



### Subway Modernisation - progress update

**Date of meeting** 13 December 2019

**Date of report** 28 November 2019

#### Report by Director of Subway

#### 1. Object of report

To provide to the Partnership the latest progress update on the Subway Modernisation programme.

#### 2. Background

The Subway Modernisation programme is the most significant investment and improvement programme to be undertaken in the Subway within the last 40 years.

The programme was scoped for delivery under five principal workstreams, namely:

- Stations and accessibility improvements;
- New Ticketing System;
- Renewal and Upgrade of Existing Infrastructure & Depot Facilities;
- New Rolling Stock, Signalling and Automated Control Systems; and
- Organisational Change and Employee Relations.

This report provides an update on the key areas of progress and emerging issues since the last written report to the Partnership via the Strategy & Programmes (S&P) Committee in May 2019.

#### 3. Progress to date

##### 3.1 Stations and accessibility

Fourteen out of a total of fifteen stations have now been refurbished with West Street expected to complete in the new year.

Key areas of progress on this workstream since the last update are:

- Refurbishment work at St Georges Cross, Cowcaddens and Kinning Park stations has completed on budget and on programme. Work commenced at West Street in August 2019.
- Design interface work with the new Rolling Stock & Control Systems (RS&CS) contractor (ANSTA JV) continued to capture any RS&CS requirements at the last remaining stations undergoing refurbishment. Some challenges have however been presented given progress of some of the RS&CS designs.

- The programme of activity to strip out legacy redundant equipment and cabling in all stations will continue into the new year. This work is being undertaken by our internal maintenance teams prior to the installation of new cabling and equipment under the RS&CS project.
- The RS&CS installation works have continued across all stations, with civil enabling works and cable containment installation well underway and expected to complete in the first half of next year. Installation of the new signalling and control equipment has also commenced in some stations on the south side of the system.
- The call off contract with MacKenzie Construction (awarded in September 2018) to address water ingress at stations continues. Since the last update, further resolution measures have been undertaken across a number of stations (including Kelvinhall, Cowcaddens, St Enoch, West Street, Shields Road and Ibrox) within passenger and operational areas. The next tranche of works is currently being scoped in readiness for the winter period.

### 3.2 Ticketing

Testing and development of the Subway SmartApp trial is still on-going, and positive steps have now been made with a wide range of Android phones now proven to work in testing. SPT intends to introduce the SmartApp as a customer ticket option early in 2020. To note:

- Online Subway ticket sales continue to grow in popularity, peaking at 7% of ticket sales by value for the four-week period to 14/10/19. This is up from 5% at the same time last year.
- For ticket sales in stations, card payments are continuing to increase while cash payments are decreasing. Card payments now account for almost 50% of all transactions, and more than 60% of transactions by value however, cash transactions clearly remain material to Subway revenue.
- The ten-week season ticket, introduced in 2018, continues to prove popular. A total of 345 were sold in the four-week period to 14/10/19, up by 37% on the previous year. SPT will continue to actively market this product.
- Smartcard interoperability was recently announced by Transport Scotland at an event at Partick Interchange with a wider range of operators now involved. This further grows the interoperability options for Subway passengers. This is a significant development that coincides with the withdrawal of the paper format Subway Add-On ticket, previously retailed by ScotRail. The intention now is to encourage customers to load ScotRail and Subway tickets onto a single smartcard.
- Technical work has now been completed to enable eligible concession card holders to load Pay AS You Go (PAYG) credit onto their National Entitlement Card (NEC). This change is anticipated to save more than 500,000 disposable Subway tickets each year, while providing increased convenience for customers.

### 3.3 Infrastructure

Works have continued on the infrastructure workstream with an on-going focus to complete key activities and remedial works across tunnel, track and line assets, in readiness for new system and train testing. Key progress made since the last update is as follows:

- Works to improve tunnel clearance in advance of train testing continues. Design work required has been completed for majority of areas and the

programme of improvement works to date has been delivered by our internal teams. Procurement of a specialist civils contractor is largely complete and works are expected to finish by spring 2020.

- Following on from previous investment improving the condition of sections of tunnel linings, action is underway to define a prioritised work bank and design specification for delivering improvements to the integrity of the remaining tunnel linings. The improvement works will build on the work done and lessons learnt from the previous tunnel lining works contract that ended in early 2018. The works will focus on the next stage priority improvements and emerging issues requiring action to mitigate any risk of disruption to service or potential to impact any testing of the new fleet.
- Arup, appointed in early 2019 to provide specialist track design consultancy support, has completed the design work to provide SPT with a prioritised programme of track geometry improvements that can be implemented prior to, and beyond, introduction of new trains. These works will improve ride quality and reduce whole life costs. Internal teams are now working with suppliers to establish how the defined work packages can be best implemented within system constraints from other projects and maintenance activity over the next few years.
- On-site testing and commissioning of the long welded rail carrier (LWRC) is nearing completion. The carrier is scheduled for introduction to service to support maintenance re-railing works in early 2020.
- Investigations and assessments have also progressed to confirm the condition and longevity of legacy electrical, telecoms and IT assets that will remain and operate in conjunction with the new system. Improvements are underway on a number of existing systems that will remain in use. Following completion of the RS&CS design, interface and integration issues have been identified with the legacy traction power system, given the age of the traction power assets and modern electrical specification requirements. Options and works scoping for improvement are being developed, whilst at the same time examining long term improvements to maximise energy efficiency throughout the system. Approval for award of contracts for a number of retained legacy electrical asset improvements will be sought in early 2020.

### 3.4 Broomloan depot facilities

Work activity to ensure the integrity, reliability and longevity of key assets within Broomloan Depot, in conjunction with readiness and preparedness for new asset introduction, continues at pace. The key areas of progress on this workstream are:

- The stabling shed roof refurbishment contract, awarded to Clark Contracts Ltd was completed to budget in autumn 2019. The works included structural repairs, strengthening works and full roof replacement on the existing stabling shed building.
- ANSTA JV has now developed a design for extension of the stabling shed to meet the future stabling requirements. The ground investigation works to inform the foundation design were completed during the summer and highlighted unexpected ground conditions. This has complicated the foundation design, with options to resolve still in discussion. Acceptance of the full design submission is not expected until after the new year, with works commencement targeted for the spring of 2020, pending ANSTA JV's award of a construction sub-contract.
- The construction of the new Operational Control Centre (OCC) has progressed significantly. The building is now substantially complete with some building

services fit out, landscaping and security installation remaining. SPT will not take occupation of this building until the new control systems are installed, which will commence in the new year. ANSTA JV has already started to deliver new equipment to the building prior to install commencing.

- Work to modify the depot maintenance workshop to accommodate the wheel lathe and lifting jacks, required to maintain the new rolling stock is now largely complete. The civils enabling work for the new equipment is now complete. Installation planning for the new plant is now being developed, with installation now expected to start in early 2020.
- A contract was awarded to Volker Rail in October 2019 to construct a new siding at the Broomloan Depot, primarily to store the long welded rail carrier. In addition, the new siding will mitigate the projected shortfalls in rail vehicles storage capacity at the depot during the introduction of the new trains and other works construction in the depot during the next phases of modernisation. Interface and integration to other planned yard improvements is being further assessed prior to works commencing on site in the new year.
- Despite some delay to establish acceptable safe access and working methodologies due to the works location in the live depot yard, installation of a new carriage wash and Automatic Train Inspection (ATI) equipment commenced in October 2019. The former wash has been decommissioned and removed and all train cleaning will be done manually until the new wash is commissioned around summer 2020.

### 3.5 New Rolling Stock and Control Systems

All of the following activity is being delivered by the ANSTA JV and their sub-contract/supply chain.

- The Manufacturer Depot and Testing Facility at Edmiston Drive is now substantially complete. Delivered by Story Rail on behalf of ANSTA JV, following the construction of two operational buildings, the depot yard and test tracks, site fencing and protection, road and pedestrian access, hard and soft landscaping and new third rail infrastructure have now been completed. Power connections and access protocols are being finalised which will allow the depot and testing facility to be fully operational by the end of the year. This site will remain under the control and operation of the ANSTA JV for reception, storage, testing and modification of the new train units and their main works depot for system installation activity.
- The first three new trains were delivered to the ANSTA JV Manufacturer Depot & Testing Facility in Glasgow during the summer of 2019. The static off-line testing programme is underway for these units at the testing facility. A number of design modifications have been completed based on findings at the factory acceptance tests conducted to date. The modifications will be implemented at the ANSTA JV Depot in conjunction with the commencement of dynamic testing. The dynamic testing for the first three vehicles will commence in the new year. There has been a slight extension to the planned break in production of any further units until spring 2020, as a proportion of testing needs to be completed first to feed results and any subsequent design changes into the production process. Following completion of off-line testing there will be an extended period of mainline dynamic testing in the tunnel system, prior to staged introduction of new fleet into service. As noted in the previous update, mainline testing will require night-time running and work on preparation for this is on-going.
- Design of the signalling, telecoms and control systems as part of the new integrated system has continued to progress. Development of the migration

installation and strategies for the various control systems is underway but has experienced significant delays. The inherent complexity of install in 19<sup>th</sup> century tunnels and the associated required detailed management to ensure limited impacts to the operational and passenger environments has presented challenges to the completion of ANSTA JV's installation designs. Complex installation of the tunnel systems and subsequent commissioning of the new OCC are critical to the success of the overall modernisation project. Cable containment installation within the stations is well advanced and installation of signalling, telecoms and control equipment has commenced on station sites however, this will shortly be interrupted until early 2020 to allow the ANSTA JV to better integrate their installation designs.

- As noted in the last report, the ANSTA JV commenced factory acceptance, functional and integration testing for a number of new assets earlier this year which has seen a range of SPT staff in attendance at various international supplier facilities to witness and input to these tests, to ensure system design meets SPT's requirements and expectations. This critical off-site testing phase is currently at its peak and will now start to ramp down with the completion of the integration and site acceptance testing. There has also been the delivery of the driver simulator to Glasgow and a period of familiarisation testing with SPT operational staff has just completed.
- Commissioning of the CCTV system installed at SPT head office, Seaward Street facility and in the bus stations, has now been completed with the removal of the old system underway at all sites. The CCTV install is being delivered by the ANSTA JV as part of the improvement of corporate systems capital investment strategy, with installation of the new Subway systems commencing in 2020.
- SPT continues to challenge and monitor the evidence provided by ANSTA JV to demonstrate the safety argument required under SPT's Safety Verification (SV) Scheme and in line with Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) requirements. The SV team has conducted a number of audits since the last update to validate that the ANSTA JV has followed their documented and agreed project processes, in a fully traceable and compliant manner. Design process audits have been completed to current stage of design for platform screen doors and signalling sub-systems. A number of associated hazard audits have also been undertaken. The holistic system design audit is planned for December 2019 at ANSTA JV's System Independent Safety Assessor's (ISA) offices in Cologne, Germany. The SV focus has also started to assess SPT's preparedness to accept the new system and verify and validate that SPT is in a position to support the change.

### 3.6 Manufacturing & Supply Agreement (MSA)

Members will recall all design, manufacturing, construction, installation and testing/commissioning work delivered by the ANSTA JV on the RS&CS project is under the Manufacturing & Supply Agreement contract.

SPT has expressed significant and on-going concern to the senior management of the ANSTA JV as to the lack of speed of their installation programme. As a result, the Joint Venture has replaced a number of key staff, including their Project Director, with more experienced individuals who have, after considerable assessment of the contract status, intimated to SPT that their current programme is no longer achievable.

The Joint Venture has been slow to design and place contracts with the sub-contractors they have engaged to carry out the necessary work packages. The Joint Venture is proposing that in view of this lateness, they require to re-baseline the programme and will submit this to SPT early 2020. SPT expect this re-baselined

programme will move some key dates significantly, to be confirmed when the ANSTA JV submit their proposed programme. We intend to vigorously review and challenge the proposed programme as lateness has significant implications for SPT, both in terms of requiring that we keep the existing fleet running for longer which has cost implications, and for the contract cash-flow outgoings which will be significantly impacted in terms of timing. SPT will inform the Partnership of the impact of the re-baselined programme in due course.

### 3.7 Technical Support and Spares Supply Agreement (TSSSA)

The Technical Support and Spares Supply Agreement contract with the ANSTA JV continues to progress. Members are reminded that under the TSSSA contract, ANSTA JV is responsible for the management of the Subway material stores and spares supply for new assets though SPT retains responsibility for the provision of stores personnel and materials and spares for legacy assets.

The testing phase of the interface between ANSTA JV and SPT's stores management systems (both Infor EAM based) is now complete and the live environment is now active for the combined stores.

SPT has appointed a new stores manager who is currently engaged with the ANSTA JV to develop the process and procedure for the new 'combined' stores planning and management, based on best practice and learning from other train maintainers', whose stores are also managed by the ANSTA JV partners. This has included a knowledge share visit to Abellio Greater Anglia's Norwich Crown Point Depot stores which is run by Stadler. A further visit to Mersey Rail's Liverpool stores, also run by Stadler, is planned in the new year. This is also allowing SPT to develop relationships with the ANSTA JV and the wider train operator/maintainer community.

The two members of SPT's maintenance team seconded to the ANSTA JV in February 2019 are currently working in various Stadler facilities across mainland Europe and Broomloan Depot. This specialist training and direct involvement in the testing and commissioning phase is proving to be of great benefit to both the individuals and wider SPT maintenance team.

Progress of the MSA and interaction with the TSSSA contract programme remains closely monitored, and therefore the TSSSA programme will be fully reviewed in conjunction with the re-baselined MSA programme upon receipt.

### 3.8 Organisational Change and Employee Relations (including operational readiness)

The Subway Modernisation operational readiness plans are aligned to the key Configuration Points (significant changes to the operation) and progress, risks and issues are actively managed to ensure appropriate prioritisation and to protect continuity of revenue service. The following is key progress and activity since the last update:

- A specific operational readiness focused 'Transformation Team' has been created, aligned side by side with the infrastructure Project team. The core team consists of existing and new resources, centralising and co-ordinating the people focused change requirements across the Subway, and there may be additional secondment opportunities for Subway staff in order to increase engagement and knowledge further. The intention is to ensure that the level of importance on this work remains high, and is given the sponsorship and spotlight it requires to succeed. Our entire Subway management will continue to collectively focus on sponsoring, planning and implementing the changes required, ensuring that we can both support on-going project activity and be

ready to accept, safely operate, and maintain our new assets, whilst continuing to seek good availability of the existing fleet.

- Employee engagement across Subway continues. The arrival of the first three trains and their delivery to the manufacturer depot and testing facility was a significant engagement milestone and in November, over 80 Subway colleagues had the opportunity to experience the new trains by arranging for one to be in the Broomloan depot for that purpose. Drone footage has also been shared with staff via various channels. There has also been early access to new facilities and equipment in order to start the familiarisation process ahead of formal training. Modernisation has been increasingly visible to staff over the last year as station refurbishment continues along with significant infrastructure projects at Broomloan Depot on the stabling shed roof, the new Operational Control Centre and revised layout in the depot to accommodate the wheel lathe and other equipment.
- Trade Union and Safety representatives have been regularly briefed on progress and have also been involved in site visits to the Manufacturer Depot as part of our standing local Information and Consultation of Employees (ICE) meetings and Safety Committee. This engagement is focussing on creating an open environment for early, two-way dialogue on operational resilience measures and any potential issues arising. The resourcing strategy continues to place building resilience, competence and flexibility at its core.
- More than half of Subway Operations staff are now fully competent in more than one service delivery function (e.g. station operation, train driving, system control), demonstrating personal flexibility and capability. This strategy is particularly important ahead of the critical migration phases from re-control to the new OCC and to support the train testing activity in the year ahead. The Operational training team has benefitted from early involvement with the development and testing of the driving and control interface simulators and have taken the opportunity to build their own expertise and to showcase the new technology to staff. Assessments and definition of the future staffing models for the new Operational Control Centre are on-going. Specialist consultant (Atkins) has been appointed to review workload analysis and facilitate surveys and workshops to ensure the future operational structure is safe, efficient and sustainable for each key operational change.
- Subway Maintenance continues to address the skills and knowledge gaps between the current technologies and methods and the future requirements. A further two mature engineering apprentices started at College in August, building on the success of the first cohort of five that started in 2018. The second year apprentices continue their broad-based development supporting maintenance activity, which will include involvement with the testing, and commissioning of our new assets, creating a pathway to future technician roles.
- Engagement with the Office of Road and Rail (ORR) has continued on a regular basis. ORR Directors visited site and inspected the manufacturer depot and testing facility in June 2019 as part of the modernisation update programme. The next meeting is planned for early 2020. The routine operation liaison meetings also continue with the last formal meeting held in July 2019. Relations with the ORR remain on good terms and SPT will continue to proactively engage with the ORR to ensure the future Authorisation and Certification requirements and expectations are clear and jointly accepted.
- Site visits and liaison meetings have also been held throughout the last six months with the Department for Transport (DfT) Transec, British Transport Police and the Fire Service to provide familiarisation to and advice on the new and modified operational facilities and new train units.

- Following completion of an initial review of the existing Subway operational rule book, regulations and process and procedure, the Rail Safety and Standards Board (RSSB) has been recently appointed to provide specialist support in developing modularised Operational Procedures documentation to support the smooth migration from current to new operations as we transition through each of the key configuration points. This activity is central to preparedness for new system operational authorisation and certification.
- Impacts and improvements to the Safety Management System (SMS) documentation continues to be analysed against project activity and information, and updates and change requirements are being compiled into a defined transition plan aligned to the key modernisation configuration points. It is intended to review this plan and current progress against it with the ORR in early 2020 to ensure this meets their expectations and needs for re-authorisation and certification.

### 3.9 Further information

#### 3.9.1 Secure Communications Network

As noted in the last update, Subway currently uses the Home Office Airwave (Motorola) secure radio communications network for all operational communications and to facilitate emergency services communications within the system. The Home Office Emergency Services Network (ESN) programme continues to be developed to replace Airwave but their overall programme is in delay. Due to these published delays to the ESN programme, Subway finds itself with a need to extend the current Airwave contract, which was due to end in December 2019, to align with the ESN switch over programme. Given the age and condition of the existing assets, a need for capital investment has also been identified. A short term extension of the existing contract beyond December 2019 is being put in place, whilst a longer term extension is negotiated. This will likely be a three-year extension and with an associated upgrade of system hardware. Approval for award of the long term extension will be brought to Committee early in the new year. Options for a future communication system after the end of Airwave are currently being assessed and a transition strategy is being developed.

#### 3.9.2 Existing rolling stock

In order to provide prudent mitigation to any significant potential delays within the MSA programme, additional options around maintaining and assuring the condition and reliability of the existing operational rolling stock are being developed by the Subway Engineering and Subway Maintenance teams. It is critical that safe and assured levels of service are maintained for the travelling public, and therefore considering risk assessed and prioritised programmes of work on the existing train sets are being investigated for inclusion in the Strategic Asset Management Plan (SAMP). Implementation of a revised SAMP is envisaged to begin around the turn of the year.

### 3.10 Programme budget

Within the overall Subway Modernisation budget of £288.7m, the 2019/20 budget was set at £47.372m at the Partnership meeting of 8 March 2019 and amended to £44.039m at the Strategy & Programmes Committee on 30 August 2019.

To the end of Period 7, 12 October 2019, £164.2m has been incurred against the total budget of £288.7m on the programme.



Per section 3.1, the final station refurbishment at West Street is due to complete early in 2020 and thereafter the remaining programme budget, including contingency, will be required and utilised for the delivery of the MSA contract and associated programme support costs only.

As noted at 3.6, a revised baseline will be submitted by the ANSTA JV to SPT early 2020. This baseline will be reviewed in detail contractually and in conjunction with existing cost variation proposals as reported to Strategy & Programmes Committee on 10 May 2019. These proposals remain under review and challenge by SPT in line with the contractual process. To date, a number of variations have been agreed which are collectively close to cost neutral but have resulted in a small net saving to SPT.

Overall, the Subway Modernisation capital programme remains within the approved budget, including programme contingency and available funding.

#### **4. Conclusions**

In conclusion, progress continues to be made across all Subway Modernisation workstreams although the ANSTA JV emerging delays are now impacting on forward forecasting, as summarised below:

- station refurbishment works are due to complete in early 2020;
- installation of new control and signalling cableways and equipment has progressed within stations. ANSTA JV is postponing further equipment and cabling installations until early 2020 to allow better co-ordination of installation designs and methodologies;
- progress on infrastructure and depot improvements continues including the completion of the stabling shed roof replacement and the new OCC building structure. Delays have been experienced in development of the stabling shed extension design and wheel lathe/lifting jack installations;
- three new train units delivered to Glasgow, and the initial phase of offline testing at the ANSTA JV testing facility has commenced. The start of dynamic testing is planned for the new year;
- on-going progress has been made with the signalling and control systems designs, testing and installations, including completion of the corporate CCTV replacements outwith Subway;
- continued progress on operational readiness activity and engagement with staff, trade unions and key external stakeholders regarding future operational changes;
- on-going progress on the safety verification and validation of project and readiness activity in support of future ORR authorisation and certification of the modernised system, including further liaison with the ORR;
- following a significant change in senior management personnel, delays to the key delivery milestones under the MSA contract have now been confirmed to SPT, with the ANSTA JV currently re-forecasting to confirm forward programme and impacts to all key dates. SPT challenge to proposed programme and on-going risk will be undertaken in early 2020 upon receipt of revised forecasting from the ANSTA JV; and
- the Subway Modernisation capital programme remains within the approved budget of £288.7m and available funding.

#### **5. Partnership action**

The Partnership is recommended to note:

- the continued progress made on all Subway Modernisation and improvements since the last written update to the Partnership via S&P Committee in May 2019;
- the complex nature of the particular stage that the Subway Modernisation is about to enter. Detailed design and installation of control systems within narrow gauge, 19<sup>th</sup> century tunnels will bring significant technical and operational challenges requiring full and detailed understanding and management;
- expected (but as yet undefined) delays to programme forecasts by the ANSTA JV for the MSA contract with some key operational dates impacted significantly since their last baseline reported dates. SPT will challenge and assess the re-baselined programme and delivery risks on receipt of full revised forecasting (expected early 2020);
- a minor change in contract costs (within contingency) has been agreed on the MSA contract and a number of submitted change items associated to reported delays remain under review and challenge;
- operational impacts of the reported delay are being assessed and mitigation planning is underway, including existing fleet maintenance and reliability programmes;
- the need to extend the Airwave contract is required and will come to a future Committee meeting in early 2020; and
- the programme remains within overall budget and funding.

## 6. Consequences

Policy consequences	<i>The Subway Modernisation is a key objective of the Regional Transport Strategy.</i>
Legal consequences	<i>Reported delays will be managed in accordance with the MSA contract terms and SPT Governance.</i>
Financial consequences	<i>Overall the proposed works remain within the allocated capital and revenue budgets and Subway Modernisation business case.</i>
Personnel consequences	<i>No significant changes within this report although significant changes are expected as the operational readiness programme continues to develop.</i>
Equalities consequences	<i>None within this report.</i>
Risk consequences	<i>ANSTA JV delay impact to forward operational service delivery and budgeting. Impacts and risks to be fully assessed and mitigated once robust forward forecasts are challenged and understood.</i>

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