4 Description of public transport scenarios

The following scenarios are set out for consultation and initial testing and evaluation below:

- *Scenario One – Enhanced Rail Scenario*
- *Scenario Two – Bus with Walking and Cycling Scenario*
- *Scenario Three – Busway Scenario*
- *Scenario Four – Light Rail Scenario*

These scenarios will be developed further, based on the feedback from this stage of consultation. They will then be evaluated in detail to help determine the most appropriate strategy for public transport in the northern suburbs.

A number of other scenarios were also investigated but considered not appropriate for the northern suburbs for various reasons. These are discussed in the last part of this section.

4.1 Enhanced Rail Scenario

The *Enhanced Rail Scenario* will involve improving the existing rail services between Johnsonville and the Wellington railway station by replacing the existing trains, which are at the end of their economic lives, with new or refurbished units and improving the frequency of trains to either 10 or 13 minutes.

The general improvements to bus services discussed in section 3.1 will be implemented in addition to rail improvements.

4.1.1 Proposed service improvements

This section explores possible service improvements under the *Enhanced Rail Scenario*.

4.1.1.1 Operation of railway

Trains will operate on the existing railway line much as they do at present but with some infrastructure and timetable improvements.

The following infrastructure improvements are required for both the 13-minute (ER1) and 10-minute (ER2) frequency options:

- Tunnel floor lowering
- Horizontal track realignment
- Reduction of cant may be required to provide necessary clearances[11]
- Introduction of slabtrack (or similar) to improve track fixity
- Bridge lowering adjacent to tunnels
- Extension of the Wadestown passing loop
- Some signal relocation
- Platform lengthening, raising and realignment, including upgrade of Johnsonville railway station
- Re-registration and regrading of the overhead wiring system
- Relocation of Crofton Downs Station platform to reduce curvature and stepping distance
- An additional passing loop may be considered to ensure reliable operation

The following infrastructure improvements will also be required for the 10-minute (ER2) frequency option:

[11] 'Cant' is the tilt of the line and the smaller the radius of turn, the greater cant required.

- Removal of the Raroa Station
- Construction of a new station and passing loop at Fraser Avenue
- Removal of the station at Box Hill and construction of a passing loop in the same location
- Construction of a passing loop in the Wellington Yards

Tranz Metro has advised that they intend to operate refurbished units on the line during the peak periods and new units during off-peak periods. During peak periods the new units would be used on other parts of the network where they are required for longer routes.

Further detail on the proposed operation of the *Enhanced Rail Scenario* is contained in the Scenarios Technical Appendices document.

4.1.1.2 Coverage of services

The proposed rail and bus routes for the *Enhanced Rail Scenario* are shown for the 13-minute frequency option (ER1) in Figure 3 and for the 10-minute frequency option (ER2) in Figure 4.

This scenario also includes the general improvements to bus services discussed in section 3.1.

4.1.1.3 Frequency of services and travel time

The frequency of services along the railway line would be 13 or 10 minutes during peak periods and between 30 and 15 minutes during non-peak periods.

For the 13-minute frequency option (ER1) the service timetable will be increased to four trains per hour, one more than present. This will require four lots of four-car sets (16 units) for operation.

For the 10-minute frequency option (ER2) the service timetable will be increased to six trains per hour. This will require four lots of four-car sets and two lots of two-car sets (20 units).

Both these options require an additional two-car set for operation during breakdowns and maintenance. These additional sets can be provided from stocks held for the rest of the network but to ensure a conservative analysis an allowance for them has been included in all calculations.

Travel times will remain similar to existing travel times, with services taking 21 minutes to travel between Johnsonville and the Wellington railway station.

4.1.1.4 Capacity of services

For the 13-minute frequency option (ER1) the maximum planning capacity of the railway line is 1,520 passengers per hour assuming 4-car sets operating at 13-minute frequencies. For the 10-

minute frequency option (ER2) the maximum planning capacity of the railway line is 2,250 passengers per hour assuming 4-car sets operating at 10-minute frequencies[12].

These capacities could be increased if the length of passing loops and stations were extended further to allow for 6-car trains.

4.1.2 Bus priority measures

Under this scenario no additional bus priority measures are proposed, other than any required as part of the general improvements to bus services in the city.

4.1.3 Advantages and disadvantages

This section highlights some of the advantages and disadvantages of the *Enhanced Rail Scenario*.

4.1.3.1 Advantages

- Frequency of trains 10 to 13 minutes during peak periods. Frequency of all other bus services 4 to 15 minutes during peak periods
- Journey times remain the same for existing rail users
- Travel time reliability for the 43% of peak period commuters who travel on train services will not be affected by traffic incidents and congestion
- Vehicles more comfortable reliable and attractive (new or refurbished rail vehicles)
- Waiting environment more comfortable (upgraded railway stations)
- Potential for regular clock-face timetable (same time past the hour) for 10 minute frequency

4.1.3.2 Disadvantages

- Travel time reliability for the 57% of peak period commuters who travel on bus services will worsen as traffic grows
- CBD congestion and traffic incidents will impact all services which run on roads
- CBD will require some bus priority measures to cater for general growth in public transport use

[12] The planning capacity used for these calculations was 190 passengers per set

- Where additional bus priority measures are provided, the resultant decrease in road space for other users will increase general congestion
- Seamless service not possible through CBD to Courtenay Place
- Difficult and expensive to change route or extend coverage of rail service
- Closure of Box Hill Station and relocation of Raroa Station to Fraser Avenue (required for 10 minute frequency option only)

4.1.4 Costs and funding

For the 13-minute frequency option (ER1) the total cost of the scenario will be in the order of $125-135m[13] in today's equivalent dollars (net present value) with $70-90m of this spent in the next 10 years. These figures include an allocation of $3m for bus priority measures from the Lambton bus interchange through the CBD to Courtenay Place.

To fund this option Greater Wellington will need to contribute a total of $55–65m in today's equivalent dollars with $30–40m of this to be funded in the next ten years as part of the current LTCCP. Land Transport NZ will fund the balance in accordance with their existing funding policies.

For the 10-minute frequency option (ER1) the total cost of the scenario will be in the order of $140-160m in today's equivalent dollars (net present value) with $85-95m of this spent in the next ten years. These figures include an allocation of $3m for bus priority measures from the Lambton bus interchange through the CBD to Courtenay Place.

To fund this option Greater Wellington will need to contribute a total of $60–70m in today's equivalent dollars with $35–45m of this to be funded in the next ten years as part of the current LTCCP. Land Transport NZ will fund the balance in accordance with their existing funding policies.

4.1.5 Implementation and construction

It is proposed for the *Enhanced Rail Scenario* to be completed by 2008/09 for the 13-minute frequency option, or by 2011/12 for the 10-minute frequency option (the latter option is deferred to enable patronage growth before implementation). Infrastructure work can be carried out within 12 months and will require the line to be closed for short periods of up to a week at a time.

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[13] Since these costs were prepared additional work has been undertaken by Ontrack indicating costs could be significantly lower than quoted here. It is not clear, however, whether these results are directly comparable to the figures quoted here. This issue will be considered in more detail during the next stage of this study.

4.1.5.1 Timeframe for implementation

A possible timeframe for the implementation of the *Enhanced Rail Scenario* is outlined in Table 3.

- **Table 3: Tasks and timeframes for implementation of *Enhanced Rail Scenario***

Task		Timing
Option ER1: Base timetable	**Option ER2: Improved timetable**	
Infrastructure improvements for new units (tunnel lowering, stations etc.)	Infrastructure improvements for new units (tunnel lowering, stations etc.)	07/08
New EMU units (14 units)	New EMU units (18 units)	08/09
Purchase of new buses (4 units) and service improvements to provide for general improvements to bus services	Purchase of new buses (4 units) and service improvements to provide for general improvements to bus services	08/09
	Infrastructure improvements for new timetable (passing loops etc.)	10/11
New EMU units (4 units)	New EMU units (4 units)	11/12
Replacement buses (4 units)	Replacement buses (4 units)	23/24
Half life refurbishment of EMUs (14 units)	Half life refurbishment of EMUs (18 units)	23/24
Half life refurbishment of EMUs (4 units)	Half life refurbishment of EMUs (4 units)	26/27

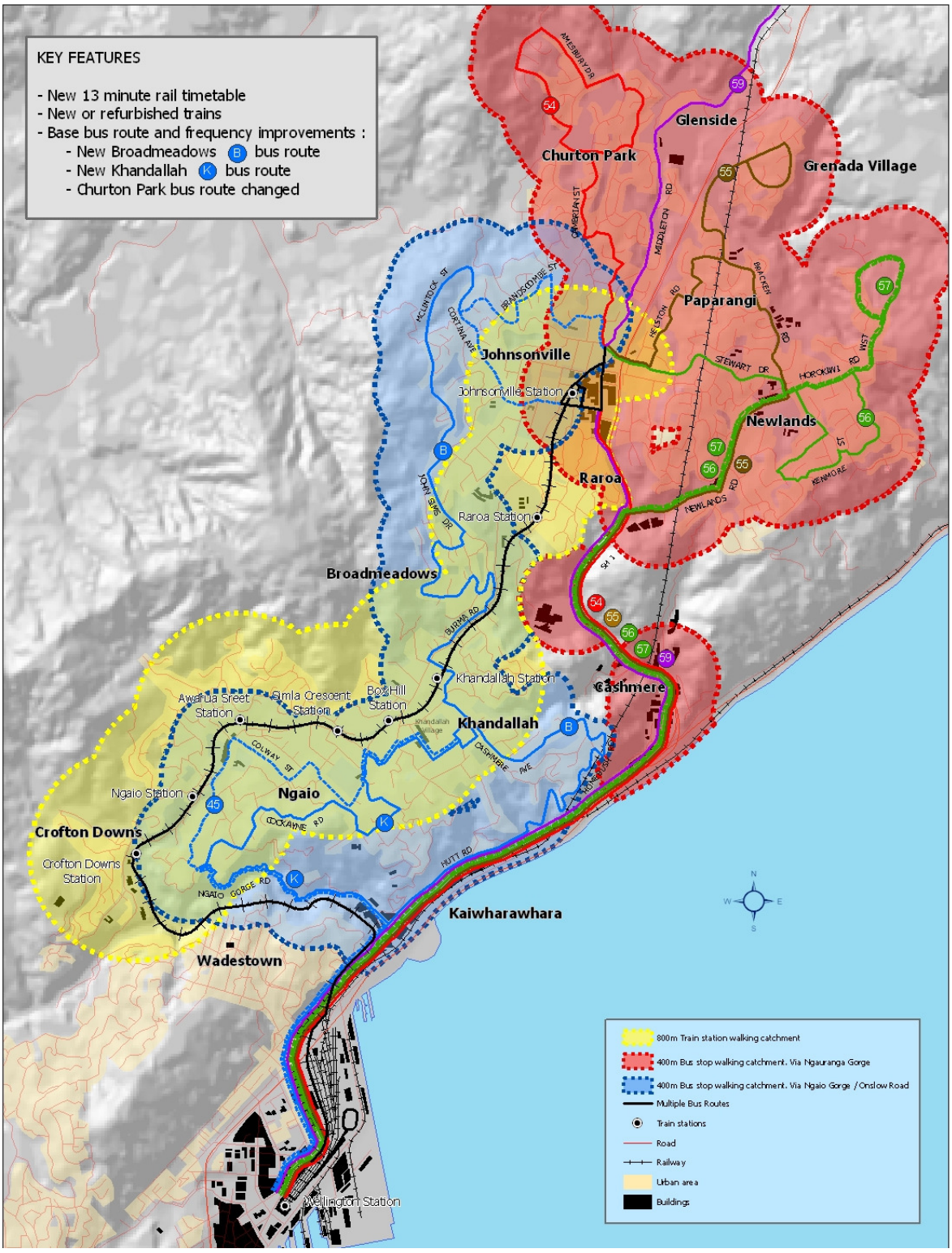
4.1.5.2 Construction period

The proposed infrastructure improvements could be completed within3 months for the 13 minute option or 12 months for the 10 minute option.

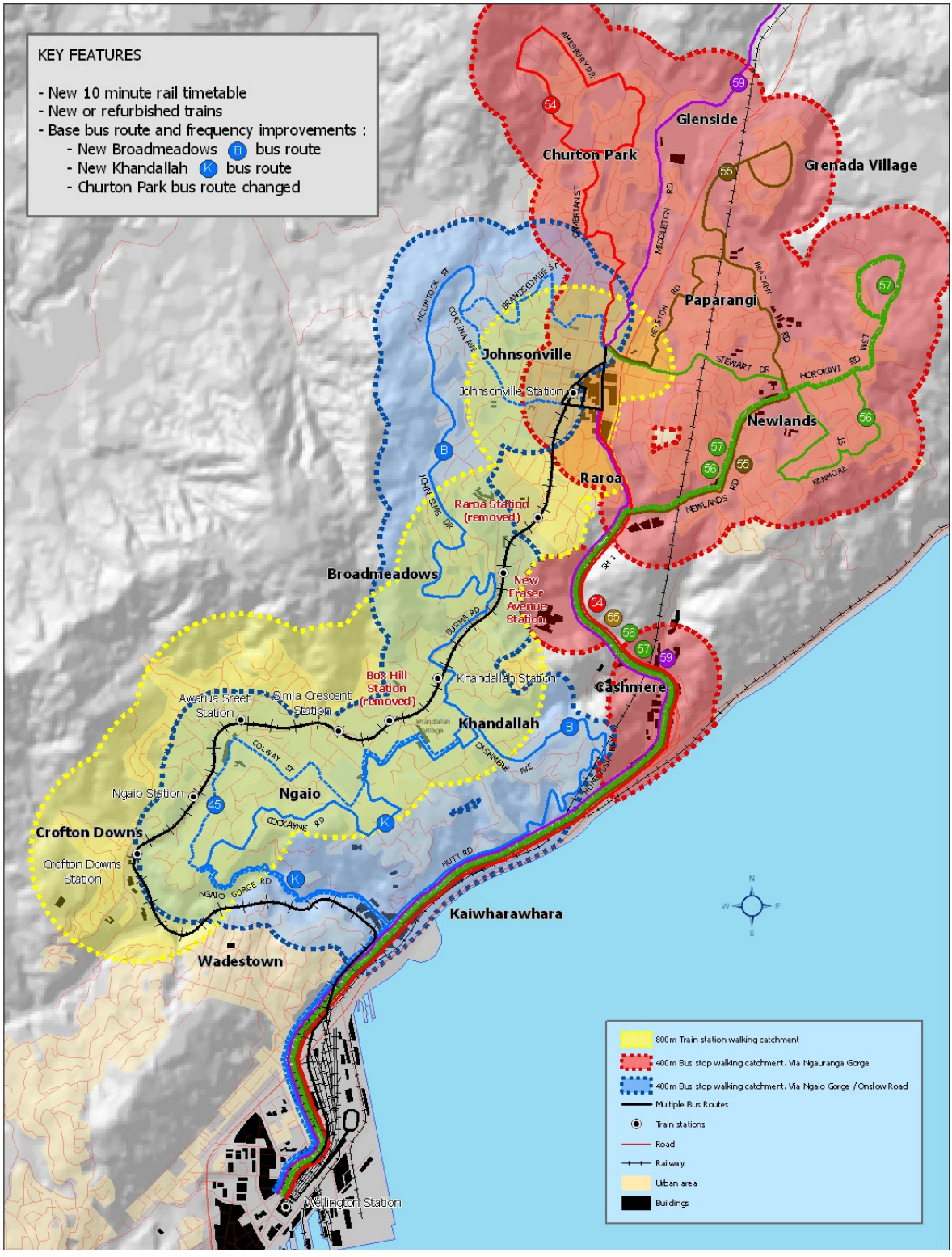
4.1.6 Other *Enhanced Rail Scenario* options considered

In developing this *Enhanced Rail Scenario* a number of other options were considered including the possibility of using refurbished Ganz-Mavag units, which currently operate on other parts of the network on the Johnsonville railway line. Further technical information on this scenario and the other options considered is available in the Scenarios Technical Appendices document.

- **Figure 3: *Enhanced Rail* Base Timetable - Option ER1**



- **Figure 4: *Enhanced Rail* Improved Timetable - Option ER2**



4.2 Bus with Walking and Cycling Scenario

The *Bus with Walking and Cycling Scenario* will involve replacing the existing rail services with bus services and providing enhanced bus services for the rest of the northern suburbs.

The railway line could be converted to a walking and cycling track or "greenway", preserving the railway line as a transport corridor and helping to promote active modes of transport and additional recreational amenity.

4.2.1 Proposed service improvements

This section explores possible service improvements under the *Busway Scenario*.

4.2.1.1 Operation of bus services

New low floor buses will be purchased to replace the existing train services. These buses will operate on Routes X, Y and Z as shown in Figure 5. Nineteen new buses will be required to provide the services identified.

It is assumed that the following infrastructure improvements would be undertaken:

- New bus shelters on the replacement routes
- Installation of a real time passenger information system
- Removal of rail infrastructure and construction of a walking and cycling track in the rail corridor

It may be possible to use cleaner environmentally friendly alternatives to diesel buses such as hybrid diesel-electric and hydrogen fuel cell buses in the future. This will need to be considered in detail before proceeding with any bus-based option.

Further detail on the proposed operation of the *Bus with Walking and Cycling Scenario* is contained in the Scenarios Technical Appendices document.

4.2.1.2 Coverage of services

The proposed bus routes for this scenario are shown in Figure 5.

This scenario also includes the general improvements to bus services discussed in section 3.1 but with route Z replacing route 45 between the Khandallah and the CBD giving this route an off-peak service.

4.2.1.3 Frequency of services and travel time

The frequency of new bus services would be 10 minutes during peak periods, combining in some locations to provide 3 to 5 minute frequencies.

Travel times from Johnsonville to Wellington railway station under this scenario will average approximately 25 minutes compared to the existing train service which takes approximately 21 minutes. This additional length of journey time is due to the need for buses to contend with general traffic.

4.2.1.4 Capacity of services

The ultimate capacity for this scenario is a function of the road capacity, and cannot be calculated directly based on the capacity of buses.

The limited capacity of the CBD to cater for additional bus services from the northern suburbs is a major issue. One way of addressing this issue could be to run northbound services that currently terminate at the Lambton bus interchange through to Johnsonville or other destinations in the northern suburbs. For example buses that currently run from Houghton Bay or other areas through the CBD to Lambton bus interchange could be extended through to Johnsonville. This could reduce the number of buses running through the CBD but the travel time reliability of longer routes may be adversely affected as these routes would have fewer opportunities to make up lost time arising from delays along their routes.

4.2.2 Bus priority measures

A number of bus priority measures are required under this scenario to enable the efficient operation of the bus network. The following bus priority measures may be required:

- Bus lanes along Hutt Road and Thorndon Quay between Kaiwharawhara Road (Ngaio Gorge) and Lambton Interchange requiring reallocation of parking and removal of the existing angle parking
- Traffic signal priority measures and extension of the Kaiwharawhara Road bus lane to the Hutt Road intersection
- Construction of a bus interchange at Johnsonville to replace the existing train station
- Bus priority measures at intersection around Johnsonville centre

Bus priority measures are required through the CBD and are being investigated as part of the Ngauranga to Airport study. Priority measures are required to maintain journey times for all bus services through the CBD, including services from outside the Study area. A description of the CBD bus priority measures is contained in the Scenarios Technical Appendices document.

4.2.3 Advantages and disadvantages

This section highlights some of the advantages and disadvantages of the *Bus with Walking and Cycling Scenario*.

4.2.3.1 Advantages

- Frequency of buses replacing trains 3 to 5 minutes during peak periods. Frequency of all other bus services 4 to 15 minutes during peak periods
- Seamless service possible through CBD to Courtenay Place
- Vehicles more comfortable reliable and attractive (new buses)
- Waiting environment more comfortable (new bus shelters)
- Operation similar to existing bus services
- Easy to change routes and extend coverage
- Increased recreational opportunities with walking and cycling track along Johnsonville railway line

4.2.3.2 Disadvantages

- Journey times increase for existing rail users who will travel on bus
- Travel time reliability for all bus services affected by traffic incidents and congestion, which will worsen as traffic grows (all peak hour commuters)
- CBD congestion and traffic incidents will impact all services which run on roads
- CBD will require bus priority measures for additional buses. Road capacity and parking spaces in CBD may be reduced
- Where additional bus priority measures are provided, the resultant decrease in road space for other users will increase general congestion

4.2.4 Costs and funding

The total cost of the *Bus with Walking and Cycling Scenario* will be in the order of $95–105m in today's equivalent dollars (net present value) with $50–60m of this spent in the next 10 years. These figures include the construction of a walking and cycling track and an allocation of $3m for bus priority measures from the Lambton bus interchange through the CBD to Courtenay Place.

In calculating the costs of this scenario it was assumed that buses would be purchased by private operators and paid for by a combination of fares and subsidies, as happens with existing bus services.

To fund this scenario Greater Wellington will need to contribute a total of $45–55m in today's equivalent dollars with $25–35m of this to be funded in over the next 10 years as part of the current

LTCCP. Land Transport NZ will fund the balance in accordance with their existing funding policies.

4.2.5 Implementation and construction

It is proposed for new bus routes to be implemented by 2008/09.

Approval will be required from central government to use the Johnsonville railway line for non-rail purposes, including the proposed walking and cycling track.

4.2.5.1 Timeframe for implementation

A possible timeframe for the implementation of the *Bus with Walking and Cycling Scenario* is outlined in Table 4 below.

- **Table 4: Tasks and timeframes for implementation of *Bus with Walking and Cycling Scenario***

Task	Timing
CBD bus route improvements	07/08
Hutt Road bus priority measures	07/08
Johnsonville Hub improvements	07/08
New bus shelters on replacement bus routes	07/08
Remove rail infrastructure and replace with walking / cycling track	08/09
Purchase of new buses (4 units) and service improvements to provide for general improvements to bus services	08/09
New 12.6m rigid buses (17 units)	08/09
Bus replacements (21 units)	23/24

4.2.5.2 Construction period

No construction period is required prior to implementing this scenario. However the construction of a walking and cycling track to replace to railway line will take approximately 12 months. Construction of bus shelters and improvements to the Johnsonville hub can be done progressively.

4.2.5.3 Other *Bus with Walking and Cycling Scenario* options considered

There were no other *Bus with Walking and Cycling Scenario* options considered. Further technical information on this scenario is available in the Scenarios Technical Appendices document.

- **Figure 5: Bus Routes for Bus with Walking and Cycling Operation**