NZ TRANSPORT AGENCY
WAKA KOTAHI

Auckland Motorways

AMADEUS – ROAD OPERATIONS CONTROL SYSTEM

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1. Purpose

The purpose of this technical note is to set out the proposed direction of AMAdeus. The note will address the base level requirements needed to physically coordinate the implementation of Traffic Management Plans (TMP), but also discuss the higher level information and efficiency needs of the various parties, plus directly reduce the level of congestion experienced by road users.

2. Background

The management of works in the motorway corridor is a key element in meeting the AMA's stated objectives of increasing stakeholder satisfaction, providing value for money, and optimising network efficiency. Works undertaken with inadequate notice; clashing with events, holiday weekends; or with inadequate or inappropriate notice about detours; and repeated works at the same location can all negatively impact on the reputation of the AMA and NZTA.

For this purpose the AMA has moved from a simple 'coordination" system to an integrated system which produces a much stronger element of forward planning of works around the network to enable a co-ordinated, structured and managed approach to corridor management.

The AMAdeus system was built and has been used successfully since 1st of December 2009. Contractors are using it directly, resulting in time saving for them and the Traffic Management Coordination Team (TMCT).

The AMA utilises an Agile development approach which allows iterative advances to be made in the systems functionality according to the User base requirements

3. Current Situation

The AMA is undertaking management and maintenance of the motorway and infrastructure around the Auckland region. As an essential part of this maintenance activity parts of the network corridor have to be accessed by contractors (including the AMA teams). This entails changes in traffic flow through speed restrictions, closures, cautionary notices and such.

Requests to access parts of the network are managed via a series of Traffic Management Plans (TMP). The contractors submit their TMPs online through the AMAdeus system, they are assessed by the TMC team at the AMA, and the contractor is advised of the approval of their TMP.

The TMP application and approval process is a workflow with the steps as shown in the flow chart below.

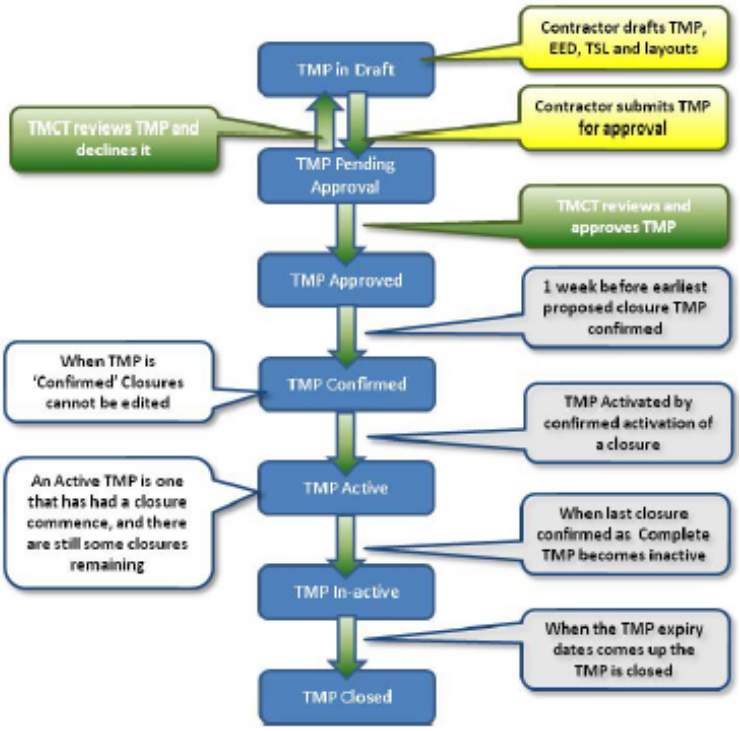

Diagram 1

To date the following functionality has been developed:

- ✓ Management of the workflow from draft application through to approval
- ✓ Processing of Temporary Speed Limits and Engineering Exception Decisions
- ✓ Production of online daily and weekly closure reports
- ✓ Confirmation of date/time of closures actually used, and use of the data for network performance contractor adherence reporting

Several enhancements have been rolled out to the industry more recently.
For example in the past the TMC team received a daily broadcast sheet from the contractors in the morning to advise which TMP's they plan to put in place for that day / night. These are put together in a report and sent to the daily broadcast group (ACC, Police etc.) at 10am.
Due to weather, bad planning, machine breakdown and other reasons, closures can be cancelled during the day, evening or while the closures are in place. Previously these did not always get communicated to the TMC team nor did it get recorded by the Traffic Operations Centre (TOC). Therefore the next day the AMA was unable to report on actual closures and their implementation time. This meant that understanding the traffic impacts at a network level was difficult.

To understand the impact of road closures on the network each day and to be able to give our customers live information about closures on the network, the AMA needed to know what closures were in place day and night. The only source to provide this information 24/7 is the TOC. An integrated system was therefore needed to be put in place between the TOC and the AMA.

This system provides a user interface for the TOC operators to view approved TMP's and enter implementation and removal times of each closure.

The integration benefits different teams:

- The TMC team understands when and what closures went in and out every night. This gives the team the opportunity to check if closures went in too early, got picked up too late and to follow up variations to approved plans with contractors.
- The AMA Network Performance team needed this integration to understand why the network was not performing well, they need to know if there was a closure out which might have affected the performance.
- The TOC again needed the information for the same reasons as the TMC team and the network performance team does.
- Probably the most important "team" that benefits of this integration is the travelling public. At this stage closures are advertised, only in the paper and on the NZTA webpage. The system now provides a real time electronic source of data on current road closures which can now be used for direct broadcast to media, and third party traveller information providers.

Before the integration of the above described system the AMA was unable to fully understand the true impact of road closures on the network, particularly beyond the immediate worksites. If congestion occurred due to early implementation or removal of road closures and was unable to update their customers in a timely manner.

4. Creating Stability

One of the most important changes to the industry will be

- ✓ Management of contingency dates for closures / logging of closures seven days in advance

Currently the activation of TMP's can be triggered by the contractor early in the morning for work the following night. This change will mean that those wishing to work on the AMA network will have a TMP approved by the TMC team not less than seven days in advance before the closure date.

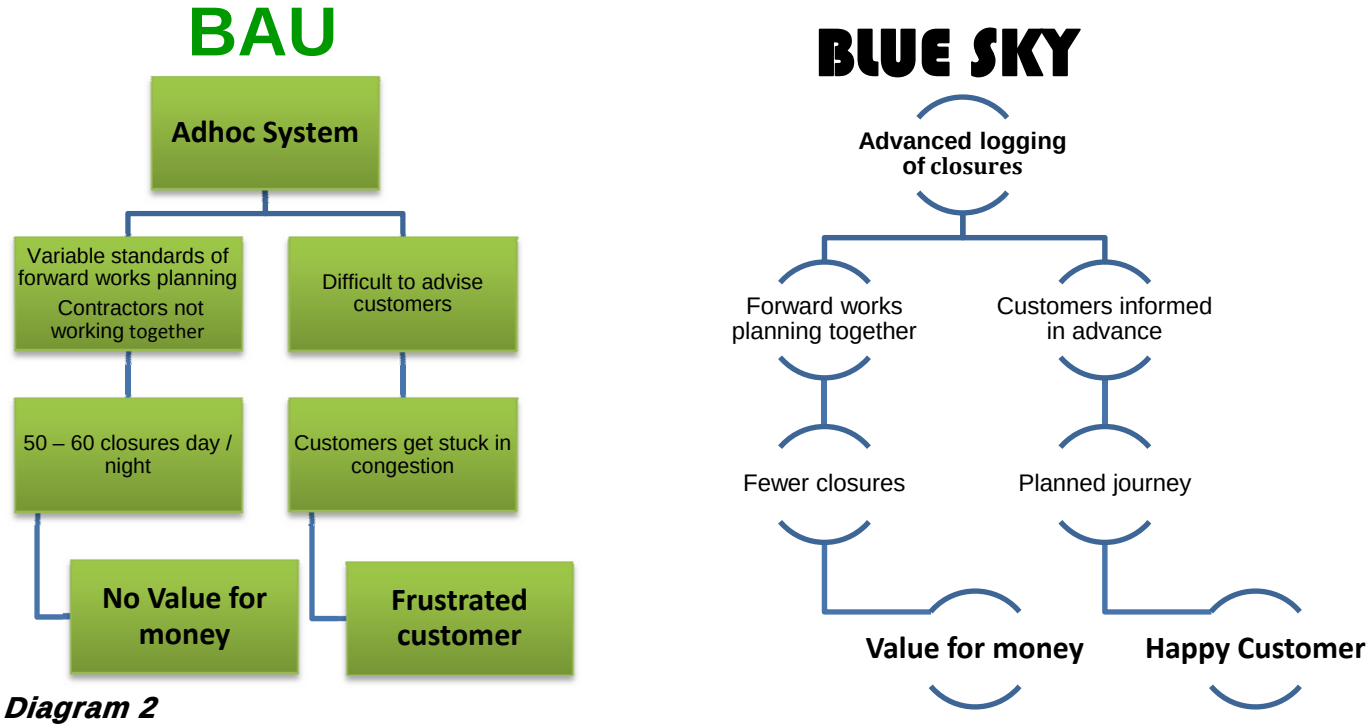

Diagram 2

The key benefits of the recent enhancements to AMADEUS are:

- Controlled approach to work on the network, thus minimising disruption
- Certainty of access to the network for all parties undertaking works to maximise resource efficiency/value for money
- The AMA will has oversight and control over the works in advance
- Project Managers / Traffic Managers and contractors get better forward planning for their operation
- Cost savings for all of the parties through less closures and more work happening in one closure
- Better advance programming and real-time information will allow better information for road users & neighbours well in advance and during closures on the network

5. Future Development

5.1 Road Closure analysis impact system

All decisions made by the TMC team require Assessment of traffic flows and the effects of lane or shoulder restrictions by time/day/highway section for all contractors.
The AMA is exploring the methods that will provide tools for the industry and the TMC team to better assess the expected traffic impacts of various closure scenarios. The AMA has developed prototype tools which link known traffic flow characteristics with the various likely TMP's for each section of motorway. This will allow the coordination and execution of road work to occur in a way that avoids or minimises congestion and gives high quality information to the contractors and the RCA.

A Road Closure Analysis System would benefit the following teams:

- The TMC team will save time, as contractors can assess the traffic impact of different closure scenarios to assist making their own decisions, before requesting approval from the TMC team
- Contractors will gain a much better understanding for the best times of closures

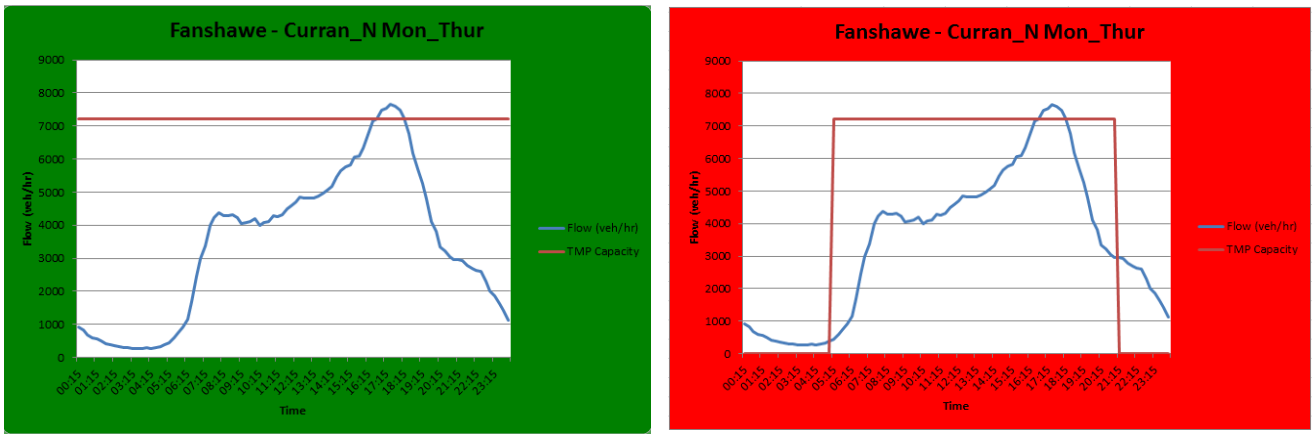

Diagram 3

5.2 Geo-Spatial Enablement

An internal GIS map will be needed for all AMAdeus users. The visualisation of closures will help the users to get a better overview of planned closures by location.

- ✓ Web based booking system for closures and advance advice of closures available for other contractors to use

To do so the AMA is adding a geospatial point selection tools to replace the text based method to increase accuracy and enhance the user experience.

An embedded GIS map will benefit the following teams:

- All AMAdeus users will benefit by having a visual map to view closures
- The TMC team will get a better understanding of what closures are planned
- External Map Interface, via web page

To give broad and high quality information to the motorists, all planned and current road closures will be on an interactive webpage where motorists can get information about travel time delay and recommended routes. The intention is that the AMA will serve the data back to NZTA, and they will publish it on their own webpages, and provide to third party providers.

The benefits of the new system are as follows:

- Overview of all actions
- Minimised obstruction of traffic flow
- Optimised implementation planning, by knowing in advance what obstruction will happen to the traffic - planning ahead, can be defined much more in detail and analysed and much better planned

6. Summary

The management of works in the motorway corridor is a key element in meeting the AMA's KRAs related to stakeholder satisfaction, value for money, and network efficiency.

The current processes have evolved considerably, but will benefit from on-going integration of traffic and other data sources, improving understanding of traffic flow and the real impact of road works. The preceding paper outlines some of the recent and proposed development of these systems.

Further challenges arise in the effective communication of planned and current works on the motorways with our customers. Recent developments provide a basis for distributing real time information in a number of formats to road users and other interested parties,