Landfall Site
Tay Road Bridge
Discussion Paper

Option Review

Report

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Job No. SCT2014

Report No. 1

Prepared by IFS

Verified IFS

Approved by IFS

Status Final

Issue No. 1

Date 20th March 2009

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Tay Road Bridge
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Contents Amendments Record

This document has been issued and amended as follows:

Status/Revision	Revision description	Issue Number	Approved By	Date
Draft		1	IFS	05/03/2009
Final		1	IFS	23/03/2009

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Tables and Figures

Appendices

1 Executive summary

1.1 SESTRAN, with financial contribution from TACTRAN, appointed JMP Consultants Ltd. to identify a package of sustainable mode interventions that will also contribute to a reduction in single occupancy car trips across the Tay Road Bridge. The options examined included the provision of new rail stations and new rail and bus based Park+Ride/Choose facilities.

1.2 The appraisal of the options in the first stage of the Scottish Transport Appraisal Guidelines (STAG 1) process concluded that the development of a bus based P+R/Choose site on the southern approaches to the Tay Road Bridge and the provision of additional car parking facilities at Leuchars Station should be pursued and were taken forward to STAG 2 appraisal. This also included, through an extension of the study, the feasibility/implementability of a Bus based Park and Ride/Choose Facility to the south of the Bridge.

1.3 Both Regional Transport Partnerships have identified the provision of bus based Park and Ride facilities in the Bridgehead area as a high priority in their approved Regional Transport Strategies and indeed, in the Strategic Transport Projects Review (STPR) recently published by the Transport Minister, the provision of such a facility in the locality of the A92 in north east Fife has been approved as a project of strategic importance.

Leuchars Station Car Park

1.4 It became clear during the STAG 1 part of the study that partly due to the recent increase in rail services at Leuchars from one train per hour to two trains per hour, and with the current parking demand being in excess of car park capacity, that there was demand for additional Park + Ride/Choose facilities at Leuchars Station for trips to Edinburgh. Accordingly this option was taken forward to STAG 2 appraisal (although it did not meet the Planning Objectives of the CTST study brief of reducing the number of single occupancy car journeys over the Tay Road Bridge).

1.5 It is therefore recommended that the station car parking provision at Leuchars be extended by use of the open land adjacent to the station which is reserved in the relevant local plan. The recommendation is to provide a further 100 at grade spaces which would be subject to the same operational regime as the current car park.

1.6 This scheme, estimated to cost £635,500, showed a Benefit to Cost Ratio of 1.55. It is therefore recommended that this scheme be taken forward to identify funding mechanisms in partnership with Fife Council, Transport Scotland and the rail industry.

Bridgehead Bus Based Park and Ride / Choose

1.7 Due to the current and future need to attract traffic to a P+R/Choose site destined for Central Dundee, Ninewells Hospital and University, it is recommended that the Landfall Site at the Tay Road Bridge (the existing car park facility and that to the south) be progressed as soon as possible through discussions with all stakeholders, including bus operators, the Tay Road Bridge Joint Board and other landowners, and that detailed negotiations and designs are undertaken.

1.8 Accepting that there is land ownership and planning policy issues at the Landfall locus, the Forgan Roundabout should be considered as the next best alternative should there be implementability issue at the Landfall Site.

1.9 Both sites identified a positive Benefit Cost Ratio:

- Landfall site 1.77:1 with a capital cost of £2.8m
- Forgan Roundabout 1.49:1 with a capital cost of £1.79m

1.10 Both sites have existing bus services that access the key traffic and people attractors in Dundee. The Landfall Site offers the best bus service frequency and catchment area. However the Forgan site offers a good level of bus services for a P+R/Choose operation should the Landfall site be too problematical.

1.11 The site will be designed to encourage park and choose with a small number of spaces set aside for car sharers and those who wish to park and cycle or walk into Dundee. Adequate parking will be provided for cycles.

1.12 It should be noted that a significant part of the overall economic benefits of this scheme befalls (collectively) to non bridge car users in Dundee City Centre, with the users of the Park & Ride/choose scheme itself as well as Bridge traffic also benefiting significantly.

1.13 It is recognised that there is relatively little congestion on the Tay Road Bridge at present but this will most likely increase, particularly with the regeneration of the Dundee City Centre and the waterfront development. It is therefore envisaged that bus priority measures will be required in due course to ensure that Bus Park and Ride remains an attractive option for people travelling to Dundee from Fife.

Financial Resource

1.14 In the delivery of the P+R/Choose sites it is recommended that the public sector funding partners seek to pass maximum commercial accountability to the private sector as they are best placed to deal with revenue related issues.

1.15 In addition, it is recommended that the public sector funding partners seek a mechanism that will allow for the recovery of site operating costs from the additional fare box revenue.

1.16 A significant level of Capital funding for the P+R/Choose should be sought from Scottish Government resources since a P+R/Choose scheme adjacent to the A92 in north east Fife was identified in the STPR to be of national strategic significance.

1.17 It is recommended that work on the detailed planning application be made as soon as consideration to the land acquisition and subsequent detailed design issues has been made.

1.18 This recommendation is also made on the basis of the need for a P+R / Choose site to be operational during the major part of the re-development of the Dundee Central Waterfront area which will restrict access to and from the Tay Road Bridge, in order to enable the redevelopment works to progress whilst maintaining acceptable progress on this strategic and local distributor route.

1 Introduction

1.1 JMP Were commissioned to undertake the Cross Tay Sustainable Transport Study (CTSTS) which is now in its final draft form.

1.2 This discussion paper will inform the findings and certain of the conclusions to date of work undertaken by JMP to assess the Study aims.

The key aims of the Study were to:

- Develop proposals for Park and Ride (P+R) and/or park and choose site(s) in the northern Fife area to assist in reducing single occupancy car trips across the Tay Road Bridge
- Identify a package of sustainable mode interventions that will also contribute to a reduction in single occupancy car trips across the Tay Road Bridge.

1.3 A steering group was formed comprising of representatives of SESTRAN and TACTRAN (the commissioning bodies) along with officers of Fife and Dundee City Council.

1.4 Key stakeholders from the major transport and infrastructure providers were invited to meetings and included as required either by the group or the individual representatives.

1.5 The Final Draft Report has identified interventions that will meet the terms of the brief however the findings relating to the provision of a Park+Ride/Choose (P+R/C) facility in north east Fife has raised a question which it is felt must be addressed before progressing to the required reporting procedures and recommendations that will have to be made to the relevant authorities.

1.6 The Final Draft Report (CTSTS) has identified that there is a sound economic/environmental case to increase the parking capacity at Leuchars Station thus improving interchange opportunity for car rail model shift (albeit that this will most benefit the trips to Edinburgh with Dundee trips being at the margin).

1.7 The report also identifies a sound economic/environmental case for the provision of a P+R/C site adjacent to the A92.

1.8 The site to the west of the Roundabout at the southern end of the Tay Road Bridge whilst indicating a Benefit Cost Ratio (BCR-1.89:1) for a P+R/ C site is not feasible to implement due to the demand forecast for 2012 being 185 cars in the morning peak. Furthermore, the estimated performance of this site was based on the (unrealistic) assumption that buses would stop in the trunk-road roundabout. This site, because of the size, is limited to a maximum capacity of 130 cars and as such, demand would be exceeded on year of opening. Capital cost of £903,900

1.9 It is clear that the capacity constraints would impact on the deliverability of a P+ R facility. Indeed the capacity constraints could see the site falling into disrepute by patrons due to the uncertainty of parking availability and as such undermine the viability of any such facility. As such, this site would fail to meet the planning objectives. Equally operating two remote sites is not feasible due to operational and functional reasons. Accordingly it is recommended that this option should not be pursued any further other than for the sake of academic comparison within this discussion paper.

1.10 The alternative site identified in the CTSTS report with a BCR (1.49:1) was adjacent to the Forgan Roundabout, some 2.5 miles from the TRB southern landfall roundabout. The demand forecast for 2012 being 143 cars in the morning peak. Capital cost of £1,790,000

1.11 The Forgan site does not offer the same frequency of bus services accessing the site nor does it have as high a level of user demand as the TRB site and indeed offers reduced opportunities for Park+Walk or Park+Cycle. However it is considered that the level of bus service provision would meet the requirements of a Park + R/Choose operation in terms of interchange from car to bus or car share.

1.12 What is clear is that the Forgan site whilst meeting the planning objectives does not maximise the full potential for interchange to more sustainable modes such as cycling or walking from a parking site...

1.13 Accordingly, given the demand forecast for a P+R/C site at the southern end of the Tay Road Bridge, this discussion paper now includes the feasibility of locating a P+R/C facility at existing car park in the ownership of the Tay Road Bridge Joint Board and or the field to the south of this locus.

1.14 The paper will compare the performance of the Tay Road Bridge site (Figure 4.1) along with the Forgan site (Figure 4.2) and that of the Landfall Site (Figure 4.3).

1.15 All these comparisons are made to the same standard and methodology as contained in the main CTSTS report.

1.16 All initial and subsequent examinations of option appraisals have been carried out in accordance with the Scottish Transport Appraisal Guidance (STAG) process.

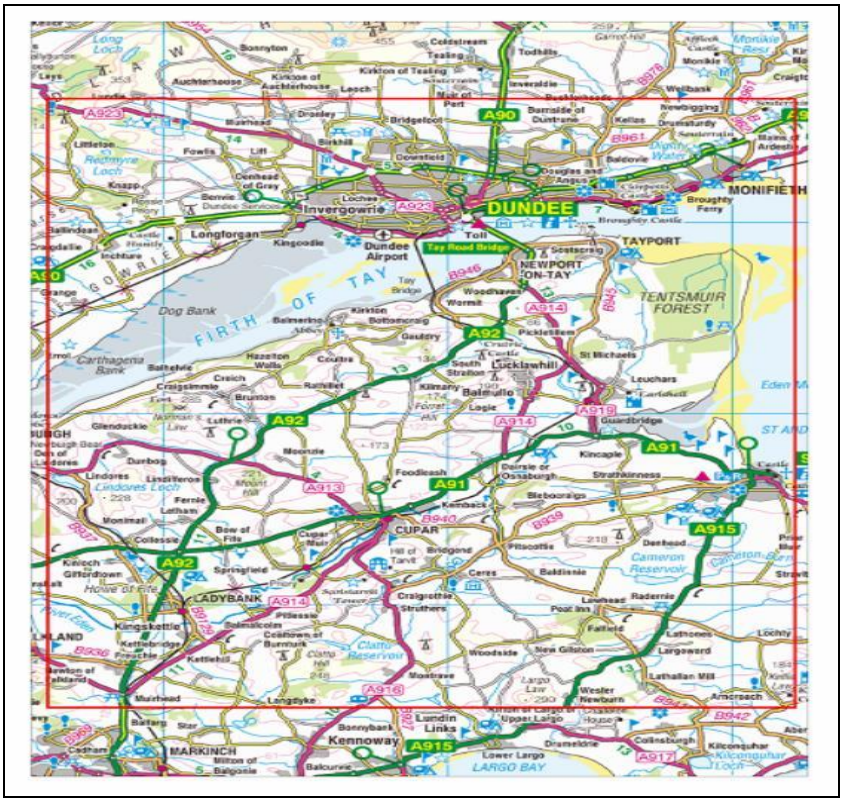
1.17 Section 2 of this paper gives further information on this process and the methodology employed and Section 3 gives a brief background to the policy context and drivers.

2 Study Methodology

2.1 The key requirement for the CTSTS was to produce STAG1 and STAG2 appraisals a range of interventions to improve sustainable mode travel across the Tay.

2.2 An initial examination of local transport conditions has been undertaken together with discussion with the wider stakeholders. In order to use the data available from key sources, such as the Tay Estuary Rail Study it was agreed to limit the study area to that shown in Figure 2.1 but to include the P + R/Choose sites that the TACTRAN P + R Strategy (which was developed on parallel timescales to this study) will be included for the greater Dundee area.

Figure 2.1 Study Area



2.3 The wider range of data has enabled the generation of a wide range of options which were sifted in the CTSTS with the data available from the Fife local area to produce a list of suitable interventions that were subject to an initial pre-appraisal option sift and the STAG1 appraisal. A do-minimum scenario of 'no Dundee focused P+R proposals' was established at this stage to inform the STAG1 appraisal in the CTSTS report.

2.4 To ensure that the STAG1 appraisal was fully informed, census data, public transport route and demand data, the Transport Model for Scotland (with land use/housing projections amended as appropriate) and the outputs from a Tay Road Bridge Origin and Destination Survey were used to create a layered GIS mapping of the current situation and market for cross-Tay travel. This mapping exercise identified key target areas and routes that could benefit from P+R /park and choose provision. Planning policies were assessed to confirm growth factors for future years. Where appropriate the patterns of proposed development were overlaid in the GIS mapping to relate land use policies to the transport network in order to identify future markets for P+R /park and choose proposals.

2.5 The outcome of the STAG2 included an economic assessment. A definitive list of interventions to be taken forward beyond the scope of the study has been established. In order to inform this final selection, outline design of civil engineering works was undertaken as has the production of an indicative delivery strategy, which will of course be dependant upon the outcome of the deliberations as a result of this discussion paper.

3 Policy Background

3.1 In order to inform the study appraisals a detailed review of the transport and land use planning policies of the relevant areas of Fife and Tayside was undertaken.

3.2 The current land use and transport planning framework in Fife and Dundee is reflected in a series of policy documents that cover national, regional and local policies which drive the key issues identified by Scottish Government of a wealthier and fairer society, a healthier society, a safer and stronger society and a smarter and greener society.

3.3 The review focused on the deliverables identified by transport policies to reduce car travel in the study area. These concentrated on the issues of bus and rail transport, accessibility planning and sustainable mode interventions. Land use polices were also examined for housing development strategies along with that of the Central Waterfront Project in Dundee.

3.4 Key policy documents;

- Fife Structure Plan – Proposal PT2 Transport Proposals includes Tay Bridgehead P+R site
- St Andrew's and East Fife Local Plan – area of search at the southern bridgehead of the Tay Road Bridge for a P+R/Park and Choose site.
- SEStran Regional Transport Strategy – established a P&R Strategy as a high priority
- Fife Local Transport Strategy – increase the number of commuters using P+R/Choose by 20% by 2011
- Fife LTS – support the implementation of measures to achieve the traffic growth reduction strategy on the Tay Road Bridge in partnership with relevant organisations.
- TACTRAN Regional Transport Strategy – commitment to develop a Park & Ride Strategy
- TACTRAN P&R Strategy – identifies the south side of the Tay Road Bridge as a high priority
- Dundee Local Transport Strategy – identifies and supports P + R/C
- Transport Scotland Strategic Transport Projects Review - Project 8 Park & Ride/Park & Choose identifies 4 sites around Dundee including South of Tay Road Bridge.

3.5 Given that the Central Waterfront Project in Dundee is of National importance it is perhaps worthy of a short recap in the following paragraphs in the context of the transport influence on its successful delivery.

3.6 Following extensive consultations on a range of options the Partnership for the project agreed on a final Masterplan for the area. This sets out an integrated package of measures to address the negative impact associated with the existing roads and Tay Road Bridge access ramps in the in the Central Waterfront area while retaining appropriate provision for vehicular access and through traffic. The main transportation elements of the package are :-

- extending the City Centre down to the Waterfront;
- creating a new street pattern;

- improving provision for walking, cycling and buses;
- reducing the effect of cars and parking;
- removing some of the Tay Road Bridge ramps;
- providing a new rail station and arrival square.

3.7 Dundee's Local Plan, along with the relevant Regional and Local Transport Strategies will have an important role in providing a statutory framework for the site to ensure that future proposals for development within the area are consistent with the provisions of the Central Waterfront Masterplan.

3.8 It is understood the build-out of the Waterfront area will take at least 7 to 9 years from 2008 onwards. This will result in major roadworks and traffic diversions that will reduce the road capacity significantly over this period. Public transport, including P + R/Choose, could have a significant mitigating role in reducing the effects of the disruption.

3.9 The Planning Objectives against which all P + R/C schemes were assessed through the STAG process were;

- **Reduce single occupancy vehicles using the Tay Road Bridge**
- **Maximise the use of existing public transport capacity across the Tay Road Bridge**
- **Promote the use of sustainable travel, whilst reducing the demand for car travel through mode shift**
- **Minimise the impact on the natural and built environment**

4 The Site Locations

4.1 There are three sites examined in this paper due to their proximity to the highest projected demand for P+R/C facilities.

Figure 4.1 Tay Bridgehead

Figure 4.2 Forgan Roundabout

Figure 4.3 Landfall Site (The existing Car Park and the land to the south)

4.2 The full CTSTS report details the option appraisal of all sites and interventions identified. These three options either best meet the study planning objectives and/or offer the best BCR of all options considered within the full study.

5 Summary Commentary & Appraisal Tables of Sites

5.1 Summary tables covering the STAG2 appraisal process have been prepared and are presented within this section. The tables draw together the key results from the appraisal process and present the findings in a standardised format for ease of comparison.

5.2 The following paragraphs give a short description and commentary on the sites

- **Tay Road Bridge Roundabout Table 5.1 (Not to be pursued further other than for academic comparison)**

Located to the west of the existing roundabout as displayed in figure 4.1. This site has a physical limit of 130 cars with a demand forecast in 2012 in the morning peak of 185 cars. Any access would be required to be taken from another arm to the roundabout. This part of the A92 is a trunk road. There is a current presumption from Transport Scotland against any new access to/from a trunk road without sound environmental and or economic reasons. The site itself is the nearest to an area of housing in terms of noise and vehicle emissions. The location offers excellent opportunity to change mode from car to bus/cycle walk or car share. Notwithstanding this and the level of BCR as previously stated this site should not be pursued mainly because of the capacity issues which would restrict the effectiveness and attractiveness of the facility. This in itself would fail the test of 'reasonableness' and on road safety grounds for any request to gain permission from Transport Scotland to create a new access/egress on the trunk road.

- **Forgan Roundabout Table 5.2**

Located to the west of Forgan Roundabout as displayed in figure 4.2. This site has the capacity to provide a P + R facility for future year's growth/demand with a demand forecast for 2012 in the morning peak of 143 cars. Any access would be required to be taken from another arm to the roundabout. The A92 at this location is a trunk road and whilst there is a presumption against any new access to/from the trunk road this site is included in the Fife Local Plan as a site suitable for a Recycling Centre .As such a facility would require access from the trunk road and there was no objection from Transport Scotland to the allocation of part of this area for a recycling centre there would be a reasonable case to be made to the trunk road authority for a new access/egress at this roundabout. This site does not offer a reasonable model shift to those who may wish to walk or cycle from the facility into Dundee. There are not many residential; properties in the immediate area.

- **The Landfall Site Table 5.3**

Located to the east of the roundabout (on the link road to the B946 Newport road and the B945 Tayport road) as displayed in figure 4.3. The site, incorporating the existing car park, is not directly accessed from the trunk road. From observations it has been established that many users currently use the facility as an unofficial park and ride/share/cycle/walk. The site is remote from residential properties. This site had three sub options taken to design/cost stage. Given the feasibility and deliverability including estimates of BCR were examined only option 2 was taken forward to STAG 2 formal appraisal and is listed in the following tables. However for completeness these options are discussed below. The three design options are displayed in Appendix B but in summary were;

Sub Option 1

- Using the existing TRB car park and providing an additional 86 spaces to give a total of 158 spaces (demand forecast for 2012 in the morning peak is 185 cars) at a cost of £600,000. (cost per additional space=£6976).This option included provision for a bus turning circle and maintained a route through the car park for maintenance vehicles to

access the area adjacent to the Tay Road Bridge in recognition of the requirement for heavy maintenance vehicles and or a works compound. Whilst this option could be delivered relatively quickly, the physical capacity of the site was recognised as a high risk. The ability to expand the site in future years without major disruption to the existing facilities was also a restraining factor. It was also recognised that the current car park does cater for some tourist demand. The existing toilet and catering facilities are seen as an advantage**. In conclusion it is considered that because of capacity constraints (158 spaces against demand for 185) that this option it not considered further.**

Sub Option 2

Linking the field to the south by way of a pedestrian bridge and providing 411 new spaces with demand forecast for 2012 being 185 cars in the morning peak (315 cars all day by 2022) at a cost of £2,800,000. (cost per additional space including pedestrian bridge=£6812).

- This option requires a pedestrian bridge to provide access to the proposed car park to the south of the existing site. In order to provide the required clearance over the existing link road, a ramp length of about 60m will be required. This could be achieved in a single span of approximately 60m or two separate spans of 30m.
- The access ramps could be constructed in either steel or reinforced concrete to suit the proposed geometry and site layout, although reinforced concrete construction should have lower maintenance costs if properly specified and constructed. The ramps would be supported on concrete piers. To minimise the extent of and cost of the suspended access ramps, it would be beneficial to form the lower section of ramp as an earth embankment. The extent of the embankment would depend on the proposed layout geometry and there would obviously be a cut off point where, as the height of the embankment increased, the cost becomes prohibitively more expensive than the suspended concrete ramp construction. A set of stairs will also be provided on the north side of the proposed bridge...
- Assuming that provision is to be made for cyclists across the proposed bridge, then a minimum internal width of 3.0m would be required to provide ‘white line’ segregation between pedestrian and cyclists. Alternatively, a minimum width of 2.0m would be acceptable for unsegregated cyclist/pedestrian use. The parapet height would need to be a minimum 1.4m above deck level to cater for cyclists. Given the more attractive option for cyclist to use the existing car park it is not considered viable to make provision for segregated cycle facilities.
- There are numerous bridge forms and span configurations which could be used in this situation but for the purposes of this section, the main selection criteria will be best value and will not consider “iconic” bridge options. As the new structure crosses the existing link road, one of the most important factors influencing the bridge form is duration of installation. This must be as short as possible to keep disruption of traffic and the costs associated with lane closures and traffic management to a minimum. Consequently it is likely that a steel bridge would provide the optimum solution as it can be prefabricated off site and quickly lifted in place by mobile crane. The one main disadvantage of steel bridges is the exposed steel superstructure will require regular maintenance which will obviously have an influence in the whole life costing of the structure. However, corrosion protection system technology is continuously improving and that maintenance periods in excess of 30 years can now be achieved.

- This option includes provision for a bus turning circle and maintains a route through the car park for maintenance vehicles to access the area adjacent to the Tay Road Bridge in recognition of the requirement for heavy maintenance vehicles and or a works compound whilst catering for the current tourist demand. The 411 spaces which will be accessed by the formation of a new road from the B945 have the opportunity to extend by at least another 80 spaces with the costs being at the margin. The existing toilet and catering facilities are seen as an advantage. In order to comply with DDA requirements the existing car park would be required to reserve at least 40 spaces for the use of people with disabilities who hold a 'Blue Badge'. This is in respect of keeping the pedestrian bridge to an acceptable length and using steps as opposed to doubling its length and 'ramping' the structure down to ground level to comply with DDA legislation. **It is considered that this option has the ability to meet the short and long term demand and has the least impact on the functions and role of the current car park whilst offering the quality standards required of a P + R/Choose facility with this particular site offering good park and walk/cycle opportunities.**

Sub Option 3

Linking the field to the south by way of a pedestrian bridge and a vehicular bridge, providing 423 new spaces at a cost of £3,750,000. (cost per additional space+£8865)

- This option requires a vehicular bridge linking the existing north site to the proposed car park on the south side over the existing link road. In addition, a pedestrian bridge is included to provide a more direct route for ambulant pedestrian traffic between the existing site and the proposed south car park. Disabled access will be provided by means of a footway on the proposed road with appropriate limiting gradients linking the north and south sites. As disabled access is provided with the new road, the pedestrian bridge in this option will not require any ramps on the north side of the bridge and stairs alone would be satisfactory for this option.
- A span of about 15m would be required for the proposed road bridge over the existing link road and assuming that it is generally more economic to provide open side spans rather closed abutments; side spans of approximately 10m will be required. It is likely that either an insitu concrete slab or prestressed concrete beam deck would be the most economical for this bridge. For the purposes of this report, it assumed that the overall bridge width would be 9.6m (allowing for 0.6m hard strip, 6.0m carriageway, 2.0m footway and 2 no. 0.5m copes).
- The pedestrian bridge would require an overall deck length of approximately 60m which could be accommodated in 2 no. spans. The footbridge construction is assumed to be as adopted for option 2 above.
- This option includes provision for a bus access route to the rear of the café/toilet block and maintains a route through the car park for maintenance vehicles to access the area adjacent to the Tay Road Bridge in recognition of the requirement for heavy maintenance vehicles and or a works compound. The 423 spaces which will be accessed by the new vehicular bridge from the existing car park have the opportunity to extend by at least another 70 spaces with the costs being at the margin. Disabled access could be taken from the P + R car park (south side) to the existing car park via the vehicular bridge thus still allowing for the pedestrian bridged to be 'stepped down' and without the need to reserve a further 40 spaces for 'Blue Badge' holders in the existing car park. The existing toilet and catering facilities are seen as an advantage. **Given the high capital costs of constructing a vehicular bridge, notwithstanding**

the revenue implications for future maintenance, it is recommended that this option is not taken forward.

5.3 All options envisage the use of the existing facilities at the car park which may require some upgrading which has not been included in the costings; however these are expected to be at the margin.

5.4 Equally all options considered take into the account the requirement for the local bus services to access the car park site and other than Option 3 because of DDA requirements all disabled parking would have to be at the existing car park site.

5.5 Following the evaluation;

- Option 1 was discarded due to the restriction on capacity and possible conflict of uses between its current use and P+R/C.
- Option 2 is taken forward for full evaluation and is displayed in table 5.3.
- Option 3 as been discarded due to capital cost which would reduce the BCR to an unacceptable level. This is notwithstanding the feasibility of the construction a major structure at this locus with the inherent ground condition issues and its ongoing maintenance burden of a vehicular bridge.

Table 5.1 Tay Bridge Roundabout P+R Appraisal Summary table –Not Recommended

<table>
<tr><td colspan="4">Proposal Details</td></tr>
<tr><td colspan="2">Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal)</td><td colspan="2">Promoter: South East Scotland Transport Partnership (SEStran)
Support: Tayside & Central Scotland Transport Partnership (TACTRAN)</td></tr>
<tr><td>Proposal Name:</td><td>Tay Bridge Roundabout P+R</td><td></td><td></td></tr>
<tr><td rowspan="3">Proposal Description:</td><td rowspan="3">Creation of a P+R site of ~130 spaces on the west side of the A92, south of the Tay Bridge Roundabout. Transit to be provided by existing bus services (routes 42, 72, 96 and 99)</td><td rowspan="3">Total Public Sector Funding Requirement:</td><td>Capital cost of construction: £903,900</td></tr>
<tr><td>Annual operating cost: £40,100</td></tr>
<tr><td>Present value of cost to govt.: £3.112 million</td></tr>
<tr><td>Funding sought from:</td><td></td><td>Amount of application</td><td></td></tr>
<tr><td colspan="4">Background Information</td></tr>
<tr><td>Geographic Context:</td><td colspan="3">The proposal makes use of land between the A92 and residential areas at the northern end of Newport-on-Tay. The land is currently grassed and screened from the residential properties by a line of mature trees.
The site is immediately south of the Tay Road Bridge and is thus potentially able to serve all road trips across the Bridge as well as be served by all existing bus routes across the Bridge.</td></tr>
<tr><td>Social Context:</td><td colspan="3">The European Structural Fund Area does not cover the Tay Bridgehead area and there are no Priority Partnership areas in Fife. Social Inclusion Partnership Areas (known as Regeneration Areas), are based on the Scottish Index of Multiple Deprivation and the Tay Bridgehead Area does not come into any of these areas. Leader In Fife Funding would be available for small projects in rural areas where it could be used for publicity and advertising of park & choose sites.</td></tr>
<tr><td>Economic Context:</td><td colspan="3">By attracting users from all origins south of the Tay, and serving multiple destinations within Dundee, the P+R site would have minimal implications for the economy in its immediate vicinity.</td></tr>
</table>

(Tay Bridge Roundabout P+R Appraisal Summary table – continued)

Planning Objectives	
Objective:	Performance against planning objective:
Reduce single occupancy vehicles using the Tay Road Bridge	Between 99 and 130 SOVs removed in peak period in 2022 – representing a 3.6 to 4.7 percent reduction in Cross Tay SOV movements. The change may, therefore, not fully meet the 5 percent planning objective
Maximise use of existing public transport capacity across Tay	Forecast increased public demand results in increased capacity utilisation – increases from 50 percent to 73 percent in peak periods by 2022. This increase exceeds the target of 5 percent set for this objective.
Contribute to air quality targets	A net reduction in vehicle mileage of 3.4 percent is forecast in 2022. While this should result in reduced emissions of CO2, it does not meet the 5 percent reduction target set.
Promote the use of sustainable travel, whilst reducing the demand for car travel through mode shift	P+R aims to encourage mode shift from car to bus for part of the journey. Although P+R can cause some switch from existing bus users a well located site such as the Tay Bridge Roundabout option should result in a net reduction in private vehicle trips (as predicted in the air quality target described above).
Minimise the impact on the natural and built environment	New P+R site can have an adverse impact on the environment that needs to be carefully managed through design and implementation. The proximity of sensitive receptors (residential properties) to this site mean that adverse noise, air quality and visual amenity factors may need to be mitigated against.
Rationale for Selection or Rejection of Proposal:	This site achieves the highest BCR of all the bus based options and contributes to the planning objectives (though not all are met). However, limited capacity at this location suggests that additional P&R facilities would also need to be provided and thus this site is only an option in conjunction with another location and as such the BCR may well fall below acceptable levels.
Implementability Appraisal	
Technical:	Provision of a P+R car park with associated stopping facilities for existing bus services is an established technique without untried technologies. The site is constrained in size to approximately 130 spaces and thus is unlikely to be sufficient for the demand at this location. Constraints on the size of the site also mean that only simple bus stopping facilities may be provided. Buses stopping on a trunk road roundabout is not considered to be a safe option.
Operational:	Continued operation of the site will depend upon the provision of regular, reliable, affordable bus services with sufficient spare capacity to accommodate the P+R demand. These services are not part of the proposal and thus are subject to their continued commercial viability.
Financial:	Site is estimated to cost £903,900 to construct. No parking charges are planned and as bus fares will be collected by the operator there will be no direct user funding stream to cover capital or operating costs (£40,100). It may be possible to agree a funding arrangement with the bus operator to cover all or part of the revenue requirements – otherwise a separate source of revenue funding will need to be identified. Some operating cost savings may be achievable within Dundee as a result of transferring parking supply to this site. Land may also be released that may be redeveloped for other purposes.

(Tay Bridge Roundabout P+R Appraisal Summary table – continued)

Environment			
Sub-objective	Qualitative information	Quantitative information	Significance of impact
Noise and vibration:	This site may present the greatest noise concern due to nearby sensitive receptors – it is in close proximity to a number of residential properties.	8 properties are adjacent to the site. Note that these properties are separated from the site by a line of mature trees.	-
Air quality – overall	The site is not within an Air Quality Management Area (AQMA).		0
CO2 (global), PM10 (local) NO2 (local)	A reduction in vehicle mileage (& hence reduction in vehicle emissions) is forecast, though there may be some increase in mileage from new trips generated or from existing bus users transferring to P+R	By 2022 a 3.4% reduction in existing cross Tay City Centre bound vehicle mileage (& hence reduction in vehicle emissions) is forecast	+
Water quality, drainage & flood defence	Low risk from car park water runoff. Low flood risk.	Flood risk of less than 0.5% in year	0
Geology	Site is not within any specific geologically sensitive area (e.g. SSSI or RIGS)		0
Biodiversity	Site is not within any biodiversity area – though a SAC covers the Tay Estuary area, close to this site		0
Visual amenity	The site will be visible from certain areas such as the A92, but is partially screened from the residential properties on the ends of Tay Street, Tay View Terrace, Prospect Terrace, Northfield Road & Elizabeth Crescent by an existing line of mature trees.		-
Agriculture & soils	Site is not classified as agricultural within the 'Land capability agricultural classification'		0
Cultural heritage	No cultural heritage sites affected		0
Landscape	The site is within an area classified as 'Urban'. Change of use to P+R is unlikely to affect this classification		0

(Tay Bridge Roundabout P+R Appraisal Summary table – continued)

Safety			
Sub-objective	Qualitative information		Quantitative information
Accidents (change in personal injury accidents, balance of severity & total discounted savings)	Accident rates per passenger kilometre are lower for bus travel than car travel and thus a transfer of trips from car to P+R (bus) would be expected to lead to a small reduction in personal injury accidents. However, forecast changes in trip volumes and kilometres are small & hence no significant measurable change is appraised		
Security	In order to maintain personal and property security within the car park site compared with the Do Minimum scenario of driving & parking in Dundee, suitable lighting levels along with a CCTV system would be implemented. No net change in security, from the Do Minimum, is thus forecast.		
Economy (Transport Economic Efficiency)			
Sub-objective	Item	Qualitative information	Quantitative information
User & non-user benefits	Generalised cost user benefits	A generalised cost saving of 18.36 minutes (in 2022) has been estimated for P+R users.	PV of benefits: £2,496,000
	Non-user benefits	In vehicle time for existing (non-P+R) bus users are increased by 20 seconds as a result of the P+R stop. Journey times of remaining cross Tay and Dundee City Centre vehicles are reduced by 3 seconds in the peak direction and period in 2022.	PV of benefits: £1,525,000
Private sector operator impacts	Investment costs	None	£0
	Operating & maintenance costs	The transfer of parked vehicles from the City Centre to the P+R site will result in a loss of revenue for privately owned car parks in Dundee. It is estimated that in 2022 the average price that P&R users would have paid to park in Dundee is £5.77 and that 27% of this would have been accrued by privately owned car parks.	PV: -£636,000
	Revenues	Bus fares modelled at typical P+R rate of £2.50 return	PV: £2,486,000
	Grant/subsidy payments	None	£0
Economic activity & location impacts	Local economic impacts	No economic activity impacts included within appraisal	
	National economic impacts		

(Tay Bridge Roundabout P+R Appraisal Summary table – continued)

Integration

Sub-objective	Item	Qualitative information	Quantitative information
Transport interchanges:	Services & ticketing	P+R site provides a new interchange, primarily for transfer from car to existing bus services. Ticketing systems will be as provided by existing bus operations.	Demand forecasts indicate around 50,000 P+R users per year. In 2022 approximately 330,000 'existing' bus users experience minor disbenefit as a result of increased journey time.
	Infrastructure & information	Primary infrastructure benefits and costs covered in economic evaluation. It is also envisaged that cycle parking facilities would be provided for users wishing to access the site by bike and continue the journey by bus. Users would also be permitted to park at the site and complete their journey by bike and thus secure cycle parking facilities could be provided for those wishing to leave their bike at the P+R site overnight.	
Land-use transport integration		A high level of consistency with land-use planning policies, specifically minimising emissions and consumption of resources and energy through modal shift from cars. This option also makes use of land at the Tay Bridgehead safeguarded for P+R use, and aims to maximise the efficient use of the Tay crossing.	
Policy integration		Proposal fits with disability policies through the provision of specific disabled parking areas, though some of the bus services are currently not operated by low floor vehicles. Health policies are also assisted through opportunities to cycle to/from the site, though social inclusion impacts could be mixed as site primarily cater for car owners.	

(Tay Bridge Roundabout P+R Appraisal Summary table – continued)

Accessibility & Social Inclusion			
Sub-objective	Item	Qualitative information	Quantitative information
Community accessibility	Public transport network coverage	Network coverage not directly affected as bus routes remain unchanged, but catchments are effectively increased as car drivers are able to access public transport services from the P+R site. Access to bus services by cycle also enhanced by the provision of secure cycle parking facilities at the site.	
	Access to other local services	This option is favourable with respect to access by walking and cycling – being close to the existing residential areas of Newport-on-Tay and Woodhaven.	
Comparative accessibility	Distribution/spatial impacts by social group	P+R of primary benefit to car drivers and thus likely to benefit higher socio-economic groups. Accessibility of this site by walk/cycle goes some way to spreading the benefits to other socio-economic groups. Capacity constraint means this site is only likely to be available to early morning commuters.	
	Distribution/spatial impacts by area	P+R enables access to public transport services by car owners in rural areas who are not directly served by buses.	
Cost to public sector			
Item		Qualitative information	Quantitative information
Public sector investment costs		Provision of car park and bus stop facility	PV: -£715,000
Public sector operating & maintenance costs		On-going maintenance of car park facility	PV: -£470,000
Grant/subsidy payments		None	£0
Revenues		The transfer of parked vehicles from the City Centre to the P+R site will result in a loss of revenue for publicly owned car parks in Dundee. It is estimated that in 2022 the average price that P&R users would have paid to park in Dundee is £5.77 and that 73% of this would have been accrued by publicly owned car parks.	PV: -£1,705,000
Taxation impacts		There is a net reduction in vehicle mileage and hence reduced fuel tax monies.	PV: -£222,000

(Tay Bridge Roundabout P+R Appraisal Summary table – continued)

Monetised summary	
Present value of transport benefits	£2,496,000
Present value of cost to government	-£3,112,000
Net present value	£2,758,000
Benefit-cost to government ratio	1.89 : 1

Table 5.2 Forgan Roundabout P+R Appraisal Summary table – Reserved Preference

<table>
<tr><td colspan="4">Proposal Details</td></tr>
<tr><td colspan="2">Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal)</td><td colspan="2">Promoter: South East Scotland Transport Partnership (SEStran)
Support: Tayside & Central Scotland Transport Partnership (TACTRAN)</td></tr>
<tr><td>Proposal Name:</td><td>Forgan Roundabout P+R</td><td></td><td></td></tr>
<tr><td rowspan="3">Proposal Description:</td><td rowspan="3">Creation of a P+R site of ~275 spaces on the southwest side of Forgan Roundabout, approximately 2km south of the Tay Road Bridge. Transit to be provided by existing bus service route 99.</td><td rowspan="3">Total Public Sector Funding Requirement:</td><td>Capital cost of construction: £1,790,000</td></tr>
<tr><td>Annual operating cost: £40,100</td></tr>
<tr><td>Present value of cost to govt.: £5.584 million</td></tr>
<tr><td>Funding sought from:</td><td></td><td>Amount of application</td><td></td></tr>
<tr><td colspan="4">Background Information</td></tr>
<tr><td>Geographic Context:</td><td colspan="3">The proposal makes use of land south of the B995 at the Forgan Roundabout (intersection of the A92, A913 and B995). The site is currently farmland and there are two existing properties immediately north of the proposal, fronting on to the B995.
In addition to serving trips along the A92 the site can also be accessed from the B995 (Wormit, Newport-on-Tay) and the A914 (Leuchars, Cupar and St. Andrews).</td></tr>
<tr><td>Social Context:</td><td colspan="3">The European Structural Fund Area does not cover this site and there are no Priority Partnership areas in Fife. Social Inclusion Partnership Areas (known as Regeneration Areas), are based on the Scottish Index of Multiple Deprivation and this site does not come into any of these areas.</td></tr>
<tr><td>Economic Context:</td><td colspan="3">By attracting users from all origins south of the Tay, and serving multiple destinations within Dundee, the P+R site would have minimal implications for the economy in its immediate vicinity.</td></tr>
</table>

(Forgan Roundabout P+R Appraisal Summary table – continued)

Planning Objectives	
Objective:	Performance against planning objective:
Reduce single occupancy vehicles using the Tay Road Bridge	Between 138 and 182 SOVs removed in peak period in 2022 – representing 5.0 to 6.6 percent reduction. The change, therefore, exceeds the 5 percent planning objective set
Maximise use of existing public transport capacity across Tay	Forecast increased public demand results in increased capacity utilisation – increases from 50 percent to 83 percent in peak periods by 2022. This increase exceeds the target of 5 percent set for this objective.
Contribute to air quality targets	A net reduction in vehicle mileage of 9.1 percent is forecast by 2022. This should result in reduced emissions of CO2, and exceeds the 5 percent reduction target set.
Promote the use of sustainable travel, whilst reducing the demand for car travel through mode shift	P+R aims to encourage mode shift from car to bus for part of the journey. Although P+R can cause some switch from existing bus users a well located site such as the Forgan Roundabout option should result in a net reduction in private vehicle trips (as predicted in the air quality target described above).
Minimise the impact on the natural and built environment	New P+R site can have an adverse impact on the environment that needs to be carefully managed through design and implementation. The Forgan Roundabout site is not believed to pose any significant environmental concerns and is largely remote from residential dwellings, though the landscape classification of 'upland foothills' is not as conducive to development as the 'urban' category of the Tay Bridge Roundabout site.
Rationale for Selection or Rejection of Proposal:	This site achieves the next highest level of demand compared with the Tay Bridge Roundabout site and is comparable with the Primary School site. It meets and exceeds the planning objectives set. The loss of parking revenue from Dundee means that there is a negative NPV. As it may be possible to develop this site in conjunction with other opportunities being pursued by Fife in this area, there is no history of planning objections to a P&R site in this location, and additional priority may be provided on the A92 at a later date, this is one of the preferred P&R site options.

(Forgan Roundabout P+R Appraisal Summary table – continued)

Implementability Appraisal	
Technical:	Provision of a P+R car park with associated stopping facilities for existing bus services is an established technique without untried technologies. As with all demand forecasting exercises there are risks that the levels of demand predicted will not be met, or may be exceeded, resulting in the infrastructure provided being inappropriate for purpose.
Operational:	Continued operation of the site will depend upon the provision of regular, reliable, affordable bus services with sufficient spare capacity to accommodate the P+R demand. These services are not part of the proposal and thus are subject to their continued commercial viability.
Financial:	Site is estimated to cost £1,790,000 to construct. No parking charges are planned and as bus fares will be collected by the operator there will be no direct user funding stream to cover capital or operating costs (£40,100). It may be possible to agree a funding arrangement with the bus operator to cover all or part of the revenue requirements – otherwise a separate source of revenue funding will need to be identified. Some operating cost savings may be achievable within Dundee as a result of transferring parking supply to this site. Land may also be released that may be redeveloped for other purposes.
Public:	This proposal has not been made public and the land not identified within the most recent deposit of the Local Plan for this purpose. However, it is understood that Fife are currently investigated a number of possible uses for land in this area, for inclusion in the Local Plan.

Forgan Roundabout P+R Appraisal Summary table – continued)

Environment			
Sub-objective	Qualitative information	Quantitative information	Significance of impact
Noise and vibration:	Minimal noise or vibration impacts are predicted – the site is remote from residential developments with only one property in the vicinity	1 property adjacent to the site.	0
Air quality – overall	The site is not within an Air Quality Management Area (AQMA).		0
CO2 (global), PM10 (local) NO2 (local)	A reduction in vehicle mileage (& hence reduction in vehicle emissions) is forecast, though there may be some increase in mileage from new trips generated or from existing bus users transferring to P+R	By 2022 a 9.1% reduction in existing cross Tay City Centre bound vehicle mileage (& hence reduction in vehicle emissions) is forecast	+
Water quality, drainage & flood defence	Low risk from car park water runoff. Low flood risk.	Flood risk of less than 0.5% in year	0
Geology	Site is not within any specific geologically sensitive area (e.g. SSSI or RIGS)		0
Biodiversity	Site is not within any biodiversity area		0
Visual amenity	The site will be visible from certain areas such as the A92.		-
Agriculture & soils	Site is classified as 3.2 (not prime agricultural land) within the 'Land capability agricultural classification'		0
Cultural heritage	No cultural heritage sites affected		0
Landscape	The site is within an area classified as 'Upland foothills'. Change of use to P+R will, therefore, be detrimental		-

Forgan Roundabout P+R Appraisal Summary table – continued)

Safety		
Sub-objective	Qualitative information	Quantitative information
Accidents (change in personal injury accidents, balance of severity & total discounted savings)	Accident rates per passenger kilometre are lower for bus travel than car travel and thus a transfer of trips from car to P+R (bus) would be expected to lead to a small reduction in personal injury accidents. However, forecast changes in trip volumes and kilometres are small & hence no significant measurable change is appraised	
Security	In order to maintain personal and property security within the car park site compared with the Do Minimum scenario of driving & parking in Dundee, suitable lighting levels along with a CCTV system would be implemented. No net change in security, from the Do Minimum, is thus forecast.	

(Forgan Roundabout P+R Appraisal Summary table – continued)

Economy (Transport Economic Efficiency)			
Sub-objective	Item	Qualitative information	Quantitative information
User & non-user benefits	Generalised cost user benefits	A generalised cost saving of 12.72 minutes (in 2022) has been estimated for P+R users.	PV: £3,103,000
	Non-user benefits	In vehicle time for existing (non-P+R) bus users are increased by 1 minute as a result of the detour in to the P+R site and the additional dwell time at the stop. Journey times of remaining cross Tay and Dundee City Centre vehicles are reduced by 4 seconds in the peak direction and period in 2022.	PV: £1,874,000
Private sector operator impacts	Investment costs	None assumed. Bus service operators could be approached for a contribution towards investment costs.	£0
	Operating & maintenance costs	The transfer of parked vehicles from the City Centre to the P+R site will result in a loss of revenue for privately owned car parks in Dundee. It is estimated that in 2022 the average price that P&R users would have paid to park in Dundee is £5.77 and that 27% of this would have been accrued by privately owned car parks. No private sector P+R site operating costs assumed. Bus service operators could be approached for a contribution towards operating costs.	PV: -£1,161,000
	Revenues	Bus fares modelled at typical P+R rate of £2.50 return	PV: £4,522,000
	Grant/subsidy payments	None	£0
Economic activity & location impacts	Local economic impacts	No economic activity impacts included within appraisal	
	National economic impacts		
	Distributional impacts		

(Forgan Roundabout P+R Appraisal Summary table – continued)

Integration			
Sub-objective	Item	Qualitative information	Quantitative information
Transport interchanges:	Services & ticketing	P+R site provides a new interchange, primarily for transfer from car to existing bus services. Ticketing systems will be as provided by existing bus operations.	Demand forecasts indicate around 96,000 P+R users per year by 2022. Approximately 235,000 existing bus users experience minor disbenefit as a result of increased journey time.
	Infrastructure & information	Primary infrastructure benefits and costs covered in economic evaluation. It is also envisaged that cycle parking facilities would be provided for users wishing to access the site by bike and continue the journey by bus. Users would also be permitted to park at the site and complete their journey by bike and thus secure cycle parking facilities could be provided for those wishing to leave their bike at the P+R site overnight.	
Land-use transport integration		A high level of consistency with land-use planning policies, specifically minimising emissions and consumption of resources and energy through modal shift from cars and maximising the efficient use of the Tay crossing.	
Policy integration		Proposal fits with disability policies through the provision of specific disabled parking areas, with the bus services operated by low floor vehicles. Health policies are also assisted through opportunities to cycle to/from the site, though social inclusion impacts could be mixed as sites primarily cater for car owners.	

(Forgan Roundabout P+R Appraisal Summary table – continued)

Accessibility & Social Inclusion			
Sub-objective	Item	Qualitative information	Quantitative information
Community accessibility	Public transport network coverage	Network coverage not directly affected as bus routes remain unchanged, but catchments are effectively increased as car drivers are able to access public transport services from the P+R site.	
	Access to other local services	This option is less favourable with respect to access by walking and cycling than other STAG2 appraised options – being relatively remote from the existing residential areas.	
Comparative accessibility	Distribution/spatial impacts by social group	P+R of primary benefit to car drivers and thus likely to benefit higher socio-economic groups. Lower levels of accessibility of this site by walk/cycle, compared with other options, means benefits not widely shared with other socio-economic groups.	
	Distribution/spatial impacts by area	P+R enables access to public transport services by car owners in rural areas who are not directly served by buses.	

Cost to public sector		
Item	Qualitative information	Quantitative information
Public sector investment costs	Provision of car park and bus stop facility	PV: -£1,415,000
Public sector operating & maintenance costs	On-going maintenance of car park facility	PV: -£470,000
Grant/subsidy payments	None	£0
Revenues	The transfer of parked vehicles from the City Centre to the P+R site will result in a loss of revenue for publicly owned car parks in Dundee. It is estimated that in 2022 the average price that P&R users would have paid to park in Dundee is £5.77 and that 73% of this would have been accrued by publicly owned car parks.	PV: -£3,112,000
Taxation impacts	There is a net reduction in vehicle mileage and hence fuel used, resulting in reduced fuel tax monies.	-£587,000

(Forgan Roundabout P+R Appraisal Summary table – continued)

Monetised summary	
Present value of transport benefits	£3,103,000
Present value of cost to government	-£5,584,000
Net present value	£2,753,000
Benefit-cost to government ratio	1.49 : 1

Table 5.3 Landfall site Sub Option 2 P+R Appraisal Summary table – Preferred Location

<table>
<tr><td colspan="4">Proposal Details</td></tr>
<tr><td colspan="2">Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal)</td><td colspan="2">Promoter: South East Scotland Transport Partnership (SEStran)
Support: Tayside & Central Scotland Transport Partnership (TACTRAN)</td></tr>
<tr><td>Proposal Name:</td><td>Landfall site P+R</td><td></td><td></td></tr>
<tr><td rowspan="3">Proposal Description:</td><td rowspan="3">Creation of a P+R site of 494 spaces (including existing 83 spaces) on the east side of the A92, south of the Tay Bridge Roundabout. Connection between the new and existing car parks by a footbridge. Transit to be provided by existing bus services (routes 42, 72, 96 and 99)</td><td rowspan="3">Total Public Sector Funding Requirement:</td><td>Capital cost of construction: £2,800,000</td></tr>
<tr><td>Annual operating cost: £40,100</td></tr>
<tr><td>Present value of cost to govt.: £7.095 million</td></tr>
<tr><td>Funding sought from:</td><td></td><td>Amount of application</td><td></td></tr>
<tr><td colspan="4">Background Information</td></tr>
<tr><td>Geographic Context:</td><td colspan="3">The proposal uses land southeast of the Tay Bridge Roundabout to provide additional P&R capacity in conjunction with the existing car park north east of the Tay Bridge Roundabout. The two locations would be connected by a footbridge.
The site is immediately south of the Tay Road Bridge and is thus potentially able to serve all road trips across the Bridge as well as be served by all existing bus routes across the Bridge. The buses would access the existing car park area only – to minimise impacts on journey times for through passengers.</td></tr>
<tr><td>Social Context:</td><td colspan="3">The European Structural Fund Area does not cover the Tay Bridgehead area and there are no Priority Partnership areas in Fife. Social Inclusion Partnership Areas (known as Regeneration Areas), are based on the Scottish Index of Multiple Deprivation and the Tay Bridgehead Area does not come into any of these areas. Leader In Fife Funding would be available for small projects in rural areas where it could be used for publicity and advertising of park & choose sites.</td></tr>
<tr><td>Economic Context:</td><td colspan="3">By attracting users from all origins south of the Tay, and serving multiple destinations within Dundee, the P+R site would have minimal implications for the economy in its immediate vicinity.</td></tr>
</table>

(Landfall site Option 2 P+R Appraisal Summary table – continued)

Planning Objectives	
Objective:	Performance against planning objective:
Reduce single occupancy vehicles using the Tay Road Bridge	Between 177 and 233 SOVs removed in peak period in 2022 – representing a 6.4 to 8.4 percent reduction in Cross Tay SOV movements. The change may, therefore, meets the 5 percent planning objective
Maximise use of existing public transport capacity across Tay	Forecast increased public demand results in increased capacity utilisation – increases from 50 percent to 92 percent in peak periods by 2022. This increase exceeds the target of 5 percent set for this objective.
Contribute to air quality targets	A net reduction in vehicle mileage of 8.2 percent is forecast in 2022. This meets the 5 percent reduction target set and will this contribute to reduced emissions of CO2.
Promote the use of sustainable travel, whilst reducing the demand for car travel through mode shift	P+R aims to encourage mode shift from car to bus for part of the journey. Although P+R can cause some switch from existing bus users a well located site such as the Landfall site option should result in a net reduction in private vehicle trips (as predicted in the air quality target described above).
Minimise the impact on the natural and built environment	New P+R site can have an adverse impact on the environment that needs to be carefully managed through design and implementation.
Rationale for Selection or Rejection of Proposal:	This site achieves a high BCR and the highest NPV of all the options and contributes to the planning objectives. These facts, along with its ability to meet forecast demand at this location, indicate that this is a preferred site.
Implementability Appraisal	
Technical:	Provision of a P+R car park with associated stopping facilities for existing bus services is an established technique without untried technologies. The site does require a substantial access road and footbridge.
Operational:	Continued operation of the site will depend upon the provision of regular, reliable, affordable bus services with sufficient spare capacity to accommodate the P+R demand. These services are not part of the proposal and thus are subject to their continued commercial viability.
Financial:	Site is estimated to cost £2,800,000 to construct. No parking charges are planned and as bus fares will be collected by the operator there will be no direct user funding stream to cover capital or operating costs (£40,100). It may be possible to agree a funding arrangement with the bus operator to cover all or part of the revenue requirements – otherwise a separate source of revenue funding will need to be identified. Some operating cost savings may be achievable within Dundee as a result of transferring parking supply to this site. Land may also be released that may be redeveloped for other purposes.
Public:	An ‘area of search’ for a P+R site, covering the Tay Bridge Roundabout area, was identified in the most recent draft deposit of the St Andrews and East Fife Local Plan.

(Landfall site Option 2 P+R Appraisal Summary table – continued)

Environment			
Sub-objective	Qualitative information	Quantitative information	Significance of impact
Noise and vibration:	Minimal noise or vibration impacts are predicted – the site is remote from residential developments with only one property in the vicinity.	1 property adjacent to site	0
Air quality – overall			
CO2 (global), PM10 (local) NO2 (local)	A reduction in vehicle mileage (& hence reduction in vehicle emissions) is forecast, though there may be some increase in mileage from new trips generated or from existing bus users transferring to P+R	By 2022 a 8.2% reduction in existing cross Tay City Centre bound vehicle mileage (& hence reduction in vehicle emissions) is forecast	+
Water quality, drainage & flood defence	Low risk from car park water runoff. Low flood risk.	Flood risk less than0.5% in a year	0
Geology	Site not within any specific geologically sensitive area (e.g SSSI or RIGS		0
Biodiversity	Site is not within any biodiversity area – though a SAC covers the Tay Estuary area, close to this site		0
Visual amenity	The site will not be visible from the A92 or immediate surrounds		-
Agriculture & soils	The site is classified as 3.2 (not prime agricultural land) within the 'Land capability agricultural classification'		0
Cultural heritage	No cultural heritage sites affected		0
Landscape	The site is within an area classified as 'Urban' Change of use to P+R/C is unlikely to affect this classification.		0

(Landfall site Option P+R Appraisal Summary table – continued)

Safety			
Sub-objective	Qualitative information		Quantitative information
Accidents (change in personal injury accidents, balance of severity & total discounted savings)	Accident rates per passenger kilometre are lower for bus travel than car travel and thus a transfer of trips from car to P+R (bus) would be expected to lead to a small reduction in personal injury accidents. However, forecast changes in trip volumes and kilometres are small & hence no significant measurable change is appraised		
Security	In order to maintain personal and property security within the car park site compared with the Do Minimum scenario of driving & parking in Dundee, suitable lighting levels along with a CCTV system would be implemented. No net change in security, from the Do Minimum, is thus forecast.		
Economy (Transport Economic Efficiency)			
Sub-objective	Item	Qualitative information	Quantitative information
User & non-user benefits	Generalised cost user benefits	A generalised cost saving of 18.36 minutes (in 2022) has been estimated for P+R users.	PV of benefits: £5,938,000
	Non-user benefits	In vehicle time for existing (non-P+R) bus users are increased by 60 seconds as a result of the P+R stop. Journey times of remaining cross Tay and Dundee City Centre vehicles are reduced by 6 seconds in the peak direction and period in 2022.	PV of benefits: £2,206,000
Private sector operator impacts	Investment costs	None	£0
	Operating & maintenance costs	The transfer of parked vehicles from the City Centre to the P+R site will result in a loss of revenue for privately owned car parks in Dundee. It is estimated that in 2022 the average price that P&R users would have paid to park in Dundee is £5.77 and that 27% of this would have been accrued by privately owned car parks.	PV: -£1,452,000
	Revenues	Bus fares modelled at typical P+R rate of £2.50 return	PV: £5,823,000
	Grant/subsidy payments	None	£0
Economic activity & location impacts	Local economic impacts	No economic activity impacts included within appraisal	

(Landfall site Option 2 P+R Appraisal Summary table – continued)

Integration			
Sub-objective	Item	Qualitative information	Quantitative information
Transport interchanges:	Services & ticketing	P+R site provides a new interchange, primarily for transfer from car to existing bus services. Ticketing systems will be as provided by existing bus operations.	Demand forecasts indicate around 124,000 P+R users per year. In 2022 approximately 330,000 'existing' bus users experience minor disbenefit as a result of increased journey time.
	Infrastructure & information	Primary infrastructure benefits and costs covered in economic evaluation. It is also envisaged that cycle parking facilities would be provided for users wishing to access the site by bike and continue the journey by bus. Users would also be permitted to park at the site and complete their journey by bike and thus secure cycle parking facilities could be provided for those wishing to leave their bike at the P+R site overnight.	
Land-use transport integration		A high level of consistency with land-use planning policies, specifically minimising emissions and consumption of resources and energy through modal shift from cars. This option also aims to maximise the efficient use of the Tay crossing.	
Policy integration		Proposal fits with disability policies through the provision of specific disabled parking areas, though some of the bus services are currently not operated by low floor vehicles. Health policies are also assisted through opportunities to cycle to/from the site, though social inclusion impacts could be mixed as site primarily cater for car owners.	

(Landfall site Option 2 P+R Appraisal Summary table – continued)

Accessibility & Social Inclusion			
Sub-objective	Item	Qualitative information	Quantitative information
Community accessibility	Public transport network coverage	Network coverage not directly affected as bus routes remain unchanged, but catchments are effectively increased as car drivers are able to access public transport services from the P+R site. Access to bus services by cycle also enhanced by the provision of secure cycle parking facilities at the site.	
	Access to other local services	This option is favourable with respect to access by walking and cycling – being close to the existing residential areas of Newport-on-Tay and Woodhaven.	
Comparative accessibility	Distribution/spatial impacts by social group	P+R of primary benefit to car drivers and thus likely to benefit higher socio-economic groups. Accessibility of this site by walk/cycle goes some way to spreading the benefits to other socio-economic groups.	
	Distribution/spatial impacts by area	P+R enables access to public transport services by car owners in rural areas who are not directly served by buses.	

Cost to public sector		
Item	Qualitative information	Quantitative information
Public sector investment costs	Provision of car park and bus stop facility	PV: -£2,215,000
Public sector operating & maintenance costs	On-going maintenance of car park facility	PV: -£470,000
Grant/subsidy payments	None	£0
Revenues	The transfer of parked vehicles from the City Centre to the P+R site will result in a loss of revenue for publicly owned car parks in Dundee. It is estimated that in 2022 the average price that P&R users would have paid to park in Dundee is £5.77 and that 73% of this would have been accrued by publicly owned car parks.	PV: -£3,890,000
Taxation impacts	There is a net reduction in vehicle mileage and hence reduced fuel tax monies.	PV: -£520,000

(Landfall site Option 2 P+R Appraisal Summary table – continued)

Monetised summary	
Present value of transport benefits	£5,938,000
Present value of cost to government	-£7,095,000
Net present value	£5,421,000
Benefit-cost to government ratio	1.76 : 1

6 Conclusion

Summary

6.1 The appraisal of the options for the Cross Tay Sustainable Transport Study has concluded that the development of a P+R site on the approaches to the Tay Road Bridge should be pursued. The Tay Bridge roundabout site is too constrained in size to support a viable stand-alone P+R/C site and will not cope with the anticipated future demand. Alternative locations at the Southern Bridgehead have been examined within this discussion paper and should be deliberated upon on order to inform the CTSTS report.

6.2 The promoting authority will seek to reach an agreement that ensures the operating costs of any site are covered through application of the fares collected at the P+R site. The site should be equipped with CCTV coverage to ensure security. A staff presence is also desirable to give users confidence that security will be maintained in all circumstances. The site should be designed to encourage park and choose with a small number of priority spaces for car sharers and those who wish to park and cycle into Dundee. Adequate parking should be provided for cycles and powered two wheelers and the possibility of buses providing “bad weather” transport for cyclists and pedestrians be explored with the bus operators.

6.3 Housing growth in northern Fife will place additional demands on the transport system and movements to key centres including Dundee. Therefore it recommended that the North Fife local plan be amended to include an area of expansion land adjacent to any proposed P+R/C site.

6.4 Due to the increase in rail services at Leuchars from one train per hour to two trains per hour and the current parking in excess of car park capacity it is recommended that the station car parking provision at Leuchars be extended by use of the open land adjacent to the station which is reserved in the draft deposit local plan. The recommendation is to provide a further 100 at grade spaces which would be subject to the same operational regime as the current car park. Due to flooding issues with the land it is recommend that a sustainable urban drainage system is adopted to ensure that the runoff from the car park area is attenuated to manageable levels. In this light the outline design makes provision for a balancing pond.

6.5 In the longer term further consideration of P+R/C provision will be needed on all approaches to Dundee. The SESTRAN and TACTRAN P+R/C strategy’s strongly supports the provision of such facilities as part of the sustainable transport solutions for their respective areas. Both Regional Council Partnerships considers that a co-ordinated approach is required.

6.6 It has been proven that there is an economic and environmental case for the provision of a P+R/C facility adjacent to the A92 on the approaches to Dundee. This paper seeks to ensure that ALL options have been explored before committing to the next stage of delivery.

Appendix A

Landfall Options

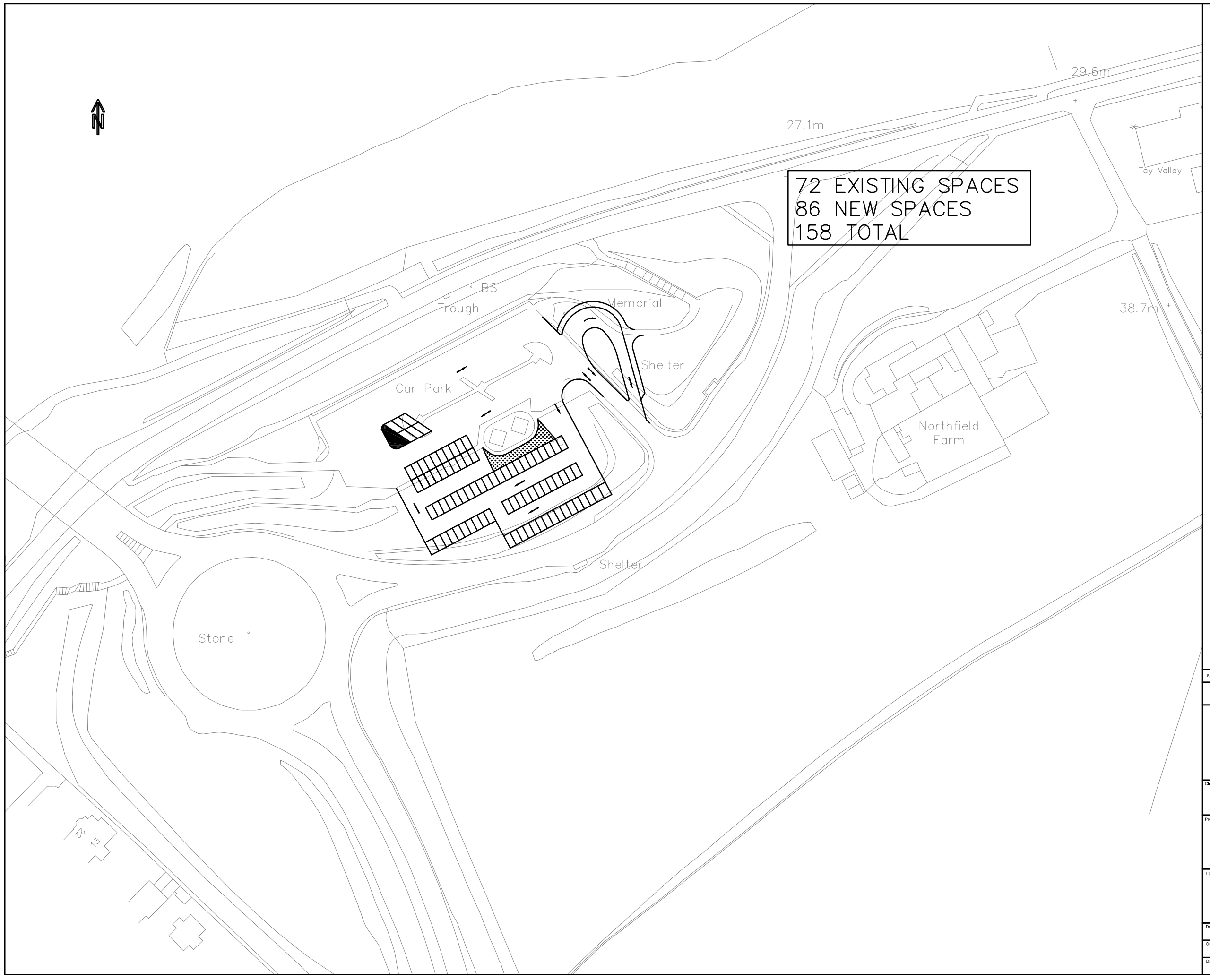
Landfall Option 1

Utilising Existing Car Park

SUB OPTION 1 COST ESTIMATE No of New Car Parking Spaces 86

Item	Cost per Space	Alternative Rate	Item Cost	Cumulative Cost
Site Clearance	50		£4,300	£4,300
Regrading, Landscaping	224		£19,264	£23,564
Earthworks	750		£64,500	£88,064
Perimeter Fence	900		£77,400	£165,464
Electrical Supply		Fixed Item	£20,000	£185,464
Signs , Information		Fixed Item	£10,000	£195,464
Car Park Drainage	100		£8,600	£204,064
Surfacing	1,260		£108,360	£312,424
Kerbing	300		£25,800	£338,224
Footpaths	60		£5,160	£343,384
Street Lighting	105		£9,030	£352,414
Road Markings	20		£1,720	£354,134
CCTV		2 cameras	£60,000	£414,134
DDA Compliance Measures		Item	£10,000	£424,134
Miscellaneous	100		£8,600	£432,734
Bus Stance and turning head		Item	£40,000	£472,734
Design Fees and Preliminaries		15%	£70,910	£543,653
Contingencies/Risk		10%	£54,365	£585,359
TOTAL CAPITAL COST				**£598,018**

OPERATING COSTS ARE CONSISTANT £40,100 per year



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Client

SESTRAN

Project

Cross Tay Park and Ride

Title

Plan Layout

Option 1

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SA	DW	
Original drg. size	**Date**	**Scale**
A3	Jan '09	1:1250
Drawing Status	**Drawing Number**	**Rev.**
Information	SCT2014/I/PL/01	-

Landfall Option 2

Using South Field with Pedestrian Bridge

SUB OPTION 2 COST ESTIMATE

Pedestrian Bridge No of New Car Parking Spaces 411

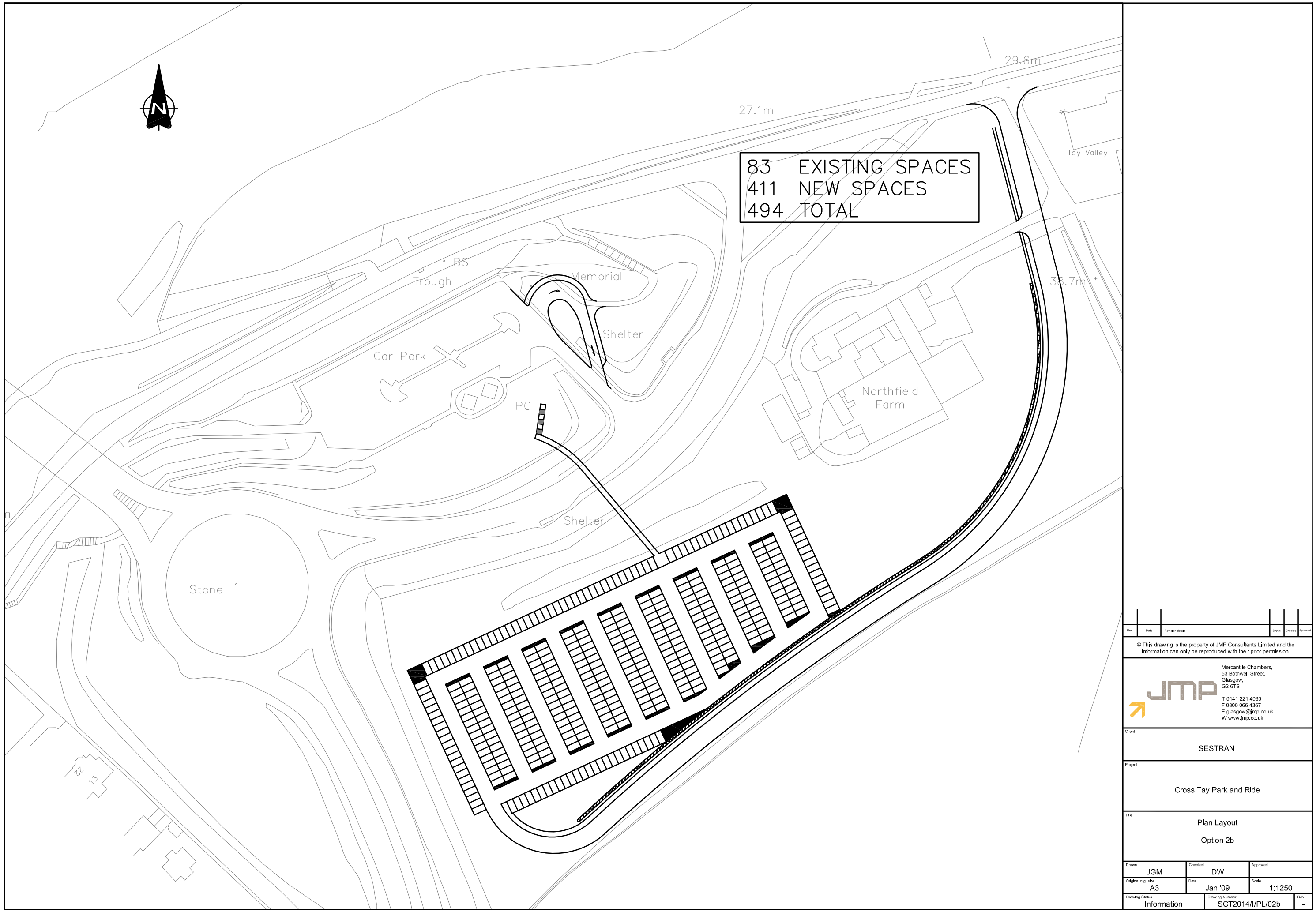
Item	Cost per Space	Alternative Rate	Item Cost	Cumulative Cost
Site Clearance	50		£20,850	£20,850
Regrading, Landscaping	224		£93,408	£114,258
Perimeter Fence	900		£375,300	£489,558
Electrical Supply		Fixed Item	£20,000	£509,558
Signs , Information		Fixed Item	£10,000	£519,558
Car Park Drainage	100		£41,700	£561,258
Surfacing	1,260		£525,420	£1,086,678
Kerbing	300		£125,100	£1,211,778
Footpaths	60		£25,020	£1,236,798
Street Lighting	105		£43,785	£1,280,583
Road Markings	20		£8,340	£1,288,923
CCTV		4 cameras	£120,000	£1,408,923
Miscellaneous	100		£41,700	£1,450,623
Bus Stance and turning head		Item	£40,000	£1,490,623
Access Road		340m x 1200	£408,000	£1,898,623
Footpath Link to Ramps		10m x130	£1,300	£1,899,923
Design Fees and Preliminaries		15%	£284,793	£2,184,716
Contingencies/Risk		10%	£218,472	£2,403,188

TOTAL CAPITAL COST **£2,403,188**

STRUCTURE COST PEDESTRIAN OVERBRIDGE **£400,000**

TOTAL SCHEME COST **£2,803,188**

OPERATING COSTS ARE CONSISTANT £40,100 per year



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Client
SESTRAN

Project
Cross Tay Park and Ride

Title
Plan Layout
Option 2b

Drawn	Checked	Approved
JGM	DW	
Original drg. size	**Date**	**Scale**
A3	Jan '09	1:1250
Drawing Status	**Drawing Number**	**Rev.**
Information	SCT2014/I/PL/02b	-

Landfall Option 3

Using South Field with Vehicular and Pedestrian Bridges

SUB OPTION 3 COST ESTIMATE
Vehicular and Pedestrian Bridge

No of New Car Parking Spaces 423

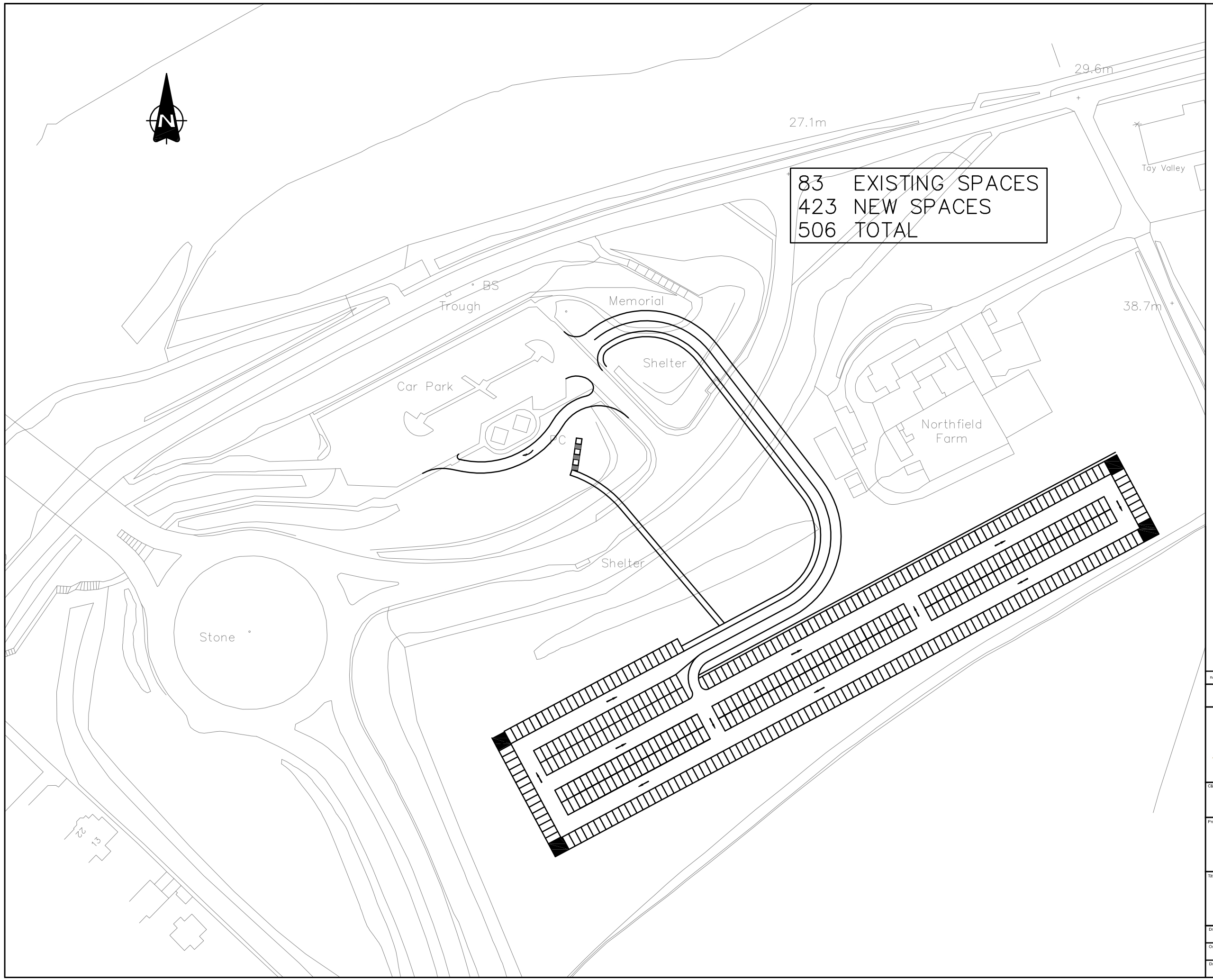
Item	Cost per Space	Alternative Rate	Item Cost	Cumulative Cost
Site Clearance	50		£21,150	£21,150
Regrading, Landscaping	224		£94,752	£115,902
Perimeter Fence	900		£380,700	£496,602
Electrical Supply		Fixed Item	£20,000	£516,602
Signs , Information		Fixed Item	£10,000	£526,602
Car Park Drainage	100		£42,300	£568,902
Surfacing	1,260		£532,980	£1,1021,882
Kerbing	300		£126,900	£1,228,782
Footpaths	60		£25,380	£1,254,162
Street Lighting	105		£44,415	£1,298,577
Road Markings	20		£8,600	£1,307,177
CCTV		4 cameras	£120,000	£1,427,177
Miscellaneous	100		£42,300	£1,469,477
Bus Stance and turning head		Item	£40,000	£1,509,477
Access Road		340m x 1200	£408,000	£1,917,477
Footpath Link to Ramps		10m x130	£1,300	£1,918,777
Design Fees and Preliminaries		15%	£287,817	£2,206,594
Contingencies/Risk		10%	£220659	£2,403,188
TOTAL CAPITAL COST				**£2,427,253**

STRUCTURE COST PEDESTRIAN BRIDGE **£400,000**

STRAUCTURE COST VEHICULAR BRIDGE **£923,000**

TOTAL SCHEME COST (ROUNDED) **£3,750,000**

OPERATING COSTS ARE CONSISTANT £40,100 per year



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Client: SESTRAN

Project: Cross Tay Park and Ride

Title: Plan Layout

Option 3a

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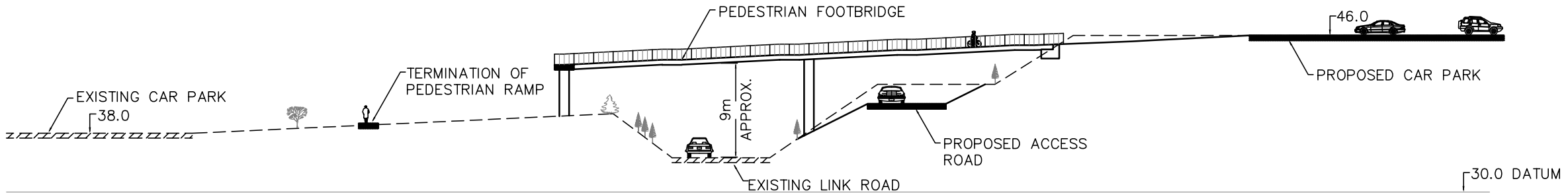
Original drg. size: A3	Date: Jan '09	Scale: 1:1250
Drawing Status: Information	Drawing Number: SCT2014/I/PL/03a	Rev.: -



INDICATIVE CROSS SECTION
(LOOKING EAST)

SCALE 1 : 500

NOTE:

ALL EXISTING AND PROPOSED LEVELS QUOTED ON THIS DRAWING ARE TO BE CONSIDERED AS CONJECTURAL.

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Project: Cross Tay Park and Ride

Title: Indicative Cross Section

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A3	Jan '09	1:500
Drawing Status	**Drawing Number**	**Rev.**
Information	SCT2014/I/CS/01	-