



District Council of
Mount Remarkable

**UNSEALED ROADS
and
PATROL GRADING METHODOLOGY**

February 2016

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1. BACKGROUND

Council has a network of approximately 650kms of Category 1 and 2 unsealed roads (main haulage routes) and a further 1800 kms of Category 3, 4 roads and reserves spread across an area of about 3,430 square kms. In the past 3 years, Council has increased its road resheeting significantly to a minimum of 30kms of full construction resheeting per annum, from a past low 4-9 kms of patching. This sees a full replacement program of 20 years, with ongoing maintenance patrol grading. Council has 3 graders for patrol grading and 1 grader full time in the road construction crew.

Despite the accelerated resheeting program, the state of many of Council's remaining unsealed roads are of concern to staff, Councillors, farmers and the community alike. An independent specialist roads engineer report was initiated to review council works practices compared to other local govt practices state-wide, and identify contributing factors to inform Council.

Similar to all rural Councils, the maintenance of DCMR's large unsealed road network is a challenge with the resources and budget available. This task is made more difficult due to the quality of the material already on the roads, the build-up of roads that require re-sheeting and climatic conditions.

The report concluded that DCMR is considered to be following good practice with its unsealed road maintenance.

- *is ensuring the quality of the material (now) being used is adequate (but past years the material was not and is of unknown quality).*
- *has increased its commitment to re-sheeting, however, the build-up of roads requiring re-sheeting is a concern and this build up contributes to the issues that are arising with grading.*
- *the planned number of grades per year is considered to be the minimum required*
- *the dry springs we are experiencing makes it difficult to undertake grading at the preferred times of the year."*

Also that,

- *DCMR is addressing the key influencing factors that affect the standard of an unsealed road*
- *DCMR has satisfactorily categorised its road network and set reasonable construction and maintenance standards*
- *material pits are being laboratory tested to ensure that the crushed material used for sheeting is of a suitable quality*

Notwithstanding, the combination of 2 consecutive long dry springs, the poor past practice of 'dry-grading' for many years (seeing loss of fines – the bonding material needed in road materials), the lack of construction well below asset replacement levels prior to the last three years, along with the introduction of B-double trucks and air bag suspensions in the last 2-3 years, have all compounded to cause considerable damage and deterioration of Council roads infrastructure.

Council is committed to tackling the major issue of unsealed roads throughout the district. Working with the engineer, Council embarked on workshops with staff (patrol grader operators, construction crews and management) and Councillors to inform and debate the issue to establish a changed methodology for road construction and maintenance patrol grading.

Council recognises this is a long term 20-30 year issue (and ongoing) and not a 'quick fix'.

2. NEW INITIATIVES SINCE JANUARY 2013

2.1. Increased Construction

It was apparent that, prior to the last 3 years, Council was underspending in its capital program and not undertaking construction re-sheeting of its unsealed roads network to the degree required. This saw only minimal short section patching totaling a reported max of about 5-9kms per annum, and to no defined and agreed standard. This was further evidenced by the Asset Sustainability Ratio continually running less than the overall 100% required (eg 47% in 2010/11, 52% in 2011/12 and 61% in 2012/13)

This continuous lack of re-sheeting has seen the need for significant catch-up. A continued accelerated capital roads works program was initiated over the past 3 years with the intention of addressing the under-spend in this area in previous years. In the past three years Council has increased its road construction re-sheeting program by well over 300% per year to a minimum of 30kms per annum and its Asset Sustainability Ratio has been increased to over 100% targeting 121% in this financial year. The target Asset Sustainability Ratio of 121% is slightly higher than the range the local government sector usually operates within, however this reflects a continuing catch up of works not completed over past years. (Actual Audited 123% in 2013/14 and 116% in 2014/15).

2.2. Road Categorisation

Council has initiated and implemented a four tier categorisation or hierarchy of unsealed roads in the district to allow meaningful asset management, informed annual works plans and long term planning. This sees:

Category 1 - sheeted width 8 metres, sheeted thickness 150 mm, residual 50mm,

Category 2 - sheeted width, 6 metres, sheeted thickness 100mm, residual 30mm

Category 3 - width 6 metres, not fully sheeted 'salt and pepper' patching 75-100 mm, 0 mm residual (natural earth roads with minimal sheeting)

Category 4 - formed width 3-6 metres, nil sheeting (natural earth 'dry weather' roads).

2.3. Road Data Collection and Road Revaluation

Council has initiated and implemented a system of extensive roads data collection for all unsealed roads in the district whereby all roads and intersections have been drilled to ascertain the depth of materials present and required and is updated as capital works (construction) are undertaken.

This extensive data is used to inform the Roads Revaluation, Infrastructure Asset Management Plan - Transport Assets 2014/15 – 2023/24, Annual Business Plan and Works Program.

2.4. Materials Testing

Council has implemented sample testing of rubble materials in the pits used for road resheeting. This allows for Council to be able to use the 'best available' materials in the area concerned. It is noted however that overall, the materials in our pits is considered medium quality at best and in some areas poor to medium. The haulage costs to cart from other areas is cost prohibitive.

2.5. Infrastructure Asset Management Plan - Transport Assets

Council adopted its first ever, Infrastructure Asset Management Plan - Transport Assets 2014/15 to 2023/24, in August in 2015. This links to other new strategic documents such as the Long Term Financial Plan, Infrastructure Asset Management Plan – CWMS Water Supply and Buildings 2014/15 – 2023/24 and Asset Management Plan CWMS 2014/2015 - Onwards, to best inform annual and long term planning.

3. CURRENT POSITION

The current position sees that a number of Council unsealed roads are not up to the desired standard due to poor past practices and the underspend on resheeting in prior years. Even with the accelerated capital works program of 30+kms per annum, this would see a 20 year program to resheet all Category 1 and 2 roads. It must be understood that this is not a 'quick fix' issue and will need significant planning and capital investment to rectify over time.

In addition Patrol Grading Practices will need to change in response climatic conditions, vehicle upgrades, and management and public expectations. Improved Quality Control and road safety will be a key focus.

4. IDENTIFIED CONTRIBUTING FACTORS

4.1. Dry Grading

Council has for many years had a practice of grading roads all year round. This has seen the damaging practice of 'Dry Grading' roads to give a very short term fix without taking into account the long term negative effects on the road materials. Patrol grading is only effective if the operators can re-work the sheeted material to form a suitable top surface. Dry Grading brings the 'fines' (the fine particles that bind the rubble together to give an effective layer) to the surface, which are then quickly lost through wind and vehicle traffic. Future Grading is less and less effective without the fines, leading to bony rock exposure, ravelling off of materials, and increased susceptibility to water penetration, corrugations and potholes.

This is supported by other sources such as from:

The Mace Engineering Report 2015

Highlights that the Patrol Grading effort on unsealed roads is a major issue for all rural Councils. DCMR has set the number of grades for its road categories and that to be fully effective these grades need to be undertaken at the optimum time with the right moisture conditions. This is made difficult when we are in a cycle of dry springs.

- *Dry grading is not recommended for the DCMR road network due to the dust it creates and the loss of sheeting material. DCMR needs to be well planned to grade the higher trafficked worst condition roads when moisture is available. This may involve longer working hours during these short time periods.*

Civil Contractors Federation 2012

- *The moisture content of the material plays an important role in the success of this operation (formed roads). It is best to form these roads just after rains.*
- *Heavy grading and cutting of the pavement in order to re-shape the roads and fill holes should be carried out in damp conditions after rain.*
- *If numerous holes form or the fines erode away, it will generally be impossible to restore the road to good condition until further good rains occurs (unless artificial watering is resorted to).*

Austroroads Guide to Pavement Technology Part 6: Unsealed Pavements

- *Granular materials with particle sizes greater than 5 mm, low plasticity and limited fines, or materials which have lost fines due to traffic action, are susceptible to corrugations*
- *The loss of fine material is the first sign of the wearing of an unsealed road surface. It is manifest as dust generation and aggregate exposure, resulting in coarse surface texture, roughness and noise.*
- *Dust is caused both by the loss of fine particles (finer than 0.425 mm) from the road surface arising from the loosening of the pavement materials, and disturbance to the wearing course caused by the action of traffic and climatic conditions.*

- *A loss of fines leads to an increase in the permeability of the surface, resulting in early pavement deterioration and accelerating the need for re-surfacing. Loss of fines also exposes a coarser textured surface, leading to higher levels of irregularities and hence increases in vehicle operating costs. It also contributes to road safety issues.*



Loss of fines increasing surface texture



Corrugations

Source: ARRB Group

Approved Action

That the past practice of 'Dry Grading' ceases immediately, as policy, for all sheeted roads (Category 1 & 2 roads).

4.2. Maximising Rain Periods

We are currently experiencing lengthy dry periods that make it a challenge for Patrol Grading to cover the amount of kms required. It is critical therefore that Council maximises grading in the time windows following rain periods. Workshops with Council staff (grader operators) have admirably agreed that where possible they are prepared to work longer hours each day, RDOs and weekends to achieve our goals. This could see graders working 10 hours per day, 6-7 days per week, with other qualified staff rotating in from other work parties as necessary.

Approved Action

That Council extends the possible operational hours of Patrol Graders after rain periods to maximise quality grading outputs up to 10 hours per day and up to 6-7 days per week, subject to staff availability.

4.3. Materials Testing

The unknown equality of road materials used in past years is a possible contributor to surface deterioration. Council now tests all pits for quality.

Approved Action

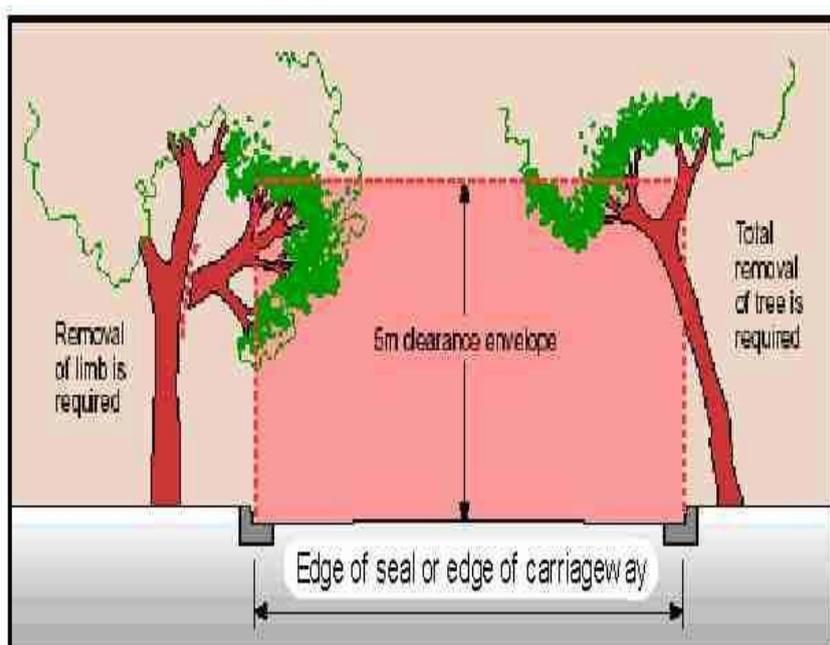
That Council continues the practice of sample testing materials from rubble pits to be used on sheeted roads.

4.4. Vegetation Plan -Tree Trimming

An ongoing issue on Council unsealed roads is the vegetation and tree growth on road verges obstructing the passage of vehicles and farm equipment, and lines of sight. The cost and difficulty of getting contractors to the area to do this work is a significant issue.

It is proposed that Council undertake this work on an ongoing basis to maximise staff time during downtimes in other programs and to ensure routes are cleared for critical times. It is recommended that Council purchase its own boom/scissor lift and trimming equipment as a matter of priority and for staff to undertake relevant training.

This would see a clearance envelope maintained to a vertical height up to 5m from the edge of the grader line (see below). Clearance beyond this height will require NVC approval.



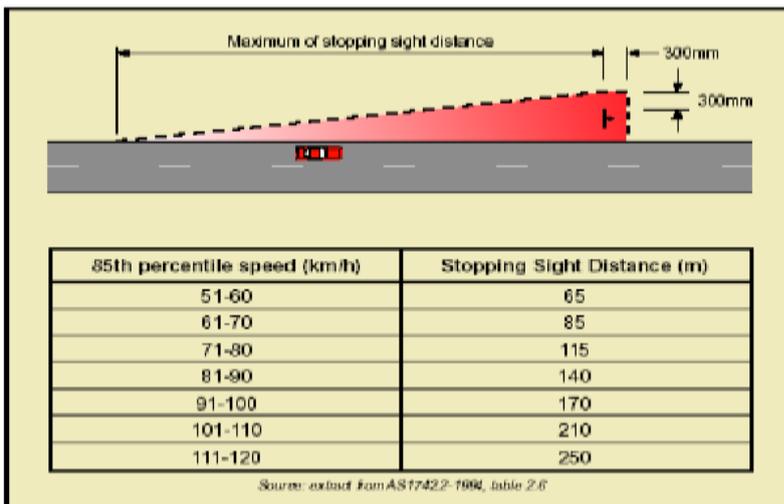
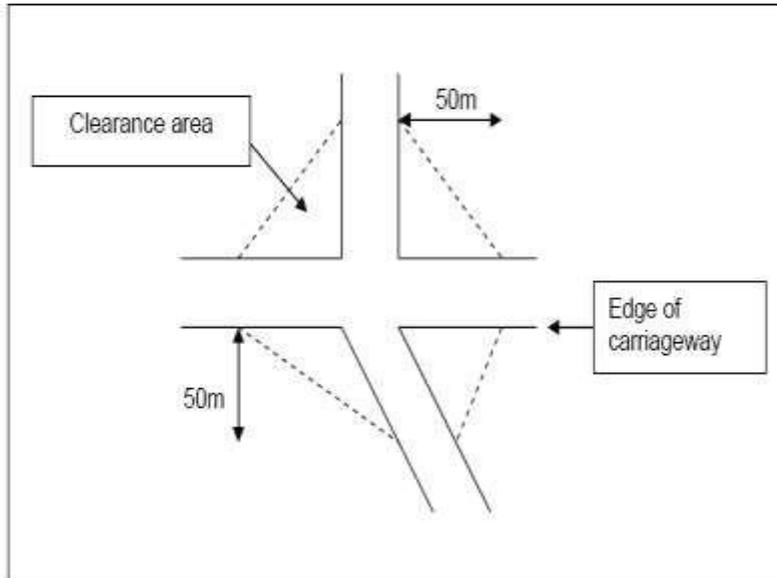
Unsealed Roads Vertical Height Clearance

Approved Action

That Council endorses the purchase of a boom/scissor lift to enable for council to undertake its own tree trimming program to a 5m high envelope over roads, for improved larger vehicle and machinery accessibility and road safety.

4.5. Verge Areas at Intersections and Secondary Clearance Envelopes

That Council develop and adopt, as a matter of good practice for routine Patrol Grading, where practicable, recommended verge clearances at intersections and for secondary line of sight clearances (in accordance with any regulatory advice), in the interests of road safety. Such practices to be in conjunction with controlled weed spraying at intersections.



Approved Action

That Council adopt a good practice model of verge clearances at intersections and line of sight secondary clearances for Patrol Grading, and in accordance with any regulatory restrictions.

4.6. Other Patrol Grading Changes

Apart from the proceeding items, a range of standards, training and quality control procedures are being developed and implemented, including:

- Patrol Graders will work in tandem on most occasions.
- Patrol Graders will be directed to specific areas by their supervisor based upon pre assessments of need.
- Quality Control through jobcards and post inspections will be implemented for training, quality, and data collection purposes.
- Flood damage to roads will be controlled through a dedicated grader (unless major).allowing the other 2 to continue grading after rain periods

4.7. Changing Haulage Vehicles - B Doubles

As identified, one of the key impacts upon road damage and deterioration is the change in haulage requirements of farmers. Recent years has seen the closure of the rail followed by the closure of nearby grain silos, forcing farmers to cart grains to more distant silos. This in turn has seen the rapid introduction of larger haulage vehicles to carry more grain in less trips and minimise the time and cost from farm-gate to silo.

Council roads were in effect, originally built for horse and cart and thence for many years to a standard to cater for the '7 tonne lorry'. This has progressed quickly through truck and trailer, to semi-trailers and in the past 2 years, to increasing numbers of B-Double trucks. Some Councils are even now experiencing road-trains on their unsealed roads. These larger vehicles with their multi axles and air bag suspension are smashing the roads that were never built to cater for them.

Many haulage vehicles are also reported to be driving on non-gazetted B-Double routes and at speeds in excess of the current 75kmph limit.

It is key and critical that Council engage with the farmers and their contractors to work through these issues. There also needs to be a realistic approach to changing expectations and the development of B-double routes within the limited resources of Council. An analogy would be that if several ratepayer buy a 747 jet plane, it is unrealistic that Council could or would afford to upgrade the Booleroo Airstrip to cater for it.

4.8. Community Engagement Strategy

A key element to moving forward is engagement across the community regarding expectations and realistic outcomes on our unsealed roads network. In addition, the hard reality of large extra ongoing expenditure on roads could mean programs in towns or other programs put on hold, or rate rises. Whilst these are all unpalatable there needs to be a consultation process for Council to make informed decisions coming into the budget period for 2016/2017 and beyond.

It is proposed that Council embark on a community engagement strategy, including:

- Meeting with communities and groups around the district to both inform and hear the differing points of view. Inform communities of the "real" situation of the roads and realistic timelines to resolve the problems
- A Survey to all ratepayers (farm owners may live in town/out of district/lease/share farm) regarding Truck usage and Routes to build a picture to maximise effort and to inform road planning, such as:
 - Stock or Grain
 - Truck, lorry and trailer, semitrailer, B-Double or Road Train (no. of axles)
 - By self or contractor
 - Roads used or preferred routes
 - Estimated trips
- This will inform regarding a review of road categories and any changes (eg from Cat 1 to Cat 2)
- Form a representative reference group of 4 Farmers from different parts of the district to work with Council staff to identify priority haulage routes

Approved Action

That Council endorses a Community Engagement Strategy as outlined above to inform the community, to gauge the support for Council's changed Patrol Grading methodology and to work together to find the best way forward.