

# Assisting Decisions

## The Transport for South Hampshire Smart Card Business Case

Final Report

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# 1 Executive Summary

## 1.1 Strategic Fit

- 1.1.1 From a customer perspective the options for paying for public transport in South Hampshire are somewhat limited and delivery of ticketing in the area is spread across a number of bodies who are either partners or stakeholders. Transport for South Hampshire (TfSH), the delivery agency for the South Hampshire sub-region, has developed a business case for providing a smart card system for the area, the scheme has been designed to be sub-regional, cover multiple modes of transport and empower operators. It has been developed through consultation with key stakeholder and designed to minimise ongoing costs.

## 1.2 The Scheme

- 1.2.1 The aim of the project is the provision of smart card infrastructure. So that by means of public sector investment, barriers to entry to smart card use can be moderated or removed. To this end the costs of a smart card system have been worked up in an incremental manner, which firstly considers the investment required to deliver a system that, whilst fully configurable, works at "go live" for both English National Concessionary Cards and the Solent Travelcard as well as the standard generic products defined nationally in the ITSO specification. Costs have then been worked up for a scheme extending to Ferries and then Rail.

## 1.3 The Business Case

- 1.3.1 In 2010 prices and values, the initial capital costs for the scheme are as follows:

Scheme	TfSH (£m)	Operator (£m)	Total (£m)
Bus	4,687,934	3,375,584	8,063,518
Bus + Ferry	6,989,172	3,375,584	10,364,756
Bus + Ferry + Rail	10,015,805	3,375,584	13,391,388

- 1.3.2 Benefits included in the business case are:

Role	Beneficiary
Time savings for all bus passengers	Bus Passengers
Cash handling savings	Operators
Reduction in passenger fraud and fare evasion	Bus Operators
Savings in analysis and survey costs	TfSH
Revenue from selling some smart card space	TfSH and other Card Issuers
Avoided investment due to shared HOPS, CMS and Payment System	TfSH
Avoided on-going costs due to shared HOPS, CMS and Payment System	TfSH
Revenue from BSOG	Bus Operators

- 1.3.3 The BCR is just greater than 1, inline with the BCR's estimated for other smart card schemes. If the costs and benefits attributed to ferry and rail are removed from the business case then the BCR is greater than 2 for an initial scheme.

## 2 Strategic Fit

### 2.1 This Commission

- 2.1.1 In March 2010 MVA Consultancy (MVA) were commissioned by Southampton City Council (SCC) on behalf of Transport for South Hampshire (TfSH), the delivery agency for the South Hampshire sub-region, to provide SCC with support to develop a business case for providing or grant-aiding elements of a smart card system for the TfSH area.
- 2.1.2 The Project Brief (The Brief) states that preliminary estimates of the costs of the system are between £5m-£10m and that this will likely need to be spent within the financial years 2010/11 and 2011/12. In order to access the funding, a business case, delivery plan and governance structure are required, in a form suitable for submission for this purpose. This is the Business Case document.

### 2.2 Strategic Context

#### Current position

- 2.2.1 From a customer perspective the options for paying for public transport in the area are somewhat limited and delivery of ticketing in the area is spread across a number of bodies who are either partners or stakeholders in the business case:
- concessionary ticketing is run by the local authority partners, with reimbursement agreements in place
  - interoperable ticketing is supplied and marketed by Hampshire County Council (HCC) as the Solent Travelcard, it is an integrated product, valid all bus services, but has only had a limited take-up
  - operator-own ticketing is handled individually by operators.
- 2.2.2 The fact that the interoperable product is a paper based system means it is particularly inflexible and like so many similar schemes across this format is potentially vulnerable to fraud. It is also difficult to expand as apportionment arrangements are based on revenue where it falls; this being a barrier to entry for newcomers whether accepting or retailing.
- 2.2.3 As a result of these constraints, it has proved difficult to diversify the standard product (eg different geographical areas and modes).
- 2.2.4 The history of smart cards in Southampton is somewhat chequered. There are currently approximately 85,000 in circulation, a legacy of a national pilot of what was, at the time, a new technology, necessitating integration with existing systems. This has led to some scepticism locally about the value for money that smart cards can deliver.

#### The Future Vision

- 2.2.5 At a high-level, The Brief describes the ideal 'benchmark' scheme as one which should:
- be sub-regional
  - cover multiple modes of transport

- empower operators to deliver schemes themselves
- be developed through consultation with key stakeholders
- be designed to minimise ongoing revenue costs.

2.2.6 In turn, as described in the Brief, this will:

- increase patronage on all forms of public transport through:
  - a better quality public transport experience for users
  - increased bus reliability, due to reduced boarding times
  - seamless integration of ticketing for public transport journeys involving interchange between modes
  - provide opportunities to apply tactical pricing mechanisms to generate increased patronage (e.g. Solent Travel Card enhancement)
- ensure compliance with statutory requirements of the concessionary fares scheme, namely that the concessionary fares scheme issues ITSO<sup>1</sup> smartcards for all pass holders, helping to reduce fraud by allowing stolen, lost and expired cards to be hot-listed
- provide better data and evidence on public transport journeys to:
  - support concessionary fares appeals processes
  - allow operators to issue commercial tickets on smart cards
  - facilitate tactical deployment of marketing and smarter choice initiatives
  - encourage better identification and design of other public transport schemes
- deliver:
  - the opportunity to use smart cards for a range of other local authority functions e.g car park charges, bridge tolls, library cards, leisure cards, cashless catering in schools, scholar passes, staff travel card. Providing service enhancement in a range of non transport areas and opportunities for wider costs savings for local authority delivered services involving low cost transactions
  - reduced carbon emissions
  - improved road safety, as a result of modal shift from forms of transport with higher causality rates than public transport
  - the opportunity to utilise smart card equipment technology to interface with improved Real Time Information schemes at minimal cost compared to existing schemes, or, where schemes already exist, reduce ongoing revenue costs
  - improved social exclusion and reduced social inequality
  - better health and wellbeing of public transport users, as a result of more active lifestyles associated with public transport use

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<sup>1</sup> ITSO (Formerly the Integrated Transport Smartcard Organisation) is the name for both a common Smart Ticketing specification, and the body that oversees development of the specification

- means of allowing scholars travel to be issued on smart cards, reducing misuse and offering more flexibility.

2.2.7 Essentially, the business case offers the opportunity to address some of the limitations of the current position and create a much more uniform means of delivery for ticketing within the sub-region by adding more flexibility and choice of approach to all the existing options. The proposed architecture will assist in delivering all of the above and other benefits at a regional level; it will also allow for local flexibility, whilst being cost effective.

### Funding issues

2.2.8 The South Hampshire sub region covers Portsmouth and Southampton and the districts of Eastleigh, Fareham, Gosport and Havant together with parts of East Hampshire, New Forest, Test Valley and Winchester.

2.2.9 The three Authorities of SCC, Portsmouth City Council (PCC) and HCC form the public sector partnership willing to contribute funding and manage the project for delivery of the infrastructure in the first instance. Initially this will be principally (but not exclusively) to provide a public transport 'payments and ticketing' platform whilst facilitating (and not precluding) other local authority non-transport applications or indeed a wide-range of other commercial smart card applications in an interoperable manner. These can potentially share both cards and the supporting infrastructure.

2.2.10 This approach has become possible in recent years through the development and increasing maturity of the UK national ITSO smart card specification for public transport. This offers an open-platform for alternatively-sourced but 'standardised' technical solutions under a certification regime for suppliers with associated operating licence responsibilities for scheme sponsors. As it has been designed within the framework of both international standards for the technical platform (ISO 14443 contactless 'proximity' smart cards including ISO 7816 functionality from the relevant parts of the contact standards pioneered by the banks) and a banking framework for relevant components of the application('card')-ownership and product-ownership approach, the public transport elements fit equally well in a transport-only or more-than-just-transport scheme approach. Key from a procurement perspective is ensuring that suppliers are reliable and have a track record that bears scrutiny.

2.2.11 The subtlety and potential scope of this is well illustrated by the re-issue around April 2008 of the 7.6 million English National Concessionary Travel Scheme passes as smart cards by a multitude of Travel Concession Authorities (TCAs), whether acting as individual TCAs or in partnerships. Well over one million 'Freedom Pass' cards have just been re-issued in the London area on a dual Oyster and ITSO compliant platform. All of these cards are interoperable but also the vast majority (MVA estimate 90%) were issued partitioned approximately 50%/50% in terms of card space allocated between ITSO for transport products (tickets etc) and the LASSeO-specified standard for local authority applications. Although such a definition originally only applied to Mifare 4k cards, this has recently been extended to DESfire 4k cards, plus an option for the use of 8k versions for ITSO, LASSeO and potentially an additional partition for other user-defined applications sitting in the extra 4k space. This may be relevant to other third-parties not using, nor able to use, the ITSO/LASSeO partitioned area (NB in the case of the current 8k card and ITSO specification it only works as a 4k ITSO or partitioned ITSO/LASSeO card – the point is the new additional 4k is available for 'other' uses). There are plenty of examples of contractual techniques for securing upgrades of any system to maintain currency with the specification and ITSO claims



to assure backwards compatibility for the most recent versions of the specification (though bus interoperability needs the v2.1.3 ENCTS aspects).

- 2.2.12 Hence, in summary, the pioneering ITSO platform is not just an infrastructure platform but one with a set of 'tools' for defining standardised ticket products within ITSO of a 'generic' nature (eg all concessions, travelcards, carnets and stored-value [STR] work in the same broad manner but individual 'instances' of a product will be defined with fares, retailing and acceptance rules under specific commercial agreements between the participants). But in addition it provides 'hooks' to other co-hosted or co-residing applications. Both initiatives are designed with interoperability in mind, within a secure operating environment, as one would expect of smart cards. The work to deliver standard ('generic') software at each ETM supplier in conjunction with a configuration editor has broadly already been achieved, but this a less developed concept in rail equipment. So whilst not plug and play (largely due to other IT constraints imposed by local authorities and operators) ITSO, as an environment, increasingly has a number of different suppliers who have nevertheless already demonstrated working together so that working combinations of specific offers can be demonstrated elsewhere in the UK.
- 2.2.13 Therefore, beyond the immediate local authority partnership for funding and delivery there are a number of important additional stakeholders and specific linked initiatives that may also be able to make funding available. Some of these are time-coincidental (eg the pressing need for the major local bus operators to renew ageing on-bus ticket machines [ETMs]); others require the opportunity of dovetailing projects together to bring synergy and cost-sharing which will require further work in parallel with this project (eg procurement across an entire Group). Experience elsewhere suggests it is a mix of local initiatives, sometimes including funding, or a Group decision which has removed inertia and allowed projects to advance.

### Operator Issues

#### Bus

- 2.2.14 There are three large bus operators running services in the region plus a number of smaller operators. The major operators are:
- First (Hampshire and Dorset)
  - Stagecoach (South)
  - Go-Ahead (Go South Coast and Bluestar)
- 2.2.15 It is envisaged that all three operators will be re-equipped with smart-enabled ETMs together with the provision of some form of 'managed service' for small operators to enable them to participate in the provision and sharing of the TfSH infrastructure, but on a basis that ensures a level playing-field between all operators including the larger ones.
- 2.2.16 The government's announcement in April 2010 about Bus Service Operator Grants (BSOG) only being paid at the higher rate for buses equipped with ITSO smart card and RTPI capability, thought currently to be worth on average approximately £800 per bus per annum for the smart card element, is expected to incentivise this process. The Comprehensive Spending Review and 2011 White Paper announcements have confirmed this funding will continue albeit reduced by 20% from April 2012. Some industry stakeholders believe the funding is uncertain beyond March 2015 but even availability to this date should be sufficient

with 3-4 years potential funding adequately covering costs of bus smart ETM installation and related smart depot back office systems. Readers are reminded that the commitment to change BSOG was a Labour policy not (yet) reflected in current Coalition priorities.

### Ferry

- 2.2.17 A number of ferry services operate within the area, the largest of which are those to the Isle of Wight from both Portsmouth (Hovertravel, Wightlink) and Southampton (Red Funnel, Red Jet) there is also a service between Lymington, in the New Forest, and Yarmouth, on the Isle of Wight (Wightlink). Other, local, operations serve passengers travelling between Portsmouth and Gosport (Gosport Ferry), Southampton and Hythe (Hythe Ferry), Portsmouth (Eastney) and Hayling Island (Hayling Ferry), and Hamble and Warsash (Hamble Ferry).
- 2.2.18 Table 1.1 summarises, at a high-level, some of the consultation we have undertaken with operators (Hovertravel, Gosport Ferry, Red Funnel and Hythe Ferry) and observations from site visits.

**Table 1.1 Summary of consultation and site visits with Ferry operators**

Operator	Description of operation	Observations from site visit	Challenges
Hovertravel	High speed passenger only, pre-paid (internet) and walk-up products inc: singles/returns, 10 trips carnets (valid for 8 days), frequent flyer cards (10 returns/20 singles), six month card for 100 trips, 1/3/6/12 month seasons, company tickets (50 and 200 singles). Planning to move towards simpler products based on Red Jets offer	Portsmouth side: purchase at 3 TVMs or 3 staffed windows, dual validating points. IoW side: 2 TVMS, 3 TVMs or 3 staffed windows, dual validating points	Integration of ITSO smart card capability with existing system
Gosport	Passenger (inc bicycle and motorbike) only, products: single/returns, 10 trip 'carnets', quarterly seasons, some integrated ferry and bus products	Portsmouth side: 5 TVMS and 1 change machine, 1 manned window. Gosport side: 4 TVMs (3 older, 1 new) ticket validation at point of boarding or on-board by crew	Ticket validation, peak sees up to 300 passengers board, turnaround time is very limited. Cost of scheme (set-up and ongoing) is a concern
Red Funnel	Passenger and vehicle operation, pre-paid (internet) and walk-up products, foot passenger products: singles/returns, 'carnets' and season products valid on both Red Funnel and Red Jet vehicle products: demand based reservation system. Red Jet offers travel cards (stored number of journeys valid for 12 months), looking to move towards e-purse. Red Jet also offers combined rail ticket to any rail station in UK	All vehicle tickets are validated at windows, 3 on Southampton side, foot passengers validate at boarding gate	Tight turnaround times, concerns over integration with current tickets and revenue allocation across modes
Hythe	Passengers only, products: single/returns, 10 trip 'carnets', monthly, quarterly and annual seasons	Ticket office with two windows at Hythe, 2 coin operated TVMs at end of pier, one by ticket office, 2 TVMs at Southampton side, tickets validated at point of boarding or on-board	Cost (set-up and ongoing) is a major concern, concerned about losing yield if forced to offer (and pick up associated commission charges) credit card purchase. Concerned about reliability of TVMs and validators. Turnaround time is very limited

## Rail

- 2.2.19 Four train operating companies (TOCs) serve the TfSH area, South West Trains (Stagecoach), Southern (Govia), Cross Country (Arriva) and First Great Western (First Group), providing passenger services to London from both Southampton and Portsmouth, to the Midlands, via Basingstoke and Reading, to the west, via Salisbury and to various destinations along the south coast.
- 2.2.20 Within the TfSH region South West Trains (SWT) are Station Franchise Operator (SFO) at all stations except for Warblington and Emsworth (where Southern is SFO) and Romsey (where FGW is SFO) however, many of the stations are served by more than one TOC.

## 2 Strategic Fit

- 2.2.21 Both SWT and Southern have obligations, under their franchise agreements (FA), to introduce ITSO compliant ticket equipment and/or ticketing across their networks. SWT was the first franchise so mandated and largely had to deliver equipment, Southern must equip a minimum of 44 of its stations with ITSO compliant equipment by January 2012.
- 2.2.22 SWT has been running a pilot ITSO compliant smart card system between Staines and Windsor and Eton for over 12 months and have rolled out ITSO compliant equipment across all their SWT stations as per their Franchise commitments. Following the initial trial, their plan was to “go live” in 2010/11 for season tickets only, on the SWT routes between:
- Staines and Wokingham
  - Basingstoke and Weymouth
  - Woking – Havant
  - Woking – Basingstoke
  - Basingstoke – Exeter.
- 2.2.23 “Go live” at stations between Southampton (via Fareham) and Portsmouth and Havant have no defined timescales and this represents a major commuter flow within the TfSH area.
- 2.2.24 Southern have a commitment to install and operate ITSO compliant ticketing equipment at 44 stations by January 2012. The 2012 rollout concentrates on mainline stations, where flows are large and will build on the Go-Ahead’s pilot on their London Midland franchise where they are trialling an ITSO compliant smart card system (for season tickets only) in 4 stations across Worcestershire, namely Droitwich Spa, Kidderminster, Worcester Foregate Street and Worcester Shrub Hill. The smart card, referred to as “The Key”, will become Go-Ahead’s nationwide smart card brand, which while being a national brand, will also incorporate local expression.
- 2.2.25 All rail journeys starting/ending in the London Travelcard Area require Oyster equipment to be updated to be compliant with the ITSO system and timescales for this are now confirmed to be by June 2013 in the recent transport White Paper.

## 3 The Scheme

### 3.1 Overview

3.1.1 The primary aim of the project is the provision of the smart card infrastructure, including support services. The intention here is that by means of financial investment by the public sector, a number of barriers to entry to smart card use on the grounds of cost by stakeholders and customers can be moderated or removed. To this end the costs of a smart card system have been worked up in an incremental manner which firstly considers the investment required to deliver a system that, whilst fully configurable, works at “go live” for both English National Concessionary Cards and the Solent Travelcard as well as the standard generic products (so-called Interoperable Product Entities or ‘ticket templates’) defined nationally in the ITSO specification (so called IPEs 2, 3, 4, 5, 14, 16, 17, 22, 23, 24, 27, 28 and 29). Costs have then been worked up for a scheme that extends to Ferries (estuarial and Isle of Wight) and then Rail (where costs have been worked up to “fill in the (known) gaps” in the systems that SWT and Southern plan to rollout). In the following sections, the components of the smart card scheme are discussed in turn. These can be summarised as:-

- a smart card data back office – the so-called ITSO AMS-HOPS or Asset Management System and Host Operator or Processor System which handles both operator/product details and key distribution as well as collecting and assuring transaction data
- a payment system – for concession reimbursement or commercial revenue apportionment/payment
- a sales network of equipment where smart cards can be obtained as part of the initial transaction – this implies some degree of staffing (some may be deployed independently of the transport network, others potentially in conjunction with some of the modes, eg ferries)
- an additional overlay of a sales network which is both automated and has a degree of customer self-service for product top-ups and renewals
- usage equipment on buses, ferries and at heavy-rail stations
- smart cards.

3.1.2 Each ITSO component has at least one ITSO SAM (Secure Application Module) or security device (there are usually multiple master SAMs or HSAMs in the AMS-HOPS) except of course for the cards themselves and the payment system which is deemed to be beyond the relevant ITSO interfaces. Whilst there have been some issues with SAM-profiling timescales recently due to ITSO SMS issues, ITSO have a plan in place to address this by the time SAMs are needed for this project. Sales or usage devices are generically called POSTs or Point of Sale/Service Terminals.

### 3.2 Back Office – ITSO AMS-HOPS

3.2.1 The ITSO ‘back office’ for smart card transactions is distinct from any existing systems of analysis in the transport sector. This is because it has two distinct roles aligned to the correct processing of ITSO smart card transactions. These are:-

### 3 The Scheme

- management of the products (including Shells, the ITSO application on the card) and security keys – the Asset Management System or AMS component part; and
- management and storage or onward-forwarding of the transaction data including the correct acknowledgement (positive or negative) of receipt to ensure lossless transmission within the ITSO environment – the Host Operator or Processing System or HOPS component part.

3.2.2 The simple rule is that all SAMs in devices are associated with an 'owning' AMS-HOPS. The current assumption is that just one AMS-HOPS will be provided by TfSH (so effecting major cost-savings instead of having a number of AMS-HOPS for each local-authority partner) and that this will be shared by other stakeholders including Ferry and potentially by some bus operators. It may also be possible to make the AMS-HOPS available to other local authorities on a commercial basis, the Far SW scheme (SWSAL) having recently pioneered this option.

3.2.3 However, as AMS-HOPS are 'networked' together in the UK under the ITSO Operating Licence rules, some stakeholders (the large bus operators for example) will have their own AMS-HOPS. Essentially, because all products belong to an owner who strikes commercial deals with whoever agrees to participate, the ITSO infrastructure is flexible as to how the arrangements are configured, so that data proceeds to the correct product-owning HOPS even if it passes through equipment or a HOPS belonging to other schemes beforehand.

3.2.4 SCC already have an AMS-HOPS but at this stage the contract extension and functionality expansion costs are unknown for a wider TfSH scheme. Therefore the scheme is costed as-new for the life of this Business Case in this iteration of outline costs to represent a reasonable 'likely case' scenario. It is also known that both Stagecoach and Go-Ahead Groups are likely to use a national or local instance of their Bus AMS-HOPS.

#### 3.3 Payment System

3.3.1 As a minimum, conversion to smart card would require an analysis and payments system to be provided for English National Concessionary Travel to justify the conversion of the scheme from 'flash pass' to smart and be able to handle the reimbursement payment elements. Again, there are cost-savings from having a single system rather than several. There may also be opportunities to join a local authority developed one in that NoWcard and Welsh Assembly Government now share the Lancashire County Council IT Services (LICTS) system, besides options for a separate procurement or developing the aggregation and reporting features of the AMS-HOPS itself.

3.3.2 Whilst it may be possible to provide this functionality as part of the HOPS, practice around the country in large schemes with many transactions has been to extract the relevant data to a separate system for analysis, maintaining data-integrity and synchronisation with the HOPS.

3.3.3 Provision has been included in this business case for a payment system to undertake transaction processing and payments.

#### 3.4 Sales Network – Staffed

- 3.4.1 Provision has been included for significant expansion of the retail network, it is envisaged that ticket office machines (TOMs – to use a generic name without implying ‘location’ eg Rail or Ferry Booking Office, local Authority or Independent Retailer etc) will ensure that a smart card, with products, can be produced for customers in an ‘over-the-counter’ fashion so that acquiring a smart card is not a barrier to entry for commercial schemes – either for passengers in obtaining their first smart card or potential scheme-partners needing to duplicate this infrastructure before they can join in with the scheme. It must be realised that concessions, perhaps involving postal application and a bureau service, where persons can justifiably be asked to apply in advance and/or turn up with their entitlement documents is a different customer proposition to commercial cards where potential passengers expect to be able to “turn up and go” without the equivalent wait for something to arrive in the post. Whilst it may be appropriate for operators to treat their customers ‘entirely commercially’ for their own-operator products, there has been a tradition in urban areas where interoperability is an issue and a requirement to provide at least a minimum-access ‘over-the-counter’ for facilities like the provision of a first smart card is commonplace, especially to meet the requirements of those without internet, bank accounts etc. Schemes that MVA have been involved in have seen a substantial reduction of outlets to provide the minimum level of provision (or proposals for this), but nevertheless there has been such a provision. Equally new solutions are emerging; particularly those which mean a person need never re-visit a sales outlet after acquiring their first smart card making even on-line purchase potentially obsolescent (eg auto-renew or auto-top-up driven by product expiry or purse depletion at a specified date or threshold, replenished for a customer determined amount eg £10, 10 rides or whatever).
- 3.4.2 However, having obtained a smart card, customer expectations then change to one where they no longer expect to have to go to a sales office to obtain the top-up or renewal.
- 3.4.3 None of the above debate precludes a supplementary ‘staffed’ service handling postal renewals or a drop-in service at the organisation’s respective office. For example a number of mature smart card concession schemes use a bureau service for the bulk production of cards for new entrants where the application process (eg “before 60<sup>th</sup> birthday”) requires advance application to allow a 3 to 5 day production cycle, but these new in-house systems also provide a limited ‘problems resolution’ service over the counter at head office for lost card replacements and customer assistance. In Centro’s case in the West Midlands, cards are still produced in the bureau at a ratio of 4:1.
- 3.4.4 A further issue for concessions is coping with the bulk re-issue every 5 years or so. Taking a bureau service entirely in-house has to consider this scenario as well as the ‘steady-state’ new-entrants to the scheme and lost/moved-area replacements.
- 3.4.5 Southampton and some of the Partners already have card issue capabilities, but we understand they do not either cover ITSO capability (eg the University) or need enhancing to provide the capability to configure any ITSO ticketing product with scheme-owner rather than supplier control over the parameter settings. Only NoWcard has so far grasped the significance of this issue for controlling software variation costs in delivered systems and has acted on resolving it (both for in-house card bureau and bus ETMs).

#### 3.5 Sales-Network – Self-service

- 3.5.1 There are three specific provisions within this project as currently envisaged. A number of Ticket Vending Machines (TVMs) could be available to top-up smart products as commercially agreed between the stakeholders such as at Stations or Ferry terminals though again cost-effectiveness of a small procurement can be an issue, which is why it is also important that the rail industry can deliver configurability to add local TfSH products into any existing TVM infrastructure (subject to there being an overall commercial deal on the products, of course). There is no reason in principle why this concept cannot be extended elsewhere (eg shopping centres). Over time, with the rise of e-retailing solutions, it should even be possible to re-distribute TVMs and although this is used as an example, the principle of these sorts of opportunity should be borne in mind throughout the project life-cycle so they can be planned.
- 3.5.2 In addition, a web-based retailing system is envisaged by TfSH on behalf of the partners who wish to participate, allowing auto-renew or ticket-on-departure (TOD) style facilities.
- 3.5.3 In addition, the ITSO specification supports some additional facilities (eg charge to account and auto-renew). It is now known that at least one ETM supplier offers a fully-functioning auto-renew as part of their existing fully-certified system and demonstrably works for stored travel rights (STR) cash. It is triggered by a low-balance threshold eg set at £2 when £5 or £10 can be added. This is configured and tested on NoWcard, Welsh, Cambridge and Scottish ETMs within Parkeon 8.21 software but is not yet in use because the interface from any HOPS to banking has not been developed but is planned to be for a pilot in Wales during 2011. This facility was demonstrated on the ETM in Southampton Civic Centre at the last meeting attended by Stakeholders and MVA. ITSO version 2.1.4 also now supports more sophisticated STR 'transport-purse' functionality so precise requirements for the TfSH scheme would need to be clearly specified at the time of procurement alongside securing delivery of a configuration editor supporting all the IPEs mandated by ITSO.

#### 3.6 Usage Equipment – Buses

- 3.6.1 Bus-equipping for the area will become a responsibility of the local operator based on the Bus Service Operator Grant, as previously discussed, to cover the bus equipment, depot system and supporting software plus communications up to the point of delivery of data to the relevant AMS-HOPS. Hence this grant over a 3-4 year period is a sizeable contribution to a full bus-operator system (ie not just the ETM) that must also be used to support a fully configurable platform and cover all smart card types and products in accordance with ITSO's statement about certification for mobile POSTs in order to protect and future-proof the investment for operational use in years ahead.
- 3.6.2 It is recommended that this approach is adopted as standard across the region and the business case has been produced on this basis to show the costs for each stakeholder. This should be considered as the base case and does not preclude any future or additional sources of funding that may become available improving the financials in the business case for individual stakeholders.



#### 3.7 Smart Cards

- 3.7.1 The business case makes a one-off provision for TfSH to issue 75,000 smart cards when the scheme goes live.
- 3.7.2 Other smart cards may be provided by the product owner (eg concessionary smart cards have been provided by TCAs already on this basis, and future concessions such as children may also have an invest to save basis or could be chargeable in exchange for granting the entitlement to cover card-issue costs). Alternatively, for commercial cards, they may be paid for by the customer as part of an insurance administration charge (in part securing other benefits) or as a reduction of the discount for the first purchase (as has been successfully pioneered by Translink in Northern Ireland for carnets and travelcards for eight years since 2002 *after* the initial launch).
- 3.7.3 None of the above precludes other discounting initiatives – eg Northern Ireland commercial products were successfully migrated to smart and with a higher take-up by incentivising customers with a discount voucher to offset the initial card cost for existing users though reverting to a chargeable basis for newcomers. Oyster charges a £3 deposit but has had special ‘free card’ offers since launch (but in a way that correctly handles any card surrender for a refund).
- 3.7.4 It is crucial that any smart card placement regime includes a pricing strategy that incentivises their recycling rather than encouraging the ‘waste’ of this resource if providing a fresh smart card with each renewal; the latter outcome would not be sustainable cost-wise for a scheme.

#### 3.8 Products

- 3.8.1 The scheme assumes that concessions will migrate to the TfSH scheme infrastructure – away from ITSO Services Limited [ISL] in the case of existing older people and disabled concessions for the Partner authorities (SCC are already independent of ISL).
- 3.8.2 For the purposes of the Business Case illustration, it is also assumed that the Solent Travelcard will migrate “as is” to the TfSH scheme infrastructure at least initially. This is the simplest available first step of delivering an interoperable commercial ticketing product on a smart card which would easily meet the aspirations in the White Paper. This would allow the implications of a change to a usage basis apportionment scheme to be assessed as a prelude to understanding the pricing issues of making the offer any more complicated (eg zones) or extending it to be multi-modal (eg rail, estuarial ferries) or with a wider geographical offer (eg all ferries and the Isle of Wight or towards London). It is understood from the local authority side consultations that the present paper-based product is ‘fossilised’ and unable to progress due to the lack of options on alternative revenue apportionment arrangements.
- 3.8.3 TfSH possibly also aspire to support a region-wide e-purse in the form of ITSO Stored Travel Rights (STR) for the provision of an integrated payment means (but assumed to be at operator-defined fares) if, for example, there is a market and commercial imperative depending on the outcome for Solent Travelcard.
- 3.8.4 Concessionary cards partitioned for transport and non-transport [other local authority use] in accordance with the ITSO specification are proposed. The new specification for using DESfire cards in this respect, as a replacement for Mifare, is now available from ITSO as a Design

Guide with instructions for co-hosting the LASSeO specification. In addition, the 8k card (rather than the 4k card) can also host an additional user-defined application as well as ITSO/LASSeO.

- 3.8.5 The latter opportunity may be important for the migration strategy of other partners (eg University). Non ITSO university applications need discussion outside this transport business case, following ACT's investigation of the transition options. MVA's view remains that a phasing out of Mifare cards is inevitable so a solution based on DESfire [4k ITSO/LASSeO or 8k ITSO/LASSeO/other-proprietary] or using generic microprocessor ITSO CMD2 options are the likely short/medium-term deliverable options (because these are the only current ITSO-compliant cards possibly up to the task). It is unrealistic to cost for this in the Business Case at this stage until the above conundrum/dilemma is answered by SCC/ACT and the University from the other work-stream.

## 4 The Business Case

### 4.1 Building the Model and Key Assumptions

4.1.1 This chapter details the key assumptions underpinning the TfSH Smart Card Business Case developed by MVA based on the principles outlined in the previous chapter. The model has been built bottom up; the outputs are forecasts, from the start of April 2011 to the end of March 2021, of the following:

- Benefits
- Capex
  - Initial investment
  - Renewals<sup>1</sup>
- Opex
  - Staff
  - Non-staff
  - Maintenance

4.1.2 Costs are all at market levels, in 2010 prices and values, all exclusive of VAT. They have, generally, been sourced from recent successful (ie contested) tenders and/or more recent feedback from suppliers where appropriate (but both sources are treated anonymously and usually aggregated and averaged); other costs have been informed by expert judgement.

4.1.3 This note is consistent with the following business case model: **20110209 SCC C3992400 TfSH Smart Card Business Case Model v3.0.xls**.

4.1.4 Costs have been developed in an incremental manner as follows:

- TfSH bus only
- TfSH bus plus ferry
- TfSH bus plus ferry plus rail.

### 4.2 Capex Initial Investment

4.2.1 The investment (and ongoing costs see 4.5 and 4.6) in on bus equipment and the depot system is assumed to be funded by the bus operators. Following the clarification in the White Paper this can continue to be offset for the foreseeable future by the BSOG funding grant for each smart-equipped bus (presented as a revenue stream falling to the bus operators in the business case). Any balance is assumed to fall to the bus operators, but it is expected that BSOG covers (or will more than cover) smart card capability costs over the life of the equipment as recent discussions with DfT confirm there is no further work being pursued at

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<sup>1</sup> This is for one renewal cycle

present on the BSOG replacement by a per-passenger incentive (a previous Labour commitment to investigate not now being pursued by the Coalition<sup>1</sup>).

- 4.2.2 As a comparator, the Nexus Business Case was built on premise that NESTI provided bus operators with a funding grant of £1k per equipped bus, the money representing grant aid to off-set the full cost of the ITS0 system. This is comparable with BSOG arrangements. Centro fully funded equipment, but in exchange for commitment this became fully an operator responsibility beyond year 2 and for the next equipment refresh in 7-10 years time. A contract has been signed by Operators in Centro area and an operator agreement is under negotiation in Nexus (possibly now signed?) Centro and Nexus pre-dates BSOG reform announcements.
- 4.2.3 The remainder of the initial bus investment with respect to the ITS0 element beyond the interface from the operators depot or HQ system, excluding bus communication costs and some provision for project management and contingency, is assumed to be funded by TfSH. In turn the TfSH contribution has been split by the three (SCC, PCC, HCC) funding partners (this is subject to further debate/refinement as this is debated with the partners).
- 4.2.4 To qualify for the BSOG the smart card system must accept all English National Concession Cards and the bus operator must commit to sharing elements of data with local authorities, central government and other relevant bodies.
- 4.2.5 Table 3.1 details the initial (upfront, excluding renewals) Capex investment for the entire scheme. For indicative information it is also disaggregated by TfSH and bus operator contributions. Bus operator contributions will vary depending on the chosen ETM supplier and final eligible fleet totals at the time of tendering, which this Business Case is unable to reflect precisely at this stage.

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<sup>1</sup> In fact the DfT official working on this project retires in April 2011

**Table 3.1 Initial Capex Investment (£s)**

Component	Total	TfSH	Bus Operator estimate
Bus Equipment	1,669,767	0	1,669,767
Bus Depot System <sup>1</sup>	723,199	0	723,199
Bus Design / Testing	58,460	58,460	0
Bus Communications	203,637	0	203,637
Ticket Offices / Sales System	1,620,954	1,620,954	0
Smart Cards	349,800	349,800	0
Back Office	1,297,159	1,297,159	0
Branding / Call Centre	50,000	50,000	0
Ferry	1,704,621	1,704,621	0
Rail	2,241,950	2,241,950	0
Project Management	991,955	732,294	259,660
Integration	495,977	495,977	0
Contingency	1,983,909	1,464,589	519,321
<b>Total</b>	<b>13,391,388</b>	<b>10,015,804</b>	<b>3,375,584</b>

**Table 3.2 Initial Capex Investment: TfSH and Bus Operator Contributions (£s)**

Component	SCC	PCC	HCC	Bus Operators estimate
Bus Equipment	0	0	0	1,669,767
Bus Depot System	0	0	0	723,199
Bus Design / Testing	19,487	19,487	19,487	0
Bus Communications	0	0	0	203,637
Ticket Offices / Sales System	540,318	540,318	540,318	0
Smart Cards	116,600	116,600	116,600	0
Back Office	432,386	432,386	432,386	0

<sup>1</sup> At the level of detail for the business case (with Contingency provided) it is not considered significantly different whether the larger operators have ENCTS records routed directly to a TfSH HOPS or they go via their own Bus Group HOPS – eg evidence of Stagecoach integration in Wales

Branding / Call Centre	16,667	16,667	16,667	0
Ferry	568,207	568,207	568,207	0
Rail	747,317	747,317	747,317	0
Project Management	244,098	244,098	244,098	259,660
Integration	165,326	165,326	165,326	0
Contingency	488,196	488,196	488,196	519,321
<b>Total</b>	<b>3,338,602</b>	<b>3,338,602</b>	<b>3,338,602</b>	<b>3,375,584</b>

### Bus Fleet and Depot Assumptions

4.2.6 Fleet and depot assumptions have been based on information sourced from SCC, operators and best judgement. It is recommended that bilateral negotiations confirm the appropriate 'eligible fleet' to equip as this has to take account of the appropriate share of cross-boundary vehicles. The numbers below are a best estimate of all known issues at the time of writing.

4.2.7 Table 3.3 details the fleet PVR and depot assumptions.

**Table 3.3 Bus Fleet PVR and Depot Assumptions**

Operator	Depot location	Number of depots in location	PVR operating from depot	Fleet operating within TfSH area
First	Southampton	1	104	104
	Fareham	1	160	160
	Hilsea	1	50	50
Stagecoach	Aldershot	1	96	1
	Andover	1	33	3
	Basingstoke	1	74	1
	Chichester	1	50	10
	Portsmouth	1	64	64
	Winchester	1	66	66
	Worthing	1	66	7
Go-Ahead	Wiltshire	1	99	16
	Hampshire	2	45	6
	Bluestar	2	62	62
	Vectis	2	76	76
Black Velvet	Hampshire	1	12	12
Brijan	Hampshire	1	13	13
Emsworth	Hampshire	1	12	12
Bluestar Unilink	Hampshire	1	17	17
<b>Total</b>		<b>21</b>	<b>1099</b>	<b>680</b>

4.2.8 The total fleet size operating from depots serving the TfSH area (including spares) is estimated to be 1,156, see Table 3.4. Allowing for cross boundary operations, 680 vehicles

are estimated to operate within the TfSH area. Assuming fleet is PVR plus 5% (for TfSH internal depots) and allowing for spares, the business case makes provision to equip 753 vehicles.

**Table 3.4 Bus Fleet Summary**

Description	First	Stagecoach	Go-Ahead	Small size operators	Unilink	Total
No. of operators	1	1	1	3	1	7
Total PVR from all depots	314	449	282	37	17	1,099
Total fleet from all depots (includes spares)	330	456	289	39	18	1,156
Total fleet to equip (includes spares)	346	169	178	41	19	753

### Bus Equipment

- 4.2.9 It is assumed that while large operators, plus Unilink, will have their own systems, smaller operators will have a managed service run on some form of an agreed commercial basis by TfSH (and optionally up to one other 'agent' on behalf of TfSH if geographically expedient). This approach has now become an established UK-wide solution to this problem, although the financial arrangements vary locally. Managed services for small operators are now in place, or proposed/committed, at Lancashire and Cumbria County Councils (hosted at Preston), South Wales (SEWTA), North Wales (TAITH), Merseyside, Bristol and at Centro in the West Midlands. The business case has been costed on this basis, but smaller operator costs would rise per each additional depot system if they were disaggregated and 'run' individually.
- 4.2.10 Table 3.5 details the total initial Capex investment in bus equipment; costs are incurred in the 12 months to the end of September 2012.

**Table 3.5 Initial Investment in Bus Equipment**

Component	Quantity	Cost (£)	TFSH (£)	Bus Operators (£) estimate	Total (£)	Source of cost
Ticket Machines (inc. Parts + tools) - on bus	753	1,380	0	1,039,809	1,039,809	Anonymous 2008 tender(s)
Handheld readers	20	2,500 <sup>1</sup>	0	50,000	50,000	Anonymous 2008 tender(s)
Installation survey and equipping plan	66	69	0	4,554	4,554	Anonymous 2008 tender(s)
Installation and testing	753	118	0	88,911	88,911	Anonymous 2008 tender(s)
Train the trainer at each depot (days)	55	480	0	26,400	26,400	Anonymous 2008 tender(s)
Staff training at each depot (days)	695	480	0	333,600	333,600	Anonymous 2008 tender(s)
Warranty (12 months)	753	45	0	33,907	33,907	Anonymous 2008 tender(s)
SAMs	812	57	0	46,293	46,293	ITSO website
SAM commissioning	812	57	0	46,293	46,293	A business case for another local authority
<b>Total</b>			<b>0</b>	<b>1,669,767</b>	<b>1,669,767</b>	

<sup>1</sup> there may be an opportunity for a cheaper NFC phone acting as a reader

<sup>2</sup> indicative cost is based on Parkeon TGX200 ETM.

#### 4.2.11 The quantities of the components in Table 3.5 are driven by the following:

- Ticket machines: by fleet size (see Table 3.4)
- Handheld readers: assumption for a small pool of checking and/or smart ticketing devices (eg 'blitz' revenue protection, events queue busters etc<sup>1</sup>)
- Installation survey and equipping plan: by approximation, one for each bus type, every 1 in 20 buses assumed to be of a different type
- Installation and testing: by the number of ticket machines (by fleet size)
- Train the trainer at each depot: by approximation, assumes 10 supervisors (the trainers) at each depot, with a 2 hour training duration

<sup>1</sup> This Business Case does not at this stage cater for hand-held checkers on rail as too early to state what the operating parameters might be for rail ticketing (or whether these would be provided by another - out of area - scheme)



## 4 The Business Case

- Staff training at each depot: by approximation, assumes 2.2 drivers per bus per day, with training taking ¼ of a day per driver
- 12 month warranty: by the number of ticket machines
- SAM and SAM commissioning: by the number of ticket machines, with an additional 5% of spares.

4.2.12 Power for spares is a marginal cost, which this business case assumes to be met from contingency.

### Bus Depot System

4.2.13 Table 3.6 details the total initial Capex investment in the depot system; costs are incurred in the 12 months to the end of September 2012. All costs fall to the bus operators.

**Table 3.6 Initial Investment in the Depot System**

Component	Quantity	Cost (£)	TfSH (£)	Bus Operators (£ estimate)	Total (£)	Source of cost
Hardware and systems software	21	14,994	0	314,874	314,874	Anonymous 2008 tender(s)
ETM management software	21	2,500	0	52,500	52,500	Anonymous 2008 tender(s)
Configuration / fares software	21	3,500	0	73,500	73,500	Anonymous 2008 tender(s)
Revenue management software	21	5,000	0	105,000	105,000	Anonymous 2008 tender(s)
Train staff at each depot (days)	55	480	0	26,400	26,400	Anonymous 2008 tender(s)
Software licence fees	5	8,000	0	40,000	40,000	Anonymous 2008 tender(s)
Installation	21	2,475	0	51,975	51,975	Anonymous 2008 tender(s)
Configuration	21	1,950	0	40,950	40,950	Anonymous 2008 tender(s)
Software warranty (12 months)	5	3,600	0	18,000	18,000	Anonymous 2008 tender(s)
<b>Total</b>			<b>0</b>	<b>723,199</b>	<b>723,199</b>	

4.2.14 In Table 3.6 the quantities of the following components are driven by the number of depots:

- Hardware and system software
- ETM management software
- Configuration / fares software
- Revenue management software
- Installation
- 12 month software warranty.

Quantities of other components in Table 3.6 are driven by the following:

- Train staff at each depot: by approximation, assumes 10 staff require training at each depot, with a 2 hour training duration
- Software licence fee: by the number of bus operators.

4.2.15 In all cases warranty support is supported at additional cost to achieve on-site attention rather than 'return for repair'.

**Bus Design / Testing**

4.2.16 Table 3.7 details the total initial Capex investment in designing and testing the bus system; all costs fall to TfSH and are incurred in the 18 months to the end of September 2012. This is essentially a review of the scheme design for which the operators are participating, to ensure that it meets the local authority requirements in delivering the initial product requirements and assuring the provision of a functioning configuration editor that avoids the local authority (and operator) incurring additional variation costs later for adding new ITSO products. The issue for the local authority is safeguarding their investment for the life of the equipment against ETM-supplier variation charges – the initial contract needs delivery of a configuration editor and ITSO upgrade assurance to at least 2.1.4 and, preferably, priced options for version-upgrade support thereafter.

**Table 3.7 Initial Investment in Design/Testing**

Component	Quantity	Cost (£)	Total (£)	Source of cost
Conceptual design review package per operator (days)	64	370	23,680	Anonymous 2008 tender(s)
Test development and management per operator (days)	94	370	34,780	Anonymous 2008 tender(s)
<b>Total</b>			<b>58,460</b>	

4.2.17 The quantities of the components in Table 3.7 are defined as follows:

- Conceptual design review package per operator: 20 days for large operators, 2 days for small operators (in this instance treated as one managed service) and Unilink
- Test development / management per operator: 30 days for large operators, 2 days for small operators (in this instance treated as one managed service) and Unilink.

**Bus Communications**

4.2.18 Table 3.8 details the total initial Capex investment in the communications system, all costs fall to the bus operators and are incurred in the 18 months to the end of September 2012.

**Table 3.8 Initial Investment in Communications**

Component	Quantity	Cost (£)	TFSH (£)	Bus Operators (£)	Total (£)	Source of cost
Site Survey	21	897	0	18,837	18,837	Anonymous 2008 tender(s)
WLAN equipment (inc install and config)	84	1,997	0	167,748	167,748	Anonymous 2008 tender(s)
Broadband line and modem for inter-depot communications	21	812	0	17,052	17,052	Anonymous 2008 tender(s)
<b>Total</b>			<b>0</b>	<b>203,637</b>	<b>203,637</b>	

4.2.19 The quantities of the components in Table 3.8 are driven off the number of depots. 4 WLAN access points have been assumed per depot.

### Ticket Office / Sales System

4.2.20 Table 3.9 details the total initial Capex investment in the ticket office / sales system; costs are incurred in the 12 months to the end of September 2012. All costs fall to TfSH.

**Table 3.9 Initial Investment in the Ticket Office/Sales System**

Component	Quantity	Cost (£)	Total (£)	Source of cost
Ticket office machines (TOMs)	30	10,800	324,000	A business case for another local authority
TVMS	30	23,000	690,000	Anonymous 2009 tender
Web sales system interface	1	250,000	250,000	A business case for another local authority
Development work for sales system	1	250,000	250,000	A business case for another local authority
Sales system reporting	1	100,000	100,000	A business case for another local authority
SAM	61	57	3,477	ITSO website
SAM commissioning	61	57	3,477	A business case for another local authority
<b>Total</b>			<b>1,620,954</b>	

4.2.21 The quantity of TOMs / TVMs is an MVA estimate of a minimum core start-up requirement for a viable scheme. This may be adjusted up or down depending on the adoption of internet and auto-renew capability.

### Smart Cards

4.2.22 Table 4.10 details the total initial Capex investment in the smart card system; costs are incurred in the 12 months to the end of September 2012.

**Table 4.10 Initial investment in the smart card system**

Component	Quantity	Cost (£)	Total (£)	Source of cost
8k Desfire card	75,000	4	300,000	A business case for another local authority
Printer (for steady state)	2	5,700	11,400	A business case for another local authority
Ribbon and cleaning kit	100	244	24,400	A business case for another local authority
CMS set-up	1	14,000	14,000	Anonymous 2010 tender
<b>Total</b>			<b>349,800</b>	

- 4.2.23 Provision has been made to issue 75,000 (15,000 Uni, 10,000 SmartCities, 50,000 other, possibly for Solent Travelcard) commercial smart cards, as directed by SCC.

### Back Office

- 4.2.24 Operators are assumed to pay their own costs for their own systems; testing/validation costs with respect to the ITSO elements are included in the integration costs.
- 4.2.25 Table 3.11 details the total initial Capex investment in the back office; costs are incurred in the 18 months to the end of September 2012, all costs fall to TfSH.

**Table 3.11 Initial Investment in the Back Office**

Component	Quantity	Cost (£)	Total (£)	Source of cost
AMS / HOPS software	1	1,000,000	1,000,000	Anonymous 2009 tender(s)
HSAM	9	1,500	13,500	ITSO website
HSAM commissioning	9	1,500	13,500	A business case for another local authority
Payment system set-up (includes Carnet and STR Balance Management software and Payment and Revenue Apportionment software)	1	30,000	30,000	Anonymous 2009 tender(s)
Integration (operators)	5	6,853	34,265	Anonymous 2008 tender(s)
Integration (overhead, project management per supplier)	4	19,765	79,060	Anonymous 2008 tender(s)
Back office hardware	1	120,000	120,000	Anonymous 2008 tender(s)
ITSO Product Registration set up fee	8	590	4,720	ITSO website
ITSO Asset Management set up fee	1	890	890	ITSO website
ITSO Shell Owner set up fee	1	1,174	1,174	ITSO website
ITSO Know Your Customer set up fee	1	50	50	ITSO website
<b>Total</b>			<b>1,297,159</b>	

- 4.2.26 No provision for an ITSO joining fee and/or membership fee has been made, since SCC are already ITSO members and therefore already meet these costs. After year 1, the ITSO annual fee falls to the Business Case.
- 4.2.27 Quantities are based on MVA assumptions, based on a business case for another local authority, for completeness:
- Provision is made for 1 back office, with associated hardware costs
  - HSAMs and HSAM commissioning are based on 3 per 1,000 SAMs, per operator
  - Small operators are treated as one managed service in estimating the quantity of operators to integrate with the back office
  - Integration with suppliers assumes 4 suppliers.

### Branding and Call Centre

- 4.2.28 Provision of £50,000 has been made for marketing/branding or contribution to the added workload of a call centre. If further funding is required it would be met from existing provisioned contingency, costs are incurred in the 12 months to the end of September 2012.

### Ferry

#### Operator data

- 4.2.29 Table 3.12 details the ferries that operate in the TfSH area.

**Table 3.12 Ferry Operations**

Operater	Terminal	Terminal	Type
Hovertravel	Portsmouth	Ryde (IoW)	Passenger only
Red funnel	Southampton	East Cowes (IoW)	Passenger + vehicle
Red Jet	Southampton	West Cowes (IoW)	Passenger only
Wightlink	Portsmouth	Fishbourne (IoW)	Passenger + vehicle
Wightlink	Lymington	Yarmouth (IoW)	Passenger + vehicle
Wightlink	Portsmouth	Ryde (IoW)	Passenger only
Gosport	Portsmouth	Gosport	Passenger only
Hythe	Southampton	Hythe	Passenger only
Hayling	Eastney	Hayling Island	Passenger only
Hamble	Hamble	Warsash	Passenger only

- 4.2.30 Table 3.13 details the total initial Capex investment in the Ferry system; costs are incurred in the 18 months to the end of September 2013. All costs fall to TfSH.
- 4.2.31 Similarly to the small bus operators, provision has been made for some form of 'managed service' for small ferry operators to enable them to participate in the provision and sharing of the TfSH infrastructure. To this end, the ferry operations are treated as follows:
- Hovertravel
  - Red Funnel + Red Jet
  - Wightlink
  - Gosport
  - Other (Hythe, Hayling and Hamble), as a managed service.

**Table 3.13 Initial Investment in the Ferry system**

Component	Quantity	Cost (£)	Total (£)	Source of cost
Design/testing – conceptual design review package per operator (days)	50	370	18,500	Anonymous 2008 tender(s)
Design/testing – test development and management per operator (days)	50	370	18,500	Anonymous 2008 tender(s)
Communications – site survey	8	897	7,176	Anonymous 2008 tender(s)
Communications – WLAN equipment	16	1,997	31,952	Anonymous 2008 tender(s)
Communications – Broadband line and modem	8	812	6,496	Anonymous 2008 tender(s)
Back office - integration	5	6,853	34,265	Anonymous 2008 tender(s)
TVMs	54	23,000	1,242,000	Anonymous 2009 tender
Central computer to manage validators	1	100,000	100,000	MVA
System reporting	1	50,000	50,000	MVA
Handheld readers	72	2,500 <sup>1</sup>	180,000	Anonymous 2008 tender(s)
SAM	138	57	7,866	ITSO website
SAM commissioning	138	57	7,866	A business case for another local authority
<b>Total</b>			<b>1,704,621</b>	

<sup>1</sup> there may be an opportunity for a cheaper NFC phone acting as a reader

#### 4.2.32 Quantities are based on the following assumptions:

- Design/testing - conceptual design review package: 10 days per operator
- Design/testing - test development / management: 10 days per operator
- Communications – site survey: by services operated
- Communications – WLAN equipment: by services operated, 2 per service
- Communications – broadband line and modem: by services operated
- TVMs: total of 54, made up of 6 for Hovertravel, Red Funnel, Red Jet, each of Wightlinks services and Gosport, and 4 for each of Hythe, Hayling and Hamble
- Handheld validators – total of 72, made up of 5 (passenger only services) x 6 (consisting of 2 for validating tickets at each terminal, plus 2 spares), plus 3 (passenger and vehicle services) x 14 (consisting of 6 as per the passengers services, plus 8 to validate vehicle tickets (3 for validating tickets at each terminal, plus 2 spares))
- SAMs and SAM commissioning are based on 1 per TVM, per back office integration and per handheld reader, plus 5% additional spares.



### Rail

- 4.2.33 For a smart card scheme to work for rail in the TfSH area it will not suffice to only equip stations within the TfSH area.
- 4.2.34 Southern (see 2.2.24) plan to equip 44 of the stations that they operate with ITSO compliant equipment by January 2012. These plans do not include equipping small stations along the South Coast, nor stations towards Horsham from Chichester. Excluding Chichester, Worthing, Hove, Brighton and Horsham (all of which have ticket gates in operation already), there are 26 stations that require equipping.
- 4.2.35 Table 3.14 details the total initial Capex investment in the Rail system to fill in the gaps in Southern's equipping plans or to accelerate them; costs are incurred in the 18 months to the end of September 2013. All costs fall to TfSH.

**Table 3.14 Initial Investment in the Rail system**

Component	Quantity	Cost (£)	Total (£)	Source of cost
Validators	114	2,500	285,000	Estimate provided by David Lynch
Platform enabling works	57	10,000	570,000	Estimate provided by David Lynch
TVMs	52	23,000	1,196,000	Anonymous 2009 tender
SAM	175	57	9,975	ITSO website
SAM commissioning	175	57	9,975	A business case for another local authority
Installation of validators	114	1,500	171,000	Anonymous 2008 tender(s)
<b>Total</b>			<b>2,241,950</b>	

- 4.2.36 This business case makes provision to equip each of the 26 stations with 2 validators per platform, all stations are two platform except for Barnham (3), Bognor Regis (4) and Littlehampton (4). There is also provision for 2 TVMs per station.
- 4.2.37 SAM and SAM commissioning: by the number of validators and ticket machines, with an additional 5% of spares.

### Overall Project Management

- 4.2.38 Total project management costs are assumed to be 10% of the initial Capex. Costs are incurred in the 30 months to the end of September 2013.
- 4.2.39 Total project management costs are **£991,955**, of which **£732,294** fall to TfSH and **£259,660** fall to the bus operators.

### Integration

4.2.40 Integration costs are assumed to be 5% of the initial Capex. Costs are incurred in the 30 months to the end of September 2013.

4.2.41 Total integration costs are **£495,977**, all of which fall to TfSH.

### FSA pool guarantee

4.2.42 The interoperable nature of this scheme means it falls under FSA regulation, this business base does not make provision for a pool guarantee (or its insurance).

### Contingency

4.2.43 Contingency costs are assumed to be 20% of the initial TfSH funded Capex. Costs are incurred in the 30 months to the end of September 2013.

4.2.44 Total contingency costs are **£1983,909**. Contingency of **£519,321** associated with the on bus equipment, depot and communications systems falls to the bus operators, the remaining contingency of **£1,464,589** falls to the TfSH funding partners.

## 4.3 Capex Renewals

4.3.1 Renewal costs and periods are detailed in Table 3.15. The business case assumes that all the SAM renewals associated with the bus equipment and bus communications are paid for by the bus operators<sup>1</sup>. Rail operators are assumed to fund SAM renewals associated with the rail equipment TfSH funds other renewals, specifically SAMS for the Ticket Office/Sales System, the Back Office, the Ferry System.

**Table 3.15 Periodic Renewals**

Component	Renewal Period (years)	Total per renewal (£)	TfSH (£)	Operator (£)
SAMS: Bus equipment	5	92,586	0	92,586
SAMs: Ticket Office/Sales System	5	6,954	6,954	0
SAMS: Back Office	5	27,000	27,000	0
SAMS: Ferry System	5	15,732	15,732	0
SAMS: Rail System	5	19,950	0	19,950
<b>Total</b>		<b>162,222</b>	<b>49,686</b>	<b>112,536</b>

4.3.2 Inline with recent successful tenders a 15% 'churn rate' (renewals) of commercial cards has been assumed to fall to this business case. This annual cost falls to TfSH. Costs associated with additional concessionary cards fall to TCA's, so are not included in this business case.

<sup>1</sup> This assumption stems from the elapsed time since equipping will have Operators with their own HOPS except for the smaller Managed Service element handled through contingency. Failures in service (as distinct from renewals) are handled through contingency.

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- 4.3.3 A re-issue of all smart cards will be necessary in 2013 as part of a UK wide policy/agreement to limit ENCTS card life to a maximum of 5 years. The renewal is estimated at £708,000 (see Table 3.16), which will be funded by TCA's, so falls outside this business case.

**Table 3.16 ENCTS renewal**

Component	Renewals	Total per renewal (£)
Current concessionary cards	85,000 <sup>1</sup>	£4.00
Further concessionary cards in circulation by 2013	17,000 <sup>2</sup>	£4.00
Commercial cards in circulation by 2013	75,000 <sup>3</sup>	£4.00
<b>Total</b>	<b>177,000</b>	<b>708,000</b>

<sup>1</sup> estimate supplied by SCC

<sup>2</sup> see section 4.3.2 above for explanation of annual smart card 'churn'

<sup>3</sup> see section 4.2.23

### 4.4 Opex - Staff

- 4.4.1 Provision has been made for 3 additional Full Time Employees (FTE) to manage the operation of smart ticketing across the region. This cost could potentially be met by existing staff resources.

**Table 3.17 Staff Opex**

Role	Staff count	Salary cost per staff pa (£)	Allowance for expenses etc	Allowance for pension, NI etc pa (%)	Total cost per FTE pa (£)
Managerial	1	40,000	4,000	26.9	54,760
Technical	1	40,000	4,000	26.9	54,760
Administration	1	25,000	2,500	22.7	33,175
<b>Total</b>	<b>3</b>				<b>142,695</b>

- 4.4.2 The costs of pension, National Insurance and other such payments are based on standard assumptions. Budgeting is based on a third party providing the service.
- 4.4.3 Costs are incurred annually from the end of March 2013, costs fall to TfSH.

## 4.5 Opex – Non-Staff

4.5.1 Table 3.18 details the components of the non-staff Opex. All costs fall to TfSH.

**Table 3.18 Non-staff Opex**

Component	Quantity	Cost (£)	TfSH (£)	Bus Ops (£)	Total (£)	Source of cost
<b>On bus equipment</b>						
SAM connecting	812	12	0	9,746	9,746	ITSO website
<b>Bus Communications</b>						
Broadband line	21	180	0	3,780	3,780	Assumption: £15/month
<b>Ticket offices / Sales system</b>						
SAM connecting	61	12	732	0	732	ITSO website
<b>Smart Cards</b>						
CMS annual cost	1	30,000	30,000	0	30,000	Anonymous 2010 tender
<b>Back office</b>						
HSAM connecting	9	12	108	0	108	ITSO website
ITSO License Annual Fee	1	5,000 <sup>1</sup>	5,000	0	5,000	Estimation <sup>1</sup>
ITSO Product Registration Annual Fee	8	117	936	0	936	ITSO website
ITSO Asset management Annual Fee	1	177	177	0	177	ITSO website
ITSO Shell Owner Annual Fee	1	235	235	0	235	ITSO website
Payment system annual cost	1	42,000	42,000	0	42,000	Anonymous 2009 tender
<b>Ferry</b>						
SAM connecting	138	12	1,656	0	1,656	ITSO website
<b>Rail</b>						
SAM connecting	175	12	2,100	0	2,100	ITSO website
<b>Total</b>			<b>82,944</b>	<b>13,526</b>	<b>96,470</b>	

<sup>1</sup> based on 0.025% of ITSO related turnover (as per the ITSO website), TfSH specific ITSO related turnover is estimated as £20,000,000 (MVA assumption)

#### 4.6 Opex – Maintenance

4.6.1 The business case assumes that all maintenance associated with on bus equipment, the bus depot system and bus communication system is paid for by the bus operators. TOCs are assumed to pick-up the rail system maintenance. All other maintenance is funded by TfSH, including for the ferry system.

**Table 3.19 Maintenance**

Component	Quantity	Cost per unit (£)	TfSH (£)	Operators (£)	Total Cost pa (£)	Source of cost
<b>On bus equipment</b>						
Enhanced (SLA based)	753	107.67	0	81,125	81,125	Anonymous 2008 tender(s)
Other maintenance	1	251,927	0	251,927	251,927	MVA assumption, 15% of associated initial Capex, driven off Table 3.5
<b>Bus Depot system</b>						
Enhanced (SLA based)	5	9,000	0	45,000	45,000	Anonymous 2008 tender(s)
Other maintenance	1	108,480	0	108,480	108,480	MVA assumption, 15% of associated initial Capex, driven off Table 3.6
<b>Bus Comms</b>						
Basic WLAN support	84	299	0	25,116	25,116	Anonymous 2008 tender(s)
<b>Ticket offices/Sales system</b>						
General maintenance	1	274,191	274,191	0	274,191	MVA assumption, 20% of associated initial Capex, driven off Table 3.9
<b>Back office</b>						
General maintenance	1	259,197	259,197	0	259,197	MVA assumption, 20% of associated initial Capex, driven off Table 3.11
<b>Branding and call centre</b>						
General maintenance	1	10,000	10,000	0	10,000	MVA assumption, 20% of associated initial Capex
<b>Ferry</b>						
General maintenance	1	340,924	340,924	0	340,924	MVA assumption, 20% of associated initial Capex, driven off Table 3.13
<b>Rail</b>						
General	1	448,390	0	448,390	448,390	MVA assumption,

maintenance	20% of associated initial Capex, driven off Table 3.14		
<b>Total</b>	<b>884,312</b>	<b>960,038</b>	<b>1,844,350</b>

**4.7 Real Cost Index**

4.7.1 The business case does not assume any change in the real cost of any Capex or Opex items over time. All costs and benefits are expressed in 2010 prices and values, until Table 3.24 where benefits are indexed over time by appropriate real value of time changes, and a 1% pa increase in public transport fares, thereafter both costs and benefits are discounted at 3.5% pa, so there is no need to apply inflation.

**4.8 Optimism bias**

4.8.1 No optimism bias has been assumed, instead 20% contingency has been included. Risks of over spend is further minimised by drawing on recent tenders where available.

**4.9 Apportioning Costs between TfSH Local Authority Funding Partners**

4.9.1 The TfSH funding partners’ contributions to total capex, opex and other on-going cost items are assumed to be as follows:

- SCC: 1/3
- PCC: 1/3
- HCC: 1/3

This is applies to all Capex and Opex.

4.9.2 Functionality exists in the business case model to vary the contribution shares by individual cost line.

**4.10 Summary View of Capex**

4.10.1 Table 3.20 presents a summary of the different elements of the initial Capex investment, disaggregated by the TfSH funding partners and operators

**Table 3.20 Capex Summary**

<b>Component</b>	<b>Total (£)</b>
<b>TfSH Contributions</b>	
<b>TfSH Bus</b>	<b>4,687,934</b>
<b>TfSH Bus + Ferry</b>	<b>6,989,172</b>
<b>TfSH Bus + Ferry + Rail</b>	<b>10,015,805</b>
TfSH Bus (exc Project Management, Integration, Contingency)	3,376,373
TfSH Bus + Ferry (exc Project Management, Integration, Contingency)	5,080,944
TfSH Bus + Ferry + Rail (exc Project Management, Integration, Contingency)	7,322,944
<b>TfSH Project Management</b>	
Bus	337,637
Bus + Ferry	508,099
Bus + Ferry + Rail	720,294
<b>TfSH Integration</b>	
Bus	298,649
Bus + Ferry	383,880
Bus + Ferry + Rail	495,977
<b>TfSH Contingency</b>	
Bus	675,275
Bus + Ferry	1,016,199
Bus + Ferry + Rail	1,464,589
<b>Operator Contributions</b>	
Bus	3,375,584
Ferry	0
Rail	0
<b>Total</b>	
<b>Bus</b>	<b>8,063,518</b>
<b>Bus + Ferry</b>	<b>10,364,756</b>
<b>Bus + Ferry + Rail</b>	<b>13,391,388</b>

#### 4.11 Procurement and Evaluation Costs

4.11.1 This is included in the Project Management assumptions.

#### 4.12 Benefits

- 4.12.1 There is one user benefit (for passengers) and there are eight operational cost/revenue benefits (for TfSH and operators). They are summarised below in Table 3.21. There is widespread disagreement between Operators and Authorities on such assumptions but, following receipt of diametrically opposed comments on this topic area, MVA have retained the benefit assumptions on the basis of being not unreasonable.

**Table 3.21 Benefits**

<b>Role</b>	<b>Beneficiary</b>
Time savings for all bus passengers derived from reduced time involved in dealing in cash transactions between the boarding passenger and the bus driver	Bus Passengers
Cash handling savings from reduced cash use on the bus (mainly through movement to use of credit and debit cards to top up the smart cards on at TVMs and other off bus sales points)	Bus Operators
Reduction in passenger fraud and fare evasion through the use of smart cards on bus	Bus Operators
Cash handling savings from reduced cash use to purchase Ferry tickets (mainly through movement to use of credit and debit cards to top up smart cards)	Ferry Operator
Savings in analysis and survey costs through improved information flow from back room systems at each bus operator	TfSH and Bus Operators <sup>1</sup>
Revenue from selling some smart card space	TfSH and other Card Issuers <sup>2</sup>
Avoided investment due to shared HOPS, CMS and Payment System	TfSH
Avoided on-going costs due to shared HOPS, CMS and Payment System	TfSH
Revenue from BSOG	Bus Operators

<sup>1</sup> The business case applies this benefit all TfSH local authorities involved in concessions and bus service provision,. In authorities where concessionary reimbursement is based on operator submissions there will also be benefits that accrue to operators as a result of the process being handled via the smart card system.

<sup>2</sup> This benefit could flow to any card issuer in the scheme but in the business case is assumed to fall to TfSH



### 4.13 Time Savings – Bus

4.13.1 This benefit falls to bus passengers, it is presented as a benefit to existing PT users.

4.13.2 The benefits drive off the assumptions below; unless stated otherwise, they are based on a business case for a different PTE.

- Total bus journeys = 44,000,000<sup>1</sup>
- Total bus operating kilometres = 25,000,000<sup>2</sup>
- Total bus passenger kilometres = 222,000,000<sup>2</sup>
- Total bus revenue = £132,000,000 (estimated using an assumed yield per journey of £3<sup>1</sup>)
- Average bus speed = 20kph
- Time saved per smart card used = 1 seconds<sup>3</sup>
- Current cash users = 49%<sup>1</sup>
- Estimate of percentage of cash users once the system is fully operational = 25%
- Estimate of percentage of previous cash users who will use smart card = 24%

<sup>1</sup> supplied by SCC

<sup>2</sup> by approximation from another business case

<sup>3</sup> see 4.14 below

4.13.3 The time saved per passenger per kilometre is 0.42 seconds, equivalent to a value of time estimate of £0.005 per passenger.

4.13.4 The per annum benefit in 2010 prices and values is £198,583. Over time this is indexed by a lag factor, the real value of time change against a 2010 base. No patronage growth over time has been assumed.

#### 4.14 Time Taken to Board Bus

4.14.1 The estimate of the “time saved per smart card used” assumes the following:

**Table 3.22 Time Taken to Board Bus**

Role	Seconds per passenger	Share (%)	Weighted seconds
<b>Current</b>			
Prepaid/concessionary	3	51	1.53
Cash	5	49 <sup>1</sup>	2.45
Weighted average boarding time			3.98
<b>Proposed</b>			
Prepaid/concessionary	3	51	1.53
Cash	5	25	1.25
Smartcard	4	24	0.96
Weighted average boarding time			3.74
Benefit per boarder			0.24
Benefit per switcher			1.0

<sup>1</sup>supplied by SCC

The benefit per switcher is a conservative estimate, other business cases have assumed prepaid/concessionary = 7 seconds, cash = 10 seconds, smartcards = 8 seconds

#### 4.15 Cash Handling Saving – Bus

4.15.1 This benefit falls to the Bus Operators.

4.15.2 The benefit is estimated as 1% (based on a business case for a different PTE) of total bus revenue transferring from cash (49%, supplied by SCC) to smart card (24%, assuming 25% of passengers will always pay by cash).

4.15.3 It should be noted that scheme rules and configuration are vitally important in securing these benefits. There have been poorly constructed stored-value schemes in the past such as those that allowed small value top-ups such that the spend equated the top-up in many cases. This is clearly a flawed model. However, if top up amounts are say £10 minimum (to justify the investment in introducing this product), then the cash transaction will only be every say 4-7 journeys on average. This in turn can be removed with auto-renew facilities so it is handled wholly off-bus or only needing an automatic transaction on bus.

4.15.4 The per annum benefit in 2010 prices and values is £316,800, or 0.24% of total bus revenue. Over time this is indexed by a lag factor and an assumed real fares increase of 1% per annum. No patronage growth over time has been assumed.

#### 4.16 Reduced Fare Evasion - Bus

4.16.1 This benefit falls to the Bus Operators.

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4.16.2 The benefits drive off the assumptions below; unless stated otherwise, they are based on a business case for a different PTE.

- Percentage of current passengers fare evading (including over-riding) = 2%
- Percentage of passengers who will always fare evade = 0.25%
- Percentage of evading passengers who will cease to travel = 50%
- Average yield of "evaders" relative to average yield = 75%
- Effectiveness of smart card = 100%

4.16.3 This reflects the simple empirical reality that when evasion is constrained not all the former evaders now pay (ie many cease travelling at all, or find alternative means).

4.16.4 The net revenue gain is estimated at 0.67%, which is a cautious, conservative estimate

4.16.5 The per annum benefit in 2010 prices and values is £883,929. Over time this is indexed by a lag factor and an assumed real fares increase of 1% per annum. No patronage growth over time has been assumed.

### 4.17 Time Saving – Ferry

4.17.1 No boarding time benefits have been assumed.

### 4.18 Cash Handling Saving- Ferry

4.18.1 This benefit falls to the ferry operators.

4.18.2 The net ferry revenue gain is estimated at 1.5% of TVM and ticket office revenue. Base annual ferry TVM and ticket office revenue is estimated at £42,187,500, sourced through consultation with operators, web searches, Companies House and SCC.

4.18.3 The per annum benefit in 2010 prices and values is £632,813. Over time this is indexed by a lag factor and an assumed real fares increase of 1% per annum. No patronage growth over time has been assumed.

### 4.19 Savings in Analysis and Survey Costs

4.19.1 This benefit falls to TfSH, it is presented as a cost saving.

4.19.2 50% of TfSH annual expenditure on surveys and associated analysis is assumed to be saved per annum, so there is some budget retention for alternative surveys (eg journey purpose). TfSH currently spend approximately £100,000 per year on deriving data from surveys and associated analysis (sourced from SCC).

4.19.3 The per annum benefit then in 2010 prices and values is £50,000. Over time this is indexed by a lag factor as explained previously.

#### **4.20 Revenue from Selling Smart Card Space**

- 4.20.1 From 30 March 2014 a revenue benefit of £160,000 has been taken, this is from selling (for advertising) some physical card space, the benefit is estimated to be £1 per annum per card in circulation, this benefit falls to 50% to TfSH and 50% to operators.

#### **4.21 Savings in Travel Administration**

- 4.21.1 No staff savings have been assumed, even though there maybe less staff time concerned with travel administration.

#### **4.22 Avoided Investment due to Shared AMS-HOPS, CMS and Payment System**

- 4.22.1 When the Department for Transport committed to the issue of smart cards as the format of the English National Concessionary Travel Scheme (ENCTS) 'passes' in Autumn 2007, they were faced with a mixed capability among existing Travel Concession Authorities (TCAs).
- 4.22.2 Therefore DfT undertook to put in place a Framework Contract for card production and for other ITSO-capable systems. In addition ITSO and DfT created and funded ITSO Services Ltd (ISL) to assist schemes and provide a temporary AMS-HOPS 'back-office' service for a limited period.
- 4.22.3 This framework contract is to be terminated shortly, meaning that TCAs now need to make their own deals with suppliers for a bureau service for card issue or the purchase of their own in-house production capability.
- 4.22.4 Hence the time is fast approaching when TCAs, either individually or collectively, will have to resolve their 'steady-state' AMS-HOPS position in conjunction with emerging smart card plans. Evidence from elsewhere suggests that regional HOPS approaches are the best market-fit.
- 4.22.5 A joined-up approach means there are some significant cost savings compared to the TfSH partners implementing their own schemes, avoiding unnecessary investment by funding a shared TfSH HOPS.
- 4.22.6 The capital savings of one regional TfSH HOPS compared to 3 individual HOPS (one at each of SCC, PCC, HCC) is £2,000,000. The revenue saving (avoided lease costs) of one regional HOPS compared to 3 individual HOPS is £2,200,000. This is a total cost saving of £4,200,000 in 2010 prices and values, which the business case assumes to be realised in the 12 months to 30 March 2013.
- 4.22.7 The CMS costs consists of a set-up cost of £14k, so capital savings of one regional TfSH CMS compared to 3 individual ones is £28k in 2010 prices and values. Similarly the Payment System costs consists of a set-up cost of £30k, so capital savings of one regional TfSH CMS compared to 3 individual ones is £60k in 2010 prices and values. The business case assumes these savings to be realised in the 12 months to 30 March 2013.

**4.23 Avoided On-going Costs due to Shared AMS-HOPS, CMS and Payment System**

- 4.23.1 Avoided on-going costs due to a shared AMS-HOPS are estimated at £840,000 pa in 2010 prices and values. This assumes per annum maintenance costs of 20% of the £4,200,000 saved, in line with the maintenance assumptions detailed in Table 3.19.
- 4.23.2 On top of the set-up cost of the CMS and Payment System there are annual leasing charges of £30k and £42k respectively. These are included as operating costs in 4.5. Having a shared CMS and Payment System means that there are avoided on-going costs £144,000 pa in 2010 prices and values.

**4.24 BSOG**

- 4.24.1 This has been modelled as an annual revenue stream falling to the bus operator from the year ending March 2013. The payment has been calculated as £600 per bus equipped (allowing for the 20% reduction in BSOG from April 2012). The business case assumes BSOG continues indefinitely.

**4.25 Apportioning Benefits between TfSH Local Authority Funding Partners**

- 4.25.1 The benefits that accrue to the TfSH partners’ are assumed to be as follows:

**Table 3.23 Apportioning Benefits**

<b>Role</b>	<b>SCC</b>	<b>PCC</b>	<b>HCC</b>	<b>Rationale</b>
Time saving – Bus	33%	33%	33%	MVA assumption
Cash handling saving- Bus				Operator benefit
Reduced fare evasion - Bus				Operator benefit
Cash handling saving- Ferry				Operator benefit
Savings in analysis and survey costs		50%	50%	PCC and HCC
Selling card space	17%	17%	17%	MVA assumption
Avoided investment due to shared HOPS, CMS and Payment System	33%	33%	33%	MVA assumption
Avoided on-going costs due to shared HOPS, CMS and Payment System	33%	33%	33%	MVA assumption
BSOG				Operator benefit

- 4.25.2 The functionality exists in the business case model to vary the apportionment of benefit by individual benefit line item.

#### 4.26 The Cost Benefit Ratio (BCR)

- 4.26.1 The BCR presented here is defined as the ratio of the Present Value of Benefits (PVB): Present Value of Costs (PVC). Costs and benefits are expressed in discounted 2010 prices and values, using a discount rate of 3.5%.
- 4.26.2 The BCR for the bus, ferry and rail system scheme is presented in Table 3.24 below.

**Table 3.24 BCR: Bus + Ferry + Rail**

<b>Benefit Cost Ratio - Scheme Total</b>	
<b>Social costs and benefits</b>	<b>£m</b>
Capital cost <sup>1</sup>	13.12
Ongoing costs	12.21
Cash handling savings – Ferry	3.33
Cash handling savings – Bus	1.97
Savings in analysis and surveys	0.29
Avoided investment due to shared TfSH HOPS	4.00
Avoided on-going costs due to shared TfSH HOPS	5.61
Revenue gain to public transport (uplift)	0
Other government costs	
Loss of indirect tax revenue	0
Benefits at market prices	
Revenue gains to Ferry Operators	0
Revenue gains to Bus Operators (includes BSOG)	8.19
Revenue gain from selling card space	0.91
Benefits to existing public transport users	1.26
Benefits to new public transport users	0
Benefits to road users	0
External benefits	0
<b>PVC</b>	<b>10.14</b>
<b>PVB</b>	<b>10.37</b>
<b>NPV</b>	<b>0.72</b>
<b>BCR</b>	<b>1.02</b>

- 4.26.3 Values for the following lines in have been omitted from the core BCR calculations:

- Revenue gains to public transport
- Loss of indirect tax revenue
- Benefits to new public transport users
- Benefits to road users
- External benefits

- 4.26.4 If the assumptions for these five lines were as per the DfT-agreed GMPTE-submitted TIF smart card business case, using their modal transfer assumptions the improvement in benefit would be an additional £2.97m NPV over the life of the scheme, with the BCR improved from 1.02 to 1.35.
- 4.26.5 If the 20% contingency is removed from the capital costs then the BCR of 1.02 increases to 1.26.

<sup>1</sup> This total differs from the value in Table 3.20 due to it being expressed in discounted 2010 prices

## 4 The Business Case

- 4.26.6 A BCR of just greater than 1 is inline with the BCR' s estimated for other smart card schemes. If the costs and benefits attributed to ferry and rail are removed from the business case then the BCR is greater than 2, since this business case assumes considerable cost for ferry and rail, with little benefit in return.
- 4.26.7 Clearly these figures can only be regarded as indicative until further local data is available on the impact of smart cards on modal transfer.

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