6.2.11 Notice of Motion - Impact of Weather and Maintenance Response

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Recommendation(s)

That Council note this report in response to Notice of Motion 1075

Attachments

Nil

Executive Summary

This report has been prepared in response to item 1 of Notice of Motion 1075 and outlines the impacts of weather on Council's road assets, what we have done in response and our performance.

The number of defects recorded on Council's assets have been significantly higher than average over recent months, both due to high to record rainfall and above average number of wet days in early winter. Council have responded through increasing our plant fleet (through hire and retention), reallocation of internal staff and engagement of contractors in an attempt to maintain service provision. These endeavours have resulted in defect rectification times remaining inside road management plan requirements and consistent with recent performance for sealed roads, with approximately 3 business day increase in average time to rectify for unsealed roads. While from an asset perspective Council have done well to manage the significant increase in failures, customer experience is will undoubtedly have suffered due to the increased number of defects.

The vast majority of social and mainstream media comments have related to state managed arterial roads and not Councils municipal roads.

Background

Cardinia Shire Council is responsible for 720 kilometres of sealed roads and 859 kilometres of unsealed roads. Maintaining this extensive road network presents many challenges but the greatest is the weather. This significantly impacts both the formation of defects in our road assets but also constrains what options we may have in how we address them.

Council can respond to most of these challenges using a flexible workforce blending both internal resources and external contractors, good planning, and a desire for continual improvement in the way it manages this network.

Road Management Plan

As a Road Authority, Council is required by the Road Management Act 2004 and Road Management Act (General) Regulations 2016 to have in place its own Road Management Plan (RMP). This plan sets out the principles, methods and systems used by the Cardinia Shire in managing the local road system. The Plan has two major components. Schedule of Maintenance Standards, which states the minimum normal levels of service that the Council provides in managing the local road network and the Road Management System, which is a

workflow process that provides a sound basis for traceability of inspections, work planning, scheduling, and monitoring.

The RMP is formerly reviewed every four years. The current iteration of the RMP adopted in June 2022, saw an increase to the proactive inspection timeframes for Arterial and Collector sealed roads by up to 300%.

Sealed and unsealed roads, typical defects and why do they occur

Below are brief descriptions of the road structure and common types of surface defects affecting both sealed and unsealed roads,

Sealed roads:

Sealed roads are normally constructed of gravel or stabilised gravel structural layers over natural soil, and either an asphalt or sprayed seal as the top most part of the pavement. As well as providing the trafficable surface people drive on, the seal protects the main structural elements of the road and underlying soils from water and mechanical damage.

- Potholes: While there are a number of causes of potholes, the largest is a result of water getting into the underlying structural layers of the road and/or the underlying natural soils. Often this is as a result of a breakdown and cracking of the seal because of fatigue, defection, oxidation or other factors. This normally results in softening of these materials and/or this water pushing on the underside of the seal when compressed by the load of a vehicle above.
- Edge break/drop offs: may be caused by narrow pavements causing vehicles to partially travel on the road shoulder or inadequate support of the gravel shoulder.

Unsealed roads

Unsealed roads are in most cases constructed of gravel and rock materials over natural soil. The top wearing layer will usually be a class of rock that has a fairly high level of fines mixed in with the aggregate stone, to allow for a mix which performs better on this asset class. The fines help retain some moisture and help bind the material during summer, and combined with a more aggressive road shape (where possible) helps shed water and drain off the trafficable surface more quickly and reliability to mitigate the impact of wet weather.

- Potholes: primarily formed because of water ponding on the surface causing both the wearing and base courses to soften, the weakened material gets depressed or displaced by vehicle movement.
- Scours: can be caused due to steep grades, no distinct drainage path and concentration of water flow.
- Corrugations: primarily form as result of the lack of moisture within the pavement, causing the surface to unravel. This may be exacerbated on steep grades, corners and intersections as result of vehicle acceleration and braking. Corrugations mainly occur during the drier months of the year.

Situation this Winter

The following table summarises the long term and short-term defect volumes and Councils response timeliness. These numbers represent a broader range of defect types than the more detailed graphs that follow.

Road type	Long term average defects recorded per month	Winter 2022 average defects per month	% Increase	Long term average business days to close defects	Average business days to close defects in 12 months to May 2022	Average business days to close defects for winter 2022
Council managed sealed roads	58 (winter average 83)	131	125% (58%)	14.01	3.93	3.99
Council managed unsealed roads	162 (winter average 173)	235	45% (36%)	15.84	10.56	13.78

Table: Summary of asset impact and Council rectification timeliness

While performance in relation to timely rectification of defects for unsealed roads has not reflected more recent and improved standards, it was still better than the longer-term average, and the prioritisation of the rectification of sealed road defects resulted in no loss of service levels despite the significant peak in workload.

Resourcing

Council predominantly use internal resources to undertake maintenance activities on its road network. Many of these resources are multi-skilled, enabling greater flexibility in responding to peaks in workload. Where required, these resources work overtime to meet this increase in demand.

Fortuitously Council received delivery of two new Flocon trucks used in sealed road maintenance over this period. The better of the older units was retained to give us more flexibility in responding to both sealed and unsealed road defects.

We had particular challenges with our grading fleet, with breakdowns on two of the older units awaiting replacement needing to be covered by hired plant, and elevated levels of utilisation required of relief operators. The broader industry was also heavily committed on infrastructure and other works limiting our capacity to bring in external contractors which we often do to increase of capacity to meet peaks in demand.

Given the particular challenges Council made the following key temporary resource changes:

- Reassigned internal staff to both sealed and unsealed road repairs from drainage
- Employed contractors to complete drainage work normally managed by reassigned staff
- Employed an additional contractor grader
- Hired and retained additional plant to meet functional need
- Many internal crews worked additional hours/days to support the community

Work programming

Council proactively inspects its road network in accordance with its Road Management Plan. Proactive inspections enable the road network to be inspected and defects identified early to reduce risk to the public and preserve the asset from further deterioration.

Reactive inspections are where Council receive requests from the public via its Customer Service centre. These inspections are also managed in accordance with Councils Road Management Plan.

Both proactive and reactive inspections are completed by trained Council Surveillance Officers. Where reactive inspections out way the resources available, additional trained Surveillance Officers are brought in to assist.

A predictive grading maintenance program has been developed for the proactive maintenance of the unsealed road network. Grading intervals would be set based on historical maintenance completed previously over the past four years on the network. To further improve this program, historical grading interval dates have been brought forward by two weeks to (in theory) enable grading to commence immediately before the road begins to deteriorate, minimising service requests. The grading program is designed to enabled roads to be serviced by the nearest of Councils three depots to improve productivity and efficiency of internal resources. Council's Maintenance Management System, Reflect records date and time of works being completed.

This is one of the key elements which has assisted in the longer-term reduction in requests, however more challenging conditions such as those we have been experiencing result in more rapid deterioration and given the highly reactive nature of unsealed roads a process we continue to invest in and improve.

Impact of climatic conditions

The topography across the Shire is unique and poses different maintenance challenges. The northern hills of the Shire contain roads that are steep or cut across the side of a hill. During the wetter months of the year, these roads are more susceptible to storm water run-off causing scouring and potholing, where during the drier months of the year are more susceptible to corrugations. Whereas the southern parts of the Shire are flatter with little fall. During the wetter months of the year, this type of topography tends lead to water to accumulate causing water to pool or flood, resulting in pothole type defects. During the drier months of the year, roads within this area may corrugate due to their exposure to the sun and wind.

Rainfall received to the end of August is approximately 15% higher than the rainfall received for the same period in 2021 and is approximately 23% off the annual average rainfall. Conditions have remained challenging beyond the end of winter with record rainfall in some locations in October. In addition, the number of wet days was higher reducing the ability of road pavements to dry and restabilise.

Performance on Sealed Roads

Figure 1. Sealed Roads – Requests and Defects

This chart illustrates a strong correlation between pothole requests received and pothole defects recorded between April 2022 to September 2022. The difference between requests and defects is due to multiple requests being received. Whereas there is an opposite correlation between edge break requests and defects recorded. This is attributed to more defects being identified through proactive inspections, rather than requests received from the public.

The peak in defects recorded during June is attributed to the way Council program its proactive inspection schedule. For this month, the Beaconsfield township which is an asset dense area is more likely to have more defects than a township with less assets. The peak during August is attributed to climatic conditions.

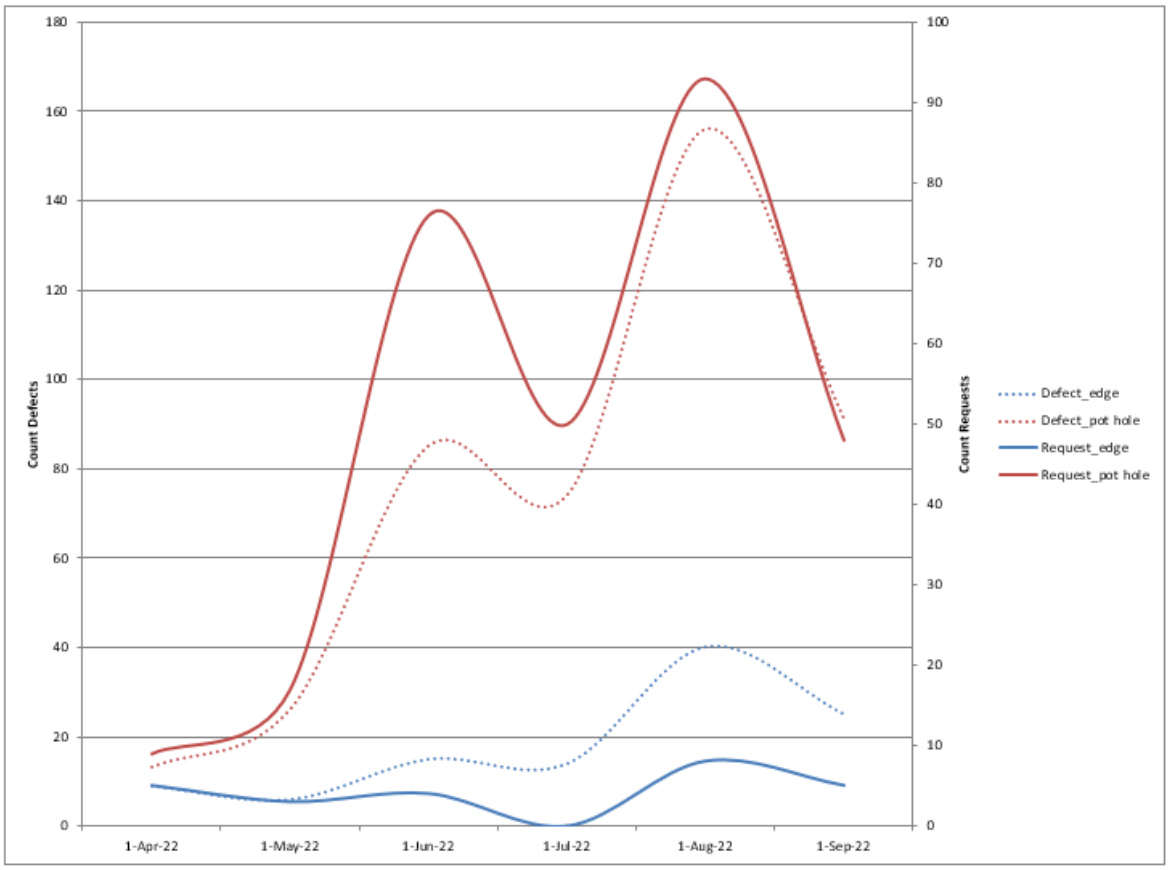


Figure 2. Sealed Roads – Hours Worked

This chart illustrates Council's efforts in responding to the remediation of sealed road pothole and edge break defects received. Demonstrating Council's ability to meet the demand of increase workload.

The data recorded between April 2022 to September 2022 shows an increase in defects which is largely attributed to climatic conditions experienced during this period.

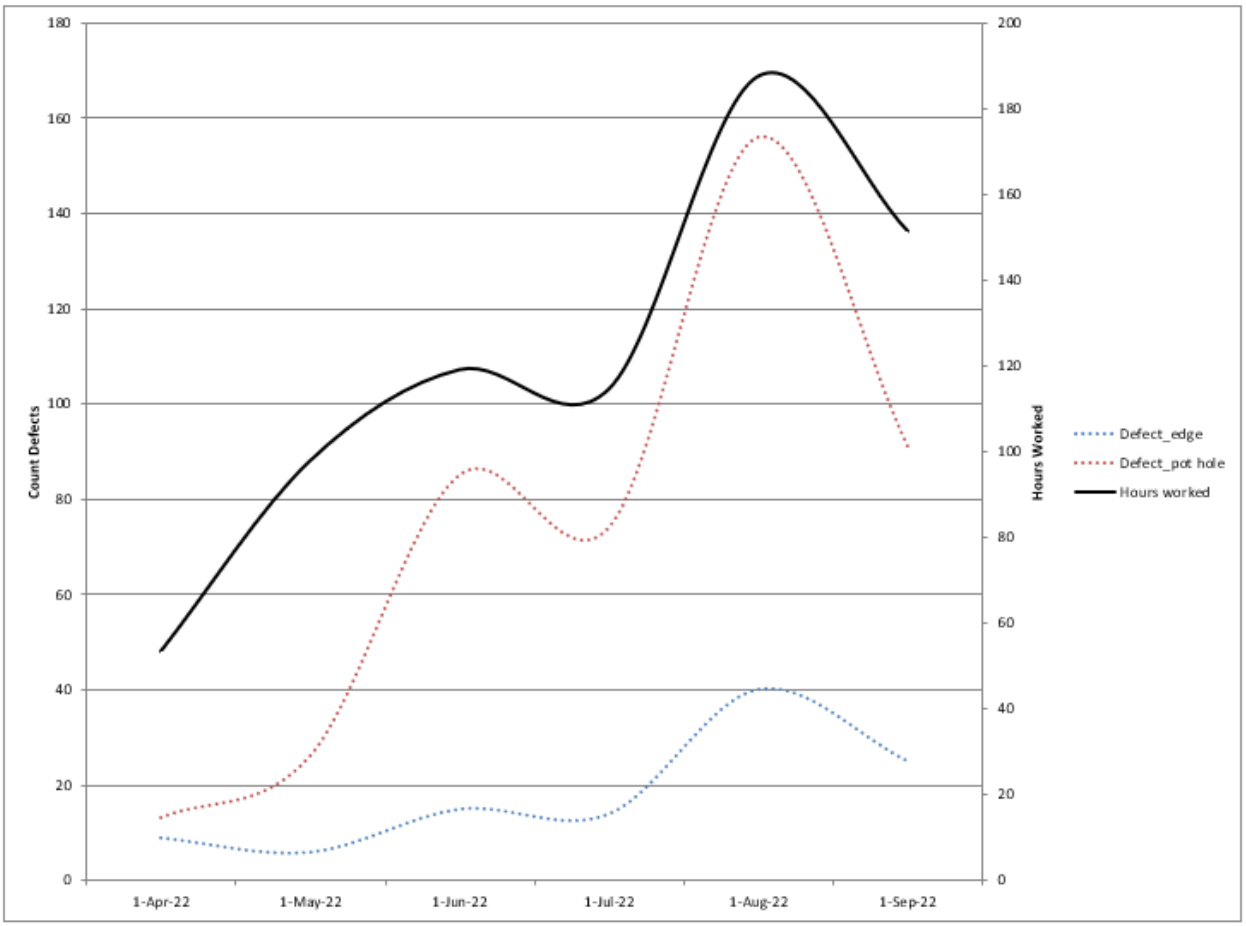
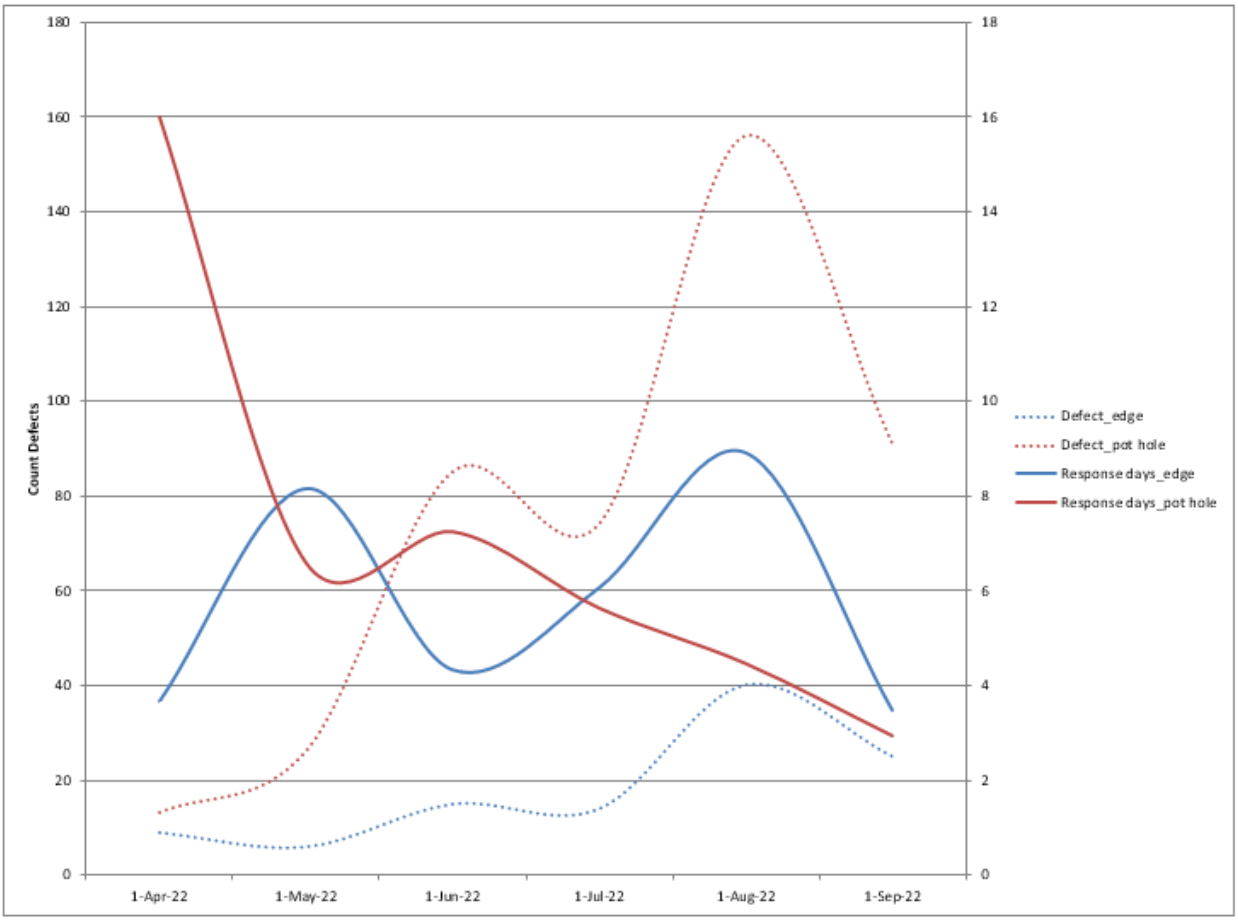


Figure 3. Sealed Roads – Average Elapsed Days to Remediate Defects

This chart illustrates the elapsed time from when a defect is recorded in Council's Maintenance Management System, to when the defect is remediated.

Average days to remediate edge defects fluctuated between 4 and 8 days. Average days to remediate potholes dropped from 16 days in April to 6 days in May and then progressively further to 2 days by September. The benefit of work hours invested in remediation are evident in stable or declining elapsed days to remediate.

Elapsed days to remediate are well below days provided for by Councils Road Management Plan.



Performance on Unsealed Roads

Figure 4. Unsealed Roads – Requests and Defects

This chart illustrates a strong correlation between grading requests received and grading defects recorded between April 2022 to September 2022. The difference between requests and defects is due to multiple requests being received. Whereas there is an opposite correlation between edge break requests and defects recorded. This is attributed to more defects being identified through proactive inspections, rather than requests from the public.

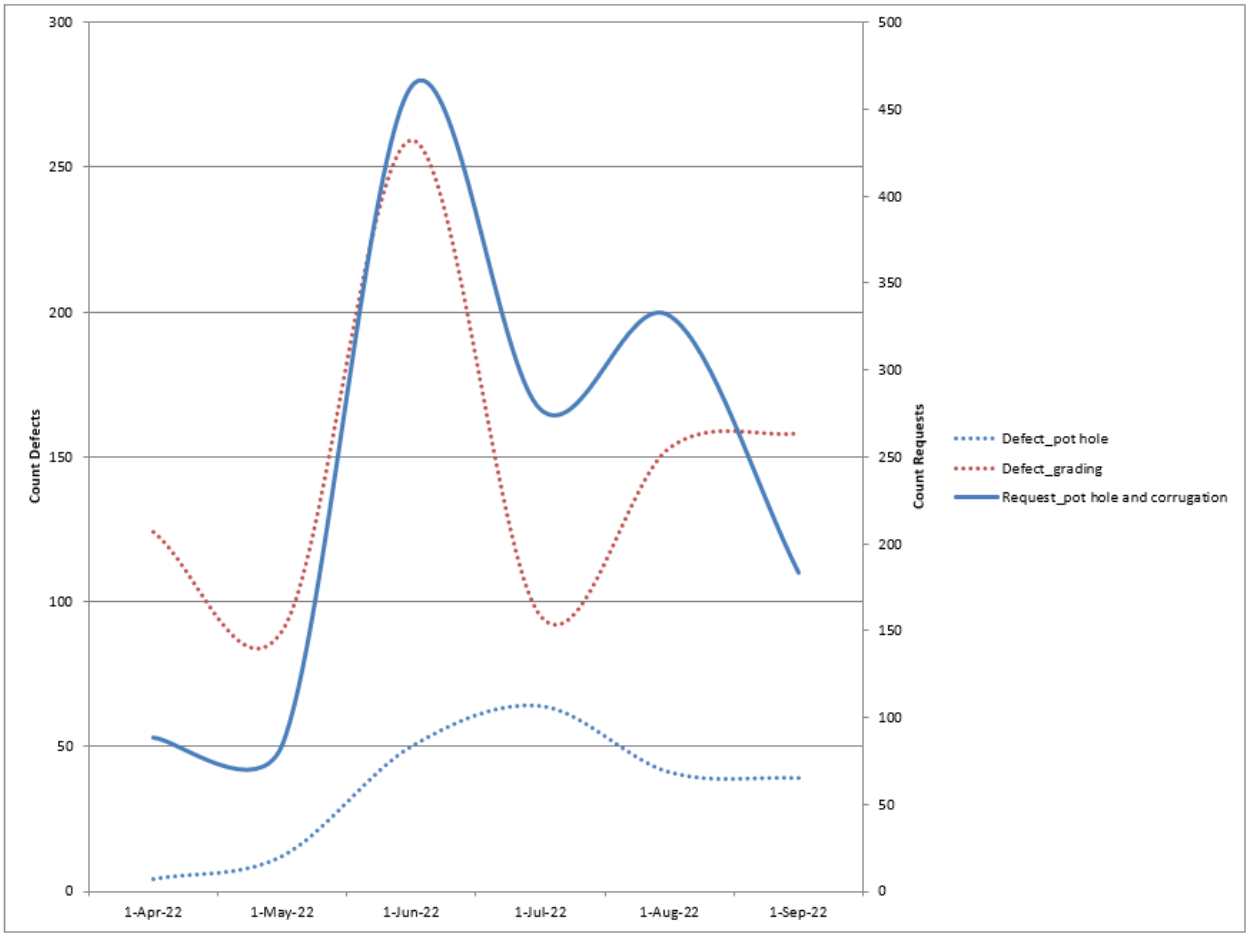


Figure 5. Unsealed Roads – Hours Worked

Hours worked were at relatively normal levels up to and including June. Hours ramped from July to respond to surge in defects.

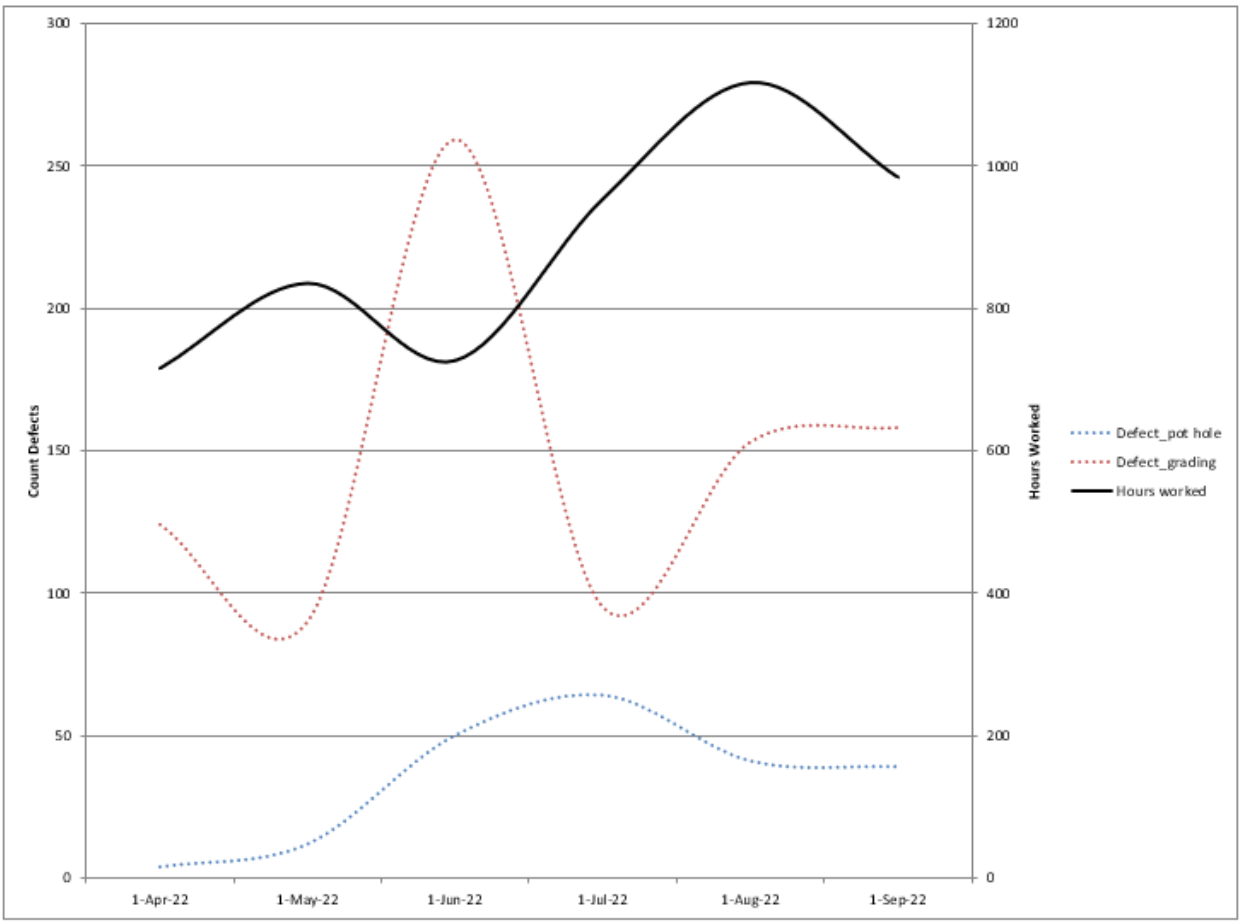
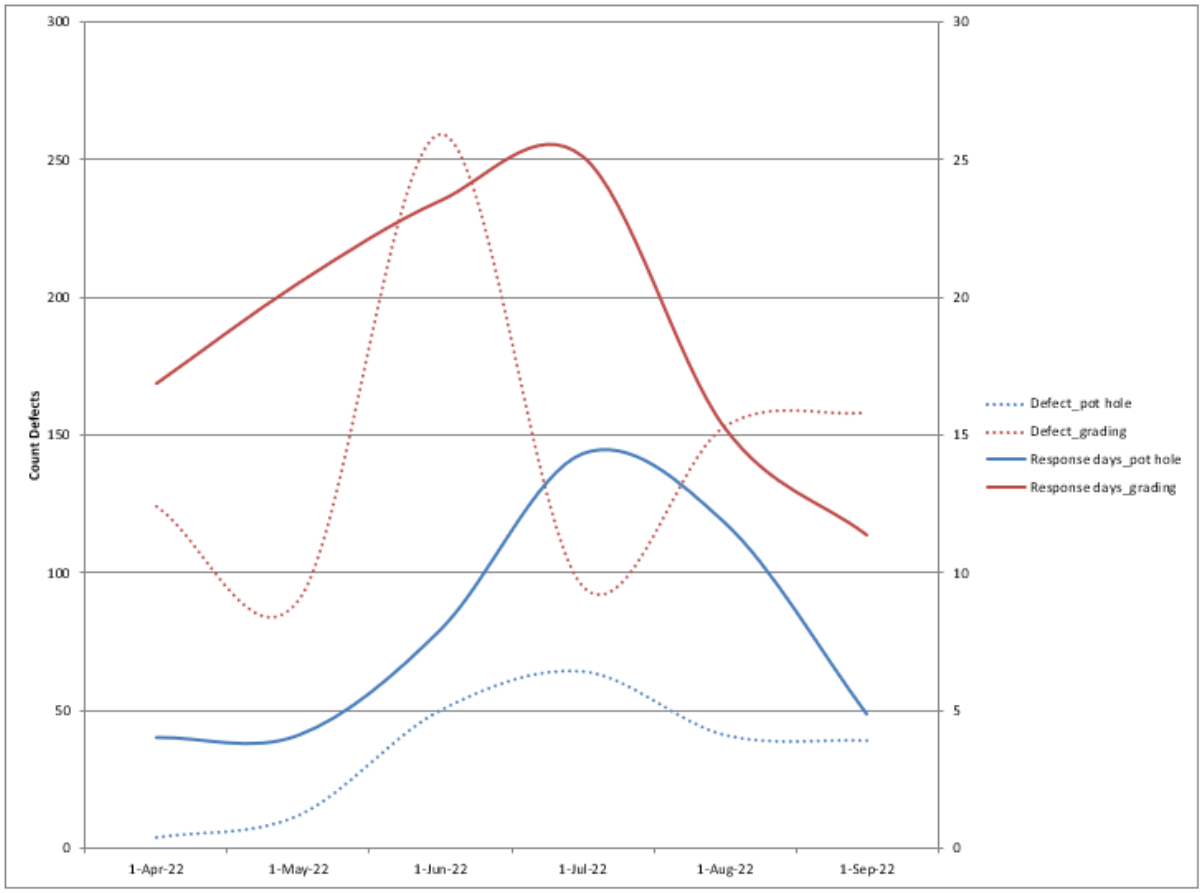


Figure 6. Unsealed Roads – Average Elapsed Days to Remediate Defects

Average days to remediate defects in the period to July, a product of relative normal investment of hours in remediation to June together with rising levels of recorded defects. Average days to remediate potholes dropped progressively from this point to end September. The effect of work hours invested in remediation are evident in declining elapsed days to remediate during August and September.

Elapsed days to remediate are well below days provided for by the Councils Road Management Plan.



Policy Implications

Cardinia Shire Council Road Management Plan v4

Relevance to Council Plan

2.1 We support the creation of liveable spaces and places

2.1.5 Upgrade Council's road network to improve safety and connectivity while considering traffic demand and freight transport needs.

Climate Emergency Consideration

The effect of climate change was not considered as part of this report, but clearly more extreme weather events, whether extended wet weather, high intensity rain fall and flooding, or extended dry periods all have adverse impact on the road network.

Consultation/Communication

The review of the Road Management Plan included detailed internal and external consultation, including advice from industry experts such as the Australian Road Research Board (ARRB), Austroads etc.

Public consultation was also completed prior to the adoption of this plan.

Risk Assessment

The intent of the Road Management Plan (RMP) is to manage risk associated with the assets listed within the RMP. This plan is designed to identify and mitigate risk to Council and users of the assets covered under this plan with respect to inspection and maintenance prioritisation, ensuring current assets are kept reasonably safe and serviceable. The classification system used is risk based, with higher usage implying a higher potential for a hazard to cause damage.

Financial and Resource Implications

Maintenance of Councils Road network is predominantly demand driven, based on both the need from the community and asset preservation. The additional effort expended, compounded by the more recent flooding and storms means our operational budget allocation is under significant pressure and rate of spend will continue to exceed initial forecasts in the immediate future. It is certain that some reallocation of budget towards road maintenance will need to occur and if adverse conditions persist maintenance of service levels will result in over budget expenditure.

Conclusion

This Notice of Motion report outlines the measures being undertaken by Council in its response to the impact of recent weather patterns on the performance of Council's roads, what measures have been undertaken by Council to respond to the conditions, and how it has impacted the timeliness of repair work.