

NGT Assessment to the BRT Standard 2013

11 September 2014

Author: Jason Smith, Mott MacDonald

Introduction

The Chartered Institute of Logistics and Transport (CILT) submitted a Representation (REP/5/1) by Mr Anzir Boodoo in relation to the NGT draft Order application. Certain aspects of this Representation are noted and responded to in outline at section 10.7 of Mr Smith's Proof of Evidence (APP 3-2) including an acknowledgement of the CILT assessment of the NGT scheme against The BRT Standard 2013. This is an initiative to establish a common definition of bus rapid transit (BRT) throughout the world and help ensure a more uniform delivery of benefits. The BRT Standard is governed by a Technical Committee and Institutional Endorsers both of which are convened by ITDP¹. As noted within the guidance (Appendix A page 10) The BRT Standard should not be used in isolation, but should be considered in combination with cost-benefit analysis such as that within a scheme business case. However, The BRT Standard does not fully take into account third party impacts; and given that an Environmental Statement is mandatory in the UK on schemes such as NGT, these aspects should also be considered in the decision making.

In the CILT Representation the NGT scheme is assessed as scoring 66 points and meeting the bronze category of The BRT Standard 2013. Furthermore, Mr Boodoo seeks clarification on certain matters and suggests changes that would give additional points, potentially placing the NGT scheme in the silver category. We note that the gold category is extremely difficult to achieve in Europe due to land take and third party impacts; whilst those systems in the gold category are generally of a much larger scale than NGT, such as Bogota's BRT system.

In his Statement of Case (Objection 1622) Mr McKinnon scores the NGT system at 41 points and does not regard it as meeting the BRT Basic standard. Mr McKinnon does not provide a commentary on his assessment of each item or reasons as to why he has arrived at a particular scoring. However, The BRT Standard (page 9) says that '*The basis for the score should be reasonably transparent and independently verifiable without recourse to information that is not readily obtained*'.

During cross examination of Mr Smith by Mr McKinnon the latter asked that the former provide a scoring of the NGT system against The BRT Standard. Consideration of the issues, interpretation of assessment criteria in a UK context and measurement of quantities would take some considerable time; and it was accepted that the witness stand at a public inquiry is not the appropriate place to undertake this assessment. However Mr Smith agreed to provide at a later date this note to the inquiry which assesses the NGT scheme against the BRT Standard.

Scoring and Categories

The assessment scoring was set up as a way of protecting the '*BRT brand*' and enabling BRT corridors to be placed on a scale of best practice from Basic to Gold. The scoring system is shown in **Table 1**

Table 1: BRT Standard Scoring System

| Certification Level | Score Range | Description |
|---------------------|-------------|--|
| Basic Standard | 18 – 54 | Basic BRT refers to a core set of elements that the Technical Committee has deemed essential to the definition of BRT. This minimum qualification is a pre-condition to receiving a gold, silver, or bronze ranking. |

¹ Institute for Transportation & Development Policy

| Certification Level | Score Range | Description |
|---------------------|-------------|---|
| Bronze Standard | 55 – 69 | Bronze-standard BRT solidly meets the definition of BRT and is mostly consistent with international best practice. Bronze standard BRT has some characteristics that elevate it above the BRT Basics, achieving higher operational efficiencies or quality of service than basic BRT. |
| Silver Standard | 70 – 84 | Silver-standard BRT includes most of the elements of international best practice and is likely to be cost effective on any corridor with sufficient demand to justify BRT investment. These systems achieve high operational performance and quality of service. |
| Gold Standard | 85 – 100 | Gold-standard BRT is consistent in almost all respects with international best practice. These systems achieve the highest in operational performance and efficiency, while providing a high quality of service. It is achievable on any corridor with sufficient demand to justify any BRT investments, but may cost a little more to achieve. These systems have the greatest ability to inspire the public, as well as other cities. |

Source: *The BRT Standard (2013)*, page 9

Assessment Summary

A detailed scoring of all criteria along with commentary to substantiate this is provided in Appendix 1. This was prepared based on the documents and drawings published as part of the Transport and Works Act Order application in September 2013, any material subsequently published for the Public Inquiry and any published historic documents and drawings for the scheme. The design assumed is that illustrated within the Revised Technical Design Drawings (A-11) published in March 2014. The assessment undertaken in this note is conservative and applies the categories as they can be best fitted to UK terminology and practice.

Appendix 2 provides a detailed comparison of scoring from Mr McKinnon (Objector 1622 in his Statement of Case), the Chartered Institute of Logistics and Transport (Representation 5/1) and a scoring undertaken by Jason Smith (Mott MacDonald) on behalf of the Promoter team.

A summary of the assessment is presented in Table 2 below. The Promoter's scoring overall is 68 points and places the NGT scheme at the top end of the Bronze category. As can be seen in the summary table below, and in more detailed comparison in Appendix 2, the scoring allocated in this assessment to by the Promoters to each criterion is broadly in line with that in the CILT assessment and their accompanying commentary.

Table 2: BRT Assessment Summary

| Item | Maximum Score | Promoters Score | McKinnon Score | CILT Score |
|--|---------------|-----------------|----------------|------------|
| BRT Basics | 33 | 22 | 12 | 25 |
| Service Planning | 24 | 21 | 10 | 20 |
| Infrastructure | 14 | 6 | 6 | 6 |
| Station Design and Station-Bus Interface | 10 | 7 | 3 | 6 |
| Quality of Service & Passenger Information Systems | 5 | 4 | 3 | 4 |
| Integration and Access | 14 | 9 | 7 | 8 |
| Total | 100 | 69 | 41 | 69 |
| Point Deductions | -36 | -1 | 0 | -3 |
| Grand Total | - | 68 | 41 | 66 |

APPENDIX 1: Detailed NGT Scoring

| Category | Max Score | NGT Score | Category Applied | Commentary | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------|-----------|------------------|---|----------------|-------------------------------|----|-------|--|------------|-----------|---|-------|--|---|------|----|------|--|---|-----|----|------|---|---|------|----|------|--|---|---|---|---|--|---|------|---|------|---|---|---|---|---|--|---|------|---|------|--|---|---|---|---|--------------|--|--|--|-------------|
| BRT BASICS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Busway alignment | 7 | 4 | Weighted score | <table border="1"> <thead> <tr> <th rowspan="2">Configurations</th> <th colspan="4">Bodington P&R to Stourton P&R</th> </tr> <tr> <th>Score Band</th> <th>Length km</th> <th>%</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Two way median aligned busways that are in the central verge of a two way road</td> <td>7</td> <td>3.11</td> <td>13</td> <td>0.88</td> </tr> <tr> <td>Bus only corridors where there is a fully exclusive right of way and no parallel mixed traffic such as transit malls</td> <td>7</td> <td>7.9</td> <td>32</td> <td>2.24</td> </tr> <tr> <td>Busways that run adjacent to an edge condition like a waterfront or park where there are few intersections to cause conflicts</td> <td>7</td> <td>4.16</td> <td>17</td> <td>1.18</td> </tr> <tr> <td>Busways that run two way on the side of a one way street</td> <td>7</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Busways that are split into two one way pairs but are centrally aligned in the roadway</td> <td>4</td> <td>0.15</td> <td>1</td> <td>0.02</td> </tr> <tr> <td>Busways that are split into two one way pairs but are aligned to the kerb</td> <td>4</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Busways that operate through virtual lanes produced by a series of bus queue jump lanes at intersections</td> <td>1</td> <td>1.33</td> <td>5</td> <td>0.05</td> </tr> <tr> <td>Curb aligned busway that is adjacent to the curb</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Total</td> <td></td> <td></td> <td></td> <td>4.39</td> </tr> </tbody> </table> | Configurations | Bodington P&R to Stourton P&R | | | | Score Band | Length km | % | Score | Two way median aligned busways that are in the central verge of a two way road | 7 | 3.11 | 13 | 0.88 | Bus only corridors where there is a fully exclusive right of way and no parallel mixed traffic such as transit malls | 7 | 7.9 | 32 | 2.24 | Busways that run adjacent to an edge condition like a waterfront or park where there are few intersections to cause conflicts | 7 | 4.16 | 17 | 1.18 | Busways that run two way on the side of a one way street | 7 | 0 | 0 | 0 | Busways that are split into two one way pairs but are centrally aligned in the roadway | 4 | 0.15 | 1 | 0.02 | Busways that are split into two one way pairs but are aligned to the kerb | 4 | 0 | 0 | 0 | Busways that operate through virtual lanes produced by a series of bus queue jump lanes at intersections | 1 | 1.33 | 5 | 0.05 | Curb aligned busway that is adjacent to the curb | 0 | 0 | 0 | 0 | Total | | | | 4.39 |
| | | | | Configurations | | Bodington P&R to Stourton P&R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | Score Band | Length km | % | Score | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Two way median aligned busways that are in the central verge of a two way road | 7 | 3.11 | 13 | 0.88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Bus only corridors where there is a fully exclusive right of way and no parallel mixed traffic such as transit malls | 7 | 7.9 | 32 | 2.24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Busways that run adjacent to an edge condition like a waterfront or park where there are few intersections to cause conflicts | 7 | 4.16 | 17 | 1.18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Busways that run two way on the side of a one way street | 7 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Busways that are split into two one way pairs but are centrally aligned in the roadway | 4 | 0.15 | 1 | 0.02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Busways that are split into two one way pairs but are aligned to the kerb | 4 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Busways that operate through virtual lanes produced by a series of bus queue jump lanes at intersections | 1 | 1.33 | 5 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Curb aligned busway that is adjacent to the curb | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | | 4.39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>The route between Bodington P&R and Stourton P&R gives a score of 4.39. This is in line with the independent CILT scoring of this item. A score of 4 or above points means that the system is defined as BRT. For the purposes of the BRT assessment, we have rounded down the score of 4.39 to 4.</p> <p>The scoring guidelines state <i>'Segments including bridges, tunnels, expressways, or non built up areas, which don't impede the efficiency of the system, are not factored into the corridor score'</i>. The Holt Park section is generally free flowing traffic and has little to impede vehicle flow and is less urbanised with large grass verges and adjacent playing fields. Furthermore, the Holt Park section only has half the service frequency of the rest of the system. As suggested by the methodology, the Holt Park section of route is therefore not included within the scoring.</p> <p>The methodology provides the highest scores where the bus lanes are in the central reserve of a highway or separated from other traffic. It does not generally give points for bus lanes in the nearside of a carriageway. Whilst this may be satisfactory for some international contexts; in the UK the preference is generally for bus stops and public transport lanes to be at the nearside of the carriageway. This provides easier access to bus stops, a more pleasant waiting environment, and reduced land take requirements with a consequential reduction of third party impacts. Nearside bus lanes best fit with the Leeds context and this has been the design assumption for NGT, although it gains no points in The BRT Standard methodology.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Category | Max Score | NGT Score | Category Applied | Commentary | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------------------------|------------------------------------|---|--|--|------------------------------------|------------------------------------|---------------------------------------|---------------|-------------|-------------|-------------|------------------------|-------------|-------------|--------------|--|------------|------------|------------|--------------------------|-------------|-------------|--------------|-------|--------|--------|--------|
| Dedicated right-of-way | 7 | 6 | <p>“Delineators only or coloured pavement only without other enforcement measures applied to over 40% of the busway corridor length”</p> <p>and</p> <p>‘Dedicated lanes and full enforcement or physical segregation applied to over 90% of the busway corridor length’</p> | <p>The scoring criteria appears to be in two parts:</p> <ol style="list-style-type: none"> <u>Dedicated lanes or delineators applied to the busway corridor length</u> As set out within Mr Smith’s Proof (APP 3-2 at 3.1.8) the lengths of dedicated lanes and segregation from other traffic is below: <table border="1"> <thead> <tr> <th></th> <th>Northbound direction of bus travel</th> <th>Southbound direction of bus travel</th> <th>Average for northbound and southbound</th> </tr> </thead> <tbody> <tr> <td>NGT exclusive</td> <td>5.7km (38%)</td> <td>5.3km (36%)</td> <td>5.5km (37%)</td> </tr> <tr> <td>NGT & public transport</td> <td>2.0km (13%)</td> <td>1.7km (11%)</td> <td>1.85km (12%)</td> </tr> <tr> <td>NGT, public transport & limited access</td> <td>0.9km (6%)</td> <td>0.9km (6%)</td> <td>0.9km (6%)</td> </tr> <tr> <td>NGT with general traffic</td> <td>6.6km (43%)</td> <td>6.9km (47%)</td> <td>6.75km (45%)</td> </tr> <tr> <td>Total</td> <td>15.2km</td> <td>14.8km</td> <td>15.0km</td> </tr> </tbody> </table> <p>On the basis of the above it can be concluded that 49% of the NGT route is either dedicated NGT exclusive lane or shared bus lane with delineators such as road markings and distinct surface finishes. Therefore on this first part of the criteria a score of 2 points is appropriate.</p> <ol style="list-style-type: none"> <u>Enforcement or physical segregation applied to the busway corridor length</u> The enforcement measures deployed on NGT include physical barriers, signage and Traffic Regulation Orders. The latter are described in Mr Smith’s Proof (APP 3-2) at section 7.10 and include measures to restrict traffic movements, parking and loading/ unloading as well as prohibiting certain vehicle types. They are intended to keep the busway free of obstructions and unimpeded by congestion. The length of NGT covered by these enforcement or physical segregation measures is over 95%. Therefore for the second part of the criteria a score of 7 is appropriate. <p>Based on the two criteria outlined above, a score of between 2 and 7 for this category would be applicable. To help with this determination we note that the scoring guidelines state that: <i>‘The scoring system is based on the amount of corridor that has a dedicated right of way, and the placement of that dedication in relation to observed peak hour congestion’.</i></p> <p>The dedicated NGT and bus lanes are predominantly located in areas with high levels of congestion such as along Otley Road (in particular through Headingley centre), along the busy Headingley Lane and Woodhouse Lane (in particular past the Universities), through the city centre on Cookridge Street, Hunslet Road and the northern parts of Belle Isle Road. In less congested areas such as Holt Park, Otley Old Road, and Winrose Grove such measures are not considered necessary. The dedicated right of way is therefore focused on areas of high congestion and those parts of the route that would experience the highest passenger loading. This would push the scoring towards the higher end of the range defined by the twin criteria in this category. On that basis we have scored this category as 6 points. The score of 4 points is above the threshold for defining the system as BRT.</p> | | Northbound direction of bus travel | Southbound direction of bus travel | Average for northbound and southbound | NGT exclusive | 5.7km (38%) | 5.3km (36%) | 5.5km (37%) | NGT & public transport | 2.0km (13%) | 1.7km (11%) | 1.85km (12%) | NGT, public transport & limited access | 0.9km (6%) | 0.9km (6%) | 0.9km (6%) | NGT with general traffic | 6.6km (43%) | 6.9km (47%) | 6.75km (45%) | Total | 15.2km | 14.8km | 15.0km |
| | Northbound direction of bus travel | Southbound direction of bus travel | Average for northbound and southbound | | | | | | | | | | | | | | | | | | | | | | | | | |
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| NGT, public transport & limited access | 0.9km (6%) | 0.9km (6%) | 0.9km (6%) | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGT with general traffic | 6.6km (43%) | 6.9km (47%) | 6.75km (45%) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 15.2km | 14.8km | 15.0km | | | | | | | | | | | | | | | | | | | | | | | | | |

| Category | Max Score | NGT Score | Category Applied | Commentary |
|---------------------------|-----------|-----------|--|--|
| Off-board fare collection | 7 | 3 | 'Proof of payment on some routes that run on the trunk corridor'. | <p>All NGT buses that use the trunk corridor have proof of payment for off board fare collection. However, we assume that the scoring is intended to include for other buses on the corridor which are not part of the NGT system; and they have both on board and off board fare collection. On that basis we have scored this category as 3 points however if the methodology is intended to relate only to the NGT system this should be raised to 6 points.</p> <p>We note that The BRT Standard has a slight preference for barrier controlled ticket verification rather than proof of payment by inspectors. This may be suitable for large scale systems connecting to major transport hubs but is not appropriate for on-street bus stops in the Leeds context. Barriers in the footway at bus stops would restrict pedestrian flows and impede bus boarding. The NGT assumption is for ticket machines at stops and other outlets, backed up by a ticket inspection regime. This provides the benefits of off-board fare collection whilst reducing inconvenience to passengers and the wider general public.</p> <p>The NGT vehicles will be compatible with the M-Card system which is a proposed smart card for public transport with contactless (tap in and out) verification, similar to London's Oyster Card. This payment regime is proposed as part of a wider Metro project for all public transport in West Yorkshire.</p> <p>Off board fare collection is provided thereby meeting an essential element of a BRT system.</p> |
| Intersection treatments | 6 | 3 | 'Some turns prohibited across the busway and some signal priority'. | <p>In addition to existing turning prohibitions, an additional 17 movements are prescribed and 11 new turning prohibitions introduced. The emphasis in the methodology is on prohibition of turning movements across the busway with lesser importance given to traffic signal priority. This is understandable for large scale systems with buses every minute or so where traffic signal priority cannot be given to every bus. However in lower frequency systems such as NGT (6 minute headway) the emphasis ought to be more towards traffic signal priority to manage and by-pass traffic queues; this is not reflected in the scoring regime.</p> <p>Bus priority at intersections is provided thereby meeting an essential element of a BRT system.</p> |
| Platform-level boarding | 6 | 6 | "100% of buses are platform level; system-wide measures for reducing the gap in place" | <p>The NGT vehicles are assumed to have a boarding threshold of 300mm height above the carriageway and consequently the NGT stops have a platform face which is also 300mm in height. This will allow for level boarding and negates the requirement to use the vehicle kneeling system thereby minimising boarding times.</p> <p>The platform face is assumed to be a profiled kerb or similar which will allow the vehicle wheel (or guide wheel) to touch the lower slope indicating to the driver that the correct boarding gap has been achieved.</p> <p>Platform level boarding is provided thereby meeting an essential element of a BRT system</p> |
| SERVICE PLANNING | | | | |
| Multiple routes | 4 | 4 | "Two or more routes exist on the corridor, servicing at least two stations" | <p>The NGT system has two route service patterns:</p> <ol style="list-style-type: none"> 1. Bodington to Stourton 2. Holt Park via Bodington to Stourton <p>In addition turn-backs at Sayner Lane, Woodhouse lane (Parkinson Building) and Headingley will allow for additional services to be run over the core part of the network with the highest passenger loadings.</p> <p>The majority of the NGT route and associated infrastructure also accommodates conventional bus services which serve a wide range of routes throughout Leeds and interchange with the NGT system; consequently these have been assumed in the scoring.</p> |
| Peak frequency | 3 | 3 | "100% [routes] have at least 8 buses per hour" | <p>The NGT peak service frequency is at least 10 buses per hour in each direction.</p> |

| Category | Max Score | NGT Score | Category Applied | Commentary |
|--------------------------------------|-----------|-----------|--|---|
| Off-peak frequency | 2 | 2 | "100% of all routes have at least 4 buses per hour" | The NGT off peak service frequency is 4 buses per hour in each direction. |
| Express, limited, and local services | 3 | 0 | "No limited or express services" | A limited express stopping service was modelled as part of the business case scenario testing and found not to be of benefit to the NGT system. The NGT infrastructure could support an express service if required in the future, as vehicles are able to de-wire (from the OLE) in transit to pass another trolleybus before automatically re-wiring (back to the OLE) at the next stop. |
| Control centre | 3 | 3 | "Full-service control centre" | A control centre is proposed at the Stourton depot site as noted in Mr Smith's Proof (APP 3-2) at paragraph 5.7.3.e. This will include for real time monitoring of all NGT vehicles and their control to regulate service intervals and where necessary truncate or add services. It will also route NGT vehicles (off wire) around road closures or major incidents as well as providing support to drivers including providing maintenance or emergency service assistance. All vehicles will be dispatched through the control system and key parameters tracked including vehicle boarding/ alighting, stop dwell times and vehicle speeds. |
| Located in top-ten corridors | 2 | 2 | "Corridor is one of top-ten demand corridors" | The NGT corridor is one of top-ten demand corridors in Leeds. |
| Hours of operations | 2 | 2 | "Both late-night and weekend service" | The NGT service will operate until midnight. The NGT service will operate on both weekend days. |
| Demand profile | 3 | 3 | "Corridor includes highest-demand segment" | The highest demand public transport corridor within 2km of the NGT route is along Otley Road (A660) in particular between the city centre and Lawnswood. On this route section there would be dedicated bus lanes as well as exclusive NGT lanes; and the proposals meet the minimum requirements of BRT Basics. On this basis the scheme would score 3 points. The highest demand traffic segment within 2km of the NGT route is the Low Road (A61) and M621 motorway corridor. The NGT route directly serves this corridor with dedicated bus lanes as well as exclusive NGT lanes, meeting the minimum requirements of BRT Basics. Furthermore the NGT scheme serves the M621 motorway by extension through the proposed facilities at Stourton Park and Ride site which sits immediately adjacent to junction 7 of the motorway. The Park and Ride site has exclusive NGT lanes and meets the requirements of the BRT Basic criteria. On this basis scheme would score 3 points. |
| Multi-corridor network | 2 | 2 | "Intersecting or connecting to an existing or planned BRT network" | The NGT system is the first line in a future BRT network. It intersects with several planned route extensions including: East Line via St James' Hospital and the Aire Valley line. Further extensions to the west are also being considered. |

| Category | Max Score | NGT Score | Category Applied | Commentary | | | | | | | | | | | | | | | | | | |
|--|-----------|---|---|---|----------|-----|------------|---|---|--|---|---|---|--|---|------|--|---|--|-------|----|--|
| INFRASTRUCTURE | | | | | | | | | | | | | | | | | | | | | | |
| Passing lanes at stations | 4 | 0 | "No passing lanes" | Generally overtaking of conventional buses is possible at most stop locations, and overtaking of another trolleybus would be possible by de-wiring from the overhead line and moving into the next lane. This may however be difficult in certain traffic flow scenarios where the bus might have difficulty in pulling into the next lane due to congestion so has not been included within the scoring. The Park and Ride sites at Bodington and Stourton where services terminate have space for one trolleybus to pass another. | | | | | | | | | | | | | | | | | | |
| Minimising bus emissions | 3 | 3 | "Euro VI or U.S. 2010" | The reference to Euro type engines in The BRT Standard is not applicable to NGT which is an all-electric trolleybus vehicle. Given that any pollutants given off by the NGT vehicle would be substantially less than Euro VI or US.2010 the scheme would score 3 points in this category. | | | | | | | | | | | | | | | | | | |
| Stations set back from intersections | 3 | 2 | "65% of trunk stations meet [listed] criteria" | <table border="1"> <thead> <tr> <th>Criteria</th> <th>No.</th> <th>Stop Names</th> </tr> </thead> <tbody> <tr> <td>Set back at least 40m from intersection</td> <td>8</td> <td>Tinshill, Hospital Lane, Wise Owl, Bodington, Churchwood Avenue., Brewery, Telford, Belle Isle Circus,</td> </tr> <tr> <td>Fully exclusive busways with no intersections</td> <td>8</td> <td>Lawnswood, Headingley Hill, Headingley Centre, Woodhouse New Dock, Joseph Street, Penny Hill and Middleton Road</td> </tr> <tr> <td>Grade separated stations where stations are at grade</td> <td>0</td> <td>None</td> </tr> <tr> <td>Stations located near intersection due to block length</td> <td>9</td> <td>Holt Park, St Chad's, University of Leeds, Leeds Met, Arena, Civic, City Square Trinity and Stourton P&R).</td> </tr> <tr> <td>Total</td> <td>25</td> <td></td> </tr> </tbody> </table> <p>In total 93% of stops meet the above criteria and therefore 2 points are awarded.</p> | Criteria | No. | Stop Names | Set back at least 40m from intersection | 8 | Tinshill, Hospital Lane, Wise Owl, Bodington, Churchwood Avenue., Brewery, Telford, Belle Isle Circus, | Fully exclusive busways with no intersections | 8 | Lawnswood, Headingley Hill, Headingley Centre, Woodhouse New Dock, Joseph Street, Penny Hill and Middleton Road | Grade separated stations where stations are at grade | 0 | None | Stations located near intersection due to block length | 9 | Holt Park, St Chad's, University of Leeds, Leeds Met, Arena, Civic, City Square Trinity and Stourton P&R). | Total | 25 | |
| Criteria | No. | Stop Names | | | | | | | | | | | | | | | | | | | | |
| Set back at least 40m from intersection | 8 | Tinshill, Hospital Lane, Wise Owl, Bodington, Churchwood Avenue., Brewery, Telford, Belle Isle Circus, | | | | | | | | | | | | | | | | | | | | |
| Fully exclusive busways with no intersections | 8 | Lawnswood, Headingley Hill, Headingley Centre, Woodhouse New Dock, Joseph Street, Penny Hill and Middleton Road | | | | | | | | | | | | | | | | | | | | |
| Grade separated stations where stations are at grade | 0 | None | | | | | | | | | | | | | | | | | | | | |
| Stations located near intersection due to block length | 9 | Holt Park, St Chad's, University of Leeds, Leeds Met, Arena, Civic, City Square Trinity and Stourton P&R). | | | | | | | | | | | | | | | | | | | | |
| Total | 25 | | | | | | | | | | | | | | | | | | | | | |
| Centre stations | 2 | 0 | "<20% and above of trunk stations have centre platforms serving both directions of service" | Stops situated within a central reserve of the highway are not generally favoured in the Leeds context as they are less accessible and provide a less attractive waiting environment than those at the side of the road. Other reasons such as traffic management may necessitate a stop being in the middle of a road (such as Lawnswood) but this is not the preferred solution for the NGT system. | | | | | | | | | | | | | | | | | | |
| Pavement quality | 2 | 1 | "New reinforced concrete designed to fifteen-year life only at stations" | NGT scheme assumes that reinforced concrete will only be used for highway construction at the stops to prevent rutting from wheels tracking over consistent paths. Using reinforced concrete for the carriageway more generally along the NGT route is not appropriate as it would hinder access to underground utility equipment, increase capital costs where the pavement does not require full reconstruction, and unless covered by another surface course would lead to noise generation and aesthetic issues. | | | | | | | | | | | | | | | | | | |

| Category | Max Score | NGT Score | Category Applied | Commentary |
|---|-----------|-----------|---|--|
| STATION DESIGN AND STATION BUS INTERFACE | | | | |
| Distance between stations | 2 | 2 | “Stations are spaced, on average, between 0.8 km (0.5 mi.) to 0.3 km (0.2 mi.) apart” | NGT stops are spaced, on average 560m apart |
| Safe and comfortable stations | 3 | 2 | “Most trunk corridor stations are wide, attractive, weather-protected” | All stop areas are at least 3m wide, with shelters formed of transparent side material, well lit, and containing passenger help points and covered by CCTV. All shelters have a significant degree of weather protection but are not fully enclosed. |
| Number of doors on bus | 3 | 3 | “100%” | 100% of vehicles are assumed to have 3 doors |
| Docking bays and sub-stops | 1 | 0 | “Less than two sub-stops or docking bays at the highest-demand stations” | The highest demand stations are Bodington and Stourton both of which have sub stops, in particular to accommodate lay-over vehicles. However at other high demand stops there is insufficient space for sub stops and they are not required as the stop capacity is sufficient. This is because only NGT vehicles use the NGT stops and the service headway is a maximum of 6 minutes. |
| Sliding doors in BRT stations | 1 | 0 | “Otherwise” | No sliding doors at stops are proposed and they are not appropriate given the street context and scale of the infrastructure proposed. |
| QUALITY OF SERVICE AND PASSENGER INFORMATION SYSTEMS | | | | |
| Branding | 3 | 2 | “All buses, routes, and stations in corridor follow single unifying brand, but different from rest of the system” | All NGT vehicles, stops and infrastructure follow a single unifying brand that defines the network identity and distinguishes the BRT system from conventional buses. |
| Passenger information | 2 | 2 | “Real-time and static passenger information corridor-wide (at stations and on vehicles)” | Real-time and static passenger information is assumed as part of the NGT proposals |

| Category | Max Score | NGT Score | Category Applied | Commentary |
|---|-----------|-----------|--|---|
| INTEGRATION AND ACCESS | | | | |
| Universal accessibility | 3 | 3 | “Full accessibility at all stations and vehicles” | All NGT stops and vehicles will permit level boarding, with tactile paving and be fully accessible for wheelchair users. |
| Integration with other public transport | 3 | 3 | “Integration of: physical design, fare payment, and informational systems” | The physical design is integrated with other bus routes including proximity, pedestrian crossings and links; as well as being close to Leeds City Railway Station. The proximity of the physical infrastructure is set out with Mr Smith’s Proof (APP 3-2) at section 10.3. Fare payment will be via ticket machines, Metro bus/ rail stations, and other outlets including the internet. NGT is assumed to be part of the wider M-Card system which will provide integrated ticketing across transport modes and routes. Metro website information, leaflets, and bus maps will include NGT services along with other public transport alternatives. |
| Pedestrian access | 3 | 2 | “Good, safe pedestrian access at every station and many improvements along corridor” | All NGT stops have good and safe pedestrian access and 64 additional signal controlled pedestrian crossings are proposed. Footways are well lit and will be provided with new surface material. Whilst some footways will be widened it is acknowledged that others will need to be narrowed to create space for bus and cycle lanes. |
| Secure bicycle parking | 2 | 0 | “Little or no bicycle parking [at stops]” | Secure and standard cycle parking is proposed at the Holt Park, Bodington and Middleton stops; with additional standard cycle parking at Stourton P&R, St Chad's and Arena NGT stops - representing 5 out of 27 NGT stops. Whilst NGT provide secure cycle parking at terminal stops and standard cycle racks elsewhere, our interpretation is that this may not qualify for the maximum 2 points as most NGT stops would not have cycle racks. Therefore we have not awarded any points for this category but note that significant cycle facilities are provided. It would not be appropriate to put cycle racks at certain NGT stops due to the available pavement widths. |
| Bicycle lanes | 2 | 1 | “Bicycle lanes do not span entire corridor” | Whilst a substantial increase in cycle lanes and facilities is proposed they will not span the entire NGT corridor; although there are parallel existing routes |
| Bicycle-sharing integration | 1 | 0 | “Bicycle sharing at less than 50% of trunk stations” | Bicycle sharing at less than 50% of trunk stations – no formal cycle hire or sharing scheme is proposed as part of the NGT system. |
| Subtotal | 100 | 69 | - | Before deductions for items in the section below, NGT would attain Bronze Status |
| BRT BASICS | 33 | 22 | NGT Satisfies the BRT Basics minimum | |
| | | | | |

| Category | Max Score | NGT Score | Category Applied | Commentary | | | | | | | | | | | | | | | |
|--|-----------|-----------|---|---|--|---------|---------|--------------|---------------|------------------------|---------|---------|--------|-----------|------------------------|---------|---------|--------|-----------|
| POINT DEDUCTIONS | | | | | | | | | | | | | | | | | | | |
| Commercial speeds | -10 | 0 | “Minimum average commercial speed is 20 kph and above” | <p>The NGT journey times are set out within a Metro Information Paper (G-4-41) and the route lengths within Mr Smith’s Proof (APP 3-2 paragraph 3.1.8):</p> <table border="1"> <thead> <tr> <th></th> <th>AM Peak</th> <th>PM Peak</th> <th>Route length</th> <th>Average Speed</th> </tr> </thead> <tbody> <tr> <td>Holt Park – Belle Isle</td> <td>38 mins</td> <td>38 mins</td> <td>14.8km</td> <td>23.37 kph</td> </tr> <tr> <td>Belle Isle – Holt Park</td> <td>39 mins</td> <td>39 mins</td> <td>15.2km</td> <td>23.38 kph</td> </tr> </tbody> </table> | | AM Peak | PM Peak | Route length | Average Speed | Holt Park – Belle Isle | 38 mins | 38 mins | 14.8km | 23.37 kph | Belle Isle – Holt Park | 39 mins | 39 mins | 15.2km | 23.38 kph |
| | AM Peak | PM Peak | Route length | Average Speed | | | | | | | | | | | | | | | |
| Holt Park – Belle Isle | 38 mins | 38 mins | 14.8km | 23.37 kph | | | | | | | | | | | | | | | |
| Belle Isle – Holt Park | 39 mins | 39 mins | 15.2km | 23.38 kph | | | | | | | | | | | | | | | |
| Peak passengers per hour per direction (pphpd) below 1,000 | -5 | 0 | “Peak passengers per hour per direction (pphpd). PHPD [is] below 1,000 pphpd” | <p>The Passenger line loadings are set out in the Leeds Transport Model Forecasting and NGT Central Case Report (C-1-8 Figures 4 and 5) and for the link with the maximum peak hour ridership they are:</p> <ul style="list-style-type: none"> • 1250 (year 2016) and 1450 (year 2031) northbound PM peak • 1050 (year 2016) and 1225 (year 2031) southbound AM peak <p>The relevant value is the maximum peak passenger loading at the opening year (2016 being the closest) and this is 1250 passengers per hour.</p> | | | | | | | | | | | | | | | |
| Lack of enforcement of right-of-way | -5 | -1 | “Occasional encroachment on BRT right-of-way” | All NGT running lanes are covered by Traffic Regulation Orders which restrict and prohibit other traffic so as to provide a clear and unimpeded route for the BRT system. Enforcement of the TROs will be by on board NGT vehicle cameras, other camera at specific locations, signage, road markings, local authority officers on the ground and the police. However it is recognised that there still may be occasional encroachment onto the BRT right of way and the enforcement regime will be further developed at the detailed design stage.. | | | | | | | | | | | | | | | |
| Significant gap between bus floor and station platform | -5 | 0 | “No gap at all stations” | No gap at any stop due to level boarding, straight approaches to stops and profiled kerb assistance with driver positioning. | | | | | | | | | | | | | | | |

| Category | Max Score | NGT Score | Category Applied | Commentary |
|---|-----------|-----------|--|--|
| Overcrowding | -3 | 0 | “[...] [There are no] visible signs of passengers unable to board buses or enter stations [...]” | <p><u>Vehicle passenger loading</u></p> <p>Making the following assumptions:</p> <ul style="list-style-type: none"> • 1450 passengers per hour in 2031 (document C-1-8 Figure 4) as a worst case • 10 Trolleybus per hour • 145 passengers per trolleybus (peak hour and busiest section of route) <p>Based on Offertzeichnung and Lenkschema (HESS Swisstrolley 3) trolleybus vehicles of 18m and 18.7m length with between 38 and 48 seats, a typical 18.75m long trolleybus is likely to have:</p> <ul style="list-style-type: none"> • 15 m² to 19m² standing area – this can only be an approximation at this stage. • 45.9m² to 47.6m² total internal passenger floor area (excluding driver cab) – this can only be an approximation at this stage. This is the appropriate figure to use when working out average passenger density within the vehicle as required by the methodology. <p>Assuming the lowest (worst case) figure for the total internal passenger floor area (45.9m²), this gives an average passenger density on the busiest section of route in the busiest peak period of 3.16 passengers per m² on the vehicle. This is well below the 5 passengers per m² threshold in the guidance</p> <p><u>Stops</u></p> <p>The stop area (excluding ramps and the wider pavement area) is at minimum of 3m x 20m which is 60m².</p> <p>The maximum combined boarding (449) and alighting (320) for the forecast year 2016 occurs at City Square NGT stop for the southbound service during the PM peak Hour (document C-1-8 Table 53) with a total of 769 passengers per hour using the platform. Assuming 10 vehicles per hour service this gives 77 passengers using the stop at any one time. The maximum combined boarding (556) and alighting (407) for the forecast year 2031 occurs at City Square NGT stop for the southbound service during the PM peak Hour (document C-1-8 Table 55) with a total of 963 passengers per hour using the platform. Assuming 10 vehicles per hour service this gives 97 passengers using the stop at any one time.</p> <p>Assuming the maximum stop usage from year 2031 as a worst case this gives an average passenger density at any stop to be 1.6 passengers per m². This is well below the 3 passengers per m² threshold in the guidance.</p> |
| Poorly-maintained busway, buses, stations, and technology systems | -8 | 0 | “[busway, buses, stations and technology systems [are] regularly maintained]” | Not applicable, NGT maintenance regime will maintain the system infrastructure and vehicle fleet to a high standard |
| Subtotal | - | -1 | - | - |
| GRAND TOTAL | - | 68 | - | Following the above deductions, NGT would still attain Bronze Status |

APPENDIX 2: FULL SCORING COMPARISON

Table 3: Scoring Comparison

| Category | Maximum Score | MM Score (Jason Smith) | McKinnon Score | CILT Score |
|---|---------------|---------------------------|----------------|------------|
| BRT BASICS | | | | |
| Busway alignment | 7 | 4 | 1 | 4 |
| Dedicated right-of-way | 7 | 6 | 2 | 6 |
| Off-board fare collection | 7 | 3 | 0 | 6 |
| Intersection treatments | 6 | 3 | 3 | 3 |
| Platform-level boarding | 6 | 6 | 6 | 6 |
| SERVICE PLANNING | | | | |
| Multiple routes | 4 | 4 | 0 | 4 |
| Peak frequency | 3 | 3 | 3 | 3 |
| Off-peak frequency | 2 | 2 | 2 | 2 |
| Express, limited, and local services | 3 | 0 | 0 | 0 |
| Control centre | 3 | 3 | 1 | 2 |
| Located in top-ten corridors | 2 | 2 | 2 | 2 |
| Hours of operations | 2 | 2 | 2 | 2 |
| Demand profile | 3 | 3 | 0 | 3 |
| Multi-corridor network | 2 | 2 | 0 | 2 |
| INFRASTRUCTURE | | | | |
| Passing lanes at stations | 4 | 0 | 0 | 0 |
| Minimizing bus emissions | 3 | 3 | 3 | 3 |
| Stations set back from intersections | 3 | 2 | 3 | 1 |
| Centre stations | 2 | 0 | 0 | 0 |
| Pavement quality | 2 | 1 | 0 | 2 |
| STATION DESIGN AND STATION-BUS INTERFACE | | | | |
| Distance between stations | 2 | 2 | 0 | 2 |
| Safe and comfortable stations | 3 | 2 | 0 | 1 |
| Number of doors on bus | 3 | 3 | 3 | 3 |
| Docking bays and sub-stops | 1 | 0 | 0 | 0 |
| Sliding doors in BRT stations | 1 | 0 | 0 | 0 |
| QUALITY OF SERVICE AND PASSENGER-INFORMATION SYSTEMS | | | | |
| Branding | 3 | 2 | 1 | 2 |
| Passenger information | 2 | 2 | 2 | 2 |
| INTEGRATION AND ACCESS | | | | |
| Universal access | 3 | 3 | 3 | 3 |
| Integration with other public transport | 3 | 3 | 2 | 2 |
| Pedestrian access | 3 | 2 | 1 | 2 |
| Secure bicycle parking | 2 | 0 | 0 | 0 |
| Bicycle lanes | 2 | 1 | 1 | 1 |
| Bicycle-sharing integration | 1 | 0 | 0 | 0 |
| Subtotal | 100 | 69 | 41 | 69 |
| BRT BASICS | 33 | 22 | 12 | 25 |
| POINT DEDUCTIONS | | | | |
| Commercial speeds | -10 | 0 | 0 | 0 |
| Peak passengers per hour per direction (pphpd) below 1,000 | -5 | 0 | 0 | 0 |
| Lack of enforcement of right-of-way | -5 | -1 | 0 | -3 |
| Significant gap between bus floor and station platform | -5 | 0 | 0 | 0 |
| Overcrowding | -3 | 0 | 0 | 0 |
| Poorly-maintained busway, buses, stations, and technology systems | -8 | 0 | 0 | 0 |
| Subtotal | -36 | -1 | 0 | -3 |
| GRAND TOTAL | - | 68 | 41 | 66 |

SUMMARY TABLE

| Category | Maximum Score | MM Score (Jason Smith) | McKinnon Score | CILT Score |
|--|---------------|---------------------------|----------------|------------|
| BRT Basics | 33 | 22 | 12 | 25 |
| Service Planning | 24 | 21 | 10 | 20 |
| Infrastructure | 14 | 6 | 6 | 6 |
| Station Design And Station-Bus Interface | 10 | 7 | 3 | 6 |
| Quality Of Service And Passenger-Information Systems | 5 | 4 | 3 | 4 |
| Integration And Access | 14 | 9 | 7 | 8 |
| Total | 100 | 69 | 41 | 69 |
| Point Deductions | -36 | -1 | 0 | -3 |
| Grand Total | - | 68 | 41 | 66 |