

Christchurch City Council

Capital Programme Group

DPR – Quarry (Screening) Provisions Review

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To: **ADELE RADBURND** (Policy Planner, City Planning Unit)

INTRODUCTION

This is an update of the report prepared in 2009, which looked to review the City Plan's screening provisions for the Rural Quarry Zones, (Refer TRIM 09/367197). This was to ensure that the rule provided for continuous and effective visual screening of quarry sites in the Rural Quarry Zone and other rural zoned land, along road frontages and zone boundaries. In order to review the existing situation regarding visual screening in Rural Quarry Zones, the existing City Plan provisions were examined and a case study of 4 existing quarry sites was carried out.

A District Plan review is currently underway following the Canterbury Earthquakes and this updated report is to feed into that review. The four original sites have been revisited and a further four sites also added to the case study. This updated report also expands discussion about the visual and amenity rules generally, rather than merely the rule 4-3.3.6 Visual Amenity.

Currently the quarrying activities are located in the "Miners Road area" (West Coast Road and Old West Coast Road), the "Pound Road area", and the "McLeans Island area". These sites sit within the Rural (Quarry) and Open Space 3D (Isaac Conservation Park/Quarry) Zones of the City Plan. Other quarries have established 'out of zone' via resource consent on other Rural zoned land and which were assessed as non-complying activities under the City Plan. Isaacs Quarry sits within the OS3D9ICP Zone at McLeans Island, and is subject to separate rules and conditions under its resource consent.

Key elements considered by the City Plan to be important in ensuring visual amenity within the Rural Quarry landscape include screening devices such as earth mounds and shelter belts,

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setback of quarry faces, crushing plants and buildings from road frontage and zone boundaries, location and heights of stockpiles, and staged quarrying activity and rehabilitation. This report will also cover tree species selection and maintenance of landscaping, particularly in regard to NZ Transit Agency's (now NZTA) "Guidelines for Highway Landscaping".

EXISTING RURAL CHARACTER

The existing Rural Quarry Zones are all located on the stony Waimakariri river bed soils of the Canterbury Plains. Recognisable features of the plains, in addition to the geometrical flat and open grasslands, are the mounded earth stop-banks and the conifer shelter belts. The character of all the existing quarry sites and their surrounding areas can be described as rural with a predominance of open space, uncluttered by buildings or other developments. Fields are generally grass covered and grazed. Fencing generally takes the form of post and wire fences. Predominant vegetation patterns are the conifer shelter belts, with some pockets of canopy type trees, particularly willows, cedars, gums, pines and macrocarpas and some oak trees.

Appropriate landscape screening interventions in this landscape are confined to earth mounding, shelterbelt planting and open grassed frontages, recreating those landscape features already present. Mounds planted thickly with native planting, while providing some bio-diversity, appear at odds with their surroundings and are not naturally occurring in this landscape. Solid timber fences sitting on top of mounds, while possibly providing some noise attenuation, again are at odds with the surrounding rural character and are inappropriate in this landscape.

EXISTING PLAN PROVISIONS FOR RURAL QUARRY ZONES

4 - 3.2.1 Road Scene (b) Mineral Extraction Activities.

The minimum building setback from road boundaries shall be 20m, except that for properties with frontage to the Old West Coast Road the minimum setback shall be 50m.

Reason (5.2.1) The setback for mineral extraction is larger than that for rural and "other" activities in view of the need to protect amenities of surrounding properties and to allow space for screening provisions. The setback for Old West Coast Road is larger in recognition of the Rural 2 Zone boundary in this area.

4 - 3.2.2 Height of buildings

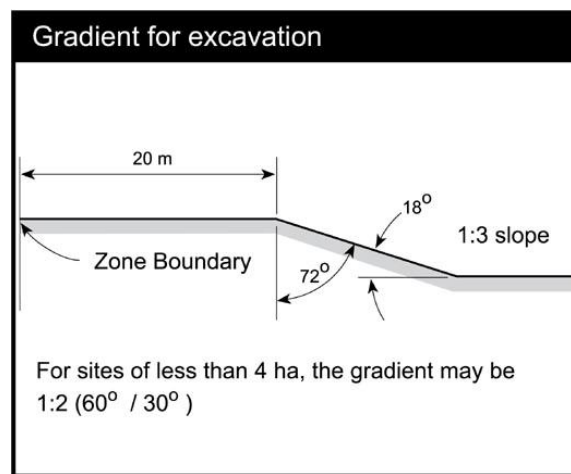
The maximum height of buildings shall be 8m above the ground level that existed prior to any mineral extraction activity taking place on the site.

4 - 3.3.4 Setback distance and gradient for excavation - Mineral extraction activities

(a) No extraction shall take place within 20m of the zone boundary or a road boundary, except on that part of the Pound Road block (adjacent to Leggetts Road and west of Pound Road) where no extraction shall take place within 6m of the zone boundary.

(b) No extraction shall take place within 6m of the boundary of an adjoining allotment, unless it is held in common ownership or the written agreement of the adjoining owner has been obtained.

(c) No excavation shall cut below the surface with a gradient greater than 1:3 measured from a point 20 metres from the zone boundary as shown on the diagram below; provided that where an allotment being worked is less than 4ha, the maximum gradient shall be 1:2 (see diagram below).



Reason (5.2.7) Effective screening of quarrying operations necessitates a combination of earth-mounding and/or tree planting on the road or zone margins of any land being worked. While 20m is generally appropriate to enable such treatment, in the specific case of Leggetts Road, a lesser set-back is permitted because the restricted shape of the site would otherwise render it unworkable with 20m set-backs.

For reasons of safety in both working and rehabilitation, edges of excavations are required to have moderately sloping faces. Where allotments are restricted in area, a slightly steeper gradient is permitted so as to enable effective utilisation of the mineral resource. In addition the rule is designed to prevent erosion of the slope and undermining of roads or adjoining land.

A setback is required on internal property boundaries in order to protect the adjoining land, unless the adjoining property is in common ownership or the work has the written agreement of the adjoining owner.

4 - 3.3.6 Visual Amenities – screening – Mineral Extraction Activity.

Quarry sites shall be screened from road frontages and zone boundaries by tree planting and such screening shall be 20m in depth, and consist of at least five rows of trees. This may be reduced to one row of trees, provided vegetated earth mounding is provided behind the row of trees to a height of at least 3m, and the total depth of trees and mounding is 20m.

Reason (5.2.9) This rule sets out planting and mounding for quarrying operations and sets a 20m landscaping strip to ensure such measures are visually effective. The undertaking of quarrying activities has considerable potential for detracting from amenities, with associated machinery, stockpiles and excavations. Screening the quarry from view also reduces the "psychological" effects of other aspects of quarrying, particularly noise.

Note: although City Plan provisions for visual screening rely on tree planting as the main screening device, there is no appended tree species list or requirement for these trees to be evergreen species. There is also no indication of what form of vegetation is required on the earth mounds nor is there any requirement for the maintenance of the trees or vegetation. A tree list would give good guidance as to which trees are suitable in this landscape and growing conditions. Provisions around maintenance of trees and vegetation (including grassed areas), would give some surety over time about the visual amenity of the landscape mitigation, thus avoiding adverse effects of dead and dying trees and poorly maintained grassed mounds. This tree list and rules around maintenance could be included within the Appendix 16.1 – Rules and guidance for landscaping and tree planting - of the City Plan.

4 - 3.3.9 Stockpiling - Mineral extraction activity

Stockpiles of extracted minerals or other material shall not exceed 5m in height above the natural ground level before excavation, or be located within 50m of the zone boundary...

Reason (5.2.11) This rule is to protect visual amenities and to lessen the potential intrusiveness of large stock piles as seen from the edges of the zones (and from the boundaries of an established farming operation in the Miners Road quarry area).

Note: case studies carried out for the purposes of this report have shown that in some instances stockpiles are located on the quarry floor, with greater benefits for visual mitigation.

4 - 3.3.10 Location of crushing plant - Mineral extraction activity

All equipment involved in the crushing of aggregates, or the screening of imported fill material, shall be located at least 100m from the zone boundary, and below original ground level or as close as possible to ground level, having regard to groundwater levels and stability of foundations.

Reason (5.2.12) This rule is intended to protect visual amenities and to reduce adverse effects from the noise of such machinery on areas beyond quarry zone boundaries. Experience has shown that such equipment is extremely noisy, and that mitigation options are limited. Siting the machinery below ground level within an excavation results in a substantial reduction in noise levels.

4 - 3.4.6 Establishment of visual screening – Mineral extraction activities

No extractions or processing of materials shall take place within the 100m of road frontage or zone boundary until landscape planting along the full length of that boundary, and to a depth of 20m, reaches a minimum height of 3m.

Reason (5.2.20) Mineral workings are almost inevitably visually unsightly and establishment of landscape planting is intended to screen such effects from view. This rule aims at ensuring that until such planting becomes visually effective, no workings are to be commenced unless they are set well back from both roads and adjoining zone boundaries. This will act as an incentive to undertake screen planting at an early date prior to planned excavations.

Note: More recently consented quarries have successfully provided 3m high grassed mounds within a 20m setback with no associated tree or shrub planting as visual mitigation.

CASE STUDIES

Currently the Rural Quarry Zone comprises three areas, the “Miners Road area” (West Coast Road and Old West Coast Road), the “Pound Road area”, and the “McLeans Island area which includes the Isaacs Quarry which is zoned OS3D(ISP) Zone approved through Variation 93. Several new quarries are now also operating in the same areas but on land zoned Ru5 (Airport Influences) and Ru4 (Waimakariri) and are assessed as non complying activities under the City Plan. See Summary table (Appendix 1).

1. Miners Road Area

- Road Metals - 394 West Coast Road (RuQ). Grass covered mounds line the entire road frontage of this site. The earth mounds are 15m in width and approximately 3.0m in height. They are flat topped, with sloping sides at a gradient of approximately 1:3. There is some planting along the western section of the mounding, and it is assumed that grazing takes place to control grass growth. The existing quarry face is adjacent to the mounding, 15-20m approximately from the road. Screening on internal boundaries takes

the form of shelter belt planting. Screening of all activity from the road is complete with the exception of the vehicle access area.

Photo 1: Road Metals 394 West Coast Road



- Fulton Hogan - 26 Miners Road (RuQ). The Miners Road and West Coast Road frontages are both lined with 3m and 4m high mounds. Mounding on the West Coast frontage is immediately adjacent to the road boundary and is planted with native shrubs reaching up to 4-5m in height. Mounding on the Miners Road frontage is setback approximately 10m with native and exotic planting on top and behind the mounds. Visual screening is complete.

Photo 2: Fulton Hogan 26 Miners Road



2. Pound Road Quarry Area

- Fulton Hogan Quarry - 333 Pound Road Frontage (RuQ) and Hasketts Road Frontage (RuQ). In 2009 the primary screening device for the Pound Road frontage was tall

shelter belt planting located approximately 75m from the road boundary in the northern section and sitting adjacent to the road boundary in the southern section. Visual screening was complete with glimpses of the quarrying activity only possible at the vehicle entrance area. Recent inspection shows that these shelter belts have now been removed (northern section) as the quarry face has moved closer to Pound Road and screening now takes the form of grassed earth mounding, 2-2.5m high, with a single row of 4m high macrocarpa trees at 2.0m centres to the front of the mound. Complete visual screening is still achieved, except for vehicle entrances. On the Hasketts Road frontage boundary sits a 2m high earth mound with a double row of mature pine shelter belt sitting on top. The mounding at the vehicle entrances is offset (Photo 5) so no view into the sight is possible. Complete screening is achieved.

Photo 3: Fulton Hogan Quarry 333 Pound Road



Photo 4:. Fulton Hogan Pound Road Quarry – Hasketts Road frontage



Photo 5. Fulton Hogan Pound Road Quarry – Hasketts Road frontage offset mounding at vehicle entranceway 2014



- Fulton Hogan - 35 Hasketts Road and 146 Barbers Road (Ru5). Resource consent was granted for this quarrying activity in a rural zone in 2012. This is a relatively small quarry at only 10ha, and will be fully rehabilitated after 5-7 years (or sooner). Trees have been retained on the northern and eastern boundaries (Hasketts Road frontage) for the duration of extraction. Grassed mounds at 3m in height have been formed on the southern and northern boundaries (set back 10m) and inside of the shelter belt on the Hasketts Road boundary. The quarry face is setback 20m from the Hasketts Road frontage (as rural residential dwellings are located on the opposite side of the road) and 6m from all other boundaries. There are no buildings on the site and all stockpiles are located on the quarry floor. The visual mitigation undertaken for this site fully screens the extraction activities.

Photo 6. Fulton Hogan quarry – Hasketts Road frontage



Photo 7: Fulton Hogan Quarry – Barters Road frontage



3. McLeans Island Area

- Harewood Golf Quarry - 397 McLeans Island Road (Ru5). Screening is achieved by earth mounding set 120m back from the road. The grass covered mound is approximately 3.0m in height. The eastern section of the quarry site is screened by established shelter belt planting. Screening is complete with the exception of the vehicle entry area.

Photo 8: Harewood Golf Quarry 397 McLeans Is Road



- Isaacs Quarry - 160 McLeans Island Road (OS3D/ICP Zone). Screening takes the form of earth mounding which also fulfils a stop bank function for the Waimakariri River. The mound is approximately 3-3.5m high and 20m deep and set back approximately 12-15m from the road. Established willow trees and groupings of newly planted exotic, deciduous canopy trees are growing in front of the mounds adjacent to the road. A tall crushing machine may be glimpsed above the mounding and between the established

trees. The trees provide a permeable screen and succeed in reducing the scale of internal buildings. Mounding successfully screens all quarrying activity from the road.

Photo 9: Isaacs Quarry 160 McLeans Island Road



- KB Contracting - 156-166 Conservators Road (Ru5). Resource consent was granted in 2010 to establish a 40ha quarry on a 136ha site. No onsite crushing of gravel will be undertaken. The proposed lifespan is to be 20 years, and the site will be progressively rehabilitated as excavation is concluded. The site is screened by 3m high grass covered grazed mounds which lie on the south and west property boundaries, perpendicular to the road. The quarry face is required to have 10m setback from all boundaries. The surrounding landscape character is particularly open, with few buildings or trees, except for some established shelter belts in the distance. The mounding is extensive, and the grass cover is well maintained by grazing. The visual mitigation provided by the mounding is successful. Any further tree planting would be unnecessary as visual screening of extraction activities is complete.

Photo 10: KB Contracting Quarry – Conservators Road



- Harewood Gravels - 535 McLeans Island Road (Ru5). This quarry gained resource consent in 2010 for a 35 year duration to extract in a Rural 5 zone. Conditions to the consent required 3m high and 15m wide grassed earth mounds to be placed 3m from the boundaries around the full perimeter of the site prior to extraction. These developments have taken place in addition to an existing stop bank to the north being realigned further north to allow room for more quarrying activity. A variation to the consent was gained in 2011 to allow the required earth mounding to be placed progressively as extraction occurs around the site. The setback for aggregate extraction is 20m from the site boundaries and the allowed depth of extraction is approximately 4m below existing ground level. Aggregate processing involves crushing using a 3m high mobile processing plant, placed on the quarry floor. Stock piles for the most part are located on the quarry floor. Currently on the McLeans Island Road frontage a stock fence sits at the base of the mound which is set back 3.0m from road. Complete screening is achieved except for at vehicle entrances.

ASSESSMENT

Currently visual mitigation at quarry sites is being carried out very successfully with the majority of extraction activity being fully screened from the road and internal boundaries. The only exception is at vehicle entrances, where it can be expected that some quarrying activity may be glimpsed, or where crushing plants or other buildings extend beyond 3m in height (there is a maximum 8m height rule within the RuQ zone). More recently consented quarry sites such as Harewood Gravels, KB Contracting (Conservators Road) and Fulton Hogan Quarries (Barbers Road) have relied on earth mounding alone for visual mitigation. The Fulton Hogan quarry on the Hasketts Road frontage has also achieved full screening at the vehicle entrance with the use of offset mounds (Photo 5).

Visual screening rules within the City Plan contain provisions requiring a minimum road setback of 20m for extraction activities and 6m from internal boundaries. The maximum height of buildings is 8m from existing ground level. Screening from road boundaries and internal boundaries is to be 20m in depth and consist of at least 5 rows of trees which may be reduced to one row of trees provided vegetated earth mounding is provided behind the row of trees to a height of at least 3m. Stockpiles are not to exceed 5m in height above natural ground level before extraction, or be located within 50m of the zone boundary. Crushing and screening equipment is to be a minimum 100m from the zone boundaries and below or at original ground level. No extraction is to take place within 100m of the road frontage or zone boundary until landscape planting has reached a minimum height of 3m.

Currently rule 4-3.4.6 (Establishment of visual screening – Mineral extraction activities) requires landscape planting along the full length of the boundary to a depth of 20m (and containing 5 rows of trees) and a height of 3m, or a 3m high vegetated earth mound and one row of trees, before extraction activities can begin. This rule does not reflect the current situation where recently consented quarries are successfully screening extraction and quarrying activity by using earth mounding alone as visual mitigation. Additional tree planting to the front of the mound or native vegetation on top of the mounds is not generally required to achieve the required screening effect, although may be appropriate for dust attenuation and / or psychological separation.

To achieve full screening the mounding must be 3m high with a flat top and graded slopes capable of being grazed or mown. In order to achieve 3.0m high mounding with a 3.0m wide flat top and grazeable or mowable slopes (maximum 1:3 gradient), a minimum 18.0m wide strip is required. The current 20m setback rule gives an appropriate amount of depth on the boundary for a mound of this size to be constructed. This device is an appropriate and successful visual screening tool within the Canterbury Plains rural landscape, with an added advantage of creating an instant screen, requiring no time lag before mining activities can take place. Mounding may also take the form of stop banks, particularly in the sites close to the Waimakariri River.

Mounding allows less possibility of failure than with shelter belt planting, which runs the risk of tree failure relating to variables such as tree stock, growing conditions and wind throw etc. Maintenance costs may also be less, with grass covered mounds only requiring grazing or mowing to be kept tidy.

Where dust attenuation may also required on the quarry boundary, for example on a rural residential boundary, shelter belt or shrub planting may still be an appropriate response so should still be allowed for within the City Plan provisions.

At the Fulton Hogan Quarry - Hasketts Road frontage, earth mounding was offset at the vehicle entrances, completely screening all views into the site. This is an effective device for complete screening, and may be appropriate where visual mitigation is a particular issue, for example opposite rural residential zones.

However shelter belt planting is an iconic feature of the Canterbury Plains landscape and can also provide an effective screen. Some quarry sites are effectively screening their activities by the retention of existing tall shelter belts. New shelter belts may be planted adjacent to the road boundary or set back further off the road boundary, within the required 20m setback, while still achieving the required screening effect.

With regard to the New Zealand Transit Agency's "Guidelines for Highway Landscaping", the guidelines state that in areas prone to frosts, tall tree plantings on the northern side of motorways be avoided as it may prevent ice thaw. Shelterbelts generally consists of evergreen conifer trees planted close together, and can be problematic if adjacent to road carriageways. It is accepted that evergreen, and particularly conifer species, are the most appropriate shelter belt tree species. In order to reduce the risk in frost prone areas, shelterbelts to be planted on the northern side of highways should be planted a minimum 6m from the road boundary within the 20m setback.

City Plan rules for visual screening of mineral extraction activities currently make no provision for specifying appropriate tree species or the maintenance of trees, plants or grassed areas. In order to ensure a high degree of visual amenity and successful establishment of new shelter belts, City Plan provisions should contain typical tree planting layout for successful visual screening (Appendix 3) and a tree list specifying appropriate trees to be planted contained within Appendix 16.1 of the City Plan (Appendix 2). Particular regard should also be given to the policies included in the New Zealand Transit Agency's "Guidelines for Highway Landscaping", where quarrying is to take place adjacent to highways.

Maintenance can be an issue in terms of maintaining a high level of visual amenity. Rules relating to any dead, damaged or diseased trees being replaced would be appropriate. A rule requiring maintaining the foliage to ground level will help ensure the required screening. The grass on many of the mounds has grown rank and is not being grazed or mown. Similarly, some sections of shelter belts have been allowed to die or have suffered wind damage and have not been removed and replaced. Provisions within the City Plan requiring maintenance of these areas would ensure a high level of visual amenity is maintained.

More recently consented quarries have conditions relating to rehabilitation of the site after extraction activity is completed. Some variations to the consents have been granted allowing staged visual mitigation and rehabilitation as the extraction activities progress around the site. These are generally appropriate conditions, allowing other activities to occur pre or post extraction, while not impacting negatively on the visually amenity of the area. In terms of full rehabilitation after extraction activities have ceased, it may be appropriate to required quarry walls to be flattened to a batter of maximum 1:6 to ensure contours are visually more in keeping with pre-existing conditions and to allow easier access for future uses.

RECOMMENDATIONS

1. That the minimum screening strip for road boundaries remain at 20m and for internal boundaries remain at 6m.
2. Visual amenities – the screening rule should allow for screening by earth mounding only as well as by tree planting and/or retention of existing shelter belts.
3. Earth mounds to be grass covered, and to be a minimum height of 3.0m with a 3.0m wide flat top and grazeable and mowable sides with a slope of no more than 1:3 (i.e. vegetating with shrubs not necessary for visual screening).
4. Off-set earth mounds for full visual screening at vehicle entrances opposite rural residential zones and other visually sensitive areas.
5. Where screening by way of tree planting necessary or preferred for dust attenuation or other reasons, tree planting may take the form of either
 - Retention of existing established shelter belts which are already a minimum 3m in height and provide full screening from ground level.
 - New shelter belts to be planted in double staggered row at 2m spacings between trees and 3m spacings between rows (Appendix 3) within the 20m setback (i.e. 5 rows of trees not necessary).
 - Shelter belts on northern sides of highways to be planted a minimum of 6m from the road boundary within the 20m setback- (in alignment with the NZTA “Guidelines for Highway Landscaping”)
 - Trees to be selected from tree list contained within Appendix 16.1 of the City Plan specific to trees suitable for visual mitigation of quarrying activities (Appendix 2).
 - No quarrying activity to take place within 100m of any road or zone boundary until trees have reached 3.0m in height.
6. Stockpiles of material to be located on quarry floor.
7. All evergreen trees required to be planted to be maintained with foliage at ground level. Any dead, damaged or diseased trees must be replaced. Grassed earth mounds to be regularly grazed or mown.
8. Rehabilitation – Provision to made in the City Play to allow for progressive visual screening and rehabilitation to take place as mineral extraction occurs progressively around the site, and a requirement that quarry walls be flattened to a batter of maximum 1:6.

Peer reviewed Dennis Preston, Team Leader, Capital Delivery Group

Attached: Appendix 1 – Summary of Visual Mitigation of Quarry Activities

Appendix 2 - Tree List for Shelter Belts and Tree Planting for visual screening of quarry activities

Appendix 3 – Tree Planting layout for visual screening by trees

Appendix 1 Summary of Visual Mitigation of quarry activities

AREA	SITE	ZONE	ROAD SETBACK	INTERNAL SETBACK	BUILDING HEIGHT/ LOCATION	SCREENING TYPE	STOCK-PILES	STAGING	REHABILITAT-ION
MINERS ROAD AREA	Road Metals 394 West Coast Road	RuQ	Mounding 0m. Quarry face 20m	6m. Shelter belts.	100m setback	Grassed earth mounding 3m high and 15m deep.	100m setback on quarry floor		
	Fulton Hogan 26 Miners Road	RuQ	Mounds 0m West Coast Road boundary. Mounds 5-10m Miners Road boundary. Quarry face 20m			Grassed mounds to 3 and 4m height, some also planted with native shrubs. Lawns mown and plants well maintained.			
POUND ROAD AREA	Fulton Hogan Quarry 333 Pound Road Frontage	RuQ	Mounding 3-5m. Quarry face 20m			Grassed earth mounding 2.5m high with single row macrocarpa trees at 2.0m centres and 4m high to front of mound. Well maintained.			
	Fulton Hogan Quarry	RuQ	Mounding and shelterbelts 0m.			Grassed earth mounding to 2m in			Full rehabilitation

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	Hasketts Road Frontage		frontages			height with a double row of mature pine shelter belt sitting on top. Offset vehicle entrances. Dead trees not replaced.			after 5-7 years.
	Fulton Hogan 35 Hasketts Road and 146 Barters Road	Ru5	Mounding 10m. Quarry face 20m from Hasketts Road an 6m from other road	Shelter belts to be retained	No buildings	Barters Road - ungrazed grass mounding to 3m in height. Hasketts Road - ungrazed 3m high mounding with exiting shelter belt in front. Dead trees not removed.	On quarry floor		
MCLEANS ISLAND AREA	Harewood Golf Quarry 397 McLeans Island Road	Ru5	Mounding and quarry face 120m	Shelter belts		Grass mounding to 3m in height. Ungrazed.			
	Isaacs Quarry 160 McLeans Island Road	OS3D9 ICP	Mounding 12-15m. Buildings and quarrying activity 150-200m		Tall crushing/scree -ning plant visible. Quarry face setback 150m	Grassed earth mounding to 3m in height and 20m deep. Tree groupings between mound and road			
	KB Contracting	Ru5	Mounds lie perpendicular to	Earth mounding lines the entire	No onsite crushing.	Grass covered earth mounding to 3m		Yes	Progressive over 20yr

	156-166 Conservators Road		the road.	south and west boundaries. Quarry face 10m setback from all boundaries.		high. Grazed and very well maintained.			lifespan
	Harewood Gravels 535 McLeans Island Road	Ru5 and O3A	Mounding 3m		Mobile processing plant 3m in height	Grass mounding and stop bank to 3m in height. Stock fence at base of mound. Ungrazed.	On quarry floor	Yes	Progressive over 35 year life span

Appendix 2. Tree List for Shelter Belts and Tree Planting for visual screening of quarry activities

Botanical Name	Common Name
<i>Cedrus atlantica</i>	Atlantic Cedar
<i>Cedrus deodara</i>	Deodar Cedar
<i>Chamaecyparis lawsoniana</i>	Lawsons Cypress
<i>Cryptomeria japonica</i>	Japanese Red Cedar
<i>Cupressus macrocarpa</i>	Monterey Cypress
<i>Eucalyptus botrioides</i>	Southern Mahogany
<i>Eucalyptus linearis</i>	White Peppermint Gum
<i>Pinus radiata</i>	Monterey Pine
<i>Pittosporum eugenioides</i>	Lemonwood
<i>Pittosporum tenuifolium</i>	Kohuhu
<i>Podocarpus totara</i>	Totara
<i>Populus italica</i>	Lombardy Poplar
<i>Salix matsudana</i>	Chinese Willow
<i>X Cuprocyparis leylandii</i>	Leyland Cypress

Appendix 3 Tree Planting Layout for visual screening by "Trees Only"

