

USE OF TECHNOLOGY IN ROADS AND INFRASTRUCTURE SERVICES

1.0 EXECUTIVE SUMMARY

- 1.1 Technology is playing an increasingly important role in delivering business solutions across a wide range of public and private sector areas. Roads and Infrastructure Services have been embracing technology for several years and have ambitious plans to further utilise technology to help deliver front line services in an effective and efficient way.
- 1.2 This report contains a summary of the technology already in place and looks forward to how technology can provide and process data to help deliver front line services. This also includes the 'internet of things' including data transfer between systems and over networks.
- 1.3 It is recommended that Members endorse this report.

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2.0 INTRODUCTION

- 2.1 This report details the technology currently used and considers how technology can be further used to help deliver the varied front line services across the Roads and Infrastructure Services portfolio.

3.0 RECOMMENDATIONS

- 3.1 It is recommended that Members endorse this report.

4.0 DETAIL

- 4.1 Roads and Infrastructure Services delivers a wide range and varied set of services, the majority of which benefit from the use of technology to a greater or lesser extent. The technology currently used within each service is summarised below together with a brief summary of potential technology solutions for development. This report highlights some of the key systems

Marine Services

- 4.2 Marine weather forecasting service which provides meteorological and sea state information. This technology replaces traditional equipment such as wind socks and provides detailed information to our in house ferry crews as well as to third party ferries and vessels using our ports.
- 4.3 Electronic ticketing has recently been introduced on the four council-run ferry services and replaces the old 'manually' issued tickets from paper rolls. This provides a more auditable trail for payments and also opens up opportunity for pre booking online and via a mobile app.

Infrastructure Design

- 4.4 Traditional surveying equipment such as theodolites and levels have been largely replaced by 'total stations'. This new surveying equipment generally uses one individual rather than a team of two required for traditional equipment. The

surveying equipment uploads survey data which is processed by software which can be used to produce section drawings, calculate quantities, creating 3D models and carry topographical surveys. Our in house Design team have capability to utilise 'total station' equipment and carry out a number of surveys for the various projects we undertake. These surveys can be easily linked to Ordnance Survey map data.

- 4.5 Traditionally drawings were created manually on drawings boards. Today Computer Aided Design (CAD) is used for almost all of our drawings and designs. This system allows for amendments to be carried out easily and to provide a high degree of accuracy. CAD also allows standard details and items of repetition to be cut and pasted onto different drawings. The drawing can be zoomed into and viewed at different scales. Tenders are now let using electronic drawings and documents which negates the need for traditional paper copies. This saves on paper, cuts down on waste and saves money. Electronic drawings are also much easier to share across internal teams, with contractors and wider stakeholders.
- 4.6 Drones have been used for some topographical surveys and also for carrying out 'visual' surveys of hard to reach places such as the underside of a bridge or pier. It is anticipated that these will be increasingly used to survey large areas of infrastructure in future such as coastal retaining walls and embankments. It is expected that this will be able to provide three dimensional data for the service's WDM infrastructure database.

Network and Standards/Operations

- 4.7 The Network and Standards team has been established in part to assist the Operations team who deliver the bulk of our services across roads, open spaces, waste collection, cemeteries and the crematorium. As such Network and Standards/Operations utilise numerous systems including:
- 4.8 Winter weather forecasting software/system which facilitates information from 12 roadside weather stations (measuring surface temperature, residual salt levels, atmosphere moisture, air temperature, rain/snow, wind speed etc.), satellite imagery detailing weather changes.
- 4.9 WDM system which is used to process condition data for the road network. This data enables proactive asset managements to be carried out to help achieve the best return for the available investment using whole life costing and scenario modelling (based on likely road condition in future years using differing levels of investment from a suite of treatment types). This system is also used for works orders and recently for providing feedback to enquiries and service requests received. WDM is also used to hold condition data on the following asset sets:
 - Roads and footways
 - Drainage gullies
 - Verges
 - Drainage ditches
 - Road signs

- Road furniture
- Street lighting
- Bridges and structure

- 4.10 The Parking Services team within Network and Standards have recently introduced a parking application which allows parking to be paid for remotely. This provides an option for individuals allowing flexibility and the ability to pay for parking without cash. Further upgrades are planned which will facilitate card payments and online payments.
- 4.11 The Parking Services team also manage on and off street car parking. Penalty Charge Notices (PCN) are issued via hand held devices which upload the information from the PCN to a central system. This central system is used to process PCNs, deal with any enquiries or challenges as well as providing information and data for any internal appeals or appeals to the independent **Parking and Bus Lane Tribunal for Scotland (PBLTS)**.
- 4.12 Our parking wardens, ferry, staff, environment wardens and staff at waste collection sites have been issued with bodycams which can be deployed in situations of confrontation as added protection for our staff who may encounter difficult situations.
- 4.13 Some of our newer waste collection vehicles are fitted with on board camera systems with hard drives that can store footage for a certain length of time. To date this footage has been used in accident investigations and to defend disputes over alleged missed bins.
- 4.14 **Electronic bin collection calendars have been developed between the Operations team, Waste Management and colleagues in Customer Support. The electronic calendars are now available through the council website.**
- 4.15 **The Council's street lighting stock has largely been replaced with LED luminaires. The LEDs use approximately 50% of the energy used in previous lighting which has huge benefits both in terms of carbon reduction and cost. There is approximately 1000 luminaires still to be installed out of the total stock circa 14,000.**
- 4.16 **Electric vehicle charging points have been installed across the council area through grant funding from Transport Scotland. The Council is also utilising a small number of electric vehicles as part of its pool car fleet and as battery range increases, electric vehicles are becoming increasingly more viable for the geography of Argyll and Bute. The service is also exploring the potential for hydrogen powered vehicles to be utilised.**

Fleet Services

- 4.17 Fleet operate two main systems to support the 450 vehicles the council operates. Tranman is an asset management system used to track vehicle usage covering repairs, servicing, faults and damage. Currently reports are produced and provided to managers detailing accidental and avoidable damage. Managers are required to act on these reports. This reporting is in the process of being enhanced with future reporting to be taken to DMT/SMT meetings to enable the senior management team to be made fully aware of any accidental/avoidable damage, the cost associated with this and actions that the manager is taking to reduce these costs.
- 4.18 All council vehicles are fitted with vehicle tracking systems which allow managers and supervisors to provide virtual support to staff who may be lone workers in remote locations. In addition to this, the tracking system provides a snapshot of where vehicles and teams are at any point in time. This can be used for responding to emergencies (allocate the nearest response to respond). The tracking system also produces a 'snail trail' which can be used to respond to complaints.
- 4.19 The Fleet team administer a fuel system, which enables remote monitoring of fuel levels and provides management. The fuel system enables stock levels to be checked remotely, enables replenishment of fuel supplies once stock reaches a certain level in any one tank (this intervention level can be changed if required – e.g. in the event of there being a national fuel shortage. This also allows the council to have a higher degree of resilience should there be fuel shortages and also would help in strategic rationing of fuel should this ever be required.

Technology being considered by the service

- 4.20 Artificial Intelligence (AI) is becoming increasingly popular and may well have a role to play in monitoring structures and other infrastructure. Officers are currently considering various opportunities for which AI could be utilised. Whilst the use of this technology is in its infancy, it is anticipated that over the next two to three years there will be an increase in use of AI which through the use of data captured through video survey and through algorithms, projections of future deterioration/condition should be able to be modelled which will enable a greater focus on a stitch in time/right first time fixes. AI has got potential for use across the marine sector, bridges and structures as well as carriageway and footway surfaces. It is not expected that AI will fully replace the current inspection regime, more that it would provide earlier indication of possible failure and also reprioritise how our existing resource can be best utilised. There is further scope to develop the 'internet of things' including data transfer between systems and over networks.
- 4.21 Initial discussions have taken place with our in house ICT team and Scottish Government's Digital Office regarding a detection systems for ports and harbours. Essentially the available berthing face of ports, harbours and marinas could be monitored remotely allowing available mooring capacity to be overseen rather than this monitored manually. This would assist the harbourmasters during out of hour's periods where the harbourmaster service could cover bookings across a

larger area remotely. This would free up harbour staff time and weekends with a rota standby system in place.

- 4.22 Route optimisation is being progressed to provide effective and efficient logistical routing for a number of the operations carried out by the service. This would include activities such as routing for bin collections, winter maintenance, gully emptying, mechanical street sweeping, routing for safety inspections etc. Route optimisation would also allow for live re-routing in the event of a vehicle breakdown. This technology couples with on board satellite navigation equipment would enable effective and efficient deployment of the council's fleet. This would also have the benefit of being able to provide more up to date and accurate information relating to service disruptions.

5.0 CONCLUSION

- 5.1 This report provides an update on technology in use and being considered by Roads and Infrastructure Services.

6.0 IMPLICATIONS

- 6.1 Policy – none known
- 6.2 Financial – from identified budgets
- 6.3 Legal – none known
- 6.4 HR – none known
- 6.5 Fairer Scotland Duty:–
- 6.5.1 Equalities - protected characteristics – none known
- 6.5.2 Socio-economic Duty – none known
- 6.5.3 Islands – none known
- 6.6 Risk – none known
- 6.7 Customer Service – none known

Executive Director with responsibility for Roads and Infrastructure Services

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February 2020

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