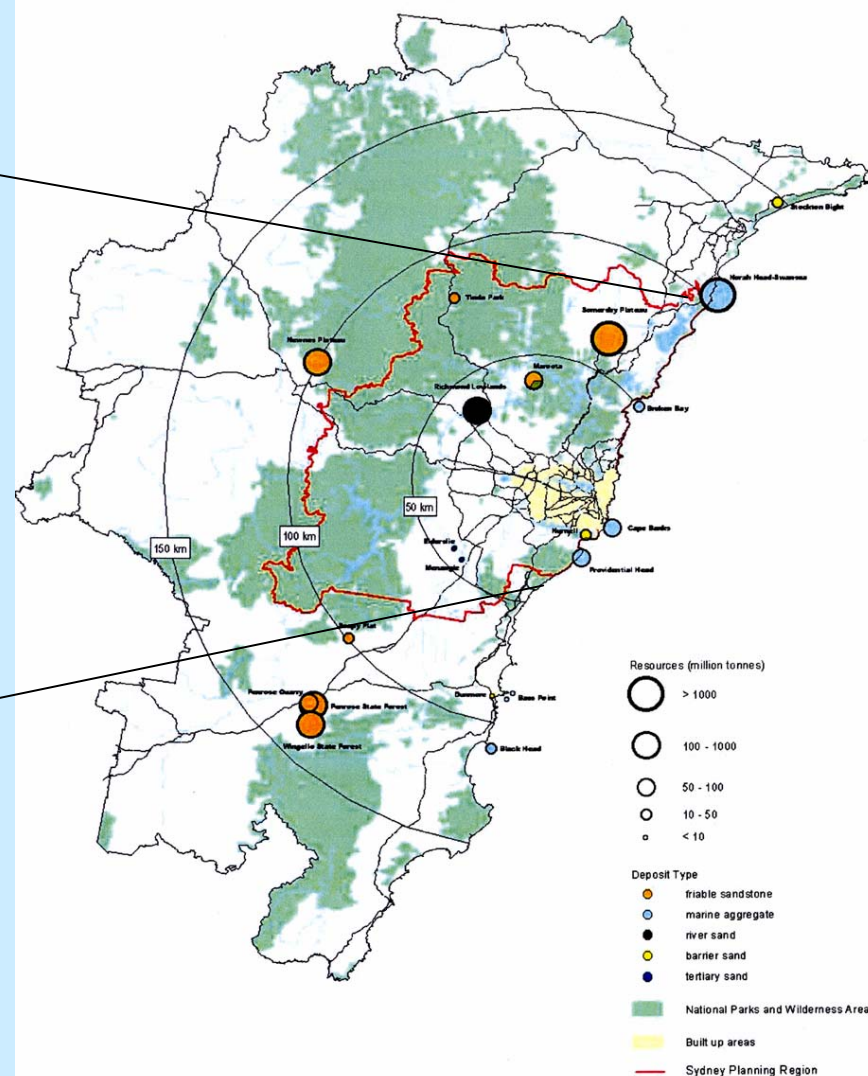


Figure 14: Remaining Construction Sand Resources After Year 2010



Construction Sand Resources – Marine Aggregate Role

- Resource offshore of Sydney is large and nearby – resource estimated in 100's Mt within 50km of Sydney CBD
- Fine-medium grained sand resource with real long-term potential (+100years) to supplement/replace existing onshore sources f-m sand
- Environmental impact potentially acceptable alternative to impacts of onshore extraction
- Rapid development and capacity of global dredging technology brings resources in water depths on innershelf within reach of industry
- Marine aggregate delivered by sea to major ports/estuaries for distribution by rail/road
- Benefits in social/environmental outcomes through reduced trucking on national roads (see Business Council Report March 2005)
- Possible spin-offs in economic feasibility of coastal protection/maintenance options such as beach nourishment

Marine Construction Sand Resources – Legislative Context*

- NSW Offshore Minerals Act 1999 (proclaimed 2000)
 - mirror Commonwealth Legislation
 - entire State waters from high water mark to 3nm limit is now a reserve block prohibiting Exploration Licence application
 - Minister determines if a reserve block will be opened up for application
- Commonwealth Offshore Minerals Act 1994
 - 3 nm to 200nm limit
 - Exploration Licence (EL) made through State the area is offshore of
 - EL's have been granted off WA, NT, SA and Tas. – rarely refused
 - Applicant deals with Designated Authority (State Minister).
 - Grant of EL determined by Joint Authority (Federal & State Ministers)

Federal Minister (Commonwealth Dept. Industry Tourism and Resources of)
State Minister (NSW Dept. Minerals & Energy)

**Construction sand is NOT classified as a mineral above the high water mark and therefore subject to State DIPNR regulations.*

Marine Aggregate Exploration Licence Application

The Sydney Marine Sand P/L “experience”

- December 2000 – Applied for Mineral Exploration Licence (MEL) in Commonwealth waters offshore of Sydney (water depths 50 to 100m; 5.5 to 8km offshore). Petroleum EL current in same area.
- May 2002 – Draft licence conditions determined between State and Federal Depts.
- June 2002 – NSW Dept. Minerals & Energy advises Commonwealth Dept. Industry Tourism and Resources (DITR) intention of recommending to NSW Minister that MEL be granted
- March 2003 – Second MEL applied for
- June 2003 – DITR recommends Minister approve MEL
- August 2003 – First MEL refused owing to “...community concerns about impacts on the flora and fauna that flourish on the seafloor and concerns about the impact on fragile beach environments” Note distance offshore (>5.5km) and water depths (>50m)
- February 2004 – Second MEL refused for same reason

Marine Aggregate Exploration Licence Application

The Sydney Marine Sand P/L “experience” (contd.)

- SMS contended there was no scientific basis for refusal of MEL’s
- MEL applications indicated the range of scientifically credible resource and environmental investigations to be initiated as part of the exploration program along with community consultation (*FOI requests into rejection of MEL’s found clear evidence of departmental, academic and community support for the exploration*)
- Project represented a significant injection of private funds into exploration of the continental shelf environment and a stimulus for research funding through industry link grants

Marine Aggregate Exploration - Summary

- Decision not to grant exploration licences highlights the divide between the bureaucratic and political processes of government.
- Decision also highlights the lack of visibility for the broader community as to the realities and reach of onshore extraction
- Exploration for marine aggregate as a source of construction sand for Sydney has merit from both resource and, arguably, environmental perspectives
- Today's presentation is about raising the level of awareness of the issues surrounding construction sand supply for a major city and the options possible for addressing these issues

Reference:

NSW Geological Survey Report GS2001/086 – “Supply and demand for construction sand in the Sydney Planning Region”