

## Subway Modernisation - progress update

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**Date of meeting** 30 March 2012

**Date of report** 05 April 2012

### Report by Assistant Chief Executive (Operations)

#### 1. Object of report

To provide to the Partnership a progress update on the subway modernisation programme.

#### 2. Background

Members will recall from the previous updates that SPT has been progressing the modernisation of the subway through a single co-ordinated programme approach<sup>1</sup>. We have established five principal workstreams under which individual projects are managed. These are:

- Rolling Stock, Signalling and Control Systems;
- Stations and Accessibility;
- Infrastructure;
- Ticketing; and
- Employee Relations/Human Resources.

In addition, an overall communication and stakeholder management plan is in place to ensure consistent and regular communication to customers and all stakeholders, including staff, as the modernisation plans progress. A significant consultation event was recently held with the Accessibility Stakeholder Group and a summary of the outcomes is provided within this report.

Also at a corporate level, the ongoing funding requirements, including the SPT generated savings that contribute to the subway modernisation fund, continue to be reported and monitored through the regular revenue and capital monitoring reports provided to the Strategy and Programmes Committee. During this period SPT has also applied for additional European Funding (ERDF) and await the outcome of this application, which is expected by June 2012.

SPT continue to learn lessons from other metro operators and recently visited RATP (Régie Autonome des Transports Parisiens) to learn from their directly relevant experience in implementing a new system of driverless trains on an existing line (Paris Line 1) as well as the delivery of other full automation across their network (e.g. Line 14). Details of the lessons learned are included within this report.

The following section provides a summary of key progress made to date since the previous progress report to the Partnership in October 2011.

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<sup>1</sup> Delivery Structures for Subway Modernisation and Step Change for Bus, SPT Operations Committee, 24 June 2011

### 3. Progress to date

#### 3.1 Rolling stock, signalling, control and associated systems

This package represents the most significant investment in the subway modernisation and in general terms this comprises: a fleet of new trains, new signalling system (likely to be CBTC<sup>2</sup> based), control system, new control room, platform and track protection (screen doors) and enhancements to the existing power supply, depot stabling and maintenance facilities. The overarching operational requirements are for a fully automated driverless system that provides more frequent, reliable and flexible service to our customers, whilst also reducing ongoing operation and maintenance costs.

SPT issued an OJEU notice in December 2011 for the turnkey package of new trains, signalling, control and associated system improvements. SPT has entered into this process utilising a performance based specification focussed on customer requirements rather than a traditional engineering based specification. In compliance with the business case submission the solution provider will be required to submit proposals that should include an option for a full turn key maintenance regime, however for clarity that remains at this stage a costed option. The procurement strategy is based on a negotiation procedure utilising a competitive dialogue process with the first stage being a pre-qualification of potential suppliers. Pre-qualification submissions were subsequently received on 9 March 2012 from five companies/consortia and the pre-qualification submissions are currently being assessed by the subway modernisation team. The procurement process is expected to take around 18 months to complete (subject to the number of varying solutions that may be offered during the competitive dialogue process), following which a decision will be sought from the Partnership to award the turnkey contract.

As part of the procurement process and future implementation of the new system, SPT requires specialist support to assist in assessing the solutions and tenders from potential suppliers. A separate paper to this Partnership Board meeting sets out the tender process and recommendation to appoint Systra as the client technical advisor on this role. As noted in the separate report, Systra has unique and directly relevant experience in performing this role on other projects and will be instrumental in assuring that SPT obtain a solution that meets our operational and customer requirements whilst also delivering world class and cutting edge technology.

#### 3.2 Experience from other operators

Following the attendance and participation at the CBTC World Congress in November 2011<sup>3</sup> SPT has followed up with a visit to RATP in Paris to learn from their experiences in implementing a fully automated driverless system on their metro system (specifically on Paris Line 1). This project has the most directly comparable issues with the subway modernisation in terms of the operational solution, technical and engineering challenges and in particular the full automation of an existing 100 year old railway, without any loss of service.

The visit to RATP included access to senior management within RATP and their suppliers and a visit to numerous aspects of the Paris Line 1 project as well as other aspects of the wider system that would not be available during a normal conference or site visit. The timing of the visit was related to RATP key staff availability but also timed to coincide with the migration period whereby they were running both fully automated trains at the same time as semi-automatic trains. This allowed invaluable first hand experience of issues relating to migration such as the operational regime, equipment requirements and project requirements.

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<sup>2</sup> Communication Based Train Control

<sup>3</sup> Subway Modernisation – CBTC World Congress 2011, Partnership Meeting 9 December 2011

The visit included meeting the project director and management team for Paris line 1 who provided a detailed insight into the project, the challenges faced and techniques used to overcome the challenges (for example the installation of platform screen doors). We were given unique access to the new Line 1 control room and met with the operations manager together with operations staff who provided detailed insight into the operation of Line 1 and the detailed working of the control room. We visited numerous stations and locations along Line 1 to view the operational and technical aspects including specific issues relating to tight track and platform curvature, the equipment and control mechanisms used for platform screen doors, the signalling and control system equipment. We also visited the local operational training facilities at Bastille station which is used to train all staff on the new system. Key lessons learned and now incorporated into the requirements for the subway modernisation are: the inclusion of platform screen doors; training requirements for a fully automated system; equipment room requirements; and the manning requirements for the new operational control centre (OCC). In particular, the inclusion of platform screen doors is a key element in fully automating the operations. In the case of Paris Line 1 we can learn from their experience during installation as the doors were installed without any major closure of stations.

In summary, this workstream continues to make good progress and a positive response has been received from five world class companies/consortia expressing an interest in pre qualifying for this major contract. In addition the visit to RATP Paris metro has provided excellent learning points that have been immediately implemented into the specification of our package of works. The visit has also confirmed that the implementation of a fully automated system is feasible to be undertaken without major closure of the existing system – this is a fundamental objective of the implementation strategy for the subway modernisation.

### 3.3 Stations and accessibility

The key areas of progress on this workstream are:

*Hillhead Station* – the refurbishment of Hillhead Station continues to be on programme for completion by summer 2012. Works at platform level are targeted to be completed by April 2012 with the remainder of works relating to the escalator installation and concourse level completed by summer 2012. We are currently examining opportunities for a phased completion of the concourse level with Clancy Docwra as this will provide advantages of releasing some areas earlier than the overall completion date. The works to date have required an extended possession of one platform at a time to undertake platform works, primarily due to the unforeseen issues relating to the condition of the existing platform and screed, which has required additional time for removal and re-screeding and returning the platform for use in a safe condition.

During the station refurbishment works there have been a number of system and interface related issues (station drainage, station masters control panel, electrical systems, improvements to advertising provision, widened stairs, escalator improvements, elements of previous minor works etc) that have been undertaken in addition to the original scope of works to ensure no future customer disruption and ensure best value by undertaking them at the same time as the building refurbishment works. These elements have been agreed with Clancy Docwra in line with the tendered rates and are noted in the table of variations agreed to date in section 3.9 below. The variations are all contained within the existing subway modernisation station improvements budget and can all be completed within the summer 2012 programme completion date.

*Kelvinhall, Ibrox and Partick (Platforms) stations* - The design for the next tranche of stations are continuing to make good progress. These designs have specifically built in lessons learned from the Hillhead works and this has included more detailed surveys being undertaken prior to the main works commencing as well as improvements and changes to the specification of some

materials (particularly wall tiling) and the construction techniques to be deployed to certain areas such as internal roofing. At the time of the major redevelopment of the Partick Interchange no work was undertaken at platform level and the new design for Partick platform level has been completed ahead of programme. In line with the procurement strategy agreed for the first tranche of stations<sup>4</sup>, the tender for Partick Station platform area is currently progressing under a negotiated procedure. The target date for commencing this work is April/May 2012.

The design for Kelvinhall is also nearing completion and has had to deal with major space restrictions in and around the station. A number of options were examined but all required third party land and the deliverability of such options, particularly for 2014, attracts major risks. Therefore the station design has been contained within the existing ownership boundary. The coincidental implementation of the new Smart ticketing system has created the opportunity to maximise the use of remote and online ticket sales to relieve some pressure on the traditional requirement of ticket office space which will now be a 'Customer Service' facility rather than a point of sale. Future opportunities for additional adjacent land will continue to be explored however the current design will be frozen for delivery in time for the Commonwealth Games in 2014. This design will then be issued for consultation with local community council and interested parties.

The design for Ibrox is also progressing to the final stage and therefore the tender process for Ibrox and Kelvinhall stations will be commencing shortly with approval being sought in Autumn 2012. This will allow the completion of these two stations in time for the Commonwealth Games in 2014. In particular an early start requires to be made on Kelvinhall station as the building works at concourse level need to be completed in advance of the installation of the new ticket gates.

Designs for St Enoch, Buchanan Street and Govan are also being progressed and as noted below the designs for St Enoch and Govan Stations incorporate lifts. Future stations will be procured in line with the overall master programme dates. An opportunity is also being examined at St Enoch station to bring forward the external elements (new canopies) in line with the installation of new escalators and to tie in with surrounding public realm improvements that are currently being explored by Glasgow City council.

All designs are being undertaken in line with the agreed Subway Modernisation Design Guide.

*Station Refresh* - the station refresh project is making good progress and the first phase involving installation of tactile paving to all platforms commenced in March 2012 and is due for completion by summer 2012. Within the station refresh project there is a rolling programme of small scale works to all stations to improve the customer experience, ensure consistency of standards, cleanliness and signage/branding. This is on programme and within budget for completion by the end of 2013. This short term work is being co-ordinated with and complementary to the larger scale refurbishment of each station.

*Escalators* – Otis have commenced the installation of new escalators at Hillhead and the works are being co-ordinated under the Hillhead station refurbishment project for completion by summer 2012. Escalator works are proposed to commence at Buchanan Street Station in April/May 2012 with Govan Station and St Enoch Station also planned to commence later this year. Advance notices will be in place at all stations advising customers of this work.

*Lifts* – as noted in the previous update there has been significant work undertaken to examine the feasibility of installing lifts at stations. The previous work highlighted that it was not operationally or physically possible to introduce lifts at eleven of the fifteen stations without

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<sup>4</sup> [http://spt.g2b.info/cgi-gen/profile.pl?action=view\\_notice&other\\_user=7790&notice=155273&type=012&oid=4377&ctype=2](http://spt.g2b.info/cgi-gen/profile.pl?action=view_notice&other_user=7790&notice=155273&type=012&oid=4377&ctype=2)

either a complete re-construction of the station or surrounding buildings and that further feasibility work was being undertaken to examine St Enoch, Buchanan Street, Govan and Partick stations. The further feasibility work undertaken has concluded that it is feasible to install lifts on both platforms at St Enoch and Govan Stations. This will therefore provide accessibility from the city centre to a key interchange at Govan with Fastlink and the bus station. The accessibility at Govan will also fulfil a key strategic location for accessibility and onward travel to the new South Glasgow Hospital. The station designs for St Enoch and Govan refurbishment have therefore now incorporated lifts into both these projects. The more detailed work has found, however, that it is not operationally feasible to install lifts at Buchanan Street, primarily due to operational safety and severe passenger flow restrictions particularly at the gateline. Third party land ownership prohibits installing lifts at Partick Station at this time, although we will continue to safeguard their future provision should land become available.

### 3.4 Ticketing

The detailed design and pre-construction activities are progressing well and the initial installation works relating to the new ticket vending machines and enabling works for the new gates is due to commence in late 2012. Software development work is also ongoing and test planning is progressing with S&B. Implementation planning with Subway Operations has also begun, taking account of revised business processes, training, user/business testing and customer support needs.

The overall migration strategy which will involve a detailed and complex transition from old magnetic stripe ticket type gates to the new smartcard enabled gates has been agreed in principle. This will involve the adoption of a dual magnetic stripe/smartcard enabled ticket being made available at stations that are undergoing the transition. During the transition period, this will allow for customers to enter a station with a magnetic stripe ticket for those stations not yet equipped with new gates whilst accessing stations with the new smartcard gates with the same ticket.

The estimated time for transition varies at each station and at present a detailed transition plan is being prepared for each individual station. The installation of the new equipment is also being co-ordinated with the station refurbishment work to ensure minimum disruption to customers.

At the same time a detailed communications, sales and marketing plan is now being prepared to communicate the new ticketing arrangements and plans to our customers, alongside the proposals for the wider integrated ticketing scheme.

The overall ticketing plan remains on programme for completion by 2013 with early works being undertaken prior to the end of 2012.

### 3.5 Infrastructure

Since the previous update a holistic package of infrastructure improvement works for the tunnels, track and yard has been prepared and the formal procurement process has commenced with the OJEU notice for the implementation of these works published in early March 2012. The award of this contract will be sought at a future Partnership meeting with a target date of commencing this work by late 2012 early 2013. The overall timeline for implementation of such improvements is in advance of the new trains, signalling and control system installation (i.e a 4 to 5 year timeframe).

In preparing the detailed specification for elements of this work, it is necessary to undertake further detailed design and detailed site investigation of tunnel lining, track and ancillary aspects in various locations along the system. A separate paper was recently submitted to the

Strategy and Programmes Committee seeking approval for the award of this contract to Arup for undertaking this design and investigation work.

As well as additional design work, the infrastructure enhancements together with station refurbishments will require additional safety critical resource to ensure a safe system of work is maintained when working on or near the track. It is essential to have flexibility in this resource above and beyond that currently employed on day to day maintenance duties and hence a single supplier call off contract has been tendered and a separate paper is presented to this Partnership meeting recommending the approval to award this contract to Orion Rail for a period up to 4 years.

In the short term there are specific areas of work that require to be undertaken to ensure the infrastructure remains fit for purpose. A paper to the recent Strategy and Programmes Committee in March 2012 recommended approval for the award of contract for watersealing works to the tunnel between Partick and Kelvinhall. This work is essential to ensure the ongoing integrity of this section of tunnel and track and is targeted for completion by the end of 2012. A further section of tunnel works related to the tunnel lining between Buchanan Street and Cowcaddens is also being progressed with these works planned to commence later in 2012. .

In the short term the existing rail block and watersealing call off contracts continue to be utilised for the replacement of rail blocks and smaller scale watersealing tunnel lining works.

### 3.6 Employee relations/human resources

Following the approval by the Personnel Committee in October 2011 of the proposals for the fundamental changes within the subway, more detailed proposals have been prepared and issued to staff affected.

The detailed proposals were submitted to and approved by the Personnel Committee meeting on 9 March 2012 and in summary included:

*Restructure of subway management and engineering* - with additional dedicated project engineering resource allocated to the subway modernisation and a new shift service delivery manager approach to the operations and maintenance;

*Restructure of operations* – involving new shift patterns and working hours, removing cumbersome and outdated working practices and providing more flexible customer driven operations; removal of contracted overtime and other measures such as single manning of certain stations etc;

*Restructure of permanent way maintenance* - including proposed new shift patterns that optimise track possession times, increased staff availability per shift, greater flexibility and productivity, proposed outsourcing of rail welding and flagmen and improved transport arrangements to each work site;

Restructure of rolling stock and line maintenance - involving moving to a new balanced maintenance regime; improved shift patterns; more flexibility across maintenance teams; undertaking train driving within the depot rather than operations staff; and incorporating the decision already made to outsource escalator maintenance and automatic fare collection (AFC) maintenance.

In respect to escalator maintenance, an extensive consultation was undertaken from July 2011 to January 2012 with union representatives. The analysis undertaken, and provided in detail during the consultation, demonstrated significant savings from outsourcing escalator maintenance in terms of direct financial savings and associated risks. The contract commenced

with Otis on 1 March 2012 and the early results are positive in terms of escalator availability to our customers.

The proposals also take cognisance of the necessary changes to the subway safety management system both in terms of the Safety Authorisation (ability to own and operate trains) and the Safety Certification (ability to own and operate infrastructure). The proposals will include consultation with the Office of Rail Regulation.

The proposed changes are essential components for the overall aims of the subway modernisations in terms of both the ongoing need to reduce operational and maintenance costs as well as the strategic aim of achieving a more flexible and customer focussed operation both for the present day but also in terms of the introduction of new technology (ticketing, driverless trains etc).

At the time of writing of this report all the above proposals are currently under discussion and consultation with union representatives and individual staff affected.

### 3.7 Accessibility consultation

SPT has a strategic aim to improve the accessibility of the subway and regularly consult with accessibility groups on the proposals and to gain feedback. Since the last progress update, a meeting was held on 30 January 2012 with the Accessibility Stakeholder Group. This included attendees from Age Concern, Describe Online, Enable Scotland, Glasgow Access Panel, Action on Hearing Loss, MACS, Scottish Accessible Transport Alliance and Transport Scotland.

The group were presented with an update on the subway modernisation with a focus on the elements relating to accessibility improvements for station improvements, station lifts, ticketing and rolling stock. The consultation provided an excellent opportunity to gain feedback on a range of issues which included matters relating to station access during escalator refurbishment, tactile paving and corduroy strips, the use of inductive loops; online accessibility guide; emergency evacuation; the operation of lifts within the subway system; visual and audio announcements on trains and integrated ticketing arrangements.

The feedback was positive in a number of areas and continues to inform the development across all workstreams. A number of short term improvements are already underway such as the installation of tactile paving in all stations in 2012 as well as plans to update the online accessibility guide throughout the modernisation.

### 3.8 Innovation and other areas of improvements

As part of the overall subway modernisation approach a number of other areas are continuing to be improved including various initiatives to encourage patronage growth, improve the customer experience and introduce innovation to the ongoing operation and maintenance of the system. This includes:

Kids go free - The recently successful kids go free campaign has been extended and will be in place during the Easter break period. Details of this can be found at [www.spt.co.uk/2012/02/kids-go-free-returns-for-easter](http://www.spt.co.uk/2012/02/kids-go-free-returns-for-easter).

Social media – we continue to receive positive feedback via Twitter and the number of followers now exceeds 4000. As noted during the presentation to the last Partnership meeting, this provides an essential and cost effective way of communicating with customers and will continue to be a key thread of our overall communications strategy.

Existing train maintenance – a new balanced maintenance approach has been prepared and is a key aspect of the improvements being made in the short term with the existing fleet to ensure

the fleet continues to provide a high degree of reliability in the short term but at a more effective cost. This work has been undertaken by a specialist consultant, Frazer Nash and is expected to conclude the analysis and preparation stage by the end of March 2012 with implementation of the new processes and procedures commencing in line with the proposed re-structure of the rolling stock and line maintenance noted in section 3.6 above.

Water Management – SPT has commenced immediate repair work on its sumps and pumps water management system. A recent investigation has shown these systems to be in a poor state of repair and consequently we remain at risk to service disruption due to track flooding.

Innovation – SPT has undertaken a number of exploratory discussions with Strathclyde University examining a number of innovations across the subway. This has ranged from examining more innovative machinery and techniques for tunnel and drainage maintenance to utilising technology for remote monitoring of various elements of the infrastructure.

Rail handling and maintenance – a specific piece of work has been recently commissioned through the specialist framework with McCullough Rail to examine the feasibility of more efficient and effective means of handling and maintaining the rail. This is specifically examining opportunities to install rail in longer sections thereby reducing installation and maintenance costs.

Track inspection – a tender has been prepared and issued for introducing more automated means of track inspection and thereby improving the planned maintenance activities, increase track availability, decrease life cycle costs and reduce the reliance on manual visual inspections.

### 3.9 Contract variations

A number of contract variations have taken place across the various workstreams and projects and those greater than 10% of the original contract value, or £50k, are reported below.

It should be noted that these variations do not constitute increases to the programme or project budget. All variations are within the approved subway modernisation programme and project budgets and the works have been undertaken in line with the rates tendered for each original contract.

Workstream / Contract	Company	Contract amount	Variations	Comment
Infrastructure – Tunnel Lining Buchanan to Cowcaddens	Arup	£162,174	£17,335	Additional three dimensional design and finite element analysis and tender assessment of contractors proposals leading to reduction in implementation costs
Ticketing – Subway replacement Ticketing	Scheidt and Bachmann	£5,171,867	£131,827	Early installation of new car park equipment plus other small scale changes and improvements.

Stations – New Escalators	Otis	£5,691,292	£767,753	Additional works including glass balustrades, lighting enhancements and various operational and technical options.
Stations – Hillhead	Clancy Docwra	£1,505,840	£407,000	Additional works for station drainage, electrical systems, enhancements to advertising, widened stairs, escalator enhancements and other elements of previous minor works now all incorporated within Hillhead project rather than separate projects.
Rolling Stock – Existing Fleet Maintenance Review	Frazer Nash	£18,250	£5,475	Additional work to complete new maintenance manual and supporting procedures.

#### 4. Conclusions

The subway modernisation programme is progressing well and all workstreams are within the overall timeline for completion and budget.

The procurement phase for the new trains, signalling and control system has recently commenced and five pre-qualification responses have been returned. Specialist support has been procured by SPT and a separate paper brought forward recommending approval to award this client technical advisor role to Systra.

The visit to RATP has proved invaluable in assisting SPT define its operational requirements and learn from the challenges of implementing a fully automatic system on an old semi-automatic system, including the introduction of platform screen doors.

The station refurbishment works at Hillhead, including escalator installation are on programme and budget for completion by summer 2012.

The design works for the next tranche of stations are nearing completion and an opportunity has been taken to advance the procurement for platform levels at Partick Station whilst designs for Kelvinhall and Ibrox are being completed.

The installation of new escalators is on programme and budget with the next station (Buchanan Street) due to commence in April 2012.

The feasibility of lift installation has been completed and has concluded that lifts can be installed on both platforms at St Enoch and Govan stations.

A significant consultation meeting has been held with Accessibility Groups and the feedback incorporated across the various workstreams, including the early implementation of physical improvements such as tactile paving at all stations.

Regarding the new Subway Ticketing system, detailed design and pre-construction activities are progressing well, software development work is ongoing and test planning is progressing with the supplier. Implementation planning with Subway Operations has also begun, taking account of revised business processes, training, user/business testing and customer support needs. The overall migration strategy which will involve a detailed and complex transition from old magnetic stripe gates to the new smartcard enabled gates has been agreed in principle.

The procurement for the infrastructure renewal works has recently commenced and in parallel the essential works for tunnel watersealing between Partick and Kelvinhall has progressed to the stage to recommend the award of a contract for these works.

A number of smaller scale initiatives and innovative work is continuing ranging from the "Kids go Free" campaign during the Easter holidays to the more specialist technical and innovative work examining options for automatic track detection, longer rail installation and remote monitoring of infrastructure.

## 5. Partnership action

The Partnership is recommended to note:

- the overall progress made since the last update to the Partnership in October 2011;
- the directly relevant lessons learned from the recent visit to RATP, specifically in relation to the automation of Paris Line 1 and the implementation of these lessons within the subway modernisation;
- the progress on the most significant package of new trains, signalling and control systems with five world class companies/consortia expressing an interest;
- the variations across the various contracts, such variations being contained within the approved programme and project budgets;
- the work undertaken to examine the feasibility of lifts at stations and the conclusion to introduce lifts at St Enoch and Govan stations;
- the ongoing programme of design and implementation of the station improvements including the programme for completion for Hillhead and implementation of the next tranche of stations at Partick (platform level), Kelvinhall and Ibrox; and
- the ongoing operational and maintenance initiatives and innovation being brought into the programme.

## 6. Consequences

Policy consequences	<i>The subway modernisation is a key objective of the Regional Transport Strategy.</i>
Legal consequences	<i>None identified within this report.</i>
Financial consequences	<i>None within this report – proposed works remain within the capital and revenue budgets and subway modernisation business case.</i>

Personnel consequences *None within this report. The proposed changes to subway structure is contained within the separate report to the Personnel Committee on 9 March 2012.*

Social inclusion consequences *None within this report, although members should note the limited ability to implement lifts at St Enoch and Govan Stations only.*

Risk consequences *None within this report. A detailed risk register is available for individual projects.*

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